

Glentunnel and Hororata, and the dismantling of about four miles of the original line between Glentunnel and Homebush. All three lines from Lake Coleridge now pass through Hororata switching-station, which will ultimately become the Department's main-load-despatching station on this system. In order to automatically cut out and sectionalize faulty sections of line without interrupting supply, oil circuit-breakers have been erected on all outgoing lines at Hororata and at Addington. The completion of this work will materially assist in maintaining uninterrupted supply to Christchurch and the south.

The results of the course of instruction in live-line testing in 1926 were very successful, and the Department is systematically treating all transmission-lines by testing insulators under live-line conditions. To date quite a number of defective insulators shown faulty by this method of testing have been removed, thus reducing the risks of interruptions.

TRANSMISSION-LINES AND SUBSTATIONS.

The construction of additional lines and the alterations outlined above have necessitated considerable alterations and additions to the various substations. At Ashburton Substation the growth of load of the Ashburton Electric-power Board necessitated the removal of the 750 kv.a. bank of transformers and the replacement of same by a 5,000 kv.a. bank. This bank was recently in use in Addington Substation, and was reconstructed for outdoor conditions. The 750 kv.a. bank was transferred to Weston (Oamaru) Substation for supply to the Waitaki Power Board.

Considerable extensions were made to the outdoor equipment at Timaru Substation to make provision for the new Hororata-Timaru line and the extension from Timaru to Oamaru. This latter line is protected by an oil circuit-breaker, and provision is made whereby Oamaru can be supplied from either of the two lines from Ashburton. Provision has also been made for a second line to Oamaru. In order to regulate the voltage at Timaru the 1,500 kv.a. synchronous condenser was transferred from Addington and installed in the substation, and put into operation on the 8th March, 1927.

Weston (Oamaru) Substation.

A contract was let in November for the erection of substation building, cottage, and garage. Owing to delay in construction these were not completed before supply was available, and temporary housing was provided for the necessary switch-gear. The outdoor equipment consists of air-break switch, arresters, and 750 kv.a. bank of transformers. These were completed and supply given to Waitaki Power Board on the 24th December, 1926. In order to regulate the voltage of supply an induction regulator was installed, and put into operation at the end of February, 1927.

INTERRUPTIONS TO SUPPLY.

Christchurch Line.

Apart from one pre-arranged shut-down, the interruptions on these lines during the year totalled 41½ minutes. Of these interruptions the longest, of 20 minutes, was due to bark and trees fouling both lines. Two interruptions were due to defective insulators (total time 14½ minutes) and two were due to operating faults (3 minutes) and to lightning (4 minutes). The period of involuntary interruptions has been considerably reduced, and it is hoped that with the installation of sectionalizing oil switches and live-line insulator testing these will be reduced to a minimum.

Timaru and Oamaru Lines.

Neglecting such pre-arranged shut-downs as were found necessary for construction work and alterations, the interruptions on these lines totalled 11 hours 56 minutes. Most of these were of short duration. The longest period of interruption was 3 hours 20 minutes, and was due to a broken phase wire causing delay in repairing. The next longest period occurred in September, when an earth-wire came into contact with the transmission-line. Difficulty was experienced in locating this trouble, and service was not restored for 3 hours 11 minutes. In both of these cases only one line was available for use.

LAKE COLERIDGE DUPLICATION.

The construction of the necessary new intake works, tunnel, surge-chamber, and pipe-lines was completed by the end of June, and the first of the two 7,500 kw. generating-units was completed and run on load on the 9th July, 1926. Up to that date the existing plant had been heavily overloaded, and assistance was obtained from the Christchurch Tramway Board. The necessity for this assistance was then removed, and the addition of the 7,500 kw. unit enabled all demands to be easily met. Erection of the second generating-unit was commenced on the 1st August, 1926, and completed at the end of November, 1926. Some trouble was experienced with both generator and turbine bearings and the lubricating system. The latter was modified, the bearings of each unit being supplied from one oil-pump, the latter being coupled to a motor for emergency drive. Both sets have been run on overload with good results.

The erection of the new ironclad switch-gear was completed on the 8th January, and has since been in operation. The dismantling of the original open-type switch-gear was then carried out, and completed at the end of March, 1927.

A system of forced ventilation was installed in the original section of the power-house to conduct the hot air from the generator basement where the generator reactors are installed. During the hot north-west winds the temperature of the basement has been somewhat high, and the installation of this system will have the effect of reducing this.