Impressions of an Overseas Visit

Simon Moorhead [1]
Ericsson Australia and New Zealand

Abstract
A fascinating paper from 1961 contrasting the technical and general differences in providing telecommunications services in Europe, North America and Australia.

Introduction
This historic paper was published in June 1961 at a time when overseas fact-finding assignments were a privilege for the recipient. A detailed report was required by management upon return (around 12,000 words in this example) which was widely circulated within the Postmaster-General's Department and ultimately published in the *Telecommunications Journal of Australia* (Volume 13, Number 1).

The actual overseas visit took place in late 1959 and was primarily to deal with technical matters in connection with the contract for the Sydney-Melbourne coaxial cable. The opportunity was also taken to investigate various aspects of external plant practices.

The paper is particularly interesting as it details the influence of non-technical factors on technical procedures. Relative wage and price levels are discussed and their influence on telecommunications manufacturing. For example, wages were higher in North America and the cost of materials handling equipment was lower, which encouraged a greater level of mechanisation in cable manufacture, compared to Europe.

The paper boldly examines various political factors which influence telecommunications infrastructure. For example, import restrictions on manufactured goods and raw materials in support of local industry are discussed. The report analyses the ownership of the telecommunications manufacturing industry in each country. It also contrasts the advantages and disadvantages of government or private ownership of telecommunications assets, and the flow-on effects to site acquisition, standardisation and interworking.

This is 1959 and well before the break up of Bell in 1984; however, the paper states the Bell System in Canada has a taint of American capitalism about it and is therefore unpopular on National grounds. It also cautions the reader on one hand about the dangers of uncritical acceptance of overseas matters, while, however, it cannot help but be impressed by the North American techniques.

The second half of the paper provides a detailed comparison between Australian and North American telecommunications infrastructure. This is a fascinating insight into the industry at the time and covers topics such
as skilled tradesmen, exchange areas, subscriber services, buildings, installation and material supply.

The paper finishes with a short appraisal of the Bell System and the service provided to the public, namely: "A strong impression is gained of the Bell System to serve the public in every possible way. How this had changed by the breakup in 1984.

Reference


The Historic Paper
quantities; for instance, the System is attempting to logically restrain long distance road hauliers from installing their own point to point radio telephone service which they will use in place of the trunk line service.

The Bell System is a highly profitable organization, and is regarded by investors in the U.S.A. as a soundly managed enterprise. At U.S.$13,750,000 per annum, consequently, it can always raise more funds on its own. Consequently, it is always looking for means to employ more funds. Hence, Bell System policy is to provide plant in advance of demand, the effectiveness of this policy is illustrated by the fact that orders for new residential services are normally issued immediately after the order for the first plant is available. There is a certain degree of "calculated risk" in this policy, but difficulties rarely occur. For instance, in travelling through widely separated areas, in the U.S.A. and Canada, aerial line plant can be seen installed and ready for service in new housing estates, well in anticipation of occupation of the houses. Quoting actual figures for the Illinois Bell Company, their area, in 1932 the Company had 900,000 main units, and 9,300 "field miles" of aerial line plant. In 1937, the company had 1,270,000 main units and 17,000 field miles installed. In England and Germany and France for telephone service are restricted in Australia under a general anti-inflationary policy of restricting public works expenditure. This consideration, of course, is not applicable to the Bell-owned Bell System, and it appears that public works funds for sponsors that the service is available to the public, the system is prepared to the telephone companies. The fact that the Bell System can be made to operate under similar circumstances, without a financial loss is excellent and is available, and this factor is partially due to the fact that the System has an excellent gross economic strength of that country. It is very difficult to find the position of a first-class telephone service, which offers every advantage over the Bell System telephone service. For instance, the system is able to provide a super class of service at a reasonable price for a super class of service at a reasonable price, and there is no need for any subsidy or similar governmental assistance. One point is mentioned because the Bell System is a private capital, particularly transport companies, which are co-operating with Government-owned services in Europe and Australia.

A result of the ready availability of funds in the Bell System is that works are planned in the most economic possible way balancing immediate capital expenditure to operating and maintenance costs of the facility over its life. In so far as this is thought to be safely assumed that the method of providing a facility where several alternative methods are available is determined strictly on the basis of Economic Comparison. By contrast Government telephone authorities, restricted for capital funds, must tend to do works in a way which makes least call on their existing funds. The extent to which they are limited by funds on the funds position in the Bell System is that individual engineers tend to charge us much expenditure as possible to Capital Account, which is freely available and to charge as little as possible to the Maintenance Account (which forms part of the Profit and Loss Account). The latter account is strictly policed and a field engineer is judged by comparison between his plant fault record and the expenditure on maintenance.

A positive factor in Bell System policy appears to be one of Government ownership. To quote an example, the Telephone Division of the Rural Electrification Administration, which has a specific task to upgrade telephone service in rural areas has had the effect that the Bell System apparently has been forced to upgrade its rural services at a much earlier stage than in the rural operations. Further, the System feels obliged to provide a good class of rural service because its view is that if the Bell System does not, then the Government will, and this will be "the thin end of the wedge" for Government ownership generally. Their views are influenced by the difficulties of the privately owned power industry in the U.S.A.

The situation is even more marked in Canada, where the Bell System has the "lent of American capitalism about it and in, therefore, unpopular on National grounds; and, secondly, because in Canada are some first-class Government-owned utilities such as the Ontario-Hydro-Electric Power Commission, which is in the U.S.A. Government service because it does not have to be Government-owned in the Government-owned form. In fact, the American Public Utilities are in the U.S.A. Government service because the Government is the only customer for its service. In addition, of course, a similar problem is prevalent in the Canadian Bell System, which, however, is able to do what it wants providing it is a reasonable cost and it is a reasonable service. The fact that the Government is a major customer, and therefore the service is Government-owned is one of the main reasons for the success of the Canadian Bell System.

Ownership of the Telephone Manufacturing Industry

Three separate cases must be considered:

(i) The operating authority designs and manufactures the bulk of its own plant and equipment. The Bell System is probably the only case.

(ii) The operating authority buys equipment designed and manufactured by a national telephone equipment manufacturing industry. This is the position in England, Germany and Sweden and other parts of Europe.

(iii) The operating authority either imports its material or has it manufactured by local factories which make to order. This is substantially the position in Australia.

There may be a tendency for the authori- ties to cut back production to the extent of the capacity of the authority to meet its own needs. For instance, the optimum balance in design can be struck between manufacturing costs and user costs (that is installation and maintenance costs). Where the telephone authority buys from a separate manufacturing industry then there must be a tendency for the authori- ties to tend to concentrate on the manufacture of its own equipment. In such a country, for example, the authori- ties must be encouraged to concentrate on the manufacture of its own equipment. In such a country, for example, the authori- ties must be encouraged to concentrate on the manufacture of its own equipment. In such a country, for example, the authori- ties must be encouraged to concentrate on the manufacture of its own equipment.
of competition including the ability to buy the latest development at the nurtured stage. Even if the telephone authority must buy from its national industry and there is no internal competition, there is intense competition with other authorities. Wherever efficient economies of scale exist, this ensures that the industry remains technically progressive even if there is no price competition in the home market.

A reasonable conclusion to be drawn is that the Bell System practice is not necessarily the best from the point of view of competitive service but that it preserves the best of the economic advantage between manufacturing and user costs. It should always be kept in mind, however, in examining any Bell System practice that the association of the Western Electric Co., and the Bell System will result in a different approach to the design of items of plant in which manufacturing aspects of the design are given more weight than when the item is designed by an authority whose main interest is in operation and maintenance.

Australia and Canada differ from the U.K., European countries and the U.S.A. in that there is no national telephone manufacturing industry—while most requirements are made in Australia they are to overseas designs and patents and imported equipment is largely custom built. One result is that there is more freedom of choice of design than in the case of overseas administrations. For instance, it would hardly be conceivable for the B.P.O. or Bundespost to adopt the Swedish cross-bar technique and ignore the technical developments and the patent pools of the national telephone industry; the freedom of technical choice of the Bell System must be limited by the manufacturing and technique of overseas designs and the commercial and manufacturing freedom does not exist. This technical prestige is sufficiently high that it is a choice of design influences other customers.

Technical and Administrative Continuity

Recent technical development such as the Broadband Programme, the E.L.S.A. and A.T.T. electronic experiments and projects are regarded by engineers as being necessary to modernise the “technical capability” and give a comparison with the Bell System—B.P.O. and Bundesystem “standardisation”. One result is that developments and modernisation to electronic design and equipment can be effected simply and with little risk. Wherever technical changes in the more complex overseas telephone systems must be closely and cautiously examined for side effects. Another probably more important result is that these three authorities have programmes to develop larger technical headquarters staffs.

Another factor is the comparatively small scale of organisation in Australia. The Bell System and the Department are organised along similar lines except that there are three tiers of authority in the Bell System—the Operating Company, the Regional Company, and the Company headquarters (A.T. & T.)—compared with the two—State Administration and Central Administration. Further, the scale of magnitude is perhaps in the ratio of thirty to one. Consequently there is much more opportunity in Australia to collect information, make decisions and put them into practice quickly and accurately. This is the advantage that Bell System have. But part of the complexity due to sheer size of the Bell System must be slow moving and cautious and give the appearance of being conservative. Similar remarks apply to the B.P.O. and Bundespost except that they are smaller in volume and territory than the Bell System and consequently can operate with somewhat more speed and flexibility.

The conclusion is that the large overseas authorities must be more cautious and slow moving than we are in technical matters and the fact that the Bell System or B.P.O. has not adapted a new practice is not necessarily a good reason why we should wait—it may merely be that administrative difficulties are delaying its investigation and introduction.

AUSTRALIA & NORTH AMERICA

General Conditions

In spite of being aware of the dangers of unwarranted acceptance of overseas matters it is difficult for an American visiting U.S.A. and Canada for the first time to avoid being so impressed by the technical similarity of the three countries to the extent as to unduly influence our minds towards North American techniques. There is such a similarity that even someone who goes to Australia after a visit to the U.K. and Europe where conditions, ideas and conditions are obviously very different from these countries, is not so much at home as he is bound to be biased towards American ways.

These are the views not only of the writer but of every experienced person with whom he has discussed the matter. Since Australia has been in contact with U.S.A. and Canada their methods are generally suitable for use here. But there are sufficient important points of difference to make the unwarranted acceptance of American ideas a dangerous procedure.

The first important aspect of similarity between Australia, Canada, and the U.S.A. is the large physical area of these countries compared to European countries.

Secondly, these three countries are new. For instance the modern development of U.S.A. has been accompanied with the opening of the West and the inauguration of large scale migration after the end of the Civil War in 1865. Australia’s growth commenced about the same time with the discovery of gold. Thus both countries grew in the age following the Industrial Revolution and the previous era has left little mark—this, for instance, is probably the reason why Australian cities appear so similar in character to American cities and with some cities similar in character to European cities. As a result there is little tradition in either country and people are probably more open to new ideas and new techniques.

Neither country has suffered modern war on its own soil, a factor which, particularly after seeing the results of air damage in Europe and England, must have a profound effect both on the economy and the outlook of the people.

Another factor is that the economy has been consistently expanding for a century in both countries and there has always been scope for application of new techniques and practices.

While an Australian feels at home in the U.S.A. and life in both countries is similar in many ways it is not correct to say that Australia is “Americanised” —it is rather that both are New World countries and the customs, manners and problems in each are those of the New World. There are, however, some very important differences between the two countries which must be taken into account.

The first point is the great economic strength of the U.S.A. The wealth of the U.S.A. is well known and much published in terms of statistical data but first hand observation is necessary to really appreciate the position and to quell any scepticism that may be felt about the statistics. Quoting some diverse examples.

1. High incomes combined with low costs of living. For instance, engineers at A.T. & T. Headquarters, New York equivalent to Sectional and Divisional rates, pay $10,000-$13,000 (in U.S.A.) and $9,000-$12,000 (in Australia). These are good, but not exceptional salaries. Their living expenses, for equal standards, would not be much higher.

2. A flight from St. Paul to Denver, a distance of about 790 miles across the heart of inland U.S.A., was over fertile farm country for its full distance. A similarly placed flight in Australia would be from Alice Spring to Coolgardie across barren desert country. The U.S.A. is endowed with a rich soil, adequate rainfall, a temperate climate, as well as with great mineral and other resources—it is a country richly endowed by nature.

3. It is most impressive in the Bell System to see the number of engineers who can be directed to work at a single task. Proportionally more Engineers are employed in England, or Germany than in Australia, but, it is clear that the Americans can and do put far more pressure and pressure pressure than we have given to such men in either England or Germany or Australia.

However, there is a wide disparity between the economic strength of the different parts of the U.S.A. and while the
Northern and Pacific coast States are undoubtedly the most prosperous area as in the world. The Southern States are comparatively weak economically. These comments apply to the North.

Another factor is the comparatively small population and relatively immaturity of industry in Australia. This has many effects, one being that there is not the weight of demand for service that there is in the U.S.A., and another being that Australia's resources have not been developed to the extent required to meet the demand.

Conclusions to be drawn are that needs for service in the two countries may differ in both type and intensity, the economic way of meeting them may be different and finally types of services which can be provided in the U.S.A. may not be feasible in Australia due to our inferior economic position.

Availability of Skilled Trademen

There appear to be few facilities for training skilled trademen in the U.S.A., such as the apprentice scheme familiar in Australia. For instance, the Bell System does not operate any equivalent to our 5-year training course for technicians or even the shorter course for training linemen. Craftsmen are recruited directly from school and are given a period of time in both shop and field in short classroom sessions from time to time. This is typical of Australian methods as a whole and has the repercussion that trade skills are highly valued in the U.S.A.

In fact, when enquiring as to how such skills as teletyping acquired a satisfactory answer could not be given, but it was suggested that such of such tradesmen are migrants from England.

This lack of a force of skilled tradesmen is an important repercussion on plant design, in that every effort is made to "pack" field operations in the U.S.A. As much of the installation complexity as possible is taken out of the task by designing the item so that most of the skillful work is done in the factory and installation becomes largely a simple attachment task. This approach is given added impetus by the heavy competition on the award of contracts by workmen in the U.S.A. Under the apprenticeship training scheme the tradition is trained in every branch of his craft, particularly in the first principles whereas in the American scheme trademen are trained to be skilled for the task in hand and nothing more.

Side by side with this absence of a large body of skilled workmen is a relative shortage of engineers that technical practices and designs can be usefulness and engineering designed and made suitable for use by a relatively unskilled body of workmen.

Hence it follows that many American designs and practices are unsuitable for Australian conditions and of the difference in the proportion of engineers to skilled workmen here.
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areas where service cannot be guaranteed on demand, but everywhere else the telephone is an essential part of the service the public wants. Indeed, in some rural areas where the telephone is the only means of communication, the loss of service can be a serious risk. As there are now few areas in which the telephone will have been in service for less than a year and where it has not been connected one or two days after it was ordered.

Other reasons for this promptness, apart from the desire to capture as much of the growing business of the capital and hence of the company, are:

1. The electrician supervisor controls the work at both the exchange and on the line.
2. The use of a line feeder installer associated with a form of outside plant construction which allows one man to run a length of drop wire, in the case of new installations, on many parts of Australia is similar.
3. Pre-judging at the M.D.F. is done the night before.
4. All testing of the installation is done by the installer using a simple battery-operated tester and an exchange type tool. If any component is faulty he reports the whole installation and not just the premises. The new service is then treated as a failure and not as a fault through the fault procedure.
5. Paper work is kept to a minimum by the installer reading his commission data from a tape recorder at the Service Center. He does not submit a written completion order.
6. The exchange Test Desk does not check any new private customer's services. It is employed for maintenance and fault testing only. This procedure was adopted to avoid a multiplicity gap due to shortage of staff and equipment testing by the line installer. A test, satisfactory and the saving in staff, equipment and time, was more than offset as the result of this, the previous system, as at present, is for the installer to test the premises before the customer.

Another important factor is the positive drive to ensure that all work is completed within the time. The efforts of all persons involved in these operations is instilled in the company by the supervisor and by the supervision on the basis that every order must complete a certain proportion of his work before he is allowed to take over another order or task. In the majority of cases the supervisor can count on the co-operation of the customer to this end. It is not unusual to have orders of 96% or more on the day they are placed and a continuous critical record is kept of its performance.

The procedure in Germany is that the Customer Service Department contacts the Cable Recorder by telephone and requests a telephone to be made available. The order is completed with installation and posted to the installation staff. The Bundestag work is kept to a minimum as it is unnecessary to have service within five working days.

In England the average time for completion of order work in London is three weeks in the case of direct dialing to the country and 18 weeks in the Engineering Division. In the Provost 66% of Orders are completed within a month, the majority being within 2 to 3 weeks.

Corresponding data is not available in Australia. It is not unlikely that the performance would be as good as in any of these, even for areas where both exchange numbers and cable pairs are available. The reasons are probably the use of the cable pairs to complete work at the subscriber's end. In the other countries the installation is complete before the article's end and the paperwork is simpler as the subscriber is informed and the premises are moved before the exchange interior is completed and finally both the delay for the order and the final delay for the final installation arrives at the subscriber's premises.

Particularly by comparison with the Bell System there seems a lack of positive drive to expedite this phase of work which is probably the most important of all in regard to good public relations.

Apart from the use of two separate sets of work to complete work at the subscriber's end, completion of the work, in some cases, is spread between three different divisions. M.D.F., Service and the Engineer's Division. At Bell, the Engineer's Division is a single body of work and the M.D.F. and subscriber's installation for the instrument. The least common of being is probably the Superintending Engineer, Metropolit.

A better agreement for management would be the use of certain single divisional units covering the exchange and all work on the exchange, and also of the work at the M.D.F. This is the practice in New Zealand, where the M.D.F. is partitioned to a similar extent and is the responsibility of the external Engineer Plant Engineer. The work is then carried out by the installer and then all work directly associated with the subscriber's installation would be controlled by a single Divisional Engineer.

MATERIAL SUPPLY

ORGANISATION

The scale of the problem in Australia is larger than might be expected. England and Germany are stereotypically small and the material distribution and control problem is simplified thereby. The volume of all work handled in Australia is surprisingly high. The material required for the year is 500,000 pairs or more per year and consists of about 35,00000 pairs per year. The consumption in the U.K. is 160,000 pairs per year in 1960. Bell System requirements of cable are estimated at 250,000 pairs for 500000 per year of 1000000 pairs per year.

Bell System requirements of cable are 1000000 pairs in the U.K. and 4000000 pairs in the U.S.A. The relative quantities of cable used in Australia, U.K. and U.S.A. are not proportional to the number of subscribers in the three countries and this suggests that the length of subscriber's loop in the U.K. is less than in Australia and is substantially larger in the U.S.A., than in either — this is undoubtedly due to the large size of exchange areas in the U.S.A.

Figures were not obtained for Germany but the output of the Bell and G G, plant in Copenhagen is about 350,000 pairs per year. This is not the total output of F. & G. as they have plants in other parts of Germany. A factory producing 350,000 pairs is in a large country and the German cable industry standards but Australian factories have a comparable volume of output.

In both the U.S.A. and U.K. the estimating of material requirements is a major difficulty and no completely satisfactory means of doing so have yet been developed. Shortly before I was in the U.S.A. the President of the American Telephone & Telegraph Co. had become so concerned with inaccuracies in forecasts, particularly underestimates and subsequent shortages, that he had written a personal instruction that material should be supplied in such quantities as to keep output at its highest levels in the Operating Companies (i.e. our State Administrations).

Both the B.O.P. and Bundespost work on negotiated contracts and the administration of the Western Electric Co. to the point where the tender system is simpler than with the public tender system used in Australia. In the Bell System, The Telco Electric Co. fulfills the role of Supplies organization, Western Branch and under-taking and public tender as in Germany it is not used. There are no administrative or sales difficulties in ordering material promptly. Material is manufactured in Western Electric Co. factories or bought by the Company from outside suppliers to W.E. specifications. Stocks are held at warehouses located at suitable points throughout the country from which the Operating Companies draw as required. Although Western Electric Co. is part of the Bell organization, it is required to show a profit in its own right and consequently seeks to maintain minimum inventories to the lowest practicable level and ability to supply any item on demand. The inability to supply an item means loss of profit on its sale to the Operating Company as well as the administrative penalties which the Company will enforce if the Operating Company is unable to provide service for this reason.

The Bell System uses "long-term estimates", and "short-term estimates" of material requirements. These estimates originate in the Operating Company. "Long-term estimates" cover the forecast of the time and quantity of material works such as switching plant and large cables which are normally supplied from the factory direct to the job. "Short-term estimates" cover day-to-day requirements of plant items, telephones, poles hardware and the like which are carried in the Western Electric Co. warehouses to meet demands from the Operating Companies in the same way as the Stores Branch carries stocks to meet Engineering Division demands.

The short-term estimates are prepared at monthly intervals covering a period of 6 months ahead and they cover about 80 "key items" from which are computed the requirements for all items of this type. Statistics of past usage of all items of plant are held by the Western Electric Co. and it is possible to match the forecasted requirement of key items. However, the Operating Company is not always satisfied with the accuracy of these forecasts, and some of the reasons the usage of certain general items is not matched with the associated key items. In the Western Electric Co. must be notified. The estimation is made when the system is line hand and estimate recoveries, is forwarded to the warehouse of the telecommunication, it is examined and a proposed delivery schedule for the items required in the period. This delivery schedule is re-tended to the warehouse where it is available for checking and agreed by both the Warehouse and the Telephone Company. It will be noted that the arrangement of agreements with the telephone companies is, for example, except for the accumulation and analysis of data over a lengthy period, which has enabled a few key items to be considered as a basis for computing material requirements.

THE BELL SYSTEM AND SERVICE TO THE PUBLIC

A strong impression is gained of the desire of the Bell System to serve the public in every possible way. This appears to be typical of American business in such public services as retailing, etc., where there appears to be a genuine desire to provide good service and it is, undoubtedly, part of the American business philosophy. But the emphasis on service appeared to run deeper in the case of the Bell than the normal desire to provide good service for good profit. In fact, the Bell System has a deep sense of responsibility to the public quite apart from any question of profit.

An impressive example is the efforts just discussed to provide subscribers' telephone service at short notice. Two features that impressed were the bell on their standard subscribers' telephone and their public telephone set. The bell has a deep melodious ring which can be adjusted for volume from almost silent to a loud clamour. As anyone with a young family knows, this is a valuable feature in a telephone which is also of assistance to the public because the position of the subscriber is not to be released before the subscriber has had his fill of ringing and disturbing the household.

The public telephone had 3 coin slots and no buttons and was simple and easy for the customer to use. By comparison, the 4d. tariff creates an inconvenience because the weight of four pences is such that an average person may not have four of them in his possession when he wants to make a call from a public telephone and is less likely still to have four if the first call is ineffective. This trouble particularly arises due to the large size of Australian coins compared to American ones. It is the type of problem which the Bell System would give serious attention to.

It could be stated that the Bell System is a customer-oriented and their whole organisation and outlook is developed so that customers' needs are met speedily and promptly. Although an awareness in Australia of this, the organisation is not geared to meet the customers' requirements so much as much to the increasing efficiency and it could well be re-examined from this point of view.

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