at this point, the cost of which is estimated at $750,000, including highway deck. This bridge will enable the Central Canada Railway to project, as contemplated, 100 miles westward. The line has been located as far as the Waterhole District.

About 340 miles of railway north of Edmonton is to be ballasted this year.

By spring it is expected that the total mileage constructed will be as follows:

E.D. & B.C. main line to Spirit River	357
Grande Prairie branch	60
Central Canada from McLennan to Peace River ...	50
A. & G.W.	250
Total mileage	717

These roads all were built under the guarantee policy of the provincial government and run through districts that were badly in need of railway facilities.

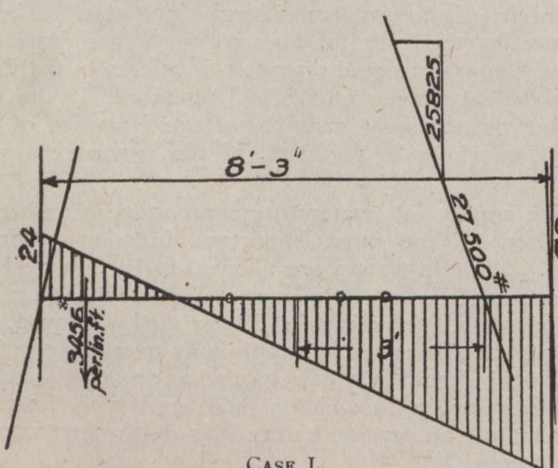
LETTER TO THE EDITOR.

An Interesting Point in Retaining Wall Design.

Sir,—An interesting point in design came up the other day and, thinking that some of your readers might be interested, I give you the problem.

The discussion came up in connection with the design for a semi-gravity retaining wall. One section of the body of the wall with the resultant stress is shown. Three methods of figuring the stresses are given. Which one is correct?

CASE I.—Figuring the stresses in the ordinary manner, we get 68 lbs. per sq. in. compression at the toe and 24 lbs. per sq. in. tension at the heel. A 9/16 inch diameter rod at 1-ft. centres placed 8 in. from back of wall would develop the entire tension.



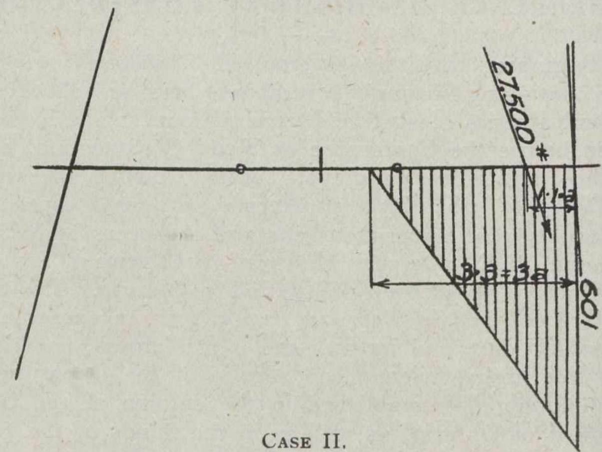
CASE I.

$$P = \frac{25825}{8.25}\left(1 \pm \frac{6\times 3}{8.5}\right) \times \frac{1}{144} = \begin{matrix} +\ 68 \\ -\ 24 \end{matrix} \text{ pds. per sq. in.}$$

CASE II.—Assuming no tension acting, we get 109 lbs. per sq. in. compression at the toe, using the formula $p = \frac{2}{3}\,\frac{V}{a}$, where V = vertical component of load and a = distance from toe to point of intersection of line of resultant with base.

CASE III.—Figuring the section as a reinforced concrete beam by commonly accepted formulæ, we require a ⅞ inch diameter rod at 12½-in. centres and get a compression at the toe of 163.5 pounds per square inch.

Should the steel be left out, as in Case II., or put in, as in Cases I. or III., in no case do we get compressive stresses that come anywhere near the working value of concrete. Both Case I. and Case III. are figured by com-

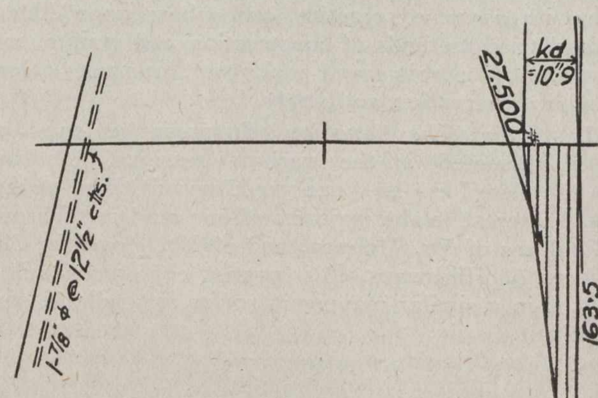


CASE II.

$$P = \frac{2}{3} \times \frac{25825}{1.1} \times \frac{1}{144} = 109 \text{ pds. per sq. in.}$$

monly adopted theories. In Case III. twice as much steel is required as in Case I., and the stress in the concrete is over twice as much.

A common method very much used is to widen the base so that the resultant will pass through the middle third, but is there any need for this when the concrete is



CASE III.

$M = 25825 \times 3 \times 12 = 930,000$ in.-pds.
Effective depth = 95 in.
Steel % = .055 = .627 pds. per ft.
$fc = \frac{M}{\frac{1}{2} k j b d^2} = 163.5$ pds. per sq. in. $k = 115$.
$fs = 16,000$ pds. per sq. in.

so lightly stressed? The writer believes that as long as the resultant does not go too near the face of the wall that the stress found by Case II. is the governing factor. The opinion of other engineers would be of interest.

E. M. PROCTOR.

Toronto, January 31st, 1916.

The Winnipeg office of The Canadian Engineer has been moved from Room 1008 to Room 1208, McArthur Building. The new telephone number is Main 2663. Mr. C. W. Goodall remains in charge of the office.