

11. OUTDOOR STATION.

The construction of steel structure was commenced in July, 1930.

A certain amount of difficulty was experienced on the construction of the steelwork due to inaccurate drilling of footings and bad fitting of girder and tower members.

The steel structure has now been completed, including lightning-arrester and isolating-switches.

To date all necessary work has been completed on the north line from Lake Coleridge, and on 28th June, 1931, power was passed over the power-house—Glenavy transmission-line at 66 kv., giving supply to the works at Waitaki Hydro.

12. MOTOR TRANSPORT AND GENERAL.

A four-stalled motor-garage for departmental vehicles was erected and a 40 ft. extension made to store.

Six hundred and eighty-two drums of transformer-oil were unloaded and leaking drums attended to. Five oil-storage tanks were received on site and inspected.

Earth tests have been carried out in likely localities for power-house and lightning-arresters and steel structure, but to date satisfactory results have been difficult to obtain on account of the nature of the country.

HYDRAULIC DESIGN.

ARAPUNI.

Plans have been prepared for the remedial measures as outlined in Professor Hornell's report. Extensive model tests were made to determine the best means of preventing further erosion in the overflow-channel, and plans have been prepared for lowering the water to the Waiteti Flat in two stages so that the energy of the falling water should be absorbed gradually.

WAITAKI.

Further work has been done on the dam, including a deep cut-off wall, separate from the dam, to prevent the development of under-pressure; the installation of permanent sluices to by-pass the water through the dam; the protection of the rock downstream of the dam and the disposal of the energy of flood-water falling over it. In connection with these latter a number of model experiments have been carried out.

DESIGN OFFICE WORK.

During the year under review the following design-work was carried out in connection with new developments and extensions to existing developments:—

LAKE COLERIDGE SYSTEM.

The advent of an abnormally dry season necessitated a curtailment of the output of Lake Coleridge, resulting in the decision to install a standby Diesel generating-station of four units at Lyttelton, with provision for extension to seven units at a later date, by transfer of the Diesel sets from Penrose station.

The site chosen has the advantages of direct access by railway siding from railway or wharf, and an unlimited supply of cooling-water from the harbour, whilst the fuel-oil supply can be pumped direct from the Oil Co.'s storage-tank.

To provide for the interconnection of the Diesel station with the Lake Coleridge system the line-conductors, switching-arrangements, and protective relay equipment required on the Addington—Lyttelton lines were investigated.

Lyttelton Diesel Station.—With the exception of a few minor details the design and layout of the Diesel station building and equipment was carried out during the year.

The following are some of the subjects dealt with:—

- (a) Design of Diesel station building.
- (b) General layout of site.
- (c) Design and specification for 200-ton fuel-oil storage-tank.
- (d) Design of compound wall and railway siding.
- (e) Layout of equipment in power-station.
- (f) Design of cooling-water and fuel-oil piping systems.
- (g) Design of machine-foundations.
- (h) Design of silencer-pits for engines.
- (i) Design of oil-sump tanks.
- (j) Design of transporter for crane.
- (k) Layout of cables and cable pits and ducts.

In preparation for the interconnection of the system with the Waitaki Power-station, and at a later date with the Waipori Power-station, the design work in connection with the additional switch-gear and protective equipment for the system was carried out as the details of the equipment ordered came to hand.

The provision of increased transformer-capacity at some of the substations to take care of a reasonable growth of load, and inter-connecting auto-transformers at Timaru to tie in the 66 kv. with the 110 kv. lines also occasioned a certain amount of design work.

The following design work was also carried out for this system:—

Addington.—Preliminary drawings were prepared for the proposed new workshop, test-room, and office building, and for the extensions to the substation building to house the new 10,000 kv.a. synchronous condenser.

Timaru.—Design and specifications for traverser-truck and turntables.

Oamaru.—Revised layout of site; foundations and traverser-truck for 5,300 kv.a. transformer-bank; design and specification for traverser-truck.