

HIKURANGI DRAINAGE AREA (50,000 ACRES), WHANGAREI COUNTY.

The preliminaries in connection with the excavating-work were put in hand about the end of July, 1921. This work consisted of the selection of sites for the main camp, blacksmith and machine shop, store-sheds, &c., also the locations for the different machines on arrival. The erection of the camp, &c., was commenced in August, about five men being employed. The tents erected for the men were 8 ft. by 10 ft., with 10 ft. by 4 ft. flies, being built on wooden frames, with similar flooring and skirting. Two scow-loads of machinery arrived during August, and the work of erecting the three Bucyrus shovels was arranged for with the Whangarei Engineering Company, the erection being done at the Whangarei Town Wharf. It was decided to run these machines from Whangarei to the works under their own power. This distance is about sixteen miles—thirteen and a half miles by road and two and a half miles through private property. An inspection of the route disclosed several bridges of insufficient strength to carry the steam-shovels (about 32 tons each), but by diversion of the route through private property it was only necessary to erect two bridges on the main road, while another four small bridges were erected over creeks having to be crossed adjacent to the works. Two of the shovels were erected by the middle of November, and the journey from Whangarei to working-sites accomplished without mishap of any kind—each shovel taking about five and a half days on the journey. According to the makers this is the longest continuous run that this class of machine has ever undertaken, and several heavy grades were encountered *en route*. Tenders were called for the carting of the locomotives, compressors, and other plant, also for the delivery of coal, timber, and general goods, and very satisfactory prices were received. The third Bucyrus shovel arrived at the works on the 24th December—also under its own power. A fair amount of work was necessary on these shovels before they could commence digging-operations. It was found advisable during the journey from Whangarei to keep the stiff-arm jib on machine, and these had to be removed and drag-line jib erected at works; the boilers were also lagged, and machines put in running-order. Two of the machines were in full working-swing at the beginning of December, and were engaged in stripping the No. 1 cut. The third machine, which had to ford the river, commenced work at the beginning of February. The particulars of the shovel-work are as follow:—

Cut No. 1.—This cut runs from the initial point of the work for a distance of about 9 chains, where it links on to the No. 1 lagoon—an old crater. The stripping on this cut was carried out by two steam-shovels to their full jib capacity, and until the main reef was met with an average depth of 9 ft. was got out, the work being completed at the beginning of February. The No. 12 shovel was then fixed with the stiff-arm jib and bucket, and worked into face at beginning of cut, while the No. 13 was placed at the opposite end in order to clear large boulders with the grips. The stripping-work on this cut was much more difficult than anticipated, large boulders being freely mixed through the clay right to the surface, while a seam of hard pan was also encountered. This necessitated a considerable amount of drilling and explosives. Two of the Ingersoll-Rand compressors were put in position, and air-leads coupled up for five jackhammers. Owing to the awkward lay of the rock at this end some time was occupied before a working-face was obtained. This also proved to be much more difficult country than anticipated; the rock was found to be split up into large blocks, the seams being filled with clay, making both boring and shooting difficult, very little actual solid rock being met with. Under the circumstances, however, good progress was made in spite of the difficulty in procuring wheels and materials for trucks, these being only available this month.

Cut No. 2.—The No. 14 Bucyrus shovel commenced the clay-stripping on this cut on the 3rd February. The rock here is on a higher level than that in No. 1, consequently the stripping is more shallow. Better going was experienced, although in some places heavy boulders ran to the surface.

Cut No. 3.—This cut was commenced by the No. 13 steam-shovel on the 7th March. Similar country to that in cut No. 2 was met with, although the rock was heavy at the start.

The following is a summary of the output of the steam-shovels for the different cuts. As a considerable amount of changing was done at the commencement of excavation-work the output of each cut is shown, and the steam-shovel working-hours.

Cut.	Days worked.		Clay. Cub. yd.	Rock. Cub. yd.	Total Output. Cub. yd.
No. 1	..	74	6,040	5,260	11,300
No. 2	..	29	3,400	1,150	4,550
No. 3	..	6	560	140	700
		109	10,000	6,550	16,550

The approximate cost of excavation is 1s. 9-74d. per cubic yard.

Water-supply.—A considerable amount of time was lost by the shovels in having to stop and probably shift positions in order to draw water. This has now been overcome by the installation of two rams for No. 1 cut, and delivering to two 600-gallon tanks at a high level, thus enabling the machine to draw from tanks while working. During March an engine (oil) and pump were procured and installed in a central position on cut No. 2, and are now delivering to tanks for the same purpose. From these tanks a line is also being run to the machine on No. 3 cut. About 1,700 ft. of piping has now been installed.

Compressors.—Altogether seven of these machines were procured, two being placed on No. 1 cut and two on No. 2 cut, and one at the blacksmith's shop for driving drill-sharpening plant, the remaining two being at present held as spares.

Bridges.—In order to get the steam-shovels from Whangarei to works and over the creeks adjacent to works the following bridges were constructed: One 24 ft. by 12 ft., and one 18 ft. by 12 ft., on main road; one 27 ft. by 12 ft., one 18 ft. by 12 ft., one 15 ft. by 12 ft., and one 13 ft. by 12 ft., inside working-area; one 35 ft. by 2 ft. footbridge at camp. The timber for these bridges was got from bush in the locality. Several approaches had also to be made, and in places fascined and metalled.