



AUSTRALIAN POST OFFICE  
STAFF INFORMATION BULLETIN

# Role of Technical Officers in the Australian Post Office

ISSUED JANUARY 1972

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Technical Officers  
in the Australian  
Post Office

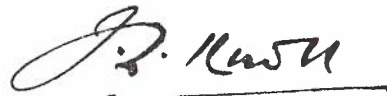
January, 1972

## Foreword

Over recent years there has been an increasing emphasis on the use of Technical Officers within the Commonwealth Public Service and community generally. In the A.P.O. we have used Technical Officers for many years in a variety of situations and they have made a valuable contribution to our general progress. A significant aspect of their use has been the teamwork displayed with engineers in the construction and operation of our modern and highly efficient telecommunications system.

In the years ahead it is clear that we need to further develop the use of Technical Officers with the aim of achieving an optimum balance of work between this group and professional Engineers. Accordingly, it is considered desirable to consolidate information from recent reviews and to outline policy on the role of Technical Officers in a suitable document. This document, it is hoped, will promote a general understanding amongst all concerned in the engineering area and act as a basis for assessment of needs and development of organisation proposals.

I commend it to you but strongly urge that words contained within are not treated to a legalistic interpretation. A spirit of co-operation and liberal outlook is required from the Professional Engineer and the Technical Officer if the proper result is to be obtained.

A handwritten signature in black ink, appearing to read 'J. L. Knott', with a horizontal line underneath.

(J. L. Knott)  
Director-General.

## **STAFF INFORMATION BULLETIN ROLE OF TECHNICAL OFFICERS IN THE A.P.O.**

### **Introduction**

Over the last four years there have been significant developments in what is described as the technical sub-professional area. These developments have occurred in Drafting, Buildings, Science, Engineering and other areas. Studies of these areas have been carried out and implementation action has proceeded following issue of circulars and memoranda from the Public Service Board.

Recently there has been discussion on the expanded use of Technical Officers in the general engineering area, particularly in situations where a close working relationship is required with engineers. In this type of situation a full understanding of "professional" and "sub-professional" roles is necessary. This document is intended to promote a better understanding of the respective roles in situations such as these.

### **Evolution of the "Sub-professional" Concept**

The introduction of Technical Grades within the Commonwealth Public Service was announced in a memorandum issued by the Public Service Board on 16 November 1956. In this document, reference was made to a new approach to professional and technical work designed to ensure that professional staffs are generally engaged on duties which require professional qualifications and that greater use is made of the capacity of non-professional staff for technical duties which are within their competence. The increased rate of technological change and the greater complexity of engineering and other technical work highlighted the need to take such action in order to make more effective use of available manpower resources.

The first use of Technical Grades in the Engineering Division occurred in 1959 when 51 positions were established in place of a corresponding number of engineer positions which had been occupied on an acting basis for long periods by staff professionally unqualified. Introduction into the Drafting, Buildings, and Radio Inspector groups then followed.

The use of Technical and Drafting Grades expanded substantially within the Commonwealth Public Service after 1956. However, it was recognised in the mid-sixties that these grades, as established, did not wholly represent the sub-professional components in the Service. Substantial elements which appeared to be of a genuine sub-professional nature were growing outside of the Technical Grade structure. Accordingly, the Public Service Board decided, in 1966, to set up an extensive study of the sub-professional area for the clarification of the existing situation and the establishment of sound guidelines for future development within the Service. The address delivered by Sir Frederick Wheeler, on 26 April 1967 (Reference 1) to the Institution of Engineers, Canberra Division, outlined the Board's reasons for this study and its views on Technical sub-professional work in the Service.

The P.S.B. study set up in 1966 concluded in 1967 with the issue of the "Moran" report. This report, of necessity, was regarded as a management document which could not be made available to staff associations. However, all main

aspects of it have been made available in P.S.B. circulars and other documents. The Board's forty-fourth annual report 1967/68, summarised the main conclusions as follows:

“As a result of this study the Board has concluded that greater emphasis should be placed on the development of sub-professional work as a separate and identifiable area of technical work. The Board sees the technical sub-professional as a person with a recognisable level of technical knowledge who is qualified by training and practical experience and who works largely according to established techniques at a level generally between that of a skilled tradesman and a professional. (The tradesman boundary may be absent in some scientific disciplines). In some circumstances he may be required to supervise the work of subordinate sub-professionals, tradesmen or other technical groups. The areas involved include most branches of engineering, the physical and biological sciences, medical science in the medical laboratory environment, architecture and surveying.

It is recognised that the use of the word 'sub-professional' to describe this broad area of work, although fairly common in Australia, is open to criticism. There is no universally accepted generic term although the word 'technician' is frequently used overseas to describe persons similarly engaged. However, this has been used as a designation in the Commonwealth Service for a number of years and its use here would lead to confusion. As yet no simple alternative to the term 'sub-professional' has been found. Its use is intended to describe a work area where standards of knowledge are relatively high but still below the full professional level.

The growing importance of the technical sub-professional work area as a separate entity between the professional and the tradesman levels derives mainly from increasingly rapid technological change which has caused the gap between professionals and tradesmen to widen significantly. Considerable effort is now required at the sub-professional level in the Service to fill this gap satisfactorily, and continuing advances in technical knowledge have led to a need for professional staff to devolve functions that have assumed a more routine or an 'accepted practice' character, while still requiring a fairly high level of technical understanding.

In recent years there has been a rapid expansion in the use of sub-professional staff in many sectors of technical employment and this growth has been recognised by educational institutions, which have been developing courses to provide specific training at the sub-professional level. Similar trends have also been in evidence for some time in many overseas industrialised countries.

In order to clarify and define the standard of knowledge required for sub-professional work in the Service the Board has concluded that qualification requirements should be firmly established at the level of a certificate from a technical college or institute of technology. Certificate courses include studies of scientific and mathematical principles at a much greater depth than courses for tradesmen, and

by comparison with professional qualifications they are more job-oriented and specialised.

However, the Board recognises that a formal certificate course, together with appropriate practical training is not the only method of reaching the sub-professional level, and provision will therefore be made for the admission of staff who do not possess formal qualifications but who have achieved an appropriate level of competence through experience, natural aptitude and/or private study. Eligibility tests will be developed and conducted for this purpose, and these will involve a practical project or projects together with formal tests designed to examine the applicant's technical knowledge. The standard to be attained will be that of the certificate level in the particular speciality."

Subsequent to the "Moran" report, which established in 1967 the general overall concept, studies and reports were made separately for the Drafting, Engineering, Science, Surveying and other areas.

A special review of the Technician area in the A.P.O. was made following consideration of the Technical Grade (Engineering) report and this resulted in the establishment of the Telecommunications Technical Officer structure. Qualified Senior Technicians and higher were translated into the new structure.

## **Relationship between Technical Officer Functions and Professional Engineer Functions**

There are semantic difficulties in describing the work of Technical Officers and Professional Engineers. This is because the description of the work of Technical Officers reads similarly in parts to that which might be used to describe the work of Professional Engineers. It is necessary to ensure that the duties of the Technical Officer are correctly placed within the framework set by his level of qualification and experience. The following is intended to provide some guidance in differentiation between the work of the Professional Engineer and that of the Technical Officer in the engineering field.

### **PROFESSIONAL ENGINEERING WORK:**

- (a)** requires the understanding of the scientific principles which form the basis of the engineering disciplines, and the quantitative expression of these principles through analytical mathematics (where appropriate); requires education in depth in a branch of engineering and a broad education in related disciplines;
- (b)** is essentially mental in nature, and varied, involving competence in a particular branch of engineering and leadership, judgement, originality and responsibility in the economical solution of engineering problems and the execution of engineering work;

- (c) includes the application of professional knowledge and experience to activities such as design, planning, applied research and development; includes the organisation and management of these activities and other activities such as production and the construction, installation, operation and maintenance of engineering facilities, systems, equipment and associated services;
- (d) requires a professional engineering qualification.

#### TECHNICAL OFFICER WORK:

- (a) requires an appreciation of scientific principles and mathematics to sufficient depth to apply with confidence established engineering knowledge, methods and techniques pertinent to an identifiable technical speciality related to a branch or branches of engineering, and a thorough knowledge of engineering standards, practices and precedents in the speciality;
- (b) is essentially mental, involving skills, originality and ingenuity in a technical speciality related to a branch or branches of engineering; is usually carried out directly or indirectly under the control of an Engineer, but may be performed in support of a professional in a related discipline, or independently within established general methods or new methods specially prescribed by a professional technologist; may involve the supervision of others;
- (c) includes support of professional engineering activities in the planning, development, design, manufacture, erection, commissioning, maintenance control, etc. of engineering equipment plant, etc; sometimes involves management responsibilities, liaison with clients on technical issues, etc;
- (d) requires a qualification at the level of a Technical College certificate (or equivalent).

#### FUNCTION OF TECHNICAL OFFICERS

Technical Officer work in the engineering area involves the application of a recognised level of technical knowledge within a framework of established engineering techniques and practices. Classification standards for Technical Officers have been set out within such a framework in P.S.B. Circulars which have been made available to staff associations and management generally. P.S.B. Circular 1970/2 describes some of the work as follows:

- **Design and Development** Design, development and associated testing, frequently in a laboratory environment, of equipment (including prototypes), systems, materials, etc.
- **Engineering Testing Laboratories** Environmental and other testing of equipment, components, materials, etc. and the development and calibration of test equipment and methods.

- **Research and Development Experiments and Trials** Planning the use of instrumentation and other systems for the conduct of large-scale field trials (e.g., of guided weapons), operation of instrumentation, evaluation of data, etc., performance of laboratory experiments.
- **Factory and Workshop Production** Planning, programming, estimating, progressing, co-ordination and control of production; investigation of production problems.
- **Industrial Engineering** Study, analysis and development of work systems in an industrial environment; supervision of work measurements and development of standard data; development and evaluation of management control systems.
- **Equipment and Materials Supply** Technical activities associated with the supply, usage, allocation and handling of equipment and materials, investigation of capacity of industry in specified areas; evaluation of packaging methods, etc.
- **Equipment and Facilities Installation and Maintenance** Planning and control of installation and maintenance; investigation of requirements and technical problems; development of procedures and servicing standards.
- **Communication Engineering — Planning and Programming** Studies of communication engineering systems; project planning and programming; conduct of associated investigations and studies.
- **Communication Engineering — Lines and Cables** Development and application of methods and procedures for lines and cable works; direction of installation works; project design; estimating and programming.
- **Regulation and Licensing of Radio Communications** Inspection of radio communication stations, assignment of frequencies, investigation of interference (This includes maritime equipment surveys, spectrum occupancy studies, testing of equipment for conformity with A.P.O. standards).

An aspect of their functions which is common to all Technical Officers is that they exercise responsibility in the application of proven techniques in a technical area. They apply new techniques prescribed by professionals. The techniques employed by Technical Officers demand experience and knowledge in the respective speciality combined with the essentially mental skills required to work out the details of an assignment within the boundaries of established practices. In performing such work they relieve professionals of functions which were originally conceived at professional level, but where subsequent refining and practice have enabled this work to be fully defined and as such it does not now rank as normal professional work.



## **Extension of the Use of Technical Officer Staff in the A.P.O.**

In considering the extension of use of Technical Officers, organisational and overall staff needs must be taken into account. In this regard certain relevant factors have emerged from the recent Engineer Review and other studies. These are as follows:

- (i) In the future, Engineering activities will be organised on a larger section basis. This will involve complete change from the present "divisional" or sub-sectional structure. Such sections will be under control of a professional engineer manager. Professional engineer groups will be placed in these sections to undertake work appropriate to their profession. The proposed arrangement is expected to use engineer resources more efficiently and provide more challenging work. The new organisation, which incorporates the concept of the engineering section, has improved career prospects for engineers.
- (ii) In order to use the professional talent to the maximum advantage, Technical Officers should be used to a larger degree in direct support and in operational roles than at present. Accordingly, Technical Officers will be placed in direct support roles to professional officers. In addition, groups of Technical Officers should be provided, where appropriate, to control activities devolved from Engineers.

In this regard the position classification standards recently developed for Engineer levels as a result of the Engineer Review state that "some positions included in the benchmarks are chosen from *areas of engineer work* where a substantially greater use is envisaged of sub-professional staff when suitably trained and experienced staff are available. This will result in changes in the work of professional engineers to the extent that modifications will be necessary to the benchmark descriptions. Examples of these areas are the operations area of P.M.G. and certain production factory situations in Supply."

### **EXAMPLES OF TECHNICAL OFFICER USE**

The following gives an indication of duties which it is believed could be used as a basis for extension of Technical Officer activities. It is appreciated that in a number of cases such officers are already being used on many of the duties outlined. However, it is believed that a considerable extension of their use will need to be made in the future. Such use would be in accordance with the definitions and scope of the position classification standards for Technical Officers (Engineering) and Telecommunication Technical Officers, as set down in P.S.B. Circulars Nos. 1970/2 and 1970/26 respectively. Those documents give further information on duties appropriate to Technical Officers. It is stressed, though, that the duties described are not meant to be complete. Nor can they be regarded as permanent in a continuously evolving engineering situation.

#### **Traffic Engineering**

Typical Technical Officers' functions in traffic engineering are the

oversight and control of traffic measurements, the processing and preparation of trunking study reports, the analysis of traffic designs and the preparation, in accordance with established principles, of detailed plans for the revision of existing trunking and interconnecting schemes and the dimensioning and forecasting of trunk and junction circuit groups. Forecasting performed by Technical Officers would normally be only short term, say, up to five years.

The role of the Engineer primarily would consist of overall network studies. However, he would be engaged also on individual evaluations of a very complex or unusual nature which require professional attention. Development and the planned introduction of new measuring, dimensioning and forecasting techniques especially in regard to mechanisation of procedures, as well as specification of standards, would be appropriate professional functions. However, Technical Officers would also be expected to assist in such work. The Traffic Engineer should be developed as an expert consultant in his speciality and be in a position to assist all those engaged in planning and operating the network.

### **Switching and Facilities Planning**

In this area Technical Officers should be used on the more detailed design functions with Engineers being engaged on the broader conceptual and network planning aspects. Technical Officers should be responsible for the detailed preparation of trunking diagrams and proposal information, equipment layouts and numbering, switching and charging details within the context of agreed and defined overall plans. The preparation of detailed plans for the development of sections of the automatic trunk network and oversight and coordination of planning aspects of such plans, the examination for compliance with approved programmes of project proposals submitted by Plant Sections and preparation of appropriate recommendations would be Technical Officer functions. Technical Officers should also carry out a significant part of the detailed work associated with the development of the annual three years' work programme.

The role of the Engineer typically should be development and specification of the optimum switching network to the point where the detailed design of individual exchanges and areas can be carried out by Technical Officers. In this regard, he would be engaged on Regional Plans, State Plans, Manual Assistance Plans, special major building submissions, and plans for the integration of new items of equipment. He would be assisted by Technical Officers preparing the more detailed sections of the plan and performing duties such as studies into alternative methods of extending exchanges and the physical, technical and cost aspects of providing specified facilities.

### **Transmission and Line Planning**

The organisation of transmission measurements and the interpretation of the results is considered to be normally a Technical Officer function. Bearer Utilisation duties such as the allocation of super groups, groups and channels, re-arrangement of existing channels to meet specified needs and normal planning associated with the provision of standard open wire systems are also seen largely as a Technical Officer function.

In the Line Planning area, typical Technical Officer functions are seen as the preparation of proposal information for coaxial and other trunk bearer projects, assessment of requirements for trunk, junction and subscribers' proposals and selection of routes, undertaking of cable occupancy studies, development and recommendation of proposals in accordance with guide-lines set down by an Engineer. Technical Officers in both the Transmission and Line Planning area would participate typically in the preparation and oversight of the annual works programme, technical evaluation of new equipment types on offer, and allocation of material to meet programme requirements.

The Engineer's role typically should be development of the optimum network framework, including consideration of location and numbers of exchanges, date of establishment and ultimate size. He would also be concerned with overall bearer and reticulation planning, involving short or long term provision of adequate bearer bandwidth and cable/duct provision, impact of new facility requirements, techniques and equipment, and optimisation of existing network facilities to provide an economic and reliable trunk network.

#### **Exchange Maintenance**

It is considered that scope exists for the greater use of Technical Officers in exchange maintenance activities. This extension of use should be on general oversight and control of day-to-day activities of groups of exchanges. The Engineers working in these areas would still be engaged on such duties as setting and oversighting of technical standards, technical control of special field trials, assessment of network performance, design of new methods, oversighting of trunking efficiency, assessment of work performance, overall staff loading and development of management control systems. Other Technical Officers would be used in direct assistance roles to the Engineers on such work. However, the Technical Officers controlling groups of exchanges would usually be responsible to the Section Manager or an Engineer delegated to control the function of network performance and/or switching systems operations.

#### **Exchange Installation**

It is believed that Engineers can be relieved of much of the work concerned with the oversight of installation works which fit standard patterns. Technical Officer positions should be established for control of standard type work. Engineers would typically be concerned with design of specially complex and critical projects or equipment, project specification and planning, development of new management control systems and work techniques, etc. Engineers may be personally involved in direct project control of critical or key point or new exchange-type installations where professional attention is considered necessary.

#### **Long Line Installation**

The use of Technical Officers should be extended as much as possible to cover control of activities on standard pattern installations where practices have been well-established. Engineers would normally not be required to control such activities in detail, but could be involved

as necessary in the control of the installation of new equipment types where the degree of complexity, novelty, importance or critical nature justifies professional attention. As outlined for other installation activities, Engineers would also be engaged on such activities as project specification and planning, equipment design, development of new methods and techniques and management control systems, and assessment of equipment and staff performance.

### **Subscribers' Equipment Installation and Service**

The control of day-to-day activities in this area where standard high volume work is carried out would not normally require the attention of an Engineer. Engineers would be used as required on assessment of performance and development of new management systems and techniques, design of special types of installations, development of new facilities or methods, technical control of special field trials and similar duties as described for other installation and service areas.

### **External Plant**

Considerable scope exists for the extended use of Technical Officers in this area particularly to relieve Engineers Class 2 of day-to-day control of field activities on standard or routine work. Such officers would report to the Engineer manager to control this function in an area. Suitably qualified and experienced Technical Officer staff are not at present available in any quantity for this purpose and because of this, difficulties will be experienced in this area in the initial years of implementing the new concept.

As experienced Technical Officers become available, the possible arrangement of Engineer and Technical Officer duties could be as follows:

#### **ENGINEER DUTIES**

- (i)** Overall direction of design of network cable and duct reticulation.
  
- (ii)** Development and promulgation of new or improved standards and operating methods arising from new or changed policies.
  
- (iii)** Direction of development and assessment of new material and work techniques.
  
- (iv)** Design and application of management control systems.

#### **TECHNICAL OFFICER DUTIES**

- (i)** In accordance with established engineering techniques and specifications, carry out detailed design for cable and duct reticulation projects.
  
- (ii)** Carry out investigations and analyses and participate in the development and promulgation of new or improved standards and operating methods.
  
- (iii)** In accordance with specifications, design, implement, and evaluate field trials and prepare reports on new materials and methods.
  
- (iv)** Participate in the development and introduction of management control systems.

#### ENGINEER DUTIES

(v) Development, specification and oversight of service and installation standards.

(vi) Oversight of professional elements of all activities. Control of particular field projects of a special or critical nature.

(vii) Discussions where necessary with professional officers in other authorities, etc. on professional matters affecting work operations.

#### TECHNICAL OFFICER DUTIES

(v) Within the framework of specified standards, develop and improve technical procedures and practices relating to installation and maintenance of external plant.

(vi) Control of day-to-day field activities and provision of technical advice and assistance to field supervisors.

(vii) Confer with municipal and shire officers and provide and obtain information on matters concerning external plant work.

#### Material Supply

In the exchange and subscribers' equipment areas, practically all equipment comprises standard items to a design approved by specialist design groups. Professional engineering involvement in this area would be confined to activity direction at a more senior level and the more critical aspects of material supply. Most of the detailed functions appear capable of being performed by Technical Officers. Decision on the procurement of completely new items of equipment such as C.U.D.N., 10C Electronic Exchanges and Mobile Radio, generally, hinge around the question of satisfactory design and the professional expertise to evaluate these projects should be supplied by Engineers in the Design, Planning and Research areas, who, in fact, already play the major role. Even in these cases, Technical Officers should be used in responsible positions as project officers and maintain technical liaison between contractors and installation projects.

In the Long Line area many material requirements are for extension to existing bearers and detail could be handled by Technical Officers. Professional guidance and overall direction would be required for the introduction of new equipment types such as (at present) V.120, PCM, 60MHZ broadband bearer, but this again should be supplied by the specialist design groups.

In the Radio area, most systems are individually designed. Thus there would be a need for somewhat more engineering involvement than in the other areas, but even here Technical Officers should be used to the maximum on all the detailed technical work associated with the system design and tender evaluation, including technical liaison with manufacturers. They would also maintain surveillance on the planning and performance of work of the contractors.

In all material supply areas, once tenders have been placed, Technical Officers could generally undertake technical liaison with the factories. However, in special cases, for example on new designs, engineers would be involved, at least, in the initial stages.

### **Equipment Design**

The design of equipment using established techniques can be performed in many cases by Technical Officers. In most design and development situations the Technical Officer will work as a member of a team with Engineers and may carry out design of segments of the equipment or system in accordance with instructions given by the Engineer.

### **Workshops**

Technical Officers reporting to the Engineer manager or other Engineers as directed by the section manager could be used to a greater extent, for example, on control of production shops. Duties appropriate to such officers can include coordination and control of groups of trades on major projects or segments of major workshops. Other duties for Technical Officers with appropriate specialist training include work study and measurement, quality control, tool design, and production planning.

### **Radio**

In the Radio Communication and Broadcasting (Sound and TV) areas, scope exists for more use of Technical Officers in design, installation and operational groups. Such duties in the operational area include oversight of standards, advisory and consultative service to field staffs and in the impending unattended control situation, analysis of service data and control of day-to-day operational activities.

## **PRACTICAL FACTORS AFFECTING EXTENSION OF USE**

Initially, the availability of suitably experienced and qualified Technical Officers in certain areas may cause problems in establishment of the optimum arrangement in the proposed section units. Nevertheless, it is believed necessary to move forward as quickly as practicable on a planned basis.

In internal plant situations the existing Technical Officer field components will continue to be the main source for meeting office type requirements for a number of years. Experience has shown that suitable officers who possess the necessary attributes for work in support roles such as circuit design, planning, design of installation and maintenance methods can be obtained from that group.

In some areas there is a dearth of suitably qualified and experienced officers who could fill the expanded role proposed for Technical Officers. Pending output from Certificate level courses, selection from existing staff, enhanced in some cases by mature age training, will need to continue. However, the needs for experienced staff in some areas will not be fully met for some considerable time.

Use of Technical Officers in all areas will expand still further as newly qualified officers become available from Certificate course training and then become experienced in the various work phases. The first graduates from the new training schemes are not expected in any quantity until 1.1.75 and such

officers would most likely not obtain the experience required for higher Technical Officer levels until beyond 1980. As an example of the process envisaged in developing and using such officers, the following outlines action that is expected in the External Plant area.

At present there is one Technical Officer Grade 2 in almost every External Plant type operational sub-section in the A.P.O. It is envisaged that new Technical Officers, Grade 1, who will have already spent some time in the External Plant area during their certificate course training, will be placed in these divisions to support Engineers and extend the work of the existing Technical Officer, Grade 2. The Engineers and the Technical Officer, Grade 2, would combine to properly develop such officers. In the course of time more duties would be devolved from the Engineer in accordance with the developing experience and maturity of the Technical Officer. More higher level Technical Officer positions will be introduced as the Technical Officer work is expanded. This will allow progression of the officer through the ranks to more senior Technical Officer positions. Whilst devolvement of tasks from the professional Engineer to the Technical Officer is occurring, the Engineers will move towards greater concentration of activity on tasks requiring professional skills.

In general, the principles outlined for the External Plant situation will be similar to those which will need to be applied in the other areas. However, the speed of application will vary depending on the availability of suitable staff with the required talent and experience.

In some fields the short term unavailability of appropriate Technical Officers may continue to cause a growth of demands for Class 1 and 2 Engineers. As the Technical Officers become available, it would be expected that Engineer growth would be reduced relatively in such areas, but probably counterbalanced by growth in Engineer requirements on functions such as planning, system design, research, special project control and network or system studies and investigations.

## RECRUITMENT AND TRAINING ACTION

- (i) Training courses for sub-professionals have been devised, negotiations with Technical Colleges carried out and about 850 Telecommunication Trainees commenced certificate courses in 1971.
- (ii) Development of eligibility tests and mature age training programmes is in hand. With regard to the former, tests for some groups have already been conducted.

The intake level of approximately 850 trainees referred to in (i) is based on the assessment of requirements for both the Telecommunications Technical Officer and Technical Officer (Engineering) areas. It will be necessary to have positions available at the base sub-professional level for those qualifying from this group. The majority of these trainees will not graduate until 1.1.75.

During training the trainees will be allocated on a planned in-house training scheme to the different engineering areas. At a certain stage of his training the trainee will be nominated for a particular area upon graduation. Priorities

will be set for such allocation in accordance with work needs and with appreciation of the ability to absorb the officer in particular work situations.

On present indications it is proposed to maintain an annual recruitment level of about 800 trainees over the next five years. This should provide of the order of 550 qualifiers per year from 1.1.75 to 1.1.79. At least 60% of such qualifiers will be required for T.T.O. type positions.

In addition to this output, the annual eligibility test for Telecommunications Technicians and other special eligibility tests or mature age training, will meet the bulk of requirements up until 1975. Where appropriate, persons with other recognised qualifications may also be recruited.

## **Summary of A.P.O. Policy on Employment of Technical Officers**

Teams of Engineers and Technical Officers have been operating very successfully in the A.P.O. for many years. However, the time is now appropriate to re-state the respective roles of these officers, particularly in the light of the development of the new "section" engineering group. The essential prerequisite for development of the optimum section organisations is the continuation of the team effort and goodwill between all such officers. With this in mind, and in consideration of the preceding information in this document, the A.P.O. policy on the use of Technical Officers is as follows:

- (a) Organisation structures involving Technical Officers and Engineers while being based on work requirements must be adaptable to changes in work needs.

In some specialist areas, groups of Technical Officers, including staff up to the Chief Technical Officer level, could work as a separate unit with general Engineer oversight from a high level. However, apart from these specialist areas, in the more general engineering situation, Technical Officers will work as part of a flexible team under the control of an Engineer Section Manager. It is proposed that this officer will be able to arrange his total technical staff in the most effective manner as required for the task in hand. However, it will be necessary to ensure that anomalous situations do not develop through wide variations in application of the various staff levels.

- (b) In the interests of technological advancement it is vital that Engineers critically examine their activities and devolve tasks or segments of activities to Technical Officers as soon as techniques are established and guide-lines set. In this regard the lack of appropriately trained and experienced Technical Officer staff may cause difficulties in some areas over the next decade. However, in the circumstances which will prevail, it will be mandatory that the Engineer Section Manager regularly examines operations and ensures that Engineers are appropriately devolving functions that have become of an accepted practice nature. It will be the responsibility of the Section Manager to decide within these established guide-lines, elements of work



which are to be performed by Technical Officer staff. When work becomes formalised, segments of activities should be given to these officers. The aim of the section manager must be to examine the available staff resources and determine the best overall method of using them.

- (c) Technical Officer positions will be provided in direct support roles to Engineers and, in addition, groups of Technical Officers will be established where appropriate to control segments of activities within the section. In any organisation which is established, the Engineer Section Manager must provide for and ensure that any professional elements are appropriately covered when and if the need arises.

Where Technical Officers control groups of activities, they will be required to accept direction from Engineers on matters requiring professional attention. Engineers, at times, may be required to control segments of activities normally appropriate for Technical Officer control for such purposes as development of new management systems, work methods or techniques or observations of current work practices.

In framing the work organisations it is not proposed to establish rules that it is necessary for any particular level of Technical Officer to work under or report to any particular level of Engineer. However, as a general guide it would be expected that the higher level Technical Officers would usually be responsible to another Technical Officer or a Class 3 or higher level Engineer. This, though, need not apply in all situations. The level of competence and experience expected of occupants of positions of Engineer and the Technical Officer and the need for professional attention at a particular level to meet the work requirements should be influencing factors in framing the organisation.

- (d) Technical Officers must have the ability to team with Engineers in their work and to accept tasks devolved to their area. In the "grey" situations, particularly, they need to develop an awareness of any components that require professional attention. They would be required to consult the appropriate Engineer in such cases. This attention in such situations may often then become a team effort between the Engineer and the Technical Officer in the solution of the problem. The ability to participate as a team member will be a very important factor in selection of Technical Officer. This ability must also, of course, be present with the Engineer.
- (e) The working arrangements developed for the future must ensure adequate work-face involvement of Engineers to enable the proper application of their professional engineering knowledge to the solution of basic problems and to the development of new procedures, equipment and techniques. This involvement must be such as to maintain standards in work-face activities and, in addition, ensure the proper development of their staff management potential at an early point in their careers.
- (f) Organisation structures must be based on work requirements. However, due regard should be given to provision of adequate career prospects for both Professional Engineers and Technical Officers.

The results of the Engineer Review and the associated re-structuring of the engineering organisation are expected to improve the operational efficiency of the Department as well as improving Engineer career prospects. In the development of the new organisational arrangements there will be additional Technical Officer positions which will provide enhanced career opportunities for this group.

The A.P.O. Policy view as outlined in (a) to (f) is in keeping with the philosophy of the Engineer Review Team's report. In this regard Section II of that report which is concerned with the relative roles of Engineers and Technical Officers/Draftsmen, and which is made available by agreement with the Public Service Board, reads as follows:

"The team has noted the decisions which have been taken in recent times by the Board and Permanent Heads of a number of departments in encouraging the growth of the technical sub-professional work-force in the Service. It is considered that the decision to formalise qualification requirements for the group, while having some disadvantages on flexibility grounds, is nevertheless a forward-looking step which should ensure that a quality of effort will be available in the future in this area.

While the technical sub-professional area is wider than the engineering field, it is to the engineering section of the sub-professional area that the Review Team has directed its thinking in endeavouring to draw some general conclusions on the relative roles of Engineers and sub-professionals.

It is noted that an important reason for the emphasis which has been placed on the sub-professional area in recent times is the need to provide a group trained to a level significantly higher than trades to which work can be devolved by professionals when it has been converted to a form where it can be applied without the need for full professional training. (The work is then usually in the 'established techniques' category.) Such a group is required in 'applications engineering' and also in 'development engineering' where they are very frequently significant elements of 'established techniques' included as part of the overall development process.

Whether the activity be in the category of 'applications engineering' or 'development engineering' the need for a capable sub-professional work-force is beyond doubt. As the role played by this group will become more and more important in the future, it will be necessary to ensure that relationships between the professionals and sub-professionals are at all times optimised.

It is not considered necessary to define in great detail the difference between professional and sub-professional work. By virtue of his higher academic training and his facility with the more advanced analytical techniques, the professional will be best suited to develop the broad scheme and to handle the large scale problems. He will (or should) provide leadership in the application of new ways and means, and be charged with considerations of alternatives on key matters.

When used in the role of team members in mixed professional/sub-professional teams, sub-professionals will provide the drive in the more detailed parts of a job, particularly where these involve 'accepted practice', 'established techniques' and/or knowledge of specialised equipment at an academic level significantly higher than that usually associated with trades work, but less than professional.

In some instances a relationship develops between engineers and sub-professionals wherein the sub-professional is knowledgeable in the application of engineering techniques in a specific field or of specialised equipment and the engineer frequently calls on the sub-professional to provide detailed information on which to base a decision. He subsequently relies on the sub-professional's knowledge of methods and processes to give effect to the decision. In like manner the sub-professional looks to the engineer to suggest an alternative attack when the application of the usual technique has failed or is in doubt. This interplay of the two types of mind makes for successful engineering.

In another type of sub-professional engineering work the sub-professional is not part of a mixed professional/sub-professional team on a full-time basis. This applies in particular to the drafting area where hierarchical organisations of draftsmen have evolved. The work which engineering draftsmen perform frequently originates from engineers, but in these circumstances it is sometimes presented to the drafting organisation in the form of a specification or brief with leading parameters defined. The draftsman actually performing the work tends to be one stage removed from the customer with some overall disadvantages on communications grounds. In some situations there are advantages in having drafting organisations under hierarchical control, but the most efficient arrangement depends upon the individual circumstances. At all times the efficiency of the arrangement is heavily dependent upon proper attitudes being adopted both by engineers and those in control of the drafting services.

In yet another arrangement the volume of purely sub-professional work is sufficiently great that sub-professional hierarchical groups can be sustained answering to Engineers only at quite a high level. The radio inspection area in P.M.G. is an example of this.

In some situations sub-professionals perform technique development work in their own right. Clearly this must be on a base of an understanding of relevant theory at certificate level.

There is no one organisation arrangement of professionals, vis-a-vis sub-professionals, which clearly stands out as best for all situations. On the one hand 'development engineering' situations call for the closest possible day-to-day contact between the two types of person and the sub-professional should be working directly to the engineers. At the other end of the spectrum there is the radio inspection type of function where the nature of the work, while clearly sub-professional, does not require engineer participation except on the odd occasions where highly technical problems arise.

Whatever organisation is best suited to the particular situation, it is abundantly clear that the optimum discharge of the engineering

responsibilities of departments in the Service is critically dependent on establishment and maintenance of goodwill between the engineer group and the sub-professional group.

It is considered that if both groups are prepared to assist each other in effecting optimum organisational and working arrangements, the future of both groups will be significantly enhanced. The engineer will be enabled to devote significantly more of his time to the execution of functions which are in keeping with the high level of his academic training and the sub-professional, by demonstrating his ability and potential in taking on more and more of the established techniques will gain greater job satisfaction and an increase in status.

The Team recognises that the devolution of functions by Engineers cannot be effected overnight. In some areas the sub-professional work force has yet to be built up to an adequate strength and in some cases the quality of sub-professional effort is perhaps not as good as it will be. However, Engineers who adopt the attitude of hanging on to traditional professional tasks which can in fact be devolved on the grounds that they (the Engineers) can do these tasks better than sub-professionals, are placing the future of the engineering profession in severe jeopardy. Engineers must also make a deliberate effort to remove, where possible, the professional content of the work so that it can be devolved. If an Engineer has to repeat a task more than once, that task should be reviewed for ways and means of devolving it.

The Team has noted conscious attempts by departments in some areas to make greater use of sub-professionals as they become available and wishes to support these moves most strongly."

The Department agrees with the Review Team that the successful extension of the use of Technical Officers in the Engineering area depends in large measure on the goodwill and team spirit existing between that group and Professional Officers. The aspirations of each depend largely on the other. It is the firm view of the A.P.O. to ensure that career prospects of the professional engineering group in the Department will not be inhibited by the devolution of duties to, and the creation of suitable career prospects for, Technical Officers. It is believed that the career prospects and general value of both groups of officers will be enhanced as the A.P.O. makes increasing use of Technical Officers. This increasing use is essential to the efficient functioning of the A.P.O. and its ability to provide modern communication facilities in the future.

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