

AMERICAN RAILWAY ENGINEERING ASSOCIATION.

Summary of the Year's Investigations of the Various Standing Committees.

During the past year the Association's various standing committees have been continuing their investigations along the lines followed in the past, and have made a number of studies of new subjects, looking toward the establishment of uniformity in maintenance of way standards and the outlining of good practice in the work of that department. A summary of the work of the committees is given in the following account. The action of the convention held in Chicago recently

the Louisville and Nashville Rd, is also discussed.

During the past two years the committee has collected information as to the drainage laws of various states, but finds that since they are frequently changing and difficult of useful application without reference to the companies' attorneys, it seems impracticable to employ them. Consequently the committee suggests that its further work along this line be directed toward the benefit

ballast, 18 in. to 14 in. in depth, and an upper layer of stone ballast, 6 to 10 in. in depth, approximately 24 in. deep in the aggregate, with the same spacing of ties, will produce nearly the same result.

In regard to physical tests of stone for ballast, the committee reports an additional compression test, which the U. S. Office of Public Roads will make for the railways, and which it presents for addition to the other tests adopted in 1910. The committee advises that the description of the physical test, together with instructions for providing samples and blue prints of machines used, may be obtained by writing to the Department of Agriculture at Washington.

In its review of the use of gravel ballast the committee presents the results of determinations by a number of railways of the percentage of sand, gravel, dust and clay in the ballast used. This information is tabulated in the report, together with brief statements of the practice of a number of roads and the results which are being obtained by them from the use of gravel ballast. A description of the new gravel-washing plant of the Richmond, Fredericksburg and Potomac Rd. is presented as an appendix.

In view of the wide variation found in the character of ballast which is reported to give good results, the committee considers further investigation of this subject desirable.

In the discussion on this report one point brought out as bearing on the experiment on the Pennsylvania Rd. to determine the depth of stone ballast and stone ballast underlaid by cinders, being the experience of the Santa Fe with deep cinder ballast, which was later replaced with slag, the latter requiring much subsequent attention due to the settlement of the cinders beneath it. It was pointed out that here the composite ballasting showed up well in experiment but not in practice.

It was decided to make the following additions to, or changes in, the association's approved practice:—

A definition of the depth of ballast as the distance from the bottom of the tie to the top of the subgrade.

A standard compression test for stone

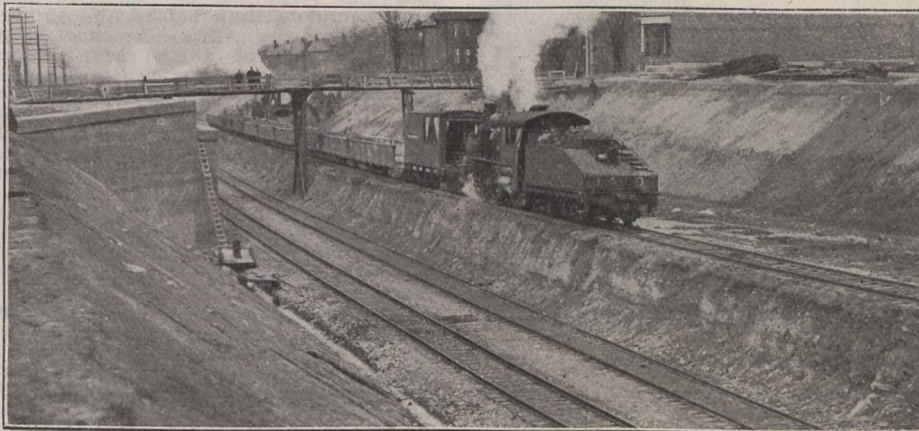


Fig. 4. G.T.R. Grade Separation. Dowling Avenue Bridge, Dec. 1, 1911.

establishes certain of the conclusions and recommendations embodied in these reports as the approved practice of the association.

Committee on Roadway

The work of this committee consisted of further investigations leading to the presentation of formulas of general application for the determination of waterway areas; a study of allowable unit pressures on roadbeds of different materials conferring with the committee on ballast; a study of tunnel construction and ventilation; and an investigation of agricultural drainage as affecting roadbeds. The first subject has been under consideration for several years and a considerable amount of data has been collected, and a general relationship also found between the best known waterway and runoff formulas. Since the previous convention the committee has directed its attention to the hydraulic features of the culvert, and reports progress, but does not go so far as to make any definite recommendation.

The committee has collected a considerable amount of additional data relative to the bearing power of soils, which is included in the report, and also presents a mathematical analysis of the action of pressures on soil composing a railroad subgrade based on Rankine's analysis of earth pressures. In this connection a form of field test of railroad subgrade material is suggested.

The committee has confined its attention to ventilation of tunnels in connection with the third subject. No definite conclusion has been reached, but the opinion is held that artificial ventilation is usually unnecessary in American steam railway tunnels of lengths less than 2,000 to 2,500 ft. The report states that probably the most efficient form of artificial ventilation for tunnels is to force air into one end by fans powerful enough to drive the smoke out ahead of the train. This system has been installed in several tunnels in this country, which are listed in the report. Experience with the clearing of smoke in several tunnels of

to the roadway to be derived by the construction of agricultural drainage work.

Committee on Ballast

This committee has been engaged in work leading to the determination of the proper depth of ballast for uniform distribution of loads on the roadbeds; on the fixing of physical tests of stone for ballast; and in the preparation of a review of the use of gravel ballast.

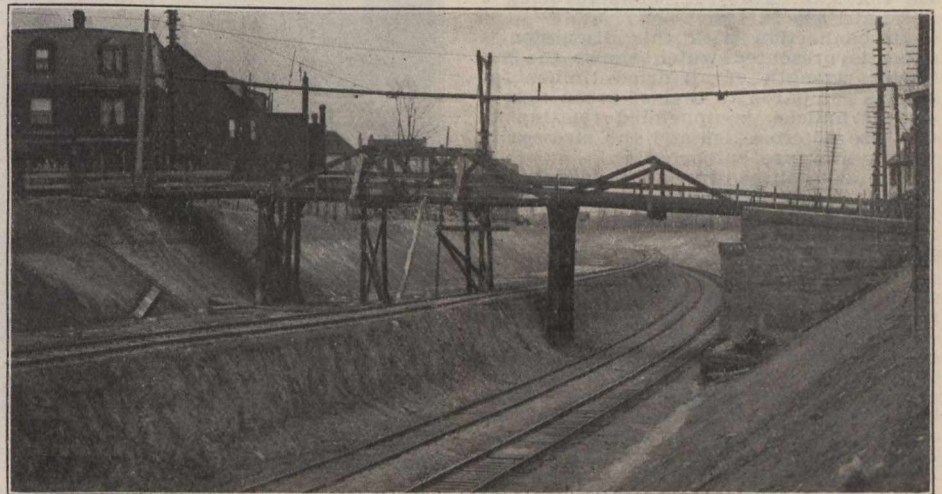


Fig. 5. G.T.R. Grade Separation. Dunn Avenue Bridge, Dec. 1, 1911.

As a part of the investigation of the proper depth of ballast the committee presents references to published accounts of investigations of this subject, calling particular attention to the experiments recently conducted on the Pennsylvania Rd. From its study of the data available the committee concludes that with ties 7 x 9 in. x 8 1/2 ft. spaced about 24 to 25 1/2 in. on centres, a depth of 24 in. of stone ballast is necessary to produce uniform pressure on the subgrade and a combination of a lower layer of cinder

to be used for ballast, this test to be added to the physical tests of stone for ballast already adopted by the association.

In addition to the adoption of these recommendations, endorsement was given to the conclusions of the committee on its study of the necessary depth of ballast for even distribution of loads.

Committee on Ties

This committee has had under consideration the subject of size of cross-tie