Fact Sheet

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KAWARTHA CONSERVATION

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Slope

Calculating Slope and Assessing Erosion Risk on Construction Sites

The slope length and slope angle of an area of exposed soils is a major factor in determining the risk of erosion and sedimentation from a construction site. For any given soil type and land cover, long and steep slopes are much more prone to erosion than short and gentle slopes.

Identifying the erodibility risk of exposed soils helps to ensure the proper design, installation, and inspection of erosion and sediment control measures (e.g., perimeter fencing, check dams, etc.) at a construction site.

Table 1 shows the erodibility risk for exposed soils, based on slope angle (gentle, moderate, or steep) and slope length (short, or long).

Table 1. Site erodibility risk assessment.

	Slope Length: Short (less than 30m/ 100' length)	**Slope Length: Long (more than 30m/ 100' length)**
Slope Angle: Gentle (<2%)	Moderate Risk	High Risk
Slope Angle: Moderate (2–10%)	High Risk	Very High Risk
Slope Angle: Steep (>10%)	Very High Risk	Very High Risk

What is slope?

Slope is the change in height over a horizontal distance, or in other words: rise over run. To calculate slope simply divide the height (vertical distance – the rise) by the length (horizontal distance – the run) and multiply by 100. This will give you slope percentage. Table 2 shows conversion values relative to other frequently used units.

Slope

Table 2. Slope unit conversions.

Percent (%)	Horizontal to Vertical (H:V)	Degrees (o)	Inches per foot ("/')	Centimetres per metre (cm/m)
2	50:1	1.1	0.4	3.3
10	10:1	5.7	1.2	10
33	3:1	18.4	4	33.3
50	2:1	26.6	6	50
100	1:1	45.0	12	100

2 Easy Ways to Calculate Slope:

Method 1: Board and level method (*Figure 1*).

Materials: a long wooden board (e.g., a 6-foot 2-by-4), a carpenter's level, and measuring tape.

■ Step 1: Locate an area that best represents the slope you would like to assess.

■ Step 2: Put the board on the ground along the slope and put the level on the top of the board.

■ Step 3: Lift the board up using the downslope end of the board until it is level.

■ Step 4: Measure the height from the top of the board to the ground.

■ Step 5: Measure the length of the board.

■ Step 6: Divide the height (the rise) by the length (the run) and multiple by 100 to obtain percent slope.

■ Step 7. Repeat several times to get the best representation of the entire area of concern, and average all values to obtain average percentage slope.

Figure 1
Board and Level method

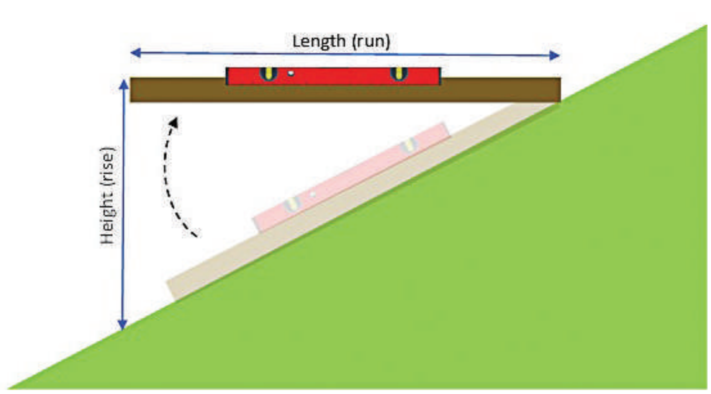
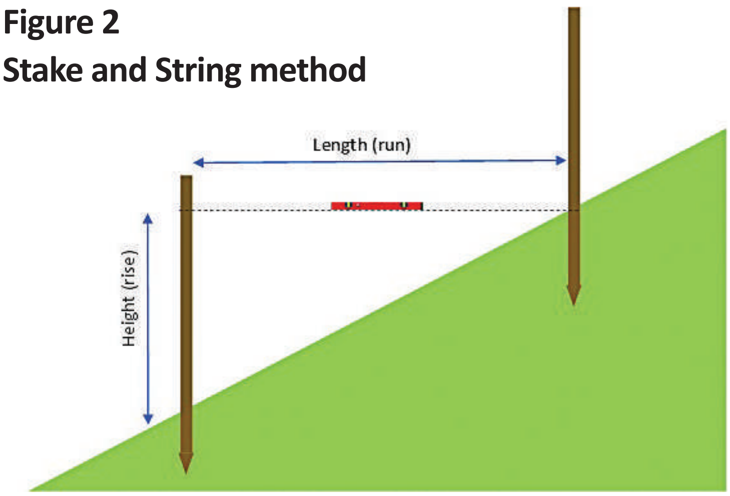


Figure 2
Stake and String method



Method 2: Stake and string method (*Figure 2*).

Materials: 2 long stakes (e.g., two 4-foot 2-by-2's), pounder, a line level, string, and measuring tape.

■ Step 1: Locate an area that best represents the slope you would like to assess.

■ Step 2: Pound both stakes firmly into the ground along the slope, separated by at least 2 metres (6 feet).

■ Step 3: Attach one string end to the bottom (ground surface) of the upslope stake.

■ Step 4: Attach the other string end to the downslope stake, at the point where the string is level.

■ Step 5: Measure height of the ground to the string on the downslope stake.

■ Step 6: Measure the length of the string between stakes.

■ Step 7. Divide the height (the rise) by the length (the run) and multiple by 100 to obtain percent slope.

■ Step 7. Repeat several times to get the best representation of the entire area of concern, and average all values to obtain average percentage slope.

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