

AN INVESTIGATION OF THE CURRENT VALIDITY OF CAREER  
PLANNING IN HIERARCHICALLY STRUCTURED ORGANIZATIONS  
SUCH AS THE SOUTH AFRICAN AIR FORCE

by

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AN INVESTIGATION OF THE CURRENT VALIDITY OF CAREER PLANNING  
IN HIERARCHICALLY STRUCTURED ORGANISATIONS SUCH AS THE  
SOUTH AFRICAN AIR FORCE

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H. J. P. BURGER

A B S T R A C T

In 1975 it became increasingly clear that the build-up of international political pressures on South Africa could lead to military confrontation with the Republic. Predictably such a possibility accelerated Defence expansion. This necessitated the more effective use of human, material and financial resources of, not only the military but also of the civilian sector of the country.

Better performance of personnel could be obtained if they were able to recognise and appreciate the requirements for advancement to their goals in their chosen careers. Viable careers are formulated in career plans - those top management directives containing details of career development programmes, job activities and opportunities, guidance, behaviour patterns and the requirements for advancement in the organisation. No formally structured career plans were found in a number of large hierarchically

structured civilian organisations such as Shell, Mobil or the University of Cape Town, to name but a few. Moreover, according to W F Glueck (1974) a similar situation existed in the United States of America. Furthermore this was also true of the South African Air Force's pilots and navigators - that vital personnel section of the Air Force's air crews.

This enigma is difficult to comprehend. The implementation of the personal practices of manpower planning, attraction, selection, rewards, protection, career development, manpower control and evaluation increases the effectiveness of an organisation. Likewise a formally structured Career Plan would ensure greater development of an organisation's personnel and give them satisfaction and dignity. Moreover, the use of such career plans reduces turnover (and thus costs) and the hoarding of high calibre personnel. The integrity of the last two statements led to the formulation of this dissertation's hypothesis:-

If the desirability of a formally structured Career Plan, containing a career development programme, a counselling guide on the application of the programme, an appraisal system to measure performance and a model for predicting promotion vacancies, were recognised by an organisation, its adoption should be seriously considered.

Thus the aim of this exploratory and descriptive study is to demonstrate the advisability and subsequent advantages to an organisation if a career plan, as proposed in the hypothesis, were adopted for use by their personnel. The applicability to the

Air Force's aircrew is shown throughout this study.

A successful career is generally seen as one where the new entrant rises steadily from one management level to the next until he reaches retirement. The time span covered is longterm:- career planning is inextricably linked to the existence of and to the long range planning activities of an organisation: in brief a career plan is a long range plan for personnel. A survey of the literature on planning was made in order to determine and show how the long range planning factors determine and relate to those of career planning. In this investigation, however, career planning emerged as an integral part of manpower planning. The latter being distinguished as the human resources area of long range planning. As such it required a separate analysis.

The need for and the implications of manpower planning entailed an investigation of the personnel functions of recruitment, redundancies, training, selection, promotion, managerial development and career development. This led to a further analysis of the demand and supply of personnel with special reference to Air Force cases. In order to find a practical method of forecasting for replacement of personnel, an evaluation of mathematical, actuarial and computer simulation manpower-planning-models was made and a suitable model selected - an actuarial one.

The reconciling of the demand and supply forecasts led to the drawing up of the manpower plan, which included the concept of a career plan.

A conceptual career plan was now argued, guided by studies made by the U. S. Air Force, U. S. Army, my own experiences in the Air Force and from relevant literary sources. The qualitative choices and quantitative magnitudes of the elements of such a plan were evaluated and formulated. The plan that emerged portrayed the basic framework of concepts and requirements needed for drawing up a viable career plan with specific relevance to aircrew in the Air Force. The acceptability of these concepts and requirements were tested by running a pilot survey at the largest Air Force base in the Cape: Air Force Base Ysterplaat.

The survey was done by means of a questionnaire which was handed to the six officers-in-command, who after the briefing, gave them to their 63 pilots and 37 navigators to complete. The questions were both open-ended and multi-choice. They covered the wide and detailed spectrum of the elements found in an Air Force officers career; rank and position; promotion; regular assessment; gaining wide experiences; achieving higher educational as well as technical qualification; age of retirement and length of service in considering retirement and promotion. The results were statistically analysed and graphically illustrated. They indicated that the elements of career planning were acceptable to a significant section of the hierarchically structured Air Force - the aircrew at AFB Ysterplaat. Moreover, it was found possible to rate the importance of these elements to each other so that a system of grading could be introduced at a later stage. The Air Force is however, not the only hierarchical structured organisation who could benefit from adopting structured career

plans. So a test study was made to investigate the applicability of these elements in an organisation other than the Air Force. The Administrative sector of the University of Cape Town was chosen. The outcome of this evaluation corroborated the principles accepted by the aircrew of AFB Ysterplaat.

Finally a validation study was run on a randomly selected number of aircrew at AFB Ysterplaat. The hypothesis was confirmed. Moreover, the Chief of the Air Force agreed with the validity of the hypothesis. However, a different view of a successful career emerged as one "wherein you attain your personal aims and goals in a manner which brings you happiness and satisfaction in your work." This indicated the wish of aircrew to participate in career planning and will no doubt receive serious consideration.

Many career anomalies and inconsistencies were identified and listed for Air Force consideration. The argument of the dissertation clearly illustrated the need for the Air Force to bring out formally structured career plans for its aircrew.

#### A CONTRIBUTION TO KNOWLEDGE

My research, in the form of letters to numerous Defence Forces, Institutions and Universities, both at home and abroad, indicates that this type of study has not already been carried out anywhere. Thus my dissertation's contribution to the knowledge of career planning is that it illustrates the advisability and advantages of adopting and using formally structured career plans for the personnel of hierarchically structured organisations such as the aircrew of the South African Air Force.

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## PART 1 : REVIEW OF THE SITUATION

### 1. INTRODUCTION

In 1975 it became increasingly clear that the build-up of international pressure on South Africa was going to accelerate military expansion. Such an expansion would involve greater employment of human, material and financial resources in both the military and civilian sectors of the country. It was evident too that only the best usage would be acceptable and it is common knowledge that maximum performance from personnel can best be obtained when they are so motivated that they are able to perceive their paths of advancement in the organisation - usually mapped out in detail in a career plan. Work on the mobilization of manpower in the South African Air Force revealed that there were no formally structured career plans in existence for either officers, warrant officers or other ranks; in fact there were none in the whole of the South African Defence Force. Subsequent investigations further afield showed that a similar situation also prevailed in a great number of civilian organisations: Shell, Mobil, the University of Cape Town, to name but a few. The result of such a state of affairs is that not only are personnel generally unsure of their career progress, but also organisations are not using their staffs to their fullest and thus not achieving greater effectiveness.

#### 1.1. Advancement

What man in his secret heart does not dream and yearn for that elevated position at the top? Yet to occupy this position requires more than dreams and wishes. How do we account for the aspirant, possessing the required qualifications for the next

grade (or rank), the necessary experience and the desired personal characteristics, not getting this sought-after and earned position? Patently, more is required than qualification, experience and personality: one such need is, undoubtedly, the existence of a viable career plan in the organisation.

Whilst other reasons for non-advancement or too slow advancement in a chosen career can be many, varied and no doubt sound, a deeper study reveals that a major common, but important requirement to all careers, is the need to spell out and clearly define the extent and content of a career. Moreover, in the organisation, there should be opportunities for advancement of all persons and not only for a chosen, lucky or favourite few.

## 1.2. Career

Many, but not nearly enough, organisations have career development schemes. Some of these schemes are merely theoretical; others, however, are rewarding and practical. It appears, furthermore, that only a few organisations implement such career development plans. In order to comprehend what is meant by the concept career development, the term "career" must first be explained.

Among the many definitions available in contemporary literature, two are given here as being comprehensive as well as being accepted universally. Webster's dictionary lists a career as "a course of action; progress; conduct in life; or progress through life." GUSFIELD (1) on the other hand states that a career is "a long term commitment to an occupation and/or a workplace in which an

individual places his economic chances in a particular occupation or organisation." GLUECK (2) defines career "to be the way the individual patterns his job related chores, such as selection, training, promotion, and transfer, to achieve his long-run work goals." All careers are not, however, successful. We need to know what then constitutes the accepted idea of a successful one, for this is the only way to the top of the tree! The following definition sums up the situation:-

"A successful career is generally seen as one where the new entrant rises steadily from one management level to the next, until he reaches retirement. From being a specialist in a particular field, he becomes an operational manager, developing into a generalist until he reaches his peak as a general manager. He then fades away into retirement."

Clearly the timespan covered by a career is long term and, equally evident, it involves the fate and lifestyle of people. Well known persons, like Mr Harry Oppenheimer, Mr Jan Luyt, Mr Anton Rupert, to name only a few, could be considered as having had successful careers. Such people appear to generate efficiency, attain high productivity, are dynamic and give the impression that they are satisfied with life! They, therefore, must tend to raise the effectiveness of their organisations: that is to say they increase their organisations' ability to achieve their aims by the best means available under the circumstances. The determination and formulation of an organisation's aims, are of utmost importance in long range planning. Thus, in the long term, the formulation and use of viable career plans

should be equally important. According to GLUECK (3), however, this practice is not general in the U.S., for "In spite of persuasive arguments that organisations should help plan careers for their employees, most experts find that few organisations do so." Sadly this is also true of South African organisations which includes the South African Air Force.

A formally structured career plan means that the organisation commits itself in the main:- to develop its people to their fullest; to provide satisfaction and dignity for its employees; to reduce employee turnover (and thus costs); and to reduce the hoarding of high-calibre personnel - GLUECK (4).

If this statement is true then the implications should be specifically evident to the S A Air Force, which also does not develop and use formal career plans for its personnel.

### 1.3. The Aim of the Dissertation

The aim of this study is to demonstrate the advisability and subsequent advantages to an organisation if a formally structured career plan were adopted for use by its personnel.

#### 1.3.1 A Specific Result

One of the results of such an analysis would be a model for use by the Air Force. This model needs to be simple (i.e. easy to understand and use); reliable; valid and flexible and capable of being adapted to computer simulation so that up-to-date information about career trends and developments can quickly be obtained and acted on.

#### 1.4 The Concept of Research

Career planning is a vital part of manpower utilization. The effective use of the latter is an essential ingredient for guaranteeing the continued survival of the organisation. Both aspects are key considerations in the formulation of long range plans. Clearly the timespan covered in a career is long term. Career planning is, thus, inextricably linked to the existence of the long range activities of an organisation. It is, in effect, the long range plan for the organisation's personnel. The basic premise upon which this thesis is grounded, is the acceptance of the fact that career planning is a dependent variable of long range planning. Long range planning factors determine the numbers and types of the elements of a career plan which ought to be considered when personnel pursue chosen careers in selected organisations.

The purpose of this exploratory study is threefold. Firstly it is to establish the advantages of using formally structured career plans by hierarchically structured organisations. Secondly it is to demonstrate the advisability of adopting such career plans by comparing existing practices with the proposed ones. Lastly it is to investigate and recommend a design of a career planning model which could be used by an organisation such as the South African Air Force for its pilots.

#### 1.5 The Formulation of Hypothesis

Thus the next logical step in our dissertation is the formulation of our hypothesis. CRISP (5) defines a hypothesis

as a "tentative theory or supposition set up and adopted provisionally as a basis explaining certain facts or relationships; in the further investigation of other facts or relationships. It is, therefore, an assertion that something may be true, stated in terms that make it amenable to testing." The Shorter Oxford English dictionary interprets hypothesis to be "a proposition or principle put forth or stated merely as a basis for reasoning or argument, or as a premiss from which to draw a conclusion". In essence both views imply the same thing: a proposal followed by the deduction of a possible solution. Guided by these definitions and bearing in mind the aim of this dissertation and the purposes of the research, we formulate our hypothesis:-

"If the desirability of a formally structured Career Plan, containing a career development programme, a counselling guide on the application of the programme, an appraisal system to measure performance and a model for predicting promotion vacancies, were recognised by an organisation, it's adoption should be seriously considered."

The complexity and vastness of the four proposed aspects of career planning envisaged in our hypothesis, is evident. Due, however, to the lack of space in our thesis to argue each aspect conclusively, we decided that the treatment regarding Counselling and Appraisals would not be dealt with in the same depth as the closer related aspects of a career development programme and a model for predicting promotion vacancies.

It is accepted that the implementation of the personal practices

of manpower planning, attraction, selection, rewards, protection, career development, manpower control and evaluation increases the effectiveness of an organisation. Likewise a formally structured career plan, as proposed in our hypothesis, would ensure fuller development of an organisation's personnel and give them satisfaction and dignity. Moreover as stated before, the USE of such career plans reduces turnover (and thus costs) and the hoarding of high calibre personnel. The integrity of these last two statements depends on the acceptance or rejection of our hypothesis.

#### 1.6 A Contribution to the Knowledge of Career Planning

Career planning, as set out above, has a deceptively familiar ring. Only some and not all aspects of career planning are usually accepted and used by organisations. Formally structured career plans commit organisations to courses of action that many feel are too inhibiting or unnecessary. Hence W.F. Glueck (1974) 's observation in his book: "Personnel - A Diagnostic Approach": ".....most experts find that few organisations (help plan careers for their employees) do so." The mix proposed in my hypothesis suggests a practical combination of four major sociological aspects of career planning that would ensure increased organisational effectiveness. However, to waylay a suspicion that the hypothesis is old knowledge, numerous letters were written by me to Institutions, Universities and Defence authorities both at home and abroad asking them if such a study had, to their knowledge, been done before. See Appendix A : Determining the

Uniqueness of the Thesis. The majority of replies (65%) indicated that a similar study had not been done. This was not only most encouraging but also confirmed that my thesis could make a significant contribution to the knowledge of career planning. Organisations could profitably apply the proposed mix of a career development programme, a counselling service, appraisal and promotion-vacancy-prediction. The Air Force could use it in working out viable Career Plans for it's Pilots.

Having cleared the ground of doubtful ideas the investigation can now proceed by determining what methods of research should be employed.

## 1.7. Methodology of Research

### 1.7.1 The Strategy

Our first task in formulating our research plan is to select a strategy. According to MURDICK (6) "Strategy must bridge the gap between the known and the unknown, between the data and the solution. The formulation of the problem provides the setting and the constraints upon the strategy." This is a reasonable and acceptable explanation of a method of how to do our research.

The problem we face in this study is the enigma of why so many hierarchically structured organisations fail to use career planning for their staffs. We know that most of them carry out long range planning, which includes the manpower plan. The latter, in turn, should normally contain the career plan. This formulation of our problem meets MURDICK's requirements of a strategy. Our selected strategy should thus answer the question

of how do we demonstrate the advisability and subsequent advantages of adopting a formally structured career plan. Thus we conclude that our strategy should be:-

"Evaluate the effects on hierarchically structured organisations, of adopting formally structured career plans for their personnel."

### 1.7.2 Techniques and Tools

The next step for carrying out our strategy is the selection of techniques and tools. Of the many techniques in use we select four which would clearly illustrate the research operations we wish to perform. They are : an investigation of the literature on career planning; a study of S A Air Force congruency with conceptual career planning; the application of the proposed career plans to organisations; and lastly a comparison of current and proposed career planning practices in the Air Force.

The tools required for carrying out our strategy are the same as those required for manipulating personnel flows: i.e. they can be either mathematical or by computer simulation.

### 1.7.3 Implementation

There are three constraints applicable to the implementation of our strategy : the career plan is confined to the four aspects laid down in our hypothesis; only the career planning aspects of long range planning are considered.

In order to implement our strategy we start with a survey of the contemporary literature on long range planning leading to the drawing up of a conceptual career plan. Secondly our study of S A Air Force congruency with conceptual career planning is done by means of a questionnaire. This questionnaire is answered by aircrew at Air Force Base Ysterplaat and the results statistically analysed. The third way of implementation is the evaluation and drawing up of career plans (subject to our constraints) for the administrative section of the University of Cape Town and for pilots in the S A Air Force. Lastly the current and proposed practices of career planning in the Air Force are compared and evaluated.

In implementing personnel flows by computer simulation we bear in mind that models can only be validated for those variations actually being tested. Thus the validation of a model as a whole would require exhaustive testing of all alternatives open to us. While all models encounter problems of parameter estimation, simulation is unique in introducing an explicit statistical variation into the model. DILL, GAVER AND WEBER, (7).

The layout and development of the dissertation trace these broadly stated phases of research. A survey of the studied literature on long-range planning follows.

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## PART 2 : LONGRANGE PLANNING

### 2. SURVEY OF LITERATURE ON PLANNING

#### 2.1 Definitions of Planning

The Spanish Jesuit, Baltasar Gracian, observed three and a half centuries ago:

"Think in anticipation, today for tomorrow, and indeed for many days. The greatest providence is to have forethought for what comes. What is provided for does not happen by chance, nor is the man who is prepared ever beset by emergencies. One must not, therefore, postpone consideration till the need arises. Consideration should go beforehand. You can, after careful reflection, act to prevent the most calamitous events. The pillow is the silent Sibyl, for to sleep over questions before they reach a climax is far better than lying awake over them afterwards. Some act and think later - and they think more of excuses than consequences. Others think neither before nor after. The whole of life should be spent thinking about how to find the right course of action to follow. Thought and forethought give counsel both on living and achieving success."

As STEINER (1) observed, Baltasar Gracian captured the spirit of modern planning in words which fittingly set the tone of his book: Top Management Planning. This Spaniard also illustrated that planning was even then an essential human

activity. The situation has since become more complex and planning has become an even more essential and critical function in human society of the twentieth century.

There are obviously many definitions of planning to be found in present-day literature. Some are given here in order that the view points of the various authors can be understood and planning appreciated in its many forms. So, for instance, it is stated by KOONTZ & O'DONNELL (2) that "the most basic of management functions is planning, the selection from among alternatives of future courses of action for the enterprise as a whole and each department within it. Planning is deciding in advance what to do, how to do it, when to do it and who is to do it. Planning bridges the gap from where we are to where we want to go. Planning is a conscious determination of courses of action, the basing of decisions on purpose, facts and considered estimates." The essential nature of planning can be understood through four basic principles: "(1) contribution to objectives, (2) primacy of planning, (3) pervasiveness of planning, and (4) efficiency of planning." Truly a most comprehensive definition given by KABAT (3).

To SCOTT (4) "planning is an analytical process which encompasses assessment of the future, the development of alternative courses of action to achieve such objectives, and the selection of a course (or courses) of action from among these alternatives."

Again to STARR (5) "the term 'planning' is generally used ambiguously by managers but a rational definition of planning can be obtained by contrasting plans and policies. A key-factor

is the degree to which decision environments are repetitive; stable, recurrent environments lend themselves to policy formulation whereas transient environments (i.e. those unlikely to occur) require planning." To ACKOFF (6) "planning is clearly a decision making process, but equally clearly not all decision making is planning. Not so clear, however, are the characteristics that make it a special kind of decision making. It is special in three ways: (1) Planning is .... anticipatory decision making; (2) Planning is a system of decisions; (3) Planning is a process toward inducing one or more future states which are desired and which are not expected to occur unless something is done." WARREN (7) on the other hand, claims that "corporate planning is not a process of making tomorrow's decisions today, but rather a process directed towards making today's decisions with tomorrow in mind, and so that future decisions may be made rapidly, economically and with as little disruption to the business as possible". It is also interesting to find that STARR (8) is very critical of how little executives understand planning. According to him "planning is understood by executives only in the most general terms, and discussion about planning produces, at best, a vague communion." Later an argument will be introduced on the importance of participation by top management so that long range plans can be successfully implemented. If STARR is correct then the planner has indeed an extra task to perform: that of converting the top hierarchy before trying to 'sell' his plans to the operational staff.

HAYNES & MASSIE (9) point out that "planning has long been recognised as one of the basic functions of management .....

planning is concerned with at least two major elements: (1) the future and (2) the relation between ends and means, between goals and ways of achieving those goals. "This view is supported by NEWMAN, SUMMER & WARREN (10) who state that "planning is a basic management task, one that has a major place in our overall division of management functions along with organisation, leading and controlling..... Planning is much broader than compiling and analysing information or than dressing up ideas of what might be done. It is more than logic, imagination or judgment. It is a combination of all these and culminates in a decision - a decision about what should be done."

It must be clear by now that it is well nigh impossible to define planning in a way that would be acceptable to all. KABAT (11) neatly sums up the situation by saying that: "viewed in another way, comprehensive business planning is composed of structural blocks of plans. The three principal ones are: (1) strategic plans, (2) medium range programmes; and (3) short range detailed plans and budgets. All these plans are obviously interrelated." Perhaps it is not a remarkable coincidence that most of the definitions are extensions of Henri FAYOL's (12) definition where he says that planning is "to assess the future and make provision for it....." and this was voiced more than 50 years ago!

Before summarising the discussion it should be noted that most of the definitions quoted contain common elements of importance. So for instance we recognise that planning not only develops specific objectives but it also outlines the means to

be used to obtain them. Furthermore coordination is involved, a specific schedule is implied and last, and, perhaps most important, planning is a discipline or process of its own! In conclusion, then, we can state that most definitions suggest that planning is a decision-making process (some say not wholly) requiring an intellectual approach, imagination and foresight. All effective planning requires a thorough understanding of the concepts involved.

## 2.2 The Fundamentals of Planning

Logically the first basic fundamental of planning should be the setting of objectives or targets. The reason for this is that the assets of an organisation, that is the skills of its executives and employees, the physical, financial and marketing resources, can only be utilized to best advantage once the organisation knows what it is trying to attain in the future. The setting of targets should enable these skills to be expanded and fruitfully employed.

A second step is that the resources of the organisation should be matched to the market, thereby making the best use of them.

The third step is planning for flexibility! This could be done by concentrating the organisation's planning efforts on areas which have a record of accepting new ideas and encouraging the development of new businesses.

The fourth basic step of long-range planning should be the selecting of a business which would be able to maintain a unique

position in its environment. Such a business could be a leader in research and development, or patent protection etc. STEINER (13).

Two further fundamentals of long-range planning deserve to be noted: the level of decision making and the step-by-step approach. Judging from the nature of the fundamentals mentioned above, it is obvious that corporate long-range planning can only be conducted at the policy maker's level. The setting of objectives or the facing of basic decisions on where an organisation's skills and resources are best used, cannot be taken by staff below this level.

With regard to the second factor, the step-by-step approach to planning, this method has now become the accepted practice mainly because of the failure of other methods ARGENTI (14). This approach, also known as the 5-step method of developing a long-range plan GRAY (15), weighs all the important aspects in turn and so allows the planner to arrive at a balanced appraisal of where the best opportunity lies for the organisation.

Before embarking on the task of drawing up a plan, we intend to look at some known conceptual models of long-range planning. This should give us a deeper insight into the application of the above concepts to the process of comprehensive corporate planning.

### 2.3 A Conceptual Model of Long-range Planning

It has been found, in contemporary literature, that most conceptual models of long-range planning, i.e. comprehensive corporate planning, include four major planning factors: (1)

Business forecasts; (2) Strategic Plans, which are essentially sets of objectives, strategies and policies covering a time-span of five to fifteen years (and more in some special cases); (3) A set of detailed functional plans covering the intermediate range of two to three years; and (4) The short-term one year plans and budgets. Three conceptual models, which have significantly influenced contemporary planning are: (1) STEINER'S (16): Structure and Process of Business Planning; (2) ANTHONY'S (17): Planning and Control Processes in Organisation; (3) STANFORD RESEARCH INSTITUTE'S MODEL: The System of Plans (18).

STEINER'S Model was constructed after he had analysed a great number of planning systems. He highlights the three keystone premises underlying any organisation's planning effort: the fundamental organisational and socio-economic purpose; the sense of values as used by top managers; and the evaluation of the environment. Each of these makes a unique and significant contribution to planning: The socio-economic purposes refer to a society's expectations from its business institutions if these are to survive, the contributions of the other two premises are self-evident.

He (STEINER) proceeds to illustrate the relative positions and interdependence of the three types of planning: strategic, medium range and short range. Based on the strengths and weaknesses of an organisation, long-range planning will only be effective if future opportunities are exploited and obstacles that may prevent the attainment of the organisation's objectives are removed. Strategic long-range planning is thus, according to

STEINER (19), "the process of determining the major objectives of an organisation and of formulating the strategies and policies that will govern the acquisition, use and disposition of resources to achieve those objectives". It must be remembered that strategic objectives can, however, be both long and short term i.e. a course of action taken now to rectify a situation, that will have long term effects. Finally an office (or place) is needed in the organisation from which the physical implementation and review of planning efforts are made.

ANTHONY'S model distinguishes two controlling aspects within strategic planning: management and operational control. Whilst his strategic planning is similar to STEINER'S definition, management control is explained by him as "the process by which managers assure that resources are obtained and used effectively and efficiently in the accomplishment of the organisation's objectives". Furthermore operational control is to ANTHONY "the process of assuring that specific tasks are carried out effectively and efficiently". The commendable quality of this model is its significant stress on the way the flow of information is handled.

The STANFORD RESEARCH INSTITUTE'S (SRI) model, See Figure 1, is of special importance to this paper for here is shown the connecting link between strategic planning and manpower planning: namely the corporate development plan. Furthermore, FERGUSON (20) confirms this by pointing out that corporate planning: (1) evaluates the effects of modified company operating strategy and tactics on manpower; (2) evaluates modified recruiting, training and placement programs; and (3) determines the adequacy

of current manpower resources in relation to future needs.

To return to SRI's model: the System of Plans. Fundamentally this model is similar to STEINER'S and ANTHONY'S. The strategic plan, in this case, leads to a corporate development plan and an operational plan. The significance of the corporate plan in relation to manpower planning has already been touched upon and will be developed to a greater extent later on in the dissertation. Further detailed plans flow out from the corporate development and operational plans and these are illustrated in figure 1.

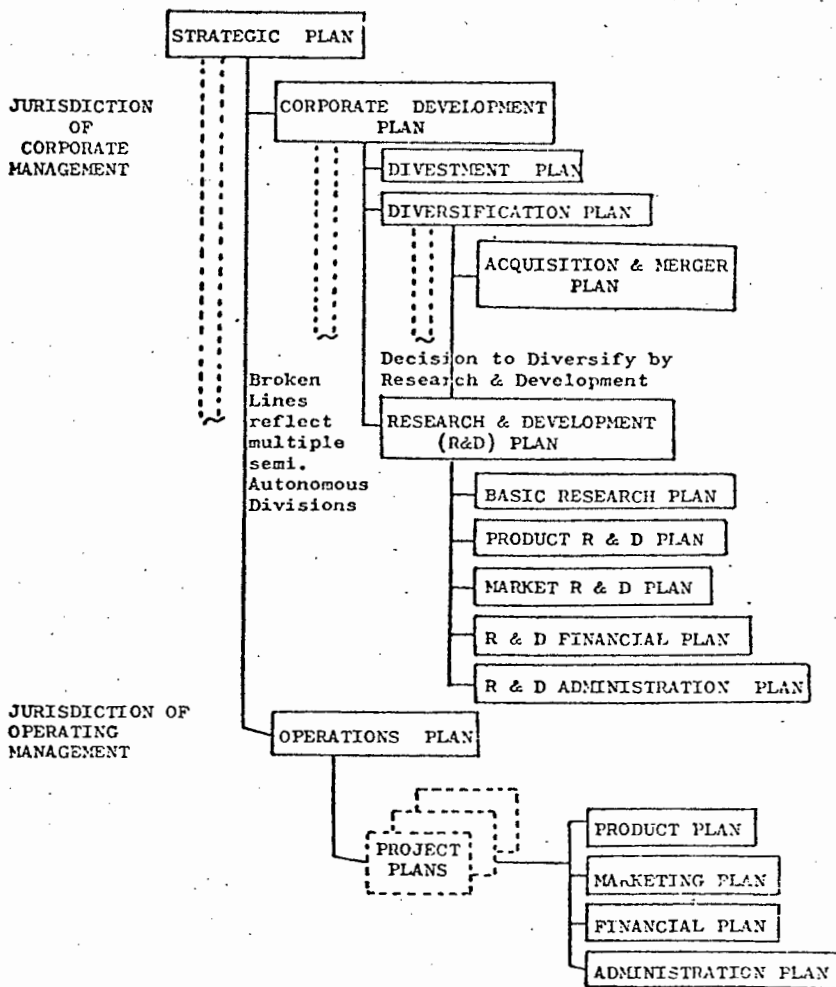


Figure 1 The System of Plans

Source: Robert F. Stewart and Marian O. Poscher,  
The Corporate Development Plan, Report No. 183  
 (Menlo Park, Calif: Industrial Economics Division,  
 Stanford Research Institute, September 1963), p. 21.

An examination of these three conceptual models highlights the fact that even in planning the basic problem-solving pattern is being followed - a must in decision making. One must:-

- (1) Determine and define the problem;
- (2) Gather all available and relevant facts affecting the solution of the problem;
- (3) Evaluate these facts and decide which course(s) of action should be taken to solve the problem;
- (4) Choose an optimal alternative. STEINER (1968).

All planning finally results in a plan being drawn up.

#### 2.4. The Plan

A plan can be defined as an ordered sequence of events or actions which have to be undertaken in order to achieve some specific aim. Thus a plan is a course of action, designed to answer the five classical questions: What? when? who? where? and how? And finally a plan also provides projected answers, "within the context of an anticipated environment in order to accomplish a specific set of objectives." - KABAT (21).

As previously mentioned, the most effective way of drawing up a plan is to use the step-by-step approach. Three views of this process are given: STEINER(1968); KABAT(1974); and ARGENTI(1968).

STEINER (22) starts his 5-step process off with a call that one should start planning to plan! This is followed by his comprehensive second step which includes the specification of the firms' objectives, forecasting of future prospects and measuring the gaps between the enterprise's aspirations and projections. Thirdly he proposes that strategies, to fill the major gaps,

should be developed. As a fourth step he recommends that detailed plans in the major functional areas of research and development, production, marketing and promotion should be developed to fit these strategies. Fifthly and lastly he advocates the integration of the long-range and short-range plans as well as the introduction of the necessary controls.

KABAT (23), on the other hand, proposes the following five major phases in drawing up a plan:

- (1) Interpretation of the external environment in which the firm will be operating during the planning period;
- (2) Establishing objectives and goals for the firm;
- (3) Analysing the capabilities and availability of resources which the firm has at its disposal;
- (4) Developing the specific programmes to be undertaken;
- (5) Evaluating the projected performance of the enterprise.

ARGENTI'S (24) introductory step, in his corporate planning process, proposes that a company's objectives should first be determined and decided on. Secondly, a forecast should be prepared and the probable error declared. For his third step he requires that the planning gap should be calculated and the company's task decided. Fourthly, a decision should be made about the required constraints and means available. Finally a Plan should then be drawn up!

The similarities and differences between these three authors

are evident. Their methods are, however, but 3 ways of many in existence for developing long-range plans - others may be found but the basic principles as formulated, remain constant. The planner needs only to apply them to be reasonably sure of compiling an outline of a viable long-range plan. Should a planner require a more detailed description of the characteristics of the plan itself and the considerations involved in its formulation, then by following the undermentioned check-list, given by KABAT (25), he would be sure of satisfying this need: (1) Scope, (2) Complexity, (3) Depth, (4) Organisational level and preparation, (5) Organisational level at which the plan is to be applied, (6) Environment in which the plan is made, (7) Environment in which the plan will operate, (8) Resources (men, money, materials, and time) involved in the plan, (9) Forward time or projection into the future, (10) Timing of the plan (when will it start?), (11) Decision points, (12) Certainty, risk and uncertainty involved in the premises, (13) Balance, (14) Integration, (15) Value of the plan, (16) Cost of the planning process, (17) Authorship, (18) Acceptance, (19) Ease of implementation, (20) Ease of control, (21) Measurement features.

It is obvious from this discussion that the size of a comprehensive plan will vary according to the level of management and the period of time involved. Thus, for instance, the overall long-range plan is the shortest and least detailed.

The most likely form of a long-range plan for an organisation will be the following:-

- (1) A broad determination of objectives and targets

drawn up by top management.

(2) General statements regarding:-

- (i) Company operations, including quality control and similar matters.
- (ii) Supply sources.
- (iii) Research and development programme(s).
- (iv) Public relations
- (v) Finance : working capital, use of funds in excess of operating needs, debt conditions, dividends etc.
- (vi) Company organisation : distribution, practice etc.
- (vii) Expected minimum levels of profit.
- (viii) The markets to be covered.
- (ix) Product lines and manufacturing standards.
- (x) Personnel :- employment, enthusiasm, morale, wages and salaries, career prospects, succession plans, safety, working conditions and welfare. So too must training, placement and recruitment programmes and sufficient personnel to meet future needs, be broadly stated.

The number and complexity of general statements of this type will vary from company to company due to the kinds of activities involved, size of company and so forth. The personnel or manpower plan is clearly an integral part of the corporate long-range plan.

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## PART 3 : MANPOWER PLANNING

### 3. MANPOWER PLANNING

#### 3.1 What is Manpower Planning?

Tom LUPTON (1), in his foreward to Angela M.BOWEY's (1974) "Guide to Manpower Planning", describes the manpower planner's brief as follows:

"Please give us in a language we can understand, some practical tips on what we (the managers) have to do now, if in the immediate future (e.g. tomorrow) and in (say) five years' time, we are to ensure that the essential jobs in the organisation are occupied by persons with skills, competences, and other relevant personal attributes (e.g. age, sex, temperament) appropriate for the efficient performance of those jobs."

This description provides a very good insight into the sheer complexity of the manpower planner's job and a note of caution to those who write about manpower planning! Continuing, LUPTON (2) says that: "The best laid plans can be frustrated, it would seem, by unpredictable shifts in government policy, the uncertainties of labour markets, unexpected technical and scientific discoveries, and shifts in social values and expectations, to name just a few of the manpower planner's nightmares." The effects of these actions have to be carefully considered from both the individual's viewpoint and from the organisation's in planning the best usage of available manpower.

What then is manpower planning? Of the many definitions and explanations available in contemporary literature a representative cross-section is given. One such definition is from DEPT. OF EMPLOYMENT AND PRODUCTIVITY(3): "Manpower planning may be defined as a strategy for the acquisition, utilization, improvement and preservation of an enterprise's human resources." This definition is strikingly but not surprisingly, similar to STEINER'S (4) one of strategic planning: ".....is the process of determining the major objectives of an organisation and the policies and strategies that will govern the acquisition, use, and disposition of resources to achieve those objectives". The inter-relationship between long-range planning and manpower planning is underlined: the latter is an essential and integral part of the former!

TIMPERLEY (5) maintains that : "manpower planning is not simply a question of predicting future requirements, but rather a question of utilizing quantitative and qualitative information as a basis for the formulation of personnel policies which are aware of, and adequately account for, the interaction of the highly complex behavioural processes involved in personnel movement." This definition is more an extension of viewpoint than a difference in meaning to the one already given.

BUCKINGHAM & NORTH (6) on the other hand : "suggest that the purpose of manpower planning is to safeguard, economically, the future manpower needs of the organisation by the development of manpower plans and programmes which would satisfy those requirements; thus in making a productivity bargain, an economic analysis of manpower needs is necessary."

GLUECK (7) uses "employment planning" in the same sense as manpower planning. He thus defines: "Employment planning is the process by which management attempts to provide adequate human resources to achieve organisational goals. Management, knowing the strategy it has planned, and given the current environment and resources, attempts to match the needs of this strategy with human resources." Figure 2 shows COLEMAN'S (8) illustration of manpower planning and programming. Once an organisation has set its objectives it can proceed to determine its needs for manpower. These needs can be then weighed against its current stock of people and so determine its net needs. In order to fill these needs, manpower is then acquired, developed or, in some cases, contracted for.

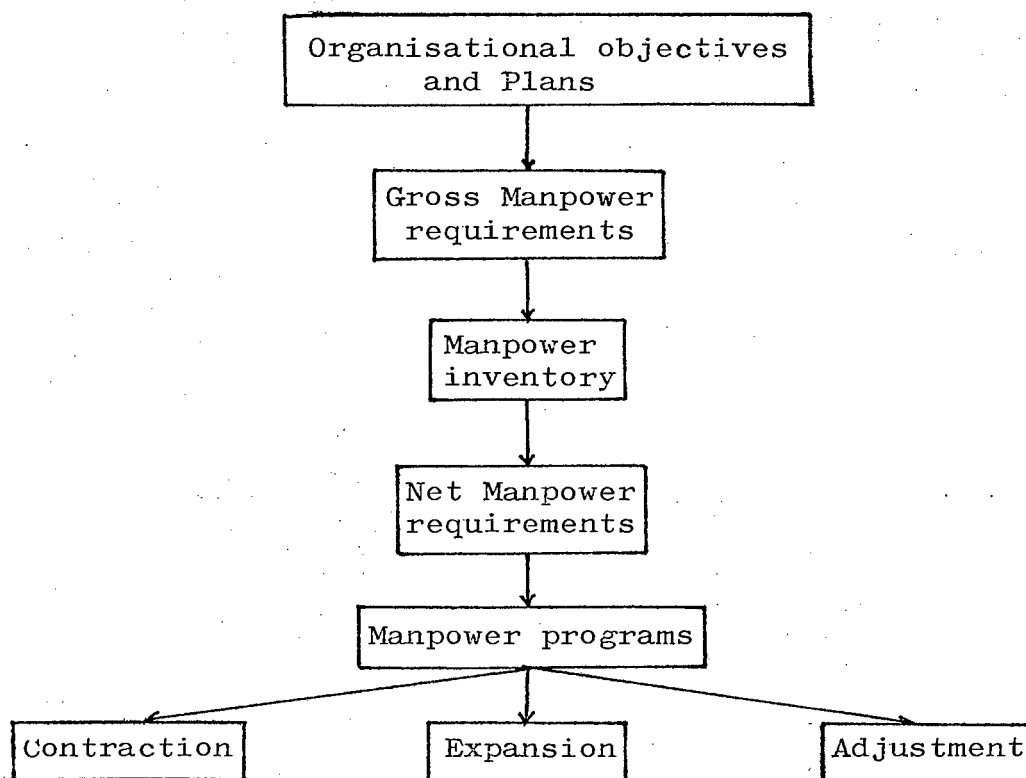


FIGURE 2 Employment planning Flow Chart

Source: Bruce Coleman, An Integrated System of Manpower Planning, "Business Horizons, 13 (October 1970) : pp 89 - 95.

WELLMAN (9), in talking about the availability of labour (i.e. manpower) and the position it should occupy in the counsels of an organisation, says : "..... it should be recognised that labour is a factor-input as critical to the activities of an enterprise as is capital investment and should be accorded a say in the basic high level strategic planning of the firm and an appropriately large R & D budget." He points out why this should be so by providing us with two simplified models of manpower planning. In Figure 3 he illustrates a procedure whereby a manpower plan could be produced but "which is clearly subordinated to the other plans and can feed-back into earlier plans only with the greatest difficulty."

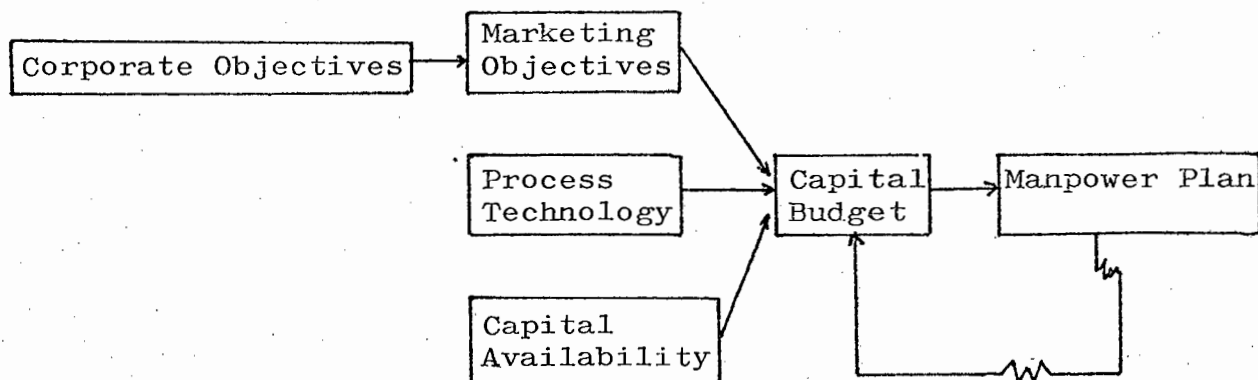


FIGURE 3 Sub-optimising Planning Procedure

Source: Glen Wellman, Practical Obstacles to Effective Manpower Planning, Personnel Review, Volume 1 Number 3, Summer 1974.

In Figure 4 Wellman shows an optimising procedure "designed to improve planning efficiency by attempting to optimize all factor-inputs simultaneously for the entire enterprise system."

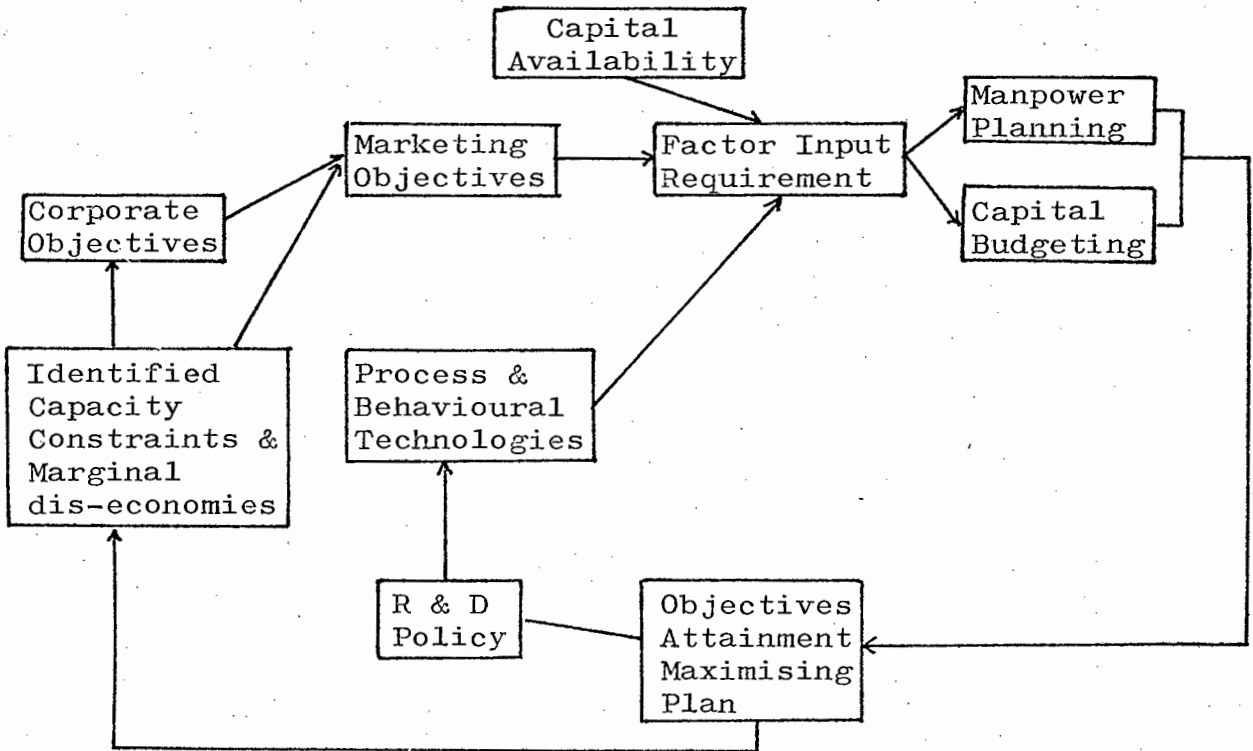


FIGURE 4 Total System Optimising Procedure

SOURCE: Glen Wellman, (*ibid*)

From the above definitions and illustrations it is possible to distinguish three stages in the planning process: Firstly, we need to establish the extent of present resources; secondly a prediction of manpower required to attain organisational objectives should be made; and thirdly what needs be done now so that the necessary resources are available when required - that is to say a Plan has to be drawn up. Obviously all three stages are inter-related and interdependent. For instance, should there be a labour shortage in meeting a given sales target, then the Plan must show one of two things: the target is not feasible or provision must be made to overcome this shortage - such as new production methods, more overtime and so forth.

Such action may well affect the prediction of future requirements in the organisation.

In the event that criticism is made that our examples are all taken from the business administration literature, we want, by way of explanation, to emphasize that most organisational structures are based on business practices. Thus we have used this opportunity to draw our illustrative examples from that source. Later on we will use examples which are more closely related to our two topic organisations: the aircrew of the South African Air Force and the administrative staff of the University of Cape Town. We round off our discussion by showing and explaining a manpower planning diagram.

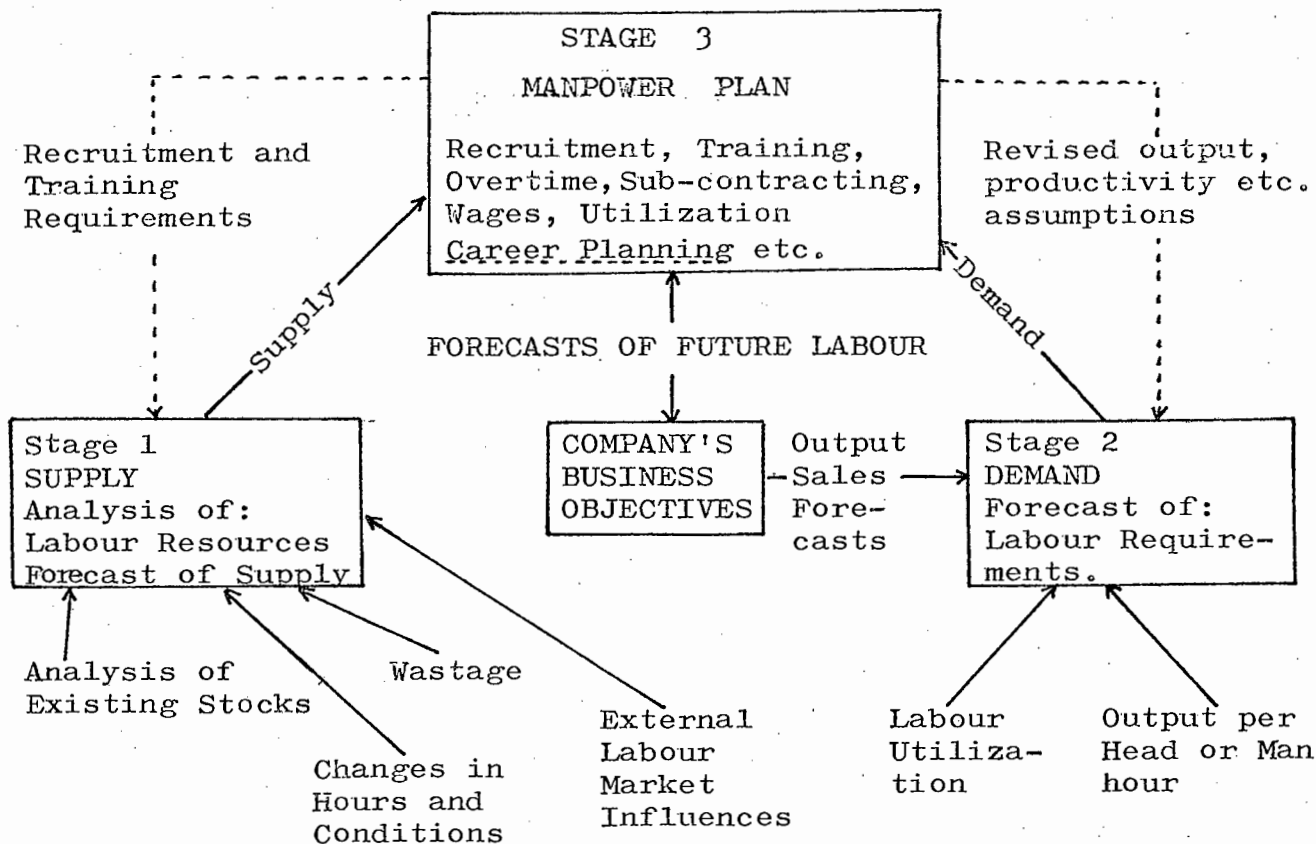


FIGURE 5 Diagrammatic presentation of manpower planning

Source: Company Manpower Planning, London, Her Majesty's Stationery Office, 1968, p. 3.

A study of the diagram shows that manpower planning involves:

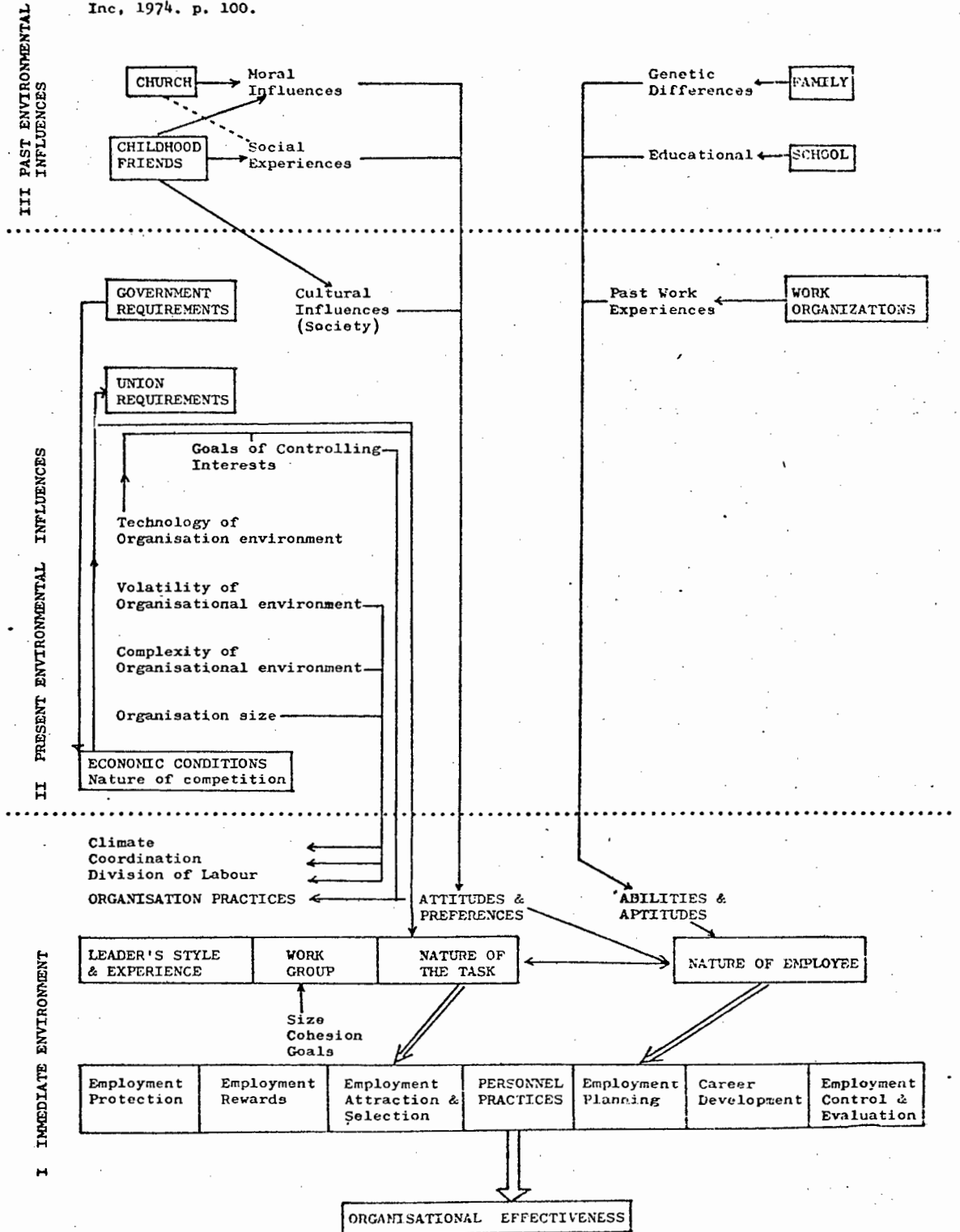
- "1. Defining overall objectives for a given period ahead (e.g. in terms of £ millions sales, output of certain goods or services, proportion of national or international market, etc);
- "2. converting these objectives to manpower (or man/hour, man/day) requirements, taking account of changes in productivity, methods, product 'mix', etc.;
- "3. estimating how many of the existing labour force in different occupations or grades will leave the company, or their present jobs, during the forecast period and how many will have been trained to replace leavers;
- "4. considering what effect changes in working hours, and holidays will have on the labour force;
- "5. assessing the possibilities of recruiting extra men and women to make good losses from wastage and to meet additional demands;
- "6. determining where and when critical manpower shortages are likely to arise; and
- "7. deciding how these shortages can best be overcome (or how the company should 'adjust' to them)." - thus

DEPARTMENT OF EMPLOYMENT AND PRODUCTIVITY (10). What is not said specifically but which could be inferred with certainty is that manpower planning influences the personnel effectiveness of an organisation and hence policy formulation. A more recent work, GLUECK (11) pertinently illustrates and expands this last point. Figure 6 highlights those factors which are most important for effective man power planning:- economic conditions; goals of

controlling interests; Government requirements; the nature of the employee; and the nature of the task. Trade union requirements (when applicable) and the leader's (or chief's) style and experience are important too - all reasonable and acceptable.

FIGURE 6 (adapted) : Factors affecting policies and organisational effectiveness.

SOURCE: William F. Glueck, Personnel: A Diagnostic Approach, Dallas, Business Publications, Inc, 1974. p. 100.



### 3.2 The Need for and the Implications of Manpower Planning

No organisation is likely to compete effectively against its rivals if it allows a shortage of personnel to develop for any significant period of time. Vacancies, especially for highly qualified personnel, must be filled quickly otherwise the efficiency of the organisation will be lowered and output schedules interrupted. Overmanning, on the other hand, will cause an under-utilization of personnel which in turn results in high labour costs and lower profits.

It thus follows that the main reason for manpower planning is that it will enable the organisation to discover timeously where labour shortages are most likely to develop or where there is an inefficient use of personnel. This is forecasting. It helps to highlight potential trouble spots. Early action allows management to control labour costs and thus the future profitability of the firm.

Furthermore, manpower planning provides the input data for many personnel functions such as: the determination of recruitment levels; anticipating redundancies and avoiding unnecessary dismissals; determining optimum training levels; providing a basis for management development programmes; costing the labour element in new projects; assisting productivity bargaining; assessing future accommodation requirements; selection of personnel; the promotion of personnel; and career development (planning).

Formal manpower planning leads to efficiencies by reducing

excessive hiring, training and transfer costs VETTER, (12) and so to greater organisational effectiveness.

In today's environment formal manpower planning is a necessity. The size and complexity of organisations, new technology and population changes have made informal methods of manpower planning obsolete for all but very small and stable organisations BURACK (13). Increasingly organisations of whatever size are finding formal planning useful in achieving their goals both effectively and efficiently GLUECK (14).

Whilst the above precepts have been discussed with the civilian commercial organisation as basis, these precepts are found to be equally applicable to the "public" administration in general and the Air Force in particular. Warfare is primarily labour intensive, or has been so in the past. With the advances in technology the military dependence on large numbers of airmen, has diminished. Airmen possess greater skills and education now. Moreover they control weapons which possess frightening degrees of destructability: e.g. nuclear armed aircraft and missiles; orbiting satellites containing atomic, biological and chemical agents to name some. The achievement of this state of control, however, involves more highly specialized and refined training programmes, as well as the acquisition of sophisticated, complex and advanced weaponry and other lethal equipment. Equally important is the fact that a large proportion of airmen now possess university qualifications. They are not "keen" to risk their lives as plain

"gun fodder"! This is a morale problem. Motivating airmen to join up and be prepared to fight needs to be carefully and meticulously considered in mobilization planning. The consequence of error if this is not done, is self evident. Thus the adopting of formal manpower planning methods - including career plans - can likewise only benefit the Air Force.

### 3.3 Personnel Functions

As previously stated manpower planning provides the input data for many personnel functions. A brief and general discussion of these functions follows as a prelude to the supply and demand aspects of manpower planning.

#### 3.3.1 Recruitment

A realistic recruitment policy should be based on the future requirements of the organisation. These requirements are influenced by wastage rates such as: retirements; deaths; ill health retirements; resignations (voluntary and involuntary); and redundancies. Sensible anticipation of these demands, as well as allowing for possible future expansion of the organisation, should ensure a balanced and even flow of recruits. Such action will prevent future wastage problems and promotion bottlenecks.

#### 3.3.2 Redundancies

Should manpower planning forecasts indicate that future personnel needs are likely to be reduced (found redundant), then the organisation is faced with the problem of how to control the rundown of the current labour to the anticipated future level. Generally the demand for personnel can be reduced by: normal wastage (attrition); reducing work-hours (or other sharing devices);

transfers within the organisation; or dismissals. Redundancy programmes, however just, harm the organisational image, are costly and damage recruiting prospects in the short-term

JONES (15). For obvious reasons they are not to be lightly resorted to by military organisations like the Air Force. Manpower planning should provide enough warning time to the organisation to enable it to use transfers and wastage schemes as alternatives to dismissals. If dismissals cannot be avoided, a reasonable period of notice should be given: the confidence and understanding of employees would thus be retained and morale maintained. However, with the present tense political situation prevailing in South Africa, military expansion is increasing. It is, thus, unlikely that redundancies in the Air Force are possible in the foreseeable future.

### 3.3.3 Training

The forecasting of manpower needs is, understandably, vital to training schemes. These schemes must in turn be related to the anticipated job requirements existing at the end of the training periods and afterwards. For this reason training officers need estimates of numbers of future members, of skills and the occupational structure of the organisation. Such knowledge is especially important when the training is long: in technical apprenticeship training and aircraft pilot training, for example. In the interests of both the individual and the organisation there must be certainty that these skills will be the ones needed in the future and that members could be retrained to new skills should such need arise, e.g. a Boeing 727 pilot converting to helicopters or a fighter pilot converting to bombers.

### 3.3.4 Costing Labour

There is no basic demand for actual people for the organisation. The demand is derived from the demand for the services the organisation offers. An evaluation of the likely demand for these services is, therefore, necessary for predicting the demand for labour. But the costing of future projects or developments can only be realistic if this demand for labour is also costed. An under-estimation of manpower requirements will lead to under costing of the project with resulting reduced profits. If labour was over-estimated a wrong conclusion may be reached that the project is too expensive and should be abandoned. The amount and quality of labour must, therefore, be carefully calculated to enable management to make sound decisions on whether a project or development or service should be pursued or given up.

### 3.3.5 Productivity Bargaining

This is an agreement between management and labour in which increased wages, reduced working hours or any other benefits are given to the workers in exchange for better working methods or practices, which should result in higher productivity. In a public service, like the Air Force, productivity bargaining is not possible because it is not allowed. Even in the University context it is difficult to imagine such a procedure being resorted to, but within the commercial environment this is a way of life. The success of productivity bargaining depends on the benefits each party sees accruing to itself as a result of these efforts. It does mean, though, that a more systematic and critical appraisal of present methods and practices must be undertaken. For management productivity bargaining will involve an assessment

of future personnel needs and hence manpower costs. Manpower planning is clearly essential to successful productivity bargaining!

### 3.3.6 Future Accommodation or Operating Bases

Organisations that grow in size and diversify their operations like the Air Force at present, need to forecast their future manpower requirements. Such forecasts will enable them to predict the type, quantity and quality of future accommodations or bases needed for expansion. Should plant locations or airfields prove to be too small or inadequate, then estimates of the number of bases required may help to determine whether expanded operations should be located elsewhere or present facilities extended.

### 3.3.7 Selection of Personnel

The advent of the last two World Wars brought tremendous selection and placement problems: large numbers of men had to be selected and placed in many different kinds of work quickly and efficiently. Selection procedures and processes have since been studied in detail by psychologists and personnel specialists: consequently this personnel function is now in a mature stage of development. Many reliable and valid techniques and methods are available for use by organisations.

Selection aims at the best matching of people and positions. The most important factors influencing personnel policies and organisational effectiveness, in this case are, the nature of the employee and the nature of the task to be performed. Others are the attitudes of co-workers and the formal leader of the workgroup. (For a diagrammatic illustration see Figure 6 on page 34)

The inter-relationship between recruitment and selection, i.e. the need to fill a position, in an organisation, by selecting the most appropriate person from outside sources, is clearly observable in the concepts of manpower planning.

### 3.3.8 Promotion of Personnel

By matching the supply and demand of manpower, management knows how many persons and of what type it needs in order to fill vacant positions within the organisation by promotion or training. Many organisations only recruit personnel from outside initially and then train them to fill subsequent appointments on promotion. This closed career system gives loyal employees a sense of security and a fair chance of promotion: most personnel favour this approach! However, it happens sometimes that an organisation has grown so stable that it becomes set in its ways: its growth has reached a "steady state". In such cases, promotion from within may be detrimental and new blood, through recruitment from outside, might be necessary to provide the organisation with the proverbial "shot in the arm" remedy. GLUECK (16).

The evaluation and promotion of both managers and employees (non-managers) are important elements in career development and will be discussed separately and in greater detail later in the paper. Suffice it to say now that promotion schemes can be both formal and informal. A formal scheme will, more likely, be used by the greater organisations rather than the smaller ones. Promotion practices and policies according to GLUECK (17) are integral parts of manpower planning in which Government and Trade Union requirements, the size of the organisation and the nature of the task (to be performed on promotion), are the most important

factors influencing the personnel policies and the effectiveness of the organisation.

### 3.3.9 Refresher Training

The best efforts at the evaluating, selecting and promoting of managers cannot ensure that they will stay abreast of all the "know-how" required by the positions they occupy; or remain qualified to handle their new positions; or remain motivated as they get older. A manager who does not keep up with a developing and dynamic environment will soon become managerially obsolescent—he no longer performs effectively.

The aim of refresher training programmes is to ensure that suitably qualified managers are available to fill vacancies as they arise. The careers of individual managers must be planned in detail not normally attempted at other levels so that the right man can occupy the right managerial position at the right time thus guaranteeing the organisation's continued survival and success.

A clear and understandable parallel can be drawn with the officers' element in the Air Force. This element is the managerial one and normally operates under the name of commanding officer: Flight Commander, Squadron Commander, Wing Commander, Station and Air Base Commander. The development of the officers as managers is mostly undertaken by the Air Force College, which offers a number of specific training and military education courses. The courses include Land/Air Warfare operations, administration, military law, staff and command training, to name only a few. A training programme like this is so designed that successful

officers are capable of staying on top of their jobs as managers. Technically, of course, they will receive specific and advanced training elsewhere to cater for the need to remain highly skilled and proficient in their various roles of pilot, navigator, etc. The most advanced military education course (for Colonels and higher ranks) is given at the S. A. Defence College. It comprises of joint staff training, i.e. Air Force, Army and Naval staff work, strategic studies (national and international) and an evaluation of size and shape of the South African Defence Force in the next decade. With the aid of this type of managerial development the Air Force tries to ensure it's continued survival and success!

### 3.3.10 Career Development Planning

GLUECK (18) and BOWEY (19) consider career development as one of the most important functions in an organisation. Careers are for people, and organisations consist of people. If the organisation's people are happy, efficient and loyal then the organisation benefits. We suggest that to get personnel in this condition, requires career development which should be set out in formally structured career plans. This is also the central theme of our dissertation.

We conclude our brief survey of certain personnel practices. Moreover we are now in a position to tackle two of the three stages of manpower planning: the analysis of the demand and supply of personnel.

### 3.4 Analysis of the Demand of Personnel

Before embarking on the main phases of the manpower planning

process, the organisation will have to define, as precisely as possible, the objectives it wants to achieve and the overall strategy through which it hopes to achieve these. This, as we have seen, should have been done during the long-range planning stage.

DEPARTMENT OF EMPLOYMENT AND PRODUCTIVITY (20) suggest that the phases of the manpower planning process should include answers to the following: which fields should the main effort be concentrated on?; what is the size of the overall market and what is the organisation's anticipated and desired share of it?; are the resources, manufacturing and sales capacities needed by the organisation adequate to take full advantage of the market potential?; are production and marketing plans and targets prepared as far ahead as possible?

Throughout this process of preparation, the organisation must take into account the constraints of available resources of men, materials and finance. These constraints will set limits on what can realistically be hoped to be achieved.

Before final decisions are taken, firm targets selected and budgets agreed on, the implications of manpower in the plan must be examined. It is vital that continuous feedback exists between the stages of this long-range planning process so that the effects of the constraints (if any) can be adjusted, e.g. anticipated shortages of skilled craftsmen may limit the rate at which output can be expanded: the sales target is reduced and alternative production sources have to be created. The assumption here is that the forecasts of demand are dependent on other planning

decisions. Although this is an over simplification forecasting labour demand is in essence, "an effort to translate organisational plans into employment needs" GLUECK (21).

### 3.4.1 Methods of Forecasting

The methods used in forecasting vary from the informed opinion of managers within the firm to very sophisticated statistical techniques and mathematical methods. COLEMAN (22) contends there are five basic ways of forecasting total employment requirements:

1. Expert estimate: An estimate is made by a combination of systems familiarity, experience, and intuition on the part of the expert.
2. Historical comparison: An estimation is made by breaking the new system into subsystems similar to those already in existence. Data on the known systems are retrieved from information libraries and provide the basis for the manning estimate of the new system.
3. Task analytic: An estimation is made by a detailed analysis of the system requirements, establishment of mission profiles and ground equipment functions, definitions of specific tasks, and a clustering of tasks.
4. Sovereign factors: An estimation is based upon identification of one or several factors that correlate highly with the item being estimated. It avoids the task of complex manipulation of multiple variables.
5. Modelling: An estimation is made by the use of decision

models such as PERT, linear and dynamic programming, and multiple regression expression. It is typified by its objective and explicit nature.

A method that is best for one organisation is not necessarily so for another. Ideally a series of forecasts should be worked out using different methods and a comparison made with those derived from informed opinion of managers. It is prudent, however, to assume that forecasts will be inaccurate to some degree - either because it is difficult to measure accurately the effects of some known changes or because the assumptions on which the forecasts were based prove mistaken.

Some of the techniques used in forecasting labour demand are quite sophisticated (e.g. the Delphi technique and certain statistical methods). The use of measures of productivity in manpower forecasting appears straightforward. Output divided by labour productivity gives the number of man-hours required to complete the task. There are, however, difficulties: exact measures of productivity are difficult to obtain for the current situation, let alone for the future. The main difficulty arises from the measurement of output: measures of change in output may be misleading because of changes in the organisation's product mix and quality and because of fluctuations in the price level of raw material and other price levels, etc. DEPT. OF EMPLOYMENT AND PRODUCTIVITY (23). The use of the "value added" concept gets over the problem of fluctuations in price although there is still the possibility that the selling price of the goods may fluctuate for other reasons than change in the quality of output.

The value added concept is defined as the value of output in constant prices less the cost of intermediate goods and services consumed in the production. The proportions of different products in the total output must remain constant (or nearly so) over the forecast period to ensure reliable forecasts.

Forecasting by means of productivity measurements requires a sales forecast as set out in the long range plan of the organisation. Moreover, we need to know how productivity has changed over the past years in the particular department requiring such a forecast. This calculation should enable us to fit a productivity trend line to the data. Using statistical analysis we can determine whether the pattern appears consistent or not. If the result is positive then the trend line offers a reasonable basis for forecasting productivity. However, before any reliance is placed on the past trend, changes in the department and organisation have to be carefully evaluated.

A forecast can now be made: divide output for the forecast year by the productivity rate anticipated for the year. This will give the number of personnel required by the organisation to fulfil the output target. DEPARTMENT OF EMPLOYMENT AND PRODUCTIVITY (24). An application of this method is given in the following section.

There are many methods used for forecasting the need for top management or other key personnel. They differ from the one previously described. One such method, the "bottom up" approach to manpower planning is worth mentioning. This technique involves an analysis of person-by person, job-by-job needs now and in the

future for each organisational unit. By analysing present and future requirements of the job and other skills of the incumbents, this method focuses on quality requirements. It is, however, time consuming and costly. GLUECK (25).

#### 3.4.2 A Theoretical Forecast Example.

The above principles of manpower demand forecasting can be illustrated by means of a theoretical example. Imagine, if you will, that No 1 Air Depot of the South African Air Force is asked by Air Force Headquarters to give a forecast of the number of airmen required in 1982 using the present (1977) data as the base for their calculations.

Assume that the 1977 data are as follows: Added value for the year - R5 000 000; Average number of airman employed during the year - 400; Number of weeks worked - 52; Average hours per week worked per airman - 40 hrs p.w. The total hours per workman for the year is then:  $40 \times 52 = 2\ 080$  man hours; and the total man hours for 1977 is -  $400 \text{ airmen} \times 2\ 080 \text{ man hours per year} = 832\ 000$  man hours. Productivity, i.e. the value added per man hour, = Added value divided by the total manhours -  $R5\ 000\ 000 \div 832\ 000 = R6$  per man hour.

For 1982 assume a planned value added of 50% over the 1977 figure due to the increasing international tension, possibly new developments in aircraft and the likelihood that more airmen will be called up for duty. Thus the figure would be  $R5\ 000\ 000 + 50\% (R5\ 000\ 000) = R7\ 500\ 000$ . Also assume that productivity is expected to be 15% higher and thus in terms of value added we obtain:  $15\% R6 + R6 = R6,90$  per man hour. The required man

hours for 1982 can now be derived by dividing the value added for the year by the cost of a man hour:  $R7\ 500\ 000 \div R6,90 = 1\ 086\ 956$  man hours. If, as a refinement, we further assume that the hours of work will decline by 5% per week to 38 hrs per week for the 52 weeks of the new year, i.e.  $38 \times 52 = 1976$  hrs per airman for 1982 then the number of airmen required can be obtained by dividing the total man hours by the hours worked per air man:  $1\ 086\ 956 \div 1976 = \underline{550}$  airmen.

### 3.5 Analysis of the Supply of Personnel

The estimate of the size of future personnel strengths in particular occupations or skills, is the purpose of personnel forecasting. The difference between the demand at a forecast date and the number of employees now with the organisation and who remain until that date, makes up the recruitment needs for the organisation. Thus if demand falls short of the expected supply some redundancy, transfers or early retirements may be unavoidable. DEPT. OF EMPLOYMENT AND PRODUCTIVITY (26). Unless current and future supply positions are related to future labour demand, the latter alone will be of limited value. An analysis of the supply of personnel includes investigating current labour resources: changes in the labour force; turnover - forecasting for replacements; the effects of changes in the conditions of work; and external supply factors.

#### 3.5.1 The Labour Force

It is important that as complete and accurate a picture as possible of available existing resources of labour should be known. Moreover, an estimate of how much of this stock will

remain by the end of the forecast period is essential. The extent of changes within the organisation and the external influences affecting the future supply of labour available to the organisation must also be assessed.

The labour market for pilots for the South African Air Force is rather restricted and sophisticated: the applicant (in his teens) must pass a strict flying medical examination; possess a recent matriculation (or equivalent) certificate with mathematics as a passed subject; and be successful in an aptitude test for manual dexterity - that is the smooth co-ordination of hands and feet movements required to manoeuvre an aircraft. In periods of flourishing economic conditions it is found that this market becomes even smaller as fewer youths find the military life attractive enough to join up: to a degree during poor economic conditions the reverse was also true - more would enlist just to have a job when jobs were scarce. (OWN RESEARCH, 1979)

Whilst in command of the Air Force's personnel section in 1975 I found that the retention of pilots in the Service depended largely on prevailing service conditions: adventurous and rewarding assignments; recognition of and the rewarding of achievements and efforts and also good promotion prospects. Should an expansion occur - such as can be experienced in mobilizing for a war situation - then promotion opportunities increase, with the resultant increased attraction of military flying. In stable peace conditions, on the other hand, Air Force services are usually reduced: and airline flying and higher pay become greater attractions: demand being less than supply with results already stated in the leading paragraph.

The accepted main ways of analysing a firm's labour force are also applicable to the Air Force pilot requirements: departmental and operational functions, occupations, skill level and status, qualifications, training and the age structure. Here the department is the Air Force itself and its operational role is aerial offence and defence. The pilot's occupation is flying (in contrast to the various other musterings of navigators, flight engineers, radio operators, etc). Skill levels of pilots vary with experience, age and thus rank (status). Figures 7 and 8 graphically illustrate the average age on promotion of pilots in the S.A. Air Force and the administrative staff at the University of Cape Town as a comparative civilian organisation. In both cases the inconsistency in ages at which officers are promoted is most noticeable - the lack of a properly structured career development scheme being mainly responsible for this state of affairs in both cases.

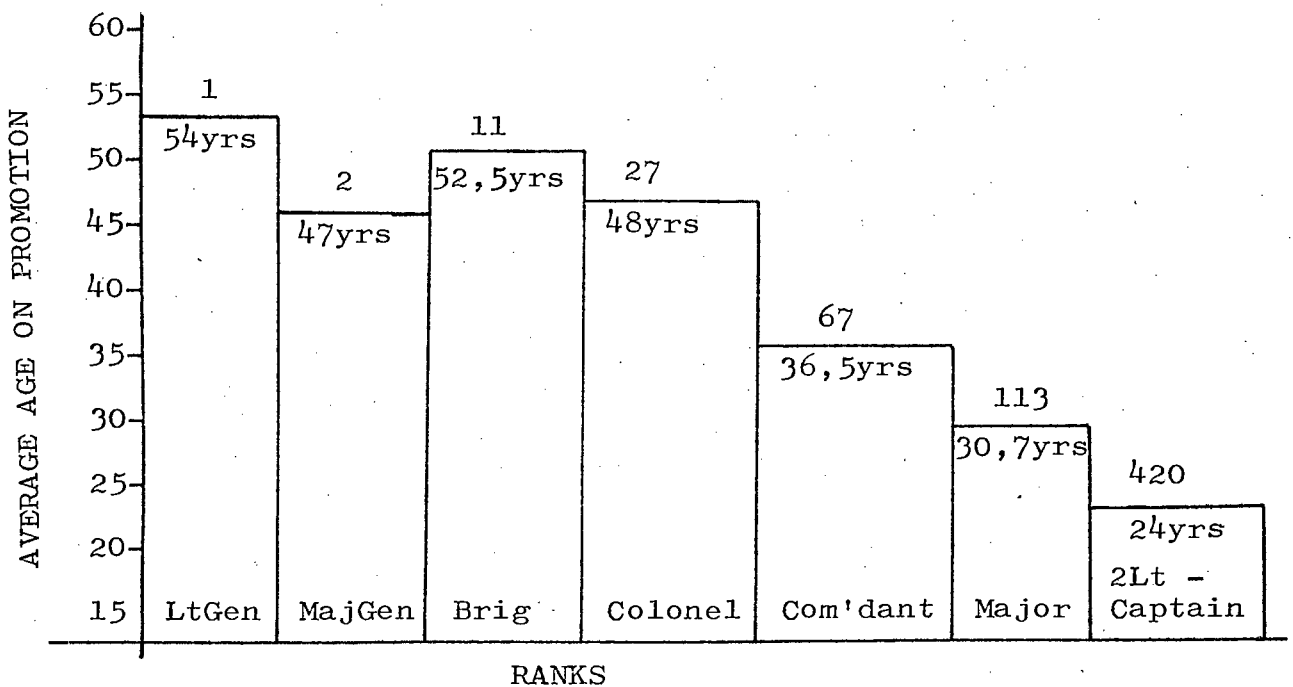


Figure 7 : Average age on promotion of Pilots in the S.A. Air Force

Source : Own research

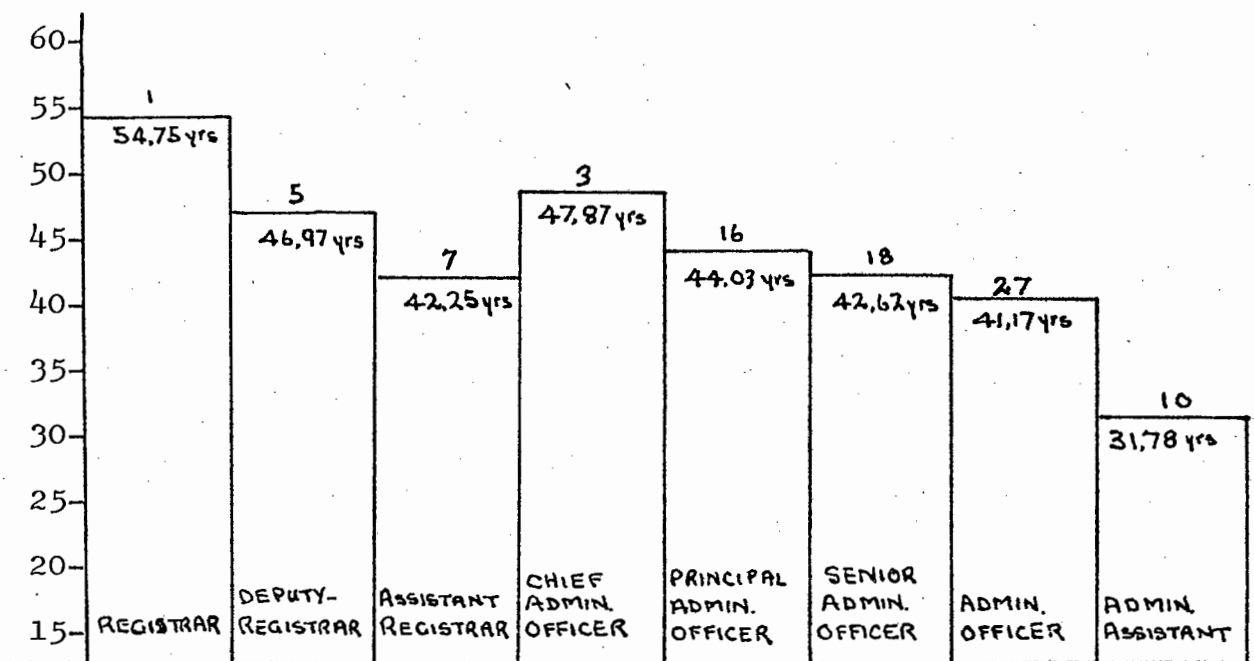


Figure 8 : Average age on promotion of Administrative Staff in the University of Cape Town

Source : Own research.

Moreover, a pilot may possess many different types of service and academic qualifications. Service-wise he can be qualified as an aircraft captain on many diverse types : 4-engined transport C-130 Hercules; 2-engined maritime Albatros; 4-engined V.I.P. Viscount etc.; be a staff trained officer in the Air Force or in joint Services; be a flying or navigation instructor; a weapons instructor, etc. Academically he could be a Bachelor of Military Science (B.Mil) - obtained at the Military Academy in Saldanha and/or possess other pure academic degrees obtained at the normal civilian universities. The possession of such qualifications normally goes hand-in-hand with increasing age and higher rank: the higher qualified officer is usually also the senior.

### 3.5.2 Forecasting for Replacements of Pilots

A pilot is a multi-skilled individual in both academic and

military senses: he has to be in order to survive and carry out his task in today's sophisticated technological and supersonic environment. In Air Force manpower forecasting and planning an estimate is made of the type and number of pilots who are likely to be lost through wastage over the period being forecasted. Where the pilot strength is expected to increase due to partial or full mobilization, an estimate of the number of replacements needed to balance wastage is added to the figure of additional needs due to this expansion before recruiting and training programmes are derived and embarked upon. Should pilot requirements be falling, on the other hand (due to the onset of stable peace conditions) then future wastage rates have an important bearing on the size and timing of the necessary redundancies.

In the Air Force wastage is defined as losses of staff due to age retirement and exits on completion of short service commissions; initial training failures; and lastly due to deaths, invalidings, voluntary withdrawals, compassionate releases, dismissals etc. In addition allowance is made for pilots who are transferred or promoted to other branches of the Service. It is clear that wastage has to be measured. The conventional method is to divide the number of pilots leaving the Service during a specified period (usually a year) by the average number of pilots in the Service during the same period and to express the answer as a percentage.

According to DEPT OF EMPLOYMENT AND PRODUCTIVITY (27) a number of general conclusions about the factors governing wastage are supported by numerous research studies which have been undertaken since the second World War:

1. Wastage tends to decrease with job tenure, or the length of time in a job. This is sometimes generalized to length of service with the company as a whole. There is conflicting evidence of the extent to which wastage is a function of age, although in many cases it is clear that length of service and age are themselves highly correlated.
2. Wastage tends to be higher amongst unskilled than skilled workers.
3. Wastage tends to be higher among women than men at most skill levels.
4. Wastage is related in some way to a number of measures of employment in the economy as a whole or in particular labour market areas. When, for example, unemployment is high, wastage tends to be low, and vice versa.

The S.A. Air Force's method of forecasting replacements for pilots is based on the replacement of losses on a yearly basis. Clearly such a method is not satisfactory. Some wastages can be forecasted with great accuracy, e.g. age retirements, but most others cannot. A pilot leaving the Service on ill-health retirement, for example, cannot be replaced by acquiring an additional recruit because persons with similar current skills are usually not found outside the Service. A more suitable forecasting method will have to be found or designed, to cater for the exigencies occurring in Air Force work.

### 3.6 Manpower Planning Models

Because they lend themselves to formal models, only staffs with an ordered hierarchy are considered; like the Air Force, University etc. In these organisations, as in most others, a growing attention to long-range planning is required. The Air Force and the University grow in size and diversity of operations and try to cope with the challenge of technological change - in enemy weapons development or advances in academic education. This forces them to make increasingly sophisticated long-range evaluations of investments in products, facilities and personnel.

The Air Force, and likewise the University, must plan in the face of rising costs, a growing population and shifts in the kinds and levels of expertise and training required by a changing and increasingly aggressive world. Extended projections of force, research and equipment requirements must be made for ten or more years in the future by the South African Air Force.

In an ideal situation, unlikely ever to be reached in practice, stable conditions of recruitment, wastage and numbers in such rank (grade) within the hierarchy persist for many years. The resulting steady state model is very useful as a standard from which to measure deviations from this ideal and so gives an early warning of future problems that may be inherent in present age and rank distributions. Moreover, the steady state model is useful in providing guidelines for policy decisions.

As previously mentioned the S A Air Force's approach to manpower planning for the supply of pilots is by using the replacement table. It is the oldest and simplest way: a list of pilots

presently on strength and grouped into their various categories (i.e. Fighters, Bombers, Helicopters, etc.) describes the present stock. As wastage occurs the Air Force takes steps to insure that suitable replacements move into the vacancies. Some wastage data are predicted with accuracy, like the numbers reaching retirement, whilst other data are not: e.g. the numbers of pilots that could not be trained successfully. Thus, in general, only rough estimates can be made where and when vacancies occur. Moreover the replacement table method is laborious to carry through by hand computations and it usually reflects a static state rather than a dynamic position of the Air Force's pilot structure and needs.

On the other hand, DILL, GAVER & WEBER (28) maintains that several researchers who looked at the supply problem found Markov chains to be a convenient technique for predicting distributions of personnel. Other techniques proposed were linear programming and network analysis. The Markovian model was elaborated to show the effects of policy decisions on the personnel system, and finally an attempt was made to describe the stocks and flows of manpower in a particular military rating. This model, while it relied heavily on demographic techniques, went beyond the first simple Markov models to the extent that some policy parameters were included. A computer version was tested and gave reasonably accurate predictions of the behaviour of manpower in this rating, GAYLORD & KNETZ (29). Policy decisions in the personnel field may have a direct impact on the careers of employees. In turn, employees' career expectations are related to their attitudes toward the organisation and their work, KIPNIS (30). At a general level, career

development in the individual is explained by the development of different needs at different stages of life and consequent exhibition of different behaviour, SUPER (31). More will be said later when career development is evaluated. Suffice to mention that the responses of employees at different career stages to organizational policies and to environmental conditions must be incorporated into models for forecasting the supply of personnel and projecting plans for altering the supply, DILL, GAVER & WEBER (32).

Model-making is an essential part of the process of understanding a situation as it is at present and as it may become in the future. Furthermore comprehensible models that may be manipulated are of immense aid in the planning and selection process. Lastly models are important in controlling a process once organised by suggesting response to organizational action and future environmental change - thus DILL et al (1966).

The South African Air Force does not use a manpower planning model, whereas the British Civil Service uses four basic types: Renewal models; Markov Chain models; Stationary or steady state models; and an individual simulation model. The renewal model corresponds closely with the way the British Civil Service operates and is also the basis of supply forecasting. Markov Chain models are not particularly suitable as British Civil Service grade sizes "are rarely free to vary under the operation of constant promotion rates", BARTHOLOMEW et al (33). Now stationary, or steady state models, are especially appropriate as "almost any model, if allowed to run on indefinitely, will reach a steady state in which all flow and stock numbers will be stable". BARTHOLOMEW continues .....

"Ideally one would like any system to be in a steady state in which all flow rates, ages of promotion etc. have acceptable values. Although such a state of affairs is only occasionally found in practice it is never the less useful to study the interrelationship between the key variables under steady state assumptions. By this means we can reveal inherent problems in the present situation, or inconsistencies between proposed policies, and arrive at compromise solutions for management consideration. The Civil Service Department uses a number of such models. Each concerns the relationship between age on promotion, proportion achieving promotion and the grade structure of the organisation." The hierarchical structure of the Air Force is strikingly similar to that of the British Civil Service and consequently a model used by the latter could well be suitable and acceptable to the former.

In the development of our thesis we intend reviewing three types of models: mathematical; actuarial and computer simulation. The aim of this review is to either select or develop a model that could be used by the Air Force taking into consideration their capability of manipulating and applying the model in career development plans for pilots.

### 3.6.1 Mathematical Models

The most useful mathematical models are those that can be used for prediction and monitoring, and in addition give some insight into the causes of turnover and related phenomena, BARTHOLOMEW (34). Such pertinent observations by the wellknown professor of statistics, will be born in mind throughout our examination of the various models. We start our investigation by looking at an American approach.

DILL et al (35) argue their case by expounding two basic mathematical models: Model 1 - Advance in a Rigid Hierarchy and Model 2 - Advance in a Flexible Hierarchy. Hierarchy is defined to mean an organisational structure like that in the Armed Forces or a University faculty, in which recognised ranks (or grades) occur. Furthermore when a top position is vacated in the hierarchy, occupants from the lower slots move into the vacant top position. In Model 1 the career possibilities of such people are examined in a static structure where promotion is by seniority or experience or by equal opportunity selection. The authors conclude that in this simple probability model the probability of a man remaining in the hierarchy to the top is given by the formula:

$$E(e^{-\mu T}) = \frac{\lambda + (S-1)\mu}{\lambda + S\mu} \cdot \frac{\lambda + (S-2)\mu}{\lambda + (S-1)\mu} \dots \frac{\lambda + \mu}{\lambda + 2\mu} \cdot \frac{\lambda}{\lambda + \mu}$$

$$= \frac{\lambda}{\lambda + S\mu}$$

- where 1. there is only one top position and
2. individuals in this top position hold that position for times that are independently and exponentially distributed with Mean  $\lambda^{-1}$
3. there are always S second (lower) level jobs.

4. individuals in the second level position hold their positions for times that are also independently and exponentially distributed with Mean  $\mu^{-1}$

The Model 2 case is the advance of persons through the rank structure in which no constraints are placed on the number of persons simultaneously occupying a given rank. In this respect individuals compete only against themselves for progress in the hierarchy; there is need only for a recognised increase in competence in order to advance, and not a vacant position. These are not, however, the conditions that pertain to our investigation. This is because the number of positions, and thus the various ranks or grades in our hierarchy are determined by the requirements for them in the organisation i.e. it is known as the Establishment or Authorized Posts. The number of these posts are, moreover, fixed by budgeting. Advances are thus only made when there are vacancies. Thus Model 2 of DILL et al is not applicable to our argument. Model 1 has possibilities and is retained for further consideration.

In England, in contrast to the American approach outlined above, it was accepted by the planners that manpower planning would develop first in organisations requiring manpower with a high degree

of skill which could not be picked up easily. Additionally these organisations would be large enough both to employ a substantial proportion of people with these skills and also to be able to perceive management needs in quantitative terms. The Royal Navy was such an organisation and it was thus not surprising that manpower planning developed first in the Admiralty. Furthermore, the factors favouring development of manpower planning by the Navy were not limited to scale and specialization, but included also a high degree of centralized management, and, fortuitously, people in key positions from time to time with a natural propensity for methodical and scientific management, such as Pepys in the late 17th century and Finlayson in the early 19th century, LAWRENCE (36).

Vajda and his colleagues developed manpower management models for use in the reconstruction period after the 2nd World War. By this time the modelling was being applied not only to naval personnel, but also to civilian employees of the Admiralty. These models aimed at establishing the inter-relationships between required numbers of employees and recruitment, wastage and promotion flows, using what were essentially demographic or actuarial principles. The group of social scientists from the Tavistock Institute of Human Relations, working on the Glacier Project at the Glacier Metal Company played a fundamental part in this development. Perhaps the most important contribution of this work was the idea of studying wastage as a function of length of service for groups of people. They constructed graphs showing how the probability of some-one leaving an organisation varies with his length of service, JONES (37)

AITCHISON (38) observed that if the chance of an employee with

'x' - years service remaining in service for another 'y' - years depended on the ratio  $y/x$ , then the log-normal distribution of length of service would be generated (this is the operation of Kapteyn's Law). LANE & ANDREW (39) who introduced the idea that the length of service distribution was of log-normal form, proposed that the expected length of service (which they called stability) should be used. This concept is equivalent to the "expectation of life" of demographers or actuaries.

In 1959 BARTHOLOMEW (40) moved beyond the question of measuring labour wastage. He considered the problem of labour turnover as a renewal process. We think of a group of men beginning their employment at time  $T = 0$  with a frequency distribution  $F(t)$  of the length of service,  $t$ , at the date of leaving. Then, if those leaving are immediately replaced by men with similar length of service characteristics, BARTHOLOMEW (41) writes down the appropriate renewal equation:

$$L(T) = F(t) + \int_0^T F(t) L(T-t) dt$$

where  $L(T)$  = rate of leaving  
at time  $T$ .

The methods of renewal theory may be used to deduce recruitment needs from this equation, provided that it can be solved for the relevant distribution of length of service. The theory can also be extended to describe more complex situations, such as a group which is being expanded or contracted. Unfortunately BARTHOLOMEW found it impossible to solve the equation for the

log-normal completed length of service distribution. However, he was able to fit an alternative distribution (a combination of two exponentials):-

$$F(t) = p \lambda_1 e^{-\lambda_1 t} + (1-p) \lambda_2 e^{-\lambda_2 t}$$

to the available data up to  $t = 2$  years. A solution is possible for this distribution, which has, however, not had any theoretical justification ascribed to it. In his early papers, BARTHOLOMEW (42) uses this solution to give recruiting requirements for a group of constant size, one that is instantaneously increased in size and one that is required to grow at a steady rate. In his later writings he goes on to develop the theory to apply to more complex situations.

LAWRENCE (43) continues his exposition on manpower and personnel models in Britain by saying that one of BARTHOLOMEW's most interesting results concerns a contracting organisation. When an organisation wants to contract we are frequently told that natural wastage will do the trick. This is undoubtedly said in good faith by the management who have observed past wastage rates. But a recruiting ban, of course, immediately begins to distort the distribution of the length of service of employees so that the natural wastage drops. BARTHOLOMEW shows that it is not usually possible to rundown an organisation at a rate as high as the observed wastage rate without causing redundancies. This is an important conclusion and it is certainly not obvious to the layman.

YOUNG & ALMOND (44) explain that a MARKOV model, is a mathematical one of staff in an organisation that had expanded rapidly.

It is a "push-model" i.e. one which assumes a man will be promoted when he is ready and not wait for a vacancy. In effect management pushes the individuals along their career paths at fixed rates. Such a state of affairs exists to a very small degree in the Air Force when a Markovian model could be applied in considering outstandingly meritorious persons for accelerated promotion. Generally speaking, however, a Markovian model is not suitable for the Air Force because accelerated promotion is too much of an exception.

In contrast to the Markovian model, another type - the linear programming model is worth mentioning. This model is usually of a complicated nature which detracts from it's popular use by planners. However, possibly the most important results from using such a programming model are the estimates it gives of the cost of a policy to limit redundancies or of limiting recruitment or transfers. This is vital to the armed forces who have to work within stringent financial limits. Unfortunately a linear programming model is not easily acceptable because of its failure to cope with uncertainty adequately. Furthermore there is the practical problem of estimating all costs. Worse, perhaps is its mathematical complexity since, if it is to be used effectively and generate confidence, it's mathematical structure must be understood by the client - the S.A. Air Force or the Administration of the University.

CULLINGFORD & SCOTT (45) in their paper "Optimality and Manpower Planning" deal in detail with this problem by means of two models: the Cost Optimal Manpower Model; and the Cost Optimal Transition Model. The linear objective function (O.F.) for the

manpower model is:

$$\text{O.F.} = \left[ \sum_{\min}^J M_a S_a + \sum_{a=H}^{Z-1} R_a T_a + \sum_{a=Z}^J F_a C_a + M_J C_J \right]$$

where :  $M_a$  = number of Men in age group a ;  $R_a$  = number Recruits in age group a

$S_a$  = average Salary of men in age group a

$T_a$  = average Recruitment and Training cost per person in group a

$C_a$  = average Compensation paid per man for severance from age-group a

$J$  = age oldest man;  $H$  = age youngest man;

$Z$  = earliest age at which forced separation is permitted;

$H \leq Z \leq J$ .

$F_a$  = number of forced separations in age group a

Constraints for this model are for continuity, total production requirement, maximum recruitment and the training ratio constant.

The O.F. for the transition model on the other hand is:-

$$\text{O.F.} = \left[ \sum_{\min}^E \sum_{a=H}^J \left\{ M_{n,a} S_a + R_{n,a} T_a + F_{n,a} C_a \right\} + \sum_{n=2}^E M_{n,J} C_J \right]$$

where:  $M_{n,a}$  = number Men in stage n age a;  $R_{n,a}$  = number Recruits in stage n age a.

$F_{n,a}$  = number of forced separations in stage n age a

$S_a$  = average Salary of a man age a

$C_a$  = average Compensation for severance for a man age a.

$E$  = number of years between first and final stages

(inclusive)

J = age oldest; H = age youngest employee.

Because this model is given the freedom to choose the types of changes (hiring or firing) the number of constraints are small: total productivity; recruitment; and separation.

The authors point out that various models have been built to produce optimal manpower distributions. Individual models differ in the mathematical techniques they use or the constraints that they consider. The application of cost optimal models has a limited value in the military sphere where costs are not the critical issue: if a pilot has to be trained for a specific role, he will be trained regardless of the costs.

Another model which is attracting a lot of attention is: "The Camel Model: a model for career planning in a hierarchy" by C.A. KEENAY, R. W. MORGAN and K. H. RAY (46).

The Camel Model. The authors maintain that "long term models ought to be simple rather than complex in the level of detail chosen" - a plea to which we also subscribe. The question is then asked: "What would be the simplest way of measuring promotion chances in a hierarchy?" The answer to this question is that there is the need to know when promotion occurs in the individual's career and what his career prospects are of achieving the promotion. This led KEENAY et al to propose the first of the two fundamental concepts used in their model: the Career Prospectus. A 5-grade (rank) hierarchy is used throughout in their example - see figure 9.

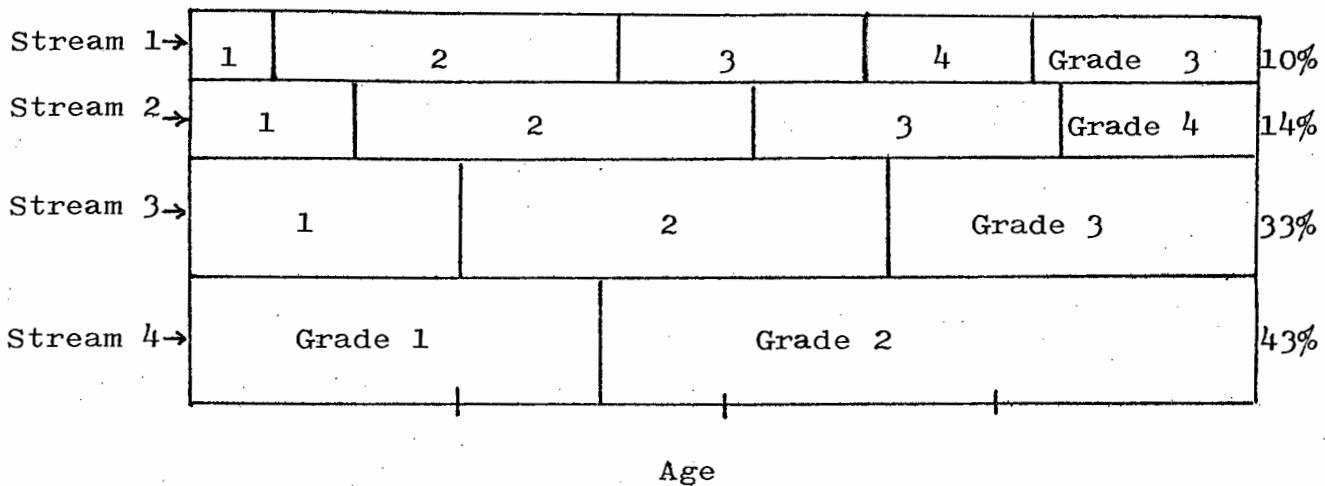


Figure 9. Career Prospectus at 1971

Source: G.A. Keenay, R. W. Morgan & K. H. Ray :  
 The Camel Model : A Model for Career  
 Planning in a Hierarchy. Personnel  
Review, Vol. 6. Number 4 Autumn 1977.

The horizontal axis represents age and the vertical axis indicates the four career streams. The vertical lines show at what age recruitment, promotion and retirement take place : for example 14% of the total employees will eventually retire from grade four (unless they leave before retirement) and are promoted from grade 2 to 3 around age 41 and from grade 3 to 4 at about age 52 years.

The second concept used is: Age Distribution of the Staff - see figure 10.

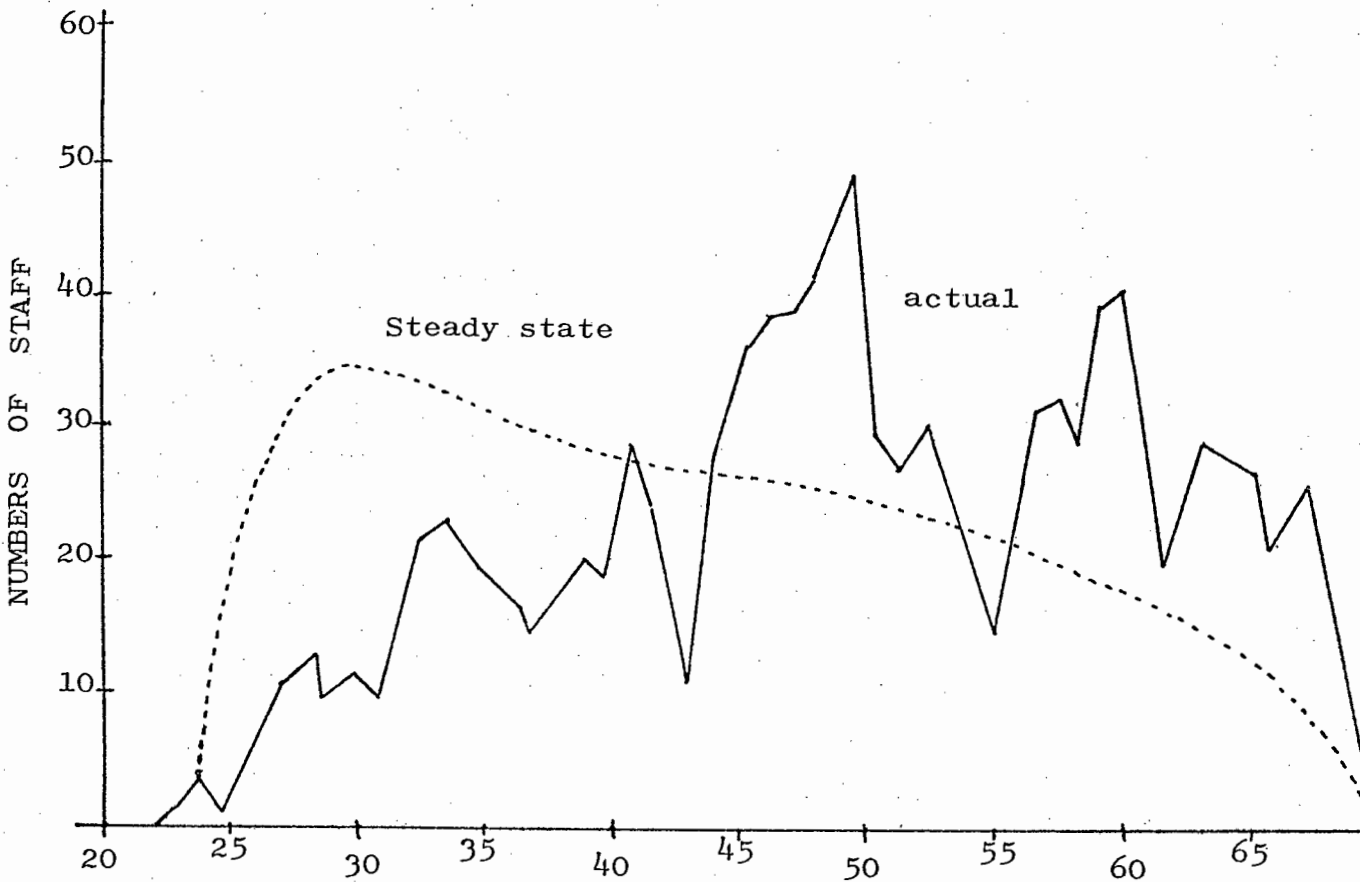
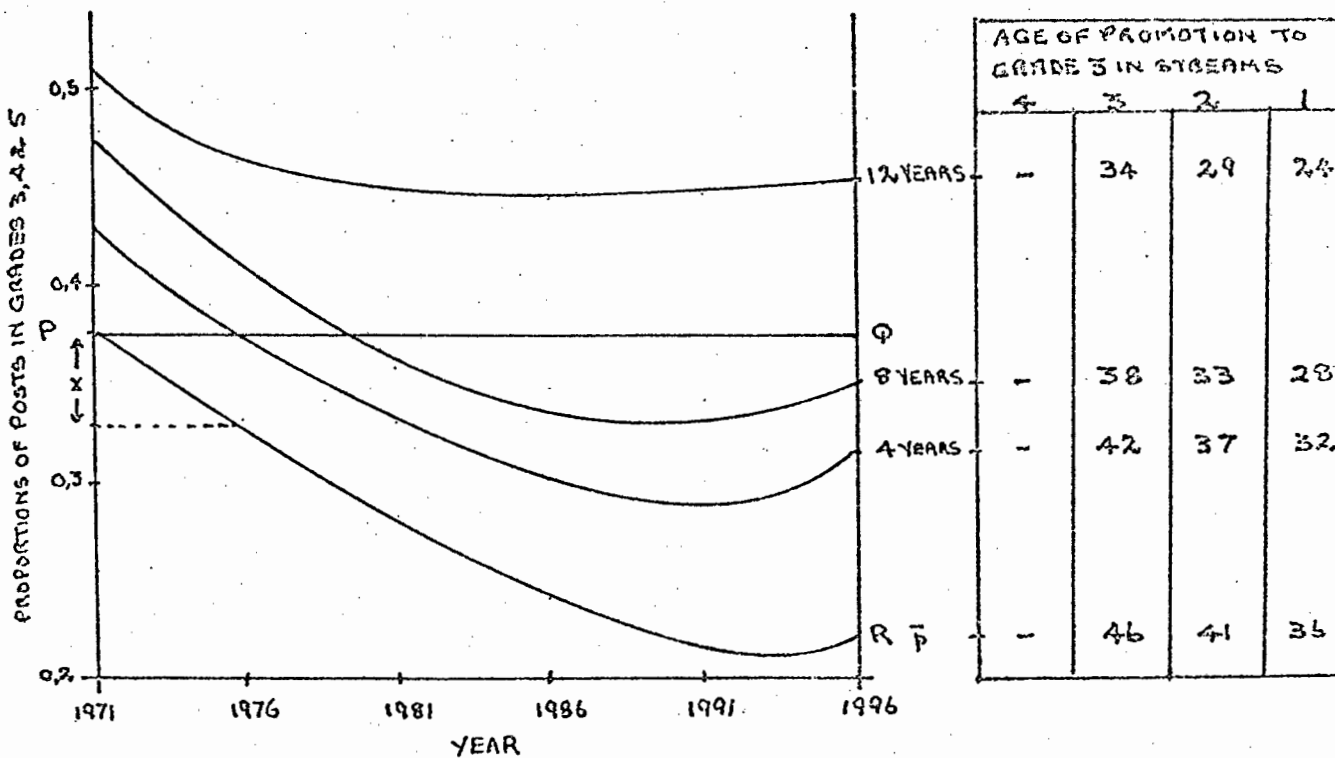


Figure 10. Age Distribution at 1971.

Source Op cit

Together these two concepts constitute the framework for describing the manpower system. The age distribution diagram not only gives the actual age distribution of staff at the beginning of the period (1971) but also shows the steady state one. (The steady state distribution being that age distribution which would be reached in the long term if the present conditions of growth, recruitment and wastage were maintained). Using the data from the Career Prospectus and the Age Distribution the numbers in each grade can easily be calculated: e.g. in stream 2 there are 392 staff of age 52 years and over which gives 55 staff in grade 4 (14%.392). The grade sizes calculated this way must, however, correspond to the actual grade sizes.

Both the Career Prospectus and Age Distribution change with time. The author projected the Age Distribution forward year by year for about 20 years to enable forecasts to be made about the future manpower size, (the numbers that leave indicating the number of recruits required and the age and grade of these recruits). The Career Prospectus is similarly projected: the model is usually run with the proportions of staff, represented by the streams, remaining fixed (see again figure 9). The output from this model is called Camel Curves. These curves indicate promotion to grades 2, 3, 4 and 5. An example for promotion to grade 3 is shown in Figure 11. Camel Curves plot grade sizes against time for a variety of policies concerning promotion age (the vertical lines in the career prospectus): the curve PR in Figure 11 shows the number of staff in grade 3 and above if there were no changes in career prospects.



x = number of staff in grades 3, 4 & 5 who have left since 1971 - about 5%

Long term ages of promotion are 38, 33, 28

Figure 11. The Camel Curves showing the policies for promotion to grade 3 Source On cit

When promotions are made earlier than those times reflected in the Career Prospectus, the proportion of staff in the various grades is increased and the curves now drawn lie above the original one. If grade sizes are kept constant then the effect would be for promotion ages to fall; that is where the line PQ (representing these constant grade sizes) cuts the different camel curves. In the above example promotion ages will fall by 4 years in 1976 and by 8 years in 1980 for promotion to grade 3. Moreover, it can be seen that grade sizes have stabilized, thus determining the long term ages for promotion to this grade as 38 years in stream 3; 33 years in stream 2; and 28 years in stream 1! Two of many possible policies are presented: maintaining promotion ages and grade sizes. It is a great advantage of this model that all these alternatives can be looked at using only one diagram!

Camel Curves can also be used to discover the range of possible policies for management and of estimating the initial promotion prospects. In the long term the age distribution will converge to a steady state age distribution if present patterns of growth, recruitment and wastage are continued. Such information is clearly "most useful since the steady state ages of promotion indicate the direction in which the present patterns are taking us". Should this direction not be to one's liking then changes in either recruitment or wastage patterns or different proportions in grades can be introduced in good time. This model, therefore, has great merit: it is indeed simple; it is explicit and it portrays promotion policies graphically - a case of seeing is believing!

Within the limits of our dissertation, where models form only a part of a formally structured career plan, not all published models can be examined. We, therefore, conclude our present examination by giving a summary, based on BRYANT's (47) evaluation, of the usefulness of nine mathematical models.

In the Hyperbolic function (Tavistock-Glacier model) the curve does not describe the actual start of the leaving process and the existence of a concealed mode in the first period. The Exponential distribution makes a bad fit to the actual data, whilst the Pearson Type XI distribution (Silcock) is computationally complex. The Force of Separation (actuarial model) is basically a mixture of the exponential distributions with different parameters. Young's Matrix-multiplication approach gives transition probabilities between one status and the next: it is useful in predicting promotion. Markov chain models have been developed by Bartholomew using the idea that the expectation of completed length of service depends on the length of service to date. Bartholomew's Multi-stage renewal process was a further development of earlier studies on the 'force of promotion' idea which have been applied to hierarchical organisations. Forecasts of the structure have been made using different wastage rates for each rank (grade). Lane and Andrew's log-normal distribution provides a good fit to data in many employing organisations. Lastly Bartholomew's Double-exponential distribution is a special case of the mixed exponential family of functions which is derived from a renewal theory approach. This distribution gives a good fit to observed data and yields a simple solution to the renewal equation.

The South African Air Force employs one qualified statistician who can interpret and use mathematical models to predict promotion vacancies and monitor personnel flows. He is required to present his findings, firstly to the Chief of Staff Personnel and then to the Chief of the Air Force in language that is completely understood by these top managers. Both the latter, however, are veteran airmen with long and varied years of practical rather than academic service behind them. They can only be convinced of the validity of the statistician's findings if it is presented in a lucid and intelligible mathematical way. Thus the more complex the model, the more difficult the statistician will find his task. A simple straight-forward mathematical model is desired. One, satisfying such a requirement, has apparently been developed by W. V. WEBB (48) of the Ministry of Defence in the United Kingdom.

WEBB'S MODEL. In a paper titled: "Some aspects of manpower planning models for staffs with an ordered hierarchy" Webb illustrates the application of his model by using the following five elements found in manpower planning: a staff of only 4 grades is considered; recruitment is to the lowest grade only; promotion, to the next higher grade, is only made when these posts fall vacant; retirement is on the grounds of age, which takes into account length of service, continuing efficiency, needs of the organisation and wishes of the individual; and lastly that staff may leave through death, ill-health retirement, voluntary or involuntary resignation, or redundancy. Such an approach to the problem is particularly relevant to a University's administrative staff structure of : Administrative Assistant; Administrative Officer; Senior Administrative Officer; and Principal Administrative Officer or to an Air

Force one of: Captain; Major; Commandant; and Colonel. Webb's basic tool, used in the calculations, is the service table - akin to a life table, but limited to the maximum working life-time of staff within the organisation. In his example he uses a work-span of 17 years to 65 years - once again very close to both the University's (18 - 60 years) and the Air Force's (20 - 60 years) career structures.

A brief look at the workings of Webb's model gives us a good idea of its usefulness to the military and answers the question whether it would, in particular, be suitable in solving the Air Force's career planning problems. Firstly the mean strength at each age, the wastage and retirement at this age of the members of the organisation is calculated yielding crude values of  $m'(x)$ . Smoothing out these results a graduated set of values,  $m(x)$ , is derived and tested by means of the normal tests of graduation. Webb underlines the fact that a separate treatment is necessary for those ages at which normal age-retirement occurs.

The chance of surviving in service from age "x" to "x + 1" he denotes by  $p(x)$ , which is calculated by the approximate formula:-

$$p(x) = \frac{\sqrt{2 - m(x)}}{\sqrt{2 + m(x)}}$$

The number of members surviving at each age, denoted by  $l(x)$ , is then calculated by:

$$l(x+1) = p(x) \cdot l(x)$$

A suitable radix (10 000 in this case) is used for the value of  $l(x)$  at the youngest age; the mean number between "x" and "x+1" is denoted by  $L(x)$  in the formula:

$$L(x) = \frac{1}{2} [\sqrt{l(x)} + \sqrt{l(x+1)}]$$

and the total number of members aged "x" and over, by  $T(x)$  in:

$$T(x) = \sum l(x)$$

Based on this data a service table is constructed. See Table 1 on page 75.

The author proceeds to recruitment in the steady state situation. This case represents that uniform number of recruits required, at a given age (or range of ages) each year for an indefinite period, to support a given staff strength. This number is based on wastage and retirement occurring each year in accordance with the service table figures. Furthermore the required number surviving at each age,  $l(x)$  annually, will support a strength of  $T(x)$ . Thus with recruitment occurring at a definite laid down age, "z" and whose strength, "N", is expected to remain constant (or fairly so) in the future, this recruitment-total  $T^R(z)$  is given by:

$$T^R(z) = N \cdot l(x) / T(x)$$

The expected ages at promotion can also be calculated: if "y" is the average age for promotion from one grade to the next higher and the proportion promoted is  $c(4)$  - say - (laid down for example as a promotion policy), then the number of given posts above the lower grade is given by:

$$T^R(z) \cdot c(4) \cdot T(y) / l(x) = \text{given posts.}$$

Now given this proportion  $\lceil c(4) \rceil$ , "y" can be found by inspection of the service table. Moreover, with some rearrangement of this formula the proportion of posts in the grades above four (4) - say - can also be determined.  $c(4)$  is, in addition, the career factor for the fourth grade: the career factor being defined as the

chance of promotion to the next grade for those who reach the age for promotion. The cumulative career factor is, of course, the product of career factors for the grade being considered and all the lower grades.

Tables linking career factors, promotion age and the number of posts can be constructed for any given entry age. Conveniently such a table can also be portrayed graphically - a significant advantage in portraying the problem and so assisting the understanding of the problem. See Figure 12 on p. 76.

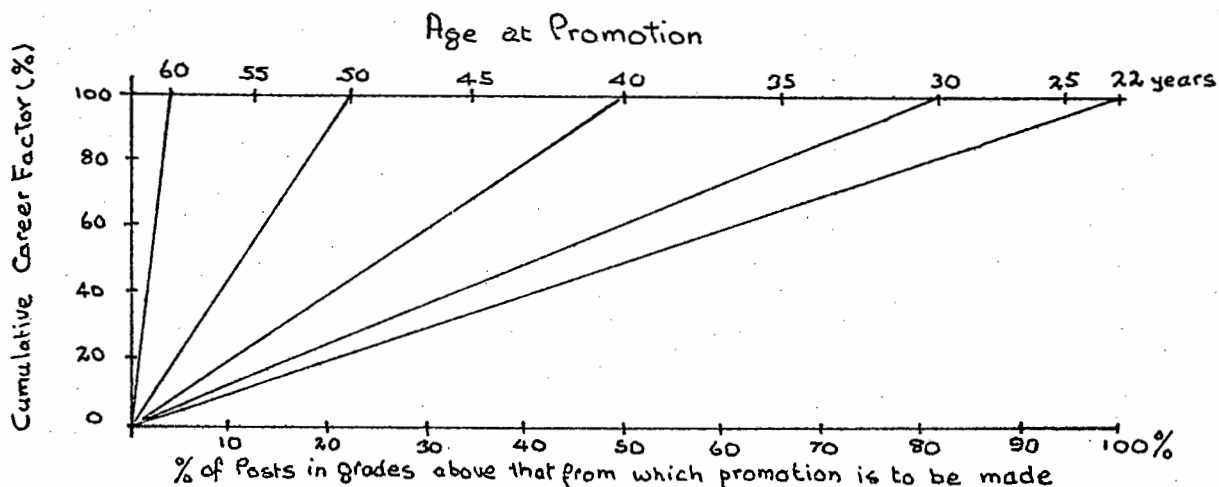
Webb develops his model logically on the principles enumerated above but does not deal with transfers and reversions. This model has potential and could prove attractive to Air Force manpower planners. Moreover, it is based on actuarial principles which are very acceptable to the Air Force's statistician!

TABLE 1 : Service Table (single decrement) - in part only

Age $x$	$P(x)$	$l(x)$	$L(x)$	$T(x)$	$T^R(x)$
17	0.910	10 000	9 550	137 955	135 435
18	0.865	9 100	8 486	128 405	125 885
19	0.850	7 872	7 281	119 919	117 399
.	.	.	.	.	.
.	.	.	.	.	.
.	.	.	.	.	.
.	.	.	.	.	.
.	.	.	.	.	.
.	.	.	.	.	.
64	0.800	240	216	216	-
65	0.000	192	-	-	-

Source : W. V. Webb, "Some aspects of Manpower Planning Models for Staffs with an ordered Hierarchy."

**FIGURE 12:** Graph linking Posts, Career Factors, and Promotion Ages. Age at entry 22



Source : W. V. Webb, *idem*.

### 3.6.2 Actuarial Models

E. JONES (49) states that possibly the earliest example of a manpower model for management purposes is an actuarial model of careers in the Royal Marines, sketched out by the first actuary John Rowe in 1793. The actuarial approach was found to be acceptable to the relatively small scale career planning problems then and should be more so today, nearly two hundred years later, with our complex organisations.

The timescale of a present day career spans nearly 50 years in age: such a period can aptly be called one's lifework. BARTHOLOMEW, HOPES & SMITH (50) states that the uncertainties when operating on this time scale are incalculable but even planning 10 or 20 years ahead, which is of the order to make sense in a career context, involves considerable uncertainties. "Never the less, and in spite of the hazards, we do attempt long term planning

but not as a once-for-all exercise. Planning is a continuous process in which policies are adjusted as objectives change and new information becomes available. "Clearly an actuarial technique is appropriate to the development of a modern career planning model.

Furthermore it was not surprising to discover that the Royal Navy had been concerned in developing and applying manpower planning since the 1940's. A paper by ELFRYN JONES (51) on officer career planning in the Royal Navy is particularly relevant to our thesis aim of drawing up a career plan and applying it to the S.A. Air Force. Because these two military organisations are based on strikingly similar organisational and managerial structures the application of proven Royal Navy techniques to the Air Force situation would be greatly facilitated.

The officers' strength in the Royal Navy consists of three groups: the General List; the Special Duties List; and the Supplementary List officers. The pilot strength in the S.A. Air Force is also made up of three groups: the Permanent Force (or Long Service); the Medium Service; and the Short Service officers. For both the RN and the SAAF there are thus three different entry streams. The Permanent Force, or Long Service, are made up of officers who have selected the Air Force as their life work. They comprise about 40% of the total aircrew and are destined to occupy the managerial positions of the service with the advance of time.

The Medium Service (MS) scheme for aircrew was brought in with the intention of providing the Air Force with a group forming about 55% of the aircrew strength. Their sole task was to be the

manning of Air Force aircraft. They did not form part of the managerial core of the Air Force. After about 20 years service these aircrew would retire on pension and start a second career elsewhere. The Short Service (SS) scheme provides the Air Force with a group of aircrew forming about 5% of the Aircrew population. Their task was also the manning of aircraft but only for a very short time : 4 years in the regular Air Force followed by 6 years in a citizen force squadron. The flying done here would be carried out during the weekends and flying camps : they thus tried to maintain their operational proficiency.

These three groups make up the aircrew strength of the Air Force. Using the steady state career structure (supra p.57) as a basis the whole of the aircrew strength structure is determined when we are given by the policy makers : the total strength required in each rank and the specific career factor for Permanent Force (PF) officer pilots in the Air Force. The career factor is the proportion of the number of promotion vacancies to the number of survivors who are promoted at the appropriate promotion age; or it is the chance of promotion to the next grade for those who reach the age for promotion. Medium and Short Service officers can transfer to the Long Service (PF) stream : in this case they too become subject to the laid down career factor.

The following information is necessary in constructing the model: the proportion of officers' strengths in the various ranks of 2/lieutenant, Lieutenant, Captain, Major, Commandant, Colonel, Brigadier, Major-General and Lieutenant-General; the wastage as the result of death, resignations, transfers, invalidings,

compassionate releases etc expressed as a proportion of the mean strength over the period concerned; wastage due to initial training failures expressed as a proportion of the number of starters; wastage as the result of age retirements and exits on completion of medium and short service contracts; and lastly the expansion and/or contraction of total strength (if any). Armed with this data we can formulate the exponential formulae required to set up the model.

$$S_v^n = e^{-nv}$$

= the number of Survivors per 1-starter after n-years at a v-wastage rate

$$T_n^v = \int_0^n e^{-kv} dk = (1 - e^{-nv}) / v$$

= Total strength at the end of n-years if in every year 1-intake is diminished at the rate of v-wastage

$P_i$  = Average number of Promotions in the particular rank-group.

$i = 1, 2, 3, \dots, 9$

where = 1 for LtGen; 2 for MajGen; 3 for Brigadier; 4 for Colonel etc.

A = Authorized strength in that rank group (laid down as policy)

$$= P_i (1 - e^{-nv}) / v \quad i = 1, 2, \dots, 9$$

thus  $P_i = \frac{A \cdot v}{1 - e^{-nv}}$

The survival rate of members in the various ranks at their average promotion ages can also be calculated using :

$$R_v^n = P_i e^{-nv} \quad i = 1, 2, \dots, 9$$

The career factor, as a percentage is:

$$C_f = \frac{(\text{Number of Promotions at average promotion age}) \cdot 100}{\text{Survivors in the rank}}$$

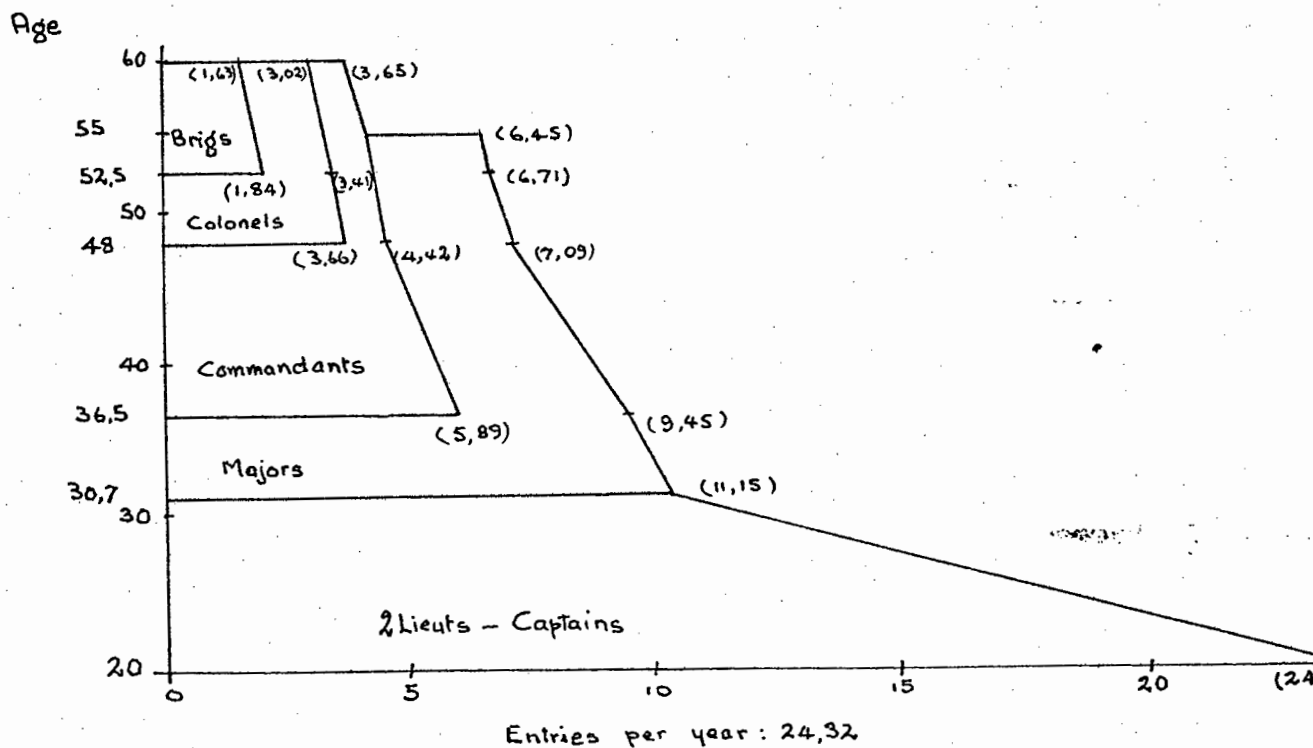
$$= x\% \text{ at the average promotion age.}$$

A Career Factor can be used as an instrument of policy to ensure and to better career prospects in a specific rank-group : a higher career factor increases promotion chances and reduces intake and strength in the lower ranks.

On the completion of the calculations involved a graphical hierarchical structure can be constructed. One such was drawn-up for Permanent Force pilots in the S.A. Air Force at the end of 1975.

- See Figure 13

Figure 13: Career structure for S. A. Air Force Pilots - 1975



Source : Own research

Explanation of the Career Structure: 24,32 2/Lieuts, of average age of 20 years must be recruited in 1975, at the average age of 30,7 years only 11,5 of this number will remain (all Captains now) and can be promoted to major; at the average age of 36,5 years only 9,45 of the original number remain of which 5,89 could be promoted to Commandant - the remaining 3,56 majors are not promoted and those who eventually reach 55 years of age, will retire; at the average age of 48 years only 7,09 of the original 24,32 entries remain in the Air Force - 3,66 of them could be promoted to Colonel and 0,76 Commandants will be retired on reaching 60 years of age; at the average age of 52½ years 1,84 Colonels can be promoted to Brigadiers whilst the remaining 1,57 Colonels will retire at 60 years of age - at this stage 0,7 Commandants and 2,48 Majors are also still in the pipeline and will not be promoted; at the average age of 55 years the remaining 2,39 Majors will retire; at the average age of 60 years (with 40 years' service) only 3,65 of the original 24,32 remain of which 1,63 Brigadiers and higher, 1,39 Colonels and 0,64 Commandants retire.

On the basis of this example, the Medium and Short Service data could be calculated and brought into play so completing the whole aircrew career structure in the South African Air Force.

### 3.6.3 Computer Simulation

We now complete our consideration of manpower planning models by discussing computer simulations. Any model that lends itself to computer simulation increases its acceptability and attractiveness to the potential user. This is because changes in data can easily be fed into the computer and rapid responses obtained. Tedious manual calculations are avoided and situations involving

long periods of time and personnel moves, can be given with ease, accuracy and speed.

Sets of decision rules are always involved in any process of personnel movements through a hierarchical structure. Logically these decision rules can be classed as being in one or other of the following three categories: Structural; policy; or individual.

DILL, GAVER & WEBER (52) said that the Structural category referred to rules which modified and controlled the structure of the organisation. This would also include rules about flows of information, influence and products. Furthermore this category dealt only with the formal organisation and ignored information about the differences which may exist between individuals who occupied the positions.

The Policy category, on the other hand, referred to those rules which were used to select and allocate personnel and must, therefore, have taken individual differences into consideration.

The Individual category, continued DILL et al, included those rules which decided whether an individual would join, remain in, or leave the organisation. They may also have dealt with an individual's decision to change one of his attributes (e.g. : productivity).

Bearing in mind that the top management structure of the Air Force consists of practical and experienced airmen, it is imperative that decision rules be explicit, simple and operational. Mathematical methods will answer some questions that naturally arise, but in order to study the sensitivity of results to the

basic assumptions made and used, to observe the actual time evolution of the processes involved and to construct large scale models, computer simulation suggests itself: and one that is particularly designed for the Air Force personnel situation.

Applying these three sets of decision rules to the Air Force we find that structurally the pilots (officers) comprise ranks from 2/Lieutenants through to Lieutenant-General, and of positions varying from pilot to flight-or squadron-or station-or base-commander, to staff officer etc. Such an organisation is formally structured with clear lines of responsibility, authority and accountability. The positions, occupied by the various ranks, are underscored by the visible signs of the ranks signifying the authoritative standing of the bearer. Assume now, for arguments' sake, and to illustrate the usefulness of computer simulation in the Air Force, that it has been decided to maintain a steady state situation of 170 senior officers: 110 Commandants; 40 Colonels; and 20 Brigadiers. Further assume that it has also been decided that the rate of entry of the Majors be restricted to the level necessary to give specific career factors to Commandant, Colonel and Brigadier. In 1975 (see figure 14) the career factor for promoting Majors to Commandants, was 62,3% at the age of 36,5 years (i.e.  $\frac{5,89}{9,45} 100 = 62,3\%$ ); for promoting Commandants to Colonels 82,8% at age 48 years (i.e.  $\frac{3,66}{4,42} 100 = 82,8\%$ ); and for promoting Colonels to Brigadiers 54% at age 52,5 years (i.e.  $\frac{1,84}{3,41} 100 = 53,96\%$ ): an average career factor of 69,7% at age 46,3 years, which is very good and should be maintained if possible. A further policy decision was that all promotions up to and including Majors would be automatic, subject only to the obtaining of the necessary

qualifications required for the next higher rank: the career factor here was thus 100% and independent of any vacancies.

The Individual category decision rate, in this case, was aimed at trying to instigate a greater rate of movement, by promotion, through the various ranks from Major upwards to Brigadier. Thus a "new" promotion policy is now under consideration in an attempt to make the Air Force more attractive and so draw more young men to a career in the light blue uniform of the Air. In order to implement this scheme it was decided that half of the 113 Majors would be eligible for promotion to Commandant and that 20% of each of the Commandants, Colonels and Brigadiers would retire annually i.e. 22 Commandants; 8 Colonels; and 4 Brigadiers. Thirty-four (34) promotion vacancies for Majors would thus be created each year so ensuring a career factor of about 61%.

In addition to the retirement policy it was decided to promote 20% of the Commandants to Colonels - i.e. 22 new Colonels - and 10% of the Colonels to Brigadiers - i.e. 4 new Brigadiers, annually. With the aid of this data a flowgraph is constructed. see Figure 14

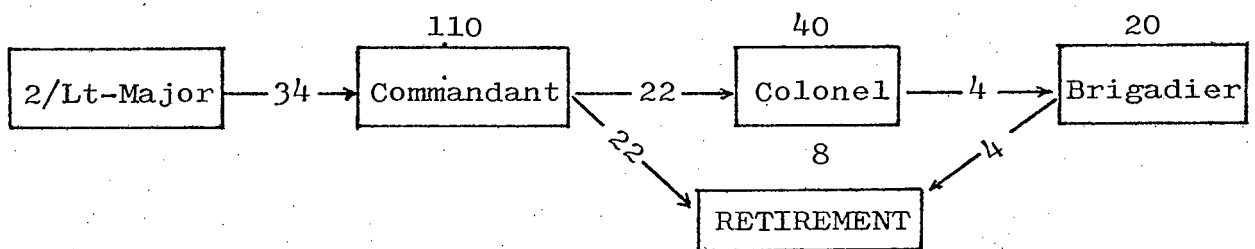


Figure 14 : The Flowgraph

Source: Own research

Before this new scheme could be put into practice an evaluation must be carried out in order to determine what the ultimate distribution of officers would be and whether this promotion scheme would be acceptable to the pilot branch of the Air Force. The method employed was the following:

Let  $k + c + b = T$  where  $k = 110$  Commandants  
 $c = 40$  Colonels  
 $b = 20$  Brigadiers  
and  $T = 170$  Total senior officers

then in year = 0

$$k + c + b = T$$

$$110 + 40 + 20 = 170.$$

the next year = 1

$$X_1 = k - 0,2k - 0,2k + 0,2T$$

$$= 0,6k + 0,2T$$

$$= 0,6k + 34 = \underline{100}. \text{ Where } X_1 = \text{Commandants in year 1}$$

and

$$Y_1 = c - 0,2c + 0,2k - 0,1c$$

$$= 0,2k + 0,7c = \underline{50} \text{ Where } Y_1 = \text{Colonels in year 1}$$

and

$$Z_1 = b - 0,2b + 0,1c$$

$$= 0,8b + 0,1c = \underline{20} \text{ Where } Z_1 = \text{Brigadiers in year 1}$$

Generally

$$X_i = 0,6k_{i-1} + 34$$

$$Y_i = 0,2k_{i-1} + 0,7c_{i-1}$$

$$Z_i = 0,8b_{i-1} + 0,1c_{i-1} \quad \text{Where } i = 1, 2, 3, \dots$$

Solving the three simultaneous equations for a stable distribution we find that:

$$k = 0,6k + 34$$

$$= \underline{85 \text{ Commandants}}$$

$$c = 0,2k + 0,7c$$

$$= 56,7 = 57 \underline{\text{ Colonels}}$$

$$b = 0,8b + 0,1c$$

$$= 28,3 = 28 \underline{\text{ Brigadiers}}$$

In addition to this information we would want to see when this situation is likely to stabilise and we therefore programme this problem on a computer and let it simulate the experience for, say, 16 years. The printout is given in TABLE 2.

TABLE 2. Computer Print-out

Source : Own research

```

5  SET DIGITS  3
10 READ  K. C. B.
20 PRINT "YEARS", "KOMMANDANTS", "COLONELS", "BRIGADIERS"
30 PRINT
40 PRINT  O. K. C. B.
50 Fov  1 = 1 T.O 16
60 LET  X = 0.6K + 34
70 LET  Y = 0.2K + 0.7C
80 LET  Z = 0.8B + 0.1C
90 PRINT I. X. Y. Z.
```

```

100 LET K = X
110 LET C = Y
120 LET B = Z
130 NEXT I
140 DATA 110. 40. 20
150 END

```

RUN YEARS	COMMANDANTS	COLONELS	BRIGADIERS
0	110	40	20
1	100	50	20
2	94	55	21
3	90.4	57.3	22.3
4	88.2	58.3	23.6
5	86.9	58.4	24.7
6	86.1	58.3	25.6
7	85.7	58.0	26.3
8	85.4	57.8	26.8
9	85.3	57.5	27.2
10	85.2	57.3	27.5
11	85.1	57.2	27.7
12	85.1	57.1	27.8
13	85.0	57.0	28.0
14	85.0	56.9	28.1
15	85.0	56.8	28.2
16	85.0	56.8	28.2

From this printout it appears that the situation is stabilising itself in the 16th year of operation: clearly the proposed scheme is a longterm one. Furthermore the maximum time any officer

could stay in the senior officers ranks would be about 10,8 years because if 0,2 Brigadiers retire annually, then the maximum time in this rank will be 5 years; and if 0,2 Colonels retire and 0,1 are promoted annually the maximum time here would be 3,3 years; and finally if 0,2 Commandants retire and 0,2 are promoted annually then the maximum time in this rank would be 2,5 years.

Thus a Major, being promoted to Commandant, would reach the top in 10,7 years. However, Majors are at present being promoted to Commandant at the average age of 30,7 years which means they will reach retirement as a Brigadier at about 41 years of age. Clearly a policy of this nature is not practicable and would also not be acceptable to the pilots as it would not offer them a long enough career. Promotion would be rapid but the rank inflation is too high - a case of too many "Chiefs" (Colonels and Brigadiers) and too few "Indians" (Commandants). A rethink of policy is thus timeously called for before embarking on a costly scheme whose benefits are largely of a short term nature.

Finally the question may be asked why the top position of Chief of the Air Force (Lieutenant General) and the two Major General positions have been omitted from the above deliberations. The answer is that the filling of these positions is subject to strategic and political considerations which do not materially affect the personnel flows in the lower ranks of the hierarchical structure of the S.A. Air Force. In brief they are posts of confidence.

This concludes our review of the three types of models and we now embark on reconciling demand and supply forecasts.

### 3.7 Reconciling Demand and Supply Forecasts

The aim of our analysis of the constituent elements of manpower planning was one of exposing all areas of such planning and, in particular spotlighting those which are needed for the development and proof of our hypothesis. The study of the demand and supply of organisational personnel should provide the data for revealing to management the extent and nature of shortages or surplusses within certain laid down objectives. Demand forecasting we know uses a blend of statistical analysis and management judgement. It is true that uncertainty occurs in both instances but it is in the latter one that the main weakness lies: a case of "it is human to err"!

Supply forecasting, on the other hand, "is mainly concerned with predicting flows, such as recruitment and wastages required to achieve the desired stocks", BARTHOLOMEW, HOPES & SMITH (53). Furthermore it is by now well established that the tendency of staff to leave an organisation depends strongly on the length of service and to a lesser extent on age and other factors like promotion, incentive schemes etc. This fact is particularly applicable to hierarchical organisations like a University or the Air Force.

The calculation of the size of a manpower gap will be illustrated by reconciling the demand and supply forecasts of a thinly disguised hypothetical case in the Air Force. We consider two situations: a steady state one and a general case - both covering a period of 5-years.

In the steady state case the wastages for the 5-year period have been determined and the intake of personnel (recruitment

to the lowest level only) calculated so as to make good these wastages. This is an intake of 64-pilots per year which will maintain a pilot personnel strength of 783 in the Air Force, providing retirements, resignations, transfers, discharges, deaths, training losses etc. remain constant. Any change in the total strength, for example, will necessitate a new intake of recruits. As already stated this ideal is unlikely to be realised in practice, but such a case is very useful as a standard from which to measure departures from the ideal and give warning of future problems that may be inherent in present age and grade distributions, WEBB (U.K.)

With regard to the general reconciliation case a fairly simple example is given. The wastage rates per year are: resignations and transfers - 1,7%; discharges - 1,1%; deaths - 1,3%, and training losses - 3,5%. Age retirements are assumed to vary and early retirements could be contemplated as a way of reducing the age bulge amongst pilots who stayed on in the Air Force after the last World War.

As explanation of the example we consider that firstly in the demand case we shall want to know how many pilots are needed at the beginning of our accounting period (normally one calendar year), plus any additional pilots we estimate might be required during the year. This sum provides the numbers required at the end of the year. Secondly, in the Supply forecast, we start with the number of pilots available at the beginning of the year. All being equal this should be the same as the number required at the beginning of the year. To this total is added the number of pilots

qualifying at the schools during the year. The expected wastage due to retirements, resignations, transfers etc. is subtracted to give us the available number of pilots at the end of the year. The difference between the Demand and Supply estimates predicts the additional numbers required during the year. Table 3 on p. 91 portrays this state of affairs.

TABLE 3. Recruitment need for Pilots in the S.A. Air Force (hypothetical)

Source: Department of Employment and Productivity:

Company Manpower Planning, London, Her Majesty's Stationery Office, 1968, p.34.

DEMAND	1979	1980	1981	1982	1983	TOTALS
1. Number required at <u>beginning</u> of year	783	786	788	790	792	
2. Additional requirements forecast during the year	3	2	2	2	-	9
3. Total requirement at <u>end</u> of year (1. + 2.)	786	788	790	792	792	
<hr/>						
SUPPLY						
4. Number available at <u>beginning</u> of year	783	786	788	790	792	
5. Intake from Flying Training Schools	<u>64</u>	<u>70</u>	<u>64</u>	<u>65</u>	<u>70</u>	333
	847	856	852	855	862	
6. Wastage:						
a. Retirements 15	14	10	12	16		72
b. Resignations & transfers- 10 1,7% p.a.	14	15	15	15		73
c. Discharges- 9 1,1% p.a.	9	9	9	9	9	45
d. Deaths - 11 1,3% p.a.	11	11	11	11	11	55
e. Training losses - 30 3,5% p.a.	<u>30</u>	<u>30</u>	<u>30</u>	<u>30</u>	<u>30</u>	90
75	75	78	75	77	81	
7. Total available at <u>end</u> of year (4.+5.-6)	772	778	777	778	781	
<hr/>						
8. Additional pilots required during year (3.- 7.)	14	10	13	14	11	62

It is interesting to note that the total additional pilots (62 in number) needed in this period is roughly equal to about one intake of pilots from the flying schools. The high additional number required in 1979 could be attributed to military involvement against SWAPO-terrorists in SWA and Angola and the tense political situation on the borders. The point of this conciliation is that with more than one year's warning of such shortages, costly recruitment campaigns can be avoided and new approaches embarked upon - for example men due to be retired could be persuaded to stay on for a year or more or the intake from the flying training schools could be increased so reducing the demand for additional aircrew.

Because forecasts of both demand and supply may turn out to be far off the mark, the main assumptions on which they are based would then require substantial revision. In order to allow for this possibility the personnel division of the Air Force would need to monitor the forecasts closely, comparing them with what actually happens. Early warning of the necessary adjustments required, is given whilst at the same time the planner is placed in a position to test and improve the forecasting methods used. Moreover, a system of review of manpower development is called for: to be done regularly during the forecast period. Such action will provide an assessment of organisational performance in the light of laid-down objectives and forecasts. With this experience, forecasts can be improved and methods made more effective.

### 3.8 The Manpower Plan

The reconciliation of demand and supply forecasting is the culminating point of our manpower evaluation. It follows logically from our discussion and leads us to the manpower plan. Thus the diagrammatic presentation of manpower planning we gave at the beginning of Part 2, is now also confirmed - see figure 5 on page 32. A plan, within the framework of organisational objectives, can now be drawn up laying down policy guide-lines regarding the related problems, procedures of recruitment, training programmes, development, overtime, wages, utilization, incentives, staff relations, redundancy, retirement, welfare and career planning.

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#### 4. CONCEPTUAL CAREER PLANNING

##### 4.1. Introduction.

Although only a small number of organisations do career planning, GLUECK (1), many career plans have two purposes. One is that a career is a job-placement rather than a lifelong work experience and secondly that it is a task of fitting the individual in a career slot in the organisation. The career slot is, furthermore, based on some form of manpower planning and prescribed career programmes. Disappointingly there is no real effort evident that the needs of the individual are matched with the needs of the organisation. SCHEIN (2) underlines the fact that organisations are dependent on the performance of their people, and people, in turn, are dependent on the organisation to provide jobs and career opportunities. DERR (3)'s definition of a career is, thus, most apt:-

"A career is: A sequence of work-related experiences which reflects how a person thinks and acts over time regarding his own internal definition of work success."

Clearly a career is longterm and comprises many job experiences over time including changing careers in an organisation; e.g. a pilot can change career to that of an administrative officer etc. Basically the needs of individuals are to find work situations which provide security, challenge and opportunities for self development throughout their entire life cycles. On the other hand the needs of the organisation are to recruit, manage and develop human resources in order to maintain its effectiveness, survive and grow, SHEIN (4). The harmonious matching of these

needs would greatly enhance the effectiveness of the organisation and the satisfaction and dignity of the individual. The best way to ensure the attainment of this aim is to use formally structured career plans.

Before a specific career plan can be designed and developed the theoretical implications contained in such a plan have to be studied. The results of this study may open an approach to the method of research required to discover ways of enhancing retention, satisfaction and productivity.

#### 4.2 Theoretical Implications

An analysis of the results of a literature review spotlighted the following five commonly accepted concepts, DERR (5): career success; career anchors; career life stages; family career concerns and career politics. These concepts are promising theoretical premises enabling us to study the individual's perspective on his career.

##### 4.2.1 Career Success.

There are many definitions of career, HALL (6). All careers are not, however, successful. A successful aircrew career is one wherein the new entrant, on qualifying for his "Wings" is commissioned and then rises steadily through the various flying and administrative levels until he retires at a rank and in a command position which represents the attainment of his personal aims and the fulfilment of his aspirations in the South African Air Force. This steady rise through the management levels traces the path of success of the career. Two aspects are evident and should be included in all successful

careers: the steady advancement and a defined path of advancement.

According to DRIVER (7) there are four types of career concepts: transient; steady-state; linear; and spiral. He relates these concepts to five career characteristics: (1) When one chooses a career; (2) The degree of permanence of the career; (3) The direction of a change of career when it occurs; (4) The central motive behind a certain career orientation; and (5) The cognitive style that typifies the career. DERR (8), building on DRIVER's ideas, concluded from interviews among US Naval officer students that there was a fifth concept: that of a second career. As we are also dealing with military personnel, it is possible that DERR's findings could be applicable to air crew in the Air Force. Table 4. below illustrates these relationships.

Career Characteristics	CAREER CONCEPTS				DERR
	Transient	Steady-State	Linear	Spiral	Second-Career
CHOICE TIME	Continuous	Youth	Youth	Cyclical	Mid-Life 40-48 years
PERMANENCE	Yearly Changes	For Life	For Life	5-7 years	Bi-Lifetime every 20 years
CHANGE DIRECTION	Usually Lateral	None	Upward Mobility	Lateral Mobility	Lateral Mobility
CENTRAL MOTIVE	Independence	Security	Achievement	Growth	Growth, or Crisis or Forced Situation
COGNITIVE STYLE	Flexible	Decisive	Hierarchic	Integrative	Searching

TABLE 4. Driver's Career Concepts and Derr's deduction.

Source: A Theory and Research Instruments for Studying U.S. Naval Officer Careers  
by C. Brooklyn Derr, August, 1977.

Studying Table 4. it is clear that it is important that we find out which concept is predominant and under which conditions each appears organisationally appropriate. Knowing the definitions of a successful career enables us to understand the various intentions and underlying motives of career behaviour. It is, of course, of particular importance that we know which definition of career success is preferred in the organisation - be it that of the University's administrative staff or that of the aircrew in the Air Force.

#### 4.2.2 Career Anchors.

These are fundamental values, needs, motives and talents which keep persons attached to specific careers. These qualities were termed "career anchors" by SCHEIN (9). A career can be said to be anchored over time in a set of needs or motives which the individual continuously attempts to fulfill through work and rewards obtained from work. The five primary career anchors postulated by SCHEIN are: (1) Managerial competence - this is a sense of satisfaction in building something; getting something accomplished, influencing people; planning and controlling resources and supervising others. (2) Technical-functional competence - i.e. exercising one's technical knowledge and skill such as quantitative knowledge, human relations and corporate planning rather than the managerial process (3) Security - a need to stabilize a career by linking it to a given organisation. (4) Creativity - a strong need to create something on one's own : such as a new business, a new product, a new service or a new method of achieving a specific result. (5) Autonomy and Independence - this is a primary and overriding concern for one's

own freedom and autonomy.

Interviews with administrative staff in the University and officers in the Air Force reveal that both these communities have predominant career anchors as envisaged by SCHEIN. It is possible, however, that there may be some career anchors which are peculiar to these communities and which are different from those discovered by SCHEIN. These anchors represent basic factors in promoting retention, satisfaction and productivity in personnel. They will have to be taken into consideration, either implicitly or explicitly when career plans are drawn up.

#### 4.2.3 Career Life Stages.

Some definite career stages, corresponding to various ages, were identified by HALL & NOUGAIM (10) as well as by MILLER & FORM (11). DALTON & THOMPSON (12) have revived the ideas of career stages.

##### 4.2.3.1 Career Stages.

In a recent study, by DALTON & THOMPSON (1977). into what distinguishes the high performance from the low one, they found that "as individuals successfully move through their careers, they progress through a sequence of stages. High performing individuals who continue to be ranked high by their supervisors throughout their careers tend to cope well with the differing demands of each of these various career stages, while individuals who do not cope as well with those specific demands tend to be ranked lower by their supervisor with respect to performance.

As a result of DALTON & THOMPSON's research four career stages

became evident. Stage 1 - this involves helping, learning and following the direction of others in the organisation: he is the apprentice. Stage 2 - he moves from a subordinate to a colleague type of relationship and becomes an "individual contributor." Stage 3 - he broadens his outlook and starts training and bringing others along - known now as a "mentor". Stage 4 - he moves to a position of providing future direction for the organisation as a whole or for some major section of it; in effect he becomes a "senior statesman".

MILLER & FORM (13), on the other hand, identify five periods of life-work (career) patterns which compare closely with the above; Preparatory stage; Initial stage; Trial stage; Stable-stage; and Retirement stage. Aircrew in the Air Force go through five stages as well: Initial stage; Intermediate development stage; Advanced development stage; Staff stage; and the Executive/Leader stage. These stages are, moreover, related to ranks. The ranks are determined by the type of career the individual follows. In a steady-state career structure the ranks will be: Lieutenant - initial stage; Captain - intermediate development stage; Major - partially intermediate and advanced stage; Commandant - advanced and staff stage; Colonel - executive/leader stage.

#### 4.2.3.2 Life Stages

Closely related to career-life stages is the area of life-stages. DERR (14), reminds us that in recent years much attention and interest have been generated in both the popular and scientific literature regarding the broad issue of adult life-stage development. He points out that the general thesis of this field of inquiry is that the various developmental stages of children do not end at

adolescence but continue on through the adult years. There are stress points in adult years (stages) which adults experience and with which they must deal. The exact timing and impact of these stages differ considerably from person to person because they are influenced by the individual's sex, occupation, mental status, physical condition, marital status etc. According to this theory these adult life stages exist and do not occur entirely at random or idiosyncratically. See below a table depicting these life-stages.

LIFE-STAGE	AGE	PROCESS
1	17 - 22 years	Individual moves into the Adult world
2	22 - 29 years	Individual gets established in Adult world
3	29 - 32 years	There are inner pressures to change and become one's own person
4	32 - 42 years	Settling down to a career and personal/family concerns
5	42 - 50 years	Mid-life transition : individual must resolve critical issues of mortality and decline.
6	50 + years	Mellowing and settling down period : looks back with a sense of satisfaction or regret.

TABLE 5. Life-stages

Source: A Theory and Research Instruments for Studying U.S. Naval Officers Careers. by C. Brooklyn Derr, August 1977.

The underlying issue behind studying career life stage dimensions of work is the extent to which these stages correspond and/or conflict at the various points and the concomitant impact of their incongruency on retention, satisfaction and productivity, DERR (15). This could be an especially important area of exploration for those Air Force officers who pursue a linear definition of career success.

#### 4.2.4 Family.- Career Concerns

Wives and children play a significant and influential role in an employee's career satisfaction, productivity and behaviour patterns.. A supportive study has already been made in the U.S.A. : "Navy Career Counseling Research: Navy Wives Study." GRACE, STEINER, & HOLOTER, (16). The role of parents, relatives and even close friends also has an impact on careers KANTER. (17). These family matters are of particular interest in studying the careers of aircrew in the Air Force. While much has been written about family difficulties when the men are away on active duty, no in-depth study has yet been made of the effects family have on the aircrew careers or on the Air Force. The interrelationship and conflicts between family expectations and Air Force demands, especially now that a low-intensity guerrilla warfare situation exists in South Africa, requires such a comprehensive study! Whilst such a study cannot be undertaken within the scope of this thesis some of the implications of family-career concerns will be taken into consideration in the planning of aircrew careers.

#### 4.2.5. Career Politics

SHEIN (18) defines organisational power as: "A's ability to

modify the behaviour of B in A's desired direction without altering his or her own behaviour." KORDA (19) says, "Power is the ability to bring about our desires". The politics used in an organisation are, therefore, the intentions, means and actions used by an individual or group to gain power.

Career politics, according to DERR (20), "are the intentions, means and actions used by an individual in an organisation to attain, (given his career anchor, his career lifestages and family concerns) his definition of career success". The opportunities available to individuals to achieve their desired careers are, in a large measure, a function of their fortune and skill in the area of career-politics. How they understand the politics, "their fortuitous circumstance", their abilities to behave politically and their achievements will determine who will continue to work hard and gain mutual benefits. Knowing how and why there was political failure might provide insight on career changes and unproductive behaviours DERR (21).

#### 4.3 The Conceptual Career Plan

In our hypothesis we advanced a proposal regarding the desirability of adopting a formally constructed career plan containing four distinct divisions: a development programme; a counselling guide; an appraisal system; and a way of predicting promotion vacancies. We intend to match these divisions with the previously argued career-concepts, illustrating the advantages of incorporating the particular divisions in a career plan.

##### 4.3.1 Career Development

According to GLUECK(22) career development schemes develop

staff to their fullest and provide satisfaction and dignity to employees. Moreover, such schemes reduce turnover and costs as well as reducing the hoarding of high calibre personnel. To justify such an assertion, the five concepts DERR (1977) identified: (see page 101) career-success; career-anchors; career-life stages; family career-concerns; and career-politics, should be present. Clearly a programme that can satisfy such needs must be good and viable!

DRIVER (1977)'s four types of career concepts: (see page 102): transient; steady-state; linear; and spiral immediately suggest a framework within which a development programme could be developed. In the Air Force two types of careers predominate: the steady-state and the linear ones. Noticeably these career structures exhibit all the characteristics portrayed in Table 4 on page 102. Not surprisingly the same is apparent in the University's administrative staff structure. In interviews and discussions with personnel it was found that both organisations preferred GLUECK's definition of a successful career - "the steady rise from one management level to the next". The hierarchical organisational structure of the Air Force and the University is thus once more underlined!

SCHEIN (1974)'s career-anchors (see page 103) are furthermore, particularly relevant in the Air Force. Managerial competence relates to the officer role of the Aircrew. Technical competence, on the other hand, is associated with the role of piloting and navigating aircraft. Aircrew stabilize their careers by linking them to the Air Force through their love of flying and the military way of living - the security career anchor. Creativity is virtually

always present in aircrew as the flying and navigating of aircraft in peace and war roles and in all types of weather conditions tend to make them devise unique means and ways to reach their goals and destinations. Finally the last anchor, autonomy and independence, is a primary quality in aircrew who are trained from the beginning of their careers to lead, take action and be an individual who is an example to his juniors and a worthy associate of his peers.

The connection between the Air Force's career-stages and those identified by MILLER & FORM (1964) have already been shown (see page 105). In a development programme these stages (or phases) have to be clearly delineated as they present the boundaries where one rank (grade) changes to another. A promotion, indicated by a change to a higher rank (grade), brings with it greater responsibilities and authority. The preparation of personnel to cope with these new demands, has to be carefully planned and phased into the various stages of the programme. Like-wise the life-stages of aircrew are related to the attainment of higher ranks, to the phases of managerial development they pass through in time, to age and to the length of service completed. This preparation is done by means of selected training, education and postings to various units throughout the individual's career.

An in-depth study of the implications of family-career concerns has not yet been made in either the Air Force or University. That the family plays an important, albeit a covert role in a person's career, is undeniable! Considerations of the effects a career programme has on the wife and children should be taken in the

design of a career plan. For instance, as far as possible the planner should aim at maintaining an individual's family life when postings to the various units are being contemplated: it is a selfdefeating exercise to post a married pilot to a unit where there is no accommodation available for his family at the unit or nearby.

Probably the finest bit of advice that could be given to any person seeking a successful career, is to heed DERR (1979)'s definition of career-politics (see page 108). A thorough understanding of how and why there was political failure might indicate the need for career changes and provide insight on unproductive behaviours. In designing the content of the career plan, those behavioural aspects which are needed to support the political aspects should be carefully phased in. So for instance, it is important that the individual gives the impression of being an "organisational person" and "of finding ways to make it appear as though he is personally committed to organisational objectives." DERR (23). Although this concept may sound Machiavellian, it is never-the-less essential that the individual should prevent displaying a "negative image". A study of the personal attributes of seniors is one way of gaining valuable insight in how to present an image that is acceptable and organisationally positive.

The integration of these career concepts in a career development programme require knowledge of and the effects of other critical factors. These are:-

- a. The age at which to promote, retire, terminate or move a person.

- b. The length of service at which to promote, retire, terminate or move a person.
- c. The ranks (grades) the individual attains as he moves through the management levels.
- d. The stages (phases) of development of the individual in his career.
- e. The positions occupied or positions moved into.
- f. The educational qualifications needed for the various stages of advancement.
- g. The technical and specific job (role) training required for the efficient execution of the job.
- h. The measure of experience necessary for further advancement.
- i. The periodic assessment of performance to enable the placement of persons in the pipeline for further promotion or otherwise.
- j. Lastly a model or a design depicting the path a person should follow to achieve a successful career in the organisation. By the nature of things this design would serve as a guide to the progress an individual makes of his career over a period of time.

In summary a tabular design of a career development programme can be drawn up containing all these critical career aspects. The requirements, (age, education, training etc.) the individual has to meet in order to follow his planned career, can be inserted

and his career path mapped out. A design for a pilot's career is given in Table 6. below. BURGER (24):-

Essential Military Education	Promotion Courses & Junior Joint Warfare Course	Air Staff Course & Senior Joint Warfare Course	Joint Staff Course	National Defence Course Symposiums: Seminars & Study Periods for Senior Officers			
Military Training	Flying Training Courses, Operational Training Courses; Specialist Courses.						
Education	Bachelor Degree (Behavioural Social or Scientific or Technical Field)	Masters Degree (Specialising in a major taken in his Bachelor's degree)		Ph.D. (Research topic related his field of employment) MANAGEMENT SEMINAR			
Postings	Pilot in Operational Squadrons	Flight & Squadron Commander & Junior Staff Officer	Senior Staff Officer at Commands & AFHQ	Base Commander & Sen.Staff Off.			
RANKS	Lieut. <sub>2</sub>	Captain <sub>15</sub>	Major <sub>17</sub>	Commandant <sub>23</sub>	Colonel		
Development Phases	Initial	Intermediate Development	Advanced Development	Staff	Executive Development		
Years of Service or Age	22	3 5 27	10 32	15 37	20 42	25 47	30 52

TABLE 6 : A Long Service Pilot's Career Development Guide.

Source: United States Air Force for format :

Own research in content.

This programme is, however, only a career progress guide. It is designed to meet the organisations's (i.e. the Air Force) goals for all pilots and so contains a large number of alternative choices which could be followed. The actual career development programme for a particular type of pilot (say a fighter-pilot), is a matching mixture of the individual's choices and the Air Force's expectations of him as a fighter pilot. The planning

of the final career programme should be done by the individual in consultation with either his commanding officer or a staff officer from the Air Force Headquarters. The career-decision taken is crucial to both the pilot and to the Air Force: the latter's effectiveness is in the balance and the pilot's productivity is at stake. This decision should, however, not be irrevocable. The pilot (or the Air Force) should be free to change careers if circumstances so dictate.

#### 4.3.2 Counselling

The important factors which affect personnel policies and organisational effectiveness in career development and counselling are the following:

- a. A stable operating environment is found to be conducive to the development of career plans in an organisation.
- b. There is a tendency in large and complex organisations to use formally structured career plans for their personnel.
- c. The interest an employee has in his career.
- d. The extent to which an organisation is interested in its personnel.
- e. Lastly, the willingness of the superior to counsel the employee sympathetically, wisely and completely. GLUECK (25).

In both the University and the Air Force there is a stable operating environment which should assist the development of formally structured career plans. Because of the lack of such plans, the organisations' interest in their personnel is suspect.

Most employees are interested in their careers; especially those that would prove to be successful.

Organisational intricacies are mysteries to the young career seeking individuals. They need to be guided in evaluating their choices of a career. Their superiors (a natural choice) should counsel them in a manner indicating sympathetic understanding of the individuals' problems. The advice about what path to take, should furthermore be given wisely, and, more important, completely. As usual, the validity of advice depends on the creditability of the counsellor. If the latter had "gone through the mill successfully" and this fact is known, then his advice would be more readily accepted than from one lesser known and experienced.

An aircrew's superior, his commanding officer, is the most obvious choice as counsellor. However, whether he is a better choice than a staff officer, who has access to the complete organisational picture, needs to be determined.

The pilot, already qualified, has selected his flying career. Air Force flying includes many different roles and refinements. So the pilot needs advice on which of the preferences to exclude: should he become a fighter pilot?; a bomber pilot? a maritime patrol pilot? a transport pilot? etc. The counsellor, possessing an intimate and accurate knowledge of the general career development guide (for pilots, say) should be in a sound position to advise the young aspirant about the relative attractiveness of all flying careers. Furthermore, for his advice to be more authoritatively based he needs to know the implications of the four main theories of vocational choice: Trait and Factor Theory; Needs Theory;

Development Theory; and Self-concept Theory. For John Holland significantly hypothesises:

"People with inadequate occupational information make inadequate career decisions more frequently than people with more adequate occupational information."

Clearly the topic of counselling is great and complex. Full justice cannot be given to it in a paper of this nature. Suffice it to point out that counselling is fundamental to career development! Counsellors should be nominated and trained to give advice on the application of career development programmes.

#### 4.3.3 Evaluation of Personnel

An employee's strengths and weaknesses should be measured in order to determine his contribution to the organisation's effectiveness. In addition an appraisal helps to decide who should be promoted, demoted or given a raise in pay; it helps to assign work in accordance with the worker's ability; it stimulates people to improve; it develops morale through stimulating confidence in the fairness of management; it acts as a check on employment procedures; it finds the exceptional talents; and so on. These evaluations can be formal or informal. The informal system is based on political and inter-personal processes: some individuals are better liked than others; some belong to the "right" club or party. The formal system, on the other hand, makes evaluations more rational and equitable. Briefly it indicates to the organisation how the individual is shaping up; to the individual how he is progressing along his selected career path. The major factors

affecting the aspect of career planning - appraisals - are: the task being performed - this influences which method of evaluation should be used; the size of the organisation - this normally determines whether a formal or informal system of evaluation is needed (normally the bigger the organisation, the more formal the system); what the employee's expectations are as a result of the selected evaluation system; and lastly the superiors' attitudes and beliefs in the evaluation of their employees.

The four general aspects of formal evaluation are: who evaluates?; what to evaluate?; who to evaluate?; and what evaluation technique to use?. Evaluators can be: the superior; the rating committee; peer evaluation; the subordinate; the field review; the employee himself. The criteria used in evaluation depends on the task to be performed - for example the quality and quantity of work, the personality of the employee, etc. All persons need to be evaluated. Evaluation techniques could be one of the following: the graphic rating scale; ranking; paired comparison; forced distribution; weighted checklist; forced choice; essay evaluation; the critical incident technique; performance tests; the field review technique; management by objectives, assessment centres; etc.

Many qualities and characteristics can be rated depending on the values accepted and practised by an organisation. Thus there are many different appraisals to be found: the one for administrative officers at the University will be different from the one used for assessing aircrew in the Air Force. So, for instance, at the University, for the administration staff, there would be a

need to assess the quantity, quality and knowledge of work; personality; appearance; sociability; leadership; integrity; co-operation; dependability and initiative. On the other hand in the Air Force, aircrew are rated on temperament; service and general knowledge; power of expression (written and oral); quality of work; adaptability; initiative; analytical ability and judgment; decision-making; planning ability; organising ability; control; teamwork; receptiveness to communication; integrity; sense of discipline; care of subordinates; and social adaptation.

When these measurements are translated into numerical values, the assessment could become a dangerous tool. It is to be remembered that virtually all assessments are of a subjective nature and when numerical values are given, people are inclined to believe they represent absolute measurements e.g. an assessment value of 75% could be interpreted as a person who is only 25% from being perfect! There is, thus, a great need to be circumspect and rating values should be substantiated by peers, superiors and assessment committees before being put into use.

In sum, appraisals assess current performance, estimate future potential and identify what developmental action is required for improved performance and enhanced potential. The subject is vast and cannot be dealt with in depth in this paper. Suffice it to say that it has been shown there is, in general, a need for such a system. A specific appraisal will be discussed when the Air Force's assessment of aircrew is argued in the following section.

#### 4.3.4 Predicting Promotion Vacancies

Promotion is an upward change of position for a person, normally

involving greater supervisory responsibility and different duties from those of his present position, GLUECK (1974). In military circles promotion is identified with a change of insignia: e.g. a Lieutenant has two stars and a Captain three stars on each shoulder. Some staff are not, however, promoted although this is a rare occurrence in the military organisation. Furthermore, not everyone can reach higher positions because of the narrowing of the promotion pyramid's top.

Staff are promoted within both the formal and the informal systems. In the Air Force the formal one is mostly used and promotions take place when vacancies occur as the result of other promotions, retirements, deaths or any other form of personnel wastage. Two of the most important formal criteria used for promotion are merit and seniority. On the informal side, however, there is the personality of the aspirant and his personal influence and lifestyle: he comes from a prestigious family, went to the "right" school, belongs to "one and only" club, political party and so on. In the past members have been promoted to higher positions in the Air Force through the informal system and more will, no doubt, be promoted in a similar way again, but generally the formal method is the operative one. Here the top management have a continuing task to maintain an acceptable and fair balance between merit and seniority promotions.

It is taken for granted that promotion is an integral and vital part of a career plan. But for it to be a logical and consequential event a career development programme must have been worked out. Such a programme will indicate the points in time in the course of an

individual's development at which he can expect promotion. The frequency of promotion depends on the number of vacancies occurring and on the career factor. The career factor is that proportion of survivors to promotion age who receive promotion. A favourable career factor is one of about 60%, JONES (26). Career factors are, moreover, also influenced by the time a person holds a specific rank: if minimum and maximum times in ranks are laid down, then career factors are increased - an individual's chance of promotion is increased!

Vacancies are created by retirements, losses and by promotions from the rank above. Career prospects are a function of age distributions, wastage rates and of fluctuations in the size of an organisation. In order to plan the growth, recruitment and allow for wastages, it is necessary to predict promotion vacancies occurring in the career-span of the individual. This involves long-term career models and short-term forecasts.

Mathematical, actuarial and computer simulation models, some of which have already been discussed, can be used to predict promotion vacancies. Close statistical control is necessary. The selection of the most appropriate model depends on the expertise available in the organisation. We found JONES' method particularly suitable and comparatively easy to handle. An added advantage is that this method is still being used by the Royal Navy - a hierarchically structured organisation like the Air Force and the Administrative staff of the University.

#### 4.4 A Pilot Study: The Administrative staff of the University of Cape Town.

Within the framework of our thesis we have now developed a concept of career planning. Our hypothesized elements are there. There is a need to try them out to see if they are feasible before developing a career plan for the Air Force. A pilot study was called for and the administrative staff of the University of Cape Town was selected.

The choice was not a random one. There are many similarities between the organisation of the University and that of the Air Force. Firstly both organisations are bureaucratically and hierarchically structured. Neither possesses formally structured career plans for their staffs! Lastly having served over four years on the administrative staff of the University and over thirty-eight years in the Air Force gave me a significant insight into these organisations that would facilitate analysis. Furthermore it enabled me to deal with their problems with knowledge and understanding.

The first step in this comprehensive study BURGER (27) was to determine what was needed in the administrative branch to initiate a viable career plan. It was found that all vacant positions were advertised outside the University in the news media. Thus any 'inside' applicant had to see this advertisement before applying: he then had to compete with this large field. Internal advertisement of vacant posts was not practised.

A viable career structure is, however, only possible when there are a known number of posts available to the staff when they move

from one management level to the other. To make this possible meant that outside applications had to be limited: a tentative 10% was proposed. In turn, this meant that 90% of vacant posts could be opened up for staff within the administration. Based on this, a viable career structure's foundation could be laid.

Next the elements contained in a career development programme were investigated. This resulted in the following proposals being suggested. Retirement age - 60 years. Length of service (related to pensionable service, grade and position of incumbent) - 40 years. Grade at which to retire - principal administrative officer. Qualifications: Educational - bachelor degree through Doctorate; Diploma in either personnel management, management accounting, commerce, theory of accounting or in business science. Training - specific training courses to learn the jobs of administrative, senior administrative and principal administrative officers. Assignments and transfers - to provide cross-training and enable a wide spread of knowledge and experience to be assimilated. To facilitate understanding the interactions and relationships between these elements, a career progress guide for administrative staff was constructed - see Table 7.

TABLE 7. Career Progress Guide : Administrative Staff : U.C.T.  
Source : Own research (1977)

TABLE 7 :-  
CAREER PROGRESS GUIDE : ADMINISTRATIVE STAFF : U.C.T.

Years of Service	Phase of Devel.	Grade	Prime Admin. Education	Training	Academic Education	Assignments (transfers)
43						
40	Executive	40 Principal Administrative Officer	39 Attends seminars on Admin., personnel or accounting.  31		Doctorate in a research aspect of Administration (Ph.D.)	
30		30 Senior Administrative Officer	Attends about 2 seminars on admin., personnel, accounting, etc.  21	29 Principal Admin. Officers Advancement Course (P.A.O.A.C.)  25 On-the-job training in new post.		30 Transferred on promotion to P.A.O. to a field selected by the member in his P.A.O.A. Course.  25 Transferred to another post in Administration.
25	Advancement					
20		20 Administrative Officer		19 Senior Admin. Officers Advancement Course (S.A.O.A.C.)	Masters degree in a specific administration aspect (M.A.).	20 Transferred on promotion to a field selected by the member in his S.A.O.A. Course.
15			Attends 1 short course and 2 seminars on administration, or personnel management or accounting, etc.			
11	Development			10 Admin. Officers Advancement Course (A.O.A.C.)	Bachelor's degree in Commerce, Business Science or Social Science.	11 Transferred on promotion to A.O. to a field selected by member in his A.O.A. Course.
10		11 Administrative Assistant				
7	Intermediate		6 Diploma/Certificate course in Business Science, Personnel Management, Commerce, Management Accounting or Theory of Accounting.	5 On-the-job training in a new work.		5 Transferred to another post in Administration at the same level i.e. Admin. Assistant.
6		6		On-the-job training in Admin.		Start work in University Administration.
3	Initial					
1						

The selection of the most effective combinations of times, studies, extra technical and academic qualifications, transfers, etc. in a career plan, is a most difficult and complex task. Someone, well versed in administration, should provide this guidance. Such a person is normally the supervisor: a senior member who should also have received some training in the application of counselling techniques.

The system of appraisal used was woefully inadequate. Investigating what standards needed to be maintained and what qualities had to be measured enabled me to draw up a more comprehensive appraisal form - see Table 8.

TABLE 8. An Appraisal Form

Source: Own research (1977)

AN APPRAISAL FORM

Name:

Position & Grade:

Department:

Reason for Appraisal:

Date: .....(day).....(month).....(year)

Instruction: Tick (✓) the appropriate box. Maximum score 4 x 7 = 28 points.

	Outstanding	Good	Satisfactory	Fair	Unsatisfactory
	(4)	(3)	(2)	(1)	(0)
1. <u>Quality of Work</u>	( )	( )	( )	( )	( )

Thoroughness, neatness, accuracy

Comments:

2. Quantity of Work ( ) ( ) ( ) ( ) ( )

Volume of acceptable work under normal conditions

Comments:

3. Knowledge of work ( ) ( ) ( ) ( ) ( )

Clear understanding of the facts or factors pertinent to the job

Comments:

4. Personal Qualities ( ) ( ) ( ) ( ) ( )

Personality, appearance, sociability, leadership, integrity.

Comments:

5. Co-operation ( ) ( ) ( ) ( ) ( )

Ability and willingness to work with associates, supervisors and subordinates toward common goals

Comments:

6. Dependability ( ) ( ) ( ) ( ) ( )

Conscientious, thorough, accurate, reliable with respect to attendance, lunch periods, reliefs, etc.

Comments:

7. Initiative ( ) ( ) ( ) ( ) ( )

Earnestness in seeking increased responsibilities. Self-starting, unafraid to proceed alone.

Comments:

8. Rating

( )  
OUTSTANDING  
25 - 28

Merit promotion or additional annual increment.

( )  
GOOD  
20 - 25

Promote normally or additional annual increment.

( )  
SATISFACTORY  
17 - 20

Full annual increment

( )  
FAIR  
6 - 17

NOT promotable - reduce annual increment.

( )  
UNSATISFACTORY  
0 - 6

Dismiss or remove from line of promotion - no increment.

Note: Increments increased or decreased by 10% for every 3 points above or below 18,5 points with a maximum deduction of 2 complete notches.

9. General Comments

.....  
Head: Department of.....

.....  
Assessor: .....

Date: .....

Grade: .....

Position: .....

This appraisal enables those in authority to draw up an internal "order of merit". This merit list could be used when considering individuals for promotion : taken in order of ranking. A Selection Committee, constituted to recommend the filling of vacant positions, could use such a list without any members, eligible for advancement making a formal application for the vacancy. Advantages of using such a system would be the increase of morale and loyalty: the University would be demonstrating that it is looking after its personnel - a case of seeing is believing!

Finally the prediction of the number of staff vacancies was attempted. A steady-state career structure was assumed to be valid and the two suggested entry streams (the incumbent staff and the outside applicants) incorporated in the model. The number of personnel in the administrative branch (i.e. from the Registrar to the Administrative Assistants) was downwardly adjusted from 104 to 100 in order to present a smooth and balanced hierarchical structure. The average promotion ages in the various grades were calculated and the subsequent graph smoothed out by adjusting some of them. Wastage losses, due to age retirements, termination, training failures, death on duty, invalidings, voluntary withdrawals, compassionate releases, dismissals etc. were extracted from staff records and expressed as a proportion of the mean strength over the periods concerned; e.g. over the period 38,97 - 65 years of age the wastage rate was 1% per annum; for 37,20 - 38,97 years of age it was 3% per annum; for 31,78 - 37,20 years of age it was 4% per annum; and lastly for 20 - 31,78 years of age it was 3% per annum. Age intervals, for the various grades, as the result of these wastage rates were then determined. Armed with this

information, promotion vacancies for the next year were computed using JONES (1967)'s model (28). The resulting vacancies predicted were: None for Registrar or Deputy Registrar; 1 for an Assistant Registrar; 1 for Chief Administrative Officer; 2 for Principal Administrative Officers; 3 for Senior Administrative Officers; 4 for Administrative Officers. Altogether 16 promotions predicted for the next year. Also the strength of Administrative Assistants required to maintain the steadystate model was calculated to be 25. Furthermore at the proposed retirement age of 60 years, it was computed that: 1 Chief Administrative Officer, 1 P.A.O., 1 S.A.O. and 1 A.O. could be retired.

The results of this investigation were:

- a. Job specifications, job descriptions and evaluations were to be started in order to determine the job content, incumbents grade and the number of posts necessary.
- b. It should be accepted that grades of Administrative Assistant through to Principal Administrative Officer are viable career ranks in the administrative branch.
- c. It should also be accepted that a career length of 40 years or one ending at 60 years of age (whichever comes first) be used.
- d. That staff appraisals be rendered at regular intervals (at least annually) and a merit list be compiled and updated regularly.
- e. That administrative vacancies be filled by 90% of internal

applications and 10% external ones.

- f. Adopting a promotion policy of: "Up, Hold or Out" - details of this policy are described elsewhere.
- g. Appointments of a Careers Staff Officer who should also act as the training officer.
- h. The drawing up of a career development programme in conjunction with the staff involved.
- i. A formally structured Career Plan for Administrative Staff should now be drawn up and circulated among all concerned.

Finally it was interesting to note that the actual number of promotions and appointments the next year (1978) were as follows (my prediction in brackets):-

- a. Four Administrative Assistants were promoted to Administrative Officers, (4)
- b. Two A.O's were promoted to Senior Administrative Officers, (3)
- c. Two S.A.O's were promoted to Principal Administrative Officers, (2)
- d. One P.A.O was promoted to Chief Administrative Officer, (1)
- e. No C.A.O. was promoted to Assistant Registrar, (1)

- f. One Academic Registrar was appointed  
(a new post). (0)
- g. No Assistant Registrar was promoted to Deputy  
Registrar (0)
- h. A Deputy Registrar was promoted to Registrar (0)

The concept of Career Planning in hierarchically structured organisations is viable. It should be applicable for use in the South African Air Force and is dealt with in detail in the next section.

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PART 4. THE SOUTH AFRICAN AIR FORCE

5. CURRENT CAREER PLANNING IN THE AIR FORCE

5.1 Introduction.

There are no formally structured career plans for aircrew in the Air Force. It is a comparatively large organisation: the aircrew (pilots and navigators) alone make up a total of 834 officers out of a total of 1 526 (1979).

Aircrew members hold ranks, varying from Second Lieutenant up to Lieutenant-General; they occupy positions covering the spectrum from aircrew to that of Chief of the Air Force. Even as junior officers, they control and are responsible for aircraft worth many thousands of rands. Furthermore, the higher the ranks they hold the higher the positions they occupy. This entails greater personnel and equipment responsibilities: e.g. an Air Base commander (normally a Colonel) has several squadrons on his base as well as servicing, aircraft - storage and stores facilities worth many millions of rands; moreover there are about 1 500 officers and men (excluding wives and children) on an average sized base. Furthermore the families of the personnel, housed on base, entail additional responsibilities.

Looking at the various ranks and positions offered by the Air Force, it is evident that there should be a large number of potentially exciting and rewarding careers for aircrew to follow. An exciting career is not necessarily a successful one. Aircrews' chances of following successful careers are enhanced if their career plans are formally structured and committed in writing. A lack of such a career plan does not imply, however, that the

aircrew are unproductive and the Air Force ineffective. We shall show, as stated in our hypothesis, that if a formal career plan (for aircrew) containing the package of a career development programme, a counselling guide on the application of the programme, an appraisal system to measure performance and a model for predicting promotion vacancies, is proved to be desirable, then its adoption should be seriously considered by the Air Force.

We intend evaluating the above career plan facets and then testing the acceptability of the principles involved by means of a pilot survey at a typical Air Force installation. The findings of this survey will subsequently be tested by means of a second survey.

## 5.2. Career Development.

The concepts we derived in our previous section have to be applied to aircrew. Types of careers encountered in the Air Force are either steady-state or linear; they possess the characteristics as laid out by DRIVER (1). See Table 4 page 102 The career concepts have already been discussed and we accept them as feasible points of departure. Specific factors, applicable to the development of Aircrew, must be determined and their relationships to the abovementioned career concepts demonstrated.

### 5.2.1 Age.

This is the age at which to promote, retire, discharge or post aircrew members. Clearly the ages at which the above actions occur differ from each other. There is a minimum age for joining up: 18 years. There is a maximum age at which aircrew retire: 60 years. Within this spectrum an aircrew member may be promoted,

his services terminated or he may be posted. Such actions are not only dependent on age, but also on a member's capabilities and career opportunities.

Aircrew members who joined the Service before 16 August 1963 are eligible to retire at 55 years of age, or any age after 55 up to 60 years of age.(2). All 'newer' members have to retire at 60 years of age. From my own experience and from interviews with aircrew there is concern that this age (60 years) is too old for active flying. It is conceded that all aircrew do not remain as active as they were when young with the passing of time: they fly less and spend more time behind a desk. Eventually such aircrew become aircrew in name only and lose the support of their juniors who look up to them for flying leadership.

Military flying is regarded as more exacting, under higher pressure and more dangerous than civilian flying. Airline pilots retire at 55 years of age. The aircraft they fly are big, fully automated with the most modern electronic landing and navigational aid systems. Their military counterparts, particularly those in our Air Force, are not so well equipped and consequently require more manual manipulation. Hence a greater strain on the aircrew!

It is a well-known and accepted medical fact that increasing age causes a deterioration of physical reaction time and co-ordination of faculties. Airline authorities are, no doubt, convinced that, as a result of this fact, the risk of an accident due to a pilot's slower reactions was just not acceptable. Contributing facts, like the number of passengers carried (nearly 500 in

a Boeing 747) and the fantastically high cost of such aircraft (a Boeing 747 Super B cost approximately R51 million) support this decision.

The Air Force estimates that the cost of training a pilot is about R120 000 (1977) - more so now with the inevitable inflation factor applied! A Mirage jet aircraft costs R2,5 million (1977) and is, of course, irreplaceable today with the United Nations arms embargo in force against South Africa. The cost of training a Mirage pilot so that he is operationally effective is R1,7 million according to Lieutenant General R. H. D. Rogers, SSA, SM, DSO, DFC, Chief of the South African Air Force (SA Air Force Association dinner on 16th June, 1978). Clearly pilots in the Air Force and in the Airlines are extremely expensive investments in human resources.

Granted an Air Force pilot does not have to fly as extensively at a later age as does his Airlines counterpart, he nevertheless has to provide flying leadership throughout his career in a more dangerous and invidious environment. Thus if there is a case for one retiring early - Airlines - then there is, ipso facto, a case for the other - the Air Force. Should this view be substantiated by aircrew, then there is a need to examine the implications of decreased retirement benefits and the prospects of a second career.

Retirement at any age earlier than 60 years, means a reduction in benefits due to the lesser amount of service. Consider, for example, an aircrew member retiring at 50 years of age having

served 32 years in the Air Force and having earned an average pensionable salary of R10 000 over his last three years. (The inflation rate and standard of living are omitted for the sake of clarity)

Gratuity :  $G_1 = 6,72\% \cdot R10\ 000 \cdot 32 = R21\ 504$

Annuity :  $A_1 = (32 \text{ years} \times R10\ 000) \div 55 = R5\ 818 \text{ per year.}$

If the member retired at 60 years of age - i.e. 42 years of service:-

Gratuity :  $G_2 = 6,72\% \cdot R10\ 000 \cdot 42 = R28\ 224$

Annuity :  $A_2 = (42 \text{ years} \times R10\ 000) \div 55 = R7\ 636$

The member loses R6 720 in gratuity and R1 818 per year in annuity due to early retirement. One way or another these losses have to be made up or their effects on the individual reduced. Increasing the gratuity by an ad hoc amount for each year served is one way: e.g. an additional amount of R210 for each year served would make up the loss in gratuity. The provision of funds depends, however, on a political decision taken in Parliament. The assessment for the need for such funds is also a political activity resting on value judgements.

The acceptance of the concept of a second career and the preparation for one, present greater difficulties. The Air Force is well aware of this problem: a pertinent case was that of the Medium Service (MS) pilot leaving the Service at age 40 - 45 years old. In a confidential letter (reference LMH/C/951/1 of 8 Sep 69) (3) addressed to the Public Service Commission, it was pointedly stated that: "An appointment of this kind, for

such a short and broken-up career, contains no advantages for the individual." (translated from Afrikaans) and further:

"..... on retirement he will be too old to begin a new career elsewhere..... He...will undoubtedly be able to obtain an appointment in the private sector, but with regard to extending his career there can be no question (of doing so). The fact that the aspirant MS officer may be unaware of these limitations, places the State under a still greater moral obligation to justifiably compensate him for the possible career and salary expectations which he must give up in order to devote the best part of his productive work-life to a dangerous and short career exclusively in the interest of State security." (translated from Afrikaans. op. cit.)

If the retirement age for aircrew is to be brought down from 60 years of age then the concern expressed above for the MS pilot, will be voiced anew but for the Permanent Force (LS) pilot this time. Clearly the remuneration of aircrew and their preparation (whilst in the Service) for another career, should be seen as tasks of primary importance in this event.

Age is also relevant in promotion and the occupying of certain positions: a member may be too young (emotionally immature and inexperienced) for a particular rank and position. Likewise he may be too old and set in his ways. Whilst it is conceded that all persons do not conform in the same way in their age characteristics, it was never-the-less felt that some guidelines, regarding this important attribute, had to be laid down. So the minimum ages and periods in ranks for promotion to the next

higher rank and the maximum period a rank may be held were recommended by the JOUBERT (4) committee: a summary is given in Table 9 below:

	Minimum Period(yrs) in Rank	Youngest Age in Rank	Maximum Period(yrs) in Rank	Maximum Age in Rank
General	-	54	5	60
Lt. Genl.	1	53	4	60
Maj.Genl.	2	51	4	60
Brigadier	3	48	5	60
Colonel	5	43	7	60

Table 9. Recommended Periods in Ranks and Compulsory Retirements.

Source. Appendix F to HSP/C/502/2 over HSP/110/2/2 dd 2 Sept 75. Report: Committee of Inquiry into the Flow of Retirements and Promotions in the S. A. Defence Force (translated).

The average ages of the three top ranks in the Air Force are given in Table 10 below:-

	AVERAGE AGES AT	
	1975	1979
Maj. Genl.	47 years	51,25 years
Brigadier	52,5 years	52,5 years
Colonel	48 years	44,74 years

Table 10. Average ages of Senior ranks in S. A. Air Force

Source: Own research of Personnel Records.

When these ages are compared with the recommended maximum and minimum ages in Table 9 it is noted that, on the average, Maj. Generals would be retired at 55,25 years, Brigadiers at 57,5 years and Colonels at 51,74 years of age instead of the legal 60 years. It is also evident that the Major General group is too young - a sign of the times perhaps.

It is also important to note the ages at which promotion took place in order to evaluate their validity and acceptability: see Table 11. The average age at promotion to a Lieutenant's rank is 23,2 years old. This supports the Permanent Force pattern where a new aircrew entrant joins the Air Force at age 18 years, completes a year's "wings" training, three years graduate education attaining a Bachelor of Military Science degree (B.Mil) and being promoted to Lieutenant a year after leaving the Military Academy. Slight variations are apparent in Table 11 below.

P R O M O T I O N			
For	To Rank	At Age	Period Between Ranks
Major Generals	Lieutenant	22,75 years	-
	Major General	49 years	26,25 years
Brigadiers	Lieutenant	23,58 years	-
	Brigadier	50 years	26,42 years
Colonels	Lieutenant	23,14 years	-
	Colonel	41,84 years	18,7 years

Table 11. Average Ages and Periods Served for Senior Ranks in S. A. Air Force.

Source: Own research of Personnel Records.

Comparing Table 10 with 11 we find that Major Generals have been in their present rank 2,25 years; Brigadiers 2,5 years; and Colonels 2,9 years, all having been promoted within a short period of each other. Age and years of service are inextricably linked together.

5.2.2 Years of Service. It has already been pointed out that the length of service on retirement determines the magnitude of a member's annuity and gratuity. Length of service is not only related to age, however, but also to rank, experience, stages of development, qualifications, training and the incumbent's position.

It identifies the career period: i.e. the period from joining until retirement during which a member reaches a satisfactory rank and position in the Air Force. Furthermore the years of service or age (or both) define the limits or boundaries within which the career development activities, for a member, are formulated and planned: e.g. it attempts to answer the question of when should a member be promoted to the next higher rank? or when should he be made a flight commander? or when should he be posted to another unit? etc. Manifestly it is an important and pervasive variable in career development programming. With retirement at 60 years of age, the maximum number of years of service an aircrew member can serve is 42 years. Career period end-points are defined.

The United States Air Force define their career period to be 30 years of service with the end rank of Colonel (5). This is the career cycle for those Colonels who are not selected for General's rank. In the South African Air Force, Colonels are

promoted to their ranks at average age of 41,84 years after about 22,7 years of service. Should the rule (proposed) of maximum service in rank of 7 years (see Table 9) be applied, then Colonels would retire at about 50 years of age and after about 30 years of service. Such a state of affairs would reinforce the U.S.A.F. policy and lend credibility to S.A.A.F. career planning.

In the case of the Brigadiers, who are promoted to their ranks at the average of 50 years of age and 26,42 years of service (see Table 11) the maximum service rule would cause them to retire at 55 years of age after about 35 years of service (see Table 9) Once again this is a viable concept providing the basis of minimum and maximum periods of service is accepted (6) and we accept GLUECK'S(7) views on the U.S.A.F. career planning efforts.

"... The Air Force is a large organization, of course, involving hundreds of thousands of employees. It has a very sophisticated employment planning system based on determination of needs and a personnel planning system for determining assignments. In conjunction with these systems, the Air Force has developed a complex career development plan for its cadre of officers. The purpose.....is to assure that enough highly qualified officers are available and that these officers are promoted to responsible positions."

The S.A. Air Force is also a large organization, albeit not as large as the U.S. Air Force. It is a like organization and would thus unquestionably endorse the views expressed above about Air Force career development. A career length of 30 years service is attractive even in the abnormal circumstances prevailing in

South Africa today. "Soldiering" (i.e. flying) is, after all the vocation for the young!

5.2.3. Stages of Development. Another important variable to be considered is that of the stages of development an aircrew is expected to go through during his career. SCHEIN (8) gives nine stages of the Career Cycle:- growth, fantasy, exploration (age 0-21); entry into world of work (age 16-25); basic training (age 16-25); full membership in early career (age 17-20); full membership mid career (age 25+); mid career crisis (age 35-45); late career in a non-leadership or leadership role (age 40 to retirement); decline and disengagement (age 40 to retirement); retirement! DERR(9) postulates six life stages: early adult or post adolescence (age 17-22); getting established in the adult world and experiencing it (age 22-29); the age 30 transition where adult life experiences and structure come into question (age 29-32); settling down to career and personal/family concerns (age 32-42); mid-life transition (age 42-50); mellow/settling period (age 50+). These stages can be presented pictorially: (see Figure 15 below).

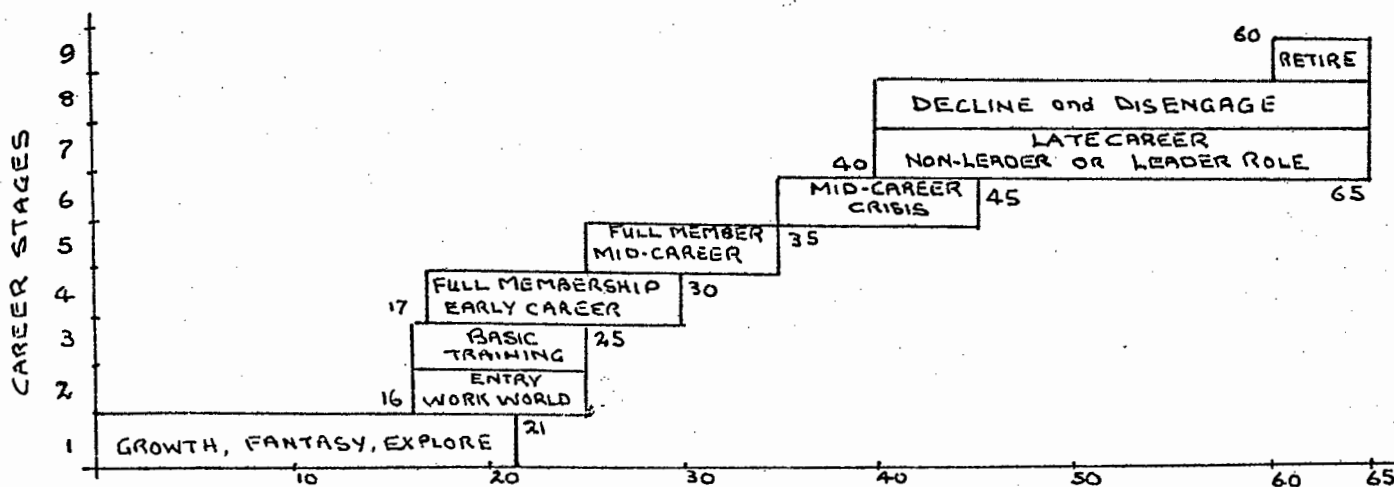


Figure 15: SCHEIN'S CAREER STAGES.

Source: SCHEIN (1978)

When career stages are presented like this, it provides a framework of a career plan, GLUECK (10). Translated to specifics, the Air Force (11) expects an aircrew member to participate in five stages of career development:-

Student Officer (age 18-22); Junior Officer (age 22-34); Staff and Command Officer (age 31-53); Chief and Senior Commander (age 42-57); General Officer (age 50-60). See Figure 16 below.

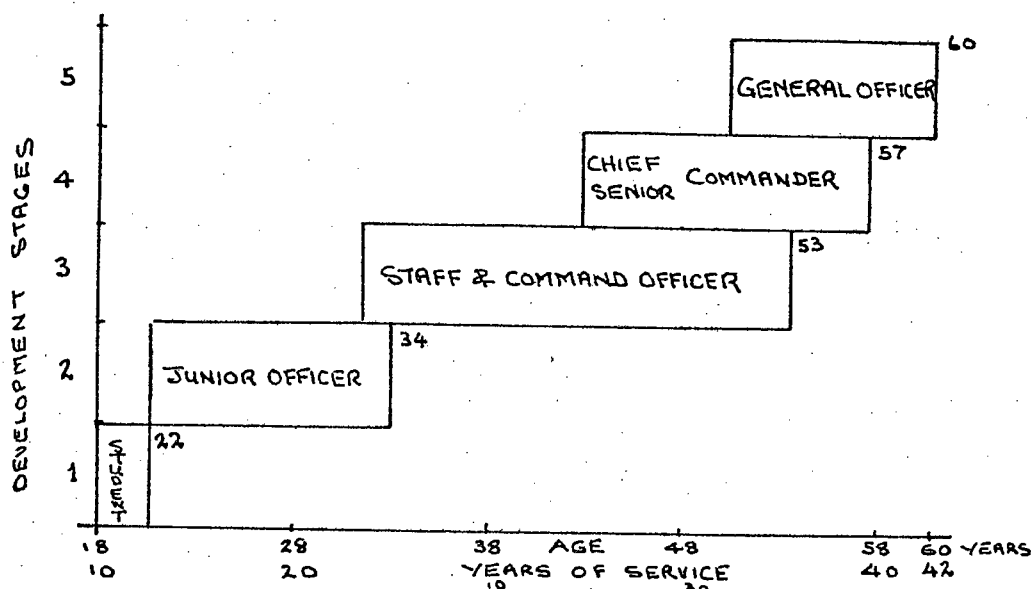


Figure 16 Aircrew (Pilot) Development Stages.

Source: S.A. Air Force: Career Guides - LMH/105/1/2/B  
dd. 29 Jul. 77.

The foundation for career planning in the Air Force can clearly be seen: the other elements need only to be added to this framework to complete the plan. Age and Years of Service are already integrated.

5.2.4. Ranks. In a successful career, age, length of service and rank are all happily integrated and satisfactorily balanced. The problem to be solved is to determine what end-rank readily

and smoothly slots into the mix of age and service? The United States Armed Forces settled, after much deliberation, on the rank of Colonel (or Captain in the U.S.Navy) in a career-period of 30 years of service. For promotion to ranks higher than that of Colonel i.e. Brigadier General, Major General, Lieutenant General, and General a sophisticated selection board procedure was adopted. Those Colonels not selected for Brigadier General were notified and were retired at the end of their 30 years service periods. On the other hand the S.A. Defence Force (and thus the S.A. Air Force) has accepted the retiring age of 60 years as the end point of a career period. Within this period the Air Force elected the top career rank to be that of a General.

Patently this is unrealistic: there is but one General in the whole of the S.A. Defence Force. All the officers of the Army, Air Force and Navy theoretically compete for this position. Moreover, this rank (General) is the rank for the position of the Chief of the S.A. Defence Force: an important post of confidence which is not open to general competition. The Chief of the Air Force is a Lieutenant General and also occupies a post of confidence: thus this rank is not open to competition from Air Force Officers. At present there are four Major Generals and twelve Brigadier positions open to aircrew competition. This means that twelve (12) Brigadiers compete for four (4) Major General positions: one chance in three. There are fifty Colonels who could compete for the twelve (12) Brigadier posts - one chance in four. The chance that an Air Force Colonel can become a Major General is

thus one in twelve. (i.e.  $p = \frac{1}{3} \times \frac{1}{4} = \frac{1}{12}$ ) - one out of every 12 Colonels could reach the rank of Major General. Ninety (90) Commandants compete for the fifty (50) Colonel positions: about one Commandant out of every two could become a Colonel. Diagrammatically the rank structure is shown in Figure 17 below.

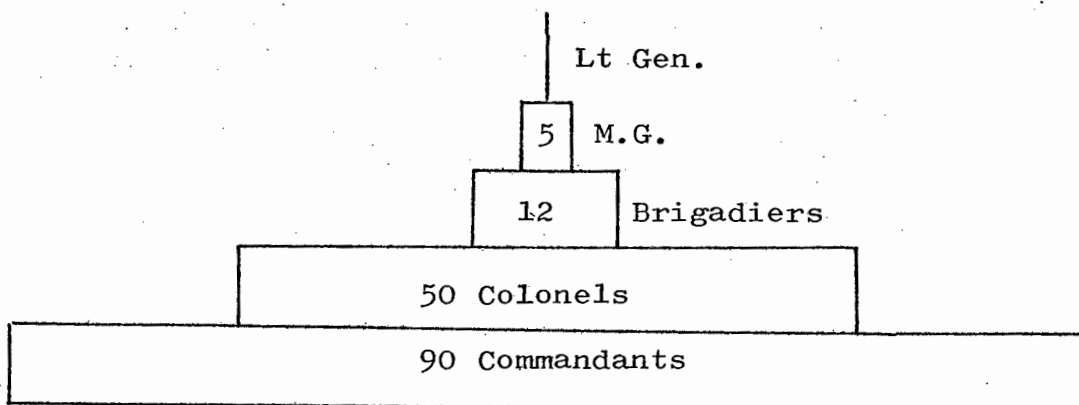


Figure 17. Rank structure in the Air Force.

Two ranks appear feasible as a possible career end-point: Brigadier or Colonel. The starting career-rank is that of 2/Lieutenant. Between these two ends lie the ranks of Lieutenant, Captain, Major and Commandant. In a career plan all the ranks should be related to the progress made by the aircrew.

The Air Force allotted the first four years of an aircrew members to the role of student officer; i.e. he is a Candidate Officer (C.O.) first and is then commissioned as a 2/Lieutenant whilst still under training. Age wise this would take the student officer from 18 years of age to about 22 years.

In the hierarchy of ranks, Lieutenants and Captains are at the lower end of the officer scale. Their flying experiences are limited and they undergo squadron training and flying exercises in order to qualify as operational pilots in the role they have been allocated: i.e. fighters, helicopters, maritime, photographic,

transport etc. Decision making is limited to their immediate tasks but would become more important as they gain experience in administrative and staff work as well as in flying. They are considered the junior officers of the corps and their advancement is at a standard rate of promotion: two years from 2/Lieutenant to Lieutenant; and three years from Lieutenant to Captain (at about twenty-five years of age). As a Captain he would be getting established and experiencing the Air Force world for the next 6 - 9 years by undergoing a variety of preparatory courses and training programmes. The qualifications so obtained entitle him to junior staff officer positions and flight commander in a squadron, senior pilot, etc.

The passing of promotion examinations and flying tests qualifies the officer for promotion to Major, between the ages of about 31 to 34 years. The member is now in an advanced development phase and could be employed in staff and command positions.

Promotion to Commandant (and higher ranks) is by selection which can be expected at about 38 years of age. Command and senior staff positions are now the order of the day. Moreover, the rank of Commandant has traditionally been associated with the genuine command function: squadron commander, flight commander in transport squadrons, and commanders of Air Stations, etc. This is also the period of the "mid-career crisis" mentioned by SCHEIN (1978), and the questioning of "life experience and structure" by DERR (1977). Being a commander, therefore, with its infinite variety of social and organisational responsibilities and attractions (or a senior staff officer at a headquarters) provides a

sound bridging of this difficult life-stage.

The selection to the rank of Colonel takes place at about forty-three years of age and appropriately qualifies for DERR(1977)'s epithet of "mid-life transition". Senior positions, such as squadron commander of a transport squadron, officer commanding an Air Force Base and senior staff officer at a command or Air Force Headquarters, are logical ones for this rank in the executive development phase of an aircrew member's career.

Selection to the rank of Brigadier signifies the end of formal training and schooling in the Air Force. The appointments of commanding officers of a Command and directors at Headquarters are associated with this rank. Promotion takes place at about the age of 48 years.

The four variables discussed so far can now be combined in a tentative career development plan. This is presented schematically in Figure 18 below.

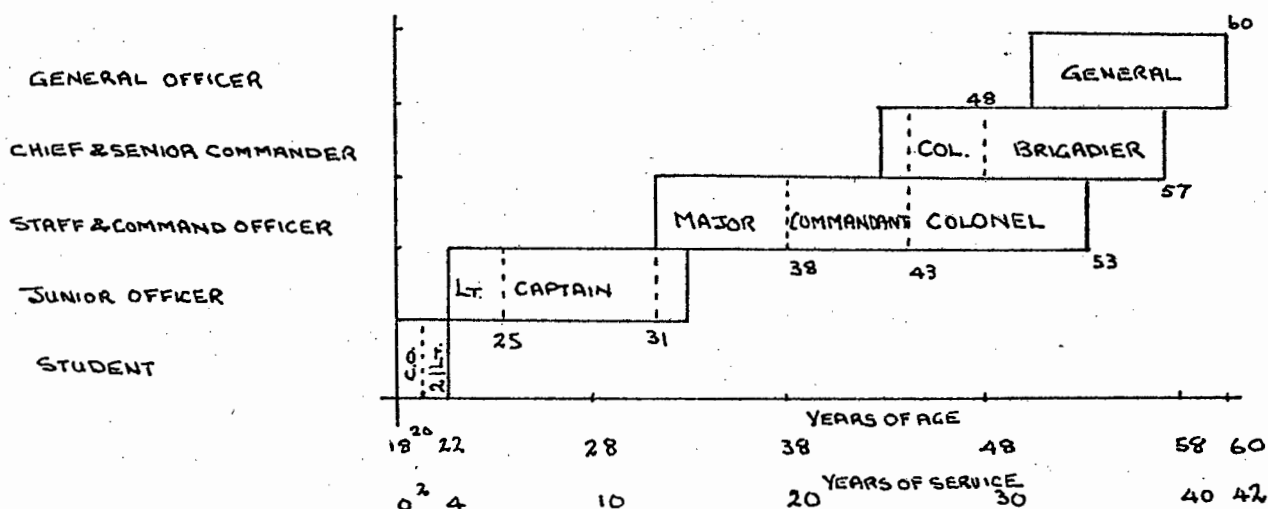


Figure 18 Aircrew career ranks

Source: S.A. Air Force: Career Guides - LMH/105/1/2/B.

dd 29 Jul 77.

It is evident that the retirement age of 60 years has dictated the maximum length of service and the periods within ranks. This approach is not the best, because the needs of the Air Force to recruit, manage, and develop its human resources in order to maintain its effectiveness, survive and grow, cannot rest on an arbitrary age determination. There are signs that the Air Force is seeking other ways to overcome this disadvantage. An attempt is being made to modify the old Medium Service (MS) System of 20 years service into a more flexible one known as Flexible Service (FS) (12). Those officers who display a particularly high flying potential in relation to their command and staff potential, would be retained as active aircrew, with rank not higher than that of Captain, but with annual incremental pay rises up to the top notch of a Commandant's pay scale. They would be retired at 55 years of age i.e. at about 37 years of service. In a survey conducted by the Air Force this scheme was positively accepted by the Permanent Force members (52,5%), the present Medium Service members (77,5%) and the Short Service members (69%). There is, however, one aspect that needs looking into: the top rank of Captain. In a rank-orientated organisation like the Air Force, it will not be long before this inequality in rank could become a source of friction and dissatisfaction. Even in S.A. Airways a four-ringed captain is senior in service, experience and standing to a three-ringed captain. Moreover, senior pilots in the Air Force will not all be of Captain's rank.

Periods within ranks are not consistent when compared with the maximum and minimum periods recommended by JOUBERT (13).

Ranks are higher than they would normally be. This is probably due, in part to aircrew pay anomalies: i.e. members are promoted, given better pay, in order to retain their services. Rank escalation is also the result of military preparation for a possible mobilization due to the tense military-political situation prevailing in South Africa.

Finally one more comment: the Air Force has grouped ranks and related them to development stages: e.g. Lt/Capt to Junior Officer stage, etc. (see Figure 16). This could lead to confusion regarding the authority, responsibility and role delegated to the differently ranked officers. There is an anomaly when a Major, Commandant and Colonel appear to operate on the same staff- and command-level: an impression is created that the same type of work is done albeit at different designated rank levels. A different grouping of the development stages with new pairings of rank associations would resolve this uncertainty. The example in JOUBERT (14) would provide a guide - but also see Figure 19 below for another way.

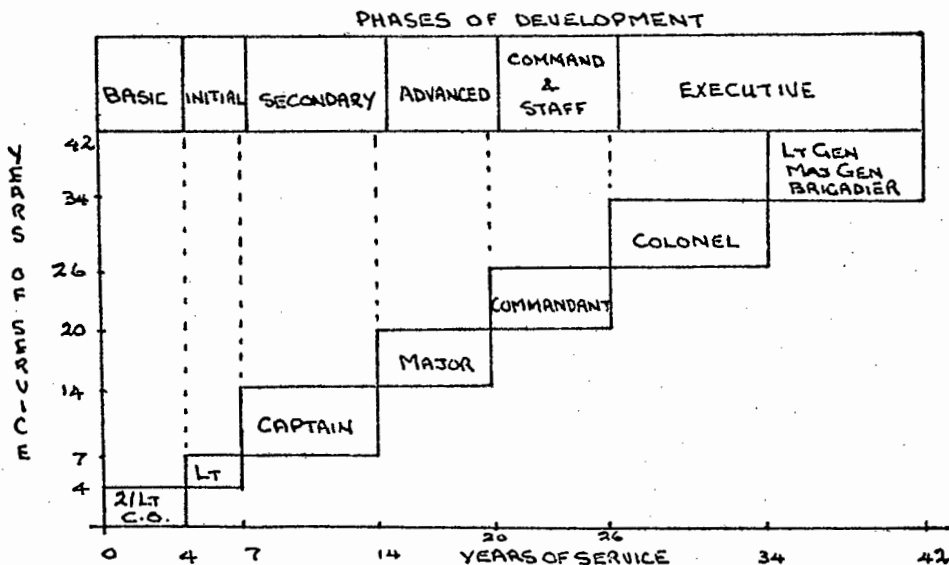


Figure 19. Suggested Aircrew Career Ranks.

5.2.5. Military Development, Training, Educational Development and Experience.

Four parameters of an aircrew's career plan have been identified and evaluated. Within these limits the remaining parameters of positional experience and on-and-off-the-job training have to be developed to suit particular musterings of aircrew: i.e. for pilots or navigators. Job training can, however, be divided into three distinct parts:

- a. Training that is necessary (mandatory) in developing and expanding the military knowledge of an officer so that the tactical and strategical deployment of the Air Force are appreciated and understood. This type of training is known as Military Education.
- b. Training that is necessary and some that is desirable in developing the technical and professional expertise of aircrew e.g. mandatory training includes Wings and Operational Role training. Desirable training includes: Flying and Navigation Instructors courses, Pilot Attack courses etc.
- c. Lastly, off-the-job training that will develop the officer aircrew member in becoming a social asset in his civil and military community. This is known as Academic Training and takes place at Universities.

Positional experience is derived from experiences aircrew gather on being posted (assigned) to the various locations and

positions in their service careers. During this time they would serve as understudies, be counselled and be coached by their superiors. Moreover they would be assigned to different positions which would develop them and broaden their outlook of the Air Force in particular and Defence Force in general.

These eight parameters completely define the framework of a career development plan. The last four mentioned constitute the body or contents of the plan. The order and balance of these elements and the phasing of them into the plan should be the combined task of the personnel section and the individual aircrew member concerned. Early development of aircrew will tend to be rather standardized as there are many similar positions to be filled. As aircrew progress however, along the career path and develop different competencies, the plan becomes more differentiated or individualized. Developing a plan for an individual aircrew (with his participation) is an essential part of the process of career development. GLUECK (15).

The Air Force has identified these parameters and has included them in the proposed career guides (16) as follows:

- a. Military Development.
- b. Training.
- c. Educational Development.
- d. Experience.

5.2.5.1 Military Development. This type of training is mandatory. It includes topics such as: Officers Orientation; Junior and Senior Land-Air Warfare; Staff and Command (for Juniors and Seniors);

and Joint Staff training. These courses are phased throughout the career of the officer, the exact time being fixed by service exigencies.

5.2.5.2 Training. This phase starts with two logical and compulsory courses: Wings-training followed by Operational Role-training. Here-after a number of desirable courses are offered: Forward Air Controller; Operations/Intelligence Officer; Pilot Navigation; Flying and Navigation Instructor; Pilot Attack Instructor; Survival Instructor; Test Pilot; Photo-interpretation; and Flying Safety. A particular course or courses are selected, depending on the career path a particular aircrew is following and this is phased into his career pattern.

5.2.5.3. Educational Development. The Air Force has not been very ambitious in advocating academic education for its members. Only two degrees are suggested as desirable parts of training: Bachelor of Military Science (B.Mil) in aeronautics and behavioural sciences; and B.A. (Honours) in Strategic Studies.

5.2.5.4. Experience. This is the experience aircrew accumulate from the various postings (assignments), be they work at various locations or the attending of courses. So, for instance, the Candidate Officer or 2/Lieutenant will, during the Student Officer's phase, attend an operational conversion course at one of the Advanced Flying Schools or at 11 Squadron (Operational training); or complete flying training for "wings" at the Flying Training Schools. Or during the Chief and Senior Commander phase the aircrew, Colonels or Brigadiers are expected to be appointed as

Air Force Base commanders or Officers Commanding Air Force Commands. Moreover at this level these officers would be expected to attend the Joint Staff Course and could, if they wish, study for their B.A. (Hons.) degree (if applicable).

Once again the details of these postings, during an officer's career should be worked out by the personnel section based on the combined recommendation of the aircrew and his senior officer. Fortunately this is now the case; the postings aircrew want are frequently granted. Full implementation will take time but the advantages accruing from such action is, of course, greater satisfaction, happier men and a more effective Air Force!

5.2.6. The Programme. A career development programme could now be drawn up. This should take the form of a formally structured document authorised by the Chief of the Air Force. Career guides for the various musterings have been constructed, based on the programme (see Table 14 - Career Guide: Pilot), and sent to personnel concerned for their comments, suggestions and amendments. And so the needs of the individual aircrew could be matched with the needs of the Air Force.

Career development contains, however, more than just the career development plan. Counselling of Aircrew in his progress in achieving career goals, is equally important. Part of this counselling should come as the result of performance evaluation, but the rest is counselling and coaching that is an ongoing part of a senior officer's role for his subordinates.

↑ = Course can be done up to and with rank of  
 D = Desirable M = Mandatory

CAREER GUIDE : PILOT

SERVICE YRS	LEVEL	RANK	MILITARY DEVELOPMENT	TRAINING	EDUCATIONAL DEVELOPMENT	EXPERIENCE
42	General Officer	General				Appointment as Chief or Chief of Staff
32	Chief and Senior Commander	Brigadier				Appointment as Command OC or as Director at Headquarters
24	Staff and Command Officer	Colonel	Joint Services Staff (M)		BA(Hons) Strategic Studies (D)	Appointment as AFB Commander or as SSO'S at Commands or Headquarters
13	Staff and Command Officer	Commandant Major	Senior Educational Technology (M) *4 CMDT Staff & Command (M) ↑CMDT Senior Land Air Warfare (M)	Flying Safety (1) *2 ↑CMDT OPC as required Photo interpretation (D) *2 ↑MAJ Test Pilot (D) *2 ↑MAJ Survival Instructor (D) *2 ↑MAJ Pilot Attack Instructor (D) *2 ↑MAJ Flying Instructor (D) *2 ↑MAJ Pilot Navigation (D) ↑MAJ		Appointment as Unit Commander or as Staff Officer at Commands & Headquarters. Above average officers will be considered for duty at Joint HQ or Air Force College. Appointment as CMDT Flying. Some Officers remain on Flying (medium service)
4	Junior Officer	Captain Lieutenant	Junior Staff and Command (M) Junior Officers Admin. (M) Educational Technology (M) *3 Junior Land Air warfare	OPS/Int (D) *2 ↑MAJ Forward Air Controller (D) *1 Capt Operation training (M) Wings Training (M)	B. Mil in Aeronautics or Behavioural Sciences	Concentrate on improving Flying skills. Above average officers in flying and Admin. skills will be considered for Junior staff appointments at Command level.
4	Student Officer	2/Lieut. Can. Off	Officers Orientation (M)		STD 10 with Maths (M)	Operational conversion at advanced flying schools or 11 Squadron (Operational Training) complete flying training at flying training schools (prerequisite)

\*1 Only Helicopter, Impala, & Light Aircraft Pilots

\*2 Only Specialist Applications

\*3 Core Runner to Instructors Course

\*4 Only for appointment as Chief Instructor or Commander of a Training Unit or as Staff Officer at Training Command or Personnel Development at AFHQ or CSP

Table 12 CAREER GUIDE : PILOT

Source : Letter: LME/105/1/2/B dd 29 July 77.

### 5.3. Career Counselling.

Because there are no formally structured career plans in existence in the Air Force, little if any career counselling has been done. There are strong indications that this matter will be corrected in the near future when career planning is developed more fully. It is, thus, not out of place to review counselling and show how the Air Force can (and should) apply it to aircrew for their and the Air Force's benefit.

LINDHARD (17) defines a careers counsellor as one who ".....is called upon to give more than information and should know how to give less than advice." A fairly detailed summary of counselling was given in the previous section of the thesis. Here some guide-lines will be provided to assist Air Force career counselling.

It is, of course, an essential part of a senior officer's role to help juniors develop and reach their goals. One way to help is by example which is then imitated. However, senior and junior officers must have a desire "to create a learning situation if it is to work", (18). In this manner the junior is coached and counselled more directly. Counselling may be given formally or informally. In both instances the counsellor must be approachable and invite the confidence of the junior officer seeking advice. This implies that counselling is given during some form of interview.

The method most often used in counselling interviews is the unstructured, in-depth, or free association one. The junior is

encouraged to do most of the talking: he has the initiative and runs the interview by getting his problem "off his chest." A fruitful discussion can then follow in advising the junior what the best solution to his problem would be, bearing in mind the Air Force needs.

The outcome of performance evaluation (or merit rating, or performance rating or performance appraisal) provides an excellent opportunity for the senior officer to approach the junior with advice and counsel. Normally this would take place during a formal interview when the results of the appraisal are communicated to the subordinate. It is true that poor communication destroys the counselling function of evaluation.

In the Air Force not all evaluations are communicated directly to the aircrew. Usually only negative or adverse evaluations are communicated to the members concerned. The advantage of discussing the strong and weak points, brought out by the aircrew's annual evaluations is so evident that it is difficult to understand why it is not being done on a regular basis. Both the individual and the Air Force can only benefit if weak or poor performances in aircrew are aired, discussed and ways shown how to improve.

MAIER (19) formulated three types of evaluation interviews: "Tell and Sell", "Tell and Listen", and "Problem Solving". He believed that the latter approach was the best. The Air Force counsellor could evaluate these three types and select one that he feels is most suited to a particular aircrew member or instance.

#### 5.4. The Appraisal System.

In 1976 the Air Force introduced a new annual appraisal

system for senior officers: Commandants, Colonels and Brigadiers. VAN DEN BOS (20). This was the result of an in-depth study of appraisal systems used both by the military and civilian agencies in South Africa and abroad. The main objective of the new appraisal was not only to "assess current performance but also to estimate future potential and to identify the development action required for improved performance and enhanced potential". Second Lieutenants, Lieutenants, Captains and Majors are assessed using the S.A. Defence Force Efficiency Form DD2170 (See Appendix B). It is an accepted and tried appraisal and will not be discussed. The Air Force's appraisal system is new, is still being tried, but holds a promise of a valid evaluation of senior members. Three forms are used: Personal Review; Appraisal Report; and Appraisal Analysis form.

#### 5.4.1 Personal Review.

This form is to be filled in by the officer who is to be rated. It serves as preparation for an interview with his immediate supervisor (see Appendix C) later on. Furthermore it gives the ratee an opportunity to "think objectively and specifically about his work, his capability in handling his work and his future in the Air Force." The rating officer, on the other hand, is given an insight into how the rated officer saw himself and his job and what aspects need to be discussed in detail at the interview. Information gleaned from this form also assists the Reviewing Officer, Personnel Division and the Chief of the Air Force in their assessments of the rated officer's potential and in formulating plans for his future employment.

#### 5.4.2 Performance Appraisal.

According to VAN DEN BOS (21) the purposes of the Appraisal form (see Appendix D) were to provide a profile of the character, achievements and potential of the ratee, to serve as a guide for individual development action and as a pointer to future employment. The form is used, firstly by the immediate superior who rates current performances, suitability for promotion and records the main points of the Personal Review. Secondly it is used by the next higher supervisor who reviews the assessment. Finally the Chief of the Air Force decides on the promotability and future employment of the rated officer.

In order to lend credibility to the assessment the rating officer has to indicate the basis on which the assessment was founded i.e. whether his association with the ratee has been continuous, frequent, intermittent, very infrequent, or only on written and/or telephonic contact. The twenty aspects of performance are rated on a 9-point scale: see Table 13.

Exceeds Requirements		Meets Requirements		Below Requirements	
By Far	: 9	Comfortably	: 6	Slightly	: 3
Markedly	: 8	Adequately	: 5	Markedly	: 2
Slightly	: 7	Only Just	: 4	By Far	: 1

Table: 13 The 9-point rating scale.

Source: Appraisal Guide: LMH/HLSP/C/105/2/1 dd 31 Oct 78.

Scores of 9, 8, 2 and 1 are to be substantiated by quoting critical incidents. In the Appraisal Guide (22) an extensive

list of rating definitions are given for the 20 aspects to be assessed - this is to ensure uniformity of definition. After the interview the rater indicates the ratee's suitability for: accelerated promotion; normal promotion on seniority; no further promotion; not being worthy of present rank. Likewise recommendations are made for future appointments to Command, Staff or Diplomatic posts and future development actions such as further schooling, training, higher education etc. All these recommendations are reviewed and the final decision rests with the Chief of the Air Force.

#### 5.4.3. Appraisal Analysis.

Final comments about the appraisal are entered on the Appraisal Analysis form. This is retained in the Personnel Division for future statistical analysis and developmental planning.

#### 5.4.4. Comment.

The Air Force appraisal system is a most comprehensive and thoroughly argued academic piece of work. It comfortably meets the three principle reasons for developing a formal evaluation programme. GLUECK (23):

- a. A formal performance evaluation system, properly designed and implemented, provides the occasion for review of a person's work related behaviour....."..regularly focusses the superior's and employee's attention on employee development as an important part of their jobs which can contribute to improved organizational and personal effectiveness."

b. It also provides better data for promotion decisions.

"The formal approach attempts to make the evaluation process more objective, and thus more valid, as well as more comparable from one employee to others in order to provide an equitable control over the promotion process."

c. Lastly the analysis of such an evaluation system...."can be used as an input when wage and salary increases are considered."

The last principle reason mentioned above, is not applicable, as wage and salary increases are a function of the Public Service Commission.

As in any new system, problems were experienced and remedial actions applied. So VAN DEN BOS (24) brought out several changes in 1978 for completing the new assessments that year. Since its inception three applications of this appraisal system have been used and according to VAN DEN BOS "..... somewhat modified as we went along." He found that the usual tendencies of inflation and poor discrimination were very evident. On analysing the three efforts he found that the average scores (based on the 9-point assessment scale) were: 6,12; 6,24; and 6,36 with the standard deviations less than 1,0 in all runs. Thus distinguishing the "best from the rest" has proved to be very difficult. However, the updating of this system is an on-going task and no doubt there will be many changes before a viable one for the Air Force is completed.

One cannot help feeling that completing this annual appraisal must be very time-consuming for the ratee, the rater, the reviewer,

the Personnel Division and the Chief of the Air Force. At present there are fifteen Brigadiers, seventy-one Colonels and one hundred and seventy two Commandants to be assessed in 1979. And this is only for the senior officers. The bulk of the officers from 2/Lieutenants to Majors go through a similar, but somewhat shorter, process. Moreover, South Africa is in a tense military-political situation with its Armed Forces (including the Air Force) on a near-combative footing. Time must be at a premium for most officers and thus it may be possible that full justification for this system cannot be given at this time. Should this be the case, then consideration should be given to:

- a. Simplifying the scheme.
- b. Training all evaluators in interviewing, counselling and developmental methods.
- c. Drawing up a "merit list" from the results of the evaluations and so select the "best from the rest" for promotion and positional development.

Selecting the "right" person for promotion is facilitated by using the results of appraisals: the better a person's results the more likely the promotion. However, promotions are made to fill vacancies which are caused by: promotions; deaths; discharges; resignations; transfers; retirements etc. A system or model which can forecast promotion vacancies, would greatly assist in the planning of aircrew careers - this is the next topic for discussion.

#### 5.5. Promotion Vacancies Prediction.

Predicting promotion vacancies is tantamount to working out

career structure statistically! Several methods of forecasting vacancies have been described previously. Of them all the actuarial method advocated by Elfryn JONES (25) appears the most attractive and practical. By way of explanation he used this method to illustrate officer career planning in the Royal Navy (RN). Whilst the RN has about 12 000 officers compared with the S A Air Force's 1 700 officers, JONES (26) says that ..... "the techniques discussed in the paper are of general applicability to any staff of reasonable size which is subdivided into distinct grades. They are known to have been used for a staff of about 75....." So clearly the Air Force with its rank structure as distinct as that of the Royal Navy, qualifies as a potential user of this method. Moreover, JONES, continued stating that ...."The planning procedures outlined are designed to provide practical answers to practical problems (e.g. how many recruits to enter next year) and have stood the test of time." (27). The Air Force is made up of practical people and this method is made the more creditable by having been used successfully (for more than 20 years) by a sister military organization of the RN's calibre.

The Air Force's aircrew officers group is made up of three distinct "streams" of officers who entered on different terms with different career prospects, viz., Long Service (LS) - the permanent force element; Medium Service (MS) - the purely flying element contracted for a 20-year service period; and the Short Service (SS) - used mainly in manning the Active Citizen Force Squadrons for periods from 4 to 10 years. VAN DEN BOS (28) has proposed a new scheme wherein the MS and the SS streams are to be phased out and replaced by a more versatile one to be known as the Flexible Service (FS). It seems more than likely that this new scheme will be

accepted and introduced in the near future. The MS and SS streams would gradually fade away leaving only the Permanent Force and FS aircrew group. The FS, in turn, would take the place of the old MS and be the pure flying element continuing in service until they are retired, as Captains, at the age of 55-years. A hypothetical study of the whole Air Force group of officers (aircrew) will be presented to illustrate this actuarial technique (with some modifications) and demonstrate a statistical way of predicting promotion vacancies.

The basis of this technique, which is also policy in the Air Force, is that the numbers in each rank are fixed and that promotions occur only when there are vacancies in the rank above. The proportion of posts in each rank, is the predominant factor determining career prospects in the long run whilst in the short term the position will depend on the age distribution of the present staff and whether there has been an expansion or contraction lately.

The Air Force is moving towards ultimate stability in size and age distribution of its staff - i.e. the Steady State position. Staff projections, by age and rank should be made up to about 10 years ahead in order to forecast retirement and wastage losses and hence promotions and recruiting needs. Planning decisions based on these two concepts, would minimize the risks of solving short-term problems by measures which may create long-run problems.

#### 5.5.1. The Parameters.

Four parameters have to be determined before this technique can be applied: the proportion of posts in each rank; the average ages at which officers were promoted; the wastage rate in the

various age groups; and the age intervals. Detailed calculations are given in Appendix E.

a. Posts in ranks.

<u>Ranks</u>	<u>No. Authorized</u>	<u>% Authorized</u>	<u>Actual No.</u>
Lt. General	1	0,1%	1
Major Generals	1	0,1%	4
Brigadiers	12	1%	12
Colonels	34	4%	50
Commandants	92	10%	90
Majors	139	15%	149
2/Lieutenants-Captains	642	70%	528
	<u>921</u>		<u>834</u>

b. Average Promotion Ages.

These are the actual and adjusted ages at which the under-mentioned officers were promoted to their present ranks;:

Average Ages

<u>Ranks</u>	<u>Actual Age</u>	<u>Adjusted Age</u>
Lt. General	54 years	54 years
Major Generals	46,5 years	52 years
Brigadiers	50 years	48 years
Colonels	41,86 years	42 years
Commandants	37,32 years	38 years
Majors	31,91 years	32 years

c. Wastage Rates.

The wastage rate in age groups - "v" is the result of death, resignations, remusterings, discharges etc. but not retirements. These have been calculated over 5-years. The actual rate has been modified and smoothed to fit in with long-term trends and is expressed as a percentage of the average strength over a given age group.

<u>Actual Age Group</u>	<u>Modified &amp; Smoothed Age Group</u>
Between 20 - 31,91 years : 7%	Between 20 - 32 years : 5%
31,91 - 37,32 years : 2,85%	32 - 38 years : 2,5%
37,32 - 41,86 years : 2,5%	38 - 42 years : 2%
41,86 - 60 years : 1,6%	42 - 52 years : 1,5%
	52 - 60 years : 1%

d. Age Intervals with Wastage Rates.

Between 54 - 60 years	$n_1 = 6$	and $v_1 = 0,01$
52 - 60 years	$n_2 = 8$	$v_2 = v_1 = 0,01$
48 - 60 years	$n_3 = 12$	$v_3 = 0,015$
42 - 60 years	$n_4 = 18$	$v_4 = v_3 = 0,015$
38 - 42 years	$n_5 = 4$	$v_5 = 0,02$
32 - 38 years	$n_6 = 6$	$v_6 = 0,025$
20 - 32 years	$n_7 = 12$	$v_7 = 0,05$

5.5.2. The Formulae.

The following formulae are used: (Source: E. JONES - "Officer Career Planning in the Royal Navy" Paper presented : September 1967; Conference of the Operational Research Society)

$$S_n = e^{-nv}$$

= number of Survivors per 1 beginner after "n"-years at a wastage rate of "v"

$$N_n^v = \int_0^n e^{kv} dk = (1 - e^{-nv})/v$$

= Strength at the end of n-years per 1 entry per year

$$e = 2,7182818 = \text{constant}$$

N = authorized strength of ranks

$$= b_i N_n^v \quad i = 1, 2, 3, \dots$$

$$= b_i \frac{(1 - e^{-nv})}{v} \quad \text{Where } b_i \text{ is the average number of promotions at a given average age in a rank-group.}$$

5.5.3. Promotion Prediction and Recruitment.

Starting with the highest rank, the promotion base ( $b_i$ ) is calculated for each rank group in order to obtain the required strength that would make such a promotion possible.

a. Lieutenant General

Number of Promotions x Strength = Authorized Strength

$$b_i \times \frac{1 - e^{-n_1 v_1}}{v_1} = 1$$

$$b_1 = \frac{0,01}{1 - e^{-6.0,01}} \doteq 0,17 \quad \underline{\text{NO PROMOTIONS.}}$$

b. Majors General and Higher

$$b_2 \times \frac{1 - e^{-n_2 v_2}}{v_2} = 1 \text{ Major General} + 1 \text{ Lt.General} = 2$$

$$b_2 = \frac{0,02}{1 - e^{-8.0,01}} \doteq 0,26 \quad \underline{\text{NO PROMOTIONS.}}$$

c. Brigadiers and Higher.

$$b_3 \times \frac{1 - e^{-n_3 v_3}}{v_3} = 1 \text{ Major General} + 1 \text{ Lt. General} + 12 \text{ Brigadiers} = 14$$

$$b_3 = \frac{0,21}{1 - e^{-12.0,015}} \doteq 0,78 \quad \underline{1 \text{ PROMOTION TO BRIGADIER}}$$

d. Colonels and Higher.

$$b_4 \times \frac{1 - e^{-n_4 v_4}}{v_4} = 1 \text{ M. General} + 1 \text{ LtGen} + 12 \text{ Brigadiers} + 34 \text{ Colonels} = 48$$

$$b_4 = \frac{0,72}{1 - e^{-18.0,015}} \doteq 3,04 \quad \underline{3 \text{ PROMOTIONS TO COLONEL}}$$

e. Commandants and Higher.

$$b_5 \times \frac{1 - e^{-n_5 v_5}}{v_5} + b_5 \times e^{-n_5 v_5} \times \frac{1 - e^{-n_4 v_4}}{v_4} = 92 \text{ Comdts} + 48 \text{ Higher}$$

$$b_5 \left[ \frac{1 - e^{-4.0,02}}{0,02} + e^{-4.0,02} \times \frac{1 - e^{-18.0,015}}{0,015} \right] = 140$$

$$b_5 \doteq 7,6 \quad \underline{8 \text{ PROMOTIONS TO COMMANDANT}}$$

f. Majors and Higher

$$\begin{aligned}
& b_6 \times \frac{1 - e^{-n_6 v_6}}{v_6} + (b_6 \times e^{-n_6 v_6} - b_5) \times \frac{1 - e^{-n_5 v_5}}{v_5} \\
& + (b_6 \times e^{-n_6 v_6} - b_5) \times e^{-n_5 v_5} \times \frac{1 - e^{-n_4 v_4}}{v_4} \\
& = 139 \text{ Majors} + 140 \text{ Higher} = 279
\end{aligned}$$

$$\begin{aligned}
& b_6 \times \frac{1 - e^{-6.0,025}}{0,025} + (b_6 \times e^{-6.0,025} - 7,6) \times \frac{1 - e^{-4.0,02}}{0,02} \\
& + (b_6 \times e^{-6.0,025} - 7,6) \times e^{-4.0,02} \times \frac{1 - e^{-18.0,015}}{0,015} \\
& = 279
\end{aligned}$$

$$b_6 \doteq 19,56$$

20 PROMOTIONS TO MAJOR

g. 2/Lieutenants to Captains

It is assumed all Captains will be promoted to Major at 32 years of age.

2/Lieutenants receive their promotion at age 20 years

Lieutenants receive their promotions at age 22 years

Captains receive their promotion at age 25 years.

h. Recruitment or Promotion of Candidate Officers to 2/Lieutenant

$$b_7 \times e^{-n_7 v_7} = \text{Captain promotions to Major} = 19,56.$$

$$b_7 = \frac{19,56}{e^{-12.0,05}} \doteq 35,64$$

i.e. 36 2/Lieutenants to be taken on annually.

i. Strength to Maintain the Structure.

$$N_5 = b_7 \times \frac{1 - e^{-n_7 v_7}}{v_7}$$

$$N_5 = 35,64 \frac{1 - e^{-12 \cdot 0,05}}{0,05} = 321,64$$

= 322 2/Lieutenants and Captains are required to maintain this steady state structure.

5.5.4. Career Factors.

Survival rates at the various ranks and at the ages of 32, 38, 42, 48, 52, 54 and 60 years have been calculated (see Appendix E). This was done in order to compute the career factors for Majors, Commandants and Colonels. A career factor is the proportion of survivors to promotion age who receive promotion, or put differently: it is the number of Promotions to the next higher rank at the average age of the promotion divided by the number surviving in the rank.

a. Captains to Majors: 100% - assumed all Captains are promoted.

b. Majors to Commandants:  $\frac{b_5}{\frac{n_6}{S_{v_5}}} = \frac{7,6}{16,83} = 45,2\%$  at 38 years of age

c. Commandants to Colonels:  $\frac{b_4}{\frac{n_5}{S_{v_5}}} = \frac{3,04}{7,02} = 43,3\%$  at 42 years of age.

d. Colonels to Brigadiers:  $\frac{b_3}{\frac{n_4}{S_{v_4}}} = \frac{0,78}{2,32} = 33,6\%$  at 48 years of age.

These career factors are low. A 60% career factor is considered

good at the level of Major to Commandant because promotion from Commandant upwards is by competitive selection. Such a decision (i.e. the 60% career factor) would be a policy one. However, career factors could also be increased for the Long Service aircrew by taking into consideration the Medium and Short Service elements and by the introduction of minimum and maximum times in ranks.

It is evident that career planning for the Air Force can be done statistically. Many models are available, of which JONES is only one. Furthermore, it is often difficult to determine the implications of policy changes, like the fixing of a 60% career factor, or laying down minimum or maximum times in rank or premature retirements, etc, without the help of a mathematically based model. The steady-state career model, which was discussed in only one of many situations, illustrated the long-term career. Frequent statistical updating of the numerical values involved will ensure the validity of the predictions. It is only a matter of time before a computer simulation model replaces the tedium of the exhausting statistical calculations involved and provides quick and frequent answers on the "how goes it?" query. A diagrammatic illustration of the hypothetical structure is given in figure 20 below.

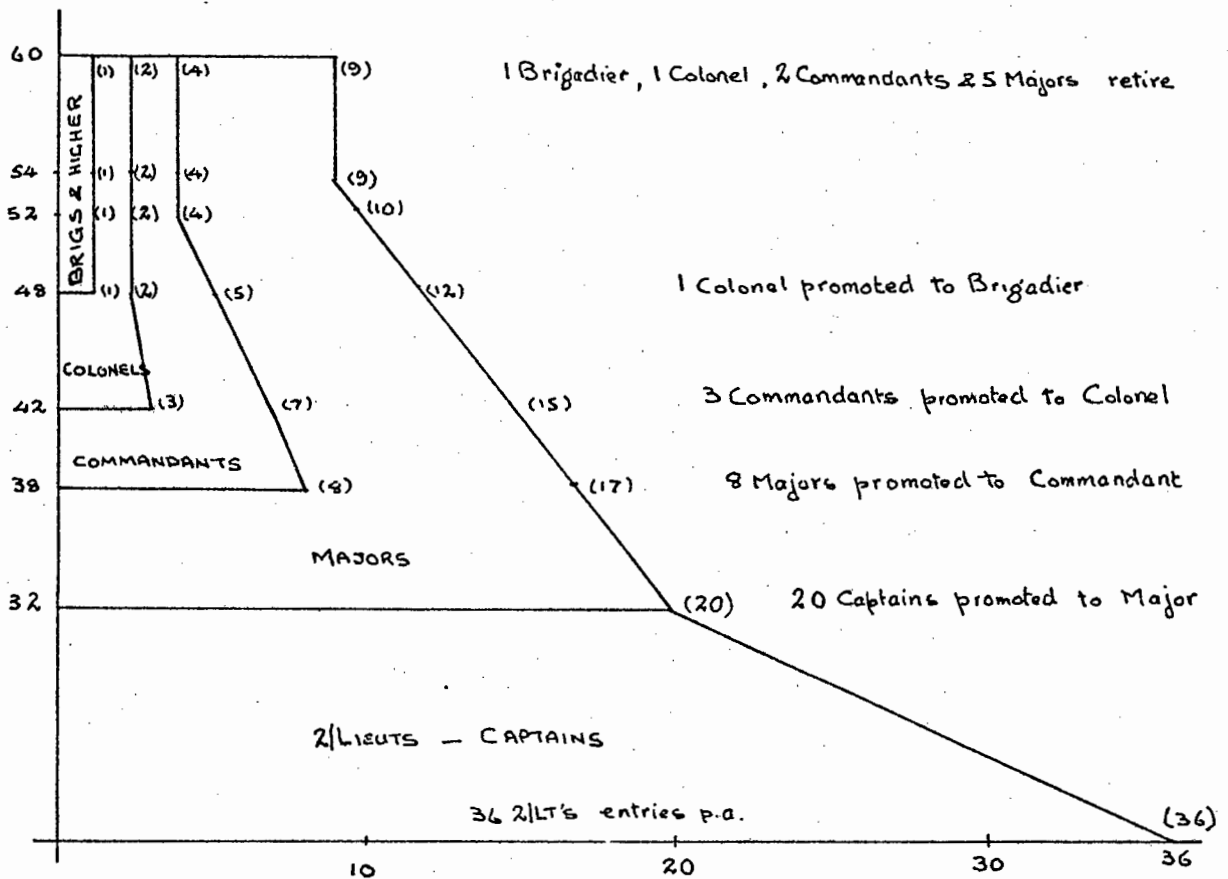


Figure 20 Hypothetical S A Air Force Career Structure

Source: E. JONES., "Officer Career Planning in the Royal Navy,"  
Conference of the Operational Research Society,  
 September 1967.

It is believed that the Air Force uses a dynamic promotion prediction model called "Rytuig". Details have not been released for discussion. Whatever model the Air Force, or a like organisation uses, the main advantage must surely lie in the fact that career planning can be refined by using mathematically based techniques.

## 5.6. Conclusion.

From a management point of view, our approach so far, career planning appears well advanced in the Air Force. It certainly is so in comparison with the Administrative Staff of the University of Cape Town and most other big organisations. However, aircrew continue leaving the Air Force, in disturbing numbers, for careers in the civilian sector. This indicates that career planning matters, at the grass-roots level, are not as well understood as they appeared from the top. With the approval of the Chief of the Air Force an investigation of the acceptability of the career planning principles involved was made at the Air Force Base Ysterplaat. This investigation constitutes the final section of this dissertation on career planning in hierarchically structured organisations in South Africa.

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## 6. THE INVESTIGATIVE STUDIES

### 6.1 The Investigation

The S.A. Air Force is following the example of the U.S. Air Force in careers management. It is in the process of building up a manpower planning system which is based on the determination of the needs of the Air Force and on a personnel planning system for determining postings. In conjunction with these systems the Air Force is developing a career development programme for its officers - particularly for aircrew members. The acceptability of the principal components of such a programme had not been tested at aircrew level and there arose doubts whether they were in fact accepted by aircrew. The solution to this problem appeared twofold: design a method that would best measure the acceptability of formal career planning (which includes all the components of the programme) and secondly determine how these principles conformed to values and views held by the aircrew.

In the event it was decided to split this investigative study in two sections: setting up a career planning questionnaire with the aims of: determining the acceptability of a formal career development programme; determining the relative importance of career variables; and lastly to show how a properly constituted career plan would develop aircrew to their fullest so ensuring that the Air Force reaches its goals. The second section of the study was to follow the first by the aircrew answering a validating questionnaire based on the first one's findings. The result of these investigations would be the drawing up of a career plan which would be acceptable to both the Air Force and the individual aircrew member.

The reason why the mailed questionnaire method was chosen was because the Air Force is dispersed over a wide geographical area. Secondly the aircrew are interested in the area of research, and thirdly there were time limitations attached to the study. Finally we were attempting to validate our hypothesis and thus had to ensure that the exact content and meaning of the questions posed were understood by writing them down so they could be studied in the aircrew's own time.

## 6.2. The First Survey.

For the purposes of this study, the population is represented by all the officer aircrew (pilots and navigators) in the South African Air Force in 1978. The population size was 718 aircrew which included all ranks from 2/Lieutenant to Lieutenant General and all ages from 19 years up to the retirement age of 60 years. These persons were based in various localities throughout South Africa and South West Africa.

The Sample. The size, the dispersion of Air Force units and the location of bases as well as the operational commitments on the borders precluded a complete census of all aircrew. Consequently a representative Air Force Base had to be chosen. There are six Air Force Bases in the Air Force: A.F.B. Bloemspruit; A.F.B. Hoedspruit; A.F.B. Pietersburg; A.F.B. Swartkop; A.F.B. Waterkloof; and A.F.B. Ysterplaat. These bases house a variety of units which perform duties such as flying and ground training and operational tasks in support of ground and naval forces. Moreover all bases have technical and maintenance units as well as stores facilities.

A.F.B. Ysteeplaat was chosen. About 15% of the Air Force's aircrew were stationed here; it houses five squadrons, a flying conversion unit, an Air Navigation School, maintenance and stores depots and a central co-ordinating headquarters. Furthermore it was the closest base to me. Moreover, I have an intimate knowledge of this Base, having spent several years there, first as officer commanding the Air Navigation School and latterly as Base Commander. The sample size was 110 aircrew including 11 student navigators.

Unit commanders were interviewed and briefed on the aims of the survey. One hundred (100) questionnaires were distributed. Eighty-three (83) completed questionnaires were returned: a 75% response. The remaining seventeen were partially completed, some not at all and some were taken by officers who were posted away and did not return their questionnaires.

The complete survey report is attached at Appendix F. In the thesis the analysis of the results obtained from the questionnaire will be discussed. The conclusions reached will be given and will serve as the basis for the validation study later on.

A comparison of the population (Air Force) and the sampling unit (A.F.B. Ysterplaat) is given in Table 14.

	Air Force Number	%	A.F.B. Ysterplaat Number	%
2/Lieuts - Captains	467	65	77	78
Majors	121	16,9	11	11
Commandants	68	9,5	10	10
Brigadiers	44	6,1	1	1
Maj. Generals	3	0,4	-	-
Lieut. Generals	1	0,1	-	-
	718	100%	99	100%

Table 14. S.A. Air Force and A.F.B. Ysterplaat Officer Strengths in 197

It can be seen that the proportion of officers in the various ranks at A.F.B. Ysterplaat follows the pattern of the S.A. Air Force. It is also evident from the distribution of the ranks at Ysterplaat that this is an operational base. As a sample it is acceptable: the survey emphasis falls in the right place - operations.

The characteristics of the sample were:

63% were pilots; 37% were navigators.

51% were single; 49% were married.

90% were matriculated; 10% were graduates of Universities.

Average age was: 28,11 years with a Std Deviation of 7,5 years.

Average flying experience was: 8,9 years with a Std. Deviation of 7,1 years.

Average Operational experience was: 7,7 years with a Std. Deviation of 7,1 years.

The units who took part in the survey were: Headquarters; 16 Squadron; 22 Squadron; 25 Squadron; 27 Squadron; 35 Squadron; 88 A.D.F.S; and the Air Navigation School. The questionnaire could now be analysed.

#### 6.2.1. The Analysis of the Questionnaire.

- a. In order to determine whether the difference between a career and a successful one was understood. the definition of a successful one was given. The respondents were asked to indicate if their progress had been satisfactory so far. 90,4% said it had been.
- b. The progress of a career is along a path towards a defined goal. In working out a career plan for aircrew there

should be a rank that would be attainable to most and that most would consider as an adequate reward. When asked which of three proposed ranks: Commandant; Colonel; or Brigadier the respondents considered as the top one, 49,4% chose the rank of Colonel; 48,2% the rank of Brigadier and the rest (2,4%) that of Commandant.

- c. Ranks go with positions, and three realistic positions most aircrew could occupy were presented to them with the request to them to state which one they would like as the fulfilment of their careers. 41% chose the position of Unit or Base Commander; 31,3% an active flying member and 27,7% the position of Chief of the Air Force.

The majority for position (41%) correlates with the majority for rank (49,4%). Moreover a Unit or Base commander is normally of a Colonel's rank. A Commandant is the most active flyer of the senior ranks in the Air Force and yet only 2,4% chose this rank although 31,3% wanted to continue an active flying career. Clearly the respondents considered a Commandant's rank as too low for such a career. The majority selected the rank of Colonel in command of a unit or base in the Air Force as the fulfilment of a successful career.

- d. Having determined how successful a career has been to date and what rank and position were considered appropriate, the next question had to establish where these objectives were laid down i.e. in a Career Plan. 96,4% said they had not seen their Career Plans and of these 98,7%

reckoned they should see it. In effect the respondents were in the dark about their careers. This led logically to the next question.

- e. When career programmes are drawn up by organisations, they mostly reflect the needs of the organisation. The Air Force has needs to recruit, manage and develop its human resources in order to maintain its effectiveness, survive and grow. Aircrew members have needs to find in their work situations : security, challenge and opportunities for self development and advancement. SCHEIN (1). Clearly these needs have to be matched. All respondents indicated that they would want to participate in planning their own careers as this would make them happier in their work and so more productive. 97,6% said that the Air Force would then also be better equipped to achieve its own aims. Aircrew participation in planning their career is overwhelmingly supported.
- f. The next question introduced the four mutually dependent elements of our hypothesis: a progress guide; a counselling service; a system of appraisals; and a technique for predicting promotion vacancies contained in a good career plan. Balanced career plans need to be worked out in conjunction with a person in the Air Force who has comprehensive knowledge of the various careers open to aircrew. 62,7% favoured the Personnel Division at Air Force HQ whilst the remainder (37,3%) elected their immediate senior, the Commanding Officer. Such a result is valid, because

most commanding officers do not know the specific details of the various career-combinations that are available to aircrew in the Air Force.

A part of our hypothesis is concerned with the appraisal system's use in drawing up a "merit-list" which could be consulted when officers are selected for promotion.

87,9% agreed with this proposition.

The present Air Force system of promotion is that of seniority. A "merit" system could have major repercussions if this traditionally accepted system was changed. And there are occasions when seniority in rank is more appropriate than the younger, lesser-experienced officer. With this in mind, two realistic possibilities were presented to the aircrew for their decision. 85,5% indicated that seniority in rank should be rewarded by promoting the officer if his speciality were the criterion. The remaining 14,5% said that such a person should be promoted six months later. This implied that those officers promoted on merit would have a time advantage (seniority) in their new ranks before the older, more experienced and erstwhile seniors joined. It is evident that the majority decision is the more fair and logical one of the two.

Promotion is an integral part of the career prospects of individuals. These in turn are dependent on the number of posts in an establishment and the proportions in each rank group; the wastage rates as the results of death,

resignations, retirements, discharges etc., and the expansion or contraction of Air Force strengths. 86,7% said that they were aware that their career prospects depended on the variables mentioned above.

g. Five important elements which have to be considered in career planning are: Age; Years of service; Experience; Higher education; and Assessment of capabilities. An effective way of determining the relative values of these variables was to request the respondents to rate them as follows: Most Important; Important; Unimportant; Most Unimportant; and Undecided. Because of the close relationships existing between some of these variables, an analysis of responses of pairs was made. e.g. Age/Years of service; Years of service/Experience; Age on promotion/Higher education; Experienced/Assessed regularly; Higher education/Wider experience. The detailed statistical analysis is given in Annexure 2 to Appendix F

g. (i) Comparison between Age on Promotion and Years of Service on Promotion.

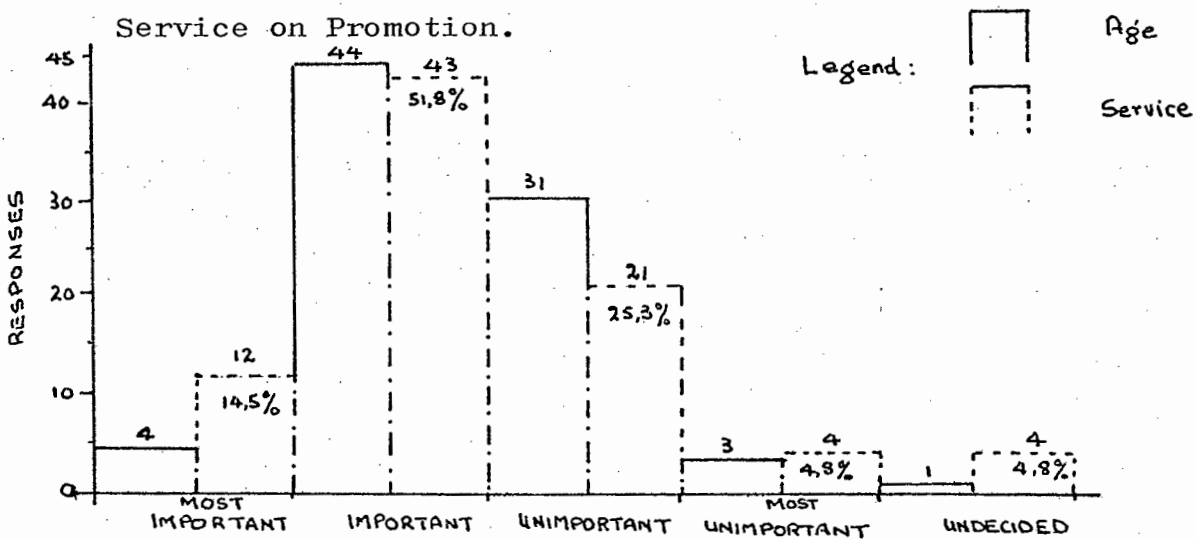


Figure 21: Histogram for Age & Service.

The close relationship between Age and Service could be seen graphically.

This was confirmed by the statistical calculation 1 in Annexure 2 to the Appendix using the  $\chi^2$ -statistic: there was no difference in importance between these two elements. We concluded that Age and Years of service on promotion were "equally" important. However, in order to see how close this relationship was, we applied Rensis Likert's intensity scale to our values as follows: Most Important - 5; Important - 4; Unimportant - 3; Most Unimportant - 2; Undecided - 1. The following table was constructed:

Aspect	AGE			SERVICE	
	Weighting (a)	Responses (b)	Weighted Responses (a)x(b)	Responses (c)	Weighted Responses (a)x(c)
Most Important	5	4	20	12	60
Important	4	44	176	43	172
Unimportant	3	31	93	21	63
Most Unimportant	2	3	6	4	8
Undecided	1	1	1	3	3
		TOTAL	296	TOTAL	306

Table 15 Comparison of Weighted Responses between Age and Years of Service on Promotion.

From this table it can be seen that, for practical purposes, Age on promotion (296) is as important as Years of Service on promotion (306).

g.(ii) Comparison between Years of service and Experience.

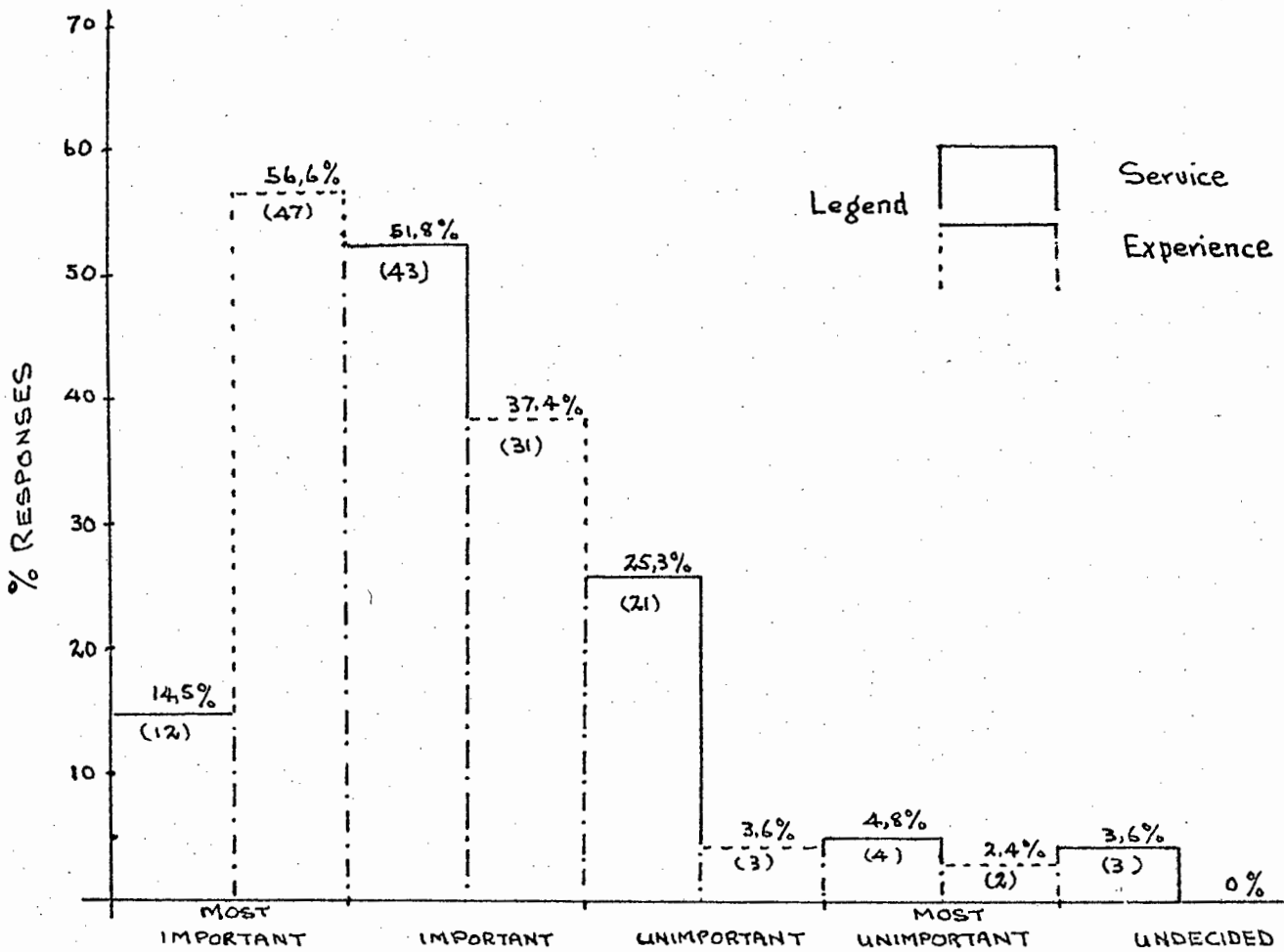


Figure 22 Histogram of Years of Service and Experience.

There was a disparity in responses indicating differences. The statistical calculation 2 in Annexure 2 to the Appendix using the  $\chi^2$ -statistic confirmed this by rejecting the Null Hypothesis that there was no difference in importance between these two variables. We concluded there was a difference. In order to resolve which element was the more important, we allotted weightings as in the previous comparison: Most Important - 5; Important - 4; Unimportant - 3; Most Unimportant - 2; Undecided - 1; We constructed the following table:-

Aspect	Service			Experience	
	Weighting (a)	Responses (b)	Weighted Responses (a)x(b)	Responses (c)	Weighted Responses (a)x(c)
Most Important	5	12	60	47	235
Important	4	43	172	31	124
Unimportant	3	21	63	3	9
Most Unimportant	2	4	8	2	4
Undecided	1	3	3	0	0
	TOTAL:-		306	TOTAL:- 372	

Table 16 Comparison of Weighted Responses between Service and Experience.

From the above table it was clear that obtaining Wider experience (372) was considered more important than Years of Service (306) on promotion.

g.(iii). Comparison between Age on promotion and Higher education

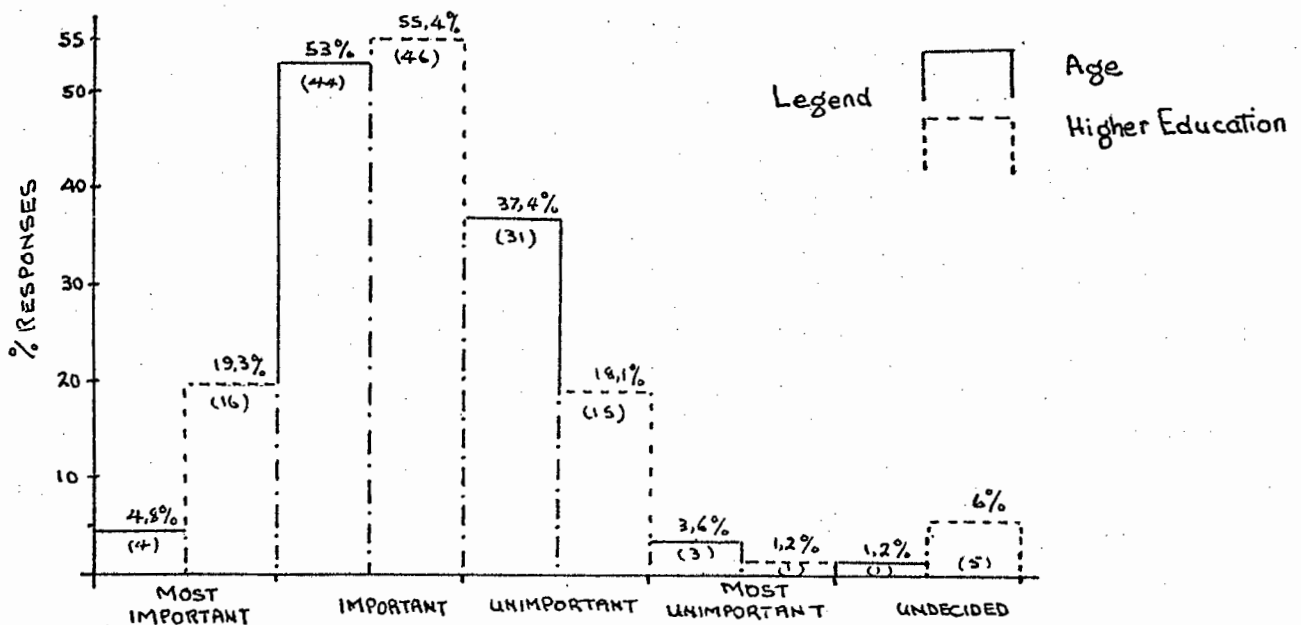


Figure 23. Histogram of Age on Promotion and Higher Education.

There was a noticeable disparity of responses. The statistical calculation 3 in Annexure 2 to the Appendix, using the  $\chi^2$ - statistic confirms this by rejecting the Null hypothesis that there is no difference in importance between these two variables. We thus concluded that there was a significant difference and constructed a table, like the previous ones, in order to identify the most important one. Age has already been determined in g.(i): 296; only Higher Education needed doing:

Aspect	Higher Education		
	Weighting (a)	Responses (b)	Weighted Responses (a)x(b)
Most Important	5	16	80
Important	4	46	184
Unimportant	3	15	45
Most Unimportant	2	1	2
Undecided	1	5	5
		TOTAL:-	316

Table 17 Weighted Responses of Higher Education.

We concluded that the obtaining of Higher educational qualifications was considered more important than the Age on promotion.

g.(iv) Comparison between gaining Wider experience and being Assessed regularly.

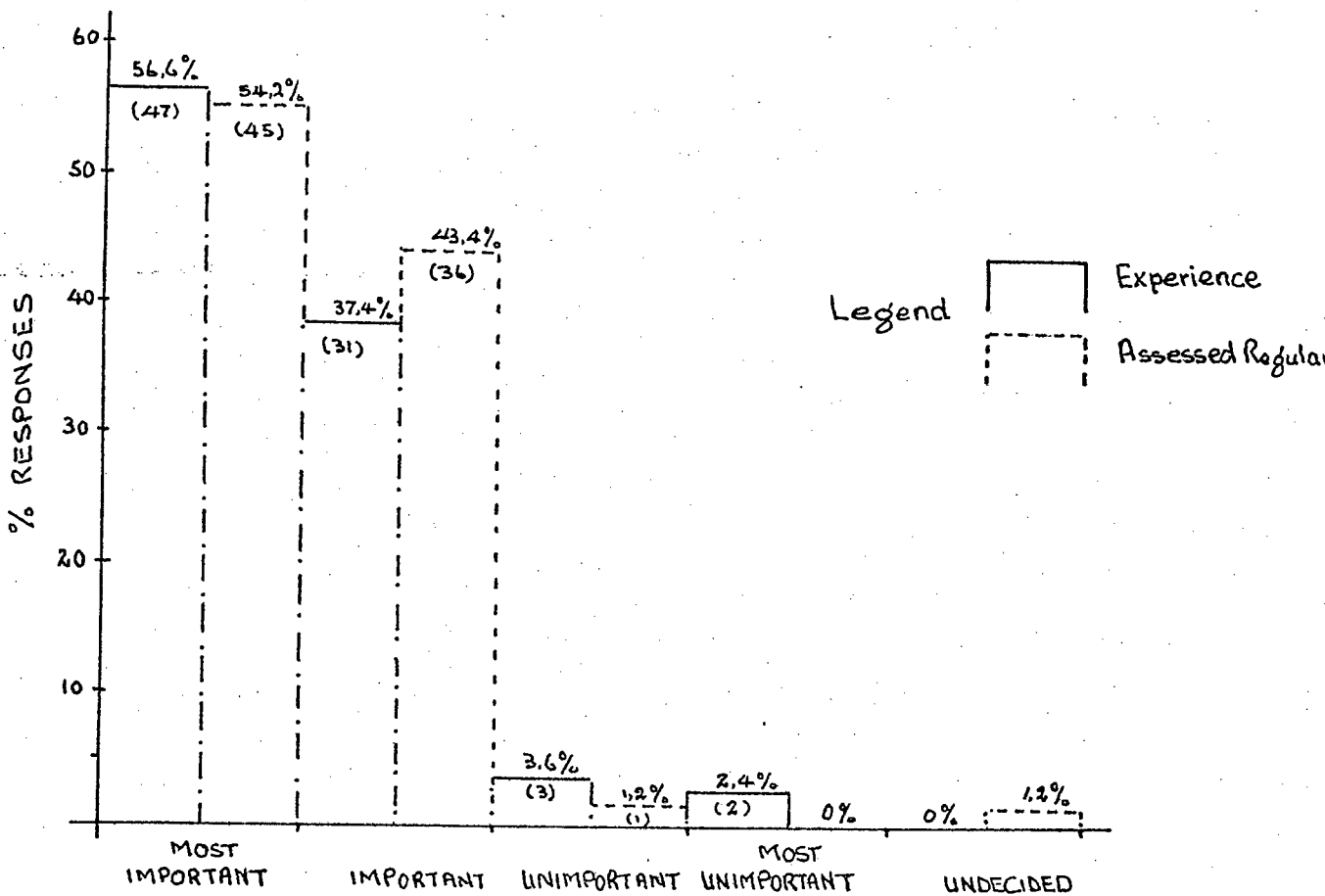


Figure 24 Histogram of Wider Experience and being Assessed Regularly

There was a very close relationship between getting Wider experience and being Assessed regularly. This graphic trend was confirmed by the statistical calculation 4 in Annexure 2 to the Appendix. We concluded that both these variables were "equally" important. Experience has already been determined in g(ii): 372, so we needed only to construct the table for being Assessed regularly.

Aspect	Assessed	Regularly	Weighted Responses (a)x(b)
	Weighting (a)	Responses (b)	
Most Important	5	45	225
Important	4	36	144
Unimportant	3	1	3
Most Unimportant	2	0	0
Undecided	1	1	1
TOTAL			373

Table 18. Weighted Responses of being Assessed Regularly.

It was clear that there was virtually no difference of importance between these two variables: Experience - 372 vs Assessed Regularly - 373!

g.(v) Comparison between gaining Wider experience and Higher education. Both variables have been determined already: Wider experience - 372; Higher education - 316. The disparity between the two was quite evident. More-over this was confirmed in the statistical calculation 5 in Annexure 2 to the Appendix using the  $\chi^2$ -statistic. We concluded that getting Wider experience was considered more important than Higher education.

g.(vi) We concluded the analysis of this question by placing these five elements in an order of merit:

1. Being Assessed regularly - 373, and  
Getting as Wide an experience as possible - 372.
2. Obtaining Higher educational qualifications - 316.

3. Years of service on promotion - 306 and  
Age on promotion - 296.

When the development programme is drawn up these elements should be considered in the order determined above.

h. The normal termination of service in the Air Force is by retirement on reaching the retirement age of 60 years. This age is a matter of controversy - many serving officers feeling it is too high. The respondents were given three possible ages and asked at what age they would consider an active aircrew member should retire. 48,2% said the age should be 50 years; 41% said the age should be 55 years; and the remainder (10,8%) opted for existing age of 60 years. The significant conclusion we made was that aircrew opinion confirmed the feeling that 60 years of age was too old for active members. The retirement age should be brought down.

i. All career development programmes are divided into developmental phases such as for instance: an initial phase, an intermediate phase, an advance phase and an executive or leadership one. Some of the typical activities associated with these phases were given. Respondents were asked how long they considered these phases should last.

- (i) The Initial phase, i.e. learning the job. 41,5% said one year; 51,2% opted for 2 years and the remainder (7,3%) indicated that it should be more than 2 years.
- (ii) The Intermediate phase: i.e. getting on top of the job. The majority (68,3%) chose 5 years from the end of the initial phase. 24,4% chose 8 years and 7,3% selected

more than 8 years.

- (iii) The Advance phase: i.e. attending specialist and staff courses. The overwhelming majority (97,6%) chose 15 years after the end of the intermediate phase. The rest (2,4%) settled for a period between 15 and 20 years.
- (iv) The Executive/Leadership phase: i.e. Officer commanding a Unit, Station or an Air Force Base. 68,3% chose a period of 5 years after the Advance phase; 31,7% said this phase should last until retirement.

It was concluded from these responses that the lengths of the development phases should be: Initial - 2 years; Intermediate - 5 years; Advance - 15 years; and Executive/Leadership - 5 years. This indicated a career length of 27 years of service.

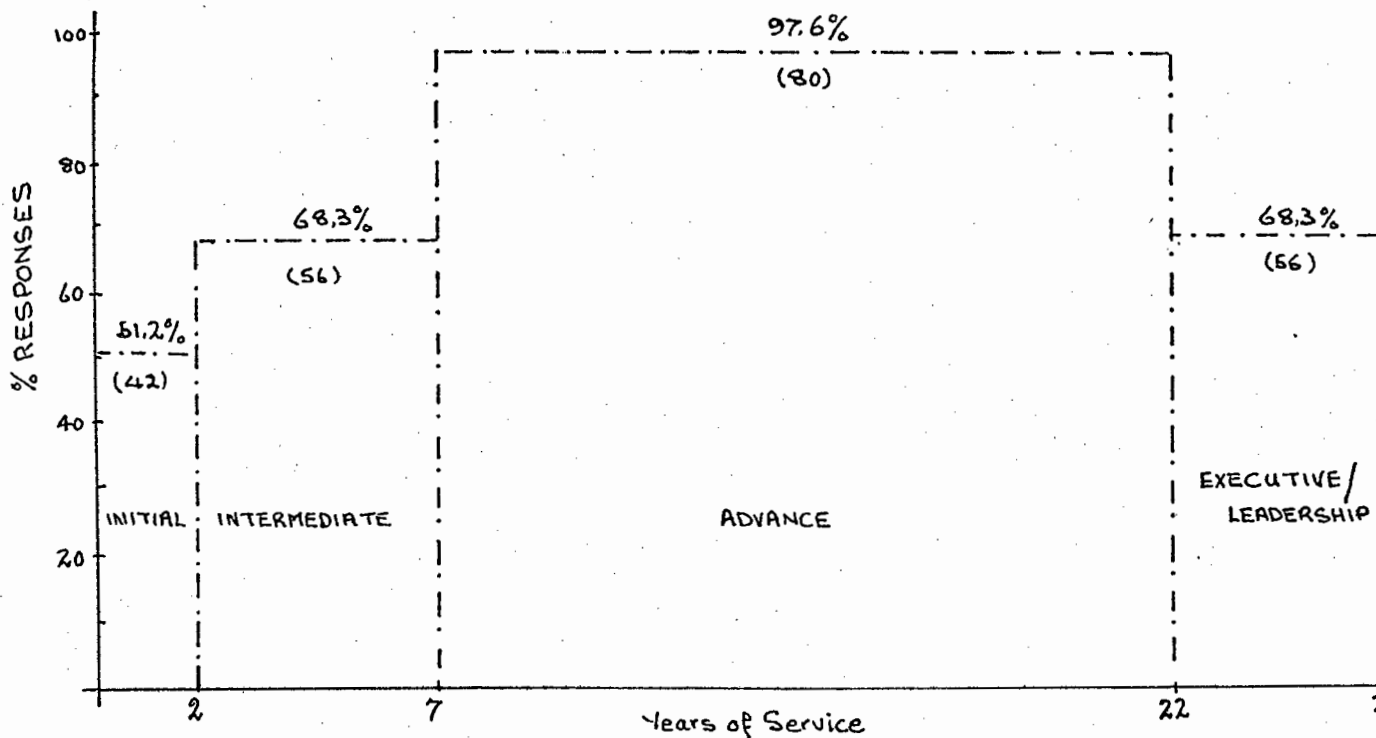


Figure 25 Lengths of Development Phases.

The determining of these development phases revealed some significant matters. Aircrew are commissioned 2/Lieutenants at the average age of 20 years. Thus a retirement age could now be about 47 years - considerably less than the legal one of 60 years. This also lent substance to the previous question where 48,2% of the respondents indicated that 50 years would be a more suitable age for retirement. Ranks could also be applied: 2/Lieutenants are promoted to Lieutenants after 2 years - i.e. at the end of the initial phase. Three years later, the Lieutenants are promoted to Captains - i.e. towards the end of the intermediate phase. The fitting in of specific ranks was the aim of the next question.

j. 98,8% indicated the rank during the initial phase should be that of a Lieutenant. 66,3% said that Captain and Major could be the rank for the intermediate phase whilst 31,3% elected Captain and the remainder (2,4%) chose Major. In the advance phase 44,6% said that a Major, Commandant or Colonel would fit in; 32,5% however, chose Commandant; and 14,5% Major. The majority (44,6%) said Commandant, Colonel and Brigadier went with the executive phase; 24,1% chose Colonel; 22,9% Brigadier; and 8,4% Commandant. Using a stratagem whereby the combined ranks of Captain/Major, Major/Commandant/Colonel and Commandant/Colonel/Brigadier were used as foundation blocks to build the other, rank-responses on, one was able to select the most appropriate rank for the specific phase. See Figure 26.

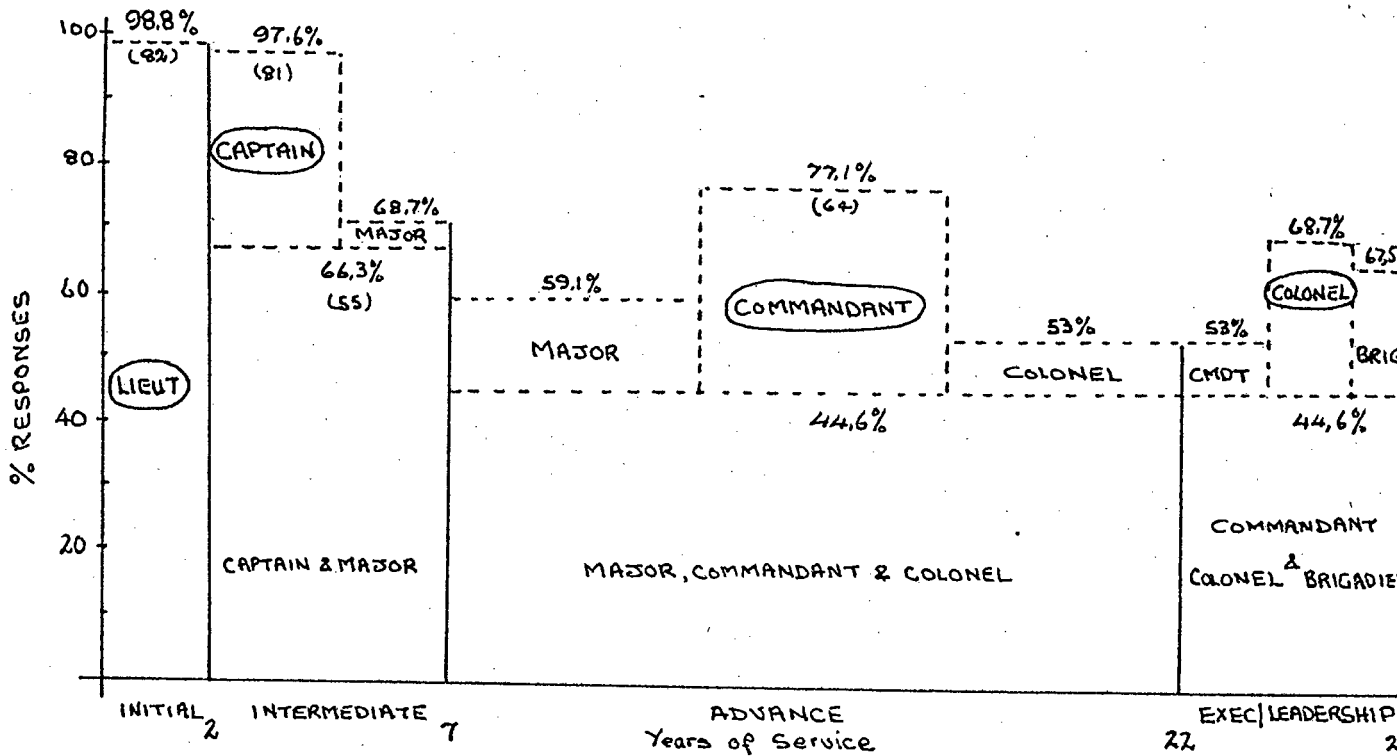


Figure 26 Ranks in Phase of Development: circled

From the figure it was clear that the ranks should be; Lieutenant - for the Initial phase; Captain - for the Intermediate phase; Commandant - for the Advanced phase; and Colonel for the Executive/Leadership phase. This conclusion also agreed with the previous one where the respondents selected the rank of Colonel as the end-rank of a successful career - see c on page 184.

k. It is known that the longer an officer occupies a given rank (and thus a position) the worse the career prospects become for his juniors. JOUBERT(2), chairing a Committee of Inquiry into the flow of retirements and promotions in the S.A. Defence Force, recommended the maximum periods of service in the various ranks as asked in question 11 of the questionnaire. The purpose

of including this question was to test aircrew acceptability of the Inquiry's recommendations. 62,6% agreed that there should be a maximum period in rank. Their responses tallied with the Inquiry's recommendations:

General	-	5 years maximum in rank	-	80,8% (42)	agreed.
Lt.Gen & Maj Gen	-	4 years maximum in rank	-	84,6%	agreed.
Brigadier	-	5 years maximum in rank	-	88,5%	agreed.
Colonel	-	7 years maximum in rank	-	92,3%	agreed.
Commandant	-	9 years maximum in rank	-	73,1%	agreed.
Major	-	10 years maximum in rank	-	61,5%	agreed.
Captain	-	9 years maximum in rank	-	51,9%	agreed.
Candidate Officer-					
Lieutenant	-	7 years maximum in rank	-	76,9%	agreed.

A contingency question was asked of those who agreed to there being a maximum period in rank in order to determine if they were aware of the implications of their decisions. 48,1% of the respondents replied that the position of an officer, who had reached the maximum period of service in his rank, should be reconsidered in 6-months time; 28,8% wanted him retired; and 23,1% said he had to be removed from the seniority (merit) list - implying he remained on the job but would not be eligible for further promotion. The majority decision, reached by the aircrew, confirmed the promotion policy recommendation of the Inquiry previously mentioned. JOUBERT (3). The results of this question were particularly significant in the career development of aircrew. A new career policy, in the form of maximum periods of service in ranks and the reviewing of promotion procedures were endorsed at

the grass-roots level.

1. In preparing an officer for senior rank and position, it is necessary that he should possess a broad but comprehensive understanding of how the Air Force operates. This entails postings to various units and localities. Of the eight choices offered, the respondents accepted four:

- (i) To serve as aircrew on other operational aircraft - 97,6% (8
- (ii) To be a Flying or Navigation Instructor - 87,9%
- (iii) To be a Staff Officer at a Headquarters - 75,9%
- (iv) To serve in the Air Defence Unit - 56,6%

And they rejected postings to the other four:

- (i) The Technical training unit - 77,1%
- (ii) The Administrative branch - 75,9%
- (iii) Instructor at the Air Force College - 61,4%
- (iv) Logistics branch - 57,8%

The flying-bias of the aircrew was clearly discernable in their choices.

m. The responses in Question 7 (i.e. in g.) indicated that getting higher educational qualifications was important. Few recruits, joining the Air Force with the intention of becoming Pilots or Navigators, possess academic degrees or diplomas. The majority, who make the Service their career, attend the Military Academy at Saldanha Bay after qualifying for their "Wings". After a three year applied military course, under the auspices of Stellenbosch University, the successful candidates are awarded their Bachelor's degree - B.Mil. Those aircrew who do not follow this path and still wish to make their careers in the Air Force are required to look elsewhere for higher academic qualifications.

Those who possess higher qualifications realize that further qualifications are desirable and sometimes necessary in order to advance their careers. When such training should start and how it was to be done was the basis of the question posed.

- (i) For a Bachelor's degree or Diploma: 45,8% said after 3 years in service, 39,7% said before 10 years in service, 14,5% did not answer this question.
- (ii) For a Master's degree or higher Diploma: 53% said before 15 years in service, 32,5% said after 7 years in service, 14,5% did not answer the question.
- (iii) For a Doctorate : 63,8% said before 20 years in service, 21,7% said after 10 years in service, 14,5% did not answer the question.

We concluded that it was desirable to start studying for higher qualifications after 3 years in service (i.e. at the rank of Lieutenant) qualifying at about the end of the sixth year. The following 5 years could be spent in rounding off military expertise and acquiring new aircrew skills by being cross-trained on other aircraft-types and operational roles. At about the 11th year further academic (or higher diploma) studies in Honours

and Master's degrees could be undertaken completing them after a period of four years. Thus by the 15th year of service, with the rank of Major (and possibly Commandant), these aircrew members could be expected to make significant academically based contributions to the effectiveness of the Air Force. Doctoral studies, for the selected few, could commence in the 18th year finishing by about the end of the 19th year in service. A higher academic educational career path as suggested, is shown in Figure 27.

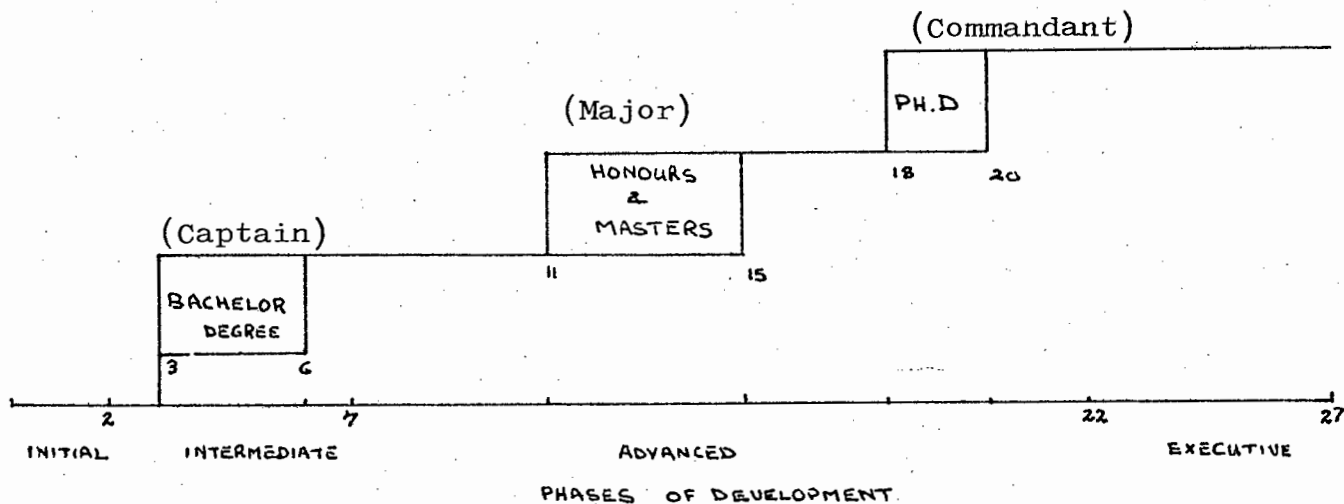


Figure 27. The Academic Educational Career Path for Aircrew.

How such training was to be done was the next question.

60,2% said they wanted to do these studies full-time at a University or College; 13,2% preferred a part-time study programme; and 12,1% indicated they would like to do their studies by means of correspondence tuition; (14,5% did not answer this question).

The implication of full-time study, at a University or College, three years after qualifying for their wings, is that such a break in service may well prove to be detrimental to their military careers. They will be out of touch with the latest tactical and strategic

developments of the last three years as well as being no longer qualified in their specific operational roles. On joining the Air Force again, such aircrew may well be confronted with an adaptation problems. The best mix, at Bachelor's level, appears to be a part-time/correspondence programme. For Honours/Master's a fulltime attendance is supported. The doctoral (Ph.D.) study would, in any case, be a research one. This can be done in the aircrew's own time with authorized part-time supervision at a University in the vicinity.

n. Just as higher academic qualifications increase an aircrew member's promotion prospects, so does specialization. However, over-qualification and over-specialization for the task on hand and position (and rank) occupied, will tend to decrease career prospects in the longterm: such aircrew have become too valuable to be easily moved elsewhere! e.g. a good test pilot would be kept in this role for as long as possible and during this period he may well be by-passed on promotion because he cannot be spared for release. This problem is analogous to the economic law of diminishing returns. Moreover the investment in high calibre officers is so high that they are hoarded (GLUECK (4)) in order to recoup as much as possible. This is detrimental to both the Air Force and the aircrew and illustrates inadequate career development. In order to establish if this aspect of a particular career development system is understood, the question was posed to the respondents. 55,4% indicated that over-specialization or over-qualification was not acceptable to them; the remaining 35,6% accepted this aspect.

o. In order to lessen resistance to potential tactical and strategic changes in role-employment, new or modified equipment,

uniforms, etc., aircrew are normally "sounded out" about such matters. Whether they are really aware of these approaches, is not certain and so they were asked if they were involved in the following areas of long-range planning.

- (i) In flying training - 50,6% said yes they were involved.
- (ii) In strategic operational planning - 90,4% said they were not involved.
- (iii) In the strategic planning of the size and shape of the Air Force - 97,6% said they were not involved.

Summing up the responses we found that only 20,9% of the aircrew at A.F.B. Ysterplaat were involved in long-range planning activities. This fact also confirms the operational bias of the Base (see page 184).

p. All aircrew are at a constant state of readiness. This entails going into action according to the requirements of contingency plans which have been drawn up for a number of likely emergencies. Each unit has a plan (or should have one) in which the details of the execution of their parts of the plan are laid down. 63,9% of the aircrew stated that they did not help develop a step-by-step plan of action to implement their unit's part in the long range operational plan; however, 36,1% said that they did help. The reasons for the large percentage of non-participation may be many and varied. It is likely though that their unit's plan was already updated and did not require any further work.

q. Longrange planning is known as strategic planning in the Air Force. The planned actions are envisaged in a future dimension. Units should be aware of their participation in these events and

initiate timeous training programmes to cater for such eventualities. The plans usually come in the form of policy statements from higher authority. 92,8% of the aircrew said that they had no manual in which Air Force and Defence Force policy statements and their supporting procedures and rules could be studied. They further went on to indicate that possession of such a manual would resolve a lot of misinterpretations of policy statements.

r. In order to gauge how much their work mattered to aircrew they were asked if they agreed that their work was crucial to their satisfaction as a human being and to the development of their personalities. 96,4% agreed with this proposition and went on to agree completely - that this meant that their careers must possess dignity and meaning.

s. Flying careers are not always seen as lifework in the Air Force:- e.g. there are aircrew who belong to the Permanent Force who stay in for their whole worklife; Medium Service who spend about 20 years in the Service; and Short Service who spend between 4 to 10 years in the Air Force. All (100%) of the respondents agreed, however, that Career Planning formed an integral part of long range planning.

t. Many aircrew leave the Air Force to seek employment in private airlines or with the South African Airways. The costs of training aircrew are exceedingly high - e.g. according to the Chief of the Air Force (on 16 June 1978) it costs R1,7 million to train a Mirage pilot with about 700 hours flying on type! Every effort is made to retain these members for as long as possible and so recoup some of the funds invested in them. 96,4% of the respondents

said if they knew that the Air Force had an acceptable career plan for them, they would stay and make a success of their Air Force careers. Furthermore this group acknowledged that if such was the case (i.e. possessing an acceptable career plan) they would develop a greater loyalty towards the Air Force. The need for the design and development of aircrew career plans could not have been more cogently expressed!

u. Finally, to bring home to the aircrew that an exercise of this nature would help them in their career development, they were asked this question: "Do you think that the answers you gave in this questionnaire will help you in planning your career?". 91,6% said it would and of these 95,2% expressed the wish that they would like a copy of the results of this questionnaire.

#### 6.2.2. The Conclusions.

On analysing the results of the survey certain logical conclusions were reached when the implication of one or more questions (Q) were considered. In the following discussion these implications, with the relevant question in brackets (Q), are argued and conclusion(s) stated.

##### a. The Career.

90,4% (Q1) of the respondents found their progress satisfactory in spite of the fact that 96,4% (Q4) of them had not seen their or any particular career plan. The awareness of the need for career planning is there: All 100% (Q5) would choose to participate in this planning because then they feel they would be happier in their work, be more productive and so enable the Air Force to be better equipped to achieve its aims (Q5).

Moreover, 62,7% (Q6) would like to work out the details of their careers with the Personnel Division at Headquarters thus assisting in drawing up an acceptable career plan (Q6). (Q20). This would not only ensure work satisfaction but would also help personality development and emphasize the dignity and meaning (Q18) of aircrew's lifework. Under these circumstances 96,4% (Q20) of pilots and navigators indicated they would be prepared to make a success of their careers, whilst 92,5% (Q20) confirmed that staying on in the Air Force under these conditions would develop greater loyalty (Q20).

It is thus concluded that aircrew are aware of the advantages and implications of having their careers planned. They are willing to participate in the planning of such careers and thus stay on in the Air Force. It is up to the Air Force to proceed expeditiously in consulting aircrew about their career aspirations.

b. Rank and Position.

All successful careers aim at achieving a specific rank and position. The majority, 49,2% (Q2) of the respondents selected the Colonel's rank and the majority, 41% (Q3) in the next question selected the position of Unit or Base Commander. It is concluded that a successful career would culminate in being promoted to the rank of Colonel in command of the Unit or Air Force Base.

c. Promotion through a "Merit" list.

87,9% (Q6) indicated a "merit"-list, based on the results of an appraisal system, could be drawn up to indicate the "merit" position of potential promotees. Such a procedure would, however, be in conflict with the present promotion by seniority system. In consideration of the existing seniors, and thus by implication

not amongst the highest on the "merit"-list, 85,5% (Q6(b)) felt that they, the seniors, should be promoted if their specialities were the criteria for promotion. Promotion is, however, directly related to career prospects. 87,7% of the respondents realized that their career prospects were dependent on the relative proportions of officers strengths in the various ranks. An expansion (e.g. mobilization) of the Air Force, would create vacancies and consequently increase the chances of promotion.

It is thus concluded that promotion is dependent on vacancies in the various ranks and that promotion based on a "merit" list is preferred to the existing system.

d. Important Career Planning Elements.

Five important career planning elements (Q7) : Age on promotion; Years of service on promotion; getting as Wide an experience as possible; obtaining Higher educational qualifications; and being Assessed regularly, were rated. Because these elements are naturally closely related to each other, paired statistical comparisons (at the 5% significance level) were made to determine their relative importance to each other. The application of the Rensis Likert importance scale-values determined the measure of importance so that these elements could be ranked in an order of merit:

1. Being Assessed regularly and getting as Wide an experineece as possible,
2. Obtaining Higher educational qualifications,
3. Age and Years of service on being promoted.

It is concluded that when the development programme is drawn up, these elements should be considered in the above ranking.

Retirement age, another important element, was reduced to 50 years by 48,2% (Q8) of the respondents. This confirmed a previous feeling that the retirement age of 60 years was too high for active aircrew. The best solution lies somewhere between 50 and 60 years of age.

Phases of development are also important career planning elements (Q9). The chosen lengths of these phases turned out to be: Initial - 2 years; Intermediate - 5 years; Advance - 15 years; and Executive/Leadership - 5 years - a career length of 27 years. This implied that the retirement age could be about 47 years of age - considerably different from the legal one of 60 years but close to the previously selected one of 50 years.

Career phase ranks were determined in Q10: Initial - Lieutenant; Intermediate - Captain; Advance - Commandant; Executive/Leadership - Colonel. This conclusion tallied with Q3 where the end-rank selected was also that of Colonel.

In this crucial discussion of the elements constituting the framework of a career development we summarize the conclusions that the aircrew:

- (i) Listed Regular Assessment and gaining Wider Experience as first in their order of merit, followed by the obtaining of Higher Educational qualifications, and finishing off with Age and Service on promotion as third.
- (ii) Chose the age of 50 years instead of the present 60.
- (iii) Would have about 32 years of service on retirement at 50 years (Service usually starts at 18 years of age).
- (iv) Would have about 27 years of active commissioned service

progressing through all the envisaged development phases.

- (v) To be able to serve this 27 years of active commissioned service on retiring at 50 years of age they would have to start their careers as Lieutenants.
- (vi) Confirm the retiring rank to be that of Colonel in their determination of the lengths of development phases.
- (vii) In deciding on these issues have laid down the elements of a framework for developing career plans for themselves.

e. Period of Service in Rank.

62,6% agreed that there should be a maximum period of service in rank thereby implicitly acknowledging that their career prospects would be enhanced by such action. This was followed by endorsing the suggested questionnaire maximum periods officers should occupy specific ranks. A solution to the problem of what to do with the officer who has reached his maximum time in office, was to reconsider his case after six months.

We concluded that the acceptance of the maximum periods of service in ranks, at this grass-roots level, was particularly significant. Not only was it a radical departure from established policy, but it would also assist in removing static promotion blocking personnel thereby increasing promotion prospects.

f. Broadening Experience.

In order to possess a broad and comprehensive understanding of how the Air Force operates, aircrew should, apart from their own military speciality training, receive higher education and such wide experience as can possibly be fitted in by being posted to many diverse assignments in their planned careers. The

disadvantage of overspecialization and overqualification were understood - 55,4% (Q14) saying it was unacceptable. Higher education was certainly desirable, starting after the third year in service and ending after about the 19th year of service. The various postings chosen showed a remarkable bias toward matters of flying (Q12). This is, however, a narrow field and the usefulness of non-flying assignments ought to be told them: the Air Force consists of more than just flying types.

g. Long-range Planning. All respondents acknowledged that they knew that career planning formed an integral part of long-range planning (Q19). However, only 20,9% were involved in long-range planning activities (Q15). This was underlined when 63,9% (Q16) indicated that they did not participate in developing a step-by-step plan of action to implement their Unit's part in the long-range operational plan. Moreover, long-range planning activities (known as strategic actions due to its long term nature), are usually made known to the participants by means of policy statements from higher authority. In order to ensure that Units are aware of their and others' roles in these activities, it was thought wise that Units should have policy manuals which would record these statements and assist in avoiding misinterpretations. 92,8% (Q17) said that their Units did not possess such a manual although they were unanimous that the possession of such a manual would greatly assist them in this regard.

h. Personal Aspects.

96,4% (Q18) affirmed that their work as aircrew in the Air Force was crucial to their satisfaction and to the development of

their personalities. As such their careers must have dignity and meaning. 96,4% (Q20) indicated that if the Air Force offered them acceptable career plans (and thus careers!) they would stay and make a success. Furthermore such action would develop a greater loyalty towards the Air Force. Considering the exceedingly high cost of training aircrew, the need for the design and development of career plans, is manifest. Moreover, morale increases when turnover decreases.

i. Usefulness of the Questionnaire.

91,6% (Q21) said that the answers given in this questionnaire would help them plan their careers. 95,2% of these respondents expressed the wish that they would like a copy of the results of this questionnaire. High praise for the researcher's effort.

j. Achievement.

We conclude that the effect of this Questionnaire has been beneficial and the results obtained meaningful and decisive. It has made aircrew at Air Force Base Ysterplaat aware that properly constituted career planning could develop them to their fullest and that the Air Force would be better able to reach its goals if it accepted such a programme. Furthermore the career variables have been identified and some rated. A validation study is required to confirm the findings of this pilot survey. Once confirmed meaningful career planning for aircrew, as envisaged, could be proceeded with by the Air Force.

6.3. The Validation Study.

The population for the validation study is, of course, the

officer strength of Air Force Base Ysterplaat in 1979. The size was 111-aircrew which included all ranks from 2/Lieutenant to Colonel and all ages from 19 to the retirement age of 60 years.

#### The Sample.

All aircrew at A.F.B. Ysterplaat were numbered from 1 to 111. A random selection of 25 numbers was drawn and 25 respondents identified : this was the sample.

The officer in charge of flying, a Commandant and the second-in-command, was briefed on the contents of the questionnaire. Twenty five questionnaires were given for completion by the randomly selected 25 respondents. Twenty-three completed questionnaires were collected two weeks later : 2 respondents had, during this time, left Ysterplaat and did not return their questionnaires. Never-the-less this was a 92% response.

The complete survey report is attached at Appendix G. The aim of this study was threefold: to validate the findings of the first study; to determine if there was a different definition of a successful career from the one given previously, and if so what the implications were; lastly to determine the order of priority of the ten job satisfaction variables which were particularly relevant to aircrew careers. The results obtained from the questionnaire were analysed and the conclusions reached compared with those of the first survey.

A comparison of the population (A.F.B. Ysterplaat) and the sampling unit (the randomly selected 25) is given in Table 19.

Ranks	A.F.B. Ysterplaat		Random Sample	
	Number	%	Number	%
Colonel	1	1%	-	-
Commandants	8	7%	2	9%
Majors	19	17%	4	17%
Captains	33	30%	5	22%
Lieutenants	26	23%	6	26%
2/Lieutenants	24	22%	6	26%
	n = 111	100%	n = 23	100%

Table 19. Relative Distribution of Ranks at AFB Ysterplaat in 1979.

It can be seen that the proportion of officers in the various ranks at A.F.B. Ysterplaat and the random sample are acceptably close to each other.

The characteristics of the random sample were:

22 were pilots; 1 was a navigator.

20 were matriculated; 3 were university graduates

Average age was: 29,65 years with a Standard

Deviation of 7,4 years.

Average flying experience was: 8,8 years with a

Standard Deviation of 7,2 years.

Average operational experience was: 4,9 years with

a Standard Deviation of 5,4 years.

In order to determine whether the average ages of the first and second survey differed significantly we applied a one-way Analysis of Variation (ANOVA MODEL 1)(5) which is widely utilized

in behavioural research. We checked the results with an application of the t-test. The method of analysis followed was one described by YA-LUN CHOU (6). See Annexure 2 of the Appendix G for the detailed workings.

a. ANOVA MODEL I.

$$F_{1,104} = \frac{MSC}{MSE} = \frac{42,92}{2572,51} = 0,017$$

$$\& P(F_{1,104} < 3,98) = 0,05$$

i.e. at the 95% level of confidence  
there is no significant  
difference between the ages.

b. t-test

$$t_{104} = \bar{A}_1 - \bar{A}_2 / \hat{\sigma} = -1,2/1,76 = -0,68$$

$$\text{at the } 0,05 \text{ level } t = -1,99 > -0,68$$

Thus at the 95% level of confidence the t-test confirmed that there was no significant difference in ages. It was thus concluded that the second survey was a representative sample of the first. The questionnaire could now be analysed.

6.3.1. The Analysis.

a. It is important to ascertain which concept of a successful career is most prevalent in order to elaborate under which conditions such a definition would be organizationally appropriate. Furthermore, knowing this definition will help understanding of the various intentions and underlying motives encountered in career behaviour. A synthesis of the 23 definitions given of a successful career was the following:

"A successful career is one wherein you attain your personal aims and goals in a manner which brings you happiness and satisfaction in your work."

This definition should make it clear to the Air Force that aircrew are feeling the need of personally managing their careers. It does imply, however, that the individual aircrew member should "become proactive and an effective diagnostician - able to identify the problem, operate with a maximum of self insight, build up a repertory of possible responses, and know how to select the appropriate response." SCHEIN (7). The requirement of matching the needs of the aircrew with those of the Air Force is underlined once more. Aircrew should seek responsible career counselling from officers, who not only know the Air Force requirements, but who are also trained in the role of counselling.

b. The next question asked was to elicit the finding of the previous survey:

"Would you, as an active aircrew member, consider the rank of Colonel and the post of Unit/Base commander a fitting climax to: a successful, a fair or unsuccessful career?"

56% (13) said this was a fair career; 39% a successful one; and 4% an unsuccessful career.

The majority (56%) said this kind of career was fair which partially confirmed the first survey's findings. The reason for this was probably due to the respondents using their definitions of a successful career as a basis for their decision. In the first survey a successful career was defined for them and then

the question posed. In this questionnaire the respondents first stated their definition of a successful career before answering the question. From the respondents' definition it is clear that their personal aspirations and needs are foremost, whilst previously they were probably subjected to the organizational views of what constituted a successful rank and position in the Air Force. How much more senior a rank than Colonel and higher position than a Unit or Air Base Commander is expected for a successful career, may require further investigation.

c. Previously the retirement age of 50 years for active aircrew members was positively supported. The implications of such early retirement could, however, have serious consequences on an aircrew's life-style if he was not prepared for such an eventuality. So the question posed was:

"If you could retire at 50 years of age instead of 60 years of age, would you consider starting a second or non-Air Force career?"

61% (14) said yes and 39% said no.

Those who answered "yes" were further asked whether they would find the idea of a new career;

- (i) An exciting opportunity to look forward to? 57% yes.
- or (ii) A prospect to be accepted with equanimity? 36% yes.
- or (iii) A necessary evil not to be contemplated before its time? 7% yes.

Early retirement is still popular and aircrew look forward

to starting another career. This intention implies an Air Force responsibility to make the transition a happy and profitable one for both parties. Such a responsibility has already been admitted by the authorities in the case of Medium Service aircrew who retire after 20 years service: ".....on retirement he will be too old to begin a new career elsewhere.....places the State under a still greater moral obligation to justifiably compensate him for the possible career and salary expectations which he must give up in order to devote the best part of his productive work life to a dangerous and short career in the interest of State security." (8)

A similar attitude should be adopted if early retirement for all active aircrew is accepted. It implies, furthermore, that aircrew members should be prepared for their second careers (if this is possible) and be compensated for loss in earnings by increasing their pay and allowances (thus also increasing their retirement benefits). SCHEIN (1978) says that....."it is obvious that the incentives and constraints which can be created by government through support of research, scholarship programs, dissemination of information about occupations and so on, can influence to a considerable degree entry into a (second) career." (9).

d. Because "Merit promotion", based on regular appraisals was highly supported in the first survey, confirmation of the acceptability of such a decision was sought by further asking:

".....would you consider this:

- (i) A fairer method than the old seniority one? 83%(19) - yes
- (ii) No better than the old method?" 13% - yes.

This validates the previous finding where 87,9% aircrew agreed

that such merit rating marks should be used to complete a list of merit for promotion.

e. In the Air Force promotion prospects are primarily dependent on vacancies in ranks. Vacancies are dependent on establishment strengths. If a maximum period of occupation of a rank or age in a rank is laid down, incumbents will retire earlier and so create vacancies. Respondents were asked:

"Which course of action would you support:

- |                                 |          |        |
|---------------------------------|----------|--------|
| (i) Maximum periods in ranks?"  | 78% (18) | - yes  |
| or (ii) Maximum ages in ranks?" | 22%      | - yes. |

This not only confirms the previous survey's findings but also those of a study made by Major General C. J. Joubert (Confidential Report: HSP/C/502/2 over HSP/110/3/2 dd 2 Sep 75) (10).

f. The relative importance of five career planning elements: Age at which promoted; Years of service completed before promotion; Wider experience; Higher education; and Regular assessment had to be determined. This was done by comparing each element with one of the others so that all the elements were compared with each other. The results were as follows:-

AGE

- (i) 100% said that Regular Assessment is more important than Age at promotion.
- (ii) 95% said that Higher Education is more important than Age at promotion.
- (iii) 94% said that Wider Experience is more important than Age at promotion.

- (iv) 74% said that Years of Service is more important than Age at promotion.

#### YEARS OF SERVICE

- (i) 87% said that Regular Assessment is more important than Years of Service.
- (ii) 68% said that Wider Experience is more important than Years of Service.
- (iii) 58% said that Higher Education is more important than Years of Service.

#### WIDER EXPERIENCE

- (i) 73% said that Regular Assessment is more important than Wider Experience.
- (ii) 35% said that Higher Education is more important than Wider Experience.

#### HIGHER EDUCATION

- (i) 70% said that Regular Assessment is more important than Higher Education.

When these responses were summed up we found that the five elements were rated in an order of merit as follows:

1. Being Assessed Regularly.
2. Getting Wider Experience.
3. Obtaining Higher Educational Qualifications.
4. Years of Service at which promoted.
5. Age at which promoted.

Those results fully validate the findings of the first survey.

g. Respondents were asked to rate the undermentioned ten job

satisfaction variables which are particularly relevant. Below is given, in order of importance, a table of these variables as determined by the aircrew. (the Rensis Likert importance scale was used).

VARIABLE	WEIGHTED TOTALS
Worthwhile Work	112
Adequate Pay and Allowances	109
Achievement	108
Advancement and Self Improvement	105
Challenging Job	104
Allowed Responsibility	104
Able to Contribute	102
Given Recognition	95
Having Authority and Independence	89
People in the Work Environment	88

Table 20 Rank order of Ten Job Satisfaction variables.

The order of importance of these variables appears significant. When they are related to the respondents' definition of a successful career, then it is clear that those variables that contribute materially towards the attainment of personal aims and goals, do in fact rate higher than others which do not do so. Doing "worthwhile work" by aircrew is understandable - the attraction, adventure and the excitement of flying remains their motivational force throughout their careers. However "achievement" is normally closely related to this and the fact that "adequate pay

and allowances" were considered more important, necessitated a further test of the validity of such a placing. Using the  $\chi^2$  test (see Appendix G for the detailed workings) at the 5% level of significance (or the 95% level of confidence) it was found that there was no difference in importance between these two variables.

On the assumption that a one point difference in the weighted totals is not significant, a new rank order of these variables was drawn up:

1. Worthwhile work.
2. Adequate Pay and Allowances; Achievement.
3. Advancement and Self Improvement; Challenging Job;  
Allowed Responsibility.
4. Able to Contribute.
5. Given Recognition.
6. Having Authority and Independence; People in Work  
Environment.

The choice that "people in the work environment" was considered less important than the other variables, once again underscored the individual effort involved in aircrew jobs: pilots and navigators are almost entirely dependent on their own skills and expertise in executing their flying tasks. The Air Force should consider these variables when drawing up career plans for aircrew.

h. As a natural follow-on from the last question, the respondents were asked to rate their Air Force careers in terms of satisfaction/dissatisfaction derived from them by choosing one of the terms below, which most aptly described their feelings. They replied as follows:

- (i) Completely satisfied : 1
- (ii) Very satisfied : 7
- (iii) Satisfied : 11
- (iv) Dissatisfied : 4
- (v) Fairly, Very and Completely Dissatisfied : 0

Clearly the majority have had satisfactory (and better) careers. This also confirms the first survey's findings where aircrew indicated that their career progress had been satisfactory so far.

#### 6.3.2. The Conclusions.

On analysing the results of this validation survey, certain logical conclusions were reached by comparing the answers given with those of the first survey.

##### a. The Career.

The 23 definitions of a successful career were analysed and the results were as follows:

- (i) Ten considered job satisfaction to be the most important variable for a successful career.
- (ii) Five considered happiness to be the most important variable for a successful career.
- (iii) Eight considered achieving one's own personal aims and goals to be the most important variables for a successful career.

The aircrew's definition of a successful career could thus be summed up as one where the personal aspects are considered more important. The previously given definition stressed the

organisational approach of moving up the various management levels. Clearly aircrew feel that their needs are as important as those of the Air Force. They should be consulted in all career planning efforts.

b. Implications of Early Retirements.

The majority (56%) of respondents indicated that retiring at rank of Colonel and occupying a position of Unit/Base commander (Q2) was a fair career. 39% on the other hand said such a career would be a successful one. A fair to successful career could consequently be considered as acceptable to most aircrew. Seen in this light our first survey's finding is supported. In the next question (Q3) 61% said that they would consider starting a second or non-Air Force career and 57% of these respondents indicated that this would be an exciting opportunity to look forward to. It is thus fair to conclude that active aircrew considered the present retiring age of 60 years too old and that being a Colonel in command of an Air Force Base is acceptable at a lower retirement age. A second career held an attractive challenge for them. Here the Service has an implied obligation: should early retirements be brought in then aircrew must be helped to prepare themselves for this event. Based on the above conclusions, it was felt that no further investigation into what rank other than that of Colonel or position other than that of Unit/Base Commander, would be justified. The "contents" of a successful career as postulated, is viable.

c. Promotion Prospects.

83% aircrew indicated that they considered their positions

for promotion on a "merit list" (Q4) to be a fairer (more just) measure than the ones indicated on the old seniority list. Prospects are also enhanced by increasing vacancies for promotion. 78% respondents chose maximum periods in ranks (Q5) so that a greater turnover and hence more promotion chances could be generated. It is concluded that these findings confirm those of the first survey as well as those of Major General C. J. Joubert's Committee in 1975 (2).

d. Career Planning Elements.

The analysis of Q5 on which element was the most important resulted in the following:

1. Being assessed regularly.
2. Getting as wide an experience as possible.
3. Obtaining higher educational qualifications.
4. Years of service at which you are promoted.
5. Age at which you are promoted.

The first survey's finding is the same and is thus fully validated.

e. Job Satisfaction.

In the first survey the overall majority of aircrew (96,4%) affirmed that their work was crucial to their satisfaction and to the development of their personalities. This study (Q7) set out to have ten relevant job satisfaction variables rated so as to indicate their relative importance in formally structured career planning. The results were gratifying:

- Order of importance :
1. Worthwhile work.
  2. Pay and Allowances; Achievement.
  3. Challenging Job; Advancement and Self Improvement;  
Allowed Responsibility.
  4. Able to contribute.
  5. Given Recognition.
  6. Having Authority and Independence;  
People in work environment.

83% indicated in Q8 that they were satisfied to completely satisfied with their Air Force Careers. This agrees with the first survey's findings where 90% indicated that their progress had been satisfactory so far. In an interview with the officer in charge of flying at A.F.B. Ysterplaat this question was brought up. The answer given was that the respondents were "wary" of saying that their progress has not been satisfactory so far and that they were not satisfied with their careers. It appears that they mistrusted the anonymity of the questionnaires and was concerned that they may be discriminated against if they said otherwise. Whatever the real reason, the subsequent answers to both questionnaires amply demonstrated that their progress had not been as satisfactory as it could have been, had the principles proposed in this study been applied. In the event that the respondents were correct in their answers, then one could conclude that they would be even more satisfied with their career progress when the proposals contained in this study are implemented.

#### 6.4 General Conclusion.

The investigative studies have been successful. The findings of the first survey have been validated by the second study. Meaningful formal career planning could now be proceeded with in the areas indicated by this study by not only the Air Force but also by other large hierarchically structured organizations:

- a. Drawing up a career development programme in conjunction with the individual concerned.
- b. Designing a counselling guide on the application of the development programme,
- c. Refining appraisal systems on the "merit"-list lines,
- d. Using a model for predicting promotion vacancies (or personnel flows).

6.5 References

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## 7. The Career Plan.

Our hypothesis states that if the desirability of a formally structured Career Plan, containing a career development programme, a counselling guide on the application of the programme, an appraisal system to measure performance and a model for predicting promotion vacancies, were recognised by an organisation, its adoption should be seriously considered. Against the background of the argument developed in our dissertation, we propose to evaluate each of the four elements of our hypothesis and confirm or reject them on the conclusions reached. Finally the complete hypothesis representing the formally structured Career Plan will be tendered for judgment.

### 7.1 A Career Development Programme.

It has been postulated by various scholars why career development and counselling should be done by organisations HALL (1); HUGHES (2); SLOCUM (3). GLUECK (4) states that there are four basic reasons for career development:

- "1. By developing people to their fullest, the organization reaches its goals.
2. It provides satisfaction and dignity to employees.
3. It reduces employee turnover and thus costs.
4. It reduces the hoarding of high caliber personnel."

Career development programmes, represented in brief by career guides, have been discussed at length. There are in fact two programmes: one catering for the needs of the organisation and one for the individual. These two have to be matched so that

the individual can reach his own goals through achieving organizational goals. This point was amply demonstrated in the case of aircrew career development. An aircrew member's satisfaction and dignity were considered in the questionnaires under the headings that his career is crucial to his satisfaction as a human being and the development of his personality. Aircrew strongly supported these personal concepts. They also indicated very clearly that if the Air Force provided them with acceptable career plans they would stay on and make a success of their careers as well as developing a greater loyalty, which of course means greater morale. When morale increases turnover decreases. Adequate career development reduces the hoarding of high calibre people. An example of a test-pilot was given and it was shown that the hoarding of such a person was to the detriment of both pilot and the Air Force. Now it is justifiable to assume that any organization would, in its own interest, support the above 4 career development reasons and would, therefore, seriously consider it more than desirable to develop the careers of its employees. The Air Force for one, would, I am sure.

## 7.2. A Counselling Guide.

It was predicted that if the desirability of a formally structured Career Plan, containing a counselling guide on the application of career development programme were realized by an organization, its adoption would be seriously considered.

The initiating of a career development programme requires an astute measure of promotion. A well planned programme should have been preceded by indepth discussions with heads of departments

and as many employees as possible in order to co-ordinate their views and suggestions on the construction of viable careers for the organization's personnel. Even such actions do not guarantee the smooth introduction and running of the programme. Career development counselling for the employee, who would be looking for guidance and advice on his career programme, would thus be expected to come from his immediate superior or supervisor. These superiors or supervisors need to know the content and extent of the career development programme - a difficult task for sure. It is not possible for one person to know all the details of such a programme in large organisations. For instance in the U.S. Air Force "...each career specialty has a career management officer whose function is to serve as an adviser on career development for that group of officers in order to help assure proper utilization of the men and to serve as an adviser to them. "(5). More important, however, is the need to know how to counsel.

The responses to the questionnaires, in the case of aircrew, revealed many career anomalies and inconsistencies which the immediate superiors were unable to solve for their subordinates. This is probably the reason why the majority of aircrew selected the Personnel Division at Air Force HQ's as their best source of counselling - this Division, after all, was the most likely initiating agency for career development.

Knowledge of the programme and being trained in counselling would make a supervisor suitable for this important role in an organization. Such counselling would go a long way towards ensuring that an individual's needs are considered and (where

possible) incorporated in his career plan. The result would be satisfaction, happiness, increased loyalty and higher morale as well as greater productivity and effectiveness for both himself and the organization. Clearly when an organization realizes the benefits accruing to itself in providing an efficient counselling guide on the application of its career development programme, it would seriously consider its adoption.

### 7.3. An Appraisal System to Measure Performance.

Without appraisals an organization does not fully know how well an employee is performing and, in turn, the employee does not know how the organization values his contribution to the common weal. Properly designed and applied appraisals provide the opportunity to review a person's behaviour at work. The removal or correction of past deficiencies could lead to improved organizational performance. Using...." past strengths can lead to reinforcement of those tendencies that enrich the employee's development and motivation" GLUECK (6). Furthermore regular appraisals focuses the superior's and the employee's attention on the employee developing as an important part of their jobs which can contribute to improved organizational and personal effectiveness so GLUECK (1974). But appraisals also provide sound information for promotion decisions. In this regard, the "Merit"-list argument for Air Force aircrew promotion is most relevant. Aircrew feel they would be more equitably promoted if their promotion-positions on a list were determined by means of appraisals.

From the questionnaires it was patently evident that aircrew valued regular assessment above all other career variables. And it is not because they are assessed at infrequent intervals: on

the contrary they are assessed at least once annually and also on being posted. Clearly a lot of value is attached to Air Force assessments. This is a great credit to the Air Force planners in the Personnel Division who designed the system and who implement it. More use is made of appraisals than just measuring performance. The Air Force uses the information to assess not only...<sup>4</sup> current performance but also to estimate future potential and identify the development action required for improved performance and enhanced potential" VAN DEN BOS (7).

In conclusion nearly all organizations use some form of appraisal. The larger the organization, the more formal the appraisal. It is thus evident that most large hierarchically structured organizations have already realized the desirability of having an appraisal system and are using appraisals in one form or another.

7.4. A Model for Predicting Promotion Vacancies.

Career prospects in hierarchically structured organizations are functions of the proportions of strengths in the various grades (ranks); the average age in the various grades (ranks); the wastage rate as the result of death, remusterings, resignations, discharges, etc; and lastly as the result of expansion and reduction in organizational strengths. Career planning consists of regulating the intakes (recruits), remusterings (transfers), early retirements (redundancies), sizes of specific grade (rank) groups, etc, in order to ensure maximum stability of promotion prospects. In order to forecast retirement and wastage losses and thus promotion and recruitment, existing staff strengths are normally projected by age and grade (rank) up to 10 years ahead. Thus predicting

promotion vacancies is tantamount to working out a career structure statistically.

Many mathematically based models are available. The choice of a suitable one for an organization depends on the composition of its staff: if statistically trained personnel are on strength, then one of the sophisticated models is likely to be selected. If not, the old tried work-horse, the replacement table, is put into use.

All big organizations use some form of prediction of future strengths in their longrange planning activities in order to maintain their effectiveness, survive and grow. Moreover, any job or role planning process....."should start with some kind of forecast, some attempt to look into the future or to project out the implication of the present" SCHEIN (8). The need for strength predictions is recognised and implemented; the method of doing so depends on the organization's personnel inventory. Such prediction systems are not, per se, included in formally structured career plans, because...."Unfortunately, most organizations are not at present concerned with career development." GLUECK (9), and so do not have such plans for their personnel. Strength prediction models are readily acceptable by organizations. Whether a formally structured Career Plan containing a promotion prediction model will be as acceptable, is not clear. If organizations can be convinced of the desirability of a Career Plan, then I believe they would accept a promotion prediction model with equanimity. The Air Force is using a dynamic promotion prediction model:- "Rytuig" which has to be modified to cater for the demands of the newly

introduced Flexible Service Concept.

#### 7.5. The Formally Structured Career Plan.

Our hypothesis predicted that if the desirability of a formally structured Career Plan, containing the four elements evaluated above were recognised by an organization, its adoption should be seriously considered.

Each element has been confirmed in its own right. Our Career Plan is made up of the four elements. Thus if the parts of a whole are accepted, then the whole too should be acceptable. This cannot, however, be said with certainty as most organisations do not have formally structured career plans; and this includes the Air Force.

Our hypothesis was tested on a representative sample of 111 aircrew members of the S. A. Air Force at Air Force Base Ysterplaat. An analysis of the answers of the first survey and those of the subsequent validation survey, substantiated these elements, but inferred that if the desirability of a formally structured career plan, as proposed in the hypothesis, were realized, its adoption could be seriously considered. Because such an action would not commit an organization (including the Air Force) to a definite course of action, the conclusion was accepted i.e. the adoption of a formally structured career plan would be seriously considered. Thus our hypothesis was substantiated.

Moreover, the advantages to an organization and the advisability of adopting a Career Plan as proposed in our hypothesis, have also been demonstrated. Thus we have achieved our aim too.

Finally a letter dated 23 April 1979 was received from the Chief of the Air Force, Lieutenant General R. H. D. Rogers, SSA, SM. DSO, DFC stating that he agreed with the validity of our hypothesis (see below).

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**KANTOOR VAN DIE—OFFICE OF THE**

Air Force Headquarters  
Private Bag XI99  
Pretoria  
23 April 1979

TO WHOM IT MAY CONCERN

I wish to state that I agree with the validity of the hypothesis as stated below:

"If the desirability of a formally structured Career Plan, containing a career development programme, a counselling guide on the application of the programme, an appraisal system to measure performance and a model for predicting promotion vacancies, were recognised by an organisation, it's adoption should be seriously considered".

  
(R.H.D. ROGERS)  
CHIEF OF THE AIR FORCE : LT GENL

/MS

With our hypothesis substantiated and its validity agreed to by the Chief of the Air Force, a formally structured Career Plan could be drawn up containing the elements of the hypothesis, viz:-

- a. A Career Development programme,
- b. A Counselling Guide on the application of the programme,
- c. An Appraisal system to measure performance,
- d. A model for Predicting Promotion Vacancies.

## 7.6. Conclusions and Summary.

### 7.6.1. Conclusions.

It is felt that the Air Force data in this dissertation show clearly that:

- a. The Aircrews' views of a successful career emphasize their personal aspirations: happiness and job satisfaction are seen as the means to attain their aims and goals in life.
- b. Formal career plans need to be drawn up and made known to aircrew in order to demonstrate the sincerity of the Air Force in looking after their career expectations.
- c. Aircrew should be consulted on all career-influencing matters and be allowed to feedback their changes in plans.
- d. Aircrew consider their work (flying) as the greatest source of satisfaction; all aspects connected with flying should be foremost in the design of their career plans.
- e. The order of importance of the career variables like:

regular assessment; wider experience; higher education; years of service and age on promotion, needs to be considered when they are being incorporated in the career plans.

- f. The high regard in which aircrew hold regular assessments, indicates the importance they attach to it as a career success determinant. To strengthen their trust even more, they feel that a promotion "merit"-list, based on the results of appraisals, would be a more just way of regulating promotions.
- g. The retirement age of 60 years is considered too old for active aircrew and should be brought down. In this event there is an implied Air Force obligation to provide adequate compensation for the shorter career and also to prepare aircrew for the earlier retirement and second career whilst they are still in the Service.
- h. The top career-rank of Colonel and the top career-position of Air Force Base commander were confirmed in two separate determinations: one as the result of a direct question and another as a deduction whilst matching the rank with the development phases.
- i. Maximum periods to be served in the ranks, need to be looked at as a means for increasing promotion and thus career prospects. The JOUBERT (10) Committee report is supported.
- j. Postings to flying units take top priority, but other non-flying ones should also be considered in order to broaden aircrew experience.

- k. Higher educational training could be more ambitious: there will always be aircrew members (like in the past) who will strive to better themselves academically for their and the Air Force's benefit. A doctorate is not impossible to attain.
- l. Counsellors need to be nominated and trained, and aircrew notified who they are and where they are to be found: the Personnel Division's staff was considered most appropriate to do this task.
- m. The maintenance of a step-by-step operations manual and a policy statement manual is not widely practised; it could be encouraged.

#### 7.6.2. Summary

In 1975 it became increasingly clear that the build-up of international political pressures on South Africa could lead to military confrontation with the Republic. Predictably such a possibility accelerated Defence expansion. This necessitated the more effective use of human, material and financial resources of, not only the military but also of the civilian sector of the country.

Better performance of personnel could be obtained if they were able to recognise and appreciate the requirements for advancement to their goals in their chosen careers. Viable careers are formulated in career plans - those top management directives containing details of career development programmes, job activities and opportunities, guidance, behaviour patterns and the requirements for advancement in the organisation. No formally structured career plans were found in a number of large hierarchically

structured civilian organisations such as Shell, Mobil or the University of Cape Town, to name but a few. Moreover, according to W F GLUECK (1974) a similar situation existed in the United States of America. Furthermore this was also true of the South African Air Force's pilots and navigators - that vital personnel section of the Air Force's air crews.

This enigma is difficult to comprehend. The implementation of the personal practices of manpower planning, attraction, selection, rewards, protection, career development, manpower control and evaluation increases the effectiveness of an organisation. Likewise a formally structured Career Plan would ensure greater development of an organisation's personnel and give them satisfaction and dignity. Moreover, the use of such career plans reduces turnover (and thus costs) and the hoarding of high calibre personnel. The integrity of the last two statements led to the formulation of this dissertation's hypothesis:-

If the desirability of a formally structured Career Plan, containing a career development programme, a counselling guide on the application of the programme, an appraisal system to measure performance and a model for predicting promotion vacancies, were recognised by an organisation, its adoption should be seriously considered.

Thus the aim of this exploratory and descriptive study is to demonstrate the advisability and subsequent advantages to an organisation if a career plan, as proposed in the hypothesis, were adopted for use by their personnel. The applicability to the

Air Force's aircrew is shown throughout this study.

A successful career is generally seen as one where the new entrant rises steadily from one management level to the next until he reaches retirement. The time span covered is longterm:- career planning is inextricably linked to the existence of and to the long range planning activities of an organisation: in brief a career plan is a long range plan for personnel. A survey of the literature on planning was made in order to determine and show how the long range planning factors determine and relate to those of career planning. In this investigation, however, career planning emerged as an integral part of manpower planning. The latter being distinguished as the human resources area of long range planning. As such it required a separate analysis.

The need for and the implications of manpower planning entailed an investigation of the personnel functions of recruitment, redundancies, training, selection, promotion, managerial development and career development. This led to a further analysis of the demand and supply of personnel with special reference to Air Force cases. In order to find a practical method of forecasting for replacement of personnel, an evaluation of mathematical, actuarial and computer simulation manpower-planning-models was made and a suitable model selected - an actuarial one.

The reconciling of the demand and supply forecasts led to the drawing up of the manpower plan, which included the concept of a career plan.

A conceptual career plan was now argued, guided by studies made by the U. S. Air Force, U. S. Army, my own experiences in the Air Force and from relevant literary sources. The qualitative choices and quantitative magnitudes of the elements of such a plan were evaluated and formulated. The plan that emerged portrayed the basic framework of concepts and requirements needed for drawing up a viable career plan with specific relevance to aircrew in the Air Force. The acceptability of these concepts and requirements were tested by running a pilot survey at the largest Air Force base in the Cape: Air Force Base Ysterplaat.

The survey was done by means of a questionnaire which was handed to the six officers-in-command, who after the briefing, gave them to their 63 pilots and 37 navigators to complete. The questions were both open-ended and multi-choice. They covered the wide and detailed spectrum of the elements found in an Air Force officer's career; rank and position; promotion; regular assessment; gaining wide experiences; achieving higher educational as well as technical qualification; age of retirement and length of service in considering retirement and promotion. The results were statistically analysed and graphically illustrated. They indicated that the elements of career planning were acceptable to a significant section of the hierarchically structured Air Force - the aircrew at AFB Ysterplaat. Moreover, it was found possible to rate the importance of these elements to each other so that a system of grading could be introduced at a later stage. The Air Force is however, not the only hierarchically structured organisation which could benefit from adopting structured career

plans. So a test study was made to investigate the applicability of these elements in an organisation other than the Air Force. The Administrative sector of the University of Cape Town was chosen. The outcome of this evaluation corroborated the principles accepted by the aircrew of AFB Ysterplaat.

Finally a validation study was run on a randomly selected number of aircrew at AFB Ysterplaat. The hypothesis was confirmed. Moreover, the Chief of the Air Force agreed with the validity of the hypothesis. However, a different view of a successful career emerged as one "wherein you attain your personal aims and goals in a manner which brings you happiness and satisfaction in your work." This indicated the wish of aircrew to participate in career planning and will no doubt receive serious consideration.

Many career anomalies and inconsistencies were identified and listed for Air Force consideration. The argument of the dissertation clearly illustrated the need for the Air Force to bring out formally structured career plans for its aircrew.

9. GLUECK, 1974, Op. Cit. p. 271.
  
10. JOUBERT, C. J., Report; Committee of Inquiry in the  
Flow of Retirements and Promotions  
in the S.A. Defence Force.  
HSP/C/502/2 over HSP/110/3/2  
dd 2 Sep 75 (translated).

DETERMINING THE UNIQUENESS OF THE THESIS

1. A letter: "SUBJECT FOR DOCTORAL DISSERTATION : CAREER PLANNING" (see Annexure 1) was written in 1978 to 61 organisations in order to determine the uniqueness of the thesis. A list of these organisations and a summary of their comments follows:

2. Organisations written

No.	Organisation	Comments
1.	Council for Scientific & Industrial Research, Pretoria.	Inquiry referred to National Institute for Personnel Research in Johannesburg.
2.	University of the Orange Free State, Bloemfontein.	Inquiry referred to H.S.R.C.
3.	University of Natal, Durban.	No knowledge of similar study done or being undertaken.
4.	Rand Afrikaans University, Johannesburg.	No knowledge of similar study done or being undertaken at the University; referred to H.S.R.C. Pretoria.
5.	Universiteit van Pretoria, Pretoria.	No knowledge of a similar study done or being undertaken.

No.	Organisations	Comments
6.	University of Manchester, Manchester, England.	No knowledge of a similar study done or being undertaken in Manchester.
7.	Manchester Business School, University of Manchester, England.	Inquiry referred to : Professor A.M. Bowey, University of Strathclyde, Glasgow.
8.	University of Stellenbosch, Stellenbosch.	No knowledge of a similar study done or being undertaken; invited to view related literature.
9.	University of Sussex, Brighton, England.	No knowledge of a similar study done or being undertaken at the University; referred to Institute of Personnel Management, London.
10.	University of Kent at Canterbury, Kent, England.	No knowledge of a similar study done or being undertaken at the University.
11.	Massey University, Palmerston North, New Zealand.	No knowledge of a similar study being undertaken at the University; inquiry referred to specialists in the military manpower field.
12.	University of Durban-Westville, Durban.	No knowledge of a similar study done or being undertaken at the University; suggest H.S.R.C. Pretoria.

No.	Organisation	Comments
13.	Northwestern University Evanston, U.S.A.	Unable to answer; referred to Comprehensive Dissertation Index & Dissertation Abstracts International.
14.	Purdue University West Lafayette, U.S.A.	No knowledge of a similar study being undertaken; suggest writing to U.S. Air Force.
15.	University of Rochester, New York. U.S.A.	Inquiry referred to Dissertation Index & Dissertation Abstracts International.
16.	The University of New Mexico, Albuquerque, U.S.A.	No knowledge of a similar study being undertaken; will inform if such a one located.
17.	University of Sydney, Sydney, Australia.	No knowledge of a similar study being undertaken at the University.
18.	Harvard University Boston, U.S.A.	Inquiry referred to Department of the Army. (Dr Francis F Medland).
19.	The American Univer- sity, Washington D.C. U.S.A.	Inquiry referred to Office of Naval Research (Dr John A Nagay).
20.	United States Military Academy, West Point, U.S.A.	Inquiry referred to military literature about career planning.

No.	Organisation	Comments
21.	Massachusetts Institute of Techno- logy, Cambridge. U.S.A.	Inquiry referred to Prof. Edgar H.Schein, recommended "Career Dynamics" by Prof. Schein.
22.	American Personnel & Guidance Association. Washington D.C., U.S.A.	No knowledge of a similar study being undertaken.
23.	University of Melbourne Parkville, Australia	No knowledge of a similar study being undertaken (by implication); included a paper written by the Registrar himself on training, education & career management of Regular Army Officers.
24.	McGill University, Montreal, Canada	No knowledge of similar study being undertaken at the University.
25.	Brookings Institution, Washington D.C., U.S.A.	No knowledge of a similar study done or undertaken by the Institution.
26.	Cornell University, Ithaca, U.S.A.	No knowledge (by implication) of a similar study being undertaken.
27.	University of Hartford, West Hartford, U.S.A.	No knowledge (by implication) of a similar study being undertaken.
28.	University of Minnesota, Minneapolis, U.S.A.	Only a bibliography about career planning done. Copy can be obtained for \$3.

No.	Organisation	Comments
29.	The Ohio State University, Columbus. U.S.A.	No knowledge of a similar study being undertaken at the University. Suggested reading of John L Holland.
30.	Department of the Navy, Arlington, U.S.A.	No knowledge of similar study being undertaken at the Office of Naval Research; technical reports forwarded on work done for the U.S. Navy.
31.	Institute of Personnel Management, London, England.	No knowledge of a similar study being undertaken; a list of periodical article references included.
32.	University of Alberta, Edmonton, Canada.	Inquiry referred to Dr Paul Otke, a staff member with considerable experience in the military as a psychologist.
33.	Grant Mc Ewan Community College, Edmonton, Canada.	No knowledge of a similar study done or being undertaken: Dr Paul Otke sent his Ph.D. Thesis: "The Relationship between Job Satisfaction and Job Requirements" as a guide.
34.	University of Birmingham, Birmingham, England.	No knowledge of similar study being undertaken at the University.

No.	Organisation	Comments
35.	National Institute for Personnel Research. Johannesburg.	Engaged in work in this area : recommend Mr E G Aspeling be contacted. I wrote to Mr Aspeling on 17th July, 1978, but have had no reply.
36.	Royal New Zealand Air Force, Auckland, New Zealand,	No knowledge of a similar study being undertaken in New Zealand.
37.	Department of the Army, Alexandria. U.S.A.	Topic of common concern to U.S. Army personnel managers; reports sent by Dr Francis F. Medland. Considered as no knowledge of a similar study being undertaken.
38.	McMaster University, Hamilton. Canada.	No knowledge of a similar study being undertaken; list of likely references sent.
39.	Human Sciences Research Council, Pretoria.	Advises scrutiny of thesis Research Bulletin.
40.	Department of the Air Force, Randolph Air Force Base, U.S.A.	Inquiry referred to : Air University Library, Maxwell A. F. B. Alabama.
41.	Air University Library, Maxwell A.F.B., U.S.A.	No reply.

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No.	Organisation	Comments
42.	University of Strathclyde, Glasgow, Scotland.	No knowledge of a similar study done or being undertaken; sent book "A Guide to Manpower Planning" by Professor Bowey.
43.	University Microfilms International, London, England.	Suggests using Datrix II to answer inquiry.
44.	Canadian Police College, Ottawa, Canada.	No knowledge of a similar study done or being undertaken.
45.	University of South Africa, Pretoria.	No reply.
46.	National Institute of Industrial Psychology, London, England.	No reply.
47.	University of Leeds, Leeds, England.	No reply.
48.	University of London, London, England.	No reply.
49.	American Institute for Research and Behavioral Sciences, Washington D.C., U.S.A.	No reply.

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No.	Organisation	Comments
50.	Alabama State University, Alabama, U.S.A.	No reply.
51.	Stanford University, Stanford, U.S.A.	No reply.
52.	University of California, Los Angeles U.S.A.	No reply.
53.	University of Connecticut, Storrs. U.S.A.	No reply.
54.	Yale University, New Haven, U.S.A.	No reply.
55.	Georgia Institute of Technology, Atlanta, U.S.A.	No reply.
56.	Wichita State University, Kansas, U.S.A.	No reply.
57.	University on Rochester, Rochester, U.S.A.	No reply.
58.	Duke University, Durham, U.S.A.	No reply.

No.	Organisation	Comments
59.	Pennsylvania State University, University Park, U.S.A.	No reply.
60.	University of Wisconsin, Milwaukee, U.S.A.	No reply.
61.	Rand Corporation, Santa Monica, U.S.A.	No reply.

### 3. Results

a.	Number of Organisations having <u>no</u> knowledge of a similar study being done or having been done	: 28
b.	Number of Organisations having a knowledge of a similar study being done or having been done	: 1
c.	Number of Organisations referring inquiry to another source	: 14
d.	Number of Organisations who have not replied	: 18
e.	Number of Organisations written to	: 61
f.	Effective size of sample (61 - 18)	: <u>43</u>

### 4. Conclusions

It is concluded that:

- a. The majority of organisations 28 (65,1%) knew of no similar study having been or being undertaken.

- b. Although the National Institute of Personnel Research said they were engaged in work in this area, they failed to answer a letter written them. By inference it could be accepted that my study does not overlap their research work.
- c. The organisations who referred the inquiry to others (14), and those who did not reply (18) constitute 32 of the total number (61) written to. If this number (32) was subtracted from the grand total (61) - then the effective sample size would be reduced to 29, and the positive responses (i.e. No knowledge) would rise to 96,5%!
- d. In any event this study is unique.

## UNIVERSITY OF CAPE TOWN

(WITH WHICH IS INCORPORATED THE SOUTH AFRICAN COLLEGE)



TELEGRAMS  
"UNIVERSITY RONDEBOSCH"  
TELEPHONE 69-4351

POSTAL ADDRESS  
UNIVERSITY PRIVATE BAG  
RONDEBOSCH 7700

ADMINISTRATIVE OFFICES - LOVERS' WALK - RONDEBOSCH

SUBJECT FOR DOCTORAL DISSERTATION : "CAREER PLANNING"

I am registered at the University of Cape Town for my doctorate (Ph.D.) degree. My intention is to make a study of the long-range planning problem with a view to developing a career planning model that could be used by the South African Air Force. As a retired pilot of 38 years' experience, I feel I could make a significant contribution to the personal effectiveness of the Air Force if I could design a Career Plan for their pilots.

I aim to use as a basis of study: that the personnel practices of manpower planning, attraction, selection, rewards, protection, career development and manpower control and evaluation are functions of organizational effectiveness. When an organization implements these practices, its effectiveness is increased. As my thesis argument I intend using the corollary hypothesis:

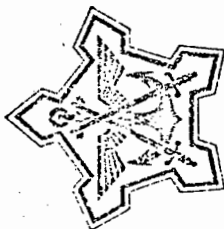
"Career Planning, as a special mix of career development, counselling, personal appraisal and predicting promotion vacancies, is also a function of organizational effectiveness. If an organization like the South African Air Force adopts and uses Career Planning, the effectiveness of its personnel, and hence the Air Force itself, will also be improved."

The purpose of my writing to you is to enquire of you whether you know of any one having done a study on similar lines to the one I propose to do. If you do know I would be grateful if you could provide me with either an abstract (Microfiche) of such a study or tell me from who I could obtain this information. If, on the other hand, you do not know, your answer will in any event be of great value: it will help establish that my thesis does make a contribution to the knowledge of Career Planning. Be assured that any costs involved in answering this request will be refunded by return of post.

Your early reply will be greatly appreciated.

Yours sincerely,

BRIGADIER H. J. BURGER



# SADF EFFICIENCY RATING

## COMPLETION OF ASSESSMENT FORM

The Officer Rating Officer fills in the personal particulars of the ratee on page 6, except for the seniority and bundle number. The surname and functional group must be written out in full.

The Rater gives his assessment of the member in column A on page 6, adds his comments on page 5 and obtains the ratee's cognizance, also on page 5.

The Unit Committee gives its assessment in column B, enters the same figure in column C, fills in block I (all on page 6) and adds its comments on page 5.

The Officer Commanding fills in block II on page 6 and adds his comments on page 5.

The Administrative HQ fills in the seniority and bundle number, fills in block III, (all on page 6) and adds its comments on page 5.

### General instructions

- a. A circle must be drawn around the chosen figure, letter or word in columns A and B and blocks I, II and III.
- b. The figure in column C must be written legibly.
- c. No alterations may be made to column C.
- d. Blue carbon paper must be used.
- e. Care must be taken to ensure that pages 5 and 6 are made the originals and 4 and 7 the duplicates.
- f. Pages 4 and 7 must be placed on the member's unit file and pages 5 and 6 must be sent to his Administrative HQ.

### REQUIREMENTS

#### Regards the Rater

The must preferably be at least a LtJ/S Lt or WO2, but, in any case, no lower than Sgt/PO. He must stand in a supervisory relationship towards the ratee in the functional line. This applies also to civilian raters.

#### Regards the Unit Committee

The committee must consist of a chairman, two members and a secretary.

The chairman must be the commanding officer or his representative.

The rater must be one of the members.

The second member must be in the same mustering and have at least the same rank as the rater.

Any change of secretary during a series of assessments must preferably be avoided.

## KEY TO SYMBOLS ON PAGES 4 AND 6

Figures in Columns "A" and "B"

- 1 = Unacceptable
- 2 = Weak
- 3 = Below Average
- 4 = Acceptable
- 5 = Satisfactory
- 6 = Good
- 7 = Above Average
- 8 = Excellent
- 9 = Outstanding

### Letters under "Training"

- U = Training can be managed by the unit.
- K = The member should attend a formal course.
- O = Further training would be fruitless.

### Letters under "Future Employment" (for maj/Lt Cdr only)

- N = Not to be employed in a staff post.
- S = To be employed in a staff post only.
- P = Can be employed in any post.

### Letters under "Potential"

- A = Warrants accelerated promotion. (Should be allocated only in the exceptional case of a member whose performance is so outstanding that it warrants his promotion to the next higher rank, even if he does not fully satisfy other promotion requirements).
- B = Warrants normal promotion.
- C = Does not yet warrant promotion. (Should be allocated to members who will not yet be able to meet the demands of the next higher rank but have the potential to do so if given the necessary guidance and experience).
- D = Does not warrant any further promotion.
- E = Does not merit his present rank. (Remedial action is called for whether in the form of training or transfer to more suitable work or, at need, dismissal).

### Replies under "Language"

- Yes = The member's proficiency in both official languages is adequate for his promotion to the next higher rank.
- No = The member's proficiency in one or both official languages is inadequate.

### Replies under "Confirmation"

- Yes = I confirm the assessment.
- No = I do not agree with the assessment.

# BEOORDELINGSBLAD - ASSESSMENT FORM

Name: \_\_\_\_\_

Grp. No.: \_\_\_\_\_

Geboortedatum / Date of birth: \_\_\_\_\_

Rang / Rank: \_\_\_\_\_

Bondnr. / Bondle No.: \_\_\_\_\_

Ansienheidsnr. / Seniority No.: \_\_\_\_\_

Waarnemingsydpark / Period observed	mnde / mths	A		B		C	
		1-3	4-5	1-3	4-5	1-3	4-5
MANAATVERMOEEN / MANAGERIAL ABILITY							
1. Sy betree oor die vloei van werk is	LW	1-3	4-5	1-3	4-5	1-3	4-5
2. Die mate van sy ondergeskiktes se werk is	NB	1-3	4-5	1-3	4-5	1-3	4-5
3. Die standaard van sy ondergeskiktes se werk is		1-3	4-5	1-3	4-5	1-3	4-5
4. Sy vermoë om te besluit op die grond van sy eie oordeel is		1-3	4-5	1-3	4-5	1-3	4-5
5. Sy vermoë om te besluit op die grond van sy eie oordeel is		1-3	4-5	1-3	4-5	1-3	4-5
6. Sy vermoë om te besluit op die grond van sy eie oordeel is		1-3	4-5	1-3	4-5	1-3	4-5
7. Sy vermoë om te besluit op die grond van sy eie oordeel is		1-3	4-5	1-3	4-5	1-3	4-5
8. Sy vermoë om te besluit op die grond van sy eie oordeel is		1-3	4-5	1-3	4-5	1-3	4-5
9. Sy vermoë om te besluit op die grond van sy eie oordeel is		1-3	4-5	1-3	4-5	1-3	4-5
10. Sy vermoë om te besluit op die grond van sy eie oordeel is		1-3	4-5	1-3	4-5	1-3	4-5
WETenskaplike / Wetenskaplike							
1. Sy vermoë om te besluit op die grond van sy eie oordeel is		1-3	4-5	1-3	4-5	1-3	4-5
2. Sy vermoë om te besluit op die grond van sy eie oordeel is		1-3	4-5	1-3	4-5	1-3	4-5
3. Sy vermoë om te besluit op die grond van sy eie oordeel is		1-3	4-5	1-3	4-5	1-3	4-5
4. Sy vermoë om te besluit op die grond van sy eie oordeel is		1-3	4-5	1-3	4-5	1-3	4-5
5. Sy vermoë om te besluit op die grond van sy eie oordeel is		1-3	4-5	1-3	4-5	1-3	4-5
6. Sy vermoë om te besluit op die grond van sy eie oordeel is		1-3	4-5	1-3	4-5	1-3	4-5
7. Sy vermoë om te besluit op die grond van sy eie oordeel is		1-3	4-5	1-3	4-5	1-3	4-5
8. Sy vermoë om te besluit op die grond van sy eie oordeel is		1-3	4-5	1-3	4-5	1-3	4-5
9. Sy vermoë om te besluit op die grond van sy eie oordeel is		1-3	4-5	1-3	4-5	1-3	4-5
10. Sy vermoë om te besluit op die grond van sy eie oordeel is		1-3	4-5	1-3	4-5	1-3	4-5

**I KOMITEE-KOMITEE**

Potensiaal / Potential: **A B C D E**

Opleidings- / Training: **U K O**

**II ZELVOEDER/OFFICER COMMANDING**

Toekomsaanwending (steeds vir maj/Lt Kdr) / Future employment (for maj/Lt Cdr only): **N S P**

TALE / LANGUAGES: **A B C D E**

ONDESKAWING / CONVERSATION: **J N**

**III HK/HQ**

TAAFWENDING / EMPLOYMENT: **N S P**

(Maj/Lt Kdr) / (Maj/Lt Cdr)

# BEOORDEELDE - CERTIFICATE OF COGNISANCE

Ek, nr. / I. No.: \_\_\_\_\_

Rang / Rank: \_\_\_\_\_

Naam / Name: \_\_\_\_\_

Handtekening / Signature: \_\_\_\_\_

Datum / Date: \_\_\_\_\_

het kennis geneem van die beoordeling. / have noted the assessment.

**BEOORDEELER - KOMMENTAAR**

A. Beoordeling breedvoerig met beoordeelde, besprek/nie besprek nie. / Assessment discussed in detail with ratee/not discussed.

B. Ek wil graag die aansig verder soos volg toelig / I wish to elucidate the rating as follows: \_\_\_\_\_

Handtekening / Signature: \_\_\_\_\_

Datum / Date: \_\_\_\_\_

**EENHEIDSKOMITEE - KOMMENTAAR**

Die beoordeling is met die beoordeelde besprek. / The rating has been discussed with the ratee.

Kommentaar: \_\_\_\_\_

Handtekening van Sekretaris / Signature of Secretary: \_\_\_\_\_

Datum / Date: \_\_\_\_\_

**BEVELVOEDER - KOMMENTAAR**

\*Die beoordeling is betroubaar/nie betroubaar nie. / \*The assessment is reliable/not reliable.

Handtekening / Signature: \_\_\_\_\_

Datum / Date: \_\_\_\_\_

**HOOFKANTOOR - KOMMENTAAR**

Handtekening / Signature: \_\_\_\_\_

Datum / Date: \_\_\_\_\_

\* Skrap wat nie van toepassing is nie. / \* Delete the inapplicable.

APPENDIX C

PERSONLIKE OORSIG  
(SENIOR OFFISIERE)

(Okt 78 Uitgawe)

PERSONAL REVIEW  
(SENIOR OFFICERS)

(Oct 78 Edition)



Nommer: \_\_\_\_\_ Rang: \_\_\_\_\_ Naam: \_\_\_\_\_  
Number: \_\_\_\_\_ Rank: \_\_\_\_\_ Name: \_\_\_\_\_

Klassifikasie: \_\_\_\_\_ Eenheid: \_\_\_\_\_ Pos: \_\_\_\_\_  
Classification: \_\_\_\_\_ Unit: \_\_\_\_\_ Post: \_\_\_\_\_

---

Check the officer career history on the back page for accuracy. Please list any errors in red on the history form. (This history will have been completed by your orderly room from your personal file)

Gaan die offisier loopbaan geskiedenis op die agterste bladsy na vir akkuraatheid. Lys aub enige foute in rooi op die geskiedenis vorm.. (Hierdie geskiedenis word deur u dienskamer saamgestel van u persoonlike leer.)

---

In your own words describe your present duties (tasks not responsibilities). If your job-description is attached, delete this question and answer questions 3 and 4 below.

Beskryf u huidige pligte in u eie woorde (take, nie verantwoordelikhede nie). Indien u posbeskrywing aangeheg is, laat hierdie vraag weg en voltooi vrae 3 en 4 hieronder.

---

Your job-description is attached. What tasks are you presently doing that are not included in the job-description? If not attached, delete question.

U posbeskrywing is aangeheg. Watter take onderneem u tans wat nie in die posbeskrywing uiteengesit is nie? Indien nie aangeheg nie, laat vraag weg.

---

Which of the described functions and tasks have become obsolete or have been allocated to others? Draw a line through them in red. If your job-description is not attached, delete question.

Watter van die funksies en take wat beskryf is, het verouderd geraak of is aan ander toegewys? Trek 'n lyn deur hulle in rooi. Indien u posbeskrywing nie aangeheg is, laat vraag weg.

---

What part of your job interests you the most?

Watter deel van u werk interesseer u die meeste?

---

What part of your job interests you the least?

Watter deel van u werk interesseer u die minste?

---

In terms of your personal objectives, describe briefly your own outstanding work achievements in the past year.

Met verwysing na u persoonlike doelwitte, beskrywe kortliks u eie uitstaande werkprestasies in die afgelope jaar.

---

In terms of your qualifications and the demands of your job, do you consider your qualifications adequate for posts at your present level?

Met verwysing na u kwalifikasies en die eise van u werk, beskou u, u kwalifikasies as genoegsaam vir poste op u huidige vlak?

---

Do you consider these qualifications adequate for posts at higher levels?

Beskou u die kwalifikasies as genoegsaam vir poste op hoer vlakke?

---

0. Are there any aspects of your job in which you feel you need more experience and training?

Is daar enige aspekte van u werk waar u voel u het meer ondervinding en opleiding nodig?

OFFICER CAREER OBJECTIVE STATEMENT - OFFISIER LOOPBAANDEELWIT VERKLARING

Serial No a	Objective/Doelwit b	Short-term/Korttermyn (1-4 yrs/jr) c	Medium-term/Mediumtermyn (5-8 yrs/jr) d	Long-term/Langtermyn (9-12 yrs/jr) e
1.	<p><b>ASSIGNMENT/TOEWYSING</b></p> <p>Desired posts: 1st choice Verlangde poste: 1ste keuse</p> <p>i. Name of post/Naam van pos ii. Unit/Eenheid iii. Reasons for choice. (Why do you think you are suitable) Redes vir keuse. (Hoekom dink jy jy is geskik).</p>	<p>.....</p> <p>i. ....</p> <p>ii. ....</p> <p>iii. ....</p>	<p>.....</p> <p>i. ....</p> <p>ii. ....</p> <p>iii. ....</p>	<p>.....</p> <p>i. ....</p> <p>ii. ....</p> <p>iii. ....</p>
2.	<p>Desired posts: 2nd choice Verlangde poste: 2de keuse</p> <p>i. Name of post/Naam van pos ii. Unit/Eenheid iii. Reasons for choice. (Why do you think you are suitable) Redes vir keuse. (Hoekom dink jy jy is geskik).</p>	<p>.....</p> <p>i. ....</p> <p>ii. ....</p> <p>iii. ....</p>	<p>.....</p> <p>i. ....</p> <p>ii. ....</p> <p>iii. ....</p>	<p>.....</p> <p>i. ....</p> <p>ii. ....</p> <p>iii. ....</p>
3.	<p><b>DEVELOPMENT/ONTWIKKELING</b></p> <p>In order to qualify yourself adequately for the posts listed above, list your personal development objectives below: Om jouself bevoegd te maak vir die poste hierbo aangedui, lys jou persoonlike ontwikkelingsdoelwitte hieronder:</p>	<p>.....</p>	<p>.....</p>	<p>.....</p>
4.	<p>Officer development Offisiersontwikkeling</p>	<p>.....</p>	<p>.....</p>	<p>.....</p>
5.	<p>Joint training Gesamentlike opleiding</p>	<p>.....</p>	<p>.....</p>	<p>.....</p>
6.	<p>Job-content training (eg flying courses, technical courses) Posinhoud opleiding (bv vlieg-kursusse, tegniese kursusse)</p>	<p>.....</p>	<p>.....</p>	<p>.....</p>
6.	<p>Academic training Akademiese opleiding</p> <p>i. Degree/Graad Diploma ii. Major subjects/Hoofvakke iii. University/College Universiteit/Kollege</p>	<p>.....</p>	<p>.....</p>	<p>.....</p>

---

Do you feel you have abilities which are not being fully utilised in your present job?

Voel u, u het vermoëns wat in u huidige werk nie ten volle benut word nie? Kan u aan die hand doen hoe hulle beter benut kan word?

---

List the changes you would like to see made in your present job which could help you to improve your performance?

Meld die veranderings wat u graag in u huidige werk sou wil sien om u in staat te stel om u prestasie te verbeter?

---

Are you satisfied that your suggestions and recommendations are achieving a positive result? If no, state why not.

Is u tevrede dat u voorstelle en aanbevelings 'n positiewe uitslag behaal? Indien nie, meld waarom nie.

---

Complete the officer career objective statement (centre pages)  
Voltooi die offisier loopbaandoelwit verklaring (middelbladsye).

---

List briefly what you have done to encourage sport in the SADF in the past year, as well as your own sporting achievements.

Meld kortliks wat u in die afgelope jaar gedoen het om sport in die SAW te bevorder, asook u eie sportprestasies.

---

List the non-SADF (eg social, cultural and job-related) organisations to which you belong and indicate what office you hold.

Meld aan watter nie-SAW (bv sosiaal, kultuur, werk-verwante) organisasies u behoort en watter amp u daar beklee.

---

Mention any personal and domestic factors (health, family, schooling, etc) which you feel should be considered in your present job and future appointments.

Meld enige persoonlike en huishoudelike faktore (gesondheid, familie, skool ens) wat u voel in u huidige werk of toekomstige aanstellings in ag geneem behoort te word.

---

Signature:  
Handtekening:

Date:  
Datum:



STAFF CONFIDENTIAL (WHEN COMPLETED)

APPRAISAL REPORT  
(SENIOR OFFICERS)  
(Oct 78 Edition)

TAKSERINGVERSLAG  
(SENIOR OFFISIERS)  
(Okt 78 Uitgawe)



NUMBER: \_\_\_\_\_ RANK: \_\_\_\_\_ NAME: \_\_\_\_\_  
 NUMBER: \_\_\_\_\_ RANG: \_\_\_\_\_ NAAM: \_\_\_\_\_

CLASSIFICATION: \_\_\_\_\_ UNIT: \_\_\_\_\_ POST: \_\_\_\_\_  
 KLASIFIKASIE: \_\_\_\_\_ EENHEID: \_\_\_\_\_ POS: \_\_\_\_\_

DATE OF BIRTH: \_\_\_\_\_ DATE OF LAST PROMOTION: \_\_\_\_\_  
 DATUM VAN GEBOORTE: \_\_\_\_\_ DATUM VAN LAASTE BEVORDERING: \_\_\_\_\_

DATE APPOINTED TO PRESENT POST: \_\_\_\_\_ DATE OF THIS APPRAISAL: \_\_\_\_\_  
 DATUM IN HUIDIGE POS AANGESTEL: \_\_\_\_\_ DATUM VAN HUIDIGE TAKSERING: \_\_\_\_\_

PERIOD UNDER SUPERVISION: \_\_\_\_\_ YRS: \_\_\_\_\_ MTHS  
 PERIODE ONDER TOESIG: \_\_\_\_\_ JR: \_\_\_\_\_ MDE

DESCRIPTION OF ACTIVITIES DURING APPRAISAL CYCLE: (TO BE COMPLETED BY RATER):  
 BESKRYWING VAN WERKSAAMHEDE TYDENS TAKSERINGSIKLUS: (MOET DEUR BEOORDELAAR VOLTOOI WORD):

FORM FOR APPRAISAL:  
 FORMSLAG VIR TAKSERING:

Rater Beoordelaar	A	B	C	D	E
Reviewer Hersiener	A	B	C	D	E

STAF VERTROULIK (WANNEER VOLTOOI)

PRESTASIE TAKSERING - PERFORMANCE APPRAISAL

Temperament:  
Temperament:

Beoordelaar:  
Rater:

Hersiener:  
Reviewer:

Dienskennis:  
Service Knowledge:

Beoordelaar:  
Rater:

Hersiener:  
Reviewer:

Algemene Kennis:  
General Knowledge:

Beoordelaar:  
Rater:

Hersiener:  
Reviewer:

Uitdrukkingsvermoë (Geskrewe)  
Power of Expression (Written)

Beoordelaar:  
Rater:

Hersiener:  
Reviewer:

Uitdrukkingsvermoë (Mondeling)  
Power of Expression (Oral)

Beoordelaar:  
Rater:

Hersiener:  
Reviewer:

Quality of Work:  
Werkgehalte:

Rater:  
Beoordelaar:

Reviewer:  
Hersiener:

Adaptability:  
Aanpasbaarheid:

Rater:  
Beoordelaar:

Reviewer:  
Hersiener:

Initiative:  
Ondernemingsgees:

Rater:  
Beoordelaar:

Reviewer:  
Hersiener:

Analytical Ability and Judgement:  
Analistiese Vermoë en Oordeel:

Rater:  
Beoordelaar:

Reviewer:  
Hersiener:

0. Decision Making:  
Besluitneming:

Rater:  
Beoordelaar:

Reviewer:  
Hersiener:

---

Beplanningsvermoë:  
Planning Ability:

Beoordelaar:   
Rater:

Hersiener:   
Reviewer:

---

Leierskap:  
Leadership:

Beoordelaar:   
Rater:

Hersiener:   
Reviewer:

---

Organisasievermoë:  
Organising Ability:

Beoordelaar:   
Rater:

Hersiener:   
Reviewer:

---

Kontrole:  
Control:

Beoordelaar:   
Rater:

Hersiener:   
Reviewer:

---

Spanwerk:  
Teamwork:

Beoordelaar:   
Rater:

Hersiener:   
Reviewer:

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Receptiveness to Communication:  
Ontvanklikheid vir Kommunikasie:

Rater:  
Beoordelaar:

Reviewer:  
Hersiener:

---

Integrity:  
Integriteit:

Rater:  
Beoordelaar:

Reviewer:  
Hersiener:

---

Sense of Discipline:  
Gevoel vir Dissipline:

Rater:  
Beoordelaar:

Reviewer:  
Hersiener:

---

Care for Subordinates:  
Besorgdheid oor Ondergeskiktes:

Rater:  
Beoordelaar:

Reviewer:  
Hersiener:

---

Social Adaptation:  
Sosiale Aanpassing:

Rater:  
Beoordelaar:

Reviewer:  
Hersiener:

STAF VERTROULIK (WANNEER VOLTOOI)

- 6 -

ONDERHOUDVERSLAG - INTERVIEW RECORD

Naam: \_\_\_\_\_

Duur: \_\_\_\_\_  
Duration: \_\_\_\_\_

---

(Handtekening van Beoordeelde)  
(Signature of Ratee)

---

(Handtekening van Beoordelaar)  
(Signature of Rater)

## STAFF CONFIDENTIAL (WHEN COMPLETED)

- 7 -

OVERALL RATING : ALGEMENE BEOORDELING

Suitability for Promotion:  
Geskiktheid vir Bevordering:

Rater Beoordelaar	A	B	C	D	E
----------------------	---	---	---	---	---

Reviewer Hersiener	A	B	C	D	E
-----------------------	---	---	---	---	---

Suitability for Command Posts:  
Geskiktheid vir Bevelsposte:

Rater Beoordelaar	A	B	C	D	E
----------------------	---	---	---	---	---

Reviewer Hersiener	A	B	C	D	E
-----------------------	---	---	---	---	---

Suitability for Staff Posts:  
Geskiktheid vir Stafposte:

Rater Beoordelaar	A	B	C	D	E
----------------------	---	---	---	---	---

Reviewer Hersiener	A	B	C	D	E
-----------------------	---	---	---	---	---

Suitability for Attache Posts:  
Geskiktheid vir Attacheposte:

Rater Beoordelaar	A	B	C	D	E
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Reviewer Hersiener	A	B	C	D	E
-----------------------	---	---	---	---	---

NEXT APPOINTMENT - VOLGENDE AANSTELLING

Rater's Recommendation and Reasons:  
Beoordelaar se Aanbeveling en Redes:

Reviewer's Recommendation and Reasons:  
Hersiener se Aanbeveling en Redes:

Chief of Service's Decision and Reasons:  
Hoof van Weermagsdeel se Beslissing en Redes:

ONTWIKKELINGSAKSIE - DEVELOPMENT ACTION

Beoordelaar se Aanbeveling en Redes:  
Rater's Recommendation and Reasons:

Handtekening: \_\_\_\_\_  
Signature: \_\_\_\_\_

Datum: \_\_\_\_\_  
Date: \_\_\_\_\_

Naam: \_\_\_\_\_  
E: \_\_\_\_\_

Rang: \_\_\_\_\_  
Rank: \_\_\_\_\_

Pos: \_\_\_\_\_  
Post: \_\_\_\_\_

Hersiener se Aanbeveling en Redes:  
Reviewer's Recommendation and Reasons:

Handtekening: \_\_\_\_\_  
Signature: \_\_\_\_\_

Datum: \_\_\_\_\_  
Date: \_\_\_\_\_

Naam: \_\_\_\_\_  
E: \_\_\_\_\_

Rang: \_\_\_\_\_  
Rank: \_\_\_\_\_

Pos: \_\_\_\_\_  
Post: \_\_\_\_\_

Weermagsdeelhoof se Beslissing en Redes:  
Service Chief's Decision and Reasons:

Handtekening: \_\_\_\_\_  
Signature: \_\_\_\_\_

Datum: \_\_\_\_\_  
Date: \_\_\_\_\_

PROMOTION PREDICTION IN A HYPOTHETICAL S. A. AIR FORCECAREER STRUCTURE1. Strengths in ranks as at 17 May 1979.

	Actual	Authorised	Proportion of Authorized
a. Lt. General	1	1	0,1%
b. Maj. Generals	4	1	0,1%
c. Brigadiers	12	12	1%
d. Colonels	50	34	4%
e. Commandants	90	92	10%
f. Majors	149	139	15%
g. Captains	190	642	70%
h. Lieutenants	172		
i. 2/Lieutenants	166		
	834	921	100,2%

2. Average promotion ages.

These are the actual and adjusted average ages at which the undermentioned officers were promoted to their present ranks.

	<u>Actual</u>	<u>Adjusted</u>
a. Lt. General	54 years	54 years
b. Major Generals	46,5 years	52 years
c. Brigadier	50 years	48 years
d. Colonels	41,86 years	42 years
e. Commandants	37,32 years	38 years
f. Majors	31,91 years	32 years

3. Wastage rate.

The wastage rate "v" - the result of death, resignations remusterings etc. but not retirements has been calculated over 5 years. The actual wastage rate has been modified to fit in with longterm trends and is expressed as a percentage of the average strength over a given age group:

<u>Actual</u>		<u>Modified and Smoothed</u>	
20	- 31,91	7%	20 years - 32 years 5% : 0,05
31,91	- 37,32	2,85%	32 years - 38 years 2,5% : 0,025
37,32	- 41,86	2,5%	38 years - 42 years 2,0% : 0,02
41,86	- 60	1,6%	42 years - 52 years 1,5% : 0,015
			52 years - 60 years 1% : 0,01

4. Age intervals with wastage rates:

54 - 60 years	$n_1 = 6$	and	$v_1 = 0,01$
52 - 60 years	$n_2 = 8$		$v_2 = v_1 = 0,01$
48 - 60 years	$n_3 = 12$		$v_2 = 0,015$
42 - 60 years	$n_4 = 18$		$v_4 = v_3 = 0,015$
38 - 42 years	$n_5 = 4$		$v_5 = 0,02$
32 - 38 years	$n_6 = 6$		$v_6 = 0,025$
20 - 32 years	$n_7 = 12$		$v_7 = 0,05$

5. Notation:

The following formulae are used:

a.  $S_v^n = e^{-nv}$   
 = number of survivors per one beginner after  
 "n" - years at a wastage rate of "v".

$$b. \quad N_n^v = \int_0^n e^{kv} dk = (1 - e^{-nv})/v$$

= Strength at the end of n-years per one-entry per year.

c.  $e = \text{constant} = 2,718281828.$

d. Base (indicated by  $b_i$  where  $i = 1, 2, 3, \dots$ ). It is the average number of promotions at a given average age in a rank group.

#### 6. Promotion Prediction and Recruitment.

Starting with the highest rank, the promotion base is calculated for each rank group in order to obtain the required strength that would make such a promotion possible.

##### a. Lieutenant General

(i) Given: Authorized Strength = 1

Age = 54

Age interval =  $60 - 54 = 6 \text{ years} = n_1$

Wastage rate in group :  $0,01 = v_1$

(ii) Calculation: Number of promotions x Strength

= Authorized Strength.

$$b_1 \frac{(1 - e^{-nv})}{v_1} = 1$$

$$b_1 = \frac{v_1}{1 - e^{-n_1 v_1}} = \frac{0,01}{1 - e^{-6 \cdot 0,01}}$$

$$= \frac{0,01}{0,0582}$$

$\hat{=} 0,17 : \text{NO PROMOTION TO LT.GEN.}$

b. Major Generals and Higher(i) Given

Authorized Strength = 1 Maj.Genl + 1 Lt Genl = 2

Adjusted Age Maj.Genl = 52 years

Age interval = 60 - 52 + 8 years =  $n_2$

Wastage rate = 0,01 =  $v_2 = v_1$

(ii) Calculation

Promotions x Strength = Authorized Strength.

$$b_2 \frac{(1 - e^{-n_2 v_2})}{v_2} = 2$$

$$b_2 = \frac{2 \cdot 0,01}{(1 - e^{-8 \cdot 0,01})} = \frac{0,02}{0,0769} \doteq 0,26$$

NO PROMOTION TO MAJ.GENL.

c. Brigadiers and Higher(i) Given.

Authorized Strength = 12 Brigs + 1 Maj Genl

+ 1 Lt Genl = 14

Adjusted Age of Brigs : 48 years

Age interval : 60 - 48 : 12 years =  $n_3$

Wastage rate : 0,015 =  $v_3$

(ii) Calculations

$$b_3 \frac{(1 - e^{-n_3 v_3})}{v_3} = 14$$

$$b_3 = \frac{14 v_3}{1 - e^{-n_3 v_3}} = \frac{14 \cdot 0,015}{1 - e^{-12 \cdot 0,015}} = \frac{0,21}{1 - e^{-0,18}}$$

$$= \frac{0,21}{0,1647}$$

$$\doteq 0,78$$

## 1 PROMOTION TO BRIGADIER.

d. Colonels and Higher(1) Given

Authorized Strength = 34 Cols, 12 Brigs, 1 Maj Gen,

1 Lt Genl = 48

Age Colonels = 42 years

Age interval = 60 - 42 = 18 =  $n_4$ Wastage rate = 0,015 =  $v_3 = v_4$ (ii) Calculation

$$b_4 \frac{(1 - e^{-n_4 v_4})}{v_4} = 48$$

$$b_4 = \frac{48 v_4}{1 - e^{-n_4 v_4}} = \frac{48 \cdot 0,015}{1 - e^{-18 \cdot 0,015}} = \frac{0,72}{1 - e^{-0,27}}$$

$$= \frac{0,72}{0,2366}$$

$$\doteq 3,04$$

## 3 PROMOTIONS TO COLONEL.

e. Commandant and Higher(i) Given

Authorized strength : 92 Cmdts + 48 Higher ranks = 140

Age Comdt : 38 years

Age intervals : 42 - 38 = 4 =  $n_5$ 60 - 42 = 18 =  $n_4$ Wastage rates = 0,02 =  $v_5$ 0,015 =  $v_4$

(ii) Calculations

Number of promotions of 38 years ( $b_5$ ) x Strength

at the end of 4 years at a wastage rate of

$$0,02 \frac{(1 - e^{-n_5 v_5})}{v_5} + \text{Number of promotions at}$$

38 years ( $b_5$ ) x the Survivals at 4 years ( $e^{-n_5 v_5}$ )  
at a wastage rate of 0,02 x Strength

$$\frac{(1 - e^{-n_4 v_4})}{v_4} \text{ at the end of 18 years } (n_4) \text{ at a}$$

wastage rate of 0,015 = Authorized Strength.

$$b_5 \frac{(1 - e^{-n_5 v_5})}{v_5} + b_5 \times e^{-n_5 v_5} \times \frac{(1 - e^{-n_4 v_4})}{v_4} = 140$$

$$b_5 \left[ \frac{(1 - e^{-4 \cdot 0,02})}{0,02} + e^{-4 \cdot 0,02} \times \frac{(1 - e^{-18 \cdot 0,015})}{0,015} \right] = 140$$

$$b_5 \left[ \frac{0,07688}{0,02} + 0,9231 \times \frac{0,2366}{0,015} \right] = 140$$

$$b_5 [ 3,8442 + 14,5616 ] = 140$$

$$b_5 = \frac{140}{18,41} = 7,60$$

8 PROMOTIONS TO COMMANDANT

f. Majors and Higher(i) Given

$$\begin{aligned} \text{Authorized strength} &= 139 \text{ Majors} + 140 \text{ Higher ranks} \\ &= 279 \end{aligned}$$

$$\text{Age of Majors} = 32 \text{ years}$$

$$\text{Age intervals} = 38 - 32 = 6 = n_6$$

$$42 - 38 = 4 = n_5$$

$$60 - 42 = 18 = n_4$$

$$\text{Wastage rates} = 0,025 = v_6$$

$$0,02 = v_5$$

$$0,015 = v_4$$

(ii) Calculations

$$\begin{aligned} b_6 \frac{(1-e)^{-n_6 v_6}}{v_6} + (b_6 e^{-n_6 v_6} - b_5) \frac{(1-e)^{-n_5 v_5}}{v_5} \\ + (b_6 e^{-n_6 v_6} - b_5) e^{-n_5 v_5} \times \frac{(1-e)^{-n_4 v_4}}{v_4} = 279 \end{aligned}$$

$$b_6 \frac{(1-e)^{-6 \cdot 0,025}}{0,025} + (b_6 e^{-6 \cdot 0,025} - 7,6) \frac{(1-e)^{-4 \cdot 0,02}}{0,02}$$

$$+ (b_6 e^{-6 \cdot 0,025} - 7,6) e^{-4 \cdot 0,02} \times \frac{(1-e)^{-18 \cdot 0,015}}{0,015} =$$

$$= 279$$

$$b_6 5,5717 + (b_6 0,8607 - 7,6) \cdot 3,8442$$

$$+ (b_6 0,8607 - 7,6) 0,9231 \times 15,7747 = 279$$

$$b_6 5,5717 + b_6 3,3087 - 29,216 + b_6 12,5332$$

$$- 110,668 = 279$$

$$21,4136 b_6 = 279 + 139,884 = 418,884$$

$$b_6 = 19,56$$

20 PROMOTIONS TO MAJOR.

g. 2/Lieuts to Captain.

(i) Given

Assume all Captains are promoted to Major  
at 32 years.

Age 2/Lieut = 20 years

Age interval : 32 - 20 = 12 years =  $n_7$

Wastage rate : 0,05 =  $v_7$

(ii) Calculations

$$b_7 e^{-n_7 v_7} = 19,56 \quad (\text{from above})$$

$$b_7 = \frac{19,56}{e^{-12,905}} = \frac{19,56}{0,5488}$$

$$= 35,64$$

36 2/Lieuts to be Commissioned annually  
at 20 years of age.

$$\begin{aligned}
 \text{Strength (2/Lieut to Captain)} &= 35,644 \frac{(1 - e^{-n_7 v_7})^{v_7}}{v_7} \\
 &= 35,644 \frac{(1 - e^{-12.0,05})}{0,05} \\
 &= 35,644 \cdot \frac{(0,45118)}{0,05} \\
 &= 321,64
 \end{aligned}$$

322 (2/Lts to Captain)

i.e. to maintain the steady state structure.

### 7. Survival Rates.

At the various ranks at the ages of 32, 38, 42, 48, 52, 54 and 60 years.

#### a. (i) Major and Higher ranks at 38 years

$$\begin{aligned}
 S_{v_6}^{n_6} &= b_6 \cdot e^{-n_6 v_6} = 19,56 \cdot e^{-6.0,025} \quad (\text{from major promotion}) \\
 &= 16,83
 \end{aligned}$$

#### (ii) Majors and Higher at 42 years

$$\begin{aligned}
 S_{v_5}^{n_5} &= S_{v_6}^{n_6} \cdot e^{-n_5 v_5} = 16,83 e^{-4.0,02} \quad (\text{from (i)}) \\
 &= 15,54
 \end{aligned}$$

(iii) Majors and Higher at 48 years

$$S_{v_4}^{n_4} = S_{v_5}^{n_5} \cdot e^{-n_4 v_4} = 15,54e^{-18.0,015} \quad (\text{from (ii)})$$

$$= 11,86$$

(iv) Majors & Higher at 52 years

$$S_{v_3}^{n_3} = S_{v_4}^{n_4} e^{-n_3 v_3} = 11,86 \cdot e^{-12.0,018} \quad (\text{from (iii)})$$

$$= 9,91$$

(v) Majors and Higher at 54 years

$$S_{v_2}^{n_2} = S_{v_3}^{n_3} e^{-n_2 v_2} = 9,91 \cdot e^{-8.0,01} \quad (\text{from (iv)})$$

$$= 9,15$$

(vi) Majors and Higher at 60 years

$$S_{v_1}^{n_1} = S_{v_2}^{n_2} e^{-n_1 v_1} = 9.15 \cdot e^{-6.0,01} \quad (\text{from (v)})$$

$$= 8,62$$

b.(i) Commandants and Higher at 42 years

$$S_{v_5}^{n_5} = b_5 e^{-n_5 v_5} \quad (\text{ex Cmdt promotions})$$

$$= 7,6 e^{-4.0,02}$$

$$= 7,02$$

(ii) At 48 years

$$S_{v_4}^{n_4} = S_{v_5}^{n_5} e^{-n_4 v_4} = 7,02 \cdot e^{-18.0,015}$$

$$= 5,36$$

(iii) At 52 years

$$S_{v_3}^{n_3} = S_{v_4}^{n_4} e^{-n_3 v_3} = 5,36 e^{-12.0,015}$$

$$= 4,48$$

(iv) At 54 years

$$S_{v_2}^{n_2} = S_{v_3}^{n_3} e^{-n_2 v_2} = 4,48 e^{-8.0,01}$$

$$= 4,13$$

(v) At 60 years

$$S_{v_1}^{n_1} = S_{v_2}^{n_2} e^{-n_1 v_1} = 4,13 \cdot e^{-6.0,01}$$

$$= 3,89$$

c. (i) Colonels and Higher at 48 years

$$S_{v_4}^{n_4} = b_4 e^{-n_4 v_4} = 3,04 \cdot e^{-18.0,015}$$

(ex Col. promotion)

$$= 2,32$$

(ii) At 52 years:

$$S_{v_3}^{n_3} = S_{v_4}^{n_4} e^{-n_3 v_3} = 2,32 e^{-12.0,015}$$

$$= 1,94$$

(iii) At 54 years:

$$S_{v_2}^{n_2} = S_{v_3}^{n_3} e^{-n_2 v_2} = 1,94 \cdot e^{-8.0,01}$$

$$= 1,79$$

(iv) At 60 years:

$$S_{v_1}^{n_1} = S_{v_2}^{n_2} e^{-n_1 v_1} = 1,79 e^{-6.0,01}$$

$$= 1,69$$

d. (i) Brigadiers and Higher at age 52 years

$$S_{v_3}^{n_3} = b_3 e^{-n_3 v_3} = 0,78 \cdot e^{-12.0,015}$$

(ex Brig. promotion)

$$= 0,65$$

(ii) At 54 years:

$$\begin{aligned} \frac{n_2}{S_{v_2}} &= \frac{n_3}{S_{v_3}} e^{-n_2 v_2} = 0,65 e^{-8.0,01} \\ &= 0,6 \end{aligned}$$

(iii) At 60 years:

$$\begin{aligned} \frac{n_1}{S_{v_1}} &= \frac{n_2}{S_{v_2}} e^{-n_1 v_1} = 0,6 e^{-6.0,01} \\ &= 0,56 \end{aligned}$$

## 8. Career Factors

A career factor is = Number of Promotions to the next higher rank at the average age of the promotion divided by the number surviving in the rank.

a. Captains to Majors = 100% - assumed all Captains are promoted

b. Majors to Commandants :

$$C_{Ma} = \frac{C_m}{S_{v_6}} = \frac{b_5}{n_6} = \frac{7,60}{16,83} = 45,2\% \text{ at } 38 \text{ years.}$$

c. Commandant to Colonel:

$$C_{Cm} = \frac{C_{ol}}{S_{v_5}} = \frac{b_4}{n_5} = \frac{3,04}{7,02} = 43,3\% \text{ at } 42 \text{ years.}$$

d. Colonel to Brigadier:

$$C_{Co}^{Br} = \frac{b_3}{S_{v4}^{n4}} = \frac{0,78}{2,32} = 33,6\% \text{ at 48 years.}$$

These career factors are low: a 60% career factor is considered good at the level of Major to Commandant (promotion hereafter is by competitive selection). To increase the promotion prospects would mean decreasing the number who compete for promotion:

E.G. (i) Majors to be promoted to Commandants remain at : 7,6

(ii) Survivors at 38 years =  $\frac{100}{60} \cdot 7,6 = 12,7$   
(instead of 16,83)

(iii) If the Strength of Majors is to be reduced then it means holding back some promotions of Captains to Majors.

All the necessary calculations have been completed and the steady-state career structure can now be presented graphically - see below.

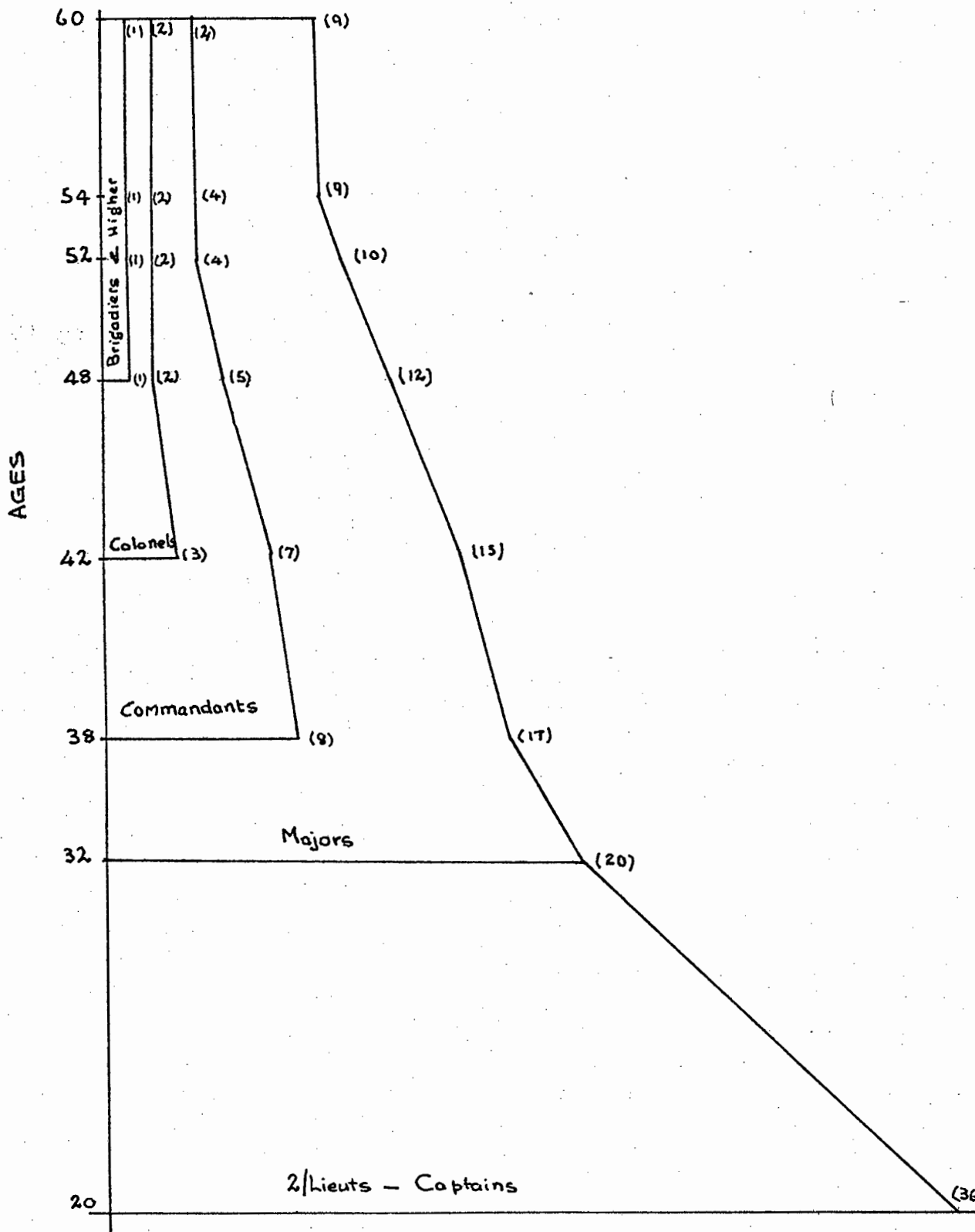


Figure 18 Hypothetical S A Air Force Career Structure

Source: E JONES. "Officer Career Planning in the Royal Navy," Conference of the Operational Research Society, September 1967.

A CAREER PLANNING SURVEY OF AIRCREW ON

AIR FORCE BASE YSTERPLAAT

C O N T E N T S

## 1. INTRODUCTION:

1.1 Terms of Reference

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## 2. SUMMARY OF RESULTS AND CONCLUSIONS

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## 4. ANALYSIS OF RESULTS

## 5. CONCLUSIONS

ANNEXURE 1 : THE QUESTIONNAIRE

ANNEXURE 2 : STATISTICAL TESTS

## 1. INTRODUCTION

### 1.1. Terms of Reference

The aim of this study is threefold:

- 1.1.1 To determine the acceptability of a formal Career Development Programme for Officer Aircrew (pilots and navigators) of the South African Air Force.
- 1.1.2 To determine the relative importance of career variables in drawing up an Air Force Career Plan.
- 1.1.3 To demonstrate that a properly constituted Career Plan could be instrumental in developing officer aircrew to their fullest thereby ensuring that the Air Force is better placed to reach its goals.

### 1.2 Methodology

#### 1.2.1 Population

For the purposes of this study, the population is represented by all the officer aircrew (pilots and navigators) at present (1978) in the South African Air Force. The population size of 718 aircrew, includes all ranks from 2/Lieutenant to Lieutenant General and all ages from 19 years up to the retirement age of 60 years: i.e. 643 Pilots and 75 Navigators. Moreover these aircrew are based at various localities throughout the Republic.

### 1.2.2 Sample.

The size, the dispersion of Air Force units and the location of bases through the Republic and South West Africa as well as the operational commitments on the Border preclude a complete census of all the aircrew. Consequently a representative Air Force Base had to be chosen.

There are six (6) Air Force Bases in the Air Force: A.F.B. Bloemspruit; A.F.B. Hoedspruit; A.F.B. Pietersburg; A.F.B. Swartkop; A.F.B. Waterkloof and A.F.B. Ysterplaat. These bases house a variety of Units which perform duties such as flying and ground training and operational tasks (i.e. tasks directed to the support of ground and naval forces in the Republic, South West Africa and our coastal waters) Moreover all bases have technical and maintenance units: some are known as Depots. A.F.B's Bloemspruit, Swartkop and Waterkloof use the maintenance base facilities at Voortrekkerhoogte while A.F.B. Ysterplaat, being relatively far away, has base depots to serve the Cape area of responsibility. A.F.B Hoedspruit is a new base and is still being developed. It is likely that, costs permitting, they too will have maintenance and stores depots supporting their primary role of operational duties of guarding our North Eastern Borders.

A.F.B. Ysterplaat was chosen as a base that is representative of any of the five. About 15% of the Air Force's aircrew (including 11 student Navigators) are stationed here.

A Graphical representation of the S. A. Air Force's population and that of this sample - Air Force Base Ysterplaat is given below:-

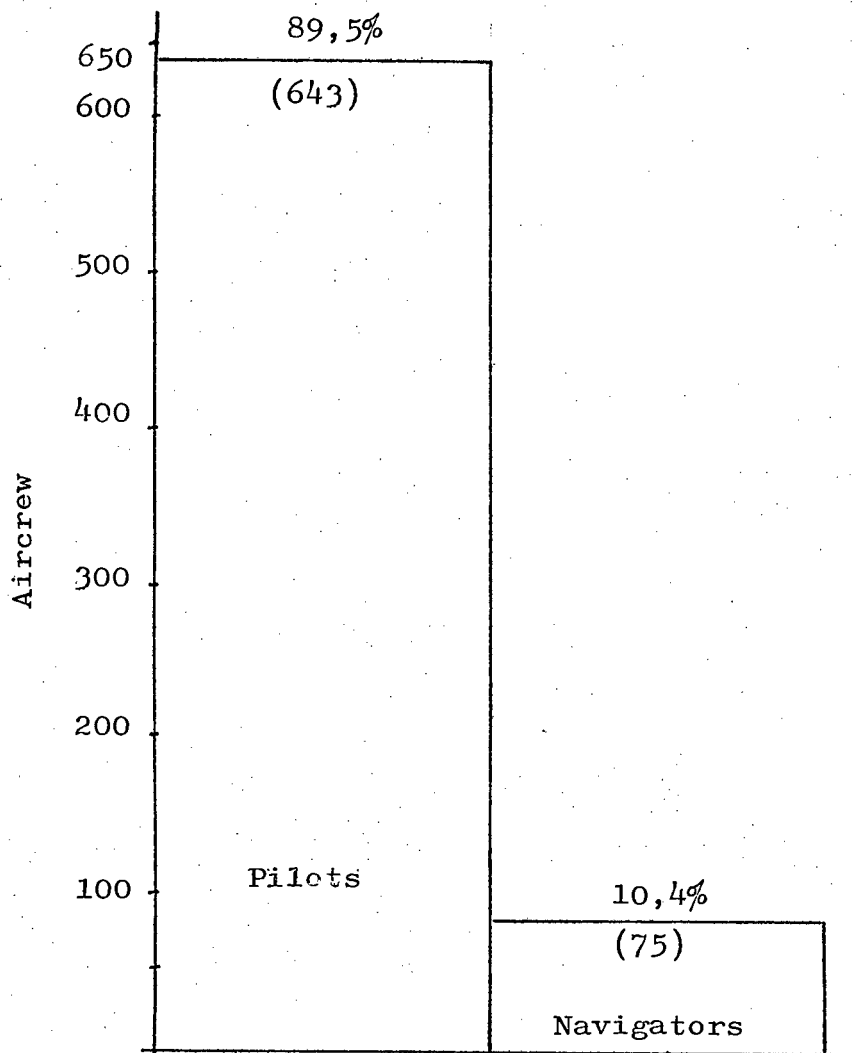


Figure 1.1 S. A. Air Force Population.

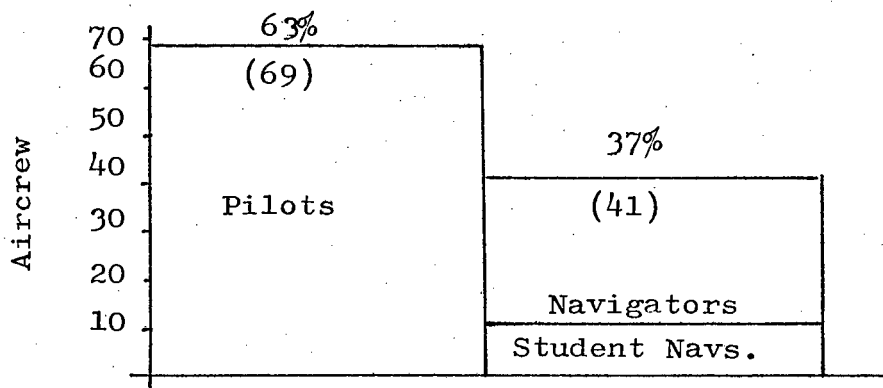


Figure 1.2 Air Force Base Ysterplaat's Population.

Furthermore, there are five (5) squadrons, a flying conversion unit, a navigation school and a central coordinating headquarters housed on this base. (I have an intimate knowledge of the running of A.F.B. Ysterplaat, having spent several years there, first as O.C. Navigation school and latterly as Base Commander). The total sample size of the select aircrew group is 110 persons (which includes 11 student Navigators). This group of 99 officers represents 14% of the total population size (718).

#### 1.2.3 Sampling Technique.

Unit Commanders were interviewed and briefed on the aims of the survey. One hundred (100) questionnaires were then handed to them for completion by their aircrew members. Eighty three (83) completed questionnaires were returned: the sample size. This is a 75% response.

#### 1.2.4 Method of Analysis.

The questionnaire - found in Annexure 1 was designed to identify the elements that make up a Career Development programme, establish the relationship between career planning and longrange planning and heighten awareness of future aspirations and responsibilities of aircrew in the South African Air Force.

The Questionnaire is analysed separately in Section

4. The form of the analysis is as follows:

1.2.4.1 In section 4, Analysis of Results, a detailed analysis is made of each question of the survey

questionnaire.

1.2.4.2 The results of the analysis are presented graphically by means of simple bar-charts, histograms, frequency distributions etc, which, together with tables, give a complete and easy visual representation of the collected data.

1.2.4.3 Cross-classification of certain questions and conducting of statistical tests were found to be necessary in order to establish whether a relationship existed between two variables.

These statistical tests are given in Annexure 2.

1.2.4.4 The conclusions reached in the analysis of these results are given in Section 2 - Summary of Results and Conclusions.

## 2. SUMMARY OF RESULTS AND CONCLUSIONS

### 2.1. Sample Characteristics.

#### 2.1.1 Sample Size.

The sample size of 83 respondents was chosen:

- 2.1.1.1 63% were pilots; 37% were navigators.
- 2.1.1.2 51% were single; 49% were married.
- 2.1.1.3 Average age was: 28 years; Standard Deviation was  $7\frac{1}{2}$  years - that is about 68% of the sample fell in the range  $20\frac{1}{2}$  years to  $35\frac{1}{2}$  years age.
- 2.1.1.4 90% were matriculated; 10% had Bachelor degrees.
- 2.1.1.5 Average of 8,9 years flying experience as aircrew; with a standard deviation of 7,1 years.
- 2.1.1.6 Average 7,7 years operational flying experience as aircrew; with a standard deviation of 7,1 years.
- 2.1.1.7 Five squadrons, an Advanced Flying unit, a HQ unit and the Air Navigation School were involved in the sample survey.
- 2.1.1.8 Aircrew, ranging from student navigators to officers commanding, took part in the survey.

### 2.2. Summary of Results.

In each case the abbreviated questionnaire - question will be stated first, followed by a summary of results obtained.

2.2.1. Question 1: "Has your progress been satisfactory so far?"

90,4% (75) : YES    9,6% (8) : NO

2.2.2 Question 2: "Which of the following ranks do you consider to be the top one of a normally successful career?"

<u>Commandant</u>	<u>Colonel</u>	<u>Brigadier</u>	
2,4%	49,4%	48,2%	100%
(2)	(41)	(40)	(83)

2.2.3 Question 3: "Which of the undermentioned officers would you like to be as fullfilment of your career in the Air Force?"

<u>Active Flying Member</u>	<u>Unit/Base Commander</u>	<u>Chief of the Air Force</u>	
31,3%	41%	27,7%	100%
(26)	(34)	(23)	(83)

2.2.4 Question 4: "Have you seen your Career Plan?"

<u>Yes</u>	<u>No</u>	
3,6%	96,4%	100%
(3)	(80)	(83)

"If No: Do you think you should see your Career Plan?"

<u>Yes</u>	<u>No</u>	
98,7%	1,3%	100%
(79)	(1)	(80)

2.2.5 Question 5: "Do you aim to participate in planning your own career?"

<u>Yes</u>	<u>No</u>
100%	0%
(83)	(0)

2.2.5.1 "If Yes: Would you be happier in your work and thus more productive?"

<u>Yes</u>
100%
(83)

2.2.5.2 "If Yes: Would the Air Force then be better equipped to achieve it's aims?"

<u>Yes</u>	<u>No</u>	100%
97,6%	2,4%	
(81)	(2)	(83)

2.2.6.1 Question 6: (a) "Who, with your participation, should work out the details of such a career plan?"

<u>Your Commanding Officer</u>	<u>Personnel Division at HQ</u>	
37,3%	62,7%	100%
(31)	(52)	(83)

2.2.6.2 (b) "A system of appraisals 'rates' individuals. Should these rating marks be used to complete a 'list of merit' for promotion?"

<u>Yes</u>	<u>No</u>	100%
87,9%	12,1%	
(73)	(10)	(83)

2.2.6.3

If Yes: "How can seniority be awarded?"  
Promoted if his speciality is the  
criterion?

85,5%  
 (71)

or

Promoted six months later?

14,5%  
 (12)

2.2.6.4

(c) "Do you realise that your career prospects are dependent on the relative proportion of officer's strength in the various ranks?"

<u>Yes</u>	<u>No</u>	
86,7%	13,3%	100%
(72)	(11)	(83)

2.2.7. Question 7: "Rate the following elements of a career plan:"

RATINGS

ELEMENTS	MOST IMPORTANT			MOST UNIMPORTANT		UNDECIDED	
	IMPORTANT	UNIMPORTANT	UNIMPORTANT	IMPORTANT			
a. Age at promotion	4,8% (4)	53% (44)	37,4% (31)	3,6% (3)	1,2% (1)	100%	(83)
b. Years of Service at Promotion	14,5%	51,8%	25,3%	4,8%	3,6%		
c. Wider Experience	56,6%	37,4%	3,6%	2,4%	0%		
d. Higher Education	19,3%	55,4%	18,1%	1,2%	6%		
e. Assessed Regularly	54,2%	43,4%	1,2%	0%	1,2%		

2.2.8 Question 8. "At what age should an active aircrew member retire?"

<u>50 years of Age?</u>	48,2%	(40)
<u>55 years of Age?</u>	41%	(34)
<u>60 years of Age?</u>	10,8%	(9)
	100%	(83)

2.2.9 Question 9. "How long do you think each development phase should last?"

2.2.9.1.

a. The Initial Phase

<u>1 Year?</u>	<u>2 Years?</u>	<u>Longer than 2 Years?</u>	
41,5%	51,2%	7,3%	100%
(34)	(42)	(6)	(83)

2.2.9.2

b. The Intermediate Phase

<u>5 Years?</u>	<u>8 Years?</u>	<u>More than 8 Years?</u>	
68,3%	24,4%	7,3%	100%
(56)	(20)	(6)	(82)

2.2.9.3

c. The Advance Phase

<u>15 Years</u>	<u>More than 15 but before 20 Years</u>	
97,6%	2,4%	100%
(80)	(2)	(82)

2.2.9.4

d. The Executive/Leadership phase

<u>5 Years</u>	<u>Until you retire</u>	
68,3%	31,7%	100%
(56)	(26)	(82)

2.2.10 Question 10. "What rank do you associate with each of the previously mentioned phases of development?"

2.2.10.1 a. The Initial phase  
Lieutenant 98,8% (82)

2.2.10.2 b. The Intermediate phase

<u>Captain</u>	<u>Major</u>	<u>Captain &amp; Major</u>	
31,3%	2,4%	66,3%	100%
(26)	(2)	(55)	(83)

2.2.10.3 c. The Advance Phase

<u>Major</u>	<u>Commandant</u>	<u>Colonel</u>	<u>Maj. Comdt. &amp; Colonel</u>	
14,5%	32,5%	8,4%	44,6%	100%
(12)	(27)	(7)	(37)	(83)

2.2.10.4 d. The Executive/Leadership phase

<u>Commandant</u>	<u>Colonel</u>	<u>Brigadier</u>	<u>Cmdt. &amp; Colonel &amp; Brig.</u>	
8,4%	24,1%	22,9%	44,6%	100%
(7)	(20)	(19)	(37)	(83)

2.2.11 Question 11. "Do you consider there should be a maximum period of service in each rank?"

<u>Yes</u>	<u>No</u>	
62,6%	37,4%	100%
(52)	(31)	(83)

2.2.11.1 "If Yes: Do you agree that these maximums could be something like the following?"

a. General - 5 years maximum	80,8%	(42)
b. Lt Gen. & Maj.Gen - 4 years maximum	84,6%	(44)
c. Brigadier - 5 years maximum	88,5%	(46)
d. Colonel - 7 years maximum	92,3%	(48)
e. Commandant - 9 years maximum	73,1%	(38)
f. Major - 10 years maximum	61,5%	(32)
g. Captain - 9 years maximum	51,9%	(27)
h. From Candidate Officer to Lieutenant - 7 years maximum	76,9%	(40)

2.2.11.2

"If Agreed: What do you think should be done with an officer who has reached the maximum period of service in his rank?"

a. Remove him from the Seniority (Merit) Lists?	23,1%	(12)
b. Hold - reconsider the case in 6 months	48,1%	(25)
c. Retire	28,8%	(15)
	100%	(52)

2.2.12 Question 12. "What postings (assignments) would you like in order to obtain a broad but comprehensive understanding of the Air Force?"

	<u>Yes</u>	<u>No</u>
a. As aircrew on other operational aircraft?	96,7% (81)	24% (2)
b. To the Administrative branch?	29,1%	75,9%

c. To the Logistics branch?	42,2%	57,8%
d. To the Technical Training branch?	22,9%	77,1%
e. To the Air Defence branch?	56,6%	43,4%
f. As instructor : Air Force College?	38,6%	61,4%
g. As a Flying or Navigation instructor?	87,9%	12,1%
h. As a staff officer at a Headquarters	75,9%	24,1%

2.2.13 Question 13. "When would you like to start/continue to improve your academic/technical qualifications?"

a. Bachelor's degree or Diploma :		
(i) After 3 years service	45,8%	(38)
(ii) Before 10 years service	39,7%	(33)
(iii) No answers	14,5%	(12)
	100%	(83)
b. Master's degree or Higher Diploma :		
(i) After 7 years service	32,5%	(27)
(ii) Before 15 years service	53%	(44)
(iii) No answers	14,5%	(12)
	100%	(83)
c. Doctorate :		
(i) After 10 years service	21,7%	(18)
(ii) Before 20 years service	63,8%	(53)
(iii) No answers	14,5%	(12)
	100%	(83)

2.2.13.1	"How would you like to do these studies?"		
a.	Full-time at a University/College	60,2%	(50)
b.	Part-time at a University/College	13,2%	(11)
c.	By means of correspondence tuition	12,1%	(10)
d.	No answer	14,5%	(12)
		100%	(83)

2.2.14 Question 14 "Is overspecialization or over-qualification acceptable to you?"

<u>Yes</u>	<u>No</u>	
35,6%	55,4%	100%
(27)	(46)	(83)

2.2.15 Question 15 "Are you involved in any of the following areas of longrange planning?"

	<u>Yes</u>	<u>No</u>
a. Flying training	50,6% (42)	49,4% (41)
b. Strategic Operations	9,6%	90,4%
c. Size and Shape of the Air Force	2,4%	97,6%

2.2.16 Question 16. "Do you help to develop a step-by-step plan of action to implement your Unit's part of the long-range operational plan?"

Yes: 36,1% (30)    No: 63,9% (53)

2.2.17 Question 17. "Does your Unit have a policy manual?"

<u>Yes</u>	<u>No</u>	
7,2%	92,8%	100%
(6)	(77)	(83)

- 2.2.17.1 "If No: Do you agree that such a manual would resolve a lot of misinterpretations of policy statements?"  
Yes: 100% (77)
- 2.2.18 Question 18. "Do you agree that your work is crucial to your satisfaction as a human being and to the development of your personality?"  
Yes: 96,4% (80) No: 3,6% (3)
- 2.2.18.1 "If Yes: Does it further mean that your career (lifework) must have dignity and meaning?"  
Yes: 100% (80)
- 2.2.19 Question 19. "Do you agree that career planning forms an integral part of long-range planning?"  
Yes: 100% (83)
- 2.2.20 Question 20. "Knowing that the Air Force has an acceptable career plan for you, would this knowledge incline you to stay and make a success of this career?"  
Yes: 96,4% (80) No: 3,6% (3)
- 2.2.20.1 "If Yes: Would this fact develop a greater loyalty in you towards the Air Force?"  
Yes: 92,5% (74)  
No: 7,5% (6)  
100% (80)
- 2.2.21 Question 21. "Do you think the answers you gave in this questionnaire will help you in planning

your career.

Yes: 91,6% (76)      No: 8,4% (7)

"If Yes: Would you like a copy of the summary of the results of this project?"

Yes: 94,7% (72)

No: 5,3% (4)

100% (76)

### 2.3 Summary of Conclusions.

This is a summary of conclusions reached on analysing the results of the survey.

#### 2.3.1 The Career.

Aircrew are aware of the advantages and implications of having their careers planned; they are willing to participate in planning their careers and stay on in the Air Force.

#### 2.3.2 Rank and Position.

A successful career is one in which the officer would attain the rank of Colonel and occupy the position of a Unit or Base Commander.

#### 2.3.3. Promotion through a "Merit" List.

Although promotion is dependant on vacancies in the various ranks, a senior officer, who is not high in the "merit" list, could be promoted if his speciality is the criterion. The "merit list" system is preferred to the existing one of promotion by seniority.

#### 2.3.4 Important Career Planning Elements.

- a. Being assessed regularly and gaining as wide an experience as possible, is considered first in order of merit; next is the obtaining of higher educational qualifications; and lastly the age and length of service of the member on being considered for promotion.
- b. Retirement to be at 50 years of age.
- c. About 32-years of service would be completed on retiring at 50 years.
- d. About 27 years of service would be completed on retiring at 50 years by progressing through the four development phases starting with the rank of Lieutenant and finishing as a Colonel.

The important elements of Career Planning have now been identified: Regular assessment; wider experience; higher education; age; years of service; retirement age; starting rank (Lieutenant); retiring rank (Colonel); phases of development (initial, intermediate, advance, executive/leadership).

#### 2.3.5 Period of Service in Rank.

Maximum periods in ranks are accepted as this would ensure greater mobility through the ranks, thereby increasing the promotion prospects of aircrew.

#### 2.3.6 Broadening Experience.

Apart from receiving their own military speciality training, aircrew choose higher education and flying related assignments as the means of gaining broadening experience. The usefulness of

non-flying postings ought to be told them as the Air Force has many branches which are staffed by ground crews and other support personnel.

#### 2.3.7 Long-range Planning.

Long-range planning activities in the Air Force are promulgated by means of policy statements from higher authorities. Units should be encouraged to open Policy Manuals which contain statements from higher authority, in order to avoid misunderstanding of activities and intentions.

#### 2.3.8 Personal Aspects.

For aircrew careers to have dignity and meaning, the personal values of job-satisfaction, being treated as human beings and developing their personalities, must be present. The advantages are financial gain for the Air Force and the increase of aircrew morale.

#### 2.3.9 Usefulness of the Questionnaire.

The answers given would help respondents plan their own careers.

#### 2.3.10 Achievement.

The affect of this pilot study survey on the aircrew at Air Force Base Ysterplaat, has been beneficial, and the results have been meaningful and decisive. The elements, comprising the framework of Career Planning, have been identified and rated. A follow-up study is now required to validate the findings of this survey before meaningful career planning, for aircrew, can be proceeded with in the South African Air Force.

### 3. SURVEY OF SECONDARY DATA

3.1. No survey of this kind had ever been done in the South African Air Force. In 1975, as head of the Personnel section, I launched a study with the aim of assisting the Chief of the Air Force in determining and filling officer aircrew promotion vacancies. This study necessitated an indepth investigation into the career prospects of these officers. It was found that there were no career plans in existence for any personnel in the Air Force.

3.2. Under the heading "Career Planning for Permanent Force Officers (S.A. Defence Force) : applicable to S.A. Air Force Long-, Medium, and Short Service Pilots and Navigators" (translated) the study was begun. BURGER (1). The result was the construction of an actuarial model which could be used to forecast officer vacancies in the Long , Medium and Short Service in the Air Force and the provision of a formula for determining the numbers of recruits needed in order to maintain such a steady-state model. It became evident, however, that career planning involved more than promotion prediction.

3.3. Independent of the Air Force study, but never-the-less as an extention of it, a confidential study by a Defence Force committee investigated the flow of retirements and promotions in the S.A. Defence Force JOUBERT (2). One of the results of this investigation was the drawing up of a tentative career progression guide for pilots in the Air Force. In 1977 the Air Force produced its own career guides on the basis of its own needs. VAN DEN BOS (3). These guides were not, however, based on imperical data and were

offered to the Air Force personnel for comment and suggestion. Clearly the needs and aspirations of the personnel had to be considered before any career guides would be accepted by them and before such guides were made policy by the Chief of the Air Force. A survey was required - the one done at Air Force Base Ysterplaat goes some way in providing an extended base for career planning in the S.A. Air Force.

3.4. As a result of these studies and the survey, it became evident that the planning and development of human resources in the S.A. Air Force had not been fully exploited. The aircrew (pilots and navigators) have needs to find in their work situations: security, challenge and opportunities for self development and advancement. The Air Force, as an organisation, has needs to recruit, manage and develop its human resources in order to maintain its effectiveness, survive and grow. SCHEIN (4). The problem to be faced is thus how to match their respective needs throughout the entire career of the person or the Air Force.

3.5 Career planning can make such a matching by considering both the aircrew pursuing its flying occupation - the "internal career" - and the Air Force trying to set up a sensible developmental path for them to follow throughout their working life in the Air Force - the "external career" VAN MAANEN AND SCHEIN (5). Whilst it is true that little work of this nature had been done in the South African Air Force specifically, it was felt that perhaps somewhere someone may have done something similar. Consequently a letter (see Appendix A) was sent to 61 Universities and Institutions to enquire whether a study along the lines contemplated in this doctoral

dissertation had been done.

3.6. Of the 43 replies received (18 did not reply) 28 indicated they knew of no similar study being done or having been done and only the South African National Institute of Personnel Research indicated that they were engaged in work in this area. No specific details of their research were given and a reply to an enquiry made in this respect, is awaited (June, '79). Should the answer indicate that there is a duplication of research effort then I can only conclude that the march of events since the launching of the investigation in 1975, has now overtaken my efforts. However, in the event that it does not, I am sure that my study has made a valuable contribution to the knowledge of career planning.

### 3.7. References.

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3. VAN DEN BOS, W. H., "Career Guides," Report LMH/105/1/2/B. 29 July 77, Air Force Headquarters, Pretoria, 1977.

4. SCHEIN, Edgar, H., "Career Dynamics: Matching Individual and Organizational Needs," Addison-Wesley Publishing Company, Inc., Reading, Massachusetts, 1978 pp 1 - 6.
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#### 4. ANALYSIS OF RESULTS

##### 4. THE ANALYSIS.

This section analyses the logical consequences (results) of the questions posed and the additional information collected during the survey.

##### 4.1. THE POPULATION.

The population of officer aircrew (pilots and navigators) in the S.A. Air Force in 1978 was as follows:

- a. Element: SAAF Officer aircrew: 718.

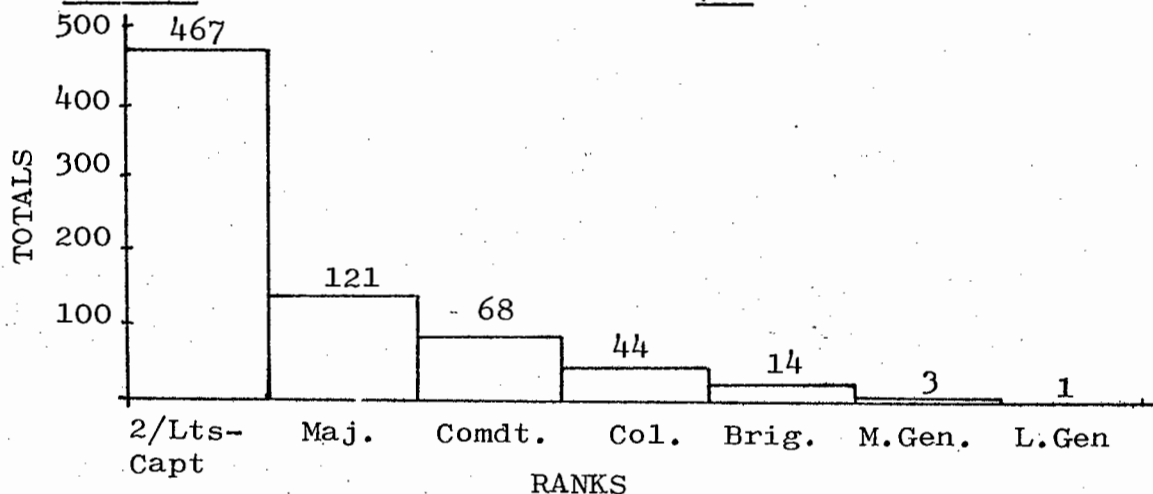


Figure 4.1. Histogram of S.A. Air Force aircrew in 1978.

- b. Sampling Unit: Air Force Base Ysterplaat: Officer aircrew: 99.

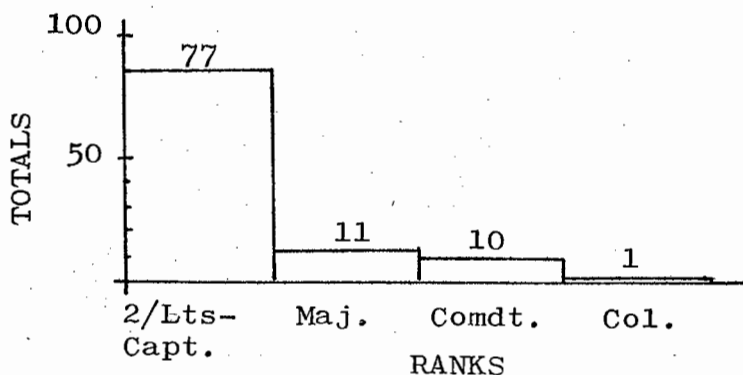


Figure 4.2. Histogram of aircrew at A.F.B. Ysterplaat in 1978.

- c. Extent: The whole population, from 2/lieutenant to Lieutenant General (Chief of the Air Force) -

see Figure 1.1. The sampling unit from 2/Lieutenant to Colonel (Officer Commanding A.F.B. Ysterplaat.

d. Time: All ages, 19 - 60 years (compulsory retirement age).

e. Relative Frequency Distributions.

Relative frequency =  $f_i/n$  where  $f$  = absolute frequency

$n$  = total observations

$i = 1, 2, 3, \dots, n.$

The following tables are given to show the proportions of the various ranks in the total and sample populations.

(i) Population: S.A. Air Force (1978)

<u>Rank</u>	<u>Frequency</u> $f_i$	<u>Rel. Frequency</u> $f_i/n$	<u>%</u>
2/Lts to Captains	467	0,650	65%
Majors	121	0,169	16,9%
Commandants	68	0,095	9,5%
Colonels	44	0,061	6,1%
Brigadiers	14	0,020	2,0%
M/Generals	3	0,004	0,4%
Lt General	1	0,001	0,1%
	n: 718	1,000	100%

Table 4.1. Relative Frequency Distribution of ranks in the SAAF.

(ii) Sampling Unit: A.F.B. Ysterplaat.

Ranks	Frequency $f_i$	Rel. Frequency $f_i/n$	%
2/Lieut to Captains	77	0,78	78%
Majors	11	0,11	11%
Commandants	10	0,10	10%
Colonel	1	0,01	1%
	n: 99	1,00	100%

Table 4.2. Relative Frequency Distribution of ranks in A.F.B. Ysterplaat.

It can be seen that the proportion of officers in the various ranks at A.F.B. Ysterplaat follows the pattern of the S.A. Air Force as a whole. It is evident from the distribution of ranks that this is an operational base. As a sample it is acceptable: the survey emphasis falls in the right place: flying operations.

#### 4.2. The Sample.

The sample size was 83 respondents.

##### 4.2.1 Characteristics.

4.2.1.1 There were 63% pilots and 37% navigators.

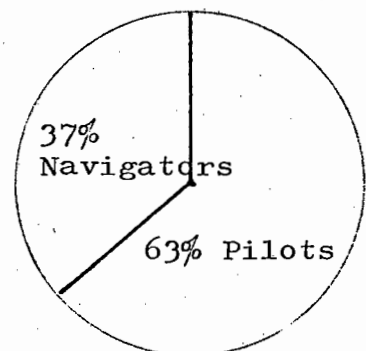


Figure 4.3. Sample Composition.

4.2.1.2 Of the 83 respondents 51% were single and 49% married.

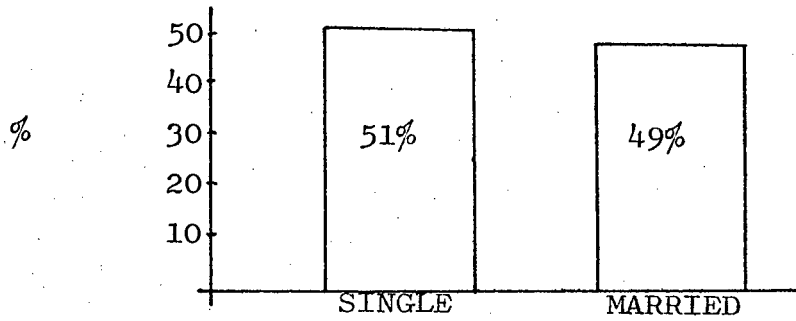


Figure 4.4 Histogram of marital status of respondents.

4.2.1.3 90% were matriculated and 10% of respondents had Bachelors degrees.

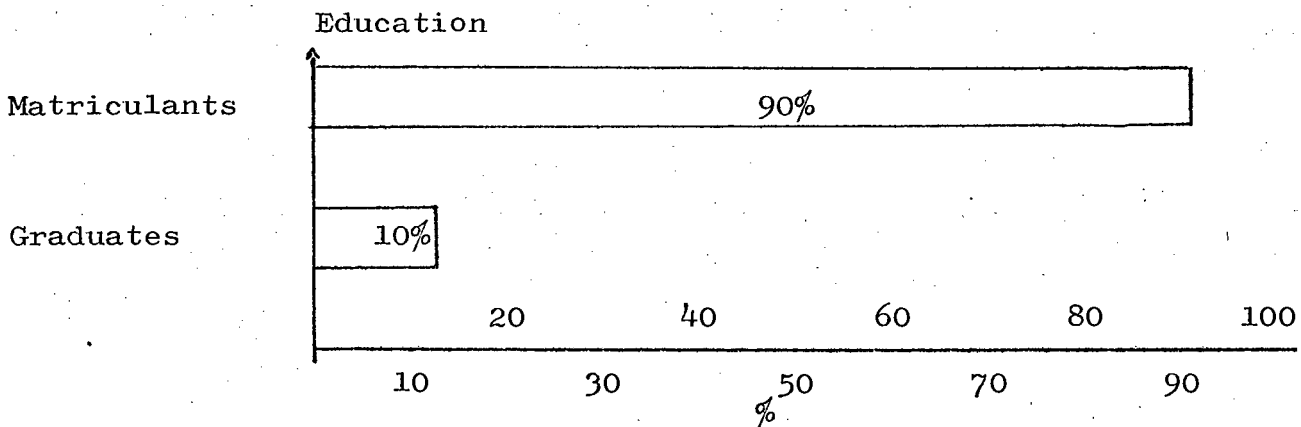


Figure 4.5 Horizontal bar chart showing educational qualifications.

4.2.1.4 Age: The ages of the respondents varied from 19 years to 58.

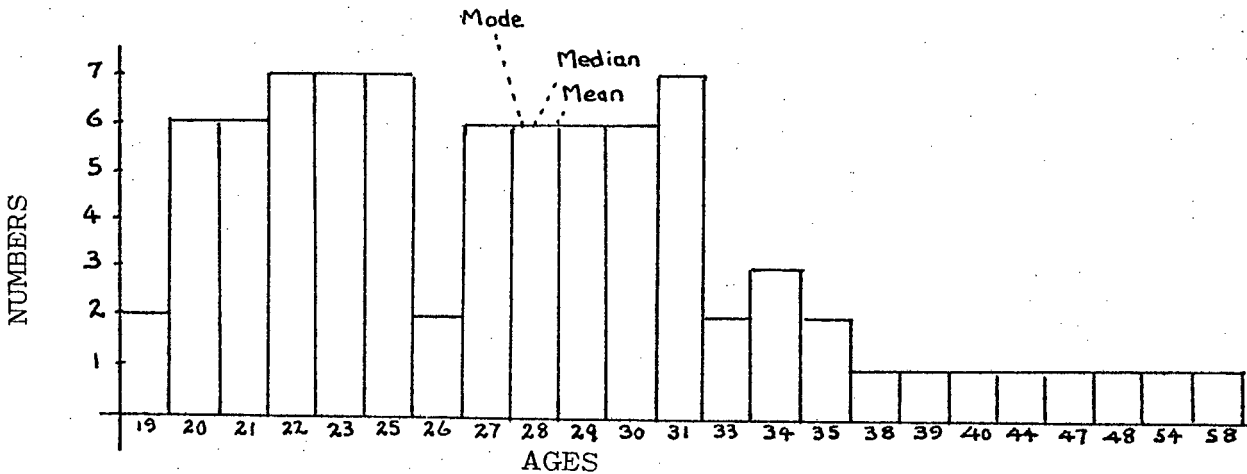


Figure 4.6 Age Distribution of Respondents.

Age (a)	No. of Respondents (b)	(a)x(b)	Cumulative (c)
19	2	38	38
20	6	120	158
21	6	126	284
22	7	154	438
23	7	161	599
25	7	175	774
26	2	52	826
27	6	162	988
28	6	168	1156
29	6	174	1330
30	6	180	1510
31	7	217	1727
33	2	66	1793
34	3	102	1895
35	2	70	1965
38	1	38	2003
39	1	39	2042
40	1	40	2082
44	1	44	2126
47	1	47	2173
48	1	48	2221
54	1	54	2275
58	1	58	2333
n=83		2333	

Middle value =  $\frac{2333 - 1166}{2}$   
 a. Median =  $28 + \frac{(1166,5 - 1156)}{174}$   
 $= 28 + 0,06$   
 $= 28,06$   
 b. Mode = Mean - 3(Mean - Median)  
 $= 28,11 - 3(28,11 - 28,06)$   
 $= 27,96$

Median : 28,06 years (middle value)

Mode : 27,96 years (most frequent value)

Mean :  $\bar{X} = \frac{1}{n} \sum_{i=1}^n X_i = \frac{1}{83} 2333 = 28,11$  years

Standard Deviation:  $\sigma = \sqrt{\frac{1}{n-1} \sum_{i=1}^n (x_i - \bar{x})^2} = 7,5$  years

Coefficient of Variation:  $CV = \frac{\sigma}{\bar{x}} = \frac{7,5}{28,11} = 0,267$  or 26,7%  
 i.e. the Std Dev. is 26,7% of its Mean.

Table 4.3. The Age characteristics of respondents.

4.2.1.5 Flying experience as qualified aircrew.

Experience (a)	No of Resp (b)	(a)x(b)	Cum Exp (c)	Experience (a)	No of Resp (b)	(a)x(b)	Cum Exp (c)
1 year	5	5	5	12 years	7	84	373
2 years	6	12	17	13 years	1	13	386
3 years	9	27	44	14 years	1	14	400
4 years	6	24	68	15 years	2	30	430
5 years	1	5	73	16 years	1	16	446
6 years	2	12	85	17 years	2	34	480
7 years	2	14	99	20 years	1	20	500
8 years	7	56	155	21 years	1	21	521
9 years	8	72	227	22 years	1	22	543
10 years	4	40	267	27 years	1	27	570
11 years	2	22	289	35 years	2	70	640
				72 * 640			

\* 11 Student navigators excluded as they do not qualify.

Mean:  $\bar{X} = 8,9$  years flying experience

Std.Dev:  $\sigma = 7,1$  years flying experience

Coeff. of Var.:  $CV = \frac{\sigma}{\bar{X}} = \frac{7,1}{8,9} = 0,7977$  or 79,8%

i.e. the Std.Dev.: 79,8% of it's Mean.

Table 4.4. The Flying Experience Characteristics of Respondents.

4.2.1.6 Operational Experience as aircrew (qualified in a specific role)

Experience (a)	No of Resp (b)	(a)x(b)	Cum Exp (c)	Experience (a)	No of Resps (b)	(a)x(b)	Cum Exp (c)
1 year	13	13	13	12 years	3	36	338
2 years	7	14	27	14 years	2	28	366
3 years	9	27	54	16 years	2	32	398
5 years	1	5	59	19 years	1	19	417
6 years	3	18	77	20 years	1	20	437
7 years	7	49	126	22 years	1	22	459
8 years	6	48	174	26 years	1	26	485
9 years	3	27	201	33 years	1	33	518
10 years	9	90	291	35 years	1	35	553
11 years	1	11	302				
				72 * 553			

\* 11 Student navigators do not qualify.

Mean:  $\bar{X} = 7,68$  years.

Std Dev:  $\sigma = 7,09$  years

Coeff of Var:  $CV = \frac{\sigma}{\bar{X}} = \frac{7,09}{7,68} = 0,9232$  or 92,3%

i.e. the Std Dev. is 92,3% of it's Mean.

Table 4.5. The Operational Experience Characteristics of Respondents.

4.2.1.7 Graphic presentations of cumulative frequency distributions.

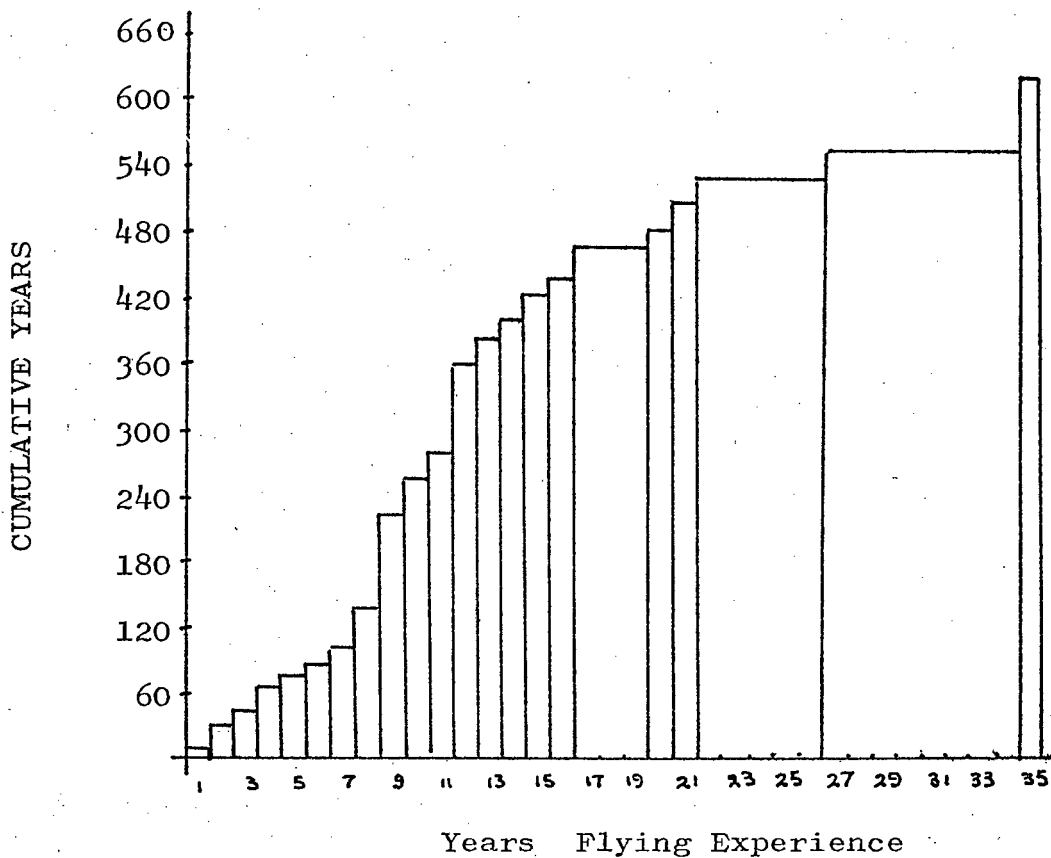


Figure 4.7 Histogram for Flying Experience data.

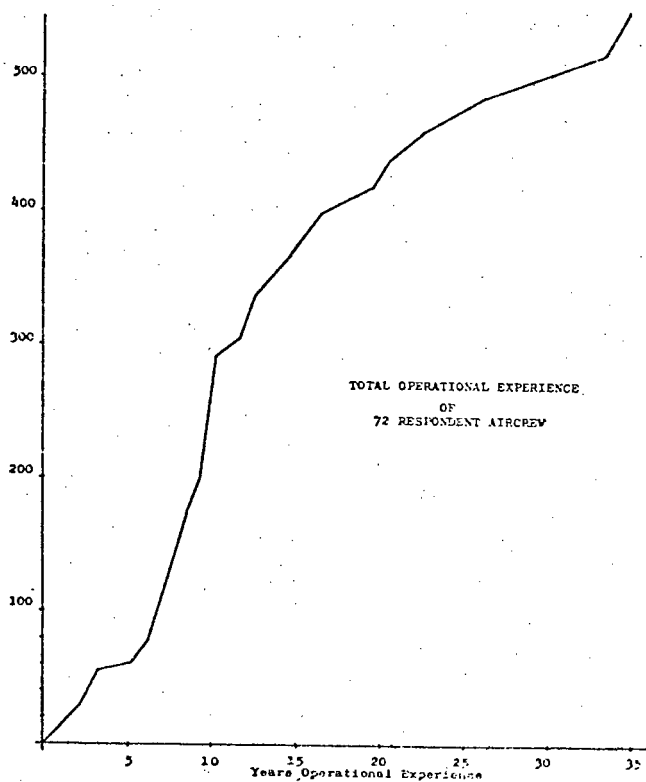


Figure 4.8 Ogive for Operational Experience.

4.2.1.8 Units in the Sample.

a.	Headquarters, AFB Ysterplaat:	2	aircrew respondents
b.	16 Squadron	9	Aircrew respondents
c.	22 Squadron	6	Aircrew respondents
d.	25 Squadron	12	Aircrew respondents
e.	27 Squadron	15	Aircrew respondents
f.	35 Squadron	15	Aircrew respondents
g.	88 ADFS	4	Aircrew respondents
h.	Air Navigation School	20	Aircrew respondents

Total	83
-------	----

4.2.1.9 Appointments of respondents.

a.	Officers Commanding	6
b.	Chief Instructors	2
c.	Flying Instructors	3
d.	Navigation Instructors	9
e.	Crew Commanders	3
f.	Pilots	38
g.	Adjutants	2
h.	H.Q. Staff	2
i.	Navigators	7
j.	Student navigators	11

Total	83
-------	----

4.3 THE QUESTIONNAIRE4.3.1. Question 1.

The question posed was: "Has your (career) progress been satisfactory so far?"

90,4% of the respondents answered "yes" to this question.

#### 4.3.2. Question 2.

Any career progress has a specific goal and so the question posed was: "Which of the following ranks do you consider to be the top one of a normally successful career?"

49,4% chose a Colonel's rank; 48,2% a Brigadier's; and 2,4% a Commandant's rank.

#### 4.3.3. Question 3.

Ranks and positions go together and the question asked was: "Which of the undermentioned officers would you like to be as fulfilment of your career in the Air Force?"

41% of the respondents selected the position of a Unit or Base commander; 31,3% wanted to be active flying members; and 27,7% chose Chief of the Air Force - the ambitious minority.

The majority for position (41%) correlates with the majority for rank (49,4%). Moreover a Unit or Base commander is normally of Colonel's rank. A Commandant is the most active flyer of the senior ranks in the Air Force yet only 2,4% chose this rank although 31,3% wanted to continue an active flying career. Clearly the respondents considered a Commandants rank as too low for such a career: Accordingly being promoted to Colonel in command of a Unit or Base in the Air Force is considered as fulfilment of a successful career.

#### 4.3.4 Question 4.

Having determined how successful a career has been to date and what rank and position were considered appropriate, the next

question had to establish where these objectives could be seen. Hence the question posed was : "Have you seen your career plan?"

96,4% said they had not seen their career plans and 98,7% of these reckoned they should see it. These results were not surprising and their main impact is that so many respondents expressed the wish to see their "career plans". This led logically to asking if they intended taking part in planning their careers.

#### 4.3.5 Question 5.

And so a contingency question was posed: "Do you aim to participate in planning your career?" If the answer was yes: "Would you be happier in your work and thus more productive?" The yes's were then further requested: "Would the Air Force be better equipped to achieve its aims?"

The answers were overwhelmingly positive: 100% for the first two questions and 97,6% for the last. In retrospect this contingency question need not have been asked: with such a select group of respondents the positive answers could have been accurately predicted!

#### 4.3.6 Question 6.

Career plans need to be worked out in conjunction with a person in the organisation who has full knowledge of the various careers open to aircrew in the Air Force. So the question was asked: "Who, with your participation, should work out the details of such a career plan?"

62,7% of the respondents favoured the Personnel Division of Air Force HQ whilst the remainder (37,3%) elected their Commanding Officers. Such a result is valid because most Commanding

Officers do not know the specific details of the various career combinations that are available to aircrew.

In order to determine the effects of appraisal on a person's career this contingency question was asked:

"A system of appraisals "rates" individuals. Should these rating marks be used to compile a "list of merit" from which officers could be selected for promotion?"

87,9% answered yes and when further asked:

"How can seniority in rank be rewarded?"

85,5% indicated that such a person should be promoted if his speciality was the criterion. 14,5% said that such a senior person should be promoted six months later. This implied that those promoted on merit would have a time advantage (seniority) in their new ranks before the older and former seniors joined them. Promotion is an integral part of the career prospects of individuals and these in turn are dependent on the number of posts in an establishment. To ensure that this was understood the question was asked:

"Do you realise that your career prospects are dependent on the relative proportion of officer strengths in the various ranks?"

86,7% respondents answered in the affirmative.

#### 4.3.7 Question 7.

Five important elements which have to be considered in career planning are: Age, years of service, experience, higher education and assessment of capabilities. An effective way of determining the relative values of these variables was to request the respondents to rate them as follows: Most Important; Important;

Unimportant; Most Unimportant; and Undecided (see Table in 2.2.7. p.309). Because of the close relationships existing between some of these variables, an analysis of responses of pairs was made, for example: Age/Years of service on promotion; Years of Service/Experience: Age on Promotion/Higher Education; Experience/Assessed Regularly; Higher Education/Wider Experience. The detailed statistical analysis is in Annexure 2.

#### 4.3.7.1 Comparison between Age on promotion and Years of Service on promotion.

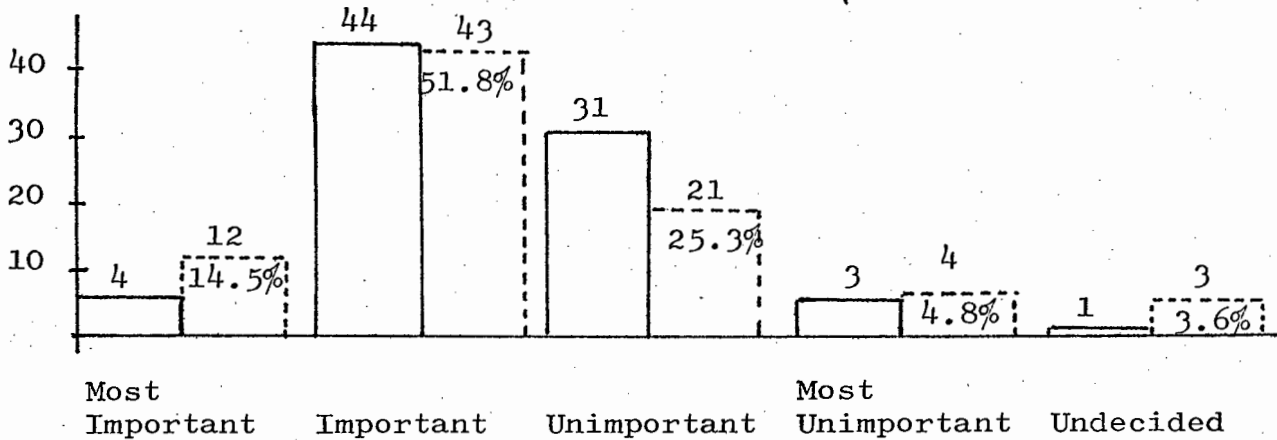


Figure 4.9. Histogram for Age and Service. Legend:  Age

Service

The close relationship between Age and Service can be seen graphically. This is confirmed by the statistical calculation 1 in Annexure 2: there is no difference in importance between these two elements. We conclude that Age and years of Service on promotion are "equally" important. In order to see how close this relationship is, we apply Rensis Likert's intensity scale to our values as follows: Most Important - 5; Important - 4; Unimportant - 3; Most unimportant - 2; Undecided - 1.

Aspect	<u>AGE</u>			<u>SERVICE</u>	
	Weighting (a)	Responses (b)	Weighted Responses (a) x (b)	Responses (c)	Weighted Responses (a) x (b)
Most Important	5	4	20	12	60
Important	4	44	176	43	172
Unimportant	3	31	93	21	63
Most Unimportant	2	3	6	4	8
Undecided	1	1	1	3	3
			TOTAL:-	TOTAL:-	306
			296		

Table 4.6 Comparison of weighted responses between Age and Years of service on promotion.

From Table 4.6 it can be seen that for practical purposes Age at promotion (296) is as important as Years of Service (306) on promotion.

#### 4.3.7.2 Comparison Years of service and Experience.

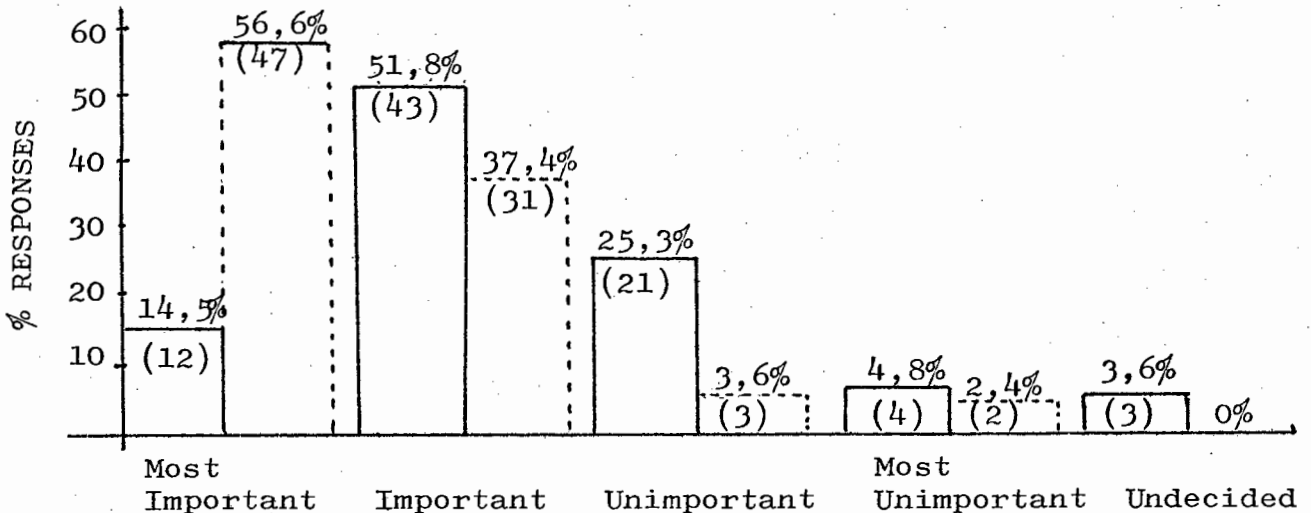


Figure 4.10 Histogram for Years of Service and Experience

#### Legend

Service



Experience



There is a disparity in responses indicating differences. The statistical calculation 2 in Annexure 2 confirms this by rejecting the Null Hypothesis: there is no difference in importance between these two variables. We conclude that there is a difference of importance between Years of service and getting as wide an Experience as possible. To resolve which element is the more important see allot weightings as in the previous section: Most Important - 5; Important - 4; Unimportant - 3; Most Unimportant - 2; Undecided -1.

Aspect	Weighting (a)	Responses (b)	<u>SERVICE</u>		<u>EXPERIENCE</u>	
			Weighted Resp's (a)x(b)	Responses (c)	Weighted Resp's (a)x(c)	
Most Important	5	12	60	47	235	
Important	4	43	172	31	124	
Unimportant	3	21	63	3	9	
Most Unimportant	2	4	8	2	4	
Undecided	1	3	3	0	0	
			306	TOTAL	372	

TABLE 4.7 Comparison of Weighted Responses between Service and Experience from Table 4.7 it is clear that the obtaining of wider Experience (372 pts) is considered more important than Years of service (306 pts.)

4.3.7.3 Comparison: Age on promotion and Higher Educational qualifications.

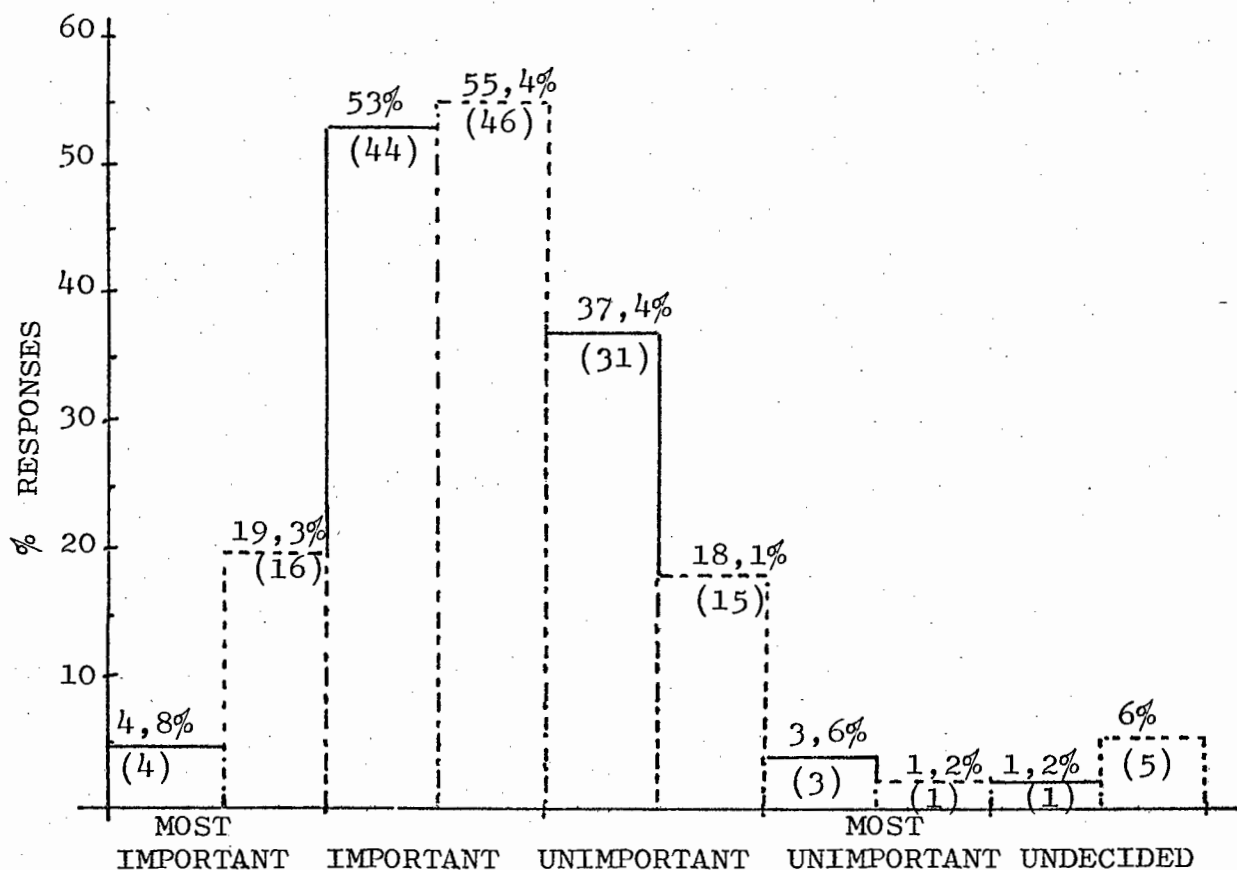


Figure 4.11 Histogram for Age on promotion and higher Educational qualifications

Legend.  Age  
 Education

There is a noticeable disparity of responses. The statistical calculation 3 in Annexure 2 confirms this by rejecting the Null Hypothesis: there is no difference in importance between these two elements. We thus conclude that there is a significant difference between the Age on promotion and getting higher Educational qualifications. In order to determine which element was considered more important we apply our Likert intensity scale criterion.

Aspect	<u>AGE</u>			<u>EDUCATION</u>	
	Weighting (a)	Responses (b)	Weighted Resp's (a)x(b)	Responses (c)	Weighted Resp's (c)x(d)
Most Important	5	4	20	16	80
Important	4	44	176	46	184
Unimportant	3	31	93	15	45
Most Unimportant	2	3	6	1	2
Undecided	1	1	1	5	5
			296	TOTAL	316
		TOTAL		TOTAL	

TABLE 4.8 Weighted differences between Age on promotion and obtaining Educational qualification.

It can be seen from Table 4.8 that the obtaining of higher Educational qualifications (316) is considered more important than the Age (296) on which a member is promoted.

Aspect	<u>EXPERIENCE</u>			<u>ASSESSED</u>	
	Weight (a)	Responses (b)	Weighted Responses (a)x(b)	Responses (c)	Weighted Responses (c)x(d)
Most Important	5	47	235	45	225
Important	4	31	124	36	144
Unimportant	3	3	9	1	3
Most Unimportant	2	2	4	0	0
Undecided	1	0	0	1	1
			372		373

Table 4.9 Weighted differences between Experience and being Assessed regularly.

From Table 4.9 it is clear that there is virtually no difference of importance between getting as wide an Experience (372) as possible and being Assessed (373) regularly.

4.3.7.5. Comparison: Obtaining higher Educational qualifications and getting as wide an Experience as possible.

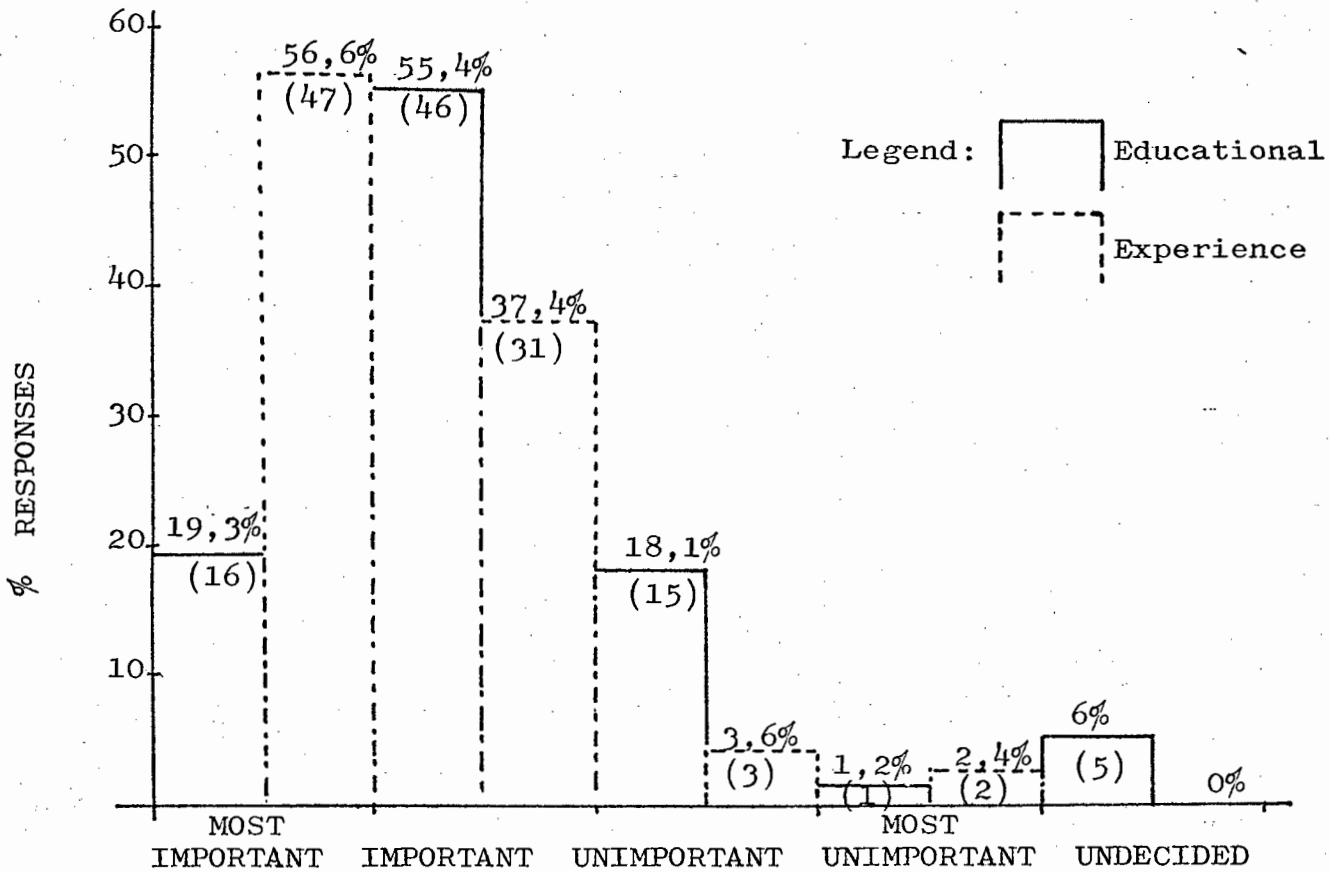


Figure 4.13 Histogram for Educational qualifications and Experience.

The disparity between the elements is quite evident. It is, never-the-less important that we know which element is considered the more important of the two when we conduct our career development framework. A table of weighted responses along the Rensis Likert intensity scaling, is drawn up.

Aspect	Weight (a)	<u>EDUCATIONAL</u>		<u>EXPERIENCE</u>	
		Responses (b)	Weighted Responses (a)x(b)	Responses (c)	Weighted Responses (a)x(c)
Most Important	5	16	80	47	235
Important	4	46	184	31	124
Unimportant	3	15	45	3	9
Most Unimportant	2	1	2	2	4
Undecided	1	5	5	0	0
			316		372

Table 4.10 Weight differences between Educational qualifications and Experience.

The statistical calculation 5 in Annexure 2 indicated that there was a significant difference in importance between obtaining higher Educational qualifications and getting as wide an experience as possible. This conclusion is supported by Table 4.9 above. Moreover it is clear that getting more Experience (372) is considered more important than getting a wider Education (316).

Finally we conclude our Analysis of Question 7 by placing in order of merit these five elements of a Career Plan:

1. Being Assessed regularly (373pts)
2. Getting as wide an Experience as possible (372 pts)
3. Obtaining higher Educational qualifications (316 pts)
4. Years of Service at which a respondent is promoted (206 pts)
5. Age at which a respondent is promoted (296 pts)

4.3.8 Question 8: The normal termination of service in the Air Force is by retirement. An Aircrew member is retired on reaching the retirement age of 60 years. This retirement age is a matter of controversy and so the question is posed:

"At what age should an active aircrew member retire?"

48,2% said the age should be: 50 years; 41% said 55 years and the remaining 10,8% elected the laid down 60 years.

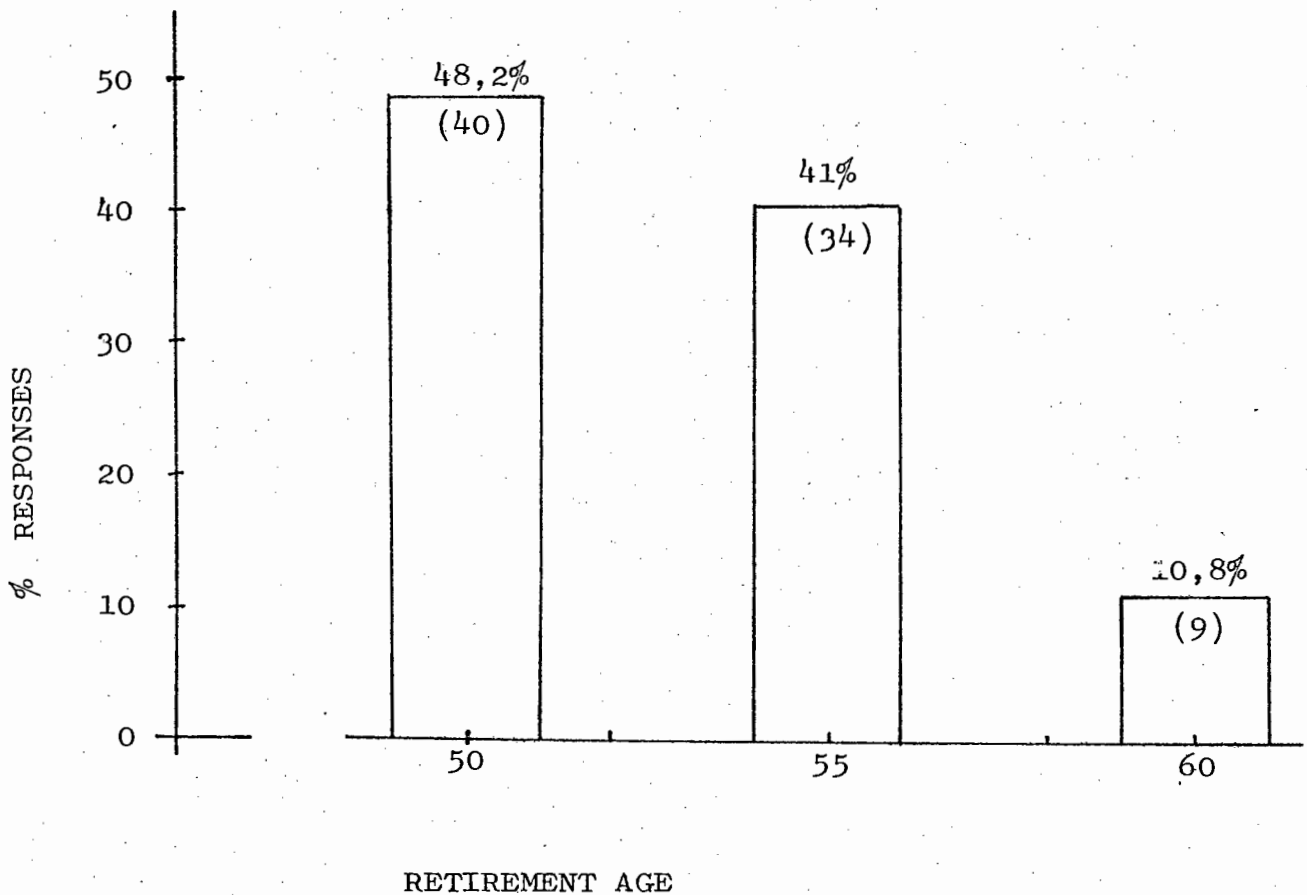


Figure 4.14 Retirement ages for Active Aircrew.

We conclude that the present retirement age of 60 years is considered too high for actively flying aircrew. This age should be brought down to one closer to 50 years of age.

4.3.9 Question 9: A Career development programme is divided into four phases: the Initial phase; the Intermediate; the Advance; and the Executive or Leadership phase. These phases cover the whole career spectrum. The question posed was:

"How long do you think each development phase should last?"

Initial Phase: 41,5% (34) said one year from starting:  
51,2% said 2 years and 7,3% chose more than  
2 years (but assumed to be less than 5 years).

Intermediate Phase: 68,3% (56) elected 5 years from the end  
of the initial phase; 24,4% chose 8 years and  
7,3% selected more than 8 years but  
less than 15 years)

Advance Phase: 97,6% (80) said 15 years after the end of the  
intermediate phase; 2,4% chose a period between  
15 and 20 years after the preceding phase.

Executive/Leadership Phase: 68,3% chose a length of 5 years  
after the Advance Phase whilst 31,7% said this  
phase should last until retirement.

We conclude from these responses that the development phases  
should be as follows:

Initial phase - 2 years; Intermediate phase - 5 years;  
Advance phase - 15 years; and the Executive/Leadership  
phase - 5 years.

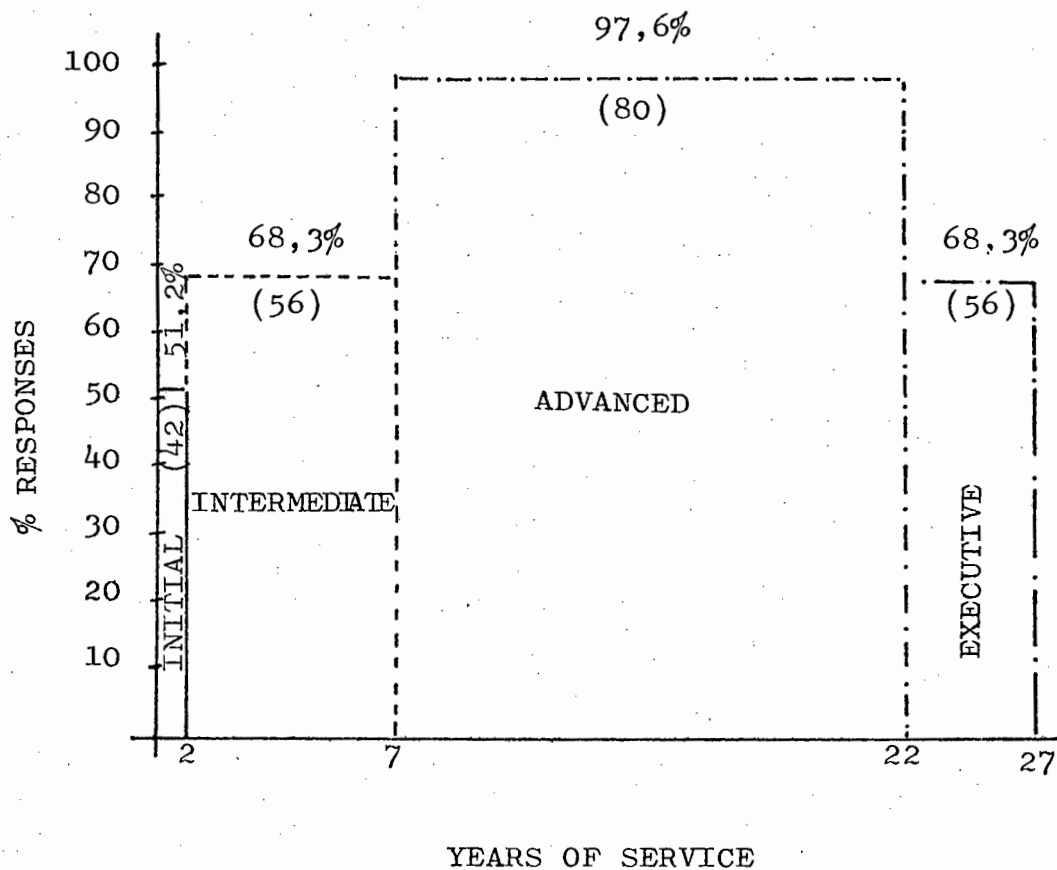


Figure 4.15 Length of Development Phases.

4.3.10 Question 10: Each development phase is associated with a certain rank or ranks.

The Question asked was:

"Which rank do you associate with each of the previously mentioned phases of development?"

Initial Phase: 98,8% agreed that the rank should be that of a Lieutenant.

Intermediate Phase: 66,3% said that Captain and Major was the rank for this phase; 31,3% said Captain and 2,4% elected Major.

Advanced Phase: 44,6% maintained that Major, Commandant and Colonel

could be the rank for this phase; 32,5% said Commandant; 14,5% said Major; and the remaining 8,4% chose Colonel.

Executive Phase: Once again 44,6% maintained that Commandant, Colonel and Brigadier could be the rank for this phase; 24,1% chose Colonel; 22,9% Brigadier; and 8,4% Commandant.

We conclude that in the Initial phase Lieutenant's rank is the most appropriate; and that although in the present situation in the Air Force the ranks of Captain and Major are very closely associated with the Intermediate development phase of aircrew, the rank of Captain appears to be the best suited. In the Advanced phase the rank of Commandant is the one selected and Colonel in the Executive Phase. These ranks are graphically illustrated in figure 4.15 where the combined ranks i.e. of Captain and Major; Major, Commandant and Colonel; and Commandant, Colonel and Brigadier, have been used as the bases upon which to add the other selected ranks in the relevant phases.

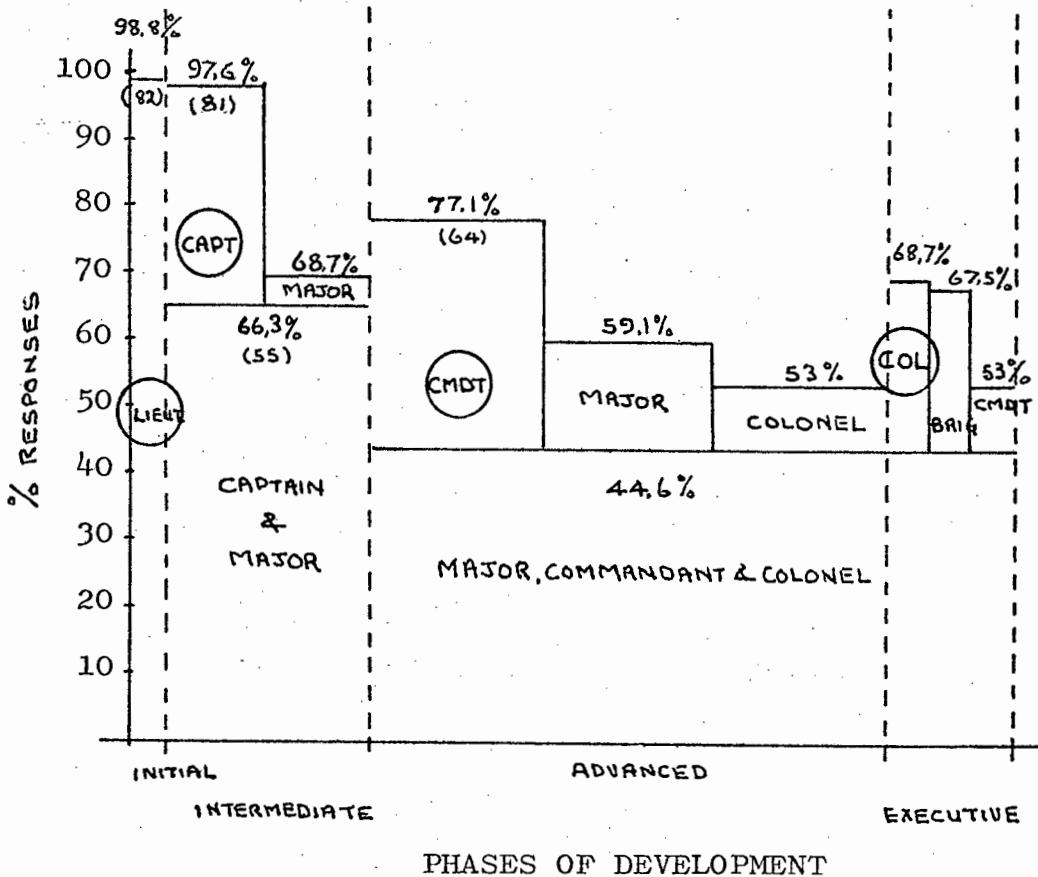


Figure 4.16 Ranks in the phases of development (indicated in the circle)

4.3.11 Question 11: It is known that the longer an officer occupies a given rank (and thus a position) the worse the career prospects become for his junior officers.

A Committee of Inquiry, Chaired by a Major General and consisting of six senior officers of the three branches of the S A Defence Force, recommended the maximum periods of service as asked in question 11 of the questionnaire (See Confidential report HSP/C/502/2 over HSP/110/3/2 of 2 Sept 75 - Appendix F). The purpose of including this question was to test aircrew acceptability or otherwise of this Enquiry's recommendation.

62,6% (52) agreed that there should be a maximum period in rank. Their responses tallied with the Enquiry's recommendations

General - 5 years maximum - 80,8% (42) agreed.

Lieutenant General and Major General - 4years maximum -  
84,6% agreed

Brigadier - 5 years maximum - 88,5% agreed.

Colonel - 7 years maximum - 92,3% agreed

Commandant - 9 years maximum - 73,1% agreed

Major - 10 years maximum - 61,5% agreed

Captain - 9 years maximum - 51,9% agreed

Lieutenant/Candidate Officer - 7 years maximum - 76,9% agreed.

A contingency question was asked of those who agreed to there being a maximum period in rank: "What do you think should be done with an officer who has reached the maximum period of service in rank?"

48,1% said his position was to be reconsidered in 6-month's time,  
28,8% said he had to be retired and,  
23,1% said that he had to be removed from the seniority (merit)  
list.

The majority decision to review an officer's position on reaching his maximum period in service confirms the promotion policy recommendation of the S A Defence Force's Committee of Enquiry previously mentioned.

We conclude that the question was particularly significant in the career development of aircrew: a new career policy in the form of maximum period of service in ranks and reviewing the promotion

procedure was considered feasible by the majority of respondents at AFB Ysterplaat.

4.3.12 Question 12: In preparing an officer for senior rank and position it is necessary that he should possess a broad but comprehensive understanding of how the Air Force operates, so the question posed was:

"Indicate by answering each question, what postings (assignments) you would like in order to obtain a broad but comprehensive understanding of the Air Force?"

Of the eight alternatives offered the respondents chose four:

- to serve as Aircrew on other operational aircraft - 97,6%(81);
- to be Flying or Navigation Instructors - 87,9%;
- to be a Staff Officer at a Headquarters - 75,9%;
- to serve in the Air Defence branch - 56,6%.

They (the respondents) turned down postings to:

- the Technical training unit - 77,1%
- Administrative branch - 75,9%
- Instructor at the Air Force College - 61,4%
- Logistics branch - 57,8%

The flying-bias of the aircrew is clearly discernable in their choices.

4.3.13 Question 13: The responses in Question 7 indicated that getting higher educational qualifications was important. Few recruits, joining the Air Force with the intention of becoming

Pilots and Navigators, possess academic degrees or diplomas. The majority, who make the Service their career, attend the Military Academy at Saldanha Bay after qualifying for their Wings. After a three year applied military course, under the auspices of Stellenbosch University, the successful candidates are awarded their Bachelor degree (B.Mil). Those aircrew who do not follow this path and still wish to make their careers in the Air Force are required to look elsewhere for higher qualifications. Those who possess higher qualifications realize that further higher qualifications are necessary in order to advance their careers. The question posed was thus:

"State when in your career you would like to start or continue to improve your academic or technical qualifications?"

For a Bachelors degree or Diploma : 45,8% said after 3 years  
service

39,7% said before 10 years service

14,5% did not answer.

For a Master Degree or diploma : 53% said before 15 years service

32,5% said after 7 years service

14,5% did not answer

For a Doctorate : 63,8% said before 20 years service

21,7% said after 10 years service

14,5% did not answer.

We thus conclude that it is desirable to start studying for higher qualifications after 3 years in service (i.e. at the rank of Lieutenant) qualifying at the end of his 6th year. The following

5 years should be spent in rounding off military expertise and acquiring new aircrew skills by being cross-trained on other aircraft types and operational roles. At about the 11th year further academic studies in Honours and Masters degrees could be undertaken completing them after a period of four years. Thus by the 15th year of service, with the rank of Major and possibly Commandant, these aircrew members could be expected to make significant academic contributions to the effectiveness of the Air Force. Doctoral studies could commence in the 18th year finishing at the end of the 19th Year of service. A higher educational career path as suggested is shown in figure 4.17.

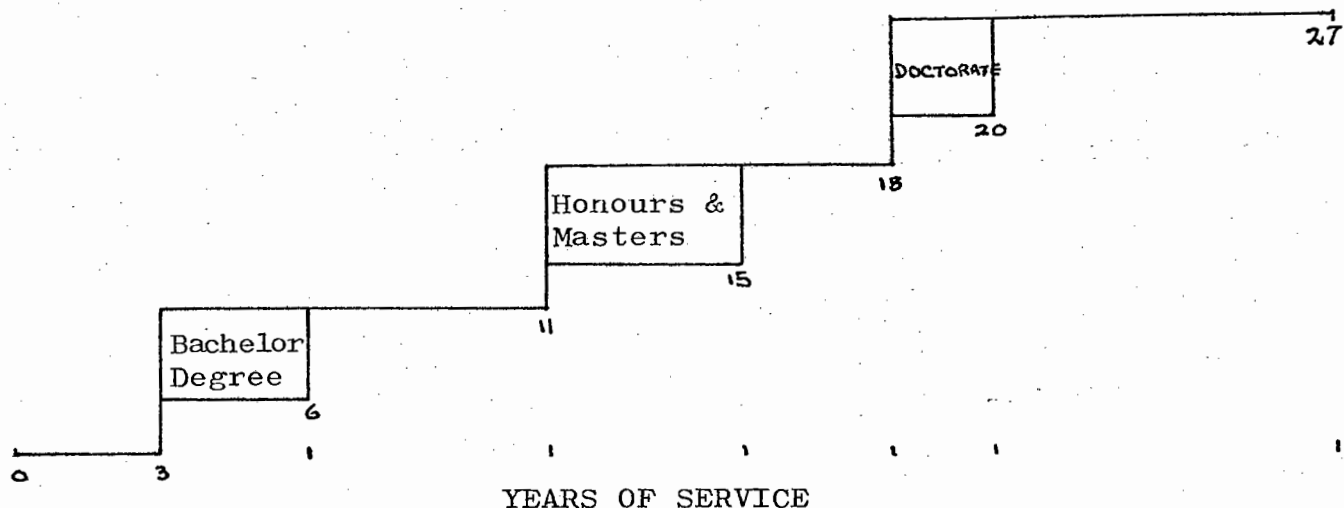


Figure 4.17. The Educational career path for aircrew.

The following question was asked:

"How would you like to do these studies?"

60,2% (50) said that they would like to do these studies full-time at a University or College.

13,2% said they preferred a part-time study programme and

12,1% said they would like to do their studies by means of correspondence tuition.

14,5% gave no answers.

The implication of full-time study, at a University or College, three years after qualifying for their "Wings" is that such a break in service may well prove to be detrimental to their military careers i.e. they may find it difficult to adapt on joining the Air Force again and also they may be out of touch with the latest technical and strategical developments.

The best mix (at Bachelor's level) appears to be a part-time/correspondence programme. For Honours/Masters a full-time attendance is supported. The doctoral study would, in any case, be a research one which could best be done in the students own time with part-time supervision.

4.3.14 Question 14: Just as higher academic qualifications increase a person's promotion prospects, so does specialization. However, overqualification and overspecialization for the task on hand and position (and rank) occupied will tend to decrease career prospects in the long-term: such people have become too valuable to be easily moved elsewhere! e.g. A good test-pilot will be kept in this role as long as possible and during this period he may be by-passed on promotion because he "cannot" be released. In order to establish if this aspect of a particular career path is understood the question posed was:

"Is this (overspecialization and overqualification) acceptable to you?"

55,4% (46) said no it was not.

4.3.15 Question 15: In order to lessen resistance to potential strategic changes in role employment, new or modified equipment etc., pilots and navigators are normally "sounded out" about such matters. Whether they are really aware of these approaches, is not certain and so the question was asked:-

"Are you involved in any of the following areas of long range planning?"

- a. "In flying training?" 50,6% (42) said yes.
- b. "In strategic operational planning?" 90,4% said no.
- c. "In the strategic planning of the size and shape of the Air Force?" 97,6% said no.

Summing up the responses we conclude that only 20,9% of the aircrew at Ysterplaat were involved in longrange planning activities.

4.3.16 Question 16: All aircrew are at a constant state of readiness. This entails going into action according to the requirements of contingency plans which have been drawn up for a number of likely emergencies. Each unit has a plan, or should have one in which the details of the execution of their parts of the plan are laid down. The question posed was:

"Do you help to develop a step-by-step plan of action to implement your Unit's part in the long range operational plan?"

36,1% (30) said yes and the remaining 63,9% said no.

4.3.17 Question 17: Long range planning is known as strategic

planning in the Air Force. The planned actions are envisaged in a future dimension. Units should be aware of their participation in these events and initiate timeous training programmes to cater for such eventualities. Such plans usually come in the form of policy statements from higher authority. So the question was posed:

"Does your Unit have a policy manual within which many Air Force and Defence Force policy statements and their supporting procedure and rules can be studied?"

92,8% (77) said their unit did not have such a manual.

These 77 aircrew members were then further asked.

"If no. Do you agree that such a manual would resolve a lot of misinterpretations of policy statements?"

The answer was wholly unanimous (100%) that it would!

4.3.18 Question 18: The most important aspects of the questionnaire had been answered and the questions still left were asked as a matter of tying up any loose ends. So the question posed was:

"Do you agree that your work is crucial to your satisfaction as a human being and to the development of your personality?"

The answer was 96,4% (80) in the affirmative. A contingency question asked of these 80 respondents:

"If yes. Does it further mean that your career (lifework) must have dignity and meaning?"

We had the overwhelmingly total response of all 83 respondents agreeing with the question.

4.3.19 Question 19: Asked further: "Do you agree that Career Planning forms an integral part of long range planning?"

We had another 100% (83) acknowledgement!

4.3.20 Question 20: Many aircrew leave the Air Force to seek employment in private airlines or the South African Airways. Because the costs of training aircrew are so high e.g. R1,7 million to train a Mirage pilot with about 700 hours flying on type (Lt.Gen. R.H.D. Rogers, SSA, SM. DSO, DFC on 16 June 1978), every effort is made to retain them and recoup some of the investment by further usage. So they were asked:

"Knowing that the Air Force has an acceptable career plan for you, would this knowledge incline you to stay and make a success of this career?"

96,4% (80) said yes.

Asked further. "Would this fact develop a greater loyalty in you towards the Air Force?"

92,5% (74) said yes.

4.3.21 Question 21: Finally, the respondents were asked;

"Do you think that the answers you gave in this questionnaire will help you in planning your career?"

91,6% (76) said it would and 95,2% (72) of these expressed the

wish that they would like a copy of the results of this questionnaire.

## 5 CONCLUSIONS

### 5. CONCLUSIONS

On analysing the results of the survey certain logical conclusions or deductions are reached when the implications of one or more questions are considered. In the following discussion these implications, with the relevant questions in bracket (Qi) are argued and a conclusion(s) stated.

#### 5.1. The Career.

90,4% (Q1) of the respondents found their progress satisfactory in spite of the fact that 96,4% (Q4) of them had not seen theirs or any particular career plans. The awareness of the need for career planning is there: All, 100%, (Q5) would choose to participate in this planning because then they feel they would be happier in their work, be more productive and so enable the Air Force to be better equipped to achieve its aims (Q5). Moreover, 62,7% (Q6) would like to work out the details of their careers with the Personnel Division at headquarters thus assisting in drawing up an acceptable career plan (Q6) (Q20). This would not only ensure work-satisfaction but would also help personality development and emphasize the dignity and meaning (Q18) of aircrews' lifework. Under these circumstances 96,4% (Q20) of pilots and navigators indicated they would be prepared to make a success of their careers, whilst 92,5% (Q20) confirmed that staying on under these conditions would develop greater loyalty (Q20) towards the Air Force.

It is thus concluded that aircrew are aware of the advantages and implications of having their careers planned, that they are

willing to participate in the planning of such careers and thus stay on in the Air Force. It is up to the Air Force to proceed expeditiously in consulting aircrew about their careers aspirations

### 5.2. Rank and Position.

All successful careers aim at achieving a specific rank and position. The majority, 49,2% (Q2) of the respondents select the Colonel's rank and the majority 41% (Q3) in the next question selected the position of Unit or Base Commander. It is concluded that a successful career would culminate in being promoted to the rank of Colonel the incumbent occupying the post of a Unit or Base commander.

### 5.3. Promotion through a "Merit" list.

87,9% (Q6) indicated a "merit" list, based on the results of an appraisal system, could be drawn up to indicate the "merit" position of potential promotees. Such a procedure would, however, be in conflict with the present promotion by seniority system. In consideration of the existing seniors, and thus by implication not amongst the highest on the merit list, 85,5% (Q6 (b1)) felt that they should be promoted if their specialities were the criteria for promotion.

Promotion is, however, directly related to career prospects. 87,7% (Q6(c)) realized that their career prospects were dependent on the relative proportions of officer strengths in the various ranks. An expansion (e.g. mobilization) of the Air Force, would create vacancies and consequently increase the chances of promotion

It is thus concluded that promotion is dependent on vacancies

in the various ranks, and that a "merit-list", from which prospective promotees are selected, would be preferred to the existing promotion-by-seniority system.

#### 5.4. Important Career Planning Elements.

Five important career planning elements (Q7) were rated as either Most Important; Important; Unimportant; Most Unimportant and Undecided. The results of the highest rating per element were: Age - 53% Important; Service - 51,8% Important; Experience - 56,6% Most Important; Higher Education - 55,4% Important; and Being Assessed regularly - 54,2% Most Important. Because these elements are naturally closely related to each other a paired statistical comparison was made so that they could be placed in some form of order of merit. The results obtained in the Analysis are as follows: i.e. at the 5% level of significance.

- a. Age vs Years of Service on promotion : Equally important
- b. Service vs Wider Experience : Experience is more important
- c. Experience vs Assessed regularly : Equally important
- d. Experience vs Higher Education : Experience is more important.
- e. Education vs Age on promotion : Education is more important

The order of merit so determined is:

1. Being Assessed regularly and getting as wide an Experience as possible,
2. Obtaining Higher Educational qualifications,
3. Age and Service at which an officer is promoted.

48,2% (Q8) indicated that the retirement age (another career planning element) should be 50 years of age instead of the present 60 years of age. The career path is divided into four phases of development (Q9). The respondents selected the Initial phase to be 2 years long (51,2%); the Intermediate phase to be 5 years long (68,3%); the Advance phase to be 15 years long (97,6%); and the Executive phase to be 5 years long (68,3%). During each development phase, the aircrew member holds a certain rank and progresses on promotion, to the next phase. 98,8% (Q10) indicated that the Lieutenant's rank is the most appropriate for the Initial phase. From our Analysis of Results the Captain's rank (97,6%) is selected for the Intermediate phase; the Commandant's rank (77,1%) for the Advanced phase; and the Colonel's rank (68,7%) for the Executive phase.

In this crucial discussion of the elements constituting the framework of a career development plan we conclude that the aircrew:

- a. Listed regular assessment and gaining wide experience as first in order of merit; obtaining higher educational qualification as next; and the age and length of service as third.
- b. Chose the retirement age to be 50 years instead of the present 60 years.
- c. Would have about 32 years of service on retirement at 50 years as their service life usually started at about 18 years of age on joining the Air Force.
- d. Would serve about 27 years as active commissioned members progressing through all the envisaged development phases.

- e. To be able to serve this 27 years of active commissioned service on retiring at 50 years of age, they would have to start their careers as Lieutenants.
- f. Confirm the retiring rank to be that of Colonel in their choice of the lengths of the development phases.
- g. In deciding on these issues have laid down the elements of a framework for developing career plans for themselves.

#### 5.5. Period of Service in Rank.

62,6% (Q11) agreed that there should be a maximum period of service in rank thereby implicitly acknowledging that their career prospects would be enhanced by such action. This was followed by endorsing the suggested questionnaire's maximum periods officers should occupy specific ranks. A solution to the problem of what to do with the officer who has reached his maximum term in office, was to reconsider his case after six months.

We concluded that the acceptance of the maximum period of service in ranks at this grass-roots level was particularly significant; not only is it a radical departure from the established policy but also it would assist in removing static promotion blocking personnel thereby increasing promotion prospects.

#### 5.6. Broadening Experience.

In order to possess a broad and comprehensive understanding of how the Air Force operates, aircrew should, apart from their own military speciality training, receive higher education and such wide experience as can possibly be fitted in by being posted to many diverse assignments in their planned careers. The

disadvantage of overspecialization and overqualification were understood - 55,4% (Q14) saying this was unacceptable. Higher education was certainly desirable, starting soon after the 3rd year in service (full-time University) and ending after about the 19th year of service in a correspondence tuition facility whilst studying for their doctorates. The various postings chosen, showed a remarkable bias toward matters of flying (Q 12): aircrew on other operational aircraft (97,6%); Flying/Navigation instructor (87,9%); Staff Officer at Headquarters (75,9%) member of the Air Defence branch (56,6%).

It was thus concluded that aircrew choose, apart from their own speciality training, higher education, and assignments that are mainly related to flying in order to gain broadening experience. This is, however, a narrow field and the usefulness of non-flying assignments ought to be told them: the Air Force consist of more than just flying types.

#### 5.7. Long range Planning.

All respondents acknowledged that they knew that Career Planning formed an integral part of long range Planning (Q19). However, only 20,9% were involved in long range planning activities (Q 15). This aspect was underlined when 63,9% (Q 16) indicated that they did not participate in developing a step-by-step plan of action to implement their unit's part in the long range operational plan. Moreover, long range planning activities, known as strategic actions in the Services due to its long term nature, are usually made known to the participants by means of policy statements from higher authority. In order to ensure that Units

are aware of their and others' roles in these activities, it was thought wise that Units should have policy manuals which would assist in avoiding any misinterpretations. 92,8% (Q 17) said that their units did not possess such a manual although they were unanimous that the possession of such a manual would greatly assist them in avoiding policy misinterpretations.

We conclude that Units should be encouraged to open Policy Manuals and so initiate greater personnel participation and involvement in preparing them for their part in understanding specific policy statements such as envisaged long range planning activities in the Air Force.

#### 5.8 Personal Aspects.

96,4% (Q18) affirmed that their work as aircrew in the Air Force was crucial to their satisfaction and to the development of their personalities. As such their careers must have dignity and meaning! 96,4% (Q20) indicated that if the Air Force offered them acceptable career plans they would stay and make a success and this action would, furthermore, develop a greater loyalty towards the Air Force.

It is concluded that aircrew are aware of the deep personal values of satisfaction, treatment as human beings, and the development of their personalities which career planning could safeguard.

As active flying members of the Air Force they would not be the only ones to reap the benefits: the Air Force would gain greater motivated and dedicated aircrew. The present cost of training of aircrew is already so high, that their retention would

be a great financial gain. Moreover, morale increase when turnover decreases.

#### 5.9. Usefulness of the Questionnaire.

91,6% (Q21) said that the answers given in this questionnaire would help them plan their careers.

#### 5.10. Achievement.

We conclude that the effect of the Questionnaire has been beneficial and the results meaningful and decisive. It has made aircrew at Air Force Base Ysterplaat aware that properly constituted career planning could develop them to their fullest and that the Air Force would be better able to reach its goals if it accepted such a programme. Furthermore the career variables have been identified and some rated. A validation study is required to confirm the findings of this pilot survey. Once confirmed, meaningful career planning for aircrew, as envisaged, could be proceeded with by the South African Air Force.

## S O U T H   A F R I C A N   A I R   F O R C E

## A CAREER PLANNING QUESTIONNAIRE

INTRODUCTION

Newly qualified pilots and navigators, being young and full of the love of life and adventure, live for the day and do not care overmuch for the morrow. You do not seriously think about your career at this stage. With more experience, higher rank and greater responsibilities comes an awareness of future aspirations and needs. You begin to concern yourself about your career. Your answers to this Questionnaire will be the start of your Career Plan.

AIMS OF THE QUESTIONNAIRE

To determine the acceptability of a formal Career Development Programme for Pilots and Navigators.

To determine the relative importance of career variables in drawing up a practical Career Plan.

To show that your properly constituted Career Plan will develop you to your fullest so ensuring that the Air Force reaches its goals.

INSTRUCTIONS

Please answer each question by putting a tick in the relevant box [ ]

PILOT :   or NAVIGATOR :

Date of Birth: Day.....Month.....Year.....

Marital Status: Single   or Married

Academic Qualifications:

Matriculation/Standard 10

Bachelor's Degree

Master's or Higher Degree

Date Wings Received: Day.....Month.....Year.....

Date Operationally Qualified: Day.....Month.....Year.....

Name of your Present Unit: .....

Your position in your Unit: .....

THE QUESTIONNAIRE

1. A successful career is one in which you, the newcomer, would rise steadily from one command level to the next until you reach retirement. Has your progress been satisfactory so far?

Yes   No

2. Which one of the following ranks do you consider to be the top one of a normally successful career?

COMMANDANT

or

COLONEL

or

BRIGADIER

3. Which one of the undermentioned officers would you like to be as fullfilment of your career in the Air Force?

An active Flying member

or

An Unit/Base Commander

or

Chief of the Air Force

4. The methods of improving your career are normally documented in a paper called a Career Plan. Have you seen your Career Plan?

Yes

No

If no. Do you think you should see your Career Plan?

Yes

No

5. Do you aim to participate in planning your own career?

Yes

No

If yes. On achieving this aim would you be happier in your work and thus more productive?

Yes

No

If yes. Do you consider that the Air Force is THEN better equipped to achieve its AIMS?

Yes

No

6. A good career plan consists of four mutually dependant elements: a progress guide; a counselling service; a system of appraisals; and a technique for predicting promotion vacancies.

- a. Who, with your participation, should work out the details of such a career plan?

Your commanding officer

or

Personnel Division at  
AFHQ

- b. A system of appraisals 'rates' individuals. Should these rating marks be used to complete a 'list of merit' from which officers could be selected for promotion?

Yes

No

If yes. How can seniority in rank be rewarded?

Promoted if the officer's speciality is the  
criterion?

or

Promote officer six months later"

- c. Do you realize that your career prospects are dependant on the relative proportion of officer strength in the various ranks (e.g. 4% of authorized strength is Colonels; 10% Commandants etc.); the division of ages in the ranks; wastage rates

as the result of deaths, resignations etc; and the expansion (or contraction) of Air Force strengths?

Yes

No

7. A practical career plan contains many elements. Which of the following elements do you rate as : Most Important (M.I.); or Important (I); or Unimportant (U.I.); or Most Unimportant (M.U.); or Undecided (U.)?

- |   | M.I.                     | I.                          | U.I.                        | M.U.                        | U.                          |
|---|--------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|
| a. The <u>Age</u> at which you are promoted                               | <input type="checkbox"/> | or <input type="checkbox"/> | or <input type="checkbox"/> | or <input type="checkbox"/> | or <input type="checkbox"/> |
| b. The number or <u>Years of Service</u> you complete before a promotion? | <input type="checkbox"/> | or <input type="checkbox"/> | or <input type="checkbox"/> | or <input type="checkbox"/> | or <input type="checkbox"/> |
| c. Getting as wide an <u>Experience</u> as possible                       | <input type="checkbox"/> | or <input type="checkbox"/> | or <input type="checkbox"/> | or <input type="checkbox"/> | or <input type="checkbox"/> |
| d. Getting higher <u>Educational Qualifications</u> ?                     | <input type="checkbox"/> | or <input type="checkbox"/> | or <input type="checkbox"/> | or <input type="checkbox"/> | or <input type="checkbox"/> |
| e. Being <u>Assessed Regularly</u> on your work performance?              | <input type="checkbox"/> | or <input type="checkbox"/> | or <input type="checkbox"/> | or <input type="checkbox"/> | or <input type="checkbox"/> |

8. At what age should an active aircrew member retire?

50 years old;  55 years old;  60 years old.



10. Which rank do you associate with each of the previously mentioned phases of development?

- a. Initial Phase: Lieutenant? Yes  No
- b. Intermediate Phase: Captain?
- or
- Major?
- or
- Captain & Major?
- c. Advance phase: Major?
- or
- Commandant?
- or
- Colonel?
- or
- Major, Commandant & Colonel?
- d. Executive or Leadership phase:
- Commandant?
- or
- Colonel?
- or
- Brigadier?
- or
- Commandant, Colonel & Brigadier?

11. Do you consider there should be a maximum period of service in each rank?

Yes

No

If yes. Do you agree that these maximums could be something like the following?

- |    |                  |    |       |         |    |       |     |                          |
|----|------------------|----|-------|---------|----|-------|-----|--------------------------|
| a. | For a General    | 5  | Years | maximum | in | Rank? | Yes | <input type="checkbox"/> |
|    |                  |    |       |         |    |       | No  | <input type="checkbox"/> |
| b. | For L Gen or     |    |       |         |    |       | Yes | <input type="checkbox"/> |
|    | M Gen            | 4  | "     | "       | "  | "     | No  | <input type="checkbox"/> |
| c. | For a Brigadier  | 5  | "     | "       | "  | "     | Yes | <input type="checkbox"/> |
|    |                  |    |       |         |    |       | No  | <input type="checkbox"/> |
| d. | For a Colonel    | 7  | "     | "       | "  | "     | Yes | <input type="checkbox"/> |
|    |                  |    |       |         |    |       | No  | <input type="checkbox"/> |
| e. | For a Commandant | 9  | "     | "       | "  | "     | Yes | <input type="checkbox"/> |
|    |                  |    |       |         |    |       | No  | <input type="checkbox"/> |
| f. | For a Major      | 10 | "     | "       | "  | "     | Yes | <input type="checkbox"/> |
|    |                  |    |       |         |    |       | No  | <input type="checkbox"/> |
| g. | For a Captain    | 9  | "     | "       | "  | "     | Yes | <input type="checkbox"/> |
|    |                  |    |       |         |    |       | No  | <input type="checkbox"/> |
| h. | From C.O to      |    |       |         |    |       |     |                          |
|    | Lieutenant       | 7  | "     | "       | "  | "     | Yes | <input type="checkbox"/> |

If agreed. What do you think should be done with an officer who has reached the maximum period of service in his rank?

Remove him from the Seniority

(Merit) List?

or

Hold - Reconsider case in

6 months?

or

Retire the Officer?

12. Indicate, by answering each question, what postings (assignments) you would like in order to obtain a broad but comprehensive understanding of the Air Force.

- a. As Aircrew on other operational Aircraft? Yes   No
- b. To the Administration branch? Yes   No
- c. To Logistics? Yes   No
- d. To a Technical training Unit? Yes   No
- e. To Air Defence? Yes   No
- f. As an Instructor at the Air Force  
College? Yes   No
- g. As a Flying or Navigation Instructor? Yes   No
- h. As a Staff Officer at a Headquarters? Yes   No

13. State when in your career you would like to start or continue to improve your academic or technical qualifications:

a. A Bachelor's degree or a Diploma?

(i) After 3 years service? Yes

or

(ii) Before 10 years service Yes

b. A Master's degree or higher Diploma?

(i) After 7 years service? Yes

or

(ii) Before 15 years service Yes

c. A Doctorate (e.g. Ph.D.)?

(i) After 10 years service? Yes

(ii) Before 20 years service? Yes

d. How would you like to do these studies?

(i) Full-time at a University or  
College? Yes

or

(ii) Part-time at a University or  
College? Yes

or

(iii) By means of Correspondence  
tuition? Yes

14. Your promotion prospects will be enhanced (in the short term) once you specialize or increase your qualifications. Overspecialization or overqualification thereafter will tend to decrease your career prospects in the longterm.

IS THIS ACCEPTABLE TO YOU?

YES

NO

15. Are you involved in any of the following areas of long range planning :-

a. In flying training? Yes   No

b. In strategic operational planning? Yes   No

c. In the strategic planning of the size and shape of the Air Force? Yes   No

16. Do you help to develop a step-by-step plan of action to implement your Unit's part of the long range operational plan?

Yes   No

17. Does your Unit have a policy manual within which many Air Force and Defence Force policy statements and their supporting procedures and rules can be studied?

YES

NO

If no. Do you agree that such a Manual would resolve a lot of misinterpretations of policy statements?

YES   NO

18. Do you agree that your Work is CRUCIAL to your satisfaction as a human being and to the development of your personality?

YES

NO

If Yes. Does it further mean that your career (lifework) must have dignity and meaning?

YES

NO

19. Do you agree that Career Planning forms an integral part of long range planning?

YES   NO

20. Knowing that the Air Force has an acceptable career plan for you, would this knowledge incline you to stay and make a success of this career?

YES   NO

If Yes. Would this fact develop a greater loyalty in you towards the Air Force?

YES   NO

21. Do you think that the answers you gave in this questionnaire will help you in planning your career?

YES   NO

If yes. Would you like a copy of the summary of the results of this project?

YES   NO

REMARKS AND SUGGESTIONS

STATISTICAL TESTS

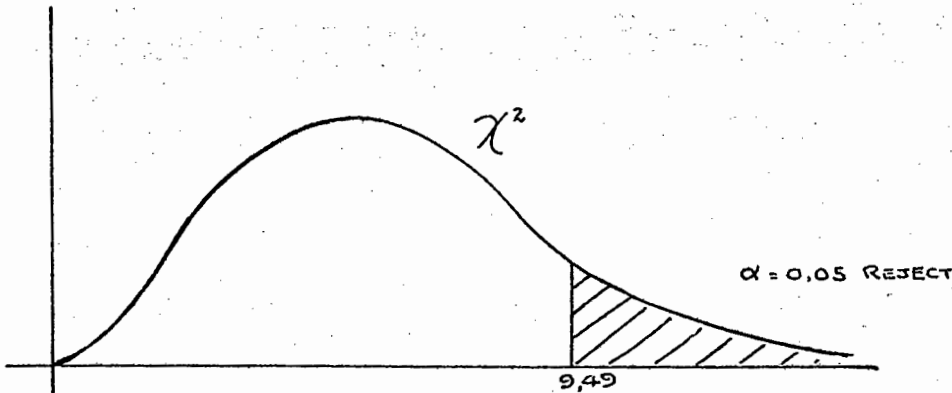
CALCULATION 1.

Aim: To establish whether Age or Years of service on promotion is more important.

- a. The Null Hypothesis:  $H_0$  There is NO difference of importance between Age and Years of service on promotion.

$H_1$  There is a difference.

- b. Area of Receptance at the 5% level



Degrees of freedom:  $(r - 1)(c - 1) = (5 - 1)(2 - 1) = 4$

$\{ \chi^2 / \chi^2 \leq 9,49 \}$   $\chi^2$  table  $(,0,05)(4) = 9,49$

- c. The Evaluation

Calculating the Sample Statistic  $\chi^2$

	<u>OBSERVED</u>			<u>EXPECTED</u>		
	Age $f_o$	Service $f_o$		Age $f_e$	Service $f_e$	
Most Important	4	12	16	8	8	16
Important	44	43	87	43,5	43,5	87
Unimportant	31	21	52	26	26	52
Most Unimportant	3	4	7	3,5	3,5	7
Undecided	1	3	4	2	2	4
	83	83	166	83	83	166

Calculating the expected frequencies (f)

$$\text{Age: Most Important} : \frac{16,83}{166} = 8 \quad \text{Service: } \frac{16,83}{166} = 8$$

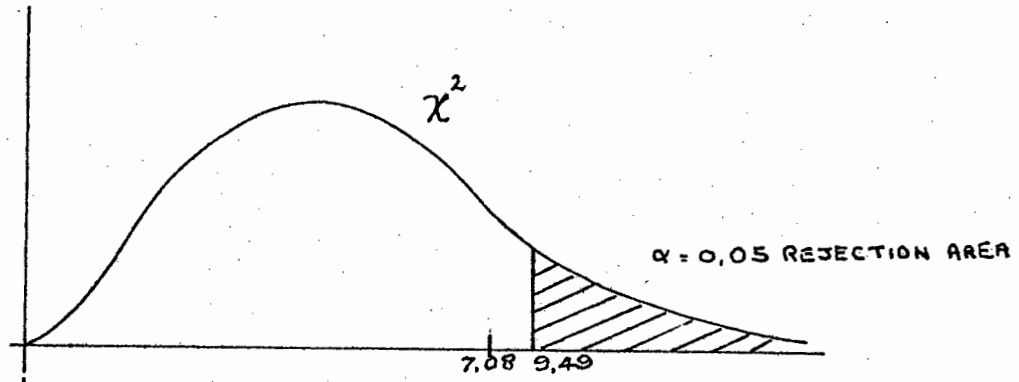
$$\text{Important} : \frac{87,83}{166} = 43,5 \quad \frac{87,83}{166} = 43,5$$

$$\text{Unimportant} : \frac{52,83}{166} = 26 \quad \frac{52,83}{166} = 26$$

$$\text{Most Unimportant: } \frac{7,83}{166} = 3,5 \quad \frac{7,83}{166} = 3,5$$

$$\text{Undecided} : \frac{4,83}{166} = 2 \quad \frac{4,82}{166} = 2$$

$$\begin{aligned} \chi^2 &= \sum \frac{(f_o - f_e)^2}{f_e} = \frac{(4-8)^2}{8} + \frac{(44-43,5)^2}{43,5} + \frac{(31-26)^2}{26} + \frac{(3-3,5)^2}{3,5} + \frac{(1-2)^2}{2} \\ &+ \frac{(12-8)^2}{8} + \frac{(43-43,5)^2}{43,5} + \frac{(21-26)^2}{26} + \frac{(4-3,5)^2}{3,5} + \frac{(3-2)^2}{2} \\ &= 2+0,01+0,96+0,07+0,5+2+0,01+0,96+0,07+0,5 \\ &= 7,08 \end{aligned}$$

d. Comparison and Conclusion.

$\chi^2$  data lies in the area of acceptance. We, therefore accept the Null Hypothesis ( $H_0$ ) and conclude at the 95% level of confidence that no difference in importance exists between Age and Years of service on promotion.

CALCULATION 2.

Aim : To establish whether Years of service on promotion or getting as wide an Experience as possible is more important.

- a. The Null Hypothesis :  $H_0$  : There is no difference in importance between Years of Service on promotion and getting as wide an Experience as possible.

$H_1$  : There is a difference.

- b. Area of acceptance at the 5% level.

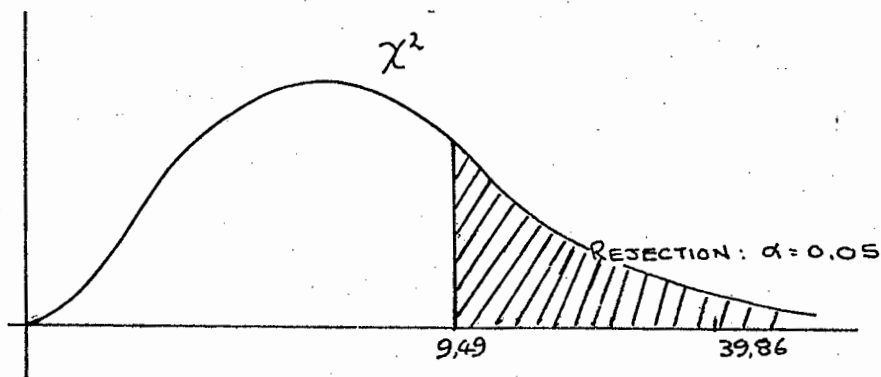
4 degrees of freedom.

$$A = \{\chi^2 / \chi^2 \leq 9,49\} \quad \chi^2(0,05)(4) = 9,49$$

c. The evaluation.

	<u>OBSERVED</u>			<u>EXPECTED</u>		
	Age $f_o$	Service $f_o$		Age $f_e$	Service $f_e$	
Most Important	12	47	59	29,5	29,5	59
Important	43	31	74	37	37	74
Unimportant	21	3	24	12	12	24
Most Unimportant	4	2	6	3	3	6
Undecided	3	0	3	1,5	1,5	3
	83	83	166	83	83	166

$$\chi^2 = \sum \frac{(f_o - f_e)^2}{f_e} = 10,38 + 0,97 + 6,75 + 0,33 + 1,5 + 10,38 + 0,97 + 6,75 + 0,33 + 1,5 = 39,86$$

d. Comparison and Conclusion

$\chi^2$  data (39,86) lies in area of rejection. We reject the Null Hypothesis ( $H_0$ ) and conclude, that at the 95% level of confidence, there is a significant difference of importance

between Years of service and getting as wide an Experience as possible.

CALCULATION 3.

Aim: To establish whether Age on promotion or getting higher Educational qualifications is more important.

- a. The Null Hypothesis.  $H_0$  : There is NO difference of importance between Age on promotion and getting higher Educational qualifications.
- $H_1$  : There is a difference.

- b. Areas of acceptance at the 5% level.

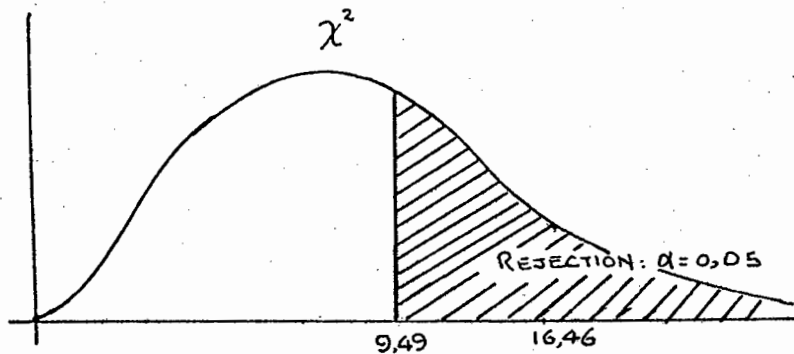
4 degrees of freedom.

$$A = \{ \chi^2 / \chi^2 \leq 9,49 \} \quad \chi^2(0,05)(4) = 9,49$$

- c. The evaluation

	<u>OBSERVED</u>		<u>EXPECTED</u>			
	Age $f_o$	$f_o$	Age $f_e$	$f_e$	$f_e$	$f_e$
Most Important	4	16	20	10	10	20
Important	44	46	90	45	45	90
Unimportant	31	15	46	23	23	46
Most Unimportant	3	1	4	2	2	4
Undecided	1	5	6	3	3	6
	83	83	166	83	83	166

$$\chi^2 = \sum \frac{(f_o - f_e)^2}{f_e} = 3,6 + 0,02 + 2,78 + 0,5 + 1,33 + 3,6 + 0,02 + 2,78 + 0,5 + 1,33 = 16,46$$

d. Comparison and Conclusion.

$\chi^2$  data (16,46) lies in area of rejection. We reject the Null Hypothesis ( $H_0$ ) and conclude that, at the 95% level of confidence, there is a significant difference in importance between Age on promotion and getting higher Educational qualifications.

CALCULATION 4.

Aim: To establish whether getting as wide an Experience as possible is as important as being Assessed regularly.

- a. The Null Hypothesis.  $H_0$  : There is NO difference between getting as wide an Experience as possible and being Assessed regularly.

$H_1$  : There is a difference.

- b. Area of acceptance at the 5% level

4 degrees of freedom.

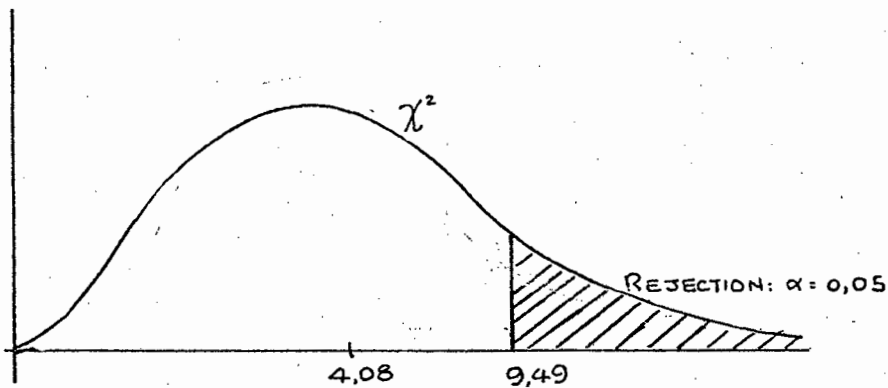
$$A = \{\chi^2/\chi^2 \leq 9,49\} \quad \chi^2(0,05)(4) = 9,49$$

c. The evaluation.

	<u>OBSERVED</u>			<u>EXPECTED</u>		
	Experience $f_o$	Assessed $f_o$		Experience $f_e$	Assessed $f_e$	
Most Important	47	45	92	46	46	92
Important	31	36	67	33,5	33,5	67
Unimportant	3	1	4	2	2	4
Most Unimportant	2	0	2	1	1	2
Undecided	0	1	1	0,5	0,5	1
	83	83	166	83	83	166

$$\chi^2 = \sum \frac{(f_o - f_e)^2}{f_e} = 2 \{0,02 + 0,19 + 0,33 + 1 + 0,5\} = 2.2,04$$

$$= 4,08$$

d. Comparison and Conclusion.

$\chi^2$  data (4,08) lies in the area of acceptance. We, therefore, accept the Null Hypothesis ( $H_0$ ) and conclude at the 95% level of confidence that there is no difference in importance between getting as wide an Experience as possible and being Assessed regularly.

CALCULATION 5.

Aim: To establish whether the obtaining of higher Educational qualifications or getting a wider Experience is more important.

- a. The Null Hypothesis.  $H_0$  : There is NO difference of importance between obtaining higher educational qualifications and in getting wider experience.

$H_1$  : There is a difference.

- b. Area of acceptance at the 5% level

4 degrees of freedom.

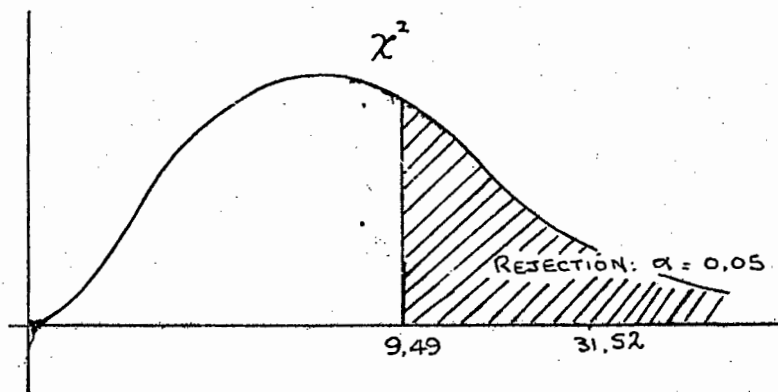
$$A = \{ \chi^2 / \chi^2 \leq 9,49 \} \quad \chi^2 (0,05)(4) = 9,49$$

- c. The evaluation

	<u>OBSERVED</u>			<u>EXPECTED</u>		
	Education $f_o$	Experience $f_o$		Education $f_e$	Experience $f_e$	
Most important	16	47	63	31,5	31,5	63
Important	46	31	77	38,5	38,5	77
Unimportant	15	3	18	9	9	18
Most Unimportant	1	2	3	1,5	1,5	3
Undecided	5	0	5	2,5	2,5	5
	83	83	166	83	83	166

$$\chi^2 = \sum \frac{(f_o - f_e)^2}{f_e} = 2 \{ 7,63 + 1,46 + 4 + 0,17 + 2,5 \} = 2.15,76$$

$$= 31,52$$

d. Comparison and Conclusion.

$\chi^2$  data (31,52) lies in the area of rejection. We reject the Null Hypothesis ( $H_0$ ) and conclude that, at the 95% level of confidence, there is a significant difference in importance between obtaining higher Educational qualification and getting wider Experience.

A VALIDATION CAREER PLANNING SURVEY  
OF AIRCREW ON  
AIR FORCE BASE YSTERPLAAT

C O N T E N T S

## 1. INTRODUCTION:

1.1 Terms of Reference

1.2 Methodology

## 2. SUMMARY OF RESULTS AND CONCLUSIONS

## 3. ANALYSIS OF RESULTS

## 4. CONCLUSIONS

ANNEXURE 1: THE VALIDATION  
QUESTIONNAIRE

ANNEXURE 2: STATISTICAL TESTS

## I. INTRODUCTION

### 1.1. Terms of Reference

The aim of this validation study was threefold:-

- 1.1.1 To validate the findings of the first study.
- 1.1.2 To determine if there was a different definition of a successful career from the one given previously, and if so what the implications were,
- 1.1.3 To determine the order of priority of ten job satisfaction variables which were particularly relevant to aircrew careers.

### 1.2. Methodology

- 1.2.1 Population. For the purposes of this validation study, the population is represented by all the officer aircrew at present on Air Force Base Ysterplaat. The population size of 111 aircrew members includes all ranks from 2/Lieutenant to Colonel and all ages from 19 years to the retirement age of 60 years.
- 1.2.2 The Sample. All aircrew at A.F.B. Ysterplaat were numbered. A random selection of 25 numbers was drawn and 25 respondents identified: this was the sample.
- 1.2.3 Sampling Technique. The Officer-in-charge of flying was briefed on the contents of the questionnaire. Twenty five questionnaires were given for

handing out to the 25 respondents. Twenty-three completed questionnaires were collected two weeks later : 2 respondents had during this time left Ysterplaat and did not return their questionnaires. This was, never-the-less a 92% response.

1.2.4 Method of Analysis. The questionnaire - found in Annexure 1-was designed to test the aims given in the first paragraph. The questionnaire is separately analysed in Section 3. The form followed in the analysis is as follows:-

- a. A detailed analysis is made of each question.
- b. The results of the analysis are compared with the previous study in order to determine whether they confirm or reject the previous findings.
- c. Statistical testing was considered necessary in order to determine the validity of a relationship between two variables - in the event the previous finding was rejected (see Question 7).

The conclusions, in the form of confirmation or rejection, reached in the analysis are given in Section 2 - Summary of Results and Conclusions.

## 2. SUMMARY OF RESULTS AND CONCLUSIONS

### 2.1. Sample Characteristics

2.1.1 Sample Size. The sample size of 23 respondents was randomly selected from the 111 Aircrew members at Air Force Station Ysterplaat.

a. 22 were pilots; 1 was a navigator.

b. (i) Average age:  $\bar{X} = 29,65$  years;  
Standard Deviation:  $\sigma = 7,42$  years;  
Co-efficient of Variation:  $CV = 25\%$ .

(ii) First survey: Average age:  $\bar{X} = 28,11$  years;  
Standard Deviation:  $\sigma = 7,5$  years;  
Co-efficient of  
Variation:  $CV = 26,7\%$ .

(iii) In order to determine whether these two average ages differ significantly or not we applied a one way Analysis of Variation (ANOVA MODEL I) (1) which is widely utilized in behavioural research and checked this result with an application of a t-test. The method of analysis followed was one described by YA-LUN CHOU (2). See Annexure 2 for detailed workings.

The results were:-

(a) ANOVA MODEL I:

$$F_{1,104} = \frac{MSC}{MSE} = \frac{42,92}{2572,51} = 0,017$$

&  $P(F_{1,104} < 3,98) = 0,05$  i.e. at the 95% level of confidence there is no significant difference between the ages.

(b) t-test

$$t_{104} = \bar{A}_1 - \bar{A}_2 / \hat{\sigma} = \frac{-1,2}{1,76} = -0,68$$

At the 0,05 level  $t = -1,99 > -0,68$

Thus at the 95% level of confidence the t-test confirms that there is no significant difference in ages. It is thus concluded that the second survey is a representative sample of the first.

- (c) 87% respondents were matriculated and 13% had bachelor's degrees.
- (d) Average of 8,8 years flying experience; Standard deviation 7,2 years.
- (e) Average of 4,9 years operational experience; standard deviation 5,4 years.
- (f) Six squadrons, a Flying Conversion Unit and the Air Navigation School were involved.

2.2. Summary of Results. In each case the abbreviated questionnaire - question will be stated first, followed by a summary of the results obtained.

2.2.1 Question 1: "What is your definition of a successful career?"

Consensus of 23 replies: "A successful career is one wherein you attain your personal aims and goals in a manner which brings you happiness and satisfaction in your work."

2.2.2 Question 2: "Would you as an active aircrew member, consider the rank of Colonel and the post of Unit/Base commander as a fitting climax to:-

- a. A successful career? (39% - yes)
- b. A fair career? (56% - yes)
- c. An unsuccessful career?" (4% - yes)

2.2.3 Question 3: "If you could retire at 50 years of age instead of 60 years, would you consider starting a second or non-Air Force career?" (61% - yes; 39% - No)

"If yes: Do you find the idea:

- a. An exciting opportunity to look forward to? (57% - yes)
- b. A prospect to be accepted with equanimity? (36% - yes)
- c. A necessary evil not to be contemplated before it's time?" (7% - yes)

2.2.4 Question 4: "Supposing your promotion were dependent on your position on a "merit list", which was based on regular assessments, would you consider this:-

a. A fairer method than the old seniority one?

or b. No better than the old method?"

83% - yes to a.; 13% - yes to b.

2.2.5 Question 5: "...promotion prospects are primarily dependent on the existence of vacancies in rank. Vacancies can be created by laying down maximum periods and ages in ranks. Which course of action would you support?":

78% chose maximum periods in ranks;

and 22% chose maximum ages in ranks.

2.2.6 Question 6: "Listed below are 5 elements of a career plan. Please compare each of the elements with one of the others in such a way that all the elements are compared with each other." The results were as follows:-

Regular Assessment:

100% considered it to be more important than Age

87% considered it to be more important than Years of Service

73% considered it to be more important than Wider Experience

70% considered it to be more important than Higher Education.

Wider Experience:

94% considered it to be more important than Age

68% considered it to be more important than Years of Service.

35% considered it to be more important than Higher Education.

Higher Education:

95% considered it to be more important than Age

58% considered it to be more important than Years of Service.

Years of Service:

74% considered it to be more important than Age.

2.2.7 Question 7: "How important to you are the following job satisfaction variables in carrying out your job?"

The results are presented in rank order - table below:

Variable	Order
Worth while work	1
Adequate Pay and Allowances	2
Achievement	3
Advancement and Self Improvement	4
Challenging Job	5
Allowed Responsibility	6
Able to contribute	7
Given Recognition	8
Having Authority and Independence	9
People in Work Environment	10

Table 2.1 A Rank Order Comparison of 10 Job Satisfaction Variables.

2.2.8 Question 8: "Rate your Air Force Career in terms of Satisfaction/Dissatisfaction derived from it....."

Completely Satisfied	1	} 19(83%)
Very Satisfied	7	
Satisfied	11	
Dissatisfied	4	} 0
Fairly Dissatisfied		
Very Dissatisfied		
Completely Dissatisfied		

### 2.3 Summary of Conclusions.

This is a summary of conclusions reached on analysing the results of this Validation Survey.

#### 2.3.1 The Career

The respondents' definition of a successful career indicated the need of fulfilling their own personal aspirations in a satisfactory manner. It underscores the fact that aircrew should be consulted, on what kind of career they wish to follow, by Air Force personnel managers when career plans are drawn up. There is a great requirement for matching the needs of the individual with those of the Air Force. Moreover the responsible counselling of aircrew in this matter of choosing an acceptable career can best be given by an officer, who not only knows Air Force requirements, but who is also trained in the role of counselling.

The individual, however, also needs to contribute to the effective management of his career by becoming "pro-active and an effective diagnostician." That is, he should "be able to identify the problem, operate with a maximum of self insight,

build up a repertory of possible responses and know how to select the appropriate response". SCHEIN (3).

### 2.3.2 Implications of an early retirement.

Retirement of active aircrew at age 60 years is considered too old. The rank of Colonel in command of an Air Base is acceptable at a younger retirement age. A second or non Air Force career appears feasible providing aircrew are prepared for this eventuality before leaving the Service.

### 2.3.3 Promotion Prospects.

The selection of maximum periods in ranks, as a method of increasing promotion prospects, were confirmed. Advancement should be the result of regular assessments determining aircrew positions on a "merit promotion list" from which promotees are selected.

### 2.3.4 Career Planning Elements.

The same rank order as in the first survey was selected:

1. Being assessed regularly.
2. Getting as wide an experience as possible.
3. Obtaining higher educational qualifications.
4. Years of service at which you are promoted.
5. Age at which you are promoted.

### 2.3.5. Job Satisfaction.

The ten (10) job satisfaction variables were rated as follows in order of importance.

1. Worthwhile work!
2. Pay and Allowances; Achievement.

3. Challenging Job; Advancement and Self Improvement;  
Allowed Responsibility.
4. Able to Contribute.
5. Given Recognition.
6. Having Authority and Independence.
7. People in work environment.

These variables should be considered when formal career plans for aircrew are designed and developed. Aircrew stated they were satisfied with their career progress so far. They would be even more satisfied if the proposals of this study were implemented! (Sic)

#### 2.4. References.

1. MEYERS, Lawrence, S. and GROSSEN, Neal, E., Behavioral Research, W. H. Freeman and Company, San Francisco, 1974, pp 237-253.
2. YA-LUN CHOU, Statistical Analysis, Holt, Rinehart and Winston, New York, 1969/1975 pp 343 - 355.
3. SCHEIN, Edgar, H., Career Dynamics: Matching Individual and Organizational Needs, Addison-Wesley Publishing Company, Inc., Reading, Massachusetts, 1978, pp 252 - 253.

### 3. ANALYSIS OF RESULTS

#### 3. THE ANALYSIS.

This section evaluates the questions posed and the additional information collected during the validation study.

##### 3.1. The Population.

The population of officer aircrew (pilots and navigators) at Air Force Base Ysterplaat, in 1979, was as follows:-

a. Element: Officer Aircrew: 111

Colonels	:	1
Commandants	:	8
Majors	:	19
Captains	:	33
Lieutenants	:	26
2/Lieutenants	:	24

b. Sampling Unit: Officer Aircrew: 23 (randomly selected)

Commandants	:	2
Majors	:	4
Captains	:	5
Lieutenants	:	6
2/Lieutenants	:	6

c. Extent. The whole population of aircrew at Ysterplaat from 2/Lieut. to Colonel. The sampling Unit was also from 2/Lieut but to Commandant.

d. Time. All ages.

e. Relative Frequency Distributions.

Relative frequency =  $F_i/n$  where:

F = absolute frequency

n = total observation

i = 1, 2, 3.....n.

The following tables are given to illustrate the proportions of the various ranks in

total and sample populations.

Population: A.F.B. Ysterplaat. Sampling Unit:- A.F.B. Ysterplaat

Rank	Frequency $F_i$	Relative Frequency $F_i/n$	%	Frequency $F_i$	Relative Frequency $F_i/n$	%
Colonel	1	0,009	1%	-	-	-
Commandants	8	0,072	7%	2	0,087	9%
Majors	19	0,171	17%	4	0,174	17%
Captains	33	0,297	30%	5	0,217	22%
Lieutenants	26	0,234	23%	6	0,261	26%
2/Lieutenants	24	0,217	22%	6	0,261	26%
	n=111	1,000	100%	n=23	1,000	100%

Table 3.1: Relative Frequency Distribution of ranks in  
A.F.B. Ysterplaat.

It can be seen that the proportion of officers in the various ranks at A.F.B. Ysterplaat and the random sample taken at A.F.B. Ysterplaat are acceptably close to each other.

### 3.2. The Sample.

The sample size was 23 respondents, randomly selected from the list of names of aircrew at A.F.B. Ysterplaat.

#### 3.2.1 Characteristics.

3.2.1.1 Composition. There were 22 pilots and 1 navigator.

3.2.1.2 Age. The ages varied 21 years to 44.

Age (a)	No of Respondents (b)	Interval (a) x (b)	Cumulative (c)
21	2	42	42
22	2	44	86
23	1	23	109
24	1	24	133
25	4	100	233
26	1	26	259
27	1	27	286
28	1	28	314
31	2	62	376
34	2	68	444
35	2	70	514
36	1	36	550
43	1	43	593
44	1	44	637
45	1	45	682
n = 23		682	

Mode  
 Median  
 Mean

Middle value =  $\frac{682}{2} = 341$

Table 3.2: The Age Characteristics of Respondents

$$\text{Mean} = \frac{682}{23} = \underline{29,65} \text{ years} = \bar{X}$$

$$\text{Median} = 28 + \frac{341-314}{62} \cdot 3 = 28 + \frac{27}{62} \cdot 3 = \underline{29,31} \text{ years}$$

$$\begin{aligned} \text{Mode} &= \text{Mean} - 3(\text{Mean}-\text{Median}) = 29,65 - 3(29,65-29,31) \\ &= \underline{28,63} \text{ years} \end{aligned}$$

$$\text{Standard Diviation: } \sigma = \sqrt{\frac{1}{n-1} \sum_{i=1}^n (x_i - \bar{X})^2} = 7,42 \text{ years}$$

$$\text{Coefficient of Variation: } CV = \frac{\sigma}{\bar{X}} = \frac{7,42}{29,65} = 0,25 \text{ or } 25\%$$

i.e. the Std. Dev. is 25% of its Mean.

### 3.2.1.3 Educational Qualification:

20 were matriculated and 3 had Bachelor's degrees.

### 3.2.1.4 Flying Experience:

Experience in Years (a)	No. Respondents (b)	Total (a)x(b)	Cumulative (c)
1 year	3	3	3
3 years	3	9	12
4 years	1	4	16
5 years	4	20	36
6 years	1	6	42
8 years	1	8	50
9 years	2	18	68
10 years	1	10	78
12 years	1	12	90
13 years	2	26	116
16 years	1	16	132
22 years	1	22	154
24 years	1	24	178
25 years	1	25	203
	23	203	

Table 3.3. Flying Experience of respondents.

Mean:  $\bar{X} = 8,8$  years.

Standard Deviation:  $\sigma = 7,2$  years.

Coefficient of Variation:  $\frac{\sigma}{\bar{X}} = 0,817$  i.e.  $\sigma$  is 81,7%

### 3.2.1.5 Operational Experience.

Experience in Years (a)	No. Respondents (b)	Total (a)x(b)	Cumulative (c)
1 year	9	9	9
2 years	3	6	15
3 years	2	6	21
4 years	1	4	25
5 years	2	10	35
7 years	1	7	42
11 years	1	11	53
12 years	2	24	77
14 years	1	14	91
21 years	1	21	112
	23	112	

Table 3.4 Operational Experience of respondents.

Mean:  $\bar{X} = 4,87$  years.

Standard Deviation:  $\sigma = 5,45$  years

Coefficient of Variation:  $\frac{\sigma}{\bar{X}} = 1,12$  i.e.  $\sigma$  is  
112% of  $\bar{X}$  !!

### 3.2.1.6 Units involved

- a. 7 Squadron                      6 pilots
- b. 16 Squadron                    5 pilots

c.	22 Squadron	2 pilots
d.	25 Squadron	2 pilots
e.	27 Squadron	5 pilots
f.	35 Squadron	1 pilot
g.	88 A.D.F.S.	1 pilot
h.	Air Nav. School	1 navigator
	<b>Total</b>	<b>23 Aircrew</b>

### 3.2.1.7 Appointments.

a.	Officers Commanding	: 2
b.	Chief Instructor	: 1
c.	Flight Commander	: 1
d.	Adjutants	: 4
e.	Training Officers	: 2
f.	Pilots	: 13
	<b>Total</b>	<b>23</b>

## 3.3 The Questionnaire.

### 3.3.1 Question 1.

It is important to ascertain which concept of a successful career is most prevalent in order to elaborate under which conditions such a definition would be organisationally appropriate.

Furthermore, knowing this definition will help understanding of the various intentions and underlying motives encountered in career behaviour. So the question posed was: "What is your definition of a Successful Career?"

A synthesis of the 23 answers given led to the following:-  
 "A successful career is one wherein you attain your personal aims and goals in a manner which brings you happiness and satisfaction in your work."

The definition should make it clear to the Air Force that Aircrew are feeling the need of personally managing their careers. It does imply, however, that the individual aircrew member should "become proactive and an effective diagnostician - able to identify the problem, operate with a maximum of self insight, build up a repertory of possible responses, and know how to select the appropriate response" SCHEIN (2). The requirement of matching the needs of the aircrew with those of the Air Force is underlined once more. Aircrew should seek responsible career counselling from officers who not only know the Air Force requirements but who are also trained in the role of counselling.

### 3.3.2 Question 2.

The next question asked was to elicit the findings of the previous survey: "Would you as an active aircrew member, consider the rank of Colonel and the post of Unit/Base commander as a fitting climax to: a successful, fair or unsuccessful career?"

39% said this was a successful career,

56% said this was a fair career, and

4% said this was an unsuccessful career.

The majority said this kind of career was fair which partially confirmed the first survey's finding. The reason for

this was probably due to the respondents using their definitions of a successful career as a basis for their decision. In the first survey a successful career was defined for them and then the questions posed. In this questionnaire, the respondents first stated their definition of a successful career before answering the question. From the respondents' definition it is clear that their personal aspirations and needs are foremost whilst previously they were probably subjected to the organisational views on what constituted a successful rank and position in the Air Force. How much more senior a rank than Colonel and higher position than a Unit or Air Base commander is expected for a successful career may require further investigation.

### 3.3.3 Question 3.

Previously the retirement age of 50 years for active aircrew members was positively supported. The implications of such early retirement could, however, have serious consequences on an aircrew's lifestyle if he was not prepared for such an eventuality. So the question posed was:

"If you could retire at 50 years of age instead of 60 years of age, would you consider starting a second or Non-Air Force career?"

61% said yes; 39% said no.

Those who answered "yes" were further asked whether they would find the idea of the new career:

a. "An exciting opportunity to look forward to?" - 57% - yes.

- or b. "A prospect to be accepted with equanimity?" - 36% - yes.  
 or c. "A necessary evil not to be contemplated before its  
 time?" - 7% - yes.

Early retirement is still popular and aircrew look forward to starting another career. This intention implies an Air Force responsibility to make such a transition a happy and profitable one for both parties. Such a responsibility has already been admitted by the authorities in the case of Medium Service aircrew who retire after 20 years service: "..... on retirement he will be too old to begin a new career elsewhere..... places the State under a still greater moral obligation to justifiably compensate him for the possible career and salary-expectations which he must give up in order to devote the best part of his productive work-life to a dangerous and short career in the interest of State Security" (3). A similar attitude should be adopted if early retirement for all active aircrew is accepted. It implies, furthermore, that aircrew members should be prepared for their second careers (if this is possible) and be compensated for loss in earnings by increasing their pay and allowances (thus also increasing their retirement benefits!). SCHEIN (1978) says that "it is obvious that the incentives and constraints which can be created by government through support of research, scholarship programs, dissemination of information about occupations, and so on, can influence to a considerable degree entry into a (second) career". (4).

#### 3.3.4 Question 4.

Because "merit promotion" based on regular appraisals was

highly supported in the first survey, the question asked now was to confirm the acceptability of such a decision by further asking: "..... would you consider this:-

- a. "A fairer method than the old seniority one?"
- or b. "No better than the old method?"

83% said it was a fairer method and 13% said it was no better than the old one.

This validates the previous finding where 87,9% aircrew agreed that such merit rating marks should be used to complete a list of merit for promotion.

### 3.3.5 Question 5.

In the Air Force promotion prospects are primarily dependent on vacancies in ranks. Vacancies are dependent on establishment strengths. If maximum period of occupation of a rank or age in a rank is laid down - incumbents will be required to retire sooner - it will create vacancies. Respondents were asked:

"Which course of action would you support:-

- a. Maximum periods in ranks?,
- or b. Maximum ages in ranks?"

78% chose maximum periods in ranks and 22% maximum age in ranks.

This not only confirms the previous survey's findings but also those of the study made by Major General C. J. Joubert (Confidential Report: No. HSP/C/502/2 over HSP/110/3/2 of 2 Sep 75).

3.3.6 Question 6.

The relative importance of five career planning elements: age at which promoted; years of service completed before promotion; wider experience; higher education; and regular assessment had to be determined. This was done by comparing each element with one of the others so that all the elements were compared with each other. The results were as follows:

AGE

- a. 100% said that Regular Assessment is more important than Age at promotion.
- b. 95% said that Higher Education is more important than Age at promotion.
- c. 94% said that Wider Experience is more important than Age at promotion.
- d. 74% said that Years of Service is more important than Age at promotion.

YEARS OF SERVICE

- a. 87% said that Regular Assessment is more important than Years of Service.
- b. 68% said that Wider Experience is more important than Years of Service.
- c. 58% said that Higher Education is more important than Years of Service.

WIDER EXPERIENCE

- a. 73% said that Regular Assessment is more important than Wider Experience.
- b. 35% said that Higher Education is more important than

Wider Experience.

### HIGHER EDUCATION

70% said that Regular Assessment is more important than Higher Education.

When these responses were summed up we found that the five elements were rated in an order of merit as follows:-

- |    |   |   |         |
|----|---|---|---------|
| 1. | Being Assessed Regularly                    | - | 330 pts |
| 2. | Getting Wider Experience                    | - | 197 pts |
| 3. | Obtaining Higher Educational qualifications | - | 153 pts |
| 4. | Years of Service at which promoted          | - | 74 pts  |
| 5. | Age at which promoted                       | - | 0       |

This fully validated the findings of the first survey.

### 3.3.7 Question 7.

Respondents were asked to rate the undermentioned ten (10) job satisfaction variables which are particularly relevant to Air Force aircrew members. (The table below gives a summary of weighted responses in order of merit using the Likert-scale).

VARIABLES WEIGHTS	MOST IMPORTANT 5	FAIRLY IMPORTANT 4	AVERAGE IMPORTANT 3	UNIMPORTANT 2	MOST UNIMPORTANT 1	WEIGHTED TOTALS
Worthwhile Work	20 x 5 = 100	3 x 4 = 12	0	0	0	112
Adequate Pay and Allowances	18 x 5 = 90	4 x 4 = 16	1 x 3 = 3	0	0	109
Achievement	16 x 5 = 80	7 x 4 = 28	0	0	0	108
Advancement and Self Improvement	14 x 5 = 70	8 x 4 = 32	1 x 3 = 3	0	0	105
Challenging Job	13 x 5 = 65	9 x 4 = 36	1 x 3 = 3	0	0	104
Allowed Responsibility	13 x 5 = 65	9 x 4 = 36	1 x 3 = 3	0	0	104
Able to Contribute	12 x 5 = 60	9 x 4 = 36	2 x 3 = 6	0	0	102
Given Recognition	10 x 5 = 50	6 x 4 = 24	7 x 3 = 21	0	0	95
Having Autho- rity and Independence	7 x 5 = 35	9 x 4 = 36	5 x 3 = 15	1 x 2 = 2	1 x 1 = 1	89
People in work Environment	4 x 5 = 20	14 x 4 = 56	2 x 3 = 6	3 x 2 = 6	0	88

Table 4.5. A Rank Order Comparison of 10 Job Satisfaction Variables.

The order of importance of these variables appears significant when they are related to the respondent's definition of a successful career, then it is clear that those variables that contribute materially towards the attainment of personal aims and goals do in fact rate higher than others which do not do so. Doing "worthwhile work" by aircrew is understandable - the attraction, adventure and excitement of flying remains their motivational force throughout their careers. However, "achievement"

is normally closely related to this and the fact that "adequate pay and allowances" are considered more important necessitated a further test of the validity of such a placing:-

AIM.

To establish whether "Adequate Pay and Allowances" or "Achievement" is more important.

a. The Null Hypothesis:  $H_0$  There is No difference of importance between these two variables

$H_1$  There is a difference.

b. Using the  $\chi^2$  statistic at the 5% level we found the area of rejection of our hypothesis:-

Degrees of freedom  $(r-1).(c-1) = (5-1).(2-1) = 4$

i.e.  $\{\chi^2/\chi^2 \leq 9,49\}$   $\chi^2$  table  $(0,05)(4) = \underline{9,49}$ .

c. The Evaluation.

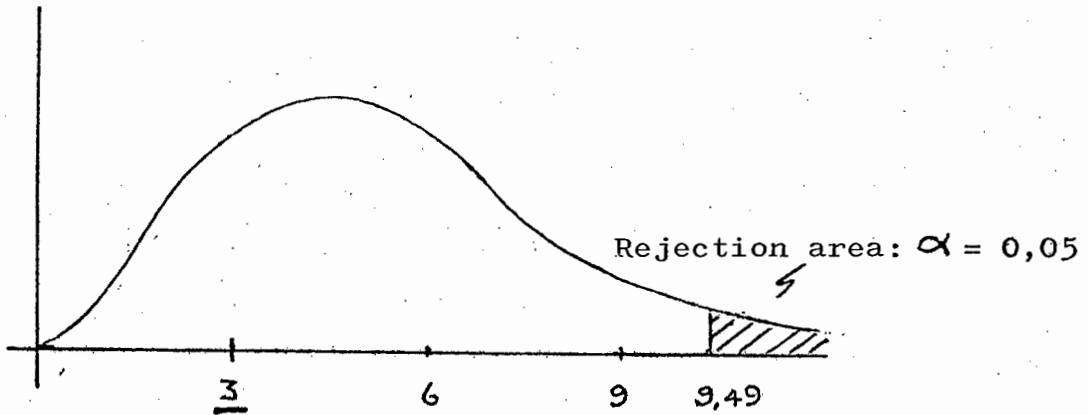
Calculating the Expected frequencies ( $f_e$ )

	OBSERVED : $f_o$		
	Pay & Allces	Achievement	
Most Important	18	16	34
Fairly Important	4	7	11
Average Important	1	0	1
Unimportant	0	0	0
Most Unimportant	0	0	0
	23	23	46

	<u>Pay &amp; Allces</u>	<u>Achievement</u>
Most Important:	$\frac{34.23}{46} = 17$	$\frac{34.23}{46} = 17$
Fairly Important:	$\frac{11.23}{46} = 5,5$	$\frac{11.23}{46} = 5,5$
Average Important:	$\frac{1.23}{46} = 0,5$	$\frac{1.23}{46} = 0,5$

	EXPECTED Pay & Allces	$f_e$ Achievement	
Most Important	17	17	34
Fairly Important	5,5	5,5	11
Average Important	0,5	0,5	1
Unimportant	0	0	0
Most Unimportant	0	0	0
	23	23	46

$$\begin{aligned}
 \chi^2 &= \sum_{i=1}^{10} \frac{(f_o - f_e)^2}{f_e} = \frac{(18 - 17)^2}{17} + \frac{(4 - 5,5)^2}{5,5} + \frac{(1 - 0,5)^2}{0,5} + 0 + 0 \\
 &+ \frac{(16 - 17)^2}{17} + \frac{(7 - 5,5)^2}{5,5} + \frac{(0 - 0,5)^2}{0,5} + 0 + 0. \\
 &= 0,59 + 0,41 + 0,5 + 0,59 + 0,41 + 0,5 \\
 &= 3.
 \end{aligned}$$

d. Comparison and Conclusion.

$\chi^2$ -data lay in the area of acceptance. We, therefore, accepted the Null Hypothesis ( $H_0$ ) and concluded that, at the 95% level of confidence, no difference in importance existed between the variables "Pay and Allowance" and "Achievement". Thus these two variables were considered equally important.

e. General Conclusion.

We conclude that the Air Force should give consideration to the undermentioned job satisfaction variables when Career Plans are being drawn up for Aircrew.

<u>Priority</u>	<u>Job Satisfaction Variable</u>
1	Ensure that the work given is worthwhile doing.
2	Ensure that Pay and Allowances are adequate and acknowledge achievement by aircrew.
3	Ensure that work offers a challenge; that opportunities exist for advancement and self improvement; and that aircrew are allowed responsibilities for their actions.
4.	Able to contribute

- 5 Give recognition for good work done.
- 6 Ensure that there is adequate authority and independence delegated to aircrew over people in the work environment.
- 7 The choice that "people in the work environment" was less important than the other variables, once again underscored the individual effort involved in aircrew jobs: pilots and navigators are almost entirely dependent on their own skills and expertise in executing their flying tasks!

### 3.3.8 Question 8

As a natural follow-on from the last question the respondents were asked to rate their Air Force careers in terms of satisfaction/dissatisfaction derived from them by choosing one of the terms below, which most aptly described their feeling. They replied as follows:-

a. Completely Satisfied	: 1	] 19
b. Very Satisfied	: 7	
c. Satisfied	: 11	
d. Dissatisfied	: 4	
e. Fairly, Very and Completely Dissatisfied	: 0	

We concluded that 83% of the respondents had satisfactory (or better) careers. This also confirmed the first survey's findings that aircrew's career progress has been satisfactory so far.

3.4. References.

1. YULE, G. Udny and KENDALL, M. G., An Introduction to the Theory of Statistics, Charles Griffen & Company Limited, London, 1953, p. 117.
2. SCHEIN, Edgar, H., Career Dynamics, Addison-Wesley Publishing Company Inc., Reading, Massachusetts, 1978, pp 252 - 253.
3. Confidential Letter: LMH/C/951/1 of 8 Sep 69 to the Public Service Commission regarding the Medium Service appointments of Pilots and Navigators in the S.A. Air Force.
4. SCHEIN (1978), Op. Cit. p. 253.
5. JOUBERT, C.J., VERSLAG. Komitee van Ondersoek na die Vloei van Aftredings en Bevorderings in die S.A. Weermag. HSP/C/502/2 oor HSP/110/3/2 van 2 Sep 75.

#### 4. CONCLUSIONS

#### 4. CONCLUSIONS

On analysing the results of the validation survey certain logical conclusions were reached by comparing the answers given with those of the first survey.

##### 4.1. The Career

The 23 definitions of a successful career were analysed and the results were as follows:

- a. Ten (10) considered job satisfacton to be the most important variable for a successful career.
- b. Five (5) considered happiness to be the most important variable for a successful career.
- c. Eight (8) considered achieving one's own personal aims and goals to be the most important variable for a successful career.

It was thus concluded that the respondents' definition of a successful career could be summed up as follows:

"A successful career is one wherein you attain your personal aims and goals in a manner which brings you happiness and satisfaction in your work."

##### 4.2. Implications of an Early Retirement.

The majority of respondents (56%) indicated that retiring at the rank of Colonel and occupying a position of Unit/Base Commander (Q2) was a fair career, whilst 39% said that such a career would be a successful one. A situation like this could, consequently be considered as acceptable to most aircrew.

Our first survey's finding is thus supported. In the next question (Q3), 61% said they would consider starting a second or non-Air Force career; 57% of these indicated that this would be an exciting opportunity to look forward to. We concluded that active aircrew considered the present retiring age of 60 years too old; that the rank of Colonel in Command of an Air Base was acceptable at a lower retirement age; and that a second or non-Air Force career held an attractive challenge for them provided preparation for this event was initiated before leaving the Service. Based on the above conclusions, it was felt that no further investigation into what rank and position constitutes a successful career would be justified. The one postulated is viable.

#### 4.3 Promotion Prospects.

83% indicated that they considered their positions for promotion on a "merit list" (Q4) were a fairer (more just) measure than the one indicated on the old seniority list. Prospects are also enhanced by increasing the vacancies for promotion. 78% of the respondents chose maximum periods in ranks (Q5) so that a greater turnover in personnel and hence more promotion chances could be generated. It is concluded that these findings confirmed the first survey's as well as those of Major General C. J. Joubert's committee in 1975.

#### 4.4. Career Planning Elements.

The analysis of Q5 on which element was the most important resulted in the following:-

1. Being assessed regularly.

2. Getting as wide an experience as possible.
3. Obtaining higher educational qualifications.
4. Years of service at which you are promoted.
5. Age at which you are promoted.

This finding fully validated the first survey's finding.

#### 4.5. Job Satisfaction.

In the first survey the overall majority of aircrew (96,4%) affirmed that their work was crucial to their satisfaction and to the development of their personalities. This survey (Q7) set out to have ten relevant job satisfaction variables rated so as to indicate their relative importance in formally structured career planning. The results were gratifying:

- Order of importance:
1. Worthwhile work.
  2. Pay and Allowances; Achievement.
  3. Challenging job; Advancement and Self Improvement; and allowed responsibility.
  4. Able to contribute.
  5. Given recognition.
  6. Having authority and independence;  
People in work environment.

83% indicated in Q8 that they were satisfied to completely satisfied with their Air Force careers. This agrees with the first survey's finding (Q1) where 90% indicated that their progress had been satisfactory so far! In an interview with the officer in charge of flying at A.F.B. Ysterplaat this

question was brought up. The answer given was that the respondents were "wary" of saying that their progress has not been satisfactory so far and that they were not satisfied with their careers. It appears that they mistrusted the anonymity of the questionnaires. Whatever the real reason, the subsequent answers to both questionnaires amply demonstrated that their progress had not been as satisfactory as it could have been had the principles proposed in this study been applied. In the event that the respondents were correct in their answers then one could conclude that they would have been even more satisfied with their career progress, if the proposals contained in this study had been implemented.

#### 4.6 General Conclusion.

The validation study has been successful. The findings of the first survey have been validated. Meaningful career planning could now be proceeded with in the areas indicated by the study:-

- a. The drawing up of a career development programme;
- b. Designing a counselling guide on the application of the programme;
- c. Refining an appraisal system on the "merit list lines";
- d. Using a model for predicting promotion vacancies (or personnel flows).

## S O U T H   A F R I C A N   A I R   F O R C E

## A CAREER PLANNING VALIDATION QUESTIONNAIRE

Introduction

A Career Planning Questionnaire has already been completed. The responses have been analysed. The major conclusions derived from the investigation are now presented for validation in this second questionnaire.

Aim of the Questionnaire

To validate (confirm) the findings of the first study.

Respondents

The respondents chosen to answer this questionnaire have been selected at random from the people who answered the first questionnaire.

Instructions

Where boxes [ ] are provided, please answer the question by putting a tick ✓ in the relevant box. Read the questions carefully before answering.

BACKGROUND INFORMATION

PILOT: [ ] or NAVIGATOR: [ ]

DATE OF BIRTH? Day:.....Month:.....Year:.....

ACADEMIC QUALIFICATIONS?

Matriculation or Standard 10 [ ]

Bachelor's Degree: [ ]

Master's or Higher Degree: [ ]

DATE WINGS RECEIVED? Day:.....Month:.....Year:.....

DATE OPERATIONALLY QUALIFIED? Day:.....Month:.....Year:.....

NAME OF YOUR PRESENT UNIT? .....

YOUR POSITION IN YOUR UNIT? .....

WHAT IS YOUR CURRENT RANK? .....

COMMENTS:

THE QUESTIONNAIRE

1. What is your definition of a successful Career?

2. Would you, as an active Air-crew member, consider the rank of Colonel and the post of Unit/Base commander a fitting climax to:

a. A successful career? Yes  No

or b. A fair career? Yes  No

or c. An unsuccessful career? Yes  No

3. If you could retire at 50 years of age instead of 60 years of age, would you consider starting a second or non- Air Force career?

Yes

No

If yes. Do you find the idea of a new career:-

a. An exciting opportunity to look forward to?

Yes  No

or

b. A prospect to be accepted with equanimity?

Yes  No

or

c. A necessary evil not to be contemplated before its time?

Yes  No

4. Supposing your promotion were dependent on your position on a "merit list", which was based on regular assessments, would you consider this:

- a. A fairer method than the old seniority one?

Yes  or No

or

- b. No better than the old method

Yes  or No

5. Your promotion prospects are primarily dependent on the existence of vacancies in rank. Vacancies can be created by laying down maximum periods and ages in ranks. Which course of action would you support:-

- a. Maximum periods in ranks?

Yes  or No

or

- b. Maximum ages in ranks?

Yes  or No

6. Listed below are five (5) elements of a career plan. Please compare each of the elements with one of the others in such a way that all the elements are compared with each other. Thus:-

element 1 is compared with 2

" 1 " " " 3

" 1 " " " 4

" 1 " " " 5

element 2 is compared with 3

" 2 " " " 4

" 2 " " " 5

Element 3 " " " 4

" 3 " " " 5

Element 4 " " " 5

Example: If you consider element 1 (Age at which you are promoted) to be more important than element 2 (number of years of service you complete before promotion), then circle the

①  
2

No.	Element	Comparison Table			
		$\frac{1}{2}$	$\frac{1}{3}$	$\frac{1}{4}$	$\frac{1}{5}$
1.	<u>Age</u> at which you are promoted				
2.	<u>Years of Service</u> you complete before promotion		$\frac{2}{3}$	$\frac{2}{4}$	$\frac{2}{5}$
3.	Getting as <u>wide an Experience</u> as possible			$\frac{3}{4}$	$\frac{3}{5}$
4.	Getting higher <u>Educational qualifications</u>				$\frac{4}{5}$
5.	Being <u>Assessed regularly</u> on your work performance				

7. How important to you are the following job satisfaction variables in carrying out your job? Indicate your decision by marking a  $\checkmark$  in the appropriate box.

	Most Important	Fairly Important	Average Important	Unimportant	Most Unimportant
Having Authority and Independence	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Achievement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Challenging Job	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Allowed Responsibility	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Worthwhile work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Able to contribute	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Most Important	Fairly Important	Average Important	Unimportant	Most Unimportant
Advancement and Self Improvement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Given Recognition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
People in Work environment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Adequate Pay and Allowances	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

8. Rate your Air Force career in terms of satisfaction/dissatisfaction derived from it by choosing one of the terms below which you believe most aptly describes your feelings. Place a  over the appropriate box.

Completely  
Satisfied

Very  
Satisfied

Satisfied

Dissatisfied

Fairly  
Dissatisfied

Very  
Dissatisfied

Completely  
Dissatisfied

STATISTICAL TESTS1. Calculation 1

Aim: To establish whether there is a significant difference in the average ages of aircrew in the first and second survey.

a. Hypotheses:  $H_0$  - There is no significant difference between the two ages

$H_1$  - There is a difference

b. Level of significance:  $\alpha = 0,05$

c. Test statistic:  $F_{1,104} = \frac{MSC}{MSE} = \frac{\text{Mean Square Column samples}}{\text{Mean Square for Error}}$

d. Decision rule: Since  $P(F_{1,104} > 3,98) = 0,05$ ,  $H_0$  will be rejected at the 5% level if the observed F is greater than 3,98.

e. Computations:

1st Survey

$$\sum A_1 = 2333 \text{ years}$$

$$\sum A_1^2 = 315873$$

2nd Survey

$$\sum A_2 = 682 \text{ years}$$

$$\sum A_2^2 = 37468$$

Average Ages:

$$\bar{A}_1 = 28,11$$

$$n_1 = 83 \text{ aircrew}$$

$$\bar{A}_2 = 29,31$$

$$n_2 = 23 \text{ aircrew}$$

$$\sum \sum A_i = 2333 + 682 = 3015$$

$$n_1 + n_2 = 83 + 23 = 106 = N$$

Basic calculations:

$$(i) \quad \left\{ \sum (\sum A_i) \right\}^2 / N = (3015)^2 / 106 = 85756,84$$

$$(ii) \quad \sum (\sum A^2) = 315873 + 37468 = 353341$$

$$(iii) \quad \sum \left( \frac{\sum^2 A_i}{n_i} \right)^2 / n_i = \frac{(2333)^2}{83} + \frac{(682)^2}{23} = 85799,76$$

Sum of Squares Calculations

Sum of Squares (Between)      SSC : (iii) - (i): 85799,76 -  
85756,84 = 42,92

Sum of Squares (Within)      SSE : (ii) - (iii): 353341 - 85799,76  
(Error)                              = 267541,24

Sum of Squares (Total)        SST : (ii) - (i): 353341 - 85756,84  
= 267584,16

Degrees of Freedom

df (Between)            k - 1 = 2 - 1 = 1

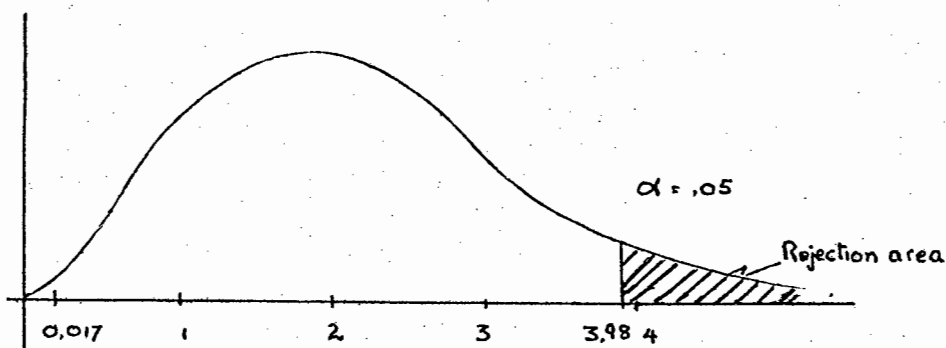
df (within)            N - k = 106 - 2 = 104

df (Total)            N - 1 = 106 - 1 = 105

ANOVA SUMMARY

Source of Variation	SS	df	MS	F.ratio
Between	SSC: 42,92	1	4292/1=42,92	0,017
Within (Experimental Error)	SSE: 267541,24	104	267541,24/104 = 2572,51	
Total	SST	n-1	-	

$$F_{1,104} = \frac{MSC}{MSE} = \frac{42,92}{2572,51} = 0,017$$



f. Decision: Since the computed value is less than 3,98,  $H_0$  is accepted at the 5% level of significance: there is no significant difference in age at the 95% level of confidence.

t-test check

1st Survey

$$n_1 = 83$$

$$\bar{A}_1 = 28,11$$

$$S_1^2 = 56,25$$

2nd Survey

$$n_2 = 23$$

$$\bar{A}_2 = 29,31$$

$$S_2^2 = 55,06$$

Level of significance:  $\alpha = 0,05$

Test Statistic :  $t_{df} = (\bar{A}_1 - \bar{A}_2) / \hat{\sigma}$  distributed

$$t_{n_1 + n_2 - 2} = 104$$

Decision Rule: With  $\alpha = ,05$  for a two sided test:

$$\text{Accept: } -1,99 \leq t_{104} \leq 1,99$$

$$\text{Reject: } t_{104} < -1,99 \\ > 1,99$$

$$\begin{aligned}
 \hat{S}_w &= \sqrt{\frac{(N_1 - 1) S_1^2 + (N_2 - 1) S_2^2}{n_1 + n_2 - 2}} = \sqrt{\frac{82.56,25 + 22.55,06}{83 + 23 - 2}} \\
 &= \sqrt{\frac{4612,50 + 1211,32}{104}} = \sqrt{\frac{5823,82}{104}} = \sqrt{55,99} \\
 &= 7,48
 \end{aligned}$$

Estimate of Standard Error of the difference between two means

$$\begin{aligned}
 \hat{\sigma} &= \hat{S}_w \sqrt{\frac{n_1 + n_2}{n_1 n_2}} = 7,48 \sqrt{\frac{83 + 23}{83 \cdot 23}} = 7,48 \sqrt{\frac{106}{1909}} = 7,48 \sqrt{0,0555} \\
 &= 7,48 \cdot 0,236 = 1,76
 \end{aligned}$$

$$\therefore t_{104} = \frac{\bar{A}_1 - \bar{A}_2}{\hat{\sigma}} = \frac{28,11 - 29,31}{1,76} = -\frac{1,2}{1,76} = -0,68$$

At the 5% level the value of  $t = -1,99$

Our computed value (-0,68) is less than this (-1,99).

Thus the t-test confirms that there is no significant difference in ages.