

NEW ZEALAND POST OFFICE.

RADIO INFORMATION BULLETIN

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1. FROM THE WELLINGTON RADIO DEPOT

New buildings for the V.H.F. Base Stations at Pukerua Bay and Normandale are now completed and work is proceeding with the installation of equipment at Normandale. The Radio Depot, cable, rigging and workshops staffs have the job well in hand (in spite of "flaming" obstacles beyond our control). The Normandale site, high in the western hills above Hutt City, commands an outstanding view of Greater Wellington taking in the Hutt Valley, Petone, Wellington harbour, city and Eastern Bays and surrounding hills. This station will provide a service for Hutt City and upper valley, also Wellington and Eastern Bays, supplementing Wright Hill.

Installation of the new standby power plant for Wright Hill has been delayed due to losses in the recent Workshops fire. As the present plant for Wright Hill will not cope with extra lighting loads all lights must be switched off during power failures. As there is no natural lighting at either the receiving or transmitting stations when a power failure occurs while the stations are manned, the "cockpit" drill of the Radio Depot staff has to be seen to be believed. Some smart action is required to prevent the machine cutting out on overload, if you doubt this try finding pull switch cords in stygian blackness yourself sometime.

The Radio Depot was the object of a recent burglary when a quantity of lunchroom chairs were removed. It's my turn to sit down a week next Friday.

2. ROYAL TOUR

Pictures to be transmitted overseas from New Zealand must usually be forwarded to Wellington or Auckland Chief Post Offices where permanent equipment is installed. But during the recent Royal Tour a direct picture transmission service was made available at every centre visited by H.M. the Queen and H.R.H. the Duke of Edinburgh.

This was achieved by supplementing the permanent installations with temporary stations set up by mobile parties. Each party consisted of an operator and a radio technician complete with Hell facsimile transmitter equipment, spare and Holden car. Maurie Hague, operator, and Keith Surridge, technician comprised party A commencing operation at Waitangi. Party B started at Tauranga with Joe Littler, operator and Boyd Brown technician. The parties then leapfrogged until the end of the Royal Tour at Christchurch.

An indication of the need for this service may be gained from the number of photographs handled by the mobile parties -

Waitangi	42
Tauranga	3
Napier	6
Nelson	2
Blenheim	Nil
Dunedin	16
Christchurch	24
	—
Total	93
	—

In addition to these figures a further nine photographs were accepted at Waitangi but, after a marathon transmission period, lasting about seventeen hours, were dispatched by road to Auckland for transmission. All were sent via inland toll circuits and COMPAC cable to Melbourne PIX terminal and then to their Australian or U.K. destinations, with Wellington PIX acting as monitor station.

No inland photo-telegrams were transmitted by the mobile parties because photographs could either be transported quickly to local newspaper offices or when wire transmission was required the press photographers used their own portable facsimile equipment over normal toll circuits.

3. TRUNKLINE SUB-SECTION RADIO SECTION

Progress is being made on all fronts though perhaps slowly in the case of some. However, some of our activities during the past few months are given hereunder.

Propagation testing for the Auckland-Whangarei and Hamilton-Tauranga-Rotorua microwave systems has finished and has kept people "on the move" and away from home for over three months. The victims were Jack Skurr (Radio Section) Robin Holdsworth (Hamilton) Neville Gregory (Auckland) Earl Plimley (Auckland) and Melvyn Woodgyer (Radio Section) and riggers C. More and A. Stewart. The sites tested were Kamo, Brynderwyn, Moirs Hill, Airedale Street, Hamilton, Sanatorium Hill, Kaimai, Tauranga and Mt Ngongotaha.

Incidentally, the extent of the bits and pieces comprising tower sections to attain a tower height of over 200 feet, as was attained when testing at the Airedale Street site in Auckland, attracted much public interest.

Actually, when fully mobile the site testing team were asked at one place whether they "belonged to a circus". No wonder, when one was confronted with two towers in broken down sections, together with associated rigging and other equipment loaded on a large flat top truck and also an Army 4X4 vehicle loaned for the job, plus two land rovers each drawing a caravan, and an Austin Gypsy functioning, among other things, as liaison vehicle to the troupe.

Lenkurt Type 76A equipment, which has already been shipped, will be used at the above-mentioned systems. Buildings will not be ready before December this year so installation will be later than had hoped. We propose that installation be done by districts under the guidance of a key man (or men) from Radio Section.

Incidentally the staff here at Wellington East on Trunkline work at the moment are Messrs Aked, Skurr (when not out propagation testing), Holloway (when not overseas) Van Loo, Dewar, Motion (when not on reporting) and Sandford.

Quotations for the Wellington-Christchurch-Dunedin microwave system have been processed and an order placed on Lenkurt International. The work will be done under the supervision of the company with assistance by our staffs. We hope Wellington-Christchurch will be operating early 1965 and Christchurch-Dunedin shortly after which are advances on our schedule and brought about by the optimism of the company!!!

Planning is under way for a microwave system Palmerston North-Masterton-Wellington. This means some foot slogging north of Masterton since contoured maps are not available for some areas north of this town.

4. FROM OUR PALMERSTON NORTH CORRESPONDENT

(a) Microwave Link: Staff Training

Five courses have been held to date, with staff from the Hamilton, New Plymouth and Palmerston North Depots attending. The courses are of a practical nature with no more than three officers present. They have been very successful and, besides the main purpose, have enabled staff from different districts to share their knowledge and problems of all phases of our work. We are very appreciative of Roy Schdroski's part in establishing this training course and it was with pleasure that we met him recently and discussed the usefulness of the programme.

(b) Marconi 48-channel Links: Staff Training

A complete set of terminal equipment is installed here and we are awaiting the completion of instructions now in the course of preparation in Radio Section.

(c) Land Mobile Services

A number of surveys have been carried out recently the most interesting being one with the base established on Mt Tauakira, a remote place inland from Wanganui.

Murray Smith from this Depot and Graham Mai from the Wellington Depot manned the base for a few days. Results of the survey are being prepared as fast as possible but time was found to immediately deal with the tasty pieces of venison which the boys donated.

We are not yet in the new building at Saddle Road but have recently started the installation. It is unlikely that this building will suffer the fate of the Transport Departments' aerial, installed on the same site, and be blown to pieces although it might be prudent to wear a parachute when using the small out building.

(d) Radio Mechanics Training Papers

Our congratulations to the officers who mark the boys papers. With such a large number to mark it would be easy to let mistakes, technical and spelling, slip through. We are pleased to see that each paper is very carefully examined.

(e) Visitors

Since this Depot was established we have met many of the technicians (Carrier and Radio) from a number of Districts, mainly because of the courses which have been held in Palmerston North. It has been a pleasure to meet them all.

5. QUARTZ CRYSTAL PRODUCTION

It may be of interest to readers to learn that, in the financial year just completed, a total of 3915 crystal units have been manufactured or repaired by the Post Office Crystal Laboratory. Located at Rugby Street, Wellington, and employing a staff of 6, this section now produces a range of seven types of holder. Of the total output, only 30% was for the Post Office, the remainder being supplied to the Armed Services and various other government departments.

6. CONTRIBUTION FROM THE AUCKLAND DEPOT

Our Auckland Radio Depot Scribe reports that considerable activity has been seen in the Auckland district recently. Starting with the completion of the Auckland-Sydney section of the COMFAC cable came the PIX machine installed in a specially equipped room on the top floor of the C.P.O. One large room has been converted into three dark rooms for developing the negs, the prints and the machine. One only is installed at present but provision has been made for two machines in the future. The equipment had to be in use for the Empire Games followed by the Royal Tour. Overheating became the major problem and large size flexible piping was used to draw in air from outside the building. During the period 17.11.62 to 31.3.63, 84 pictures were sent and 124 pictures were received.

The Royal Tour involved the Radio Depot in the installations of a 5-channel G.E.C. V.H.F. R/T circuit between Waitangi and Russell P.O. Also the installation of duplicated equipment in a Fairlane car. A L.F. to V.H.F. link was established between the Britannia-Mt Eden-Pukekohe and ZLD at Musick Point to allow communication between the V.H.F. equipped cars and the Britannia if the ship was out of V.H.F. range.

Two members of our staff have been on loan for the Microwave survey covering the Hamilton-Cambridge-Kaimai-Rotorua and Tauranga links, also the Auckland-Moira Hill-Brynderwyn-Kamo Hill link, and a proposed Auckland to Bombay link.

Communications for cable repair work in the Waitemata Harbour have also featured rather prominently involving the Radio Depot in the supply of V.H.F. R/T sets and batteries to Launches, barges and cars and the establishment of lines to R.C.U.'s in exchanges, E.O.'s and manholes. These circuits have proved invaluable to the cable staff whilst grappling for the faulty cable, and again when the repaired section is being lowered into the water.

A survey for a V.H.F. R/T toll link between Auckland and McCallums Island has been completed. This link will allow direct dialling into the Auckland Automatic Telephone system. Country set equipment with the necessary adaptor unit will be used.

Equipment for the Transport Department (Traffic) service was installed in time for the Grand Prix meeting and consisted of a Base Station at Mt Victoria on the North Shore controlled by lines from the Auckland Office. The Base triggered off a set of equipment at Warkworth and Pukekohe giving a fairly wide coverage.

In addition to the above the V.H.F. R/T service has been rushing ahead and the figures to date are 95 channels 328 subscribers and 2,795 mobiles in the area bounded by Warkworth in the north and Pukekohe in the south. Owing to the rapidly changing position the above figures apply as at 1100 hours 1.4.63. Owing to restrictions as to the number of masts that can be erected on Mt Eden attendant additional aerial loading at Mt Eden is becoming a problem. We are now proposing to feed 32 transmitters into the one aerial to try and overcome the problem. Also, at Mt Eden an extension to the present receiving station to house the standby generators is nearly completed and has been so designed that tourists can stand on the station roof and take in the lovely views.

Reconstruction of our V.H.F. stations at Pukekohe, Manurewa, Mt Eden, Glen Eden and Torbay is being carried out where necessary and more up to date equipment is being installed. The arrival of additional high quality test equipment has enabled a speed-up in the work and a more workmanlike approach to fault finding. A school has been started out at ZLD with the accent on practical work only such as soldering, fitting of connectors of all types and an introduction to alignment and tuning of sets as used by the Post Office is also undertaken. This school is an endeavour to bring our intake of junior staff up to a level where they can assist our hard pressed senior men in construction and fault clearance.

The training in practical work is not very difficult with the type of trainee we are now getting, considering that the majority are straight from college with very limited actual construction practice.

7. OVERSEAS TOUR: MESSRS D.C. ROSE AND P.L. HOLLOWAY

Messrs D.C. Rose and P.L. Holloway from the Radio Section recently spent some five weeks in Geneva, representing New Zealand at the three-yearly assembly of radio people whose job is to make recommendations on all technical matters pertaining to the worlds radio systems, particularly in the international field.

This conference (the Plenary Assembly) of the C.C.I.R. (International Radio Consultative Committee) made vital recommendations as to how the new satellite services are to fit into the radio spectrum which is already over-crowded with many other radio services right up to 10,000 Mc/s. All the latest information on transmitters, receivers, H.F. services, microwave systems, mobile services and many other technical developments were examined and it seems as though, before very long, we will have to look to the tightening up of the frequency tolerances of our transmitters and receivers. (What? Again! You may ask).

A thing which is becoming increasingly obvious is that many of the former under-developed nations are making rapid technical advances and, of course, are using their share of the radio/frequency spectrum,

On their way home Messrs Rose and Holloway spent a few days in the U.K. where they saw 12 $\frac{1}{2}$ kc/s channelling land mobile equipment and the latest transistor repeater for submarine cables. A visit to Dollis Hill, the B.P.O. research headquarters revealed that in radio research a large number of people had been diverted from their normal jobs on to space communications development, and among the items seen there were parametric amplifiers, a new maser amplifier and one end of a 11,000 Mc/s radio relay link which is being used to corrolate propagation with rainfall.

Among the items discussed at Dollis Hill were the new electronic exchange; the startling new point-to-point H.F. radio system which extracts the amplitude information from a single sideband signal and transmits it as a frequency modulated sub-carrier; the use of pulse code modulation for telephone trunk circuits; and the 2,700 channel microwave system for the 6,000 Mc/s band.

The B.P.O. Space Communications Earth Station at Goonhilly Downs in Cornwall was also visited and the 950-ton dish aerial was seen in action being steered by a paper tape from a computer. The quality of pictures received from the Telstar satellite has to be seen to be believed, but, of course, the Goonhilly receiver uses the lowest noise amplifier known to man, that is the helium cooled maser amplifier and will produce excellent pictures from signals as low as one thousand millionth of a watt.

Messrs Rose and Holloway also spent some days in the United States where they had an opportunity of inspecting the production facilities, and discussing the engineering developments of the new Lenkurt type 76A microwave equipment which has been bought by the New Zealand Post Office for the Hamilton Eastern Zone and Auckland-Whangarei radio relay systems. The equipment apart from the two transmit and receive klystrons is fully transistorised and is of high performance. Also seen at the Lenkurt 250,000-square ft factory was the sophisticated type 46A carrier equipment and the type 936 radio supervisory equipment. Lenkurt have a special group of people whose sole job is Quality Control and this is one of the reasons that the firm is able to maintain a consistently high standard of production.

A full report has been prepared on the Geneva Conference and will be available shortly.

8. RADIO SECTION LABORATORY

Type Approval

A new phase of work, namely that of testing new equipment for type approval, is becoming more common in the Radio

Section Laboratory.

Type approval is given by the Post Office to Radio equipment which, having been submitted for type approval by a manufacturer or distributor, satisfies the tests conducted according to the particular type approval specification for that equipment.

Up to date, type approval has been granted to several mobile V.H.F. transmitter/receiver sets as well as Citizens Band and Marine sets.

The tests conducted on the equipment are determined by the type approval specification concerned. In the case of say a V.H.F. mobile transmitter/receiver, tests consist of those for, selectivity, sensitivity, distortion, fidelity, stability etc, of the receiver section, and power output, harmonic output, frequency stability, modulation capability and spurious outputs of the transmitter. It is a requirement that some tests be conducted at a temperature as low as -10°C , and as high as 40°C , as well as at input voltages plus and minus 10% of nominal.

9. OUR CHRISTCHURCH CORRESPONDENT REPORTS

The following comes from our Christchurch correspondent:-

Radio Depot

With the steady growth of staff we have outgrown the capacity of workbench space in the Radio Workshop and it is again necessary in some cases, to have two juniors occupying one single-man bench. We have had to rearrange some fittings to permit the addition of two more work benches but extensive alterations will be necessary to achieve the essential feature of having one bench per Technician/Mechanician. Total staff at the moment is 20 of whom 11 are juniors and 1 is a recorder. We welcomed Eric Churchill ex R.N.Z.N. and Jim Whitney ex Hamilton as senior staff and look forward to having Braddon Smellie, who has been at Napier for the past few months, back with us to improve the Senior/Junior ratio and take his share of the Depot works. Murray Cotton has taken up his duties in the Engineering Office.

V.H.F. Mobile Radio

Both Cashmere and Marleys Hill house more mobile channels than they are reasonably capable of, and working space, ambient temperatures and standby power plants have been a problem. However we are at present installing racks and cabling at Mt Pleasant station which will take over most of the channels from Marleys Hill and all from Cashmere. Two 120 ft wooden masts have been erected at Mt Pleasant and were raised fully rigged with aerials using a winch truck. Provision is being made for 64 channels using "Pye" or equivalent equipments and 16 channels using equipment type 48/52. Type-48 equipment has given faithful and reliable service over the years but must eventually be replaced to make available room for a further 64 channels using current sized equipment, making a total of 128 channels.

The permanent building at Mt Alexander in North Canterbury is almost completed and existing channels housed in a temporary wooden building will be transferred into it. A second aerial pole will be erected simultaneously.

At Mt Horrible, Timaru, the permanent building is complete and ready to receive the channels at present housed in a temporary wooden building.

Transport Department on the 40 Mc/s band are operating from both Marleys Hill and Mt Horrible on channel 1 and with the performance of the equipment and the consequent coverage from each station, interference between the two cities is being experienced by mobiles in either city triggering both stations simultaneously. The heterodyne note is being overcome by shifting transmitter frequencies plus or minus 4 kc/s from the assigned frequency.

Toll Bearer System

The Marconi Toll Bearer system, apart from maintenance, has remained passive since the modifications effected simultaneously with the change to 3-wire rhombic aerials. All staff are anxious to "get cracking" on the Microwave systems to Wellington and Dunedin.

We hope to have more information on this subject at a later date and this will undoubtedly be the biggest project this Depot will have experienced.

Travelling

Travelling duties still occupy a large proportion of our time with 6-monthly visits to the West Coast and an annual visit to the Chatham Islands. The Chatham Islands trip is more in the category of an expedition! With growth of V.H.F. Radio at Timaru the number of trips there is increasing although quite a number are one-day trips. Mt Alexander, in North Canterbury is worked on a one-day trip basis as required and there is the regular monthly visit to Kaikoura and Manuka Bay Toll Bearer stations. More reliable equipment at Mt Alexander would reduce the number of trips made to that station considerably.

No doubt one day soon there will be a Radio Depot established at Timaru. Each channel at Mt Horrible is controlled by a trigger control station in Timaru, at which place it is later also expected to have a Microwave spur terminal.

Tellurometers

We are now maintaining on a permanent basis, Tellurometers, Microwave Distance Measuring Equipment, operated by the Lands and Survey Department for measuring survey lines of up to 80 miles, plus or minus an inch or two. These instruments incorporate some interesting techniques and staff are very interested in their workings and maintenance. Following a trial period of maintenance the Lands and Survey Department have expressed their satisfaction and have arranged their maintenance on a permanent basis.

Instruments

The receipt of additional instruments in the form of V.H.F. signal generators and R.F. Power meters has been a tremendous help in alignment and maintenance work. There is, however, still a shortage of these instruments and it is hoped that more will be forthcoming.

A sweeping oscillator with an oscilloscope incorporated would be a desirable acquisition to replace the array of instruments at present used to correct the shape factor of V.H.F. mobile Radio receivers and maintaining symmetry about the assigned frequency which is so important in eliminating intermodulation interference. The Motorola Frequency Meter is rendering sterling service in maintaining frequencies accurately, all measurements of channel frequencies being done from the Depot.

Conclusion

We received with pleasure advice that after a recess Vol. 12 of this Radio Information Bulletin is to be published. With the growing number of Radio establishments throughout the country the need for the dissemination of information is increasing, particularly from the Engineer-in-Chief who has the first taste of all new developments, and we hope that the periodical publication of this bulletin will continue.

10. DOINGS AT THE HAMILTON RADIO DEPOT

A considerable amount of work has been necessary in the Waikato to cope with wide coverage V.H.F. and trunk line systems which have been established and based on Hamilton Radio Depot.

The depot building is about three miles airline to the west of the Chief Post Office and is a large new building housing the no-break plant including the diesels and has an equipment room, staff room, store rooms, vehicle servicing dock and two workshop rooms.

In the equipment room are two Marconi 48-channel terminals one each for Paeroa and Rotorua links, two rows of V.H.F. equipment a mixed assortment of 52, Pye and Tait sets, a monitoring cubicle and S.T.C. supervisory cubicle. Cables, both control and aerial, enter by above the ceiling ducting.

A separate screened building houses the S.T.C. microwave equipment and spares and at this building the coaxial cable to the carrier room is terminated for connection to the microwave transmitter and receiver.

The aerial farm consists of two 70-ft masts for the urban mobile folded dipoles common aerial working, plus police and transport folded dipoles. Three masts supporting stacked yagis for Marconi equipment, seven masts supporting a double rhombic for Marconi and a steel tower for the S.T.C. microwave link.

So much for the depot then, the view is fine, the distance to town close enough - a fortunate combination which happens to meet transmission requirements in this area.

Of the three wide coverage stations two are the new design V.H.F. buildings just completed and about to be occupied, while the third is located at a Marconi repeater site. Four other buildings are to the standard trunk line repeater design.

It is a natural assumption that equipment purchased from a well-known manufacturer and conforming to international standards would not only conform but continue to do so, also that maintaining this equipment is possible without really struggling to achieve normal performance figures. Therefore, we are not surprised to find that the S.T.C. microwave bearer equipment meets these natural assumptions but it is a new and pleasant experience to handle equipment which does the job it was purchased for without modifications.

An interesting experience recently was to observe turbulent air conditions under which frequency conscious fading took place at around 4000 Mc/s during several consecutive afternoons with no fading at night.

Firstly we have Taumatamare and Te Kuiti repeater stations 26 miles apart, both stations are on hills one at each end of a valley averaging about six miles in width, the hills on each side of the valley near enough to the same height as the station sites.

Egmont with a little snow lies 40 miles south-east, the weather is calm, clear sky during the day, a light south-easterly -say five miles per hour at night. Result of all this (in theory) is that the valley between the repeaters received a nightly supply of cool air which filled the valley then lies undisturbed meantime.

During the following day the sun warms up the valley floor and causes the columns of heated air to rise and become very turbulent about the level of the beam between the two stations. The evidence to support this was the observed formation of wispy cumulus clouds as the heated moisture-laden air reached a height where condensation took place (about the height of the beam between the stations) and made visible the turbulence of the air which continued to rise with a boiling toroidal appearance. A slow drift eastwards of these forming clouds took place where the accumulation of numerous small clouds gradually built up a cloud bank.

While it could not be established which column of air actually caused a particular fade, up to six db fades were evident while the air movement continued.

This amount of fade is not significant in a bearer circuit of this nature but in nearly all cases of fading both at 4000 Mc/s and on the 400 Mc/s supervisory link calm weather has prevailed on the section affected. In due course, as some of our best memoranda say, the T.V. relay stations being rushed up will wish for a properly engineered system that can cope with fading.

11. RADIO TRAINING SCHOOL

The radio training school is now located in the Rugby Street premises in rooms adjoining the Crystal Laboratory. This has enabled a second class room to be brought into operation and later extra rooms will become available for practical lab work. These premises are a big improvement over Trentham and the old coke heater. It is very much easier also for the N.Z.C.E. students attending the Technical College which is close by.

Further good news is the arrangement of accommodation of visiting trainees at the Johnsonville Hostel instead of Trentham. Ian Grant, Technician G.P.O. has been brought in as an additional instructor.

12. GENERAL

Our thanks, are due particularly to the various district correspondents, for contributions to this issue of the Radio Information Bulletin which has received more support than formerly. As has been mentioned previously this is your magazine and we would like you to make full use of it.

We hope to make a further issue of this Bulletin in September next and would ask that districts particularly bear this in mind and let us have information in sufficient time.