

ELECTRICAL DESIGN OFFICE WORK.

During the year under review a large amount of detail design-work was carried out in connection with new developments and extensions to existing developments.

Although the damage resulting from the recent Hawke's Bay earthquake to the Mangahao-Waikaremoana system in the affected area was comparatively slight considering the magnitude of the shake, the necessity was shown for taking every precaution against the effects of possible earthquake forces in design-work, if power systems are to withstand and maintain continuity of supply during earthquakes of this magnitude.

The possible effects of these forces on buildings and equipment were fully investigated and taken into account in all subsequent design-work.

In connection with equipment already erected, arrangements were made for power and potential transformers and oil circuit-breakers to be securely fixed to their foundations where this had not already been done.

(a) LAKE COLERIDGE SYSTEM.

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

Lyttelton Diesel Station.—Layout and foundation details for the 11,000-volt switch-gear. Pipe-work details.

Addington Substation.—Drawings and specifications for the building contract for the extensions to the main substation building to house No. 2 11,000-volt synchronous condenser (10,000 kv.a.), including the foundations for the condenser. Drawings for proposed new test-room, workshop, and office building.

Layout and foundation drawings for 66 kv. and 33 kv. switch-gear and 66/33 kv. and 66/11 kv. transformers.

Design of 30-ton traverser-truck for transformers.

Preliminary layout and diagram of connections for proposed new 11,000-volt switch-gear for tendering purposes.

Timaru Substation.—Layout drawing of new 110 kv. and 66 kv. switch-gear and steelwork and proposed new buildings on site.

Foundation drawings for 110 kv. and 66 kv. switch-gear, steelwork, and transformers.

(b) MANGAHAO-WAIKAREMOANA SYSTEM.

In connection with the new substations at Melling, Hawera, Stratford, and New Plymouth preliminary drawings showing the layout of buildings and equipment had already been prepared, but much detail design-work remained to be done, which for the most part had to be held over until the details of the machinery and equipment ordered came to hand. This work was completed for the initial development except for a few minor details.

The installation of increased transformer capacity at Napier and Bunnythorpe, together with its controlling switch-gear, involved design-work for foundation details.

Alternative proposals for the repair of earthquake damage to Napier Substation building were investigated, and drawings and specifications prepared for the field.

Short-circuit calculations and calculations to determine the voltage regulation and carrying-capacity with and without synchronous condensers were carried out for the Arapuni-Stratford-Bunnythorpe Tie-line. A proposed protective system was drawn up for this line and intermediate stations.

(c) ARAPUNI-HORAHORA SCHEME.

Calculations were made for the Arapuni-Penrose lines to determine the carrying-capacity with increased synchronous condenser capacity.

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

Arapuni Power-station.—Draught tube for No. 4 unit with provision for alteration to cross-section.

Hamilton No. 2 Substation (110/50 kv.).—Layout of extensions to 110 kv. switch-gear, steelwork, and relay-house. Preliminary drawings of extensions to 110 kv. switch-gear and steelwork for tendering purposes, 25-ton traverser-truck for transformers, gantry for 15-ton chain block. Foundations for 110 kv. transformers and oil circuit-breaker.

Hamilton No. 1 Substation (50/11 kv.).—Foundations for 50 kv. switch-gear, steelwork, and transformers, 12-ton traverser-truck for transformers; details of temporary 11 kv. connections.

Bombay Substation.—Drawings and specifications for store and extensions to switch-room. Specification for additional steelwork for 110 kv. and 50 kv. switch-gear.

Taumarunui.—Preliminary layout on site for proposed substation.

General.—Foundations for additional 50 kv. oil circuit-breakers for protective scheme.

(d) WAITAKI POWER DEVELOPMENT.

Throughout the year a large amount of design-work was carried out in connection with Waitaki Power-station.

In a hydro-electric station of this magnitude the building itself and most of the machinery and equipment are of special design. The greater part of the time for delivery of the machinery from the makers' works is spent on the design thereof, and the full details reach the Department only a short time before its arrival on site. To avoid undue delay in the erection on site, the design and construction of the building, and the layout of the machinery must be gone on with before the full details of the latter are received. As a result, amendments to the design are inevitable, but this course is