

ANNEX 1

NATIONAL ANNEX TO STANDARD SFS-EN 1990 EUROCODE – BASIS OF STRUCTURAL DESIGN

Preface

This national annex is used together with Standard SFS-EN 1990:2002.

This national annex sets out:

- a) the national parameters for the following paragraphs in Annex A1 to Standard SFS-EN 1990 where national selection is permitted:
 - A1.2.2 (Table A.1.1)
 - A1.3.1 (1) Tables A1.2(A), (B) and (C)
 - A1.3.1(5)
 - A1.3.2 (Table A.1.3)
- b) Guidance for the use of the informative annexes B, C and D.

Annex A1

Application to buildings

A.1.2.2 Values of ψ factors

A1.2.2(1)

Table A1.1 (FI) provides values for the symbols of Table A1.1 of EN 1990. The national annex to standard SFS-EN 1993-3-1 is complied with in respect of masts.

Table A1.1: (FI) Values of ψ factors for buildings

Load	ψ_0	ψ_1	ψ_2
Imposed loads in buildings, category (see EN 1991-1-1)			
Category A: areas in residential buildings	0,7	0,5	0,3
Category B: office areas	0,7	0,5	0,3
Category C: congregation areas	0,7	0,7	0,3
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 ≤ 30 kN	0,7	0,7	0,6
Category G: traffic area, 30 kN < vehicle weight ≤ 160 kN	0,7	0,5	0,3
Category H: roofs	0	0	0
Snow loads on buildings (see EN 1991-1-3)*), when			
$s_k < 2,75$ kN/m ²	0,7	0,4	0,2
$s_k \geq 2,75$ kN/m ²	0,7	0,5	0,2
Ice loads **)	0,7	0,3	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
*) Outdoor terraces and balconies $\psi_0 = 0$ combined with categories A, B, F and G. Note: In case there are different categories of loads in one building, which cannot clearly be separated into different sections, values for ψ factors giving the most unfavourable effect should be used. **) Added in the Finnish National Annex			

Commentary: Characteristic values of ice loads are given among others in ISO 12494:2001.

A1.3.1 Design values of actions in persistent and transient design situations

A.1.3.1(1)

For the design of buildings the Tables A1.2(A) (FI), A1.2 (B) (FI) and 1.2(C) (FI) provide values to be used in Finland for the symbols of Tables A1.2(A), A1.2(B) and A1.2(C) of EN 1990.

Commentary: Multiplication factor K_{FI} is used only in combinations of actions for persistent or transient design situations according to clause 6.4.3.2. The factor is not used in fatigue or serviceability limit state design situations.

Table A1.2(A) (FI) Design values of actions (EQU) (Set A)

Persistent and transient design situations	Permanent actions		Leading variable action (*)	Accompanying variable actions (*)	
	Unfavourable	Favourable		Main (if any)	Others
(Eq. 6.10)	$1,10 K_{FI} G_{kj,sup}$	$0,90 G_{kj,inf}$	$1,50 K_{FI} Q_{k,1}$		$1,50 K_{FI} \psi_{0,i} Q_{k,i}$

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

K_{FI} depends on the reliability class given in table B2 of Annex B as follows:

- In reliability class RC3 $K_{FI} = 1,1$
- In reliability class RC2 $K_{FI} = 1,0$
- In reliability class RC1 $K_{FI} = 0,9$.

The reliability classes are associated with the consequence classes CC3 ... CC1 given in Annex B.

Table A1.2(B) (FI) Design values of actions (STR/GEO) (Set B)

Persistent and transient design situations	Permanent actions		Leading variable action (*)	Accompanying variable actions (*)	
	Unfavourable	Favourable		Main (if any)	Others
(Eq. 6.10a)	$1,35K_{FI} G_{kj,sup}$	$0,90 G_{kj,inf}$			
(Eq. 6.10b)	$1,15K_{FI} G_{kj,sup}$	$0,90 G_{kj,inf}$	$1,5K_{FI} Q_{k,1}$		$1,5 K_{FI} \psi_{0,i} Q_{k,i}$
(*) Variable actions are those considered in Table A1.1					
<p>Note 1. This can be expressed as a design formula in such a way that the most unfavourable of the two following expressions is used as a combination of loads when it should be noted that the latter expression only contains permanent loads:</p> $\left\{ \begin{array}{l} 1,15 K_{FI} G_{kj,sup} + 0,9 G_{kj,inf} + 1,5 K_{FI} Q_{k,1} + 1,5 K_{FI} \sum_{i>1} \psi_{0,i} Q_{k,i} \\ 1,35 K_{FI} G_{kj,sup} + 0,9 G_{kj,inf} \end{array} \right.$					
<p>K_{FI} depends on the reliability class given in table B2 of Annex B as follows:</p> <ul style="list-style-type: none"> In reliability class RC3 $K_{FI} = 1,1$ In reliability class RC2 $K_{FI} = 1,0$ In reliability class RC1 $K_{FI} = 0,9$. 					
<p>The reliability classes are associated with the consequence classes CC3 ... CC1 given in Annex B.</p>					
<p>Note 2: See also standards SFS-EN 1992 to SFS-EN 1999 for γ values to be used for imposed deformations.</p>					
<p>Note 3: The characteristic values of all permanent actions from one source are multiplied by $\gamma_{G,sup}$ if the total resulting action effect is unfavourable and $\gamma_{Q,inf}$ if the total resulting action effect is favourable. For example, all actions originating from the self weight of the structure may be considered as coming from one source; this also applies if different materials are involved.</p>					
<p>Note 4: For particular verifications, the values for γ_G and γ_Q may be subdivided into γ_g and γ_q and the model uncertainty factor γ_{sd}. A value of $\gamma_{sd} = 1,05 \dots 1,15$ can be used in most common cases.</p>					
<p>Note 5: In respect of geotechnical design of foundations, see standard SFS-EN 1997-1 with its National Annex.</p>					

Table A1.2(C) (FI) Design values of actions (STR/GEO) (Set C)

Persistent and transient design situation	Permanent actions		Leading variable action (*)	Accompanying variable actions (*)
	Unfavourable	Favourable		
(Eq. 6.10)	$1,0 K_{FI} G_{kj,sup}$	$1,0 G_{kj,inf}$	$1,3 K_{FI} Q_{k,1}$	$1,3 K_{FI} \psi_{0,i} Q_{k,1}$
(*) Variable actions are those considered in Table A1.1 K_{FI} depends on the reliability class given in table B2 of Annex B as follows: In reliability class RC3 $K_{FI} = 1,1$ In reliability class RC2 $K_{FI} = 1,0$ In reliability class RC1 $K_{FI} = 0,9$. The reliability classes are associated with the consequence classes CC3 ... CC1 given in Annex B.				

A.1.3.1 (5)

Approach 2 is used in Finland. For verifications of stability of slopes and the total stability Approach 3 is used.

Concerning geotechnical design of foundations see also standard SFS-EN 1997-1 with the National Annex.

A.1.3.2 Design values of actions in the accidental and seismic design situations

A1.3.2.(1)

Table A1.3 (FI) provides values to be used in Finland for the symbols of Table 1.3 of SFS-EN 1990.

Table A1.3 (FI) 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	$\psi_{11} Q_{k1} (**)$	$\psi_{2,i} Q_{k,i}$
Seismic (***) (Eq. 6.12a/b)	$G_{kj,sup}$	$G_{kj,inf}$	γA_{Ek} or A_{Ed}		$\psi_{2,i} Q_{k,i}$
(*) Variable actions are those considered in Table A1.1. (**) When the main action is other than snow, ice or wind action, the value ψ_{21} is however used. (***) The seismic design situation should be used only when specified by the client. See also standard SFS-EN 1998-1.					

Annex B

Management of structural reliability for construction works

The informative annex B is used in Finland concerning consequence classes and K_{FI} factor.

Commentary: Load factors K_{FI} are not used in fatigue design. Standard SFS- EN 1993-1-9 gives consequences classes for fatigue loaded structures, which can be applied.

B3.1 Consequences classes

B3.1(1)

Table B1 (FI) of Annex B is given below:

Table B1 (FI) Definition of consequences classes

Consequences Class	Description	Examples of buildings and civil engineering works
CC3	High consequence for loss of human life, or economic, social or environmental consequences very great	The load bearing system ¹⁾ with its bracing parts in buildings which are often occupied by a large number of people for example <ul style="list-style-type: none"> – residential, office and business buildings with more than 8 storeys²⁾ – concert halls, theatres, sports and exhibitions halls, spectator stands – heavily loaded buildings or buildings with long spans. Special structures such as high masts and towers. Ramps as well as embankments and other structures in areas of fine-grained soils in environments sensitive to adverse effects of displacements.
CC2	Medium consequence for loss of human life, economic, social or environmental consequences considerable	Buildings and structures not belonging to classes CC3 or CC1.
CC1	Low consequence for loss of human life and economic, social or environmental consequences small or negligible	1- and 2-storey buildings, which are only occasionally occupied by people for example warehouses. Structures, which when damaged, don't pose major risk, for example <ul style="list-style-type: none"> – low basement floors without cellar rooms – roofs, under which there is a load bearing floor and the loft is low – walls, windows, floors and other similar structures, which are mainly loaded horizontally by air pressure difference and which do not have a load bearing or stabilizing function in the load bearing system.

		<ul style="list-style-type: none">– sheeting in structural classes II and III of SFS-EN 1993-1-3– sheeting in structural class I of SFS-EN 1993-1-3 for loads vertical to surface causing bending ³⁾.
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- ¹⁾ roofs and floors are however in class CC2 if they do not form a part of the stiffening system of the whole structure. When the structure is composed of independent parts, the consequence class of each part is determined separately.
- ²⁾ underground floors included.
- ³⁾ does not apply to loads, which are induced when sheeting is used to transfer shear forces parallel to the surface of the sheeting (diaphragm action) or normal forces.

Annex C

Basis for partial factor design and reliability analysis

Informative Annex C may be used in Finland.

Annex D

Experimental design

Informative Annex D may be used in Finland.