GENERAL MEETING.

PAPER No. 9.

DESCRIPTION OF FLOOD GATES,
NACHCHADUWA,

BY

B. C. FRUHJING, IRRIGATION ENGINEER.

The following paper is a short description, illustrated by a drawing, of the new type of flood gates which are to be erected on the spill of the recently restored tank of Nachchaduwa in the North-Central Province, Ceylon.

The existing system of spill gates in Ceylon so far, has been by the use of strip planks.

It has proved a very difficult matter to remove the planks during flood times.

Mr. Ward, Director of Irrigation therefore, suggested the method now illustrated, and requested the author to prepare the drawings.

The advantages to be obtained by the improved gates are (a) Economy of cost, (b) Lightness, and (c) Great reduction of friction.

The gates have been designed to a batter of 1 in 15. Immediately after the first movement, during the process of lifting, they will rest clear of their bases, so that the friction then becomes roller friction.

Another material advantage gained is the total removal of friction between the faces, as in the case of the "sliding" sluice, but which in an ordinary sluice is so severe, that the faces soon become abraded and leaky and then repairs are required.

The weight of each gate is about 1½ tons, the present being 7 tons.
The estimated cost of each gate, 9' 0" x 7' 6", high, is Rs. 500.

In an ordinary sluice, the flat face of the moving door fits tightly against the prepared face, whether it be of stone, iron or wood.

Mr. Stoney states that the friction between these faces is such, that the power to remove the sluice under pressure, is 0.6 of the total pressure on the door, when everything is in good working order.

In the "Stoney" sluices, it has been well ascertained, that the power required to move a sluice on "Stoney" rollers is 0.57 of the load instead of 0.6 as in ordinary sluices.

Taking the above into consideration, the author is of opinion that the power required to move the gates illustrated will be very slight.

The length between the North Sluice and the South Abutment of the Dam, on which the Nachchikudawa Spill Sluices are to be erected, is 465 feet.

The tank has a drainage area of 192 square miles and the estimated discharge of the spill is 14,000 cu. ft. per second. To deal with this volume of water, 28 gates 9' 0" x 7' 6" high, each capable of discharging 500 cu. ft. per second, will be necessary.

A principle feature of the gate is that it travels by four wheels, on two rails fixed to the concrete piers.

The gate is constructed of 9" x 1" planks and its bearing face will consist of angle iron 4" x 3" x 4" let into the sides.

The bearing on which the gate rests is also of angle iron 7" x 4" x 4" fixed to the concrete piers, at a batter of 1 in 15. The attachment to the wheels is by 3 flat iron bars, each 24" x 1" which not only serve for the bearing of the gate, but also to secure the planks of the gate together.

In order to make the framing of the wheels rigid, 6" x 1" iron struts are fixed, a system to keep the gate in position, the axles are extended beyond the wheels and run in a 6" x 3" channel iron let into the projecting portion of the concrete piers.

The gates will be raised by means of a movable crane which is secured to a truck, running on rails the entire length of the spill.
When a gate requires to be lifted, it will only be necessary to attach a small length of chain from the winch to the chain or wire rope of the gate. This chain or rope will be found immediately under the rail.

The girders on which the track, carrying the crab winch runs, are supported by means of the concrete piers and stanchions. The latter form the channel iron guides and running rails for the gates.

The concrete piers are carried up alternately to the under side of the main girders. The latter is at the level of 342.43 above the 1. level, being 0.6" above spill level. The width of the piers at the top carrying the main girder is 3.0", widening out at a batter of 1 in 24, the termination at the base being 13.0". This extra width is obtained by the projecting portions of the piers, which take the channel iron guides, and which is also the face of the sill.

The intermediate piers, at the top are 9.0" and widen out at a batter also of 1 in 24. They are in a line with the main piers.

The spans between the piers on which the main girders rest are 26.0". The latter consist of 16" x 6" x 16" rolled steel joists with 10" x 1/2" plate rivetted to top and bottom. From the main girder 3.5" x 4" x 1/2" T-irons, at 3.0" centres are attached for the purpose of carrying the footbridge, the flooring of which consists of a 5" iron plate. This floor plate is also hoisted & rivetted to the plate on top of the main girder and adds to the solidity of this portion of the structure.

The rails on which the track and crab winch travel, are supported by longitudinal girders, consisting of 8" x 5" rolled steel joists. The outer one is carried by the channel iron guides and stanchions, the greatest span being 12.0". The inner longitudinal and connecting girder rests on the main girders. Cross girders of the same size are rivetted to the longitudinal rolled steel joists. They are also supported by the upright rails on which the gates travel. The channel iron guides and upright rails acting as stanchions are braced together by angle irons. The whole of the steelwork therefore becomes as it were a solid structure.