

## OPERATION AND MAINTENANCE.

*Headworks and Power-house.*

During the year the plant has operated very satisfactorily. Minor repairs were carried out on the automatic crest gate at Mangahao dam, and these reduced the leakage very considerably. The pipe line and the steelwork on the roof required painting where the rust was showing through. On the turbines the new stainless steel nozzles are not showing any signs of wear, but the buckets and deflectors have had to be welded where wear has taken place. The underspeed device was also altered to give more stability under overload conditions. The oil in the bearings and governors was filtered and reconditioned during the year. Minor repairs and adjustments were carried out on the 11,000 v. regulators, the "Olmsted" regulators, and the 110,000 v. oil-switches. The power-house roof required repairing where blisters had formed. The louvres over the Horowhenua regulators had to be blocked, as driving rain through these caused a flashover of the 11 kv. pot-heads.

The growth of load of the Horowhenua Power Board early in the year put a heavy overload on the induction regulators, and fans had to be installed to cool these. Larger regulators have since been installed. During the periods when the fuel plants were running in parallel no difficulties were encountered, and the various plants kept in parallel very well.

*Transmission-lines—110,000 v. Lines.*

*Powerhouse-Khandallah Section.*—During the year there have been four interruptions on this line, totalling 11½ minutes in duration. One interruption was due to the West line tripping on the leakage relay when the East line was put in, and the other three were due to transient troubles, of which no trace could be found.

A considerable amount of work has been done clearing patrol tracks and erecting small bridges, repairing broken members and tightening bolts on towers, and a start has been made on altering weights. All underground cables have been removed from the telephone-line, and an additional hut placed at Brandon's Rock. A groyne has been built to protect poles near Waitohou Stream from erosion during floods. At Tower 59 it was found that clearance was not up to standard of 22 ft., so a 50 ft. tower has been built in place of a 30 ft. tower at this point.

*Power-house - Bunnythorpe Section.*—West line: Apart from pre-arranged shut-downs there have been nine interruptions to service, totalling 1 hour 5 minutes duration. Of these, seven were probably due to flashovers on Wanganui switch-gear or discharge of the lightning-arresters at Wanganui; two were due to the leakage relay at the power-house opening the oil circuit-breakers when switching was being done at Bunnythorpe.

East line: This line, which is normally connected to the Hawke's Bay and Wairarapa system, has given a considerable amount of trouble, particularly in the earlier part of the year. These interruptions in the main have been due to flashovers between the phase-wire and the earth-wire, consequent on unequal swinging of these two wires during heavy gales, and the earth-wire was therefore removed from all long spans on Bunnythorpe-Dannevirke section. The number of interruptions before this work was completed was forty-nine, of which ten were arranged, and it can be assumed from the service obtained since that a very large part of the interruptions had been due to the above cause.

The known causes of interruptions are as follows: Three due to lightning; two due to flashovers on pillar insulator at Woodville; one due to gale lifting a piece of timber on to an air-break switch at Bunnythorpe; one due to switch being opened by hand at the power-house to reduce the excitation of the station when No. 2 generator dropped out.

Willow-planting has been carried out at the Manawatu River crossing on this line to protect the tower foundations from erosion during heavy floods.

A start has been made to replace jumpers where the steel core had been removed from the aluminium-steel-core cable, and to alter weights where necessary.

A start has been made with the telephone deviation at the Manawatu River, which will do away with the lead-covered cable across the Longburn Railway-bridge, and which will bring the telephone-line close to the transmission-line.

*Bunnythorpe-Wanganui Section.*—Apart from the arranged shut-downs, interruptions to this section totalled 5 hours 24 minutes. Five of these interruptions were due to disturbances on the east line previously mentioned, and of the others seven were probably due to either flashovers on the Wanganui switch-gear or discharges on the lightning-arresters; one was due to a lightning surge, three due to trouble on Power Board feeders bringing out the oil circuit-breakers at Bunnythorpe, and five due to some unknown transient troubles.

During the year a good deal of attention has had to be paid to protection of the Rangitikei River crossing from erosion in flood-times, the protective willow mat having been broken by floods. This has been repaired, but owing to the constant danger at this point it has been decided to alter the construction across the river. Two special towers have been ordered to carry stranded copperweld conductors right across the river-bed, without a support in the middle. The material is now to hand, and this source of danger will be permanently removed. A large number of small bridges have also been erected on the patrol tracks to facilitate patrol during floods.

*Bunnythorpe-Woodville Section.*—The interruptions on this line were practically the same as on the Power-house-Bunnythorpe east line, mentioned above. On this section the earth-wire has been removed from all long spans, and jumpers have been stiffened by suspension from a string of insulators to keep them from blowing about in the wind.