SURCHARGED AND DIFFERENT FORMS OF RETAINING WALLS

Published @ 2017 Trieste Publishing Pty Ltd

ISBN 9780649350018

Surcharged and Different Forms of Retaining Walls by James S. Tate

Edited by Trieste Publishing Pty Ltd.
Cover @ 2017

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BY

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NEW YORK:
D. VAN NOSTRAND, PUBLISHER,
23 MURRAY AND 27 WARREN STREET.
1873.

PREFACE.

This little Work is intended to supply what has no doubt been often wanted by many Engineers—a certain and ready means of correctly and easily ascertaining the Pressures of Embankments, Submerged or otherwise, composed of different materials; also the Moments of Retaining Walls of different forms of cross-section, to successfully withstand those pressures; so that, by knowing the exact value of each, the right dimensions of the most suitable form of wall for the purpose required can be at once ascertained.

As the method adopted does not involve the use of any long or laborious calculations, it is hoped it will prove useful to the Profession generally.

RETAINING WALLS.

Retaining walls are adopted as a necessary expedient in railway and other practice, often under very peculiar circumstances, as when there is not sufficient room for the slope of the embankment; it being sometimes perched high on a steep mountain's side, and where it would have been hardly possible to construct a railway at all, except by securing it with a massive wall occupying comparatively little space.

When it is also remembered how fearfully terrible any accident would be if it was to occur in such a dangerous situation—if by any erroneous calculation or mistaken judgment on the part of the engineer sufficient strength had not been given to the work, the wall which was to have supported the embankment, suddenly giving way, falling over into a deep ravine or chasm, a large portion of the embankment going

with it, and, it may be also, a passing train —there can be no doubt but that the nature of the material of which the embankment is to be made should be understood, and the best form and requisite dimensions for the wall should be well considered and accurately ascertained beforehand, so that it may be amply strong enough.

At the same time that the wall should be made perfectly secure, it is also often desirable that any unnecessary excess of strength should not be given to it, and so thereby avoid increasing its cost considerably, as the value of work is often very much enhanced when it has to be executed in such inaccessible situations as before mentioned, where all the materials for building it may have to be brought from a great distance.

The engineer thus may be at a loss to determine of what size a retaining wall should be built, so as to be safe against all contingencies that can occur, and yet also to be economical.

In many cases there have been failures which may have arisen from not correctly ascertaining beforehand how the material of

which the embankment is composed will be affected by the alternations of wet and dry weather before it is thoroughly consolidated, and the precise angle at which its slope will stand in either case, thereby causing a considerable difference in its pressure against the wall.

A retaining wall also, as in the case of the wing-walls of a bridge, being built at the same time that the embankment is being filled in behind it, has often to withstand then a considerable greater pressure than it will have to do afterwards when the embankment is settled; this also perhaps when its work is green, and not prepared to resist the pressure intended for it. Sometimes also the punning of the material behind it has (as is often the case) not been done effectually, and a heavy rain changes the dry earth or clay into a wet sludge, causing it to swell considerably.

It therefore being such an important point in railway construction, it would no doubt be very desirable if some simple form of calculation were used, not only strictly accurate, but easily adapted to any circum-