

of the ground and the difficulty of access. To convey material to the tunnel it was necessary to construct 30 ch. of sledge track and erect a chute 530 ft. long.

At the Coast Tunnel (1,024 lineal yards) the bottom heading was completed, 824 yards being driven during the year. Metal bins and concrete-mixing plant were erected at the south portal, and 5 yards of tunnel excavated to full section.

Good progress was made with the driving of the Waiau-Tikiwhata Tunnel (3,267½ lineal yards) (north end), but concrete lining was delayed pending the arrival of suitable electric and Diesel mine locomotives. One Diesel and two battery locomotives are now in operation, and the party is concentrating on lining the length of tunnel already excavated.

A length of 311 yards was excavated, and 60 yards of tunnel lined with concrete. An additional 32 lineal yards of concrete butt walls are in position.

The machine shop with modern equipment, including electric arc welder, has had difficulty in keeping ahead of the work, which includes plant repairs of all kinds and the fabrication of tunnelling and bridge gear.

The sawmill at Bartlett's cuts to size timber for all the tunnels, on massed-production lines, and has effected a considerable saving.

4,730 cubic yards of crushed metal was supplied by the stone-crushing plant for use on highway deviations and access roads.

Major plant in use on this section includes: Two Diesel excavators, two steam-locomotives, two petrol locomotives, one Diesel locomotive, five Diesel mine-type locomotives, five electric-battery locomotives, ten concrete-mixers, four air-compressors (stationary), two air-compressors (portable), three tunnel-mucking scrapers, three concrete pumps, and five air-hoists.

One Y.M.C.A. and twenty married-men's quarters were erected, in addition to various service buildings, all being served with electric light.

Minor damage only was caused on this section by the flood on 19th February. Floods on 25th April and 4th May, however, caused many large slips. Culverts and water-drives were blocked with debris, and in one case the inlet to a water-drive was completely buried under a large slip, and the drive had to be abandoned. The clearing of slips will be undertaken by Diesel excavators when the material is sufficiently dry to handle.

*Gisborne Section* (Length, 14 m. 7 ch.).—No fewer than sixteen bridges are required on this section, and work has been confined mainly to bridge-construction, platelaying, and ballasting.

Ninety per cent. of the earthwork has been completed, involving the removal of 149,881 cubic yards of material, and formation is ready for platelaying as far as 10 m.

Station-yards at Matawhero, 2 m., and Muriwai, 9 m., were formed, using a Diesel excavator and tractor-drawn carry-all scraper.

Approach banks to the Waipaoa Bridge were completed and withstood floods exceptionally well.

The deviation of the main highway between 8 m. 35 ch. and 8 m. 67 ch. was completed and opened for traffic during the period. This deviation necessitated 11 ch. of new road, and a level-crossing at 8 m. 77.5 ch. to provide access to Muriwai Village.

At 10 m. 33 ch. a diversion of the Wairekaia Stream, 9 ch. long, is being constructed to straighten the stream and improve the sites for the railway bridge and new highway bridge. A Diesel drag-line has half completed this work, the spoil being utilized to form approach ramps to the overbridge at 10 m. 49 ch.

A relocation of the railway from 13 m. 60 ch. to 14 m. 10 ch. was necessitated by the flood of 19th February, which washed out part of the completed formation. The survey and plans for the new location have been completed.

Fifty per cent. of the fencing of the railway reserve is now completed, 567 ch. being erected during the year.

272 lineal feet of culvert, ranging from 18 in. pipe to 4 ft. by 4 ft. reinforced box, were constructed.

Bridge-construction has been pushed ahead as fast as steel-supplies would allow. Floods retarded the work for a period of three months, during which silt and water rendered bridge-sites inaccessible. During part of this period workmen were employed on the erection of temporary bridges on the main highway, where washouts had occurred.

Piers were completed on both bridges at 2 m. 55 ch. and 3 m. 4 ch., and temporary decking erected to enable platelaying to proceed.

Waipaoa Bridge, 5 m. 4 ch. (six 30 ft. and nine 60 ft. spans): All piers on this bridge were completed, and the erection of steel spans is proceeding. The six 30 ft. spans are in position, and two have been riveted. Four 60 ft. spans have been launched, and the riveting of two is completed. The loss of the temporary staging during the floods delayed the erection of the steelwork.

Karaua Stream, 5 m. 37 ch. (three 25 ft. spans): This bridge was completed.

Wherowhero Stream, 5 m. 67 ch. (three 25 ft. spans): Concrete piles have been cast, but will not be driven until the access track dries up.

6 m. 55 ch. (one 25 ft. span): Pile-driving is in progress at this bridge, and the piles for the next bridge at 7 m. 50 ch. are under construction.

Wairekaia Stream Highway Bridge, 10 m. 36 ch.: This bridge will improve the highway alignment, which has been located to suit the railway overbridge at 10 m. 55 ch. The contractor has completed all piers with the exception of the south abutment.

Overbridge, 10 m. 55 ch.: Four 45 ft. spans are being erected by contract. Two piers have completed, together with the reinforced-concrete beams and girders of the north span.

The permanent track was laid to the north abutment of the Waipaoa Bridge at 4 m. 77.85 ch.: The first lift of ballast has been completed over this length, and the second lift as far as 2 m. 4 ch.

At Matawhero Station Yard the first siding was laid and is being used for accumulating a stock of ballast.