

tion felt equally convinced that double intersection was not practical for such a structure. Studies were made along both lines, but neither party was convinced that their ideas were not the best. There being a divergence of view on the point, it was decided to advertise for tenders on the official plan prepared by the chairman and chief engineer on the single intersection principle with the mutual understanding that while tenders were asked on this design, tenderers were to be allowed to present any other design they chose, which would be fully considered by the Board on an equality with the official design.

This decision was embodied in a unanimous resolution of the board passed on May 2, 1910:

'It is resolved that the plans and specifications for a cantilever design now completed be approved and submitted to the minister for tenders and that in the event of a better plan being submitted by any of the bidders same shall be adopted.'

The advertisement for tenders consequently contained a clause embodying the principle of this resolution.

A full history of the tenders received appears in our former report. It will be seen that ten tenders were received for designs other than the official design, according to the advertisement, and they were considered, as outlined in a former report.

On close investigation of the alternative designs it was found that one, presented by the St. Lawrence Bridge Company, while designed on the single intersection principle, in a very practical way met all the demands that a portion of the Board had in their minds when they favoured the double intersection principle. It certainly is an original and happy combination, which embodies to a large extent the views of the advocates of each of the principles—single and double.

As stated in our former report, a bridge could undoubtedly be constructed on the official design, and once erected would be a substantial structure, but we are of opinion that design 'B', in addition to providing for a satisfactory bridge offers features which simplify the erection and minimize the risk to both life and property entailed in a work of such magnitude. This we consider of paramount importance. In addition to this we favour design 'B' for the following reasons:

1st. The numerous temporary members, sub-trusses and other connections to the permanent members involved in the official design are all dispensed with in design 'B'.

2nd. The erection can proceed in a regular manner, the traveller being carried on the main members only and as it advances each operation is similar to the preceding one, which similarity greatly favours speed and safety in construction.

3rd. There are no members in the trusses that do not carry live load with the exception of two small struts over the centre pier.

4th. There is less distortion and secondary stress as may be seen by comparing the Williot's diagrams, showing in each case the deflections of the trusses for different conditions of loading.

5th. The 'B' design admits of comparatively

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small stresses in the web members, thus rendering connections with the chords much more simple.

6th. No pin holes are required in the chords as connections are made by means of gussets, thus evading loss of section by large pin holes and permitting the compression members to abut with half holes in gusset plates outside the chords. The absence of pin holes in the centre line of the chord permits the use of a centre diaphragm connecting the several leaves of the bottom chord and presenting a more symmetrical section than in the official plan.

7th. By the substitution of riveted tension chords for eyebars all risk and difficulty of assembling a double line of eyebars with the heavy inclined posts in the official plan is removed and the diagonal tension and compression web members are in practically the same vertical plane as the corresponding leaf of the upper chord, thus insuring a more direct transmission of stress.

8th. All the heavy extras demanded by steel makers occur in the long and heavy web members of the official design. Owing to smaller stresses in the 'B' design these extras may be avoided, thus insuring less risk in the use of material which is beyond commercial limits.

9th. The general appearance of design 'B' will certainly be appreciated from an æsthetic point of view, the large open panels and wide riveted members convey the idea of strength combined with economical distribution of material, which is the true test of scientific construction. A bridge constructed upon this design would compare most favourably with the highest type of long span bridges in existence.

We, therefore, beg to recommend the acceptance of the tender of the St. Lawrence Bridge Company on their design 'B.' We do not wish to be understood as condemning any other design nor is this recommendation in any sense a reflection on any of the companies tendering, but we have arrived at this conclusion after a careful study of all the designs and conditions.

Respectfully submitted,  
(Sgd.) CHARLES MACDONALD.  
" RALPH MODJESKI.

Hon. Geo. P. Graham,  
Minister of Railways and Canals,  
Ottawa, Ont.

At one o'clock, the House took recess.

House resumed at three o'clock.

Mr. GRAHAM. As soon as the report signed by Messrs. Macdonald and Modjeski reached me, I forwarded it to the chairman of the board, and he wrote me at some length on December 10, setting out very fully and at considerable length his objections to the report of the majority, and, among other things, in this letter or the one following it, he contended that the tender of the St. Lawrence Bridge company could not be entertained, as it did not comply in some respects with the advertisement, and he could not at all agree that it was a