RELACION STRUKTURAL

REHABILITIMI I BULEVARDIT ZOGU I

REVIZION: 0

ING KONSTRUKTOR

GENTIAN LIPE

Gentian Lipe

Digitally signed by Gentian Lipe
DN: cn=Gentian Lipe , c=AL, l=Tirane,
o=Person Fizik, title=Inxinier Strukturist
Date: 2019.02.05 15:45:54 +01'00'

SHKURT 2019

1. PERSHKRIM I PERGJITHSHEM STRUKTURAL

1.1 Fasada dhe Tenda, Godina 7.

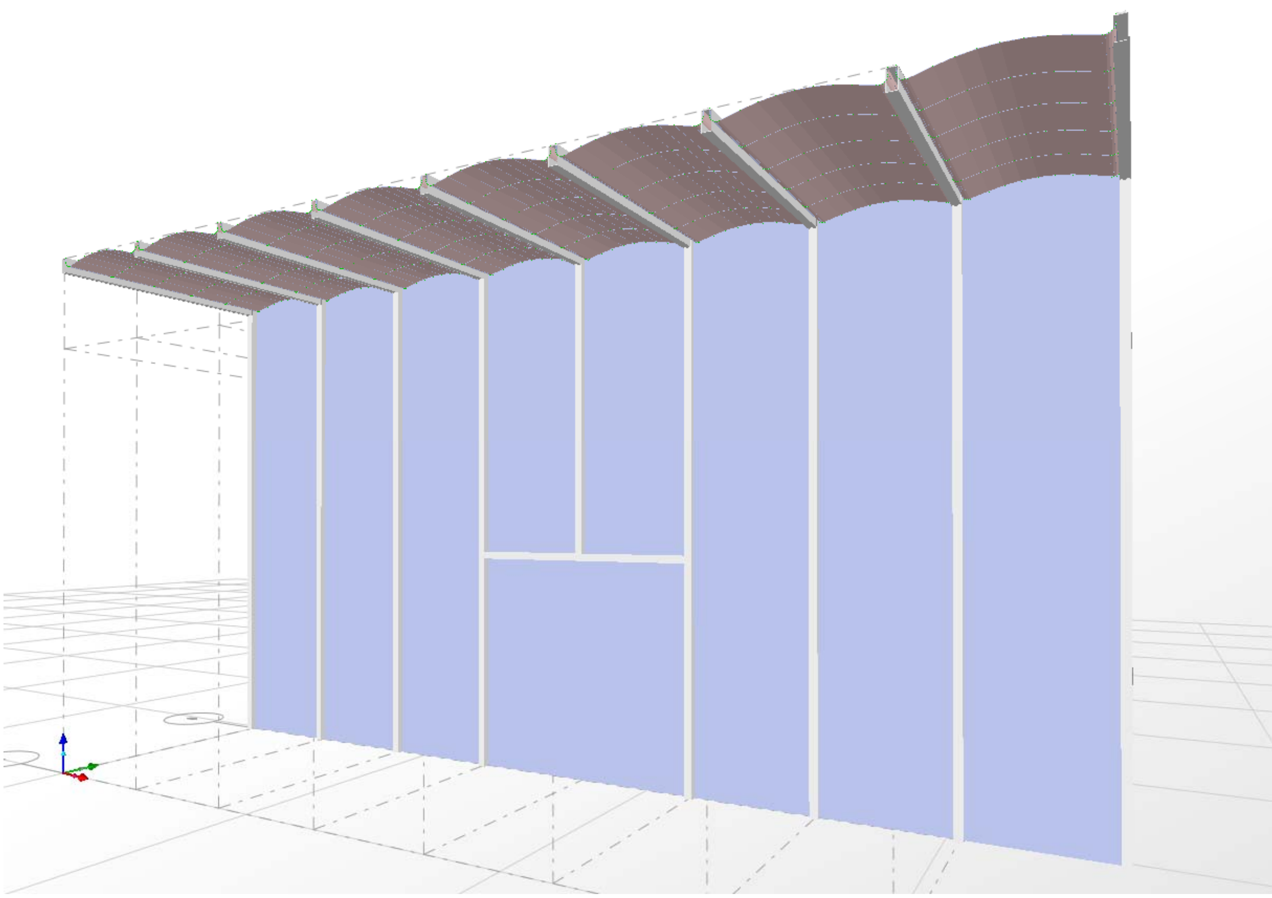
Struktura e fasades dhe tendes do te jete me profile metalike. Mbulesa e tendes do te jete me panele inoxi (pllake spesor 3 mm).

Profilet vertikale jane profile tubolare RHS160*80*4;

Profilet horizontale jane profile te kompozuara me profil SHS80*4 dhe RHS160*80*4;

(per me shume info referoju vizatimeve te struktures)

Pamje 3D – Modeli llogarites



1.2 Sheshi Fortuzi, Mbulesa e Tregut.

Struktura e mbuleses do te jete b/arme.

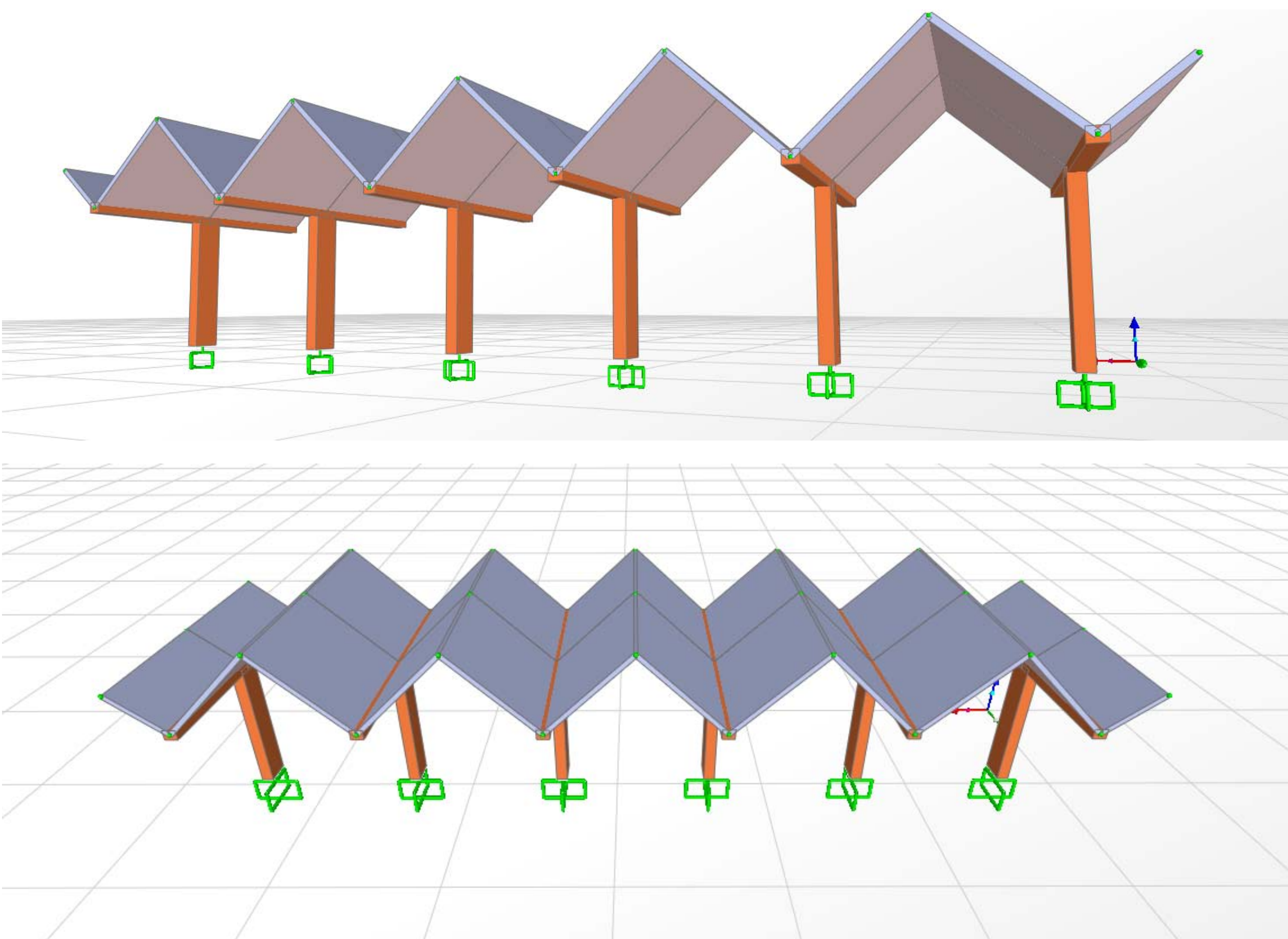
Plintat vendosen ne kuoten -1.00 m dhe kane permasa 320x150 cm;

Plintat lidhen ne drejtimin terthor me trare lidhe 40x50 cm;

Kollonat kane permasa 30x70 cm;

Mbulesa eshte solete 12 cm;

Pamje 3D – Modeli llogarites



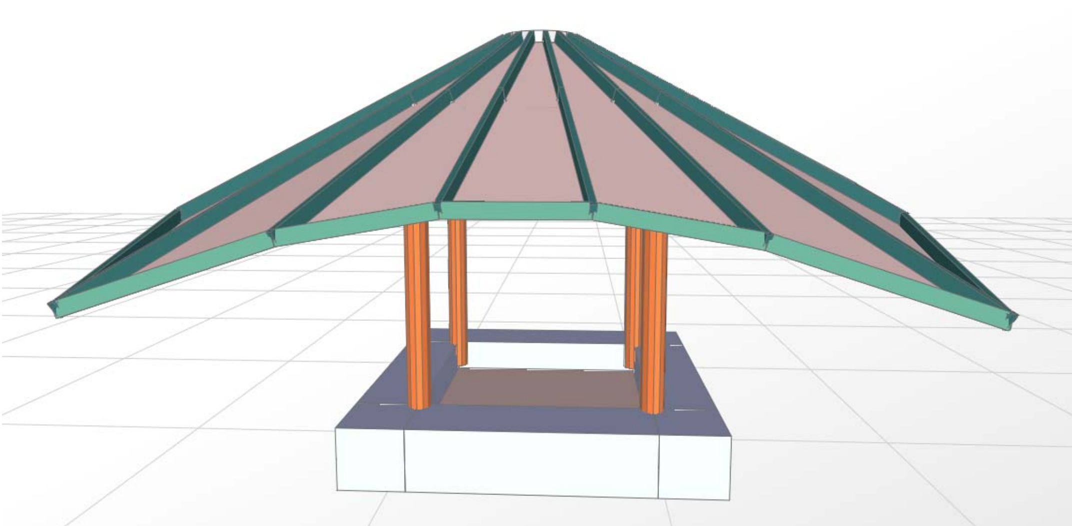
1.3 <u>Sheshi i Universitetit., Shatervani i Mbuluar</u>

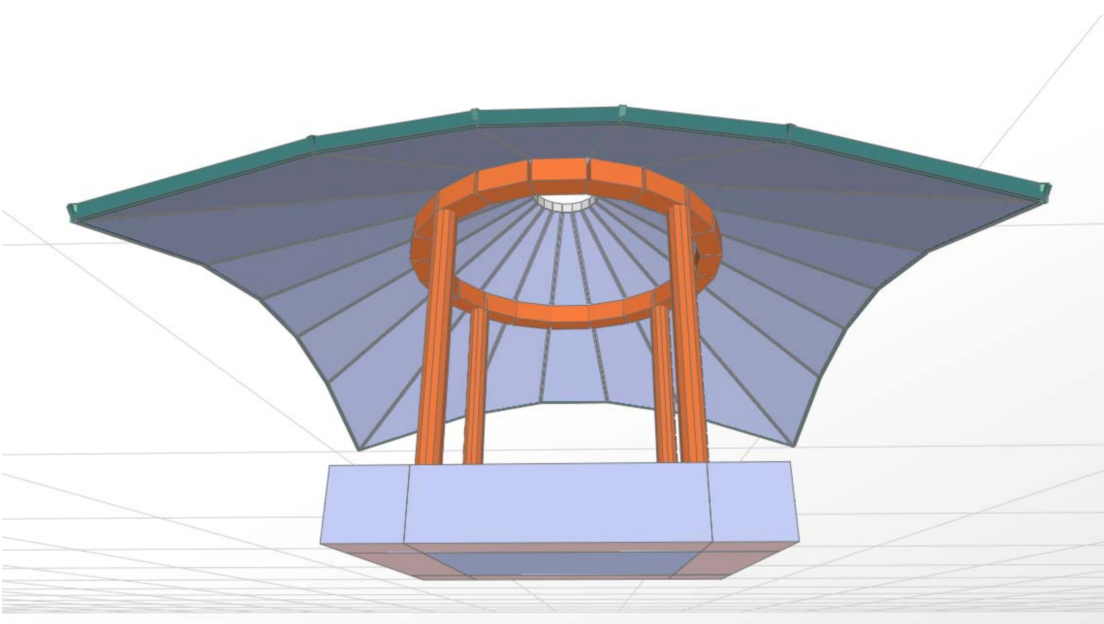
Struktura do te jete kompozite:

- Struktura baze (themeli, kollonat, trau unazor) eshte beton/arme.
- Mbulesa do te jete me profile druri (60/150 mm).

;

<u>Pamje 3D – Modeli llogarites</u>





2. STANDARDET DHE KODET E APLIKUAR

Llogaritja e struktures eshte bere bazuar ne kodet e meposhtem:

1) Analize globale e struktures me keto kritere ngarkesash:

- Ngarkesa te Perhershme – (EN 1991-1-1:2002);
- Ngarkesa te Perkohshme– (EN 1991-1-1:2002);
- Ngarkesa nga Debora – (EN 1991-1-3:2003 dhe KTP);
- Ngarkesa nga Era– (prEN 1991-1-4:2004);
- Ngarkesa e sherbimit (sipas te dhenave te klientit);
- Sizmika – (sipas prEN 1998-1:2005);

2) Llogaritja e elementeve metalike – (EN 1993-1-1:2006);

3) Llogaritja e elementeve b/a – (EN 1992-1-1:2005);

4) Llogaritja e themeleve – (prEN 1997-1-2005);

3. NGARKESAT

Rastet e meposhtme te ngarkimit jane marre parasysh ne analize:

3.0. PESHA VETJAKE (SW)

Pesha vetjake e elementeve strukturale eshte marre parasysh automatikisht nga programi duke perdorur peshat volumore respektive te materialeve.

3.1. NGARKESAT E PERHERSHME (DL)

Ngarkesat e perhershme jane llogaritur bazuar ne shtresat respektive per cdo strukture (referoju vizatimeve arkitektonike).

3.2. NGARKESAT E PERKOHSHME (LL)

Ngarkesat e Perkohshme jane aplikuar sipas EN1991-1-1: Actions on structures, General actions, Densities, Self-Weight, Imposed Loads for Buildings.

- Mbulesa 0.6 kN/m2

3.3. NGARKESA E DEBORES

Ngarkesa e debores eshte llogaritur sipas Kushteve Teknike te Projektimit KTP8-78

q_0= 220 * 0.2 = 44 kg/m2 - ngarkesa karakteristike e debores;

Meqe ngarkesa e perkohshme eshte me e madhe sesa ajo e debores, kjo e fundit nuk eshte konsideruar ne analize.

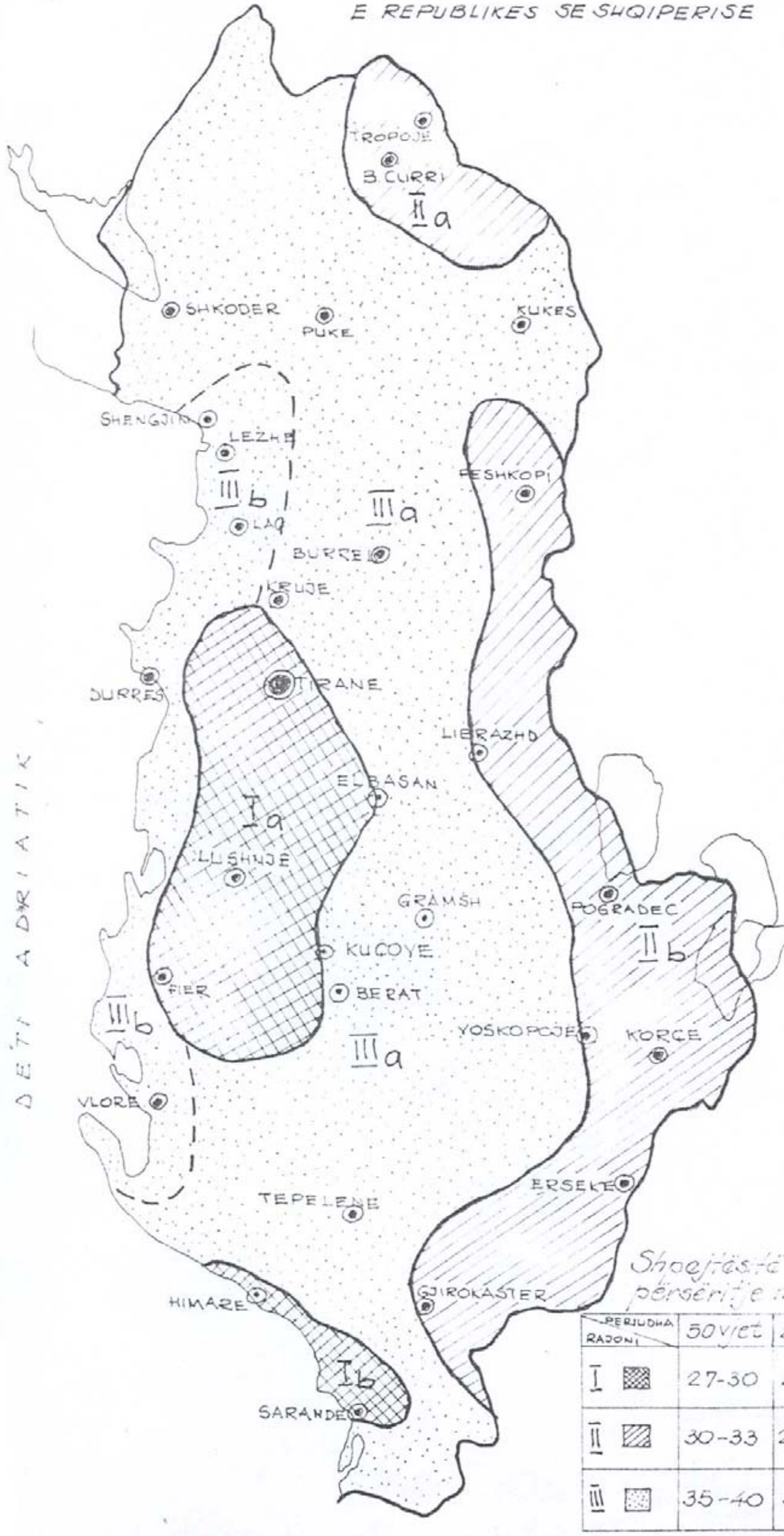
3.4. NGARKESA E ERES

Ngarkesa e eres eshte aplikuar sipas EN1991-1-4 Wind Loads.

Vlera e shpejtesise baze te eres eshte marre nga Harta Zonale e Institutit te Hidrometereologjise

Zona I - Tirane

RAJONIZIMI I SHPEJTESIVE MAKSIMALE TE ERES NE TERITORIN E REPUBLIKES SE SHQIPERISE



Shpejtësitë max. me periudhe përsëritje në 50, 20, 10 e 5 vjet në m/sek

PERIUDHA / RAJONI	50 vjet	20 vjet	10 vjet	5 vjet
I	27-30	23-26	20-23	18-20
II	30-33	28-30	24-27	20-23
III	35-40	31-35	28-30	24-27

3.4.1. PRESIONI I ERES

Presioni i eres eshte llogaritur ne proceduren e meposhtme:

BASIC WIND VELOCITY

$v_{b.0} := 30$ m /s — Fundamental value of the basic wind velocity

$c_{season} := 1$ — Seasonal factor

$c_{dir} := 1$ — Directional factor

$v_b := c_{dir} \cdot c_{season} \cdot v_{b.0} = 30$ m /s

TERRAIN ROUGHNESS FACTOR

Terrain Category II

$z_0 := 1$ m — Roughness length

$z_{min} := 10$ m — Minimum height

$z := 4$ m — Building effective height

$z_{0.II} := 0.05$ — Roughness length for Terrain Category II

$$k_r := 0.19 \cdot \left(\frac{z_0}{z_{0.II}} \right)^{0.07} = 0.234$$ Terrain factor

$$c_{r.z} := k_r \cdot \ln\left(\frac{z}{z_0} \right) = 0.325$$ Roughness factor

OROGRAPHY FACTOR

The orography is not significant

$c_{o.z} := 1$

MEAN WIND VELOCITY

$v_{m.z} := c_{r.z} \cdot c_{o.z} \cdot v_b = 9.75$ m /s

WIND TURBULENCE

$k_I := 1$ Turbulence factor

$$I_{v.z} := \frac{k_I}{c_{o.z} \cdot \ln\left(\frac{z}{z_0}\right)} = 0.721$$

PEAK VELOCITY PRESSURE

$\rho := 1.25$ kg / m3 Air density

$$q_{p.z} := \left(1 + 7 \cdot I_{v.z}\right) \cdot \frac{1}{2} \cdot \rho \cdot \frac{{v_{m.z}}^2}{9.81} = 37$$ kg / m2

$$q_b := \frac{1}{2 \cdot 9.81} \cdot \rho \cdot {v_b}^2 = 57.3$$ kg / m2 basic velocity pressure

$$c_{e.z} := \frac{q_{p.z}}{q_b} = 0.64$$ exposure factor

Table 4.1 — Terrain categories and terrain parameters

Terrain category		z_0 m	z_{min} m
0	Sea or coastal area exposed to the open sea	0,003	1
I	Lakes or flat and horizontal area with negligible vegetation and without obstacles	0,01	1
II	Area with low vegetation such as grass and isolated obstacles (trees, buildings) with separations of at least 20 obstacle heights	0,05	2
III	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)	0,3	5
IV	Area in which at least 15 % of the surface is covered with buildings and their average height exceeds 15 m	1,0	10
The terrain categories are illustrated in Annex A.1.			

3.4.2. KOEFICENTET E PRESIONIT TE JASHTEM

Ngarkesa e eres eshte aplikuar ne muret dhe mbulesen e objektit duke perdorur koeficentet e presionit te paraqitur ne tabelat e meposhtme:

Table 7.1 — Recommended values of external pressure coefficients for vertical walls of rectangular plan buildings

Zone	A		B		C		D		E	
h/d	$c_{pe,10}$	$c_{pe,1}$	$c_{pe,10}$	$c_{pe,1}$	$c_{pe,10}$	$c_{pe,1}$	$c_{pe,10}$	$c_{pe,1}$	$c_{pe,10}$	$c_{pe,1}$
5	-1,2	-1,4	-0,8	-1,1	-0,5		+0,8	+1,0	-0,7	
1	-1,2	-1,4	-0,8	-1,1	-0,5		+0,8	+1,0	-0,5	
≤ 0,25	-1,2	-1,4	-0,8	-1,1	-0,5		+0,7	+1,0	-0,3	

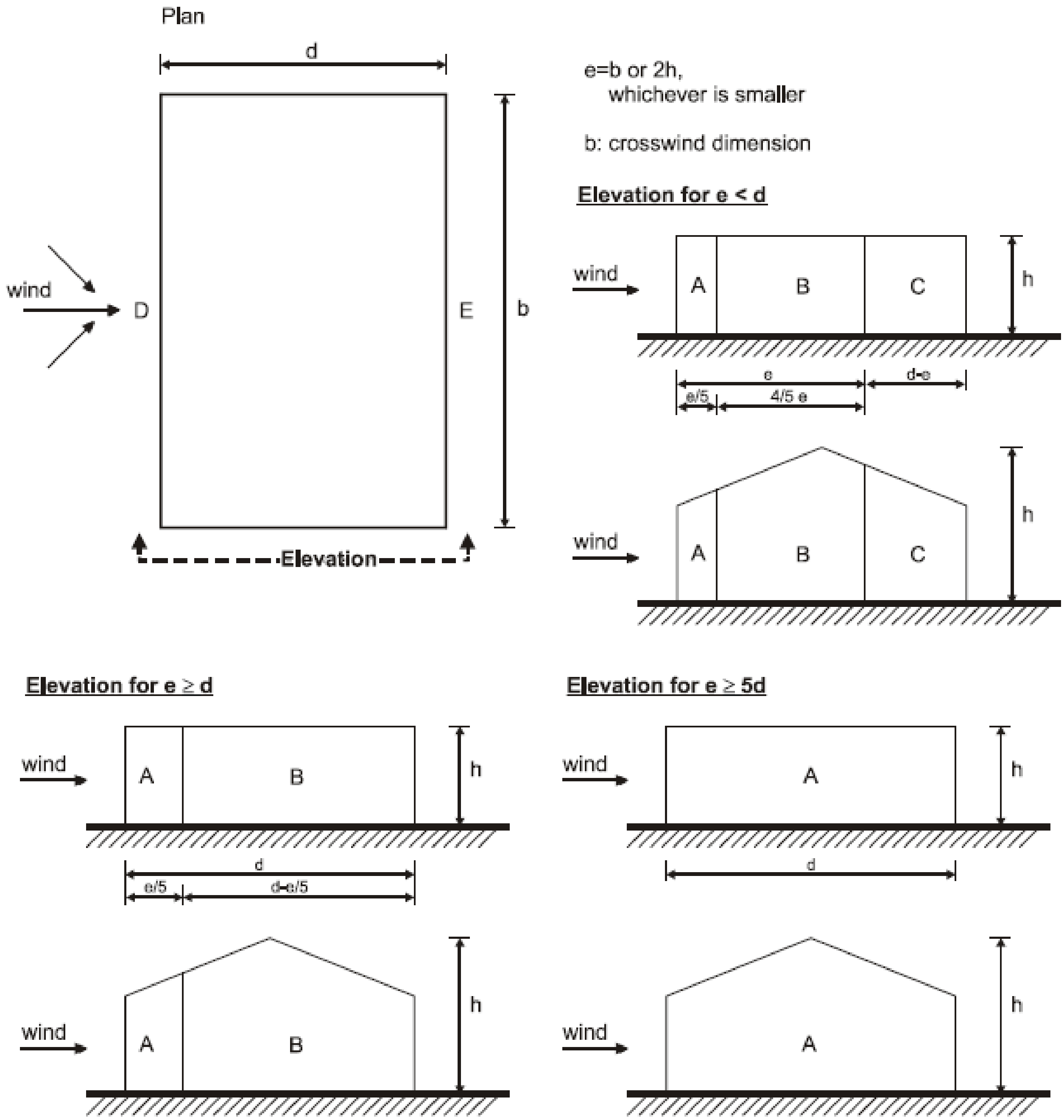


Figure 7.5 — Key for vertical walls

NOTE 1 The values of $c_{pe,10}$ and $c_{pe,1}$ may be given in the National Annex. The recommended values are given in Table 7.1, depending on the ratio *h/d*. For intermediate values of *h/d*, linear interpolation may be applied. The values of Table 7.1 also apply to walls of buildings with inclined roofs, such as duopitch and monopitch roofs.

Table 7.4a — External pressure coefficients for duopitch roofs

Pitch Angle α	Zone for wind direction $\Theta = 0°$									
	F		G		H		I		J	
	$c_{pe,10}$	$c_{pe,1}$	$c_{pe,10}$	$c_{pe,1}$	$c_{pe,10}$	$c_{pe,1}$	$c_{pe,10}$	$c_{pe,1}$	$c_{pe,10}$	$c_{pe,1}$
-45°	-0,6		-0,6		-0,8		-0,7		-1,0	-1,5
-30°	-1,1	-2,0	-0,8	-1,5	-0,8		-0,6		-0,8	-1,4
-15°	-2,5	-2,8	-1,3	-2,0	-0,9	-1,2	-0,5		-0,7	-1,2
-5°	-2,3	-2,5	-1,2	-2,0	-0,8	-1,2	+0,2		+0,2	
							-0,6		-0,6	
5°	-1,7	-2,5	-1,2	-2,0	-0,6	-1,2	-0,6		+0,2	
	+0,0		+0,0		+0,0				-0,6	
15°	-0,9	-2,0	-0,8	-1,5	-0,3		-0,4		-1,0	-1,5
	+0,2		+0,2		+0,2		+0,0		+0,0	+0,0
30°	-0,5	-1,5	-0,5	-1,5	-0,2		-0,4		-0,5	
	+0,7		+0,7		+0,4		+0,0		+0,0	
45°	-0,0		-0,0		-0,0		-0,2		-0,3	
	+0,7		+0,7		+0,6		+0,0		+0,0	
60°	+0,7		+0,7		+0,7		-0,2		-0,3	
75°	+0,8		+0,8		+0,8		-0,2		-0,3	

NOTE 1 At $\Theta = 0°$ the pressure changes rapidly between positive and negative values on the windward face around a pitch angle of $\alpha = -5°$ to $+45°$, so both positive and negative values are given. For those roofs, four cases should be considered where the largest or smallest values of all areas F, G and H are combined with the largest or smallest values in areas I and J. No mixing of positive and negative values is allowed on the same face.

NOTE 2 Linear interpolation for intermediate pitch angles of the same sign may be used between values of the same sign. (Do not interpolate between $\alpha = +5°$ and $\alpha = -5°$, but use the data for flat roofs in 7.2.3). The values equal to 0,0 are given for interpolation purposes

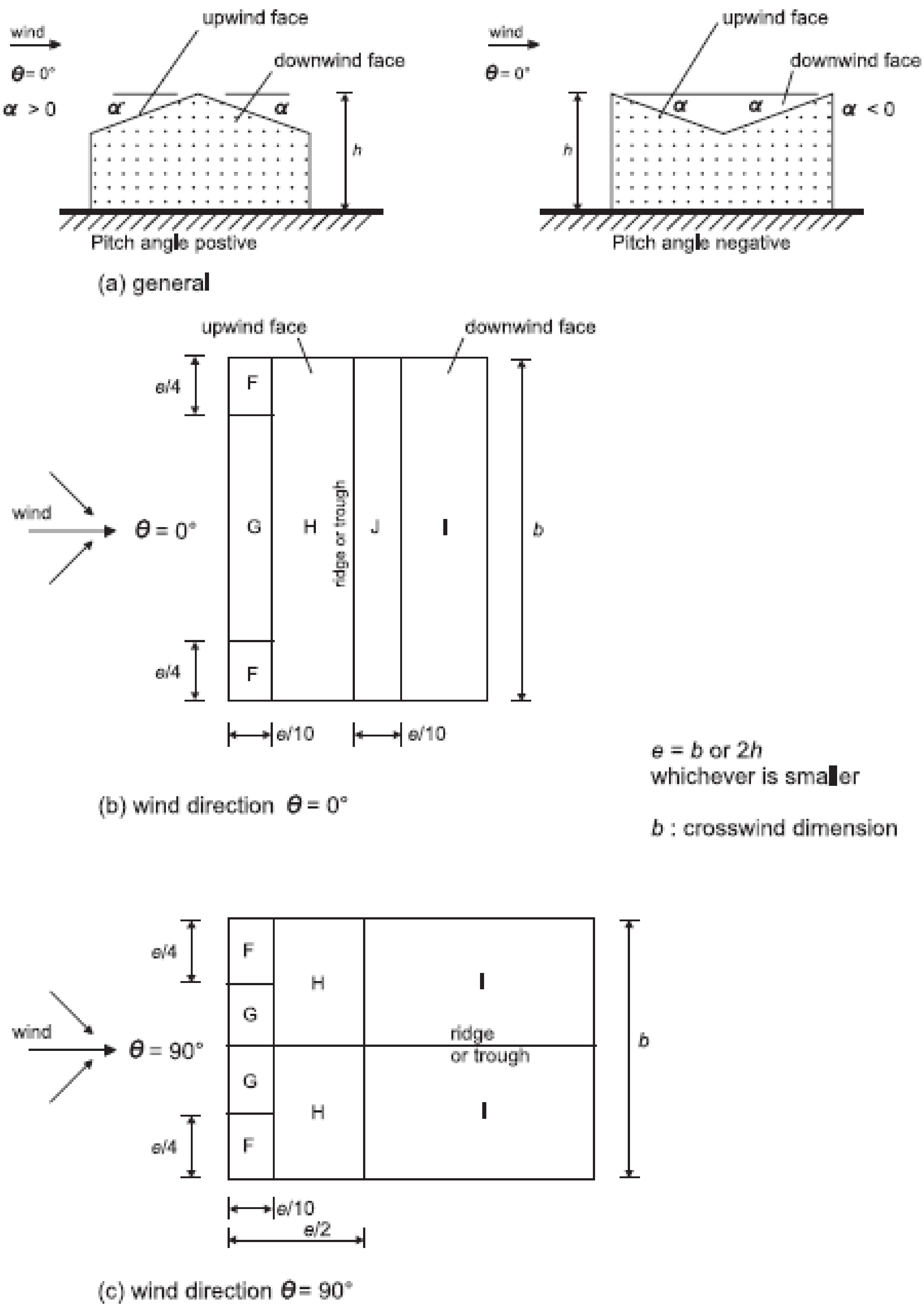


Figure 7.8 — Key for duopitch roofs

3.4.3. KOEFICENTET E PRESIONIT TE BRENDSHEM

Koeficentet e presionit te brendshme jane aplikuar sipas Klauzoles 7.2.9 per te gjitha siperfaqet e mureve dhe mbuleses.

Ne analize jane marre parasysh te dyja rastet e presioneve te brendshme (pozitive dhe negative) sipas Note. 2 of Eq. (7.4) si raste te vecanta.

Presionet e jashtme jane kombinuar me presionet e brendshme pozitive dhe negative per te percaktuar rastin me kritik te ngarkimit.

Koeficenti i presionit te brendshem pozitiv +0.2
Koeficenti i presionit te brendshem negativ -0.3

3.5. NGARKESA SIZMIKE

Llogaritja Sizmike eshte bere konform EC8 – Design of structures for earthquake resistance – General rules and rules for buildings.

Seismic Parameters

- Trualli eshte klasifikuar si i kategorise B.

Table 3.1: Ground types

Ground type	Description of stratigraphic profile	Parameters		
		$v_{s,30}$ (m/s)	N_{SPT} (blows/30cm)	c_u (kPa)
A	Rock or other rock-like geological formation, including at most 5 m of weaker material at the surface.	> 800	_	_
B	Deposits of very dense sand, gravel, or very stiff clay, at least several tens of metres in thickness, characterised by a gradual increase of mechanical properties with depth.	360 – 800	> 50	> 250
C	Deep deposits of dense or medium-dense sand, gravel or stiff clay with thickness from several tens to many hundreds of metres.	180 – 360	15 - 50	70 - 250
D	Deposits of loose-to-medium cohesionless soil (with or without some soft cohesive layers), or of predominantly soft-to-firm cohesive soil.	< 180	< 15	< 70
E	A soil profile consisting of a surface alluvium layer with v_s values of type C or D and thickness varying between about 5 m and 20 m, underlain by stiffer material with v_s > 800 m/s.			
S_1	Deposits consisting, or containing a layer at least 10 m thick, of soft clays/silts with a high plasticity index (PI > 40) and high water content	< 100 (indicative)	_	10 - 20
S_2	Deposits of liquefiable soils, of sensitive clays, or any other soil profile not included in types A – E or S_1			

- Reference peak ground acceleration a_{gR}=0.24
- Building Importance Class II
- Building Importance Factor γ_I = 1

Table 4.3 Importance classes for buildings

Importance class	Buildings
I	Buildings of minor importance for public safety, e.g. agricultural buildings, etc.
II	Ordinary buildings, not belonging in the other categories.
III	Buildings whose seismic resistance is of importance in view of the consequences associated with a collapse, e.g. schools, assembly halls, cultural institutions etc.
IV	Buildings whose integrity during earthquakes is of vital importance for civil protection, e.g. hospitals, fire stations, power plants, etc.

- Design ground acceleration $a_g = \gamma_I * a_{gR}$ = 0.24 * 1 = 0.24g
- For Ground type B and Type 1 elastic response spectrum the following seismic parameters are used:

S = 1.2 , T_B = 0.15 s, T_C = 0.5 s, T_D = 2 s,

Table 3.2: Values of the parameters describing the recommended Type 1 elastic response spectra

Ground type	S	T_B (s)	T_C (s)	T_D (s)
A	1,0	0,15	0,4	2,0
B	1,2	0,15	0,5	2,0
C	1,15	0,20	0,6	2,0
D	1,35	0,20	0,8	2,0
E	1,4	0,15	0,5	2,0

- The design spectrum for the horizontal components shall be defined by the following expressions:

$$0 \le T \le T_B : S_d(T) = a_g \cdot S \cdot \left[\frac{2}{3} + \frac{T}{T_B} \cdot \left(\frac{2,5}{q} - \frac{2}{3}\right)\right] \qquad (3.13)$$

$$T_B \leq T \leq T_C: \quad S_d(T) = a_g \cdot S \cdot \frac{2,5}{q} \tag{3.14}$$

$$T_C \leq T \leq T_D: \; S_d(T) \begin{cases} = a_g \cdot S \cdot \dfrac{2,5}{q} \cdot \left[\dfrac{T_C}{T}\right] \\ \geq \beta \cdot a_g \end{cases} \tag{3.15}$$

$$T_D \leq T: \quad S_d(T) \begin{cases} = a_g \cdot S \cdot \dfrac{2,5}{q} \cdot \left[\dfrac{T_C T_D}{T^2}\right] \\ \geq \beta \cdot a_g \end{cases} \tag{3.16}$$

A1.3.2 Design values of actions in the accidental and seismic design situations

(1) The partial factors for actions for the ultimate limit states in the accidental and seismic design situations (expressions 6.11a to 6.12b) should be 1,0. ψ values are given in Table A1.1.

NOTE For the seismic design situation see also EN 1998.

Table A1.3 - Design values of actions for use in accidental and seismic combinations of actions

Design situation	Permanent actions		Leading accidental or seismic action	Accompanying variable actions (**)	
	Unfavourable	Favourable		Main (if any)	Others
Accidental (*) (Eq. 6.11a/b)	$G_{kj,sup}$	$G_{kj,inf}$	A_d	ψ_{11} or $\psi_{21} Q_{k1}$	$\psi_{2,i}\, Q_{k,i}$
Seismic (Eq. 6.12a/b)	$G_{kj,sup}$	$G_{kj,inf}$	$\gamma_I A_{Ek}$ or A_{Ed}		$\psi_{2,i}\, Q_{k,i}$

(*) In the case of accidental design situations, the main variable action may be taken with its frequent or, as in seismic combinations of actions, its quasi-permanent values. The choice will be in the National annex, depending on the accidental action under consideration. See also EN 1991-1-2.

(**) Variable actions are those considered in Table A1.1.

Table A1.1 - Recommended values of ψ factors for buildings

Action	ψ_0	ψ_1	ψ_2
Imposed loads in buildings, category (see EN 1991-1-1)			
Category A : domestic, residential areas	0,7	0,5	0,3
Category B : office areas	0,7	0,5	0,3
Category C : congregation areas	0,7	0,7	0,6
Category D : shopping areas	0,7	0,7	0,6
Category E : storage areas	1,0	0,9	0,8
Category F : traffic area, vehicle weight ≤ 30kN	0,7	0,7	0,6
Category G : traffic area, 30kN < vehicle weight ≤ 160kN	0,7	0,5	0,3
Category H : roofs	0	0	0
Snow loads on buildings (see EN 1991-1-3)*			
Finland, Iceland, Norway, Sweden	0,70	0,50	0,20
Remainder of CEN Member States, for sites located at altitude H > 1000 m a.s.l.	0,70	0,50	0,20
Remainder of CEN Member States, for sites located at altitude H ≤ 1000 m a.s.l.	0,50	0,20	0
Wind loads on buildings (see EN 1991-1-4)	0,6	0,2	0
Temperature (non-fire) in buildings (see EN 1991-1-5)	0,6	0,5	0
NOTE The ψ values may be set by the National annex. * For countries not mentioned below, see relevant local conditions.			

4.2.4 Combination coefficients for variable actions

(1)P The combination coefficients ψ_{2i} (for the quasi-permanent value of variable action q_i) for the design of buildings (see **3.2.4**) shall be those given in EN 1990:2002, Annex A1.

(2)P The combination coefficients ψ_{Ei} introduced in **3.2.4(2)**P for the calculation of the effects of the seismic actions shall be computed from the following expression:

$$\psi_{Ei} = \varphi \cdot \psi_{2i} \qquad (4.2)$$

NOTE The values to be ascribed to φ for use in a country may be found in its National Annex. The recommended values for φ are listed in Table 4.2.

Table 4.2: Values of φ for calculating ψ_{Ei}

Type of variable action	Storey	φ
Categories A-C*	Roof	1,0
	Storeys with correlated occupancies	0,8
	Independently occupied storeys	0,5
Categories D-F* and Archives		1,0

* Categories as defined in EN 1991-1-1:2002.

4.3.3.5 Combination of the effects of the components of the seismic action

4.3.3.5.1 Horizontal components of the seismic action

(1)P In general the horizontal components of the seismic action (see **3.2.2.1(3)**) shall be taken as acting simultaneously.

(2) The combination of the horizontal components of the seismic action may be accounted for as follows.

a) The structural response to each component shall be evaluated separately, using the combination rules for modal responses given in **4.3.3.3.2**.

b) The maximum value of each action effect on the structure due to the two horizontal components of the seismic action may then be estimated by the square root of the sum of the squared values of the action effect due to each horizontal component.

c) The rule b) generally gives a safe side estimate of the probable values of other action effects simultaneous with the maximum value obtained as in b). More accurate models may be used for the estimation of the probable simultaneous values of more than one action effect due to the two horizontal components of the seismic action.

(3) As an alternative to b) and c) of **(2)** of this subclause, the action effects due to the combination of the horizontal components of the seismic action may be computed using both of the two following combinations:

a) E_{Edx} "+" $0{,}30 E_{Edy}$ (4.18)

b) $0{,}30 E_{Edx}$ "+" E_{Edy} (4.19)

where

"+" implies "to be combined with";

E_{Edx} represents the action effects due to the application of the seismic action along the chosen horizontal axis x of the structure;

E_{Edy} represents the action effects due to the application of the same seismic action along the orthogonal horizontal axis y of the structure.

Faktoret e sjelljes

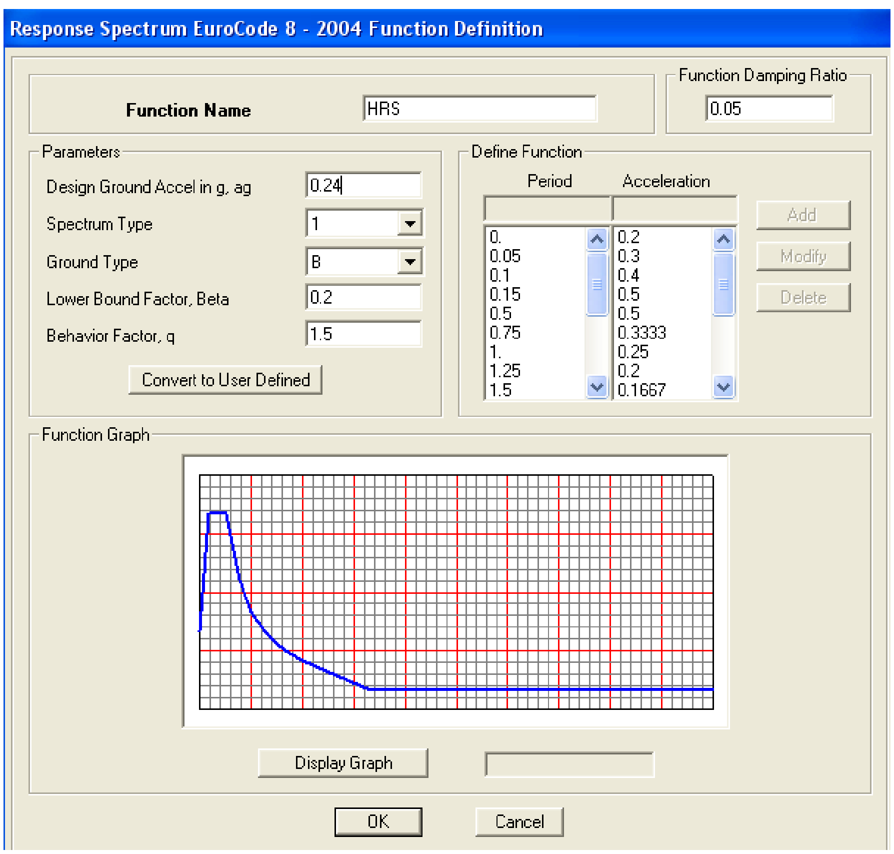
Llogaritja eshte bere per Medium Ductility Class **DCM**

Table 5.1: Basic value of the behaviour factor, q_o, for systems regular in elevation

STRUCTURAL TYPE	DCM	DCH
Frame system, dual system, coupled wall system	$3{,}0\alpha_u/\alpha_1$	$4{,}5\alpha_u/\alpha_1$
Uncoupled wall system	3,0	$4{,}0\alpha_u/\alpha_1$
Torsionally flexible system	2,0	3,0
Inverted pendulum system	1,5	2,0

- Fasada Godina 7: $q_x = q_y = 1.5$
- Mbulesa e Tregut: $q_x = q_y = 1.5$
- Shatervani i Mbuluar: $q_x = q_y = 1.5$

Spektri Horizontal i perdorur ne analize per te dy drejtimet



5. KARAKTERISTIKAT E MATERIALEVE

Beton (C25/30)

fck=250 kg/cm2

Pesha volumore 2500 kg/m3

Moduli i Elasticitetit E=300000 N/mm2

Koeficienti i Puasonit 0.2

Celik armimi S-500s

fy =500 N/mm2

Pesha volumore 7849 kg/m3

Celik struktural S275 JR (Struktura primare)

fy =275 N/mm2

fu=430 N/mm2

Pesha volumore 7849 kg/m3

Moduli i Elasticitetit E=210000 N/mm2

Koeficienti i Puasonit 0.3

Koeficienti i bymimit termik αT = 12*10-6 per ºC.

Celik struktural S235 JR (Profilet tubolare)

fy =235 N/mm2

fu=360 N/mm2

.

Bullona Class 8.8

fyb=640 N/mm2

fub=800 N/mm2

Elementet e Inoxit

AISI316

6. THEMELET

Llogaritja e themeleve eshte bere sipas:

EC -1997;
Bowles;

Kontrolli i aftesise mbajtese te terrenit eshte bere per kombinimet SLS.

Llogaritja e pllakes dhe plintave eshte bere per kombinimet ULS.

7. VERIFIKIMI I ELEMENTEVE

Konstruimi i elementeve beton-arme eshte bere automatikisht nga programi.
Per elementet “Frame” (traret, kollonat) armimi gjatesor dhe terthor eshte marre ai i gjeneruar nga programi konform EC2.

Per elementet “Shell” (pllaka e themelit, soletat e plota) jane marre momentet perkatese nga programi dhe jane llogaritur sasite e armatures konform EC2.
Per elementet “Shell” (muret b/a) llogaritja eshte bere duke i kthyer ato ne “Pier” dhe “Spandrel” dhe duke marre sasite e armatures te gjeneruara nga programi konform ACI 318-08.

Kontrolli i elementeve metalike eshte bere automatikisht nga programi konform EC3.