

# **CYS National Annex to CYS EP '3; ; 24224**

## **Eurocode: Basis of Structural Design**

Prepared by

Eurocodes Committee, Scientific and Technical Chamber  
of Cyprus under a Ministry of Interior's Programme



**NATIONAL ANNEX**  
**TO**  
**CYS EN 1990:2002 Eurocode: Basis of Structural Design**

H\ ]g'BU]cbU`5 bbYl ` \ Ug`VYYb`Uddfcj YX`VmiH Y`6 cUfX`cZ; cj Yfbcfg`cZH Y`7 ndfi g`  
Cf[ Ub]gU]cb Zcf`GHubXUfX]gU]cb`cb`%/#\$\* #8\$%"

## **INTRODUCTION**

This National Annex has been prepared by the Eurocodes Committee of the Technical Chamber of Cyprus which was commissioned by the Ministry of Interior of the Republic of Cyprus

### **NA 1 SCOPE**

This National Annex is to be used together with CYS EN 1990:2002

This National Annex gives:

- (a) Nationally determined parameters for the following clauses of CYS EN 1990:2002 where National choice is allowed. The Nationally determined parameters for the clauses below apply to buildings and civil engineering works (see Section NA 2.1).
  - A1.1 (1)
- (b) Nationally determined parameters, applicable to buildings only, for the following clauses of CYS EN 1990:2002 where National choice is allowed (see Section NA 2.2).
  - A1.2.1 (1)
  - A1.2.2 (Table A.1.1)
  - A1.3.1 (1) Table A1.2 (A) to (C)
  - A1.3.1 (5)
  - A1.3.2 (Table A.1.3)
  - A1.4.2 (2)

Note:

Clause NA 2.3 will be applicable for bridges; 2.4 for Cranes and Machinery; 2.5 for silos and tanks etc will be added by amending the National Annex at appropriate future dates.

- (c) Guidance on use of the Informative Annexes B, C and D for buildings and civil engineering works (see Section NA 3).
- (d) References to non-contradictory complementary information applicable to buildings and civil engineering works (see Section NA 4)

## **NA 2 NATIONALLY DETERMINED PARAMETERS**

### **NA 2.1 Nationally determined parameters for buildings and civil engineering works**

#### **NA 2.1.1 Clause A.1.1 Field of application**

Table 2.1 (CYS) provides values for the design working life given in Table 2.1 of CYS EN 1990:2002.

**Table 2.1 (CYS): Indicative design working life**

Design working life category	Indicative design working life (years)	Examples
1	10	Temporary structures <sup>(1)</sup>
2	10 to 25	Replaceable structural parts, e.g. gantry girders, bearings
3	15 to 30	Agricultural and similar structures
4	50	Building structures and other common structures
5	100	Monumental building structures, bridges, and other civil engineering structures
<sup>(1)</sup> Structures or parts of structures that can be dismantled with a view to being re-used should not be considered as temporary. In the case of replaceable structural parts the design life for the statistical determination of loads should be the design life of the structure.		

**NA 2.2 Nationally determined parameters for buildings****NA 2.2.1 Clause A.1.2.1 (1)**

- (a) All effects of actions that can exist simultaneously should be considered together in combination of actions
- (b) With regard to Note 2 of clause A1.2.1 (1) of CYS EN 1990:2002 no modifications are allowed through the National Annex for A1.2.1 (2) and (3).

**NA 2.2.2 Clause A.1.2.2 Values of  $\psi$  factors**

Table A1.1 (CYS) provides values for the symbols of Table A1.1 of CYS EN 1990:2002.

**Table A1.1 (CYS): Values of  $\psi$  factors for buildings**

Action	$\psi_0$	$\psi_1$	$\psi_2$
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 $\leq 30\text{kN}$	0,7	0,7	0,6
Category G : traffic area, vehicle weight $\leq 160\text{kN}$	0,7	0,5	0,3
Category H : roofs*	0	0	0
Snow loads on buildings (see EN 1991-1-3)			
- for sites located at altitude $H > 1000$ m a.s.l.	0,7	0,5	0,2
- for sites located at altitude $H \leq 1000$ m a.s.l.	0,5	0,2	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
* See also EN 1991-1-1: Clause 3.3.2 (1)			

**NA 2.2.3 Clause A.1.3 Ultimate limit states****NA 2.2.3.1 Clause A.1.3.1 (1) Values for the symbols of Table A1.2 (A)**

Table A1.2 (A) (CYS) provides the values for the symbol  $\gamma$  of Table A1.2 (A) of CYS EN 1990:2002. The values chosen are

$$\gamma_{Gj,sup} = 1,10$$

$$\gamma_{Gj,inf} = 0,90$$

$$\gamma_{Q,1} = 1,50 \text{ where unfavourable (0 where favourable)}$$

$$\gamma_{Q,i} = 1,50 \text{ where unfavourable (0 where favourable)}$$

Note: for  $\psi$  values see table A1.1 (CYS)

**Table A1.2 (A) (CYS): 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)	$1,10G_{kj,sup}$	$0,90G_{kj,inf}$	$1,5Q_{k,1}$ (0 when favourable)		$1,5\psi_{0,1}Q_{k,1}$ (0 when favourable)
<p>(*) Variable actions are those considered in Table A1.1 (CYS)</p> <p>In cases where the verification of static equilibrium also involves the resistance of structural members, as an alternative to two separate verifications based on tables A1.2 (A) and A1.2 (B), a combined verification, based on Table A1.2 (A), should be adopted, with the following set of values:</p> $\gamma_{Gj,sup} = 1,35$ $\gamma_{Gj,inf} = 1,15$ $\gamma_{Q,1} = 1,50 \text{ where unfavourable (0 when favourable)}$ $\gamma_{Q,i} = 1,50 \text{ where unfavourable (0 when favourable)}$ <p>provided that applying <math>\gamma_{Gj,inf} = 1,00</math> both to the favourable part and to the unfavourable part of permanent actions does not give a more unfavourable effect.</p>					

### NA 2.2.3.2 Clause A1.3.1 (1) Values for the symbol $\gamma$ of Table A1.2 (B)

Table A1.2 (B) (CYS) provides the values for the symbol  $\gamma$  of Table A1.2 (B) of CYS EN 1990:2002. The values chosen are

$$\gamma_{Gj,sup} = 1,35$$

$$\gamma_{Gj,inf} = 1,00$$

$$\gamma_{Q,1} = 1,50 \text{ where unfavourable (0 when favourable)}$$

$$\gamma_{Q,i} = 1,50 \text{ where unfavourable (0 when favourable)}$$

Note: for  $\psi$  values see table A1.1 (CYS)

**Table A1.2 (B) (CYS): 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. 6.10)	$1,35G_{kj,sup}$	$1,00G_{kj,inf}$	$1,5Q_{k,1}$ (0 when favourable)		$1,5\psi_{0,1}Q_{k,1}$ (0 when favourable)

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

NOTE 1 Expression 6.10 should be used

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  $\gamma_{G,inf}$  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.

NOTE 4 For particular verifications, the values of  $\gamma_G$  and  $\gamma_Q$  may be subdivided into  $\gamma_g$  and  $\gamma_q$  and the model uncertainty factor  $\gamma_{sd}$ . A value of  $\gamma_{sd}$  of 1,15 can be used in most common cases.

**NA 2.2.3.3 Clause A1.3.1 (1) Values for the symbol  $\gamma$  of Table A1.2 (C)**

Table A1.2 (C) (CYS) provides the values for the symbol  $\gamma$  of Table A1.2 (C) of CYS EN 1990:2002. The values chosen are

$$\gamma_{Gj,sup} = 1,00$$

$$\gamma_{Gj,inf} = 1,00$$

$$\gamma_{Q,1} = 1,30 \text{ where unfavourable (0 when favourable)}$$

$$\gamma_{Q,i} = 1,30 \text{ where unfavourable (0 when favourable)}$$

Note: for  $\psi$  values see table A1.1 (CYS)

**Table A1.2 (C) (CYS): Design values of actions (STR/GEO) (Set C)**

Persistent and transient design situations	Permanent actions		Leading variable action(*)	Accompanying variable actions(*)	
	Unfavourable	Favourable		Main (if any)	Others
(Eq. 6.10)	$1,00G_{kj,sup}$	$1,00G_{kj,inf}$	$1,3Q_{k,1}$ (0 when favourable)		$1,3\psi_{0,1}Q_{k,1}$ (0 when favourable)

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

**NA 2.2.3.4 Clause A1.3.1 (5)**

Approach 2 should be used for the design of buildings.

### NA 2.2.4 Clause A.1.3.2 Design values of actions in the accidental and seismic design situations

Table A1.3 (CYS) provides the values for the symbol  $\gamma$  of Table A1.3 of CYS EN 1990:2002. All  $\gamma$  factors are equal to 1,00. Coefficient  $\psi_{1,1}$  is selected for the main accompanying variable action for the accidental design situations.

Note: For  $\psi$  values see Table A1.1 (CYS).

**Table A1.3 (CYS): Design values of actions for use in accidental and seismic combinations of actions**

Design situation	Permanent actions		Leading variable action(*)	Accompanying variable actions(**)	
	Unfavourable	Favourable		Main (if any)	Others
Accidental (Eq. 6.11 a/b)	$G_{kj,sup}$	$G_{kj,inf}$	$A_d$	$\psi_{1,1}Q_{k,1}$	$\psi_{2,i}Q_{k,i}$
Seismic (*) (Eq. 6.12 a/b)	$G_{kj,sup}$	$G_{kj,inf}$	$\gamma_1 A_{Ek}$ or $A_{Ed}$		$\psi_{2,i}Q_{k,i}$
(*) For the seismic design situation see also EN 1998					
(**) Variable actions are those considered in Table A1.1 (CYS)					

### NA 2.2.5 Clause A1.4.2(2) Serviceability criteria

Clause A1.4.2 of CYS EN 1990:2002, states that the serviceability criteria should be specified for each project and agreed with the client. In the absence of specific requirements in EN 1992 to EN 1999 or their National Annexes it is recommended that the following Combination of Action expression are used with particular serviceability requirements:

- For function and damage to structural and non-structural elements (e.g. partition walls etc) the characteristic combination (i.e. expression 6.14b of CYS EN 1990:2002)
- For comfort to user, use of machinery, avoiding ponding of water etc, the frequent combination (i.e. expression 6.15b of CYS EN 1990:2002)
- For appearance of the structure the quasi-permanent combination (i.e expression 6.15c of CYS EN 1990:2002)

Separate consideration should be given to serviceability related to appearance and that related to user comfort which may be affected by structural deformation or vibration.

Note: Clauses relating to Annex A2 Application for Bridges of CYS EN 1990:2002 Application for Bridges to be added in 2.3 when available. Nationally determined parameters for other Annex As (i.e cranes and machinery, silos and tanks, towers and masts etc) will be added when available in Clauses NA 2.4, 2.5 etc.

## NA 3 GUIDANCE ON USING INFORMATIVE ANNEXES B, C AND D

### NA 3.1 For buildings

#### NA 3.1.1 Annex B

Annex B may be used. If used it should be in accordance with the full reliability based approach described in Annex C of CYS EN 1990:2002.

Annex B provides informative guidance relating to a number of the assumptions (see Clause 1.3 of CYS EN 1990:2002), and in particular on quality management and control measures in

design, detailing and execution which aim to eliminate failures due to gross errors, and to achieve the resistance assumed in the design.

For this purpose the use of Clauses B4 and B5 of this Annex are recommended.

### **NA 3.1.2 Annex C**

Annex C may be used for calibration purposes, and for cases of actions not covered by EN 1991.

### **NA 3.1.3 Annex D**

Annex D may be used

Note: Guidance on using Annexes B, C and D for bridges, cranes and machinery, silos and tanks, towers and masts etc will be given when available.

## **NA 4 REFERENCES TO NON-CONTRADICTORY COMPLEMENTARY INFORMATION**

### **NA 4.1 For buildings**

None

Note: References to any non-contradictory complementary information for bridges, cranes and machinery, silos and tanks, towers and masts etc will be given when available.





**NA to CYS EN  
1990:2002**

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