Editorial

THE TORONTO HARBOR SITUATION.

Hon. Robt. Rogers, Minister of Public Works for the Dominion, turned his attention last week to the Toronto harbor work, and, it is to be hoped, put the quietus on the "scandal" and "mystery" talk which the daily press, in some small measure, succeeded in creating. Some Toronto newspapers, recognizing the reading value of the Winnipeg graft exposure, at a time when the general sameness of war news was not conducive to creating public interest in scare heads, imagined when a section of the Toronto harbor work closed down a month ago without public ceremony and with the head of the Department of Public Works presumably tied up in the Manitoba elections, that the event would make excellent "scandal" copy, and with a we-should-worry-as-to-whom-it-hits attitude started in accordingly to implicate many in the "$22,000,000 scandal" centering around the water front development.

Some piling, driven by several firms operating on sub-contracts for that portion of the waterfront development that is being executed by the Canadian Stewart Company for the Department of Public Works, Ottawa, did not fit tightly and allowed sand to get through in places. The Department, through the general contractors, stopped the work, removed its idle inspectors, and had a commission of engineers investigate the extent of the defective work. This, being under water, could not be effected in an hour or a day. The general contractors at once satisfied the Department that the defects would be removed, and, pending a knowledge of the amount of work not up to specifications, had the job remain at a standstill. The extent of defective piling has been ascertained, and operations are in full swing again this week.

Thus the "$22,000,000 scandal" petered out, but not without injury in the public mind to some very capable and exacting engineers. The Toronto Harbor Commission, the Department of Public Works, Canada, and the Canadian Stewart Company are fully aware of the vital importance of good engineering design and workmanship in the development of Toronto harbor and waterfront. They have set about to carry out the greatest piece of harbor improvement work in America. They are seeing to it that no sub-contractor slips out from under the specifications.

Will the newspapers that perpetrated the "scandal" stigma endeavor to remove all traces of it? They have found no mystery, no scandal, no faulty design, or no occasion for such gross misrepresentation. There had been some loose inspection, with apparent advantage taken of it by sub-contractors, unknown to the general contractors, who are at all times responsible to the Commission and to the Government for workmanship in accordance with specifications. There is no misunderstanding regarding the removal of any defective work (which is very liable to occur on a job of such proportions), or concerning reconstruction in accordance with the specifications without incurring any additional expenditure on the part of either the Government or the Commission.

WIND STRESSES DETERMINED BY THE SLOPE-DEFLECTION METHOD.

The desire to get a large rentable floor space on a small parcel of land has led to the general use of the steel-skeleton type of building, in which the live and dead loads are carried by a system of beams and girders to columns and are carried by the columns to the footings.

A mathematical analysis of the stresses in the steel frames of office buildings due to the wind load on the building has come to hand from the Engineering Experiment Station of the University of Illinois. The bulletin, prepared by Messrs. W. M. Wilson and G. A. Maney, is one of the most extensive studies of the subject which have appeared.

The steel frames of office buildings resist the horizontal shear due to wind by virtue of the stiffness of the columns and girders. The sum of the moments at the tops and the bottoms of all of the columns in a story is equal to the total shear on the story multiplied by the story height. The distribution of this moment depends not only upon the relative stiffness of the columns but also upon the relative stiffness of the girders which connect the columns. Further, the distribution of the moment in one story depends not only upon the size of the members in that story but also upon the size of the members in the adjacent stories.

General equations are derived which can be used to determine the wind stresses in both symmetrical and unsymmetrical bents from one to five spans wide and any number of stories high. These equations are used to determine the numerical values of the moments, shears, and direct stresses in a symmetrical three-span bent twenty stories high. The method of determining these stresses presented in the bulletin is called the "Slope-Deflection" method. It is mathematically exact except for the assumptions upon which it is based. In the discussion of the assumptions the fact is brought out that while the assumptions are not exactly true, the errors do not materially affect the results.

Four approximate methods are presented which are in use. The moments are determined in a number of bents having different proportions, by these approximate methods and by the slope-deflection method. This comparison shows that two of the approximate methods are so inaccurate that they should never be used. The other two approximate methods are quite accurate when applied to certain bents but when applied to other bents they may give results which are seriously in error. A new approximate method is presented which agrees with the slope-deflection method except where there are large changes in the size of the columns and girders.

A model of a bent cut from a sheet of celluloid was subjected to a known shear. The deflection of the columns and the changes in the slope of the elastic curve at the ends of the girder as measured, and as computed by the slope-deflection method agreed very closely.

The slope-deflection method can be used in the design of buildings but it has its greatest value as a standard for determining the accuracy of approximate methods.