

Editorial

CALGARY ENGINEERS SETTLE DISPUTE.

Certain action recently taken by the Calgary Branch of the Canadian Society of Civil Engineers, and approved of by the Council of the Society, deserves special publicity as illustrating one of the many ways in which such a society serves the interests of the engineering profession as well as of the public in general.

G. W. Craig, city engineer of Calgary, Alta., had been seriously criticized in regard to a reinforced concrete arch bridge over the Bow River. The city council had ordered the Board of Commissioners to investigate the charges, and the citizens of Calgary believed, as a result of the discussion, that the safety of the bridge, which was under construction, was endangered. The controversy was very technical, and the public could not judge of its merits.

At that stage the Calgary Branch held a general meeting and passed a resolution offering the gratuitous services of the branch in determining the technical questions involved. The city accepted the offer, and the branch named a committee of three of its prominent members, who were independent of all civic politics. The report of the committee, stating that they could "find no reason for the charges, and are unable to understand why they should ever have been made," was adopted by the city council, and the city engineer was thus fully exonerated.

"Mr. Craig," says the committee, "showed a very complete knowledge of the general questions of the design and of the history of the particular questions in controversy."

Mr. Greene, the city's bridge engineer, and Mr. Field, the city chemist, were examined. The committee then visited the work, where various employees were questioned, and a visit was paid to the city laboratory, where samples of steel were tested, and the equipment at the laboratory and methods of tests were noted.

The charges that had been made in connection with the bridge were as follows:—

- (1) The use of unsuitable steel in a portion of the structure, and extravagance in cost of testing the same.
- (2) Neglect or carelessness in not carrying the foundations of the north retaining wall or abutment to rock.
- (3) Failure on the part of the engineering department to submit the design to a consulting engineer for endorsement, "it having always been understood that such a course would be followed."
- (4) Purchase of unsuitable cable at a higher price than suitable cable could have been bought for.

In regard to the testing of the steel, the committee "cannot see how any private firm could make the necessary tests and inspection any cheaper than the city has done in this case." The committee's report goes very fully into the character of the material used in the bridge and deals with the questions of physical tests, specifications for steel, re-rolled steel, process of manufacture, significance of tests, and so on. In regard to the use of re-rolled steel, the report says:—

"It has been used as reinforcement in the construction of the retaining wall which forms a part of the north

abutment. It has also been used, or is contemplated, as dowels to furnish a bond between successive pourings of concrete in the river piers and springings. It was also used, or contemplated, in the curtain walls of the main piers and pylons of the river arches, and as carriers or spacing rods in various other parts of the work. With the exception of the retaining walls, the function of the steel is arbitrary, and the material is subject to no definite stresses. In the pylons, the curtain walls are a mere architectural effect and have no structural functions. The steel is used merely to prevent unsightly cracks due to temperature and shrinkage stresses, and its section is in most cases far in excess of possible requirements."

In regard to carrying the foundations of the north retaining wall or abutment to rock, the committee "are of the opinion that the wall is reasonably safe against failure, and that the additional expenditure necessary to carry this wall to rock would not be justified by the returns."

The stresses in the retaining walls were checked, and the possibility of failure investigated. The calculated loads are moderate, and the methods of calculation adopted are conservative. The committee are of the opinion that failure from any of the causes mentioned in the charges is a very remote possibility.

As to the submission of the design to a consulting engineer, the committee found that there was no common understanding to that effect. "As to the advisability of such a course," says the report, "the decision must be made by the parties who pay for the work. In general, when a proposed structure departs widely from well-established precedents, or the designer has not had the necessary progressive experience in the design of structures of such magnitude or importance, it is usually considered wise to employ an outside opinion to check over the design, or to pass on some particular feature of the construction. When the structure is well within precedent as well as the experience of its designer, the expense of a consulting opinion may not be justified. It might be remarked at this point that no consulting engineer whose opinion would carry any weight, would guarantee the safety of a structure any more than a counsel would guarantee the result of a suit at law, or a surgeon the result of a major operation. The decision as to the employment of a consulting engineer does not and should not rest on the designing or executive engineer. It is his duty in certain cases to suggest an outside opinion and in others to point out to his employers or clients, on request, the facts which may or may not justify the expense of such an opinion, but it is seldom his duty to insist on it."

The responsibility for the purchase of the cable was assumed by the city commissioners, and the opinion of the Calgary Branch on this matter was not required.

The Canadian Engineer has had the opportunity of perusing the voluminous details of the case, as brought out by the committee, and it can be readily seen that they undoubtedly represent a great deal of painstaking work. The Calgary Branch are to be congratulated upon their initiative. The unselfishness of their action is proven by the fact that Mr. Craig is not a member of the Canadian Society of Civil Engineers.