Telecom Australia

Minute

File

Subject HISTORICAL STUDY OF TELECOM AND ITS ANTECEDENTS

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To EXECUTIVE AIDE - ENGINEERING DEPARTMENT

With reference to the General Manager, Engineering's memorandum of 27.2.81, the attached copy of part of a document prepared for the ANZAAS Conference in Hobart 1965, is of interest. You will note that it indicates that the first telephone trunk line in Australia was provided between Hobart and New Norfolk, a distance of 22 miles, in 1899. Further, the submarine cable from the mainland to Tasmania via King Island, laid in 1935, was the first submarine coaxial cable provided in Australia and at that time was the longest telephone submarine cable in the world and only the second carrier type submarine cable in the world. The information on repair activities with this cable were rather unique and could also be of interest.

It might be useful to contact the historical groups which I think exist in all States now, for the purpose of getting past historical matters of significance.

The open wire phase of our communication development, particularly in view of the very long east-west route, might also be worthy of inclusion as an item.

It was noted that Mr. N.M. McDonald, a retired officer, has been listed for information on the Sydney/Melbourne coaxial cable project. Mr. McDonald also has a very deep and long knowledge of transmission developments generally in Australia and I am sure he could provide some useful information for this purpose.

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copy to:

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Development of the Telecommunications System in Tasmania

1. Introduction

The island State of Tasmania situated some 200 miles off the South East corner of the Australian continent is the smallest state in Australia. It has a population of approximately 360,000 and this is spread over an area of 26,215 square miles. In area it approximates the size of Scotland or rather less than one third of the area of Victoria. In population it represents about 3.4% of the national total.

Notwithstanding its small size, the Development of the Telecommunication system has kept pace reasonably well with the development in the larger states both in rate of growth and in the introduction of modern equipment and techniques. At present the overall system is increasing at the rate of 6% per year, i.e. doubling every twelve years.

2. Historical

As the second oldest colony, Tasmania has many historic links with the early settlement days of Australia and this tradition has been followed in its Telecommunication Development.

For example, the first telephone trunk line in Australia was provided between Hobart and New Norfolk, a distance of twenty two miles in 1889. Surprisingly this pole route was only dismantled in 1962 following provision of an underground trunk cable.

The first direct telephone lines in Tasmania were established in 1880 between the Hobart Post Office and the following centres:

Moonah Post Office (a suburb of Hobart)
Mt. Nelson Signal Station, and
Government House.

The first of these was provided on the 15th September, 1880, and this was the same year that the first exchange in the Southern Hemisphere was established in Melbourne. It is notable that this exchange in Melbourne followed only four years after the invention of the telephone in 1876 and two years after the first telephone exchange in the world established in New Haven, Connecticut, in 1878.

In the Northern area of Tasmania the first direct telephone line was provided between the Post Office at Launceston and St. Leonards, a distance of five miles in 1881.

The first exchange in Tasmania was brought into service at Hobart on the 6th August, 1883, with five subscribers. These subscribers were as follows :

Sub no. 1	Doctor Smart
Sub no. 2	Observatory
Sub no. 3	Doctor Crowther
Sub no. 4	General Hospital
Sub no. 5	The Superintendent of Telegraphs (Mr. K. Henri)

Subscriber number 3 was still held by Doctor Crowther (son of the original Doctor Crowther) until the conversion of Hobart Central Exchange to automatic working in 1929. This was the first automatic exchange in Tasmania and was established seventeen years after the first in the Southern Hemisphere at Geelong, Victoria on the 6th July, 1912. The second automatic exchange in the state was provided at New Town a suburb of Hobart in 1930, and the first country rural Automatic Exchanges were provided at Ross and Hagley in 1935/36.

In the interstate sphere the provision of a communication link from Tasmania to the mainland received early consideration and in 1857 a route for a telegraph submarine cable to link Tasmania and the Mainland of Australia was surveyed from Cape Otway, Victoria to Stanley, Tasmania, via King and Three Hummock Islands a route distance of 127 miles.

The following extract from the "Key Note" Official Organ of the Tasmanian Postal - Telegraph Association, July, 24th, 1901 gives this information about this enterprising project;

> "The first cable agreement was signed on 10th February, 1859, by Messrs. McNaughton and Co., of Launceston (Alexander McNaughton, merchant, Launceston; Thomas Brown, merchant, Hobart; and John Dunn, the younger merchant, London) for the construction of an effective line of electric Telegraph from Cape Otway to Low Head via Circular Head, The contract price was £45,000, and the route specified was from Parker's River, Cape Otway, by cable to Victoria Cove in King's Island, thence overland to Sea Elephant Bay in King's Island, thence by cable to West Bay in Three Hummock Island, thence overland to East Bay in Three Hummock Island, thence by cable to West Bay, Circular Head, thence Overland (about three miles) to East Bay, Circular Head, and thence by submarine cable to East Beach Bay, Low Head, near George Town."

From Low Head an overhead line was to be erected to Launceston and thence to Hobart. On 18th August, 1859, cable laying was completed and a telegraph circuit established; however, frequent interruptions occurred and the cable failed completely between King Island and Tasmania on 28th April, 1860. Following several unsuccessful attempts to repair it, the cable was abandoned. Telegraph communication was not re-established with Tasmania until 1869 when a new cable was laid between Flinders, Victoria, and Low Head. The cable was duplicated in 1885 and two new cables over the same route were laid in 1909. These cables to Low Head remained as the only means of communication to the mainland until the commissioning of a new cable via King Island in 1935. The old cables although abandoned were not forgotten and in a "secret" operation during the last war were recovered for re-use in the New Guinea area. However, it is understood that they did not operate satisfactorily for very long. The new submarine cable was laid by the C.S. Faraday from Tanbryn, Victoria to Stanley, Tasmania via a repeater station at Naracoopa, King Island, in 1935. This was the first submarine co-axial cable provided in Australia and at the time was the longest telephone submarine cable in the world and only the second carrier type submarine cable in the world. The northern section (Mainland - King Island) is 78.92 miles in length and the Southern section 82.04 miles. This cable operates in the frequency range from 0KC to 110KC and provides 15 - 3KC speech channels and one reversible broadcast channel. Originally in 1935 four telephone channels were provided but traffic increased at such a rate that two channels were added in 1937 and a further two in 1946. In 1954 an additional nine channels were provided at the expense of the two added in 1946. The routing of this cable and the earlier cables are as shown on Attachment 1.

The difficulties with the submarine cable provision to the mainland have continued and major cable faults with the present cable have occurred in 1938, 1940, 1943 and 1957.

In 1939 following the repair of the first fault a rather unique underwater inspection of the Southern cable was made by a diver 'riding' the cable on an underwater sheave for 27 miles, being towed by a ketch, the 'Julie Burgess'. This special inspection provided valuable information on the state of the cable and the conditions of the ocean bed. The faults up to and including those in 1943 were all associated with the Southern section of the cable. In each case the failure had happened practically without any warning and was complete within a matter of hours, or at the best within a few days. All were found to be due to abrasion of the cable by the rocks of Sea Elephant shoal (off Naracoopa) and by abrasion of the cable against

itself (where loops or kinks of the cable had been formed due to excess slack). The southern cable is laid across the Shoal over a distance of approximately 4 - 8 Nauts from King Island, and three faults were all located in this section of the cable. Other abrasions which had occurred in this section had necessitated the replacement of long lengths of cable; thus in 1943 a length of about 4 Nauts had been replaced.

The 1957 repairs were the culmination of a long deterioration in insulation resistance which commenced in the Southern section with a sudden drop in December, 1945. The IR of each cable in good condition is of the order of 500 - 2000M ohms, and it dropped at this time to lower than 100,000 ohms. However, as distinct from previous occasions no further deterioration occurred. It was well known that the application of a DC - Voltage to a submarine cable normally results in an increase of insulation resistance due to "polarisation" effects and accordingly, it was decided to apply a 'polarising' potential to the centre conductor in order to restore the insulation resistance, as far as possible, to the original value. The polarising potential, applied on the 1st January, 1946, was obtained from a 22.5 Volts battery applied to the centre conductor through a resistor of 2 M ohms, the centre conductor being DC - separated by means of capacitors from the equipment at the cable stations. The effect of the polarising voltage was most satisfactory, resulting in the insulation resistance being increased to about 100 M ohms, and maintained in the 5 - 100 M ohms range for 5½ years, when a sudden drop to the range 1 - 10 M ohms occurred. This range was maintained for 5 years (up to November, 1956), and a 0.25 - 5 M ohms range was maintained until 14th January, 1957, when a further violent decrease occurred. As consequence of this, the polarising current was increased to 45V through 100 K ohms. This did produce an improvement, but at irregular intervals very low insulation resistance, that is of the order of a few hundred ohms, occurred. The Northern Cable commenced to show signs of deterioration in August, 1949, but a really serious drop in insulation resistance did not occur until late in June 1950 when a decrease from the order of 800 M ohms to the range 0.1 - 10 M ohms occurred. As a consequence a polarising voltage was applied on the 2nd July, 1950, resulting in the insulation resistance being maintained in the 5 - 170 M ohms range up to August, 1954 and in the 0.5 - 10 M ohms range from this date until the repair in April, 1957.

Repairs of submarine cable are extremely expensive and for this reason accurate pre location of faults before commissioning a repair ship is most desirable. The necessary pre location of the fault in 1957 could not be properly carried out until the insulation resistance reduced to a figure of about 30 K ohms and the location

required the special adaption of Pulse Echo techniques by P.M.G. Engineers. This method gave an accurate location of the major fault which was found 4.65 nauts from King Island. Other sections of the cable were found to be badly damaged when the cable was picked up and faults were also found in the two Southern Cable terminations and the Northern Cable termination at Naracoopa. A length of about 8 nauts of cable was replaced in this repair operation.

The last cable ship used for repairs (the "Matai") was located at Wellington, New Zealand, and was not normally staffed. The time taken to obtain a crew and make the voyage to Bass Strait was of the order of three weeks and the cost of chartering the ship in the vicinity of £1,000 a day. The P.M.G.'s Department subsidised in conjunction with the New Zealand Post Office and Cable and Wireless Ltd. the up-keep of this ship until fairly recently. However, it has now been replaced by the "Retriever" following provision of the Compac cable, and establishment of an agreement with the Pacific Cable Management Committee that the ship would be made available to the Australian and New Zealand Governments if required. The base for this ship is Suva and accordingly as the cost of repair to the Bass Strait cable would now be much higher than before the ultimate future of the cable is in some doubt.