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A workshop on
**SHORELINE MANAGEMENT
 AND STABILIZATION
 USING VEGETATION**



Washington
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Relationship between degrees, percent slope, and ratio to express slope gradient.

Slope gradient is a key factor in influencing the relative stability of a slope. It determines the degree to which gravity acts upon a soil mass. Slopes are often irregular and complex, with gradients varying greatly throughout a given shoreline profile. Each slope profile section should be treated as a separate management and restoration site unit. Slope gradient can be expressed in several ways. The table and slope determination formulas below illustrate three commonly used notations.

DEGREES (x°)	PERCENT (%)	RATIO (H:V)
2.5	5.0	
5.7	10.0	10:1
10.0	17.6	
14.0	25.0	4:1
18.0	33.5	3:1
19.3	35.0	
20.0	36.4	
24.2	45.0	
26.1	49.0	
26.6	50.0	2:1
30.0	57.7	
33.0	66.7	1.5:1
35.0	70.0	
38.6	80.0	
42.0	90.0	
45.0	100.0	1:1
55.0	142.8	
60.0	173.2	

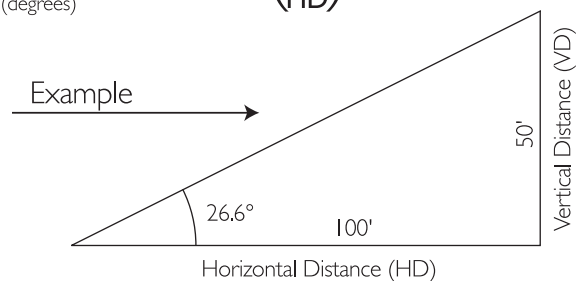
Adapted from: A Guide for Management of Landslide – Prone Terrain in the Pacific Northwest (1991) Land Mgmt. Handbook 19. B.C. Ministry of Forests.

Slope Determination Formulas

Slope Ratio: HD:VD

Slope Percent: $\left(\frac{VD}{HD}\right) \times 100$

Slope Angle: $\text{Arctan}\left(\frac{VD}{HD}\right)$
 (degrees)



Examples

Slope Ratio: 100:50 = 2:1

Slope Percent: $\left(\frac{50}{100}\right) \times 100 = 50\%$

Slope Angle: $\text{Arctan}\left(\frac{50}{100}\right) = 26.6^\circ$
 (degrees)

Corrected From: Urban Riparian Inventory and Assessment Guide (1998) Oregon Div of State Lands.