IMPROVEMENTS ON NIAGARA FALLS PARK AND RIVER RAILWAY.

J. C. Royce and H. W. Middlemist, engineers for the Ontario Railway and Municipal Board, have presented the following report on the improvements which were made recently on the Niagara Falls Park and River Railway. On August 19th, accompanied by the chairman of the board, we conducted a test on the Queenston hill, in order to ascertain the efficiency of the new safety switch and the effect on the speed of the car produced by the change of grade and radius of curve. A car was provided by the company, whose officials were present and witnessed the test.

A test was first made of the safety switch by starting the car freely without trolley connection from the curve at Dumfries Street, 200 feet up the grade, and allowing it to accelerate to the end of the switch. The car was then taken to Dumfries Street to a point about half-way between the two curves there and started freely and allowed to attain a speed it would likely do in case of accident, and was brought to a stop at the end of the safety switch. A test was then conducted in order to ascertain the acceleration of the car from the safety switch to the end of the lower curve near the river, the radius of which had been increased to 145°, and the grade reduced to 4.2 per cent. The car started by gravity from the switch and passed satisfactorily around the curve without the application of the brakes.

A further test was made of the braking power of the four motors which are now installed in the cars in accordance with the board's order. The trolley was taken off the wire and the car allowed to run free, and when it attained considerable speed the lever on the controller was thrown into reverse position and the car was brought successfully to a standstill by the resistance of the motors only. Another test was made to ascertain the acceleration which the car would attain on the curve itself, and this was found to be comparatively small on account of the curve resistance.

We consider these tests satisfactory, in so far as they show the efficiency of the safety switch, and that if a car should run freely down the grade from the safety switch it should pass around the curve at the river at a safe speed, unless power is applied by the motorman voluntarily, in which case no precautions taken by the board will avail. We have taken into consideration the use of a dead trolley wire between the switch and the end of the curve as a precaution against the motorman using current and thereby attaining speed beyond the safety limit on the curve. We have decided, however, not to recommend this, as it is advantageous to have current available at all times while passing down grade, not only for operating the air-brake and lighting system, but to enable the motorman to reverse his car, which would be advantageous in case of emergency.

We also called the superintendent's attention to an irregularity in the curve on the safety switch, and he promised to rectify this. We would recommend that the spring frog at the safety switch be kept greased, and have pointed this out to the superintendent, who has promised to see to it.

In reference to the improvements which have been made on the N.F.P. and R. Ry. to secure greater safety, it may be stated that the original construction of the portion of the line from Queenston wharf to Brock's monument required similar methods to those used by steam railways in mountainous countries. The distance on a straight line from the top of the hill to the wharf is 2,650 feet. The difference in elevation is 293.8 feet. To descend this hill, without an excessive gradient, the line had to be lengthened. This was accomplished by constructing along its face for 2,100 feet westerly, where it turned in an easterly direction, still on a descending grade. The length of track actually constructed between the named points was 7,500 feet. A section of track where the gradient was 5.7 per cent., at the foot of which was a curve having a radius of 115 feet, has been raised several feet at the low place recently, and the alignment has been changed so that the curve radius is now 145 feet. A new safety switch has also been installed.

ELECTROLYSIS IN UNDERGROUND PIPES.

Some important considerations relating to the mitigation of the electrolytic corrosion of underground pipes by stray currents are embodied in a report of the United States Bureau of Standards.

It is found that paints, dips, wrappings, etc., are not of much avail in themselves, although useful in a secondary way. Even insulating points offer but an imperfect guard. The Dressem coupling is commonly used in gas mains. A sleeve rests with rubber packing on the two pipe ends, and is sub-divided by rubber insulations. Through the use of this coupling high insulation resistances have decreased to a few ohms. In leadite joints the decrease occurred in a very short time. In this case the leadite, which is poured like lead, contains sulphur, resulting in sulphuric acid when the ground is wet.

Wood stave joints, as used by the Pennsylvania Water Company, do well in an area where jointings are few, and appear to be preferable to wood stavings wrapped in asphalted spiral steel tape.

The Metropolitan Water Board, Boston, has recourse to a plain sort of joint, consisting of planed and shaped overlapping sections of white pinewood built up to form a ½-in. lining, encased in paraffin impregnated canvas. The ring thus formed and driven in prevents the pipe ends coming into contact, and stops leaks up to a pressure of about 75 lbs. A higher pressure is overcome by closing the pores of the wood in a bath of red lead. The spigot end of the pipe may be banded with iron.

Another type is a cement joint with a packing of rubber or fibre between the ends of the pipes. After a hempen ring is driven in, cement is added, and then another ring of hemp binds the joint. The report recommends that tarred paper or a coating of pitch may be used on the exterior. Another point which compels attention is that of the danger to electric pipe drainage system by negative boosters. The bureau opposed the system of pipe drainage in a complicated area.

A warning is issued against uninsulated negative feeders accompanied by the following suggestions: (1) Limit the actual potential drops on the earth or on pipe network; (2) limit the over-all voltage drop to 2 or 4 volts, and the gradients to 0.3 or 0.4 volt per 1,000 feet; (3) install permanent potential wires to determine drop period values. The bureau deprecates metallic connection between underground metallic structures and the track, and recommends inter-connection of intersecting or parallel tracks as well as good bonding and cross-bonding.