

(iv) *General.*

(1) *Lightning-storms.*—Eight lightning-storms were experienced during the year, seven of which caused interruptions to supply. Four affected apparatus at substations; one near Hawera caused several insulators to flash over on the Hawera–Wanganui line and damaged the telephone-line; one near Khandallah caused a total interruption on the two Mangahao–Khandallah lines, but caused no damage; while the seventh tripped the Mangahao–Bunnythorpe west line, but caused no damage.

The other lightning-storm occurred on the Arapuni–Stratford line, but caused no interruption to supply to any consumer.

(2) *Special Maintenance Work.*—During the year the “live-line” gang carried out the following work with the line alive: 64 poles were replaced, 94 poles lowered, 196 poles refitted, crossarms on 64 poles overhauled, and 123 insulators changed.

In addition to the above-mentioned maintenance work, the following special work was carried out under live-line conditions:—

A damaged isolating-link at Woodville was repaired alive, and at the same substation the eye-bolts at the terminals of the Dannevirke and Mangamaire lines were replaced by longer ones.

During the reconstruction at Woodville jumpers were removed and later replaced to give clearance for work on the structure.

At Mangamaire jumpers from the line to the isolating-links of the O.C.B. were removed and later replaced in order to give clearance for work on the O.C.B. bushings.

At Bunnythorpe the 11 kv. leads from a pothead to the Manawatu–Oroua Power Boards’ lines were removed alive and later reconnected.

Experimental work was carried out to check a method of testing post insulators by the buzz-stick method, and subsequently the post insulators at Dannevirke and Waipawa were tested by this method.

The other special maintenance gang was employed on the Mangaore–Khandallah line during the year, and worked under “dead-line” conditions.

(3) *Khandallah High-tension Testing-set.*—The usual retests were made at Khandallah of all insulators found “dud” by the buzz-stick tests and removed from the line. In addition to these, the following special tests were made during the year:—

Flashover and thermal cycle tests were made on sixteen units submitted for test; porosity tests were made on some fifty kv. pin-type insulators, and several post insulators were submitted to a 50-cycle power test under salt conditions.

An 11 kv. strain insulator submitted by a supply authority was tested for wet and dry flashover at 50 cycles, and some 33 kv. pin-type insulators were submitted to a flashover test.

## (d) TELEPHONE-LINES.

In order to reduce the number of vibration breaks which were occurring on the cadmium-copper sections of the telephone-lines, cork dampers were fitted on all sections, and, with the exception of one break which occurred very shortly after the installation of the dampers, the trouble has ceased.

## (e) TELEPHONE SYSTEM.

*Investigation Work.*—Measurements of the induced voltages occurring on the telephone-lines during earth faults on the power-lines were carried out, and these will serve as a basis for rationalizing the degree of insulation required and the system of protection against damage to apparatus and acoustic shock to operators.

*General.*—The enclosure and sound-proofing of the control-rooms at Tuai and Mangahao Power-houses has been completed, and, as a result, the receiving and transmitting conditions have been greatly improved.

## (f) TESTING.

Maintenance tests on all relays and metering equipments were carried out in accordance with the six-monthly testing schedule. A large number of special tests were carried out in the test-room and in the field. These included tests on the telephone system and apparatus, and the calibration and testing of meters and substandards for various supply authorities.

Following the mal-operation of No. 6 O.C.B. at Khandallah, an investigation was made and tests were made on the east line capacitor bushings. A number of tests were made, and a method was developed to obtain comparative tests between good and bad bushings, these tests being made with the apparatus in service.

## (g) GENERAL.

*Load.*—Standby stations were called on to supply power to the Department on four occasions.

The New Plymouth Borough Council supplied 5,060 units, the Taranaki Power Board supplied 10,136 units, and the Wellington City Council generated 54,826 units at the Department’s request, and 19,388 units were supplied back to Khandallah Substation.

The maximum load on the system was 55,120 kw., as compared with 53,010 kw. for last year, an increase of 4 per cent. The total output was 274,728,861 units, as compared with 260,499,714 for last year, an increase of 5.5 per cent. The annual load factor was 56.7 per cent. for this year, as against 56.1 per cent. for last year.