Volume 22. Toronto, April 4, 1912

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The Canadian Engineer

An Engineering Weekly

WATERPROOFING CONCRETE STRUCTURES*

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One of the hardest problems presented in connection with the construction of the concrete subway track elevation of the Chicago, Burlington & Quincy in Chicago is the waterproofing. These subways are constructed with concrete slabs or girders 7 ft. wide, built away from the work, resting on concrete abutments at the street lines and on concrete columns and cross girders at the curb lines and centre line of street. There is a joint between the slabs longitudinally across the bridge, also one over each cross girder and one at the bridge seat on top of the abutment. The slabs over the strees are 2 ft. 9 in. thick over the street girder, and 2 ft. 6 in. thick over the curb cross girder. The slabs over the sidewalk are 1 ft. 5½ in. thick over the curb cross girder and 1 ft. 2½ in. thick over the bridge seat.

The first waterproofing was done in 1906. The most natural method seemed to be the closing of the joints. In order to do this the first slabs were built with the sides offset as shown in Fig. 1. The open space between them after they were set was ¼ in. at the lower part and 1¼ in. at the upper part. A board was put under the joint where the bridge seats did not prevent the mortar from leaking through and the ¼-in. space was filled with cement grout to within 1½ in. of the offset. The next 3 in. was calked with oakum soaked with an asphaltic compound. The rest of the opening was filled with cement grout and over the entire joint were placed three layers of felt painted with this compound.

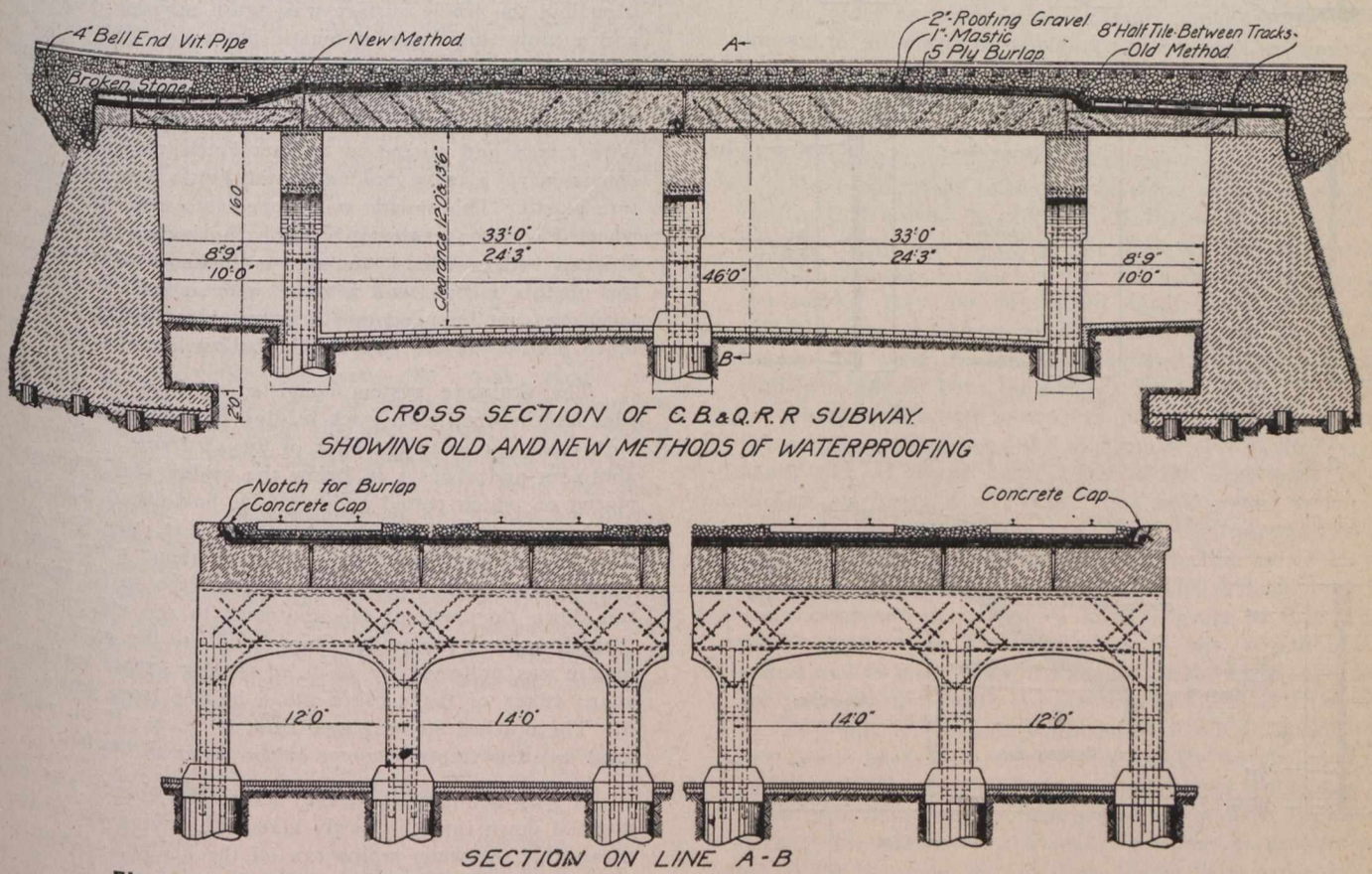

Fig. 8. Standard Method of Waterproofing Subways; C. B. & Q. Track Elevation Work, Chicago.

This method was not effective, the subways leaking very badly. It did not prevent the water behind the abutment from running through the mortar joint down the face, and the joints cracked open, letting the water through. It was thought best to fill the joints with some elastic material and six schemes were tried as shown in Figs. 2 to 7 inclusive. They consist of different arrangements of oakum, cement grout, tar or some asphaltic compound and sand. In every case the bottom of the crack was calked with oakum to prevent having to use boards under the joints. None of the methods were even partly successful until the sixth was tried.

* The Armour Engineer, January, 1912.