

Civil Engineer's Solutions Suite

Platform: Windows
Includes Mathcad Engine
Available for ground shipment



This Mathcad electronic book is a rendering of selections from *Hick's Standard Handbook of Engineering Calculations* by McGraw-Hill. Solve hundreds of applied problems in civil engineering with this practical electronic resource which contains 165 relevant formulas and equations from the book, as well as text, tables, graphs and diagrams. This fully-interactive CD-ROM supplies you with all the tools you need to find the right equation and solve a problem in an instant.

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STABILITY OF A RETAINING WALL

Determine the factor of safety (FS) against sliding and overturning of the concrete retaining wall in Fig. 10. The concrete weight 150 lb/ft^3 (23.56 kN/m^3), the earth's coefficient of active earth pressure is 0.333.

Calculation Procedure:

1. Compute the vertical loads on the wall. Select a 1-ft (304.8-mm) length of wall as b , linearly with the depth and is represented by

Figure 10

Diagram showing a retaining wall cross-section with dimensions and forces. The wall is 1 ft thick. The soil is on the left, and the wall is on the right. The soil surface is at a height of 10 ft. The wall height is 10 ft. The soil is represented by a triangle with a base of 10 ft and a height of 10 ft. The wall is represented by a rectangle with a width of 1 ft and a height of 10 ft. The forces are labeled W_1 , W_2 , W_3 , and W . The distances from the left edge of the wall to the centers of gravity of the soil and wall are labeled x_1 , x_2 , and x_3 .

Mathcad Engine - (Civil Eng. Solutions Suite: Statics Equations)

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1. Compute the vertical loads on the wall.

$W_1 := b \cdot \text{top unit } \rho$	$+ W_1 = 2250 \cdot \text{lb}$
$W_2 := \frac{1}{2} h (b - \text{top}) \text{ unit } \rho$	$W_2 = 5625 \cdot \text{lb}$
$W_3 := \frac{1}{2} h (b - \text{top}) \text{ unit } \rho$	$W_3 = 3750 \cdot \text{lb}$
$W := W_1 + W_2 + W_3$	$W = 11625 \cdot \text{lb}$
$x_1 := \frac{1}{2} \text{ top}$	$x_1 = 0.5 \cdot \text{ft}$
$x_2 := \text{top} + c (b - \text{top})$	$x_2 = 2.67 \cdot \text{ft}$
$x_3 := \text{top} + (1 - c) (b - \text{top})$	$x_3 = 4.34 \cdot \text{ft}$

The Civil Engineer's Solutions Suite includes topics such as statics, stress and strain, steel beams and plate girders, steel columns and tension members, timber engineering, reinforced and pre-stressed concrete, fluid mechanics, surveying, and soil mechanics.

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