

# UK National Annex for Eurocode 0 — Basis of structural design

ICS 91.010.30; 91.080.01

## Committees responsible for this National Annex

The preparation of this National Annex was entrusted by Committee B/525, Building and civil engineering structures, to B/525/1, Actions (loadings) and basis of design, upon which the following bodies were represented:

Association of Consulting Engineers  
British Constructional Steelwork Association  
British Masonry Society  
Building Research Establishment  
Concrete Society  
Health and Safety Executive  
Highways Agency  
Institution of Civil Engineers  
Institution of Structural Engineers  
National House Building Council  
Office of the Deputy Prime Minister  
Steel Construction Institute

This National Annex was published under the authority of the Standards Policy and Strategy Committee on 15 December 2004

© BSI 15 December 2004

First edition December 2004

### Summary of pages

This document comprises a front cover, an inside front cover, pages 1 to 6, an inside back cover and a back cover.

The BSI copyright notice displayed in this document indicates when the document was last issued.

### Amendments issued since publication

Amd. No.	Date	Comments

The following BSI references relate to the work on this National Annex:  
Committee reference B/525/1  
Draft for comment 03/700353 DC

## National Annex (informative) to BS EN 1990:2002: Eurocode basis of structural design

### Introduction

This National Annex has been prepared by BSI Subcommittee B/525/1, Actions (loadings) and basis of design and it is to be used in conjunction with BS EN 1990:2002: Eurocode Basis of structural design.

### NA.1 Scope

NA.1.1 This National Annex gives:

a) Nationally determined parameters for the following clauses of EN 1990 where national choice is allowed. The nationally determined parameters for the clauses below apply to buildings and civil engineering works. (See NA.2.1.)

— A2.1 (1)

b) Nationally determined parameters, applicable to buildings only for the following clauses of EN 1990 where national choice is allowed. (See NA.2.2.)

— A1.2.1 (1)

— A1.2.2 (Table A.1.1)

— A1.3.1 (1) Tables A1.2 (A) to (C)

— A1.3.1 (5)

— A1.3.2 (Table A.1.3)

— A1.4.2 (2)

NOTE Clauses applicable for bridges; cranes and machinery; 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 NA.3.)

d) References to non-contradictory complementary information applicable to buildings and civil engineering works. (See NA.4.)

### NA.2 Nationally determined parameters

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

##### NA.2.1.1 EN 1990 Clause A.1.1 Field of application

Table NA.2.1 provides modified values for the design working life given in Table 2.1 of EN 1990.

**Table NA.2.1 — Indicative design working Life**

Design working life category	Indicative design working life (years)	Examples
1	10	Temporary structures <sup>a</sup>
2	10 to 30	Replaceable structural parts, e.g. gantry girders, bearings
3	15 to 25	Agricultural and similar structures
4	50	Building structures and other common structures, not listed elsewhere in this table
5	120	Monumental building structures, highway and railway bridges, and other civil engineering structures

<sup>a</sup> Structures or parts of structures that can be dismantled with a view of being re-used should not be considered as temporary.

**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 A.1.2.1 (1) of EN 1990 no modifications are allowed through the National Annex for A1.2.1 (2) and (3).

**NA.2.2.2 Clause A.1.2.2**

Table NA.A1.1 provides values for the symbols of Table A1.1 of EN 1990.

**Table NA.A1.1 — 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 $\leq 30$ kN	0,7	0,7	0,6
Category G: traffic area, $30$ kN $<$ vehicle weight $\leq 160$ kN	0,7	0,5	0,3
Category H: roofs <sup>a</sup>	0,7	0	0
Snow loads on buildings (see EN 1991-3)			
— for sites located at altitude $H > 1\ 000$ m a.s.l.	0,70	0,50	0,20
— for sites located at altitude $H \leq 1\ 000$ m a.s.l.	0,50	0,20	0
Wind loads on buildings (see EN 1991-1-4)	0,5	0,2	0
Temperature (non-fire) in buildings (see EN 1991-1-5)	0,6	0,5	0

<sup>a</sup> See also EN 1991-1-1: Clause 3.3.2 (1)

**NA.2.2.3 Clause A.1.3**

**NA.2.2.3.1 Values for the symbols  $\gamma$  of Table A1.2 (A)**

Table NA.A1.2 (A) provides the values for the symbols  $\gamma$  of Table A1.2 (A). The values chosen are:

- $\gamma_{Gj,sup} = 1,10$
- $\gamma_{Gj,inf} = 0,90$
- $\gamma_{Q,1} = 1,50$  where unfavourable (0 where favourable)
- $\gamma_{Q,i} = 1,50$  where unfavourable (0 where favourable)

NOTE For  $\Psi$  values see Table A1.1 (BS).

**Table NA.A1.2 (A) — Design values of actions (EQU) (Set A)**

Persistent and transient design situations	Permanent actions		Leading variable action <sup>a</sup>	Accompanying variable actions	
	Unfavourable	Favourable		Main (if any)	Others
(Eq. 6.10)	1,10 $G_{kj,sup}$	0,90 $G_{kj,inf}$	1,5 $Q_{k,1}$ (0 when favourable)		1,5 $\Psi_{0,i} Q_{k,i}$ (0 when favourable)

<sup>a</sup> Variable actions are those considered in Table NA.A1.1.

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 NA.A1.2 (A) and A1.2 (B), a combined verification, based on Table NA.A1.2 (A), should be adopted, with the following set of values.

$\gamma_{Gj,sup} = 1,35$   
 $\gamma_{Gj,inf} = 1,15$   
 $\gamma_{Q,1} = 1,50$  where unfavourable (0 where favourable)  
 $\gamma_{Q,i} = 1,50$  where unfavourable (0 where favourable)  
 provided that applying  $\gamma_{Gj,inf} = 1,00$  both to the favourable part and to the unfavourable part of permanent actions does not give a more unfavourable effect.

**NA.2.2.3.2 Values for the symbols  $\gamma$  and  $\xi$  of Table A1.2 (B)**

Table NA.A1.2 (B) provides the values for the symbols  $\gamma$  and  $\xi$  of Table A1.2 (B). The values chosen are:

- $\gamma_{Gj,sup} = 1,35$
- $\gamma_{Gj,inf} = 1,00$
- $\gamma_{Q,1} = 1,50$  where unfavourable (0 where favourable)
- $\gamma_{Q,i} = 1,50$  where unfavourable (0 where favourable)
- $\xi = 0,925$

NOTE For  $\Psi$  values see Table NA.A1.1.

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

Persistent and transient design situations (Eq. 6.10)	Permanent actions		Leading variable action	Accompanying variable actions <sup>a</sup>		Persistent and transient design situations (Eq. 6.10a) (Eq. 6.10b)	Permanent actions		Leading variable action <sup>a</sup>	Accompanying variable actions <sup>a</sup>	
	Unfavourable	Favourable		Main (if any)	Others		Unfavourable	Favourable		Action	Main
	$1,35G_{kj,sup}$	$1,00G_{kj,inf}$	$1,5Q_{k,1}$				$1,35G_{kj,sup}$	$1,00G_{kj,inf}$		$1,5Q_{k,1}$	$1,5\psi_{0,1}Q_{k,i}$
							$0,925*1,35G_{kj,sup}$	$1,00G_{kj,inf}$	$1,5Q_{k,1}$		$1,5\psi_{0,1}Q_{k,i}$

NOTE 1 Either expression 6.10, or expression 6.10a together with and 6.10b may be made, as desired.

NOTE 2 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 3 For particular verifications, the values for  $\gamma_G$  and  $\gamma_Q$  may be subdivided into  $\gamma_g$  and  $\gamma_q$  and the model uncertainty factor  $\gamma_{ed}$ . A value of  $\gamma_{ed}$  in the range 1.05 to 1.15 can be used in most common cases and can be modified in the National Annex.

NOTE 4 When variable actions are favourable  $Q_k$  should be taken as 0.

<sup>a</sup> Variable actions are those considered in Table NA.A1.1.

**NA.2.2.3.3** Values for the symbols  $\gamma$  of Table A1.2 (C)

Table NA.A1.2 (C) provides the values for the symbols  $\gamma$  of Table A1.2 (C). The values chosen are:

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

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

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

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

NOTE For  $\Psi$  values see Table NA.A1.1.

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

Persistent and transient design situation	Permanent actions		Leading variable action <sup>a</sup>	Accompanying variable actions <sup>a</sup>	
	Unfavourable	Favourable		Main (if any)	Others
(Eq 6.10)	1,0 $G_{kj,sup}$	1,0 $G_{kj,inf}$	1,3 $Q_{k,1}$ (0 when favourable)		1,3 $\Psi_{0,i} Q_{k,i}$ (0 when favourable)

<sup>a</sup> Variable actions are those considered in Table NA.A1.1.

**NA.2.2.4** Clause A.1.3.1 (5)

Approach 1 should be used for the design of buildings in the UK.

**NA.2.2.5** Clause A.1.3.2

Table NA.A1.3 provides the values for the symbols of Table A1.3 of EN 1990. All  $\gamma$  factors are equal to 1,00. Coefficient  $\Psi_{11}$  is selected for the main accompanying variable action for the accidental design situation.

NOTE For  $\Psi$  values see Table NA.A1.1.

**Table NA.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 <sup>b</sup>	
	Unfavourable	Favourable		Main (if any)	Others
Accidental (Eq 6.11a/b)	$G_{kj,sup}$	$G_{kj,inf}$	$A_d$	$\Psi_{11} Q_{k,1}$	$\Psi_{2,i} Q_{k,i}$
Seismic <sup>a</sup> (Eq 6.12a/b)	$G_{kj,sup}$	$G_{kj,inf}$	$\gamma_1 A_{Ek}$ or $A_{Ed}$		$\Psi_{2,i} Q_{k,i}$

<sup>a</sup> The seismic design situation should be used only when specified by the client. See also Eurocode 8.  
<sup>b</sup> Variable actions are those considered in Table NA.A1.1.

**NA.2.2.6 Clause A1.4.2**

Clause A1.4.2 of EN 1990, 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 expressions 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 EN 1990).
- For comfort to user, use of machinery, avoiding ponding of water etc. the frequent combination (i.e. expression 6.15b of EN 1990).
- For appearance of the structure the quasi-permanent combination (i.e. expression 6.15c of EN 1990).

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 Nationally determined parameters for EN 1990 Eurocode — Basis of Design Annex A2 Application for Bridges and other Annexes (e.g. cranes and machinery, silos and tanks, towers and masts) will be added when available.

## **NA.3 Guidance on using the 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 EN 1990.

Annex B provides informative guidance relating to a number of the assumptions (see Clause 1.3 of EN 1990), 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 Reference to non-contradictory complementary information (NCCI)**

### **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.





---

---

## BSI — British Standards Institution

BSI is the independent national body responsible for preparing British Standards. It presents the UK view on standards in Europe and at the international level. It is incorporated by Royal Charter.

### Revisions

British Standards are updated by amendment or revision. Users of British Standards should make sure that they possess the latest amendments or editions.

It is the constant aim of BSI to improve the quality of our products and services. We would be grateful if anyone finding an inaccuracy or ambiguity while using this British Standard would inform the Secretary of the technical committee responsible, the identity of which can be found on the inside front cover. Tel: +44 (0)20 8996 9000. Fax: +44 (0)20 8996 7400.

BSI offers members an individual updating service called PLUS which ensures that subscribers automatically receive the latest editions of standards.

### Buying standards

Orders for all BSI, international and foreign standards publications should be addressed to Customer Services. Tel: +44 (0)20 8996 9001. Fax: +44 (0)20 8996 7001. Email: [orders@bsi-global.com](mailto:orders@bsi-global.com). Standards are also available from the BSI website at <http://www.bsi-global.com>.

In response to orders for international standards, it is BSI policy to supply the BSI implementation of those that have been published as British Standards, unless otherwise requested.

### Information on standards

BSI provides a wide range of information on national, European and international standards through its Library and its Technical Help to Exporters Service. Various BSI electronic information services are also available which give details on all its products and services. Contact the Information Centre. Tel: +44 (0)20 8996 7111. Fax: +44 (0)20 8996 7048. Email: [info@bsi-global.com](mailto:info@bsi-global.com).

Subscribing members of BSI are kept up to date with standards developments and receive substantial discounts on the purchase price of standards. For details of these and other benefits contact Membership Administration. Tel: +44 (0)20 8996 7002. Fax: +44 (0)20 8996 7001. Email: [membership@bsi-global.com](mailto:membership@bsi-global.com).

Information regarding online access to British Standards via British Standards Online can be found at <http://www.bsi-global.com/bsonline>.

Further information about BSI is available on the BSI website at <http://www.bsi-global.com>.

### Copyright

Copyright subsists in all BSI publications. BSI also holds the copyright, in the UK, of the publications of the international standardization bodies. Except as permitted under the Copyright, Designs and Patents Act 1988 no extract may be reproduced, stored in a retrieval system or transmitted in any form or by any means – electronic, photocopying, recording or otherwise – without prior written permission from BSI.

This does not preclude the free use, in the course of implementing the standard, of necessary details such as symbols, and size, type or grade designations. If these details are to be used for any other purpose than implementation then the prior written permission of BSI must be obtained.

Details and advice can be obtained from the Copyright & Licensing Manager. Tel: +44 (0)20 8996 7070. Fax: +44 (0)20 8996 7553. Email: [copyright@bsi-global.com](mailto:copyright@bsi-global.com).