

REVIEW OF NEW SPECIFICATIONS FOR STEEL HIGHWAY BRIDGES

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THE General Specification for Steel Highway Bridges which has been prepared by a committee of the Canadian Society of Civil Engineers, is very comprehensive and complete, and covers the construction of highway bridges carrying the ordinary highway traffic or combined highway and electric railway traffic.

The various chapters are: Introductory; General Features; Floor; Loads and Stresses; Unit Stresses; Proportioning of Parts; Details of Design; Movable Bridges; Workmanship; Materials; Full-Sized Tests; Inspection and Testing at the Mills; Inspection and Testing at the Shops; Painting, Creosoting and Asphalt; Motor Truck Loads; Electric Car Loads; Detail of Wooden Handrail; Data to be Supplied by the Engineer; and Index.

An examination of the specification shows that a broad choice of loadings for bridges is presented. A new heavy loading, noted as Class "A", consisting of a 25-ton motor truck is suggested. This is along the lines of present-day tendency in motor truck design. Such loading is proposed for manufacturing districts in cities. A concentrated loading of 15 tons is proposed in residential districts in cities and towns, while the same concentrated loading is proposed for country highways. A new light loading for mountainous districts is very useful, and consists of a concentrated load composed of a 6-ton motor truck, with a uniform load of from 70 pounds per square foot for 50-foot spans and less, diminishing to 40 pounds per square foot for spans 200 feet and over. The T-chord design is recognized and approved for spans up to 80 feet, for structures in mountainous districts, and in such structures metal $\frac{1}{4}$ inch thick is also permitted. A slight change has been made in the requirements for strength of handrail posts, which would accordingly be reduced slightly in size. Planking of sidewalks may have $\frac{1}{2}$ -inch open joints which would hardly seem desirable on account of small objects being able to pass through the floor.

Creosoted timber flooring is recommended for all bridges requiring a small dead load. The application of impact stresses has been changed so that the impact is only added to stresses produced by the concentrated loads. In the case of motor truck loads 30 per cent. of the computed stresses is added for impact, while for electric car loads the usual formula is given. The distribution of the concentrated wheel load on the floor is given, specifically, and results in rather heavier loading than used in present practice.

A departure from present specifications has been made in the column formula which as proposed is $12,000 - 0.3 \left(\frac{l}{r} \right)$ in pounds per square inch. The stress allowed on steel castings has been reduced, while an allowable compressive stress on iron castings has been included. Unit stresses in bending are also given for steel and iron castings, while allowable stresses for bending in timber is included. Present-day improved shop and field methods in the driving of rivets have been recognized by increasing the shearing and bearing value for such rivets. Hard bronze expansion bearings are recommended, and the unit stress in bearing for such members is given. Granite masonry has been allowed a bearing pressure of 800

pounds per square inch, and the bearing capacity of concrete has been increased.

In arriving at the net section of tension members, a minimum of at least two rivet holes must be deducted. The size of compression members has been reduced, and it is proposed to permit a length of 175 times the least radius of gyration. A formula for the minimum thickness of cover plates and web plates in compression and also for the minimum thickness for unstiffened flanges of compression members is given. Bridges less than 50 feet in length and composed of T-chords may have single web trusses. The design of connections for all members is definitely settled by requiring that such connections be detailed for the net sectional area of the member and the allowable unit stress on that area is given. Diaphragms are required in the ends of certain sizes of compression members and such a detail is desirable in the interests of stiffness of the member. The design of the latticing of compression members is to be based on the stress in the member, and such latticing shall resist cross shear equal to 2 per cent. of that stress.

The minimum size of expansion roller is to be increased from 3 to 4 inches, while plates for expansion bearings of spans 80 feet and over are to be of hard bronze or other non-corrosive material. Spans of 100 feet and over are to be preferably supported on hinge or disc bearings.

A very satisfactory paragraph containing some 47 clauses covers the complete design of movable bridges, and brings the design of such structures up to date.

Under "Workmanship" it is stated that rivet holes must be drilled from the solid or sub-punched and reamed. This marks a step in the proper direction that all shop work should take and undoubtedly connections under this specification should have a much better fit.

The other paragraphs on materials, tests, inspection and bending are composed of the usual general clauses, and the last three or four pages are taken up with diagrams of concentrated loads, dimensions of handrail details, data required and the index.

U.S. POWER DEVELOPMENT BILL

The United States Administration Water Transportation and Power Development Bill, which is designed to increase transportation and power facilities, is ready for introduction into Congress.

The bill creates a commission, composed of the Secretary of War, Secretary of Agriculture and Secretary of the Interior, to have charge of developing the country's water power.

President Wilson is authorized to appoint an executive officer for the commission through whom its policies shall be carried out. He is to serve for five years at \$10,000 a year. He is given power to issue licenses for construction of dams, reservoirs, power houses, transmission lines or any other projects which will aid in power development or improve navigation. Licenses are for fifty years. Licensees must submit all plans for improvement to the commission, which may alter them if it sees fit.

The federal government is to be given free power to operate locks. If the government wants any power plant for manufacture of explosives or fixation of nitrogen to use in explosives manufacture, the bill empowers the commission to commandeer such plants. Rates to be charged for power are subject to regulation and reduction by the commission, to which they must be submitted.