

No. 11 Kingston dredge has been working intermittently deepening the Awaiti Canal where shoaling due to bank-caving has occurred, and also raising the stop-banks. In this work progress is limited by the small quantity of material that can be placed on the banks at one time without causing further subsidence. This dredge has also been deepening the Intercepting Canal, where depth has been reduced by the movement of a large amount of sediment into the canal, caused by dredging in the Upper Elstow Canal. The dredge worked eighty-three days and excavated 16,252 cubic yards, the cost, including interest and depreciation during the time the dredge was idle, being 15·92d. per cubic yard.

No. 15 Bucyrus excavator, operating with 50 ft. boom and $\frac{1}{2}$ -cubic-yard drag-line bucket, was engaged during the months April to June (inclusive) on the Intercepting Canal stop-bank in the Netherton district. Attempts to raise this bank to final level without a dam in canal to keep the water at ground-surface level proved unsuccessful, and work had to be discontinued until the dam was built. In July the machine reached the junction of the Intercepting Canal and Awaiti Canal, and proceeded down the eastern bank of the latter, completing the stop-bank to Awaiti West Road, a distance of 2 miles 21 chains. Early in December the machine was shipped to the Piako River and has been employed widening and deepening the Waikaka spillway. Working two shifts per day, the output for 495 eight-hour shifts was 91,122 cubic yards at unit cost of 7·56d.

No. 16 Bucyrus excavator has been raising the stop-bank on the western side of the Awaiti Canal between 2 m. 30 ch. and 7 m. 55 ch. Good progress was made throughout the year, though a breakdown necessitating extensive repairs to the girder frame of the machine caused delay in July. This machine is using $\frac{1}{2}$ -yard drag-line equipment and 50 ft. boom, and, working two shifts, excavated 135,296 cubic yards during the year at a cost of 5·5d. per cubic yard.

No. 19 dredge is a plant that was reconstructed on the works in 1929 and put into service early in 1930. The original machine was a Michigan dipper dredge designed for the construction of ditches 20 ft. to 25 ft. wide. Making use of most of the original machinery, the plant was redesigned for widening the channel of the Piako River to 170 ft. For this duty the machine operates a 1-cubic-yard drag-line bucket on boom 105 ft. long. The material excavated from the channel is placed on the river-bank 50 ft. to 100 ft. from the river, which is a special advantage in eliminating the troubles due to collapse of the banks under the weight of the material placed upon them. With an operating-range of over 200 ft., costly rehandling of material is avoided. From April to December, 1930, the machine was working below Ngatea Bridge, and completed 95 chains of channel-enlargement. The quantity excavated on this reach was 62,480 cubic yards, and the cost 7·44d. per cubic yard. In January the machine was loaded on to a pontoon and landed on the right bank of the river below Kaihere Ferry. The moving-costs were heavy, as the machine had to be partially dismantled to reduce weight and to allow it to pass through the opening span of the Ngatea Bridge. The work from the Kaihere Ferry down-stream is similar to that on which the plant was engaged below Ngatea. The total yardage for the year was 70,612, and the cost, including moving-costs and all charges, 8·87d. per cubic yard. The actual working-time was 249 days.

No. 23 steam dipper dredge, after being out of commission since March, 1929, recommenced work in the Intercepting Canal and Upper Elstow Canal on the 16th September, 1930, and has deepened these canals for a distance of 3 miles 18 chains, and extended the Elstow Canal by the construction of 25 chains of new canal. The dredge is now working back to the starting-point, and indications are that the peat through which the channel is excavated is now sufficiently consolidated to allow the required cross-section to be excavated. Owing to the accumulation of floating peat behind the dredge, some difficulty was experienced in getting supplies to the dredge, and a considerable amount of labour was often required to maintain a channel to float the coal-punt through the floating material. The dredge worked 130 days and excavated 40,968 cubic yards of material, the cost being 13·07d. per cubic yard.

No. 24 steam dipper dredge was engaged on the construction of the Pouarua Canal during the first five months of the financial year. The land through which this canal passes consists of peat and timber 8 ft. to 10 ft. deep, overlaying soft alluvium. Due to the instability of the banks, it was not possible to construct a ditch of sufficient depth to float the dredge without raising the water-level by means of temporary dams placed in the channel behind the dredge. It was found, however, that the impounded water percolated through the timber and peat forming the abutments of the dams, so it was decided to suspend operations temporarily to allow the land to consolidate, and the dredge crew was transferred to No. 23 dredge in September. The plant was working only thirty-four days. In that time 20,166 cubic yards was excavated, the unit cost, including interest and depreciation charges for the whole year, being 18·75d.

No. 28 Bay City drag-line excavator is a light machine specially suitable for the construction and maintenance of large drains. During most of the year the machine was used for improving the large machine-excavated drains in the Kerepeehi Block. The work involved the removal of growth and sediment from the drains and sloping the drain-banks, which were originally constructed more or less vertical by dipper dredges. One man operates the machine, and it has proved very satisfactory and economical for reconditioning large drains. The average quantity of spoil removed from 475 chains of drains improved by the machine was about 55 cubic yards per chain, and this was handled for 6d. per cubic yard. During June, 1930, the excavator was used for the construction of an outlet channel through the river-bank mud-flat for a new two-barrel flood-gate at Pipiroa. The output for the year was 28,329 cubic yards, and the cost 7·06d. per cubic yard.