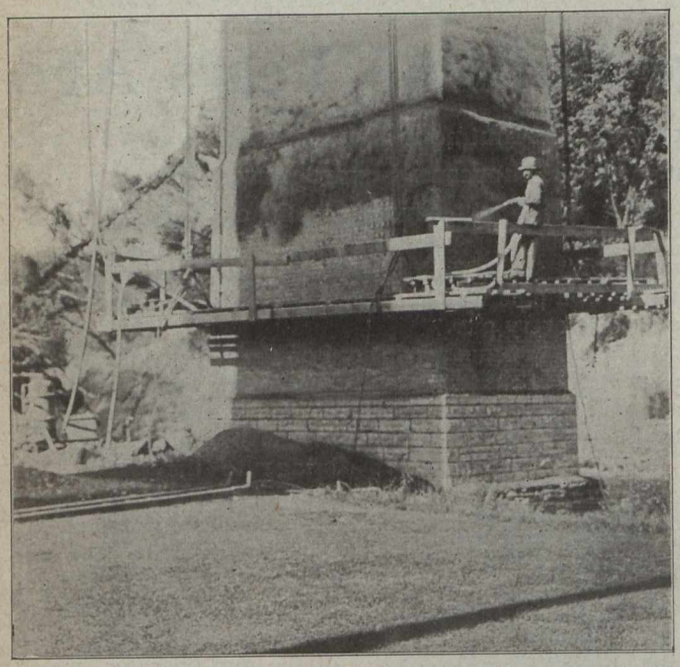
acute angle to the surface to be covered, instead of shooting the material directly onto the surface in a line perpendicular to the surface. The nozzleman soon noticed, however, that he was making but little headway, as the stream rebounded too much and also tended to cut off material already on, and he soon discovered, by his own observations, the proper way to handle the nozzle. A number of days and partial days were also lost through extraordinarily heavy rains which prevented the men from working and which at one time caused the river to overflow its banks to such an extent that they could not reach their work. These delays accounted for a considerable amount of time, and the men feel that, with the experience they have acquired, they could now do the same work, with continued fair weather, in a month; and if the air were to be pre-cooled, so that it would not reach the gun so damp as it did after travelling through the long stretch of pipe, considerably more time could be saved, as the gun and nozzle would then deliver as a faster rate. The rate of delivery of the gunite was only about half as fast as the writer has seen accomplished on other jobs with the same mixture.



A Closer View Showing the Nozzleman at Work

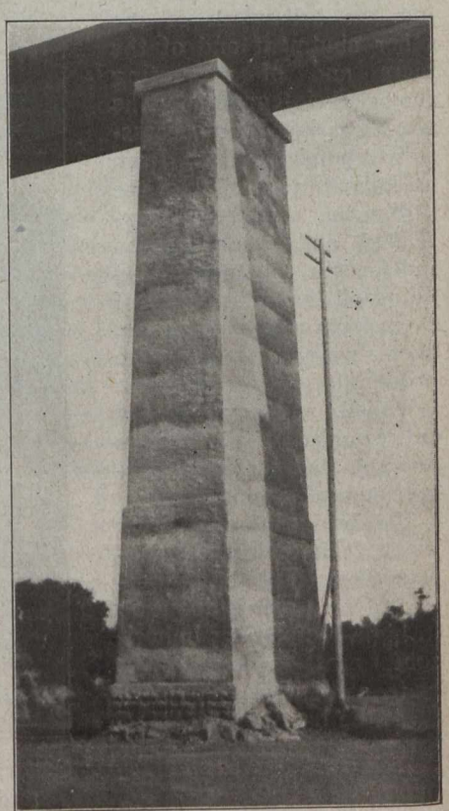
Besides the workmen mentioned above, it was deemed advisable, on account of the novelty of the work, to have a foreman devote most of his time to it, and several visits were also made by members of the railway's engineering staff.

The mixture was 3 to 1, that is, three pails of sand and one of cement being emptied at a time into the feeding hopper of the gun, the mixture being hydrated at the nozzle. About sixty bags of St. Mary's Portland cement were used for each pier and fifty bags for the abutment. The gun tended to clog with the very fine beach sand first used, but after a coarser sand was obtained, no such trouble was experienced. The water pressure was about 40 lbs. The air pressure first tried was about 30 lbs., but was changed to between 40 and 50 lbs. The gun was a type G.L.N., built in 1912, and had been frequently used before being acquired by the G.T.R. for this work.

No official figures regarding the cost of the work have been compiled, but from information furnished by the men on the job and by the bridge and building department of the railroad, the cost is estimated as follows:—

133 bbls. cement @ $1.85 net	$ 246.05
52 cu. yds. sand @ $1.55 delivered at base of piers	80.60
Rent of compressor plant and piping at G.T.R. fixed scale, coal and water	220.00
Interest and depreciation on gun, depreciation at the rate of 17% per annum and interest at 7% per annum, and the whole multiplied by three to allow liberally for time gun might stand idle (value of gun, new, $1,250)	112.50
Three men @ 27½c. per hour, 10-hour day	297.00
One man @ 27½c. per hour, 11-hour day	108.90
One man @ 32c., 10-hour day	115.20
Foreman's time	165.00
	$1,345.25
Engineering and overhead, 5% (G.T.R. percentage for maintenance work of this class)	67.26
Total	$1,412.51

As about 2,720 sq. yds. on piers and 280 sq. yds. on abutment were covered, or a total of about 3,000 sq. yds., the work cost approximately forty-seven cents per square yard, which compares very favorably with costs of gunite work in the United States, considering the high price of cement (and only 350 lbs. to the barrel instead of the American 380 lbs.), the unfavorable weather, the liberal allowance for all machinery rents and overhead, and the total inexperience of the foreman and workmen in this type of construction. On the other hand, it will be noticed that the wage scale is lower than paid by most contractors and others to-day for similar work. The cost as figured by the G.T.R. may be even a little lower, as the railway classes this as maintenance work, and usually makes no charge for the use of any machinery on maintenance work.



The Cement Stucco Effect is Pleasing and Makes the Bridge Look New, Besides Protecting and Strengthening the Brickwork

So far as is known, this is the first use of the cement-gun by the G.T.R., and the first application of gunite to brickwork in Canada. No reinforcement was used, the