TG20:13 wind factor calculations

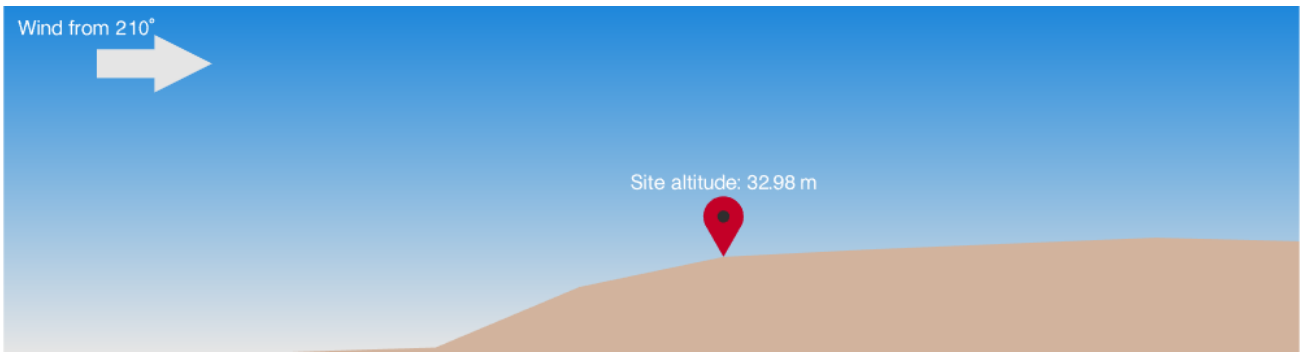
In accordance with BS EN 1991-1-4:2005 + A1:2010 and NASC TG20:13.

Site location

Description	Value
Site address	Toft Steps, Bournemouth BH1 3EN, UK
Site location	50.720°N, 1.854°W
Structure height, h	20.00 m
Sheltered by surrounding buildings	Yes
Standing season	Any season
Design life	2 years
Site altitude, A	32.98 m
Fundamental basic wind velocity, $v_{b,map}$	21.84 m/s

Site elevation profile

The elevation profile for the dominant wind sector (sector 8, at 210°) is:

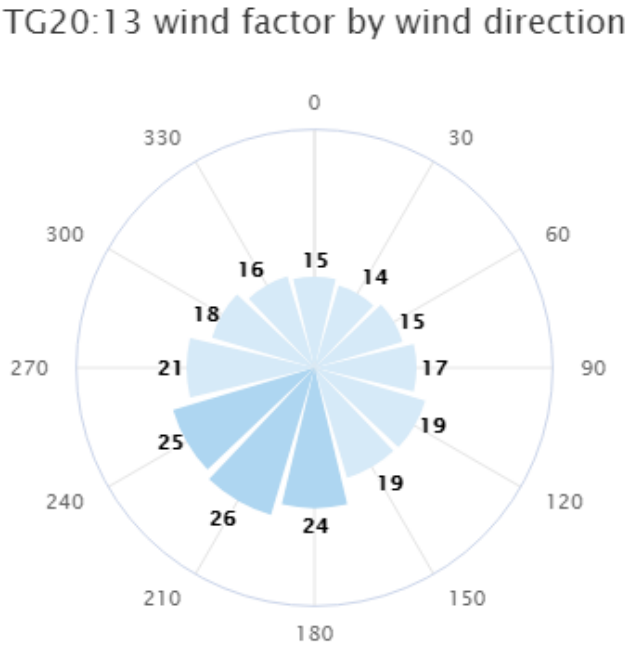


Wind sector analysis

Sector	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
Direction (°)	0	30	60	90	120	150	180	210	240	270	300	330
Directional factor, c_{dir} [1]	0.78	0.73	0.73	0.74	0.73	0.80	0.85	0.93	1.00	0.99	0.91	0.82
Altitude factor, c_{alt} [2]	1.032	1.032	1.032	1.001	1.0	1.0	1.0	1.001	1.0	1.032	1.032	1.032
Orography factor, c_o [3]	1.0	1.0	1.0	1.094	1.346	1.162	1.432	1.425	1.215	1.0	1.0	1.0
Orography correction factor, c'_o [4]	-	-	-	1.059	1.217	1.102	1.270	1.265	1.134	-	-	-
Distance to shoreline (km)	293.6	272.4	35.4	0.7	0.4	0.3	0.3	0.3	0.6	6.8	97.2	103.3
Terrain category	Town			Sea						Town		
Distance inside town terrain (km)	4.4	3.8	0.5	-	-	-	-	-	-	0.1	3.5	5.0
Average height of surrounding buildings, h_{ave} (m) [5]	8.0	8.0	8.0	-	-	-	-	-	-	8.0	8.0	8.0
Average distance to surrounding buildings, x_0 (m) [6]	30.0	30.0	30.0	-	-	-	-	-	-	30.0	30.0	30.0
Displacement height, h_{dis} (m) [7]	3.60	3.60	3.60	-	-	-	-	-	-	3.60	3.60	3.60
Effective height, z (m) [8]	16.40	16.40	16.40	20.00	20.00	20.00	20.00	20.00	20.00	16.40	16.40	16.40
Exposure factor, $c_{e(z)}$ [9]	2.647	2.647	2.721	3.21	3.21	3.21	3.21	3.21	3.21	2.87	2.649	2.647
Exposure correction factor, $c_{e,T}$ [10]	0.884	0.892	1.0	-	-	-	-	-	-	1.0	0.895	0.878
Peak velocity pressure, $q_{p(z)}$ (kN/m²) [11]	0.305	0.270	0.311	0.398	0.510	0.502	0.753	0.898	0.832	0.603	0.421	0.335
Wind factor, $S_{TG20:13}$	15.3	14.4	15.4	17.1	19.4	19.2	23.6	25.7	24.8	21.5	17.9	16.0

[1] Table NA.1, [2] NA.2.5, [3] A.3, [4] Eq. NA.4a, [5] NA.2.17, [6] NA.2.17, [7] A.5, [8] A.5, [9] Figure NA.7, [10] Figure NA.8, [11] NA.2.17

SMART SCAFFOLDER	Project no	0001	Date	11/09/2019
	Name	Sample project	Prepared by	TR
	Item		Checked by	BB
	Notes	A sample wind factor calculation	Revision	
	File	Sample wind factor in town and by sea.ssc	Page	3 of 3
Your company contact details are displayed here.				



Wind factor calculation

The wind factor calculation for the dominant wind sector (sector 8, at 210°) is as follows.

Seasonal factor	$c_{season} = 1.00$
Probability factor	$c_{prob} = 0.83$
Effective height	$z = 20.00$ m
Orography correction factor	$c'_o = \frac{c_o + 0.6}{1.6} = 1.265$
Peak velocity pressure	$q_{p(z)} = (v_{b,map} \cdot c_{alt} \cdot c'_o \cdot c_{dir} \cdot c_{season} \cdot c_{prob})^2 \cdot c_{e(z)} \cdot \frac{\rho}{2} \cdot 10^{-3} = 0.898$ kN/m²
Maximum exposure factor	$c_{e,max(z)} = 3.21$
Wind factor	$S_{TG20:13} = v_{b,map} \cdot c_{alt} \cdot c'_o \cdot c_{dir} \cdot c_{season} \cdot \sqrt{\frac{c_{e(z)}}{c_{e,max(z)}}} = 25.7$

Results summary

Description	Value
Wind factor, $S_{TG20:13}$	25.7
Peak velocity pressure, $q_{p(z)}$	0.898 kN/m²
Wind factor classification	Moderate
Dominant wind direction	210 °