

COMPANY NAME		Calculation No.		
CALCULATION SHEET		CALCULATION NO.		
onlinestructuraldesign.com		Project No.		
Project Title: Project Name		PROJECT NUMBER		
Subject/Feature: Wind orography factor calculation - Eurocode EN1991-1-4		Calc. By	Date	Rev.
		Author	Date	0
		Checked By	Date	
		Checker	Date	

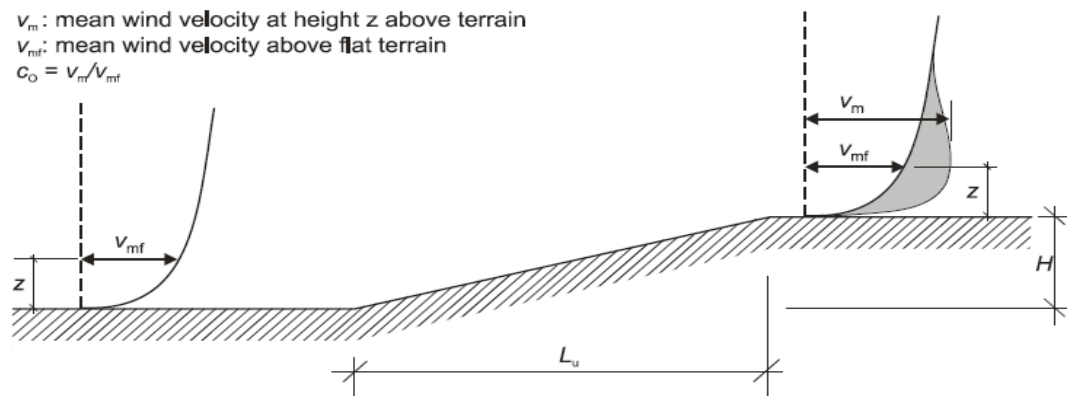
Wind reference pressure calculation

per EN 1991-1-4

Input	Output
Terrain category	Orography factor $c_o(z)$
Terrain orography	
Site location rel. to crest	

Terrain category: **III** $z_{min} = 5$ m

Area with regular cover of vegetation or buildings or with isolated obstacles with separations of maximum 20 obstacle heights (such as villages, suburban terrain, permanent forest)



Terrain orography:

$$c_o(z) = v_m / v_{mf}$$

Where orography (e.g. hills, cliffs etc) increases wind velocity by more than 5% the effects should be taken into account using the orography factor c_o .

- $H = 50$ m - effective height of the feature;
- $L_u = 180$ m - actual length of the upwind slope in the wind direction;
- $x = -30$ m - horizontal distance of the site from the top of the crest; (input negative values for upwind case)
- $z = 30$ m - vertical distance from the ground level of the site

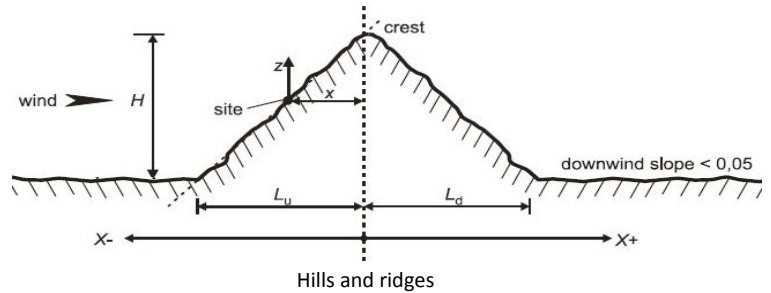
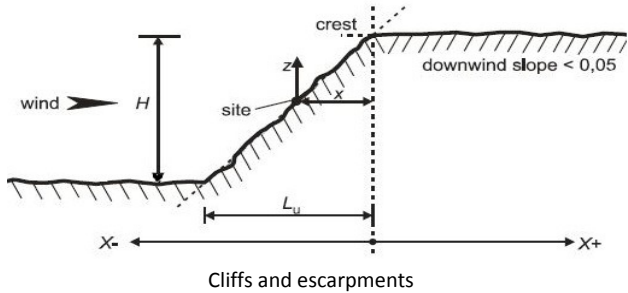
$\Phi = 0.278$ per EN 1991-1-4 Section A.3 (3)

References:

- EN 1991-1-4:2005 - Eurocode 1: Actions on structures - Part 1-4: General actions - Wind actions
- EN 1991-1-4:2005 - Eurocode 1: Actions on structures - Part 1-4: General actions - Wind actions - Annex A.3

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Type of orography: Hills and ridges



Value of the effective length L_e :

$L_e = 100$ m
Shallow slope

per EN 1991-1-4
Section A.3 (3), Table A.2

$L_d = 35$ m

- actual length of the downwind slope in the wind direction;
(used for cliffs and escarpments ONLY)

Upwind section for hills and ridges

Per Section A.3 (5) a)

$A = 0.580$

per EN 1991-1-4
Section A.3 (5) a), Expression (A.5)

$B = 2.360$

per EN 1991-1-4
Section A.3 (5) a), Expression (A.6)

$s = 0.392$

per EN 1991-1-4
Section A.3 (5) a), Expression (A.4)

Orography factor:

$c_o(z) = 1.218$ ->

$-1.5 < x / L_u < 0$
 -0.167

References:

EN 1991-1-4:2005 - Eurocode 1: Actions on structures - Part 1-4: General actions - Wind actions

EN 1991-1-4:2005 - Eurocode 1: Actions on structures - Part 1-4: General actions - Wind actions - Annex A.3