

SOUTH ISLAND MAIN TRUNK RAILWAY : SOUTH END.

(44 m.—37 m. 40 ch. ; length, 29 m. 30 ch.)

When work was first recommenced and after the general clearing-up of the old formation had been completed, excavation was begun on the old Conway Section, and cuttings between 54 m. and 62 m. were put in hand and are now about 50 per cent. completed.

Road access has been opened from Oaro at 67 m. 30 ch. to the north end of the Amuri Bluff Tunnel at 62 m. 68 ch. by means of a track along the sea coast.

The most spectacular work on this section has been the excavation of the Hawkwood Cutting at 48 m. 30 ch. A start was made dismantling and re-erecting the $1\frac{1}{2}$ cubic yards Ruston steam drag-line, which was put into operation digging a gullet 30 ft. deep and about 60 ft. to 70 ft. wide at the top in October, and an 8 cubic yard carry-all and Caterpillar tractor was provided to rehandle and spread the material clear of the final batter lines. Two $\frac{3}{4}$ cubic yards Diesel shovels were started at the south end on successive levels below the stream drag-line excavation from the south end, and a second steam drag-line was put into operation in February. The first steam drag-line had by this time excavated a gullet as mentioned, the whole length of the cutting, and both machines were then started widening the upper level. A third $\frac{3}{4}$ cubic yard Diesel shovel was then started at the north end of the cutting, working south. Later the south end second lift-shovel was converted to work as a drag-line, and, after digging a bench for the steam drag-line on the right batter to work from, was moved to pull the batters down for the north-end shovel to load to the trucks. All machines were working three shifts, material being led to bank by trucks and steam locos, and the rehandling of spoil from the steam drag-lines being taken care of by the 8 yard carry-all and tractor and angledozer and tractor. The best four-weekly output for all machines was 43,780 cubic yards. Of the 291,439 cubic yards left in the cuttings when the works closed in 1931, approximately 248,000 cubic yards had been excavated by the end of June, 1937.

At the same time as earthwork was proceeding and the formation work was advancing from Parnassus, the building of bridges to cross the gaps in this formation was also in hand. The two chief bridges in the first ten miles at Leader River (44 m. 65 ch.) and Conway River (50 m. 50 ch.) are of the same length, 724 ft., and have each sixteen spans of 45 ft. with plate girders on concrete piers founded on piles in the case of the Leader Bridge, and on solid papa in the case of the Conway. At the Leader River the piers have been completed, and a start has been made placing the girders. At the Conway River there are three piers yet to complete.

Construction of culverts and water-drives was well advanced in 1931, but the work has been continued and the back of the work has been broken in this branch of our activities. Three water-drives aggregating 300 ft. in length, six pipe culverts of a total length of 240 ft., and a 4 ft. arch culvert 72 ft. long make up the completed work.

Tunnelling is the controlling feature on the south end as there are $2\frac{1}{4}$ miles to pierce in fifteen tunnels. A certain amount of plant is on the job for the purpose, and a start has been made with the first tunnel at 61 m. 26 ch., where 100 ft. of bottom heading has been driven, while at the Amuri Bluff Tunnel (62 m. 27 ch. to 62 m. 66 ch.), which is the longest tunnel on the length, everything is in readiness for a start from the northern end. The driving of this tunnel controls the time for completion of this end of the railway, and everything has been done to expedite its commencement. Unfortunately, unlike all other tunnels on this section, it is a long way from a formed road, and before anything could be done access roads had to be formed to both ends. At the northern end this amounted to $2\frac{1}{2}$ miles and at the southern end $1\frac{1}{2}$ miles. While the Amuri Bluff Tunnel is being driven it is expected that all the other tunnels, together with bridge and culvert work on the whole length, can be completed.

Sea-protection forms quite a large part of the work along the coast from Oaro, 65 m. north, to the Kahautara River, 73 m. 30 ch. There are numerous road deviations necessitated by the location of the railway, and in many of these places banks encroach on the sea a considerable distance. It is estimated that nearly 100,000 cubic yards of heavy stone up to about six tons and more in weight will be required for building the outside of or facing filling. A start has been made quarrying stone at 67 m. 70 ch., and a steam-crane with two heavy-duty lorries is engaged getting out stone. At a later date, when the line is laid, it may be necessary to provide larger stone than five tons to six tons to protect the toes of the fillings in the more exposed positions, but in the meantime the stone now being quarried enables the banks to be pushed out with little chance of serious damage.

North of the Oaro work has been concentrated on opening up approach cuttings to tunnel portals, and six of these are in hand at present.

The provision of accommodation for the workmen employed on the work presented rather a problem on account of the shortage of building materials, but advantage was taken of the hutments and buildings which were available from the completed Waitaki works, and these were transferred and filled a gap while other supplies were being assembled.

Accommodation has now been provided for 212 married men, and the balance of 346 have been provided with single huts or tents. These men are distributed in sixteen camps, and at the main centres facilities for recreation have been provided in the shape of three large halls which are under the jurisdiction of the Y.M.C.A., and contain billiard-room, picture and social hall, canteen, staff quarters, &c. Two smaller halls are also in course of construction.

The old workshop at Parnassus has been re-equipped with machine tools for the maintenance and repair of all plant on the works, and a subsidiary shop, stores, &c., have also been provided at Oaro, which is now the main camp.

Some of the principal items of machinery at this end of the work are : One air-lock; one 800 ft., one 600 ft., five 200 ft., and three 85 ft. air-compressors ; three ventilating-fans ; six Crawler type Diesel-engined excavators ; two steam drag-lines on crawler tracks ; five Diesel electric-generating