Metal Structures

ERASMUS

Polish National Appendixes

Contents

Data in Your project

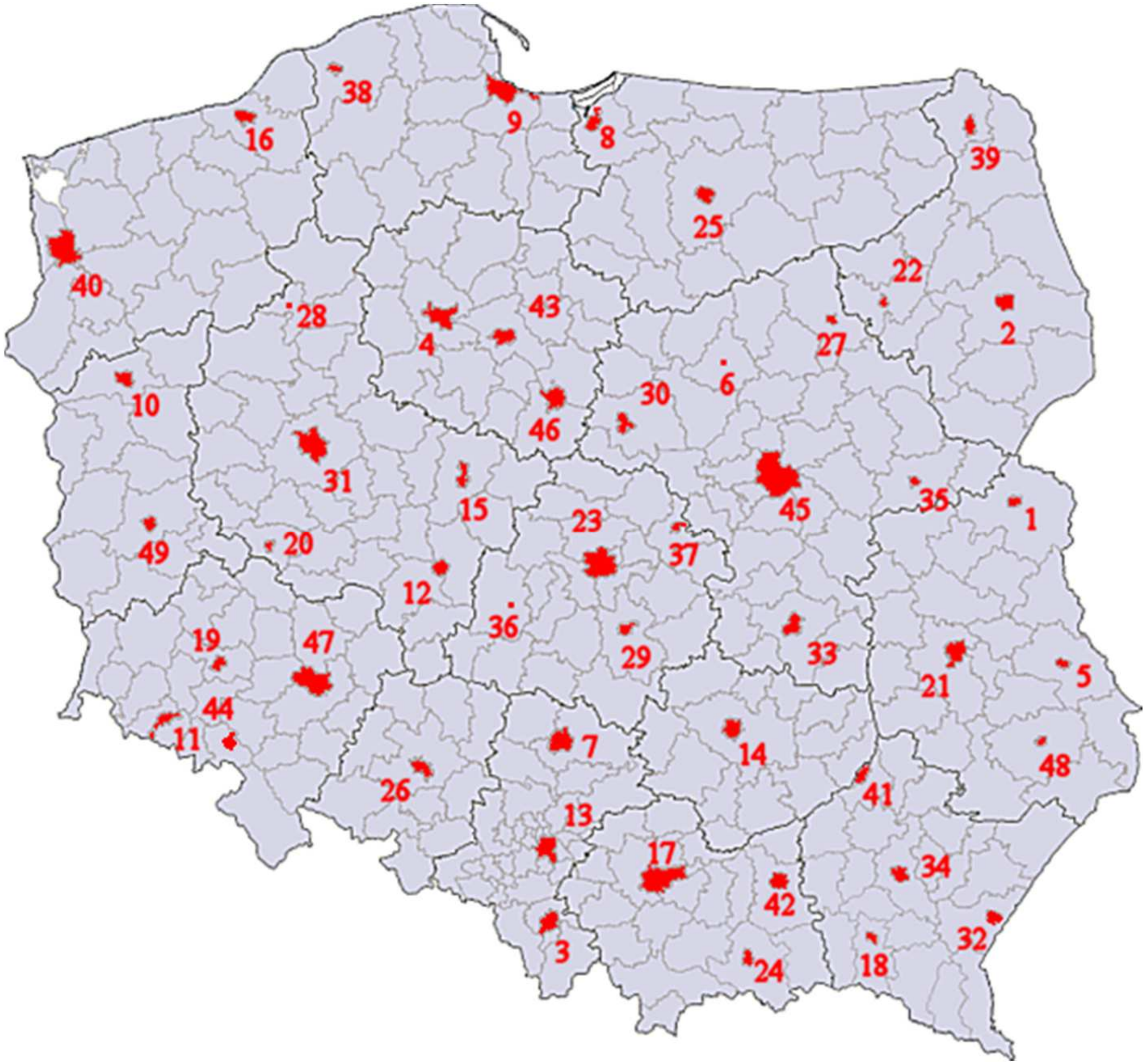


Photo: Author

Town	#		Town	#		Town	#
Biała Podlaska	1		Krosno	18		Siedlce	35
Białystok	2		Legnica	19		Sieradz	36
Bielsko-Biała	3		Leszno	20		Skierniewice	37
Bydgoszcz	4		Lublin	21		Słupsk	38
Chełm	5		Łomża	22		Suwałki	39
Ciechanów	6		Łódź	23		Szczecin	40
Częstochowa	7		Nowy Sącz	24		Tarnobrzeg	41
Elbląg	8		Olsztyn	25		Tarnów	42
Gdańsk	9		Opole	26		Toruń	43
Gorzów Wielkopolski	10		Ostrołęka	27		Wałbrzych	44
Jelenia Góra	11		Piła	28		Warszawa	45
Kalisz	12		Piotrków Trybunalski	29		Włocławek	46
Katowice	13		Płock	30		Wrocław	47
Kielce	14		Poznań	31		Zamość	48
Konin	15		Przemyśl	32		Zielona Góra	49
Koszalin	16		Radom	33			
Kraków	17		Rzeszów	34			

EN 1991-1-3 Snow loads

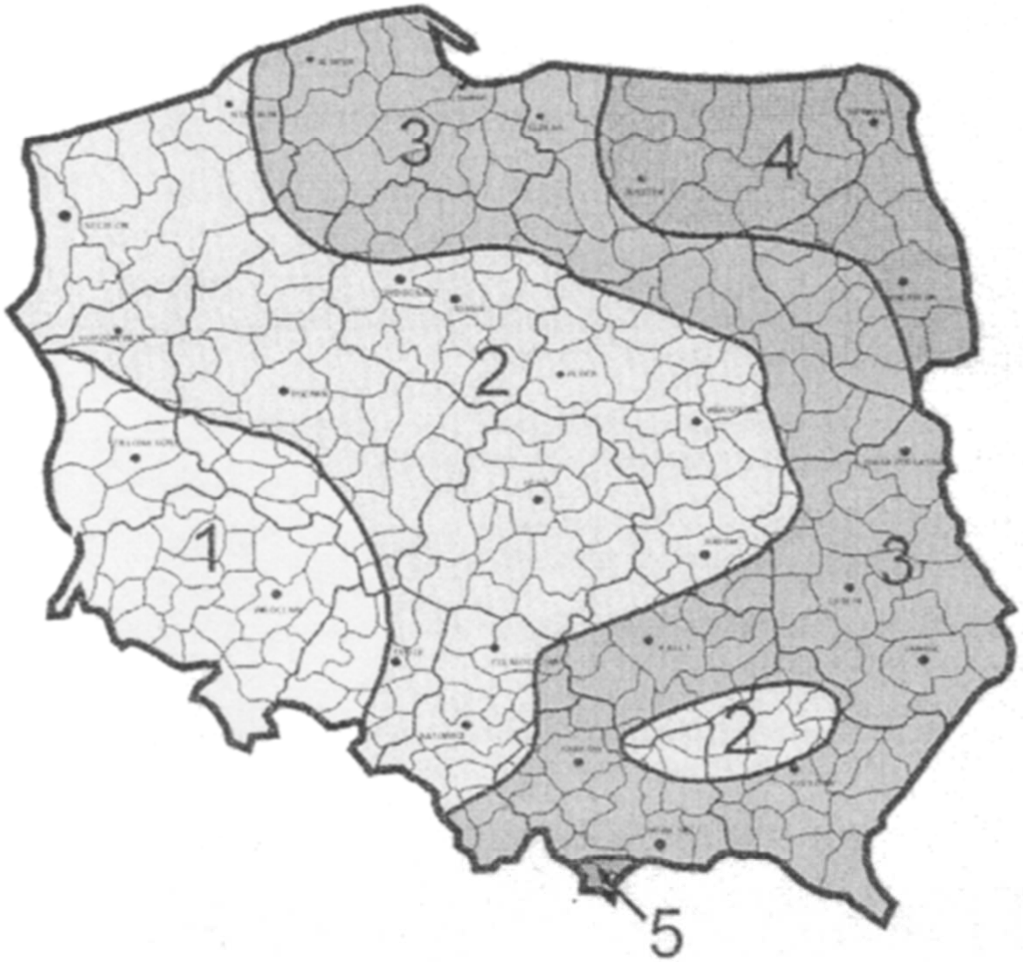


Photo: EN 1991-1-3 fig. B.1

Strefa	s_k, kN/m^2
1	$0{,}007A - 1{,}4$; $s_k \geq 0{,}70$
2	0,9
3	$0{,}006A - 0{,}6$; $s_k \geq 1{,}2$
4	1,6
5	$0{,}93\exp(0{,}00134A)$; $s_k \geq 2{,}0$
UWAGA: A = Wysokość nad poziomem morza (m)	

EN 1991-1-3 tab. NB1

A - altitude over sea level

	Teren	C_e
A	Wystawiony na działanie wiatru [a]	0,8
B	Normalny [b]	1,0
C	Osłonięty od wiatru [c]	1,2

EN 1991-1-3 tab. 5.1

There are five terrain categories for wind and three for snow. There are defined independently for snow (EN 1991-1-3 tab 5.1) and wind (EN 1991-1-4 tab 4.1). Rough comparison looks as follows:

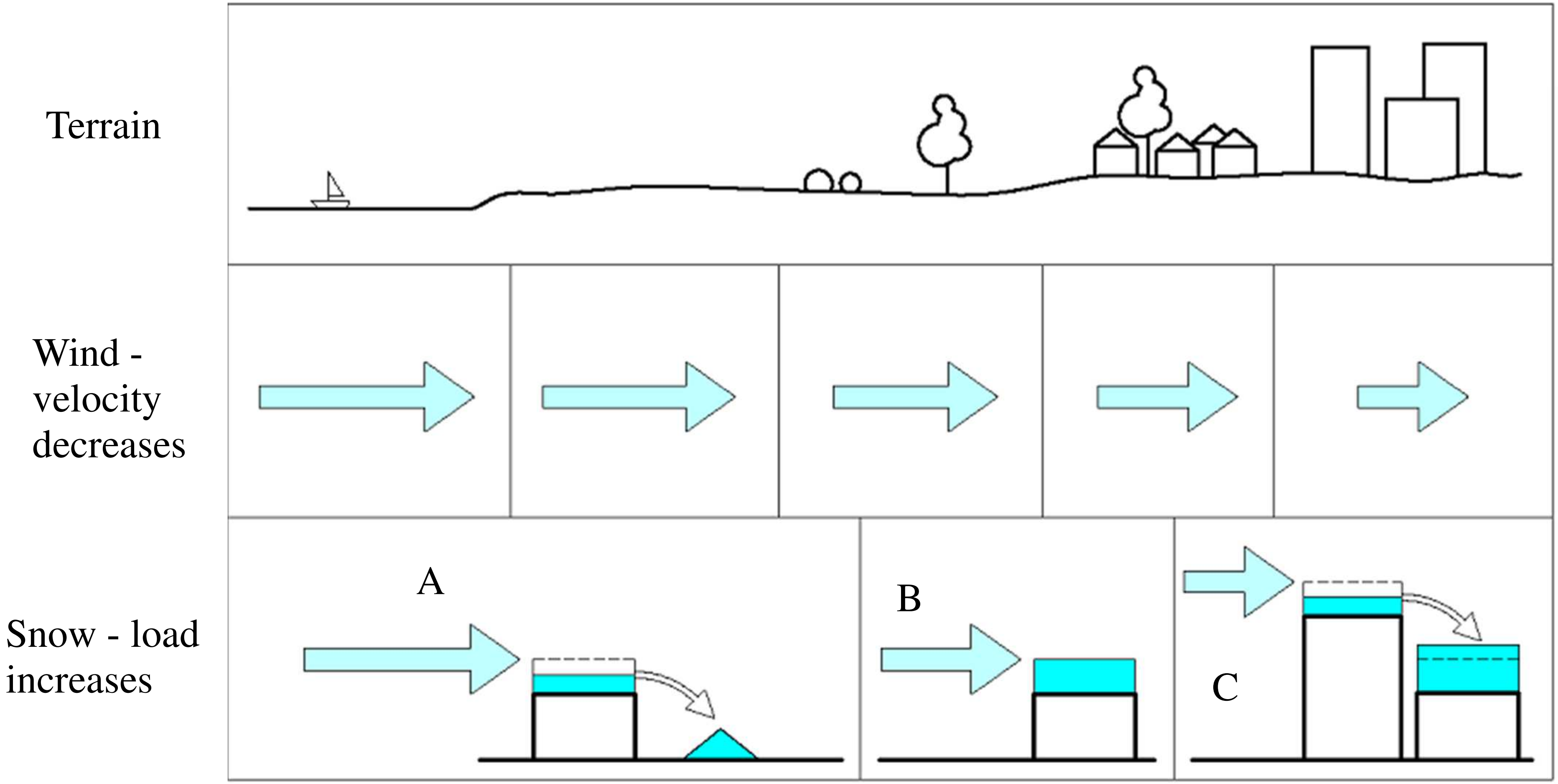


Photo: Author

EN 1991-1-4 Wind actions

Photo: EN 1991-1-4 fig. NB.1

Strefa	$v_{b,0}$, m/s	$v_{b,0}$, m/s	$q_{b,0}$, kN/m^2	$q_{b,0}$, kN/m^2
	a ≤ 300 m	a > 300 m	a ≤ 300 m	a > 300 m
1	22	22·[1 + 0.0006 (a - 300)]	0,30	$0{,}30 \cdot [1 + 0{,}0006(a-300)]^2$
2	26	26	0,42	0,42
3	22	22·[1 + 0.0006 (a - 300)]	0,30	$0{,}30 \cdot [1 + 0{,}0006(a-300)]^2 \cdot \left[\frac{20000-a}{20000+a}\right]$

EN 1991-1-4 tab. NB1

a - altitude over sea level

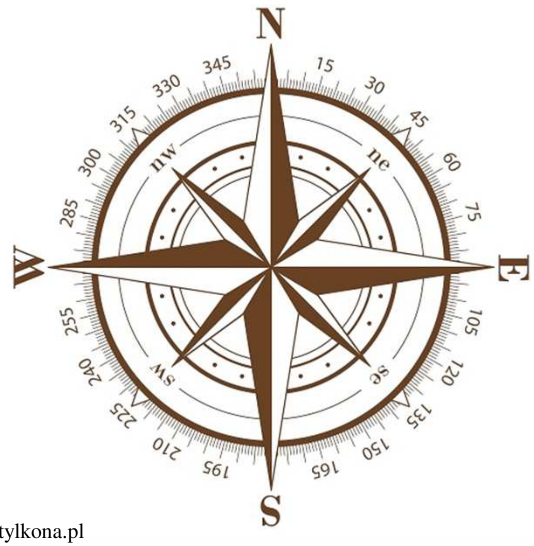


Photo: nietylkona.pl

EN 1991-1-4 tab. NB2

<table>
<tr><th rowspan="3">Strefa</th><th colspan="12">Kierunek wiatru (sektor)</th></tr>
<tr><th>0°</th><th>30°</th><th>60°</th><th>90°</th><th>120°</th><th>150°</th><th>180°</th><th>210°</th><th>240°</th><th>270°</th><th>300°</th><th>330°</th></tr>
<tr><th>1</th><th>2</th><th>3</th><th>4</th><th>5</th><th>6</th><th>7</th><th>8</th><th>9</th><th>10</th><th>11</th><th>12</th></tr>
<tr><td>1</td><td>0,8</td><td colspan="6">0,7</td><td>0,8</td><td>0,9</td><td colspan="2">1,0</td><td>0,9</td></tr>
<tr><td>2</td><td>1,0</td><td>0,9</td><td>0,8</td><td colspan="4">0,7</td><td>0,8</td><td>0,9</td><td colspan="3">1,0</td></tr>
<tr><td>3</td><td>0,8</td><td colspan="4">0,7</td><td>0,9</td><td colspan="6">1,0</td></tr>
</table>

Recommendation: $c_{dir} = 1{,}0$

$c_{season} = 1{,}0$

Kategoria terenu	$c_r(z)$	$c_e(z)$
0	$1{,}27\left(\frac{z}{10}\right)^{0{,}11}$	$2{,}98\left(\frac{z}{10}\right)^{0{,}176}$
I	$1{,}18\left(\frac{z}{10}\right)^{0{,}13}$	$2{,}78\left(\frac{z}{10}\right)^{0{,}205}$
II	$\left(\frac{z}{10}\right)^{0{,}17}$	$2{,}29\left(\frac{z}{10}\right)^{0{,}265}$
III	$0{,}81\left(\frac{z}{10}\right)^{0{,}19}$	$1{,}89\left(\frac{z}{10}\right)^{0{,}26}$
IV	$0{,}62\left(\frac{z}{10}\right)^{0{,}24}$	$1{,}47\left(\frac{z}{10}\right)^{0{,}30}$

EN 1991-1-4 tab. NB3

z - height of building

There are five terrain categories for wind and three for snow. There are defined independently for snow (EN 1991-1-3 tab 5.1) and wind (EN 1991-1-4 tab 4.1). Rough comparison looks as follows:

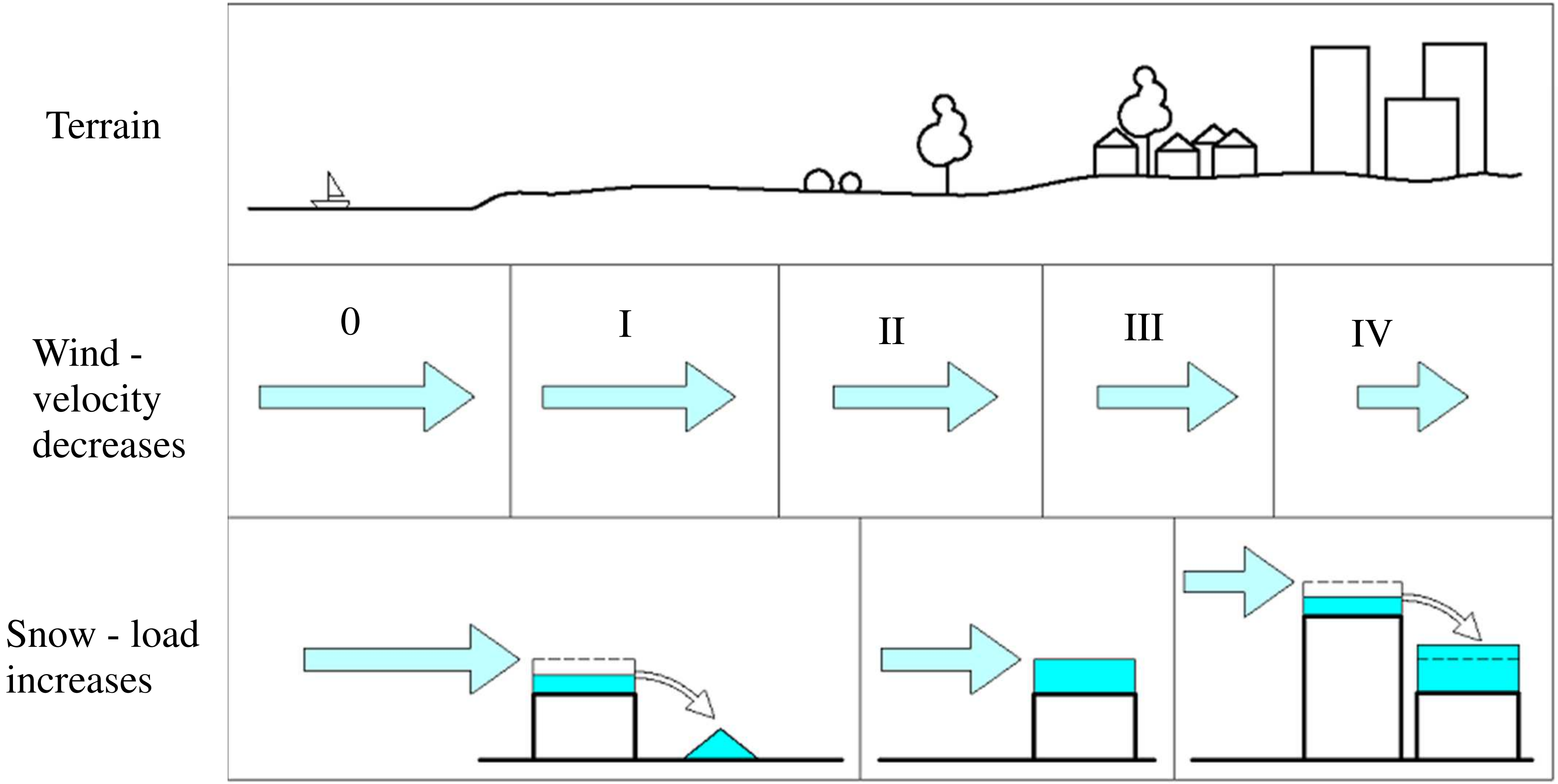


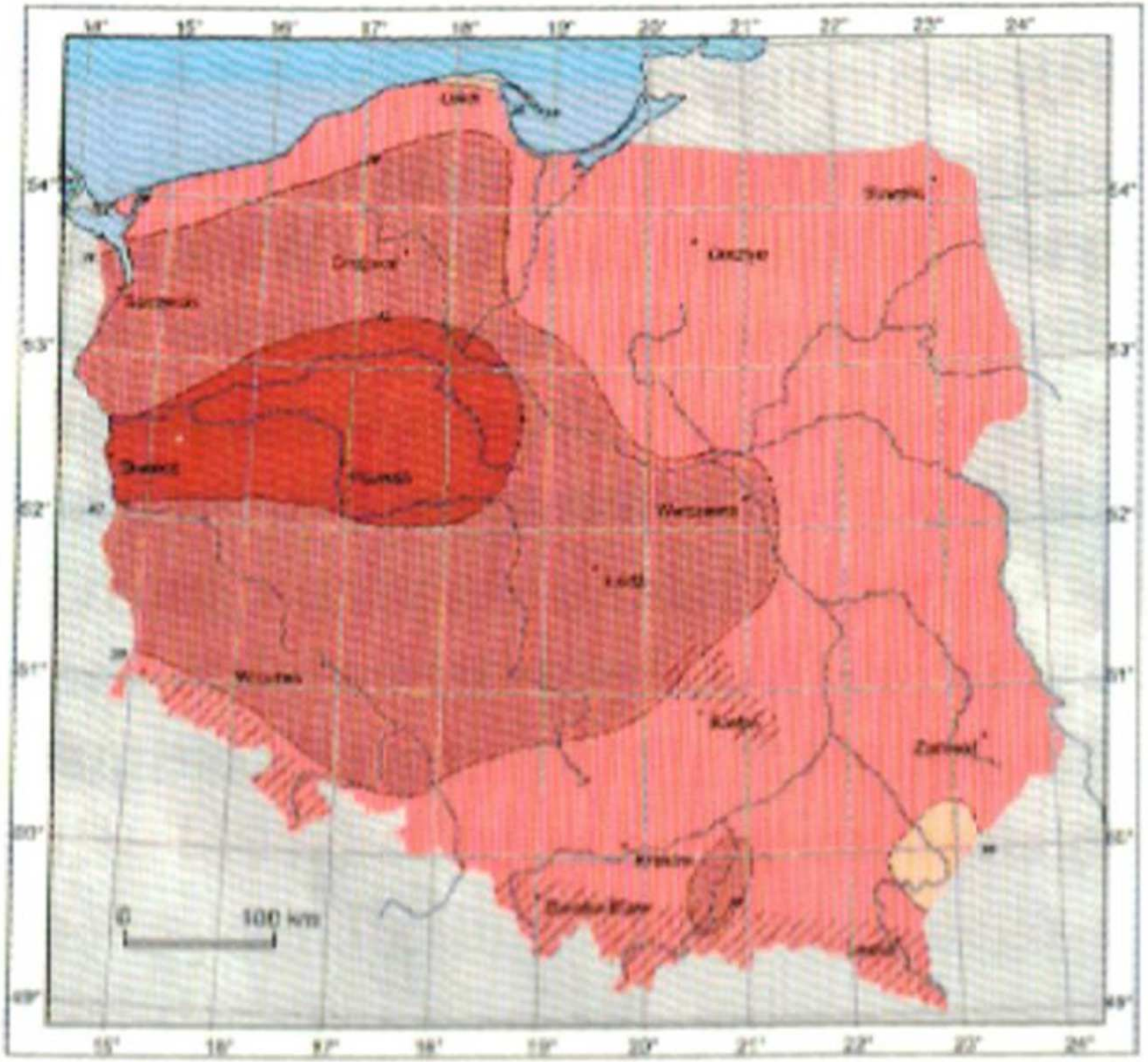
Photo: Author

EN 1991-1-5 Thermal actions

Difference between temperature of erection and temperature of exploatation

$$\Delta T = T_{min\,/\,max} - T_0$$

$$T_0 = 8\ ^oC$$



34 36 38 40

Photo: EN 1991-1-5 fig NB.2

$$T_{max}(H) = -0{,}0053\ [^oC\ /\ m]\ H + T_{max}$$

H – altitude over sea level

Difference between temperature of erection and temperature of exploatation

$$\Delta T = T_{min\,/\,max} - T_0$$

$$T_0 = 8\ ^{o}C$$

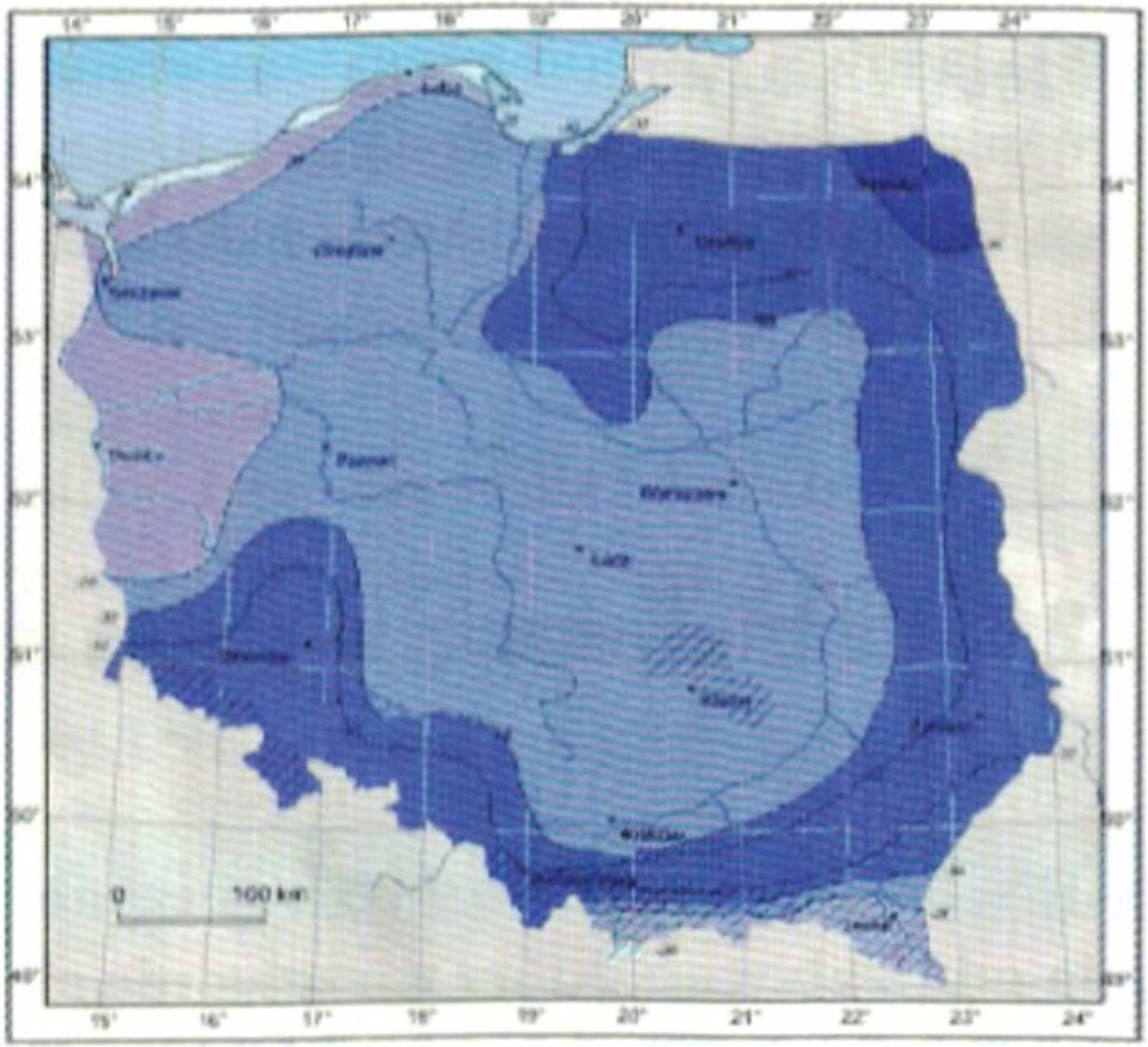


Photo: EN 1991-1-5 fig NB.3

$$T_{min}(H) = -0{,}0035\ [^{o}C\ /\ m]\ H + T_{min}$$

H – altitude over sea level

EN 1993-1-1 N.A. 22 Deflections

Member	w_{max} or w_3
Main roof girder (truss or full-walled)	L / 250
Purlin	L / 200
Corrugated sheel - roofing	L / 150
Floor girder: primary beam secondary beam	 L / 350 L / 250
Door head or window head	L / 500
w_{max} = netto (total - precamber) w_3 = from variable actions L -length of beam or 2x length of cantilever	

Full-walled girder

Photo: Setro Metal Group

Truss girder

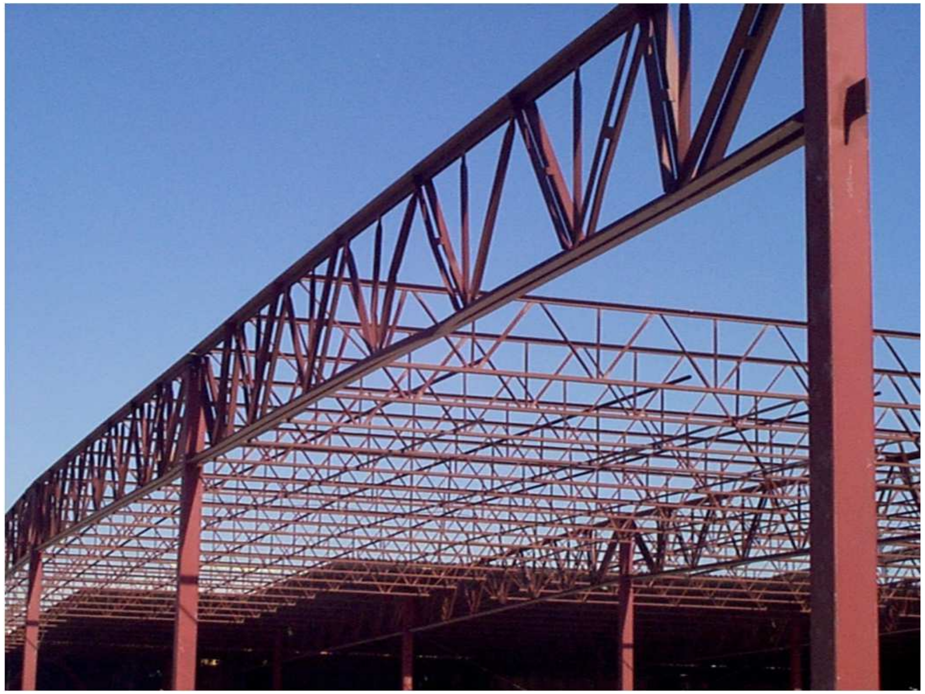


Photo: nashmetal.com

Corrugated sheet

Photo: manseametal.com

Purlin

Photo: selector.com

Window head, door head

Photo: budujesz-kupujesz.pl

Secondary beam, primary beam

Photo: image.made-in-china.com

Thank you for attention

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