## PROPOSED DESIGN OF CONCRETE TRUSS FOR DAVIES BRIDGE ON DON MILLS ROAD, NEAR TORONTO

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N connection with the road improvements carried on by the Toronto and York Roads Commission, bridges have been an important item, both as to expense and as to ap-While the commission have not gone to the expearance. treme of spending funds for appearance only, yet they have planned that works designed for utility shall have a pleasing appearance, and in this regard an attempt has been made to improve the lines as well as the utility of the concrete truss.

The crossing of the Don River by the Don Mills Road, a short distance north of Toronto, required particular study because of the meeting of two streams at the bridge site,



SECTION THROUGH ROADWAY, DAVIES BRIDGE

and further because the highway at the approaches to the bridge is always submerged at high water.

At this point there is likewise a right-angle turn in the road, and to eliminate this sharp turn and provide sufficient clearance for the water in time of flood, it was necessary that the maximum of clearance be provided with the minimum of height.

Because of the conditions mentioned above, it appeared that a reinforced concrete truss bridge might be the most suitable for this location, and with this in mind the bridge indicated in the accompanying drawings was designed.

The design is somewhat unusual in that the two end panels were considered as concrete beams or girders, and designed to resist shear. The central five panels were considered as an arch, and the arch rib was designed to with-



SECTION AT CENTRE OF BRIDGE

stand the bending stresses incident to loading, and independent of the stiffness of hangers, bottom chord and floor.

In estimating the cost of crossing the stream at this point, it was found that if a beam bridge with centre pier were to be used, there would be 90 cu. yds. more of concrete required, but upon opening tenders it was found that the truss was 25% more expensive than two 45-ft. girder spans with centre pier.

## Letters to the Editor

## HIGHWAY CONSTRUCTION

Sir,-The following extract from a recent editorial in a technical publication sounds a timely note of warning that should command the serious consideration of our public officials :-

"Engineers are fully convinced that under normal conditions, expenditures for good highways are investments that yield satisfactory returns to the public, but when costs have risen abnormally, the investor must consider alternative plans for accomplishing the desired results. Last year we had to acquire the habit of considering \$40,000 per mile as the proper cost for a road that could have been

built for half that sum before the war. This

year, if the bids received are a fair criterion, we must decide to pay \$60,000 for the identical product. Against an annual interest and amortization charge of \$2,233 (interest at 41/2 % and amortization in 15 years), we now have an annual charge of \$6,700, three times as much. No highway engineer who has any sense of values and the significance of figures can fail to set against these

annual charges the cost of maintaining a cheaper type of pavement, even though he knows maintenance costs, too, have gone up. Already there is much talk of serious curtailment of highway programs until costs come down to their pre-war level and when the annual charge for the better type of road will again, with a given traffic, be equal to or less than that of maintaining a cheaper surface."

For the past few months, numerous deputations from different sections of Ontario have urged our provincial highway department to build nothing but rigid pavement on our provincial system. The folly of committing the province of Ontario to a road program of \$90,000,000 for a small percentage of our total highways must be apparent to anyone who reflects on the situation.

The public at large will welcome the announcement made at the Ontario Good Roads Convention recently, of the policy adopted by the Department of Public Highways for the provincial system. This "pay-as-you-go" policy is particularly appropriate at the present time when labor and material prices are unusually high. Many states in the Union are becoming much alarmed at their rapidly increasing road bond indebtedness for expensive pavements that too frequently must be resurfaced with a suitable wearing surface long before their bonds have matured. The tendency is to build more cautiously by establishing well consolidated macadam bases, thoroughly drained, and surfacing them with bituminous tops. Our engineers who served in France appreciate the traffic-carrying capacity of well maintained macadam roads.

A recent article on "Asphalt Constructed on a Macadam Base" states that 21 miles of the Warnersville-Palmyra road, one of the main thoroughfares of Pennsylvania, were recently surfaced with a 21/2-in. asphalt top at 91c. per sq. yd. Another example of economical construction is that of a 21/2-in. sheet asphalt surface constructed in Burlington County, New Jersey, in 1917, on a gravel base, at a cost of \$1.32 per sq. yd., including the cost of gravel shoulders. Absolutely no maintenance charges on these roads have been incurred to date.

Irving T. Patterson, chief engineer, State Board of Public Roads, Rhode Island, in writing on "Asphalt Macadam Roads." states that "in no case has the maintenance been over \$100 per mile, and the average cost of maintenance we estimate to be \$50 per mile." Mentioning a two-mile section built under unfavorable conditions late in 1916, Mr.