

***NATIONAL ANNEX  
TO  
CYS EN 1993-2:2006  
(Including AC:2009)***

***Eurocode 3: Design  
of steel structures***

***Part 2: Steel bridges***



**NATIONAL ANNEX**

**TO**

**CYS EN 1993-2:2006+AC:2009**

**Eurocode 3: Design of steel structures**

**Part 2: Steel bridges**

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## INTRODUCTION

This National Annex has been prepared by the CYS TC18 National Standardisation Technical Committee of the Cyprus Organisation for Standardisation. (CYS).

## NA 1 SCOPE

This National Annex is to be used together with CYS EN 1993-2:2006+AC: 2009. Any reference in the rest of this text to CYS EN 1993-2:2006 means the above document.

This National Annex gives:

(a) Nationally determined parameters for the following clauses of CYS EN 1993-2:2006 where National choice is allowed (see Section NA 2)

- 2.1.3.2 (1)
- 2.1.3.3 (5)
- 2.1.3.4 (1) & (2)
- 2.3.1 (1)
- 3.2.3 (2) & (3)
- 3.2.4 (1)
- 3.4 (1)
- 3.5 (1)
- 3.6 (1) & (2)
- 4 (1) & (4)
- 5.2.1 (4)
- 5.4.1 (1)
- 6.1 (1)P
- 6.2.2.3 (1)
- 6.2.2.5 (1)
- 6.3.2.3 (1)
- 6.3.4.2 (1) & (7)
- 7.1 (5)
- 7.3 (1)
- 7.4 (1)
- 8.1.3.2.1 (1)
- 8.1.6.3 (1)
- 8.2.1.4 (1)
- 8.2.1.5 (1)
- 8.2.1.6 (1)
- 8.2.10 (1)
- 8.2.13 (1)
- 8.2.14 (1)
- 9.1.2 (1)
- 9.1.3 (1)
- 9.3 (1)P & (2)P
- 9.4.1 (6)
- 9.5.2 (2), (3), (5), (6) & (7)
- 9.5.3 (2) (2 places)
- 9.6 (1) (2 places)

- 9.7 (1)
- A.3.3 (1)P
- A.3.6 (2)
- A.4.2.1 (2), (3) & (4)
- A.4.2.4 (2)
- C.1.1 (2)
- C.1.2.2 (1) & (2)
- E.2 (1)

(b) Decisions on the use of the Informative Annexes A, B, C, D and E (see Section NA 3)

(c) References to non-contradictory complementary information to assist the user to apply CYS EN 1993-2:2006. In this National Annex such information is provided for the following clauses in CYS EN 1993-2:2006 (see Section NA 4)

## NA 2 NATIONALLY DETERMINED PARAMETERS

### NA 2.1 Clause 2.1.3.2 (1) Design working life

The recommended value of 100 years is adopted for the design working life of a permanent bridge.

### NA 2.2 Clause 2.1.3.3 (5) Durability

No additional recommendations are provided for durable details.

### NA 2.3 Clause 2.1.3.4 (1) Robustness and structural integrity

No recommendation is provided for components subject to accidental design situations.

### NA 2.4 Clause 2.1.3.4 (2) Robustness and structural integrity

No recommendation is provided for the choice of a design method.

### NA 2.5 Clause 2.3.1 (1)

No additional actions are specified beyond EN 1991.

### NA 2.6 Clause 3.2.3 (2)

No additional requirements are specified for the toughness of the base material.

### NA 2.7 Clause 3.2.3 (3)

Use Table 2.1 of EN 1993-1-10 for  $\sigma_{Ed} = 0,25f_y(t)$  as recommended. The maximum permissible values of elements thickness  $t$  are specified in Table 2.1 of CYS EN 1993-1-10, which is repeated below.

**Table 2.1: Maximum permissible values of element thickness  $t$  in mm**

Steel grade	Sub-grade	Charpy energy CVN		Reference temperature $T_{Ed}$ [°C]																							
		at T [°C]	$J_{min}$	$\sigma_{Ed} = 0,75 f_y(t)$								$\sigma_{Ed} = 0,50 f_y(t)$								$\sigma_{Ed} = 0,25 f_y(t)$							
				10	0	-10	-20	-30	-40	-50	10	0	-10	-20	-30	-40	-50	10	0	-10	-20	-30	-40	-50			
S235	JR	20	27	60	50	40	35	30	25	20	90	75	65	55	45	40	35	135	115	100	85	75	65	60			
	J0	0	27	90	75	60	50	40	35	30	125	105	90	75	65	55	45	175	155	135	115	100	85	75			
	J2	-20	27	125	105	90	75	60	50	40	170	145	125	105	90	75	65	200	200	175	155	135	115	100			
S275	JR	20	27	55	45	35	30	25	20	15	80	70	55	50	40	35	30	125	110	95	80	70	60	55			
	J0	0	27	75	65	55	45	35	30	25	115	95	80	70	55	50	40	165	145	125	110	95	80	70			
	J2	-20	27	110	95	75	65	55	45	35	155	130	115	95	80	70	55	200	190	165	145	125	110	95			

S355	M,N	-20	40	135	110	95	75	65	55	45	180	155	130	115	95	80	70	200	200	190	165	145	125	110
	ML,NL	-50	27	185	160	135	110	95	75	65	200	200	180	155	130	115	95	230	200	200	200	190	165	145
	JR	20	27	40	35	25	20	15	15	10	65	55	45	40	30	25	25	110	95	80	70	60	55	45
	J0	0	27	60	50	40	35	25	20	15	95	80	65	55	45	40	30	150	130	110	95	80	70	60
	J2	-20	27	90	75	60	50	40	35	25	135	110	95	80	65	55	45	200	175	150	130	110	95	80
S420	K2,M,N	-20	40	110	90	75	60	50	40	35	155	135	110	95	80	65	55	200	200	175	150	130	110	95
	ML,NL	-50	27	155	130	110	90	75	60	50	200	180	155	135	110	95	80	210	200	200	200	175	150	130
	M,N	-20	40	95	80	65	55	45	35	30	140	120	100	85	70	60	50	200	185	160	140	120	100	85
	ML,NL	-50	27	135	115	95	80	65	55	45	190	165	140	120	100	85	70	200	200	200	185	160	140	120
	Q	-20	30	70	60	50	40	30	25	20	110	95	75	65	55	45	35	175	155	130	115	95	80	70
S460	M,N	-20	40	90	70	60	50	40	30	25	130	110	95	75	65	55	45	200	175	155	130	115	95	80
	QL	-40	30	105	90	70	60	50	40	30	155	130	110	95	75	65	55	200	200	175	155	130	115	95
	ML,NL	-50	27	125	105	90	70	60	50	40	180	155	130	110	95	75	65	200	200	200	175	155	130	115
	QL1	-60	30	150	125	105	90	70	60	50	200	180	155	130	110	95	75	215	200	200	200	175	155	130
	Q	0	40	40	30	25	20	15	10	10	65	55	45	35	30	20	20	120	100	85	75	60	50	45
S690	Q	-20	30	50	40	30	25	20	15	10	80	65	55	45	35	30	20	140	120	100	85	75	60	50
	QL	-20	40	60	50	40	30	25	20	15	95	80	65	55	45	35	30	165	140	120	100	85	75	60
	QL	-40	30	75	60	50	40	30	25	20	115	95	80	65	55	45	35	190	165	140	120	100	85	75
	QL1	-40	40	90	75	60	50	40	30	25	135	115	95	80	65	55	45	200	190	165	140	120	100	85
	QL1	-60	30	110	90	75	60	50	40	30	160	135	115	95	80	65	55	200	200	190	165	140	120	100

**NOTE 1** Linear interpolation can be used in applying Table 2.1. Most applications require  $\sigma_{Ed}$  values between  $\sigma_{Ed} = 0,75 f_y(t)$  and  $\sigma_{Ed} = 0,50 f_y(t)$ .  $\sigma_{Ed} = 0,25 f_y(t)$  is given for interpolation purposes. Extrapolations beyond the extreme values are not valid.

**NOTE 2** For ordering products made of S 690 steels, the test temperature  $T_{AV}$  should be given.

**NOTE 3** Table 2.1 has been derived for the guaranteed Charpy energy values CVN in the direction of the rolling of the product.

### NA 2.8 Clause 3.2.4 (1)

The required quality classes according to EN10164 are specified in Table 3.2 (CYS).

**Table 2.2: Quality class conforming to EN 10164**

Target value $Z_{Ed}$	Quality class
$Z_{Ed} \leq 10$	–
$10 < Z_{Ed} \leq 20$	Z15
$20 < Z_{Ed} \leq 30$	Z25
$Z_{Ed} > 30$	Z35

### NA 2.9 Clause 3.4 (1)

No types of cables for specific bridge types are specified.

### NA 2.10 Clause 3.5 (1)

No further guidance is provided.

### NA 2.11 Clause 3.6 (1)

No further guidance is provided.

### NA 2.12 Clause 3.6 (2)

No further guidance is provided.

### NA 2.13 Clause 4 (1)

No further guidance is provided.

**NA 2.14 Clause 4 (4)**

No further guidance is provided.

**NA 2.15 Clause 5.2.1 (4)**

No further guidance is provided.

**NA 2.16 Clause 5.4.1 (1)**

No further guidance is provided.

**NA 2.17 Clause 6.1 (1)P**

The following recommended partial factors for  $\gamma_{Mi}$  are specified as:

$$\gamma_{M0} = 1,00$$

$$\gamma_{M1} = 1,10$$

$$\gamma_{M2} = 1,25$$

$$\gamma_{M3} = 1,25$$

$$\gamma_{M3,ser} = 1,10$$

$$\gamma_{M4} = 1,10$$

$$\gamma_{M5} = 1,10$$

$$\gamma_{M6,ser} = 1,00$$

$$\gamma_{M7} = 1,10$$

**NA 2.18 Clause 6.2.2.3 (1)**

No further guidance is provided.

**NA 2.19 Clause 6.2.2.5 (1)**

Both methods 1 and 2 may be used. No further guidance is provided for method 2.

**NA 2.20 Clause 6.3.2.3 (1)**

No further information is provided.

**NA 2.21 Clause 6.3.4.2 (1)**

The recommended values of  $\lambda_{c,0}$  is 0,2 and  $k_{\eta}$  is 1,0..

**NA 2.22 Clause 6.3.4.2 (7)**

No further guidance is provided.

**NA 2.23 Clause 7.1 (5)**

No further guidance is provided.

**NA 2.24 Clause 7.3 (1)**

The recommended value of  $\gamma_{Mser}$  is 1,0.

**NA 2.25 Clause 7.4 (1)**

No further guidance is provided.

**NA 2.26 Clause 8.1.3.2.1 (1)**

No further guidance is provided.

**NA 2.27 Clause 8.1.6.3 (1)**

No further guidance is provided.

**NA 2.28 Clause 8.2.1.4 (1)**

No further guidance is provided.

**NA 2.29 Clause 8.2.1.5 (1)**

No further guidance is provided.

**NA 2.30 Clause 8.2.1.6 (1)**

No further guidance is provided.

**NA 2.31 Clause 8.2.10 (1)**

No further guidance is provided.

**NA 2.32 Clause 8.2.13 (1)**

No further guidance is provided.

**NA 2.33 Clause 8.2.14 (1)**

No further guidance is provided.

**NA 2.34 Clause 9.1.2 (1)**

No further guidance is provided.

**NA 2.35 Clause 9.1.3 (1)**

No further guidance is provided.

**NA 2.36 Clause 9.3 (1)P**

The recommended value of  $\gamma_{Ff}$  is 1,0.

**NA 2.37 Clause 9.3 (2)P**

The recommended values of  $\gamma_{Mf}$  are specified in Table 3.1 of CYS EN 1993-1-9 and is repeated below.

**Table 2.3: Recommended values for partial factors for fatigue strength**

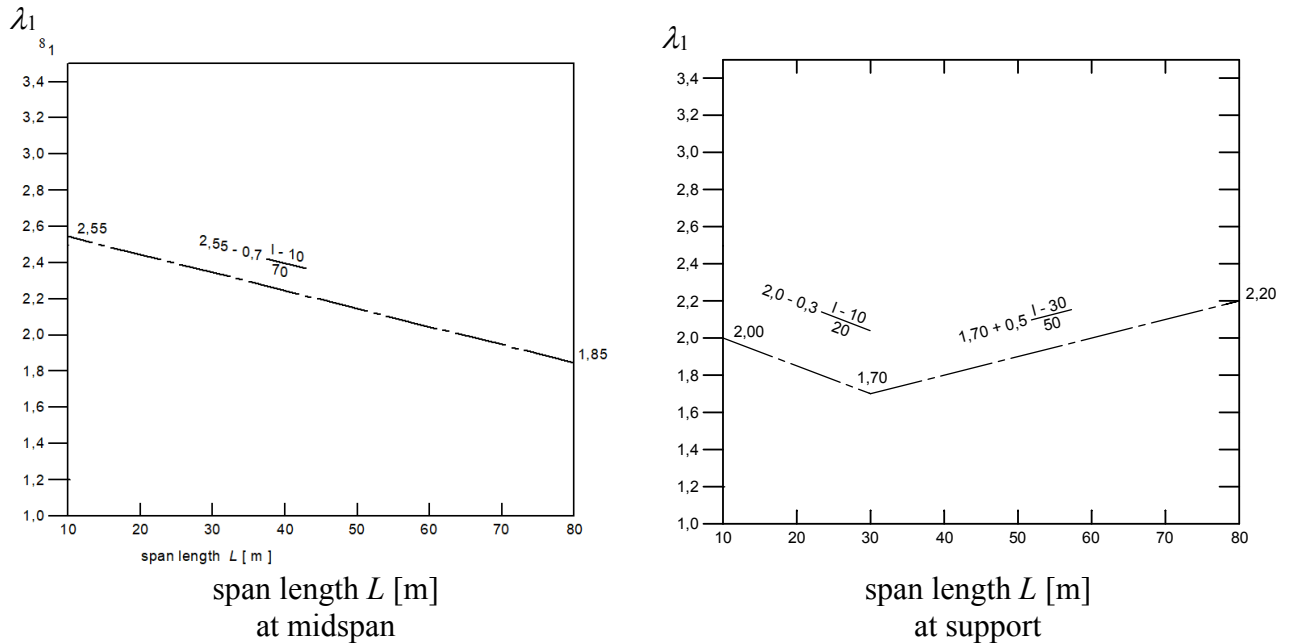
Assessment method	Consequence of failure	
	Low consequence	High consequence
Damage tolerant	1,00	1,15
Safe life	1,15	1,35

**NA 2.38 Clause 9.4.1 (6)**

No further guidance is provided.

**NA 2.39 Clause 9.5.2 (2)**

The recommended values of  $\lambda_1$  are specified in Figure 9.5 of CYS EN 1993-2 and is repeated below.



**Figure 2.1:  $\lambda_1$  for moments for road bridges**

**NA 2.40 Clause 9.5.2 (3)**

No further guidance is provided.

**NA 2.41 Clause 9.5.2 (5)**

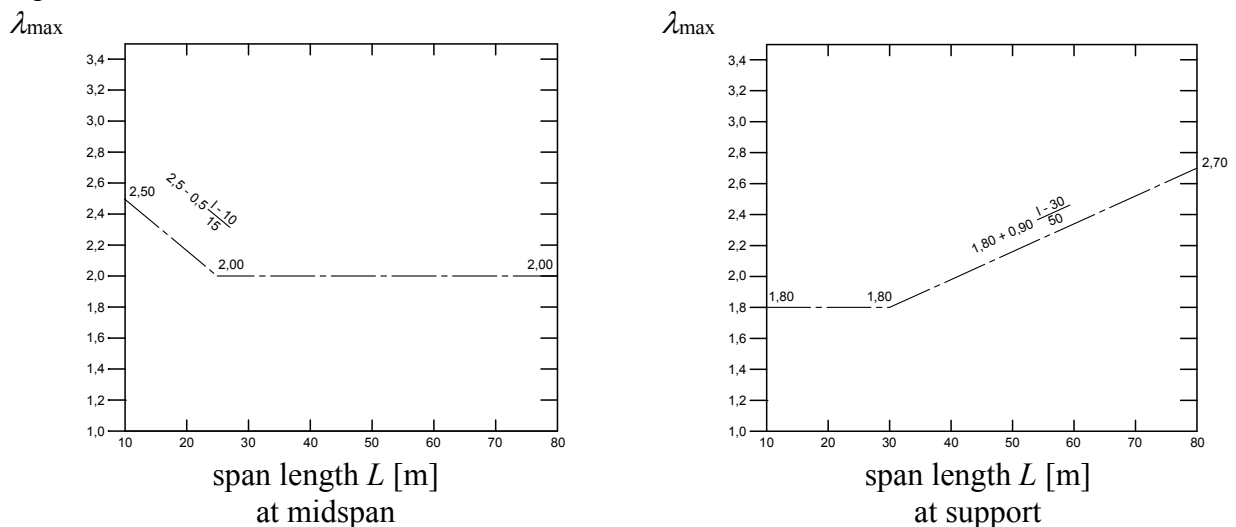
The recommended value of  $t_{Ld}$  is 100 years.

**NA 2.42 Clause 9.5.2 (6)**

No further guidance is provided.

**NA 2.43 Clause 9.5.2 (7)**

The recommended values of  $\lambda_{max}$  are specified in Figure 9.6 of CYS EN 1993-2 and is repeated below.





**NA 2.44 Figure 2.2:  $\lambda_{max}$  for moments for road bridges Clause 9.5.3 (2) (2 places)**

Note 1: No further guidance is provided.

Note 3: No further guidance is provided.

**NA 2.45 Clause 9.6 (1) (2 places)**

Note 1: No details from EN 1993-1-9 are excluded for the design of bridges.

Note 2: No further guidance is provided.

**NA 2.46 Clause 9.7 (1)**

No further guidance is provided.

**NA 2.47 Clause A.3.3 (1)P**

The recommended value of  $\gamma_{\mu}$  is 2,0 for steel on steel and  $\gamma_{\mu}$  is 1,2 for steel on concrete.

**NA 2.48 Clause A.3.6 (2)**

The recommended values of  $a$  are specified in Table A.2 of CYS EN 1993-2 and is repeated below.

**Table A.2: Factors  $\alpha$**

$n$	$\alpha$
$\leq 4$	1
$4 < n < 10$	
$\geq 10$	0,5

**NA 2.49 Clause A.4.2.1 (2)**

No further guidance is provided.

**NA 2.50 Clause A.4.2.1 (3)**

The recommended values of  $\Delta T_0$  are specified in Table A.4 of CYS EN 1993-2 and is repeated below.

**Table A.4: Numerical values for  $\Delta T_0$**

Case	Installation of bearings	$\Delta T_0$ [°C]
1	Installation with measured temperature and with correction by resetting	0
2	Installation with estimated temperature and without correction by resetting with bridge set at $T_0 \pm 10$ °C	15
3	Installation with estimated temperature and without correction by resetting and also one or more changes in the position of the fixed bearing	30

**NA 2.51 Clause A.4.2.1 (4)**

The values of  $\Delta T_0$  are specified in Table A.4 of CYS EN 1993-2 and is repeated above. The additional safety term is  $\Delta T_{\gamma} = \pm 5$  °C.

**NA 2.52 Clause A.4.2.4 (2)**

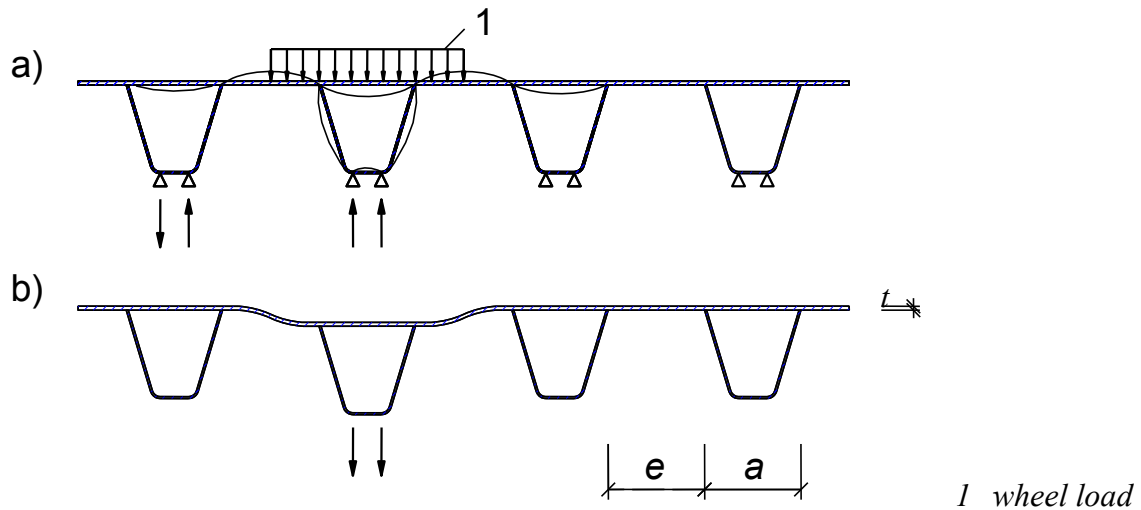
No further guidance is provided.

**NA 2.53 Clause C.1.1 (2)**

No further guidance is provided.

**NA 2.54 Clause C.1.2.2 (1)**

The recommended values for the plate dimensions appear in Note 1 and Figure C.2 of CYS EN 1993-2 and is repeated below.

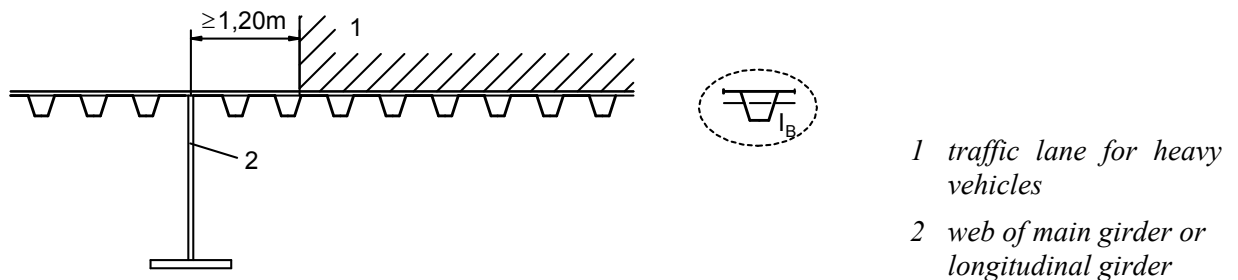


**Figure C.2: Effect of a) local wheel loads and b) differential deflections of stiffeners**

**NA 2.55 Clause C.1.2.2 (2)**

The recommended minimum stiffness values are specified in Figure C.4 of CYS EN 1993-2 and is repeated below.

Condition for curve A



- NOTE**
- a) Curve A applies to all stiffeners, that are not covered by b).
  - b) Curve B applies to stiffeners that are located under the most heavily loaded traffic lane within 1,20 m of a web of a main girder
  - c) The figure applies to all types of stiffeners

**Figure C.4: Minimum stiffness of longitudinal stiffeners**

### NA 2.56 Clause E.2 (1) Combination factor

The recommended values of the combination factor  $\psi$  are shown in Figure E.2 of CYS EN 1993-2 and is repeated below.

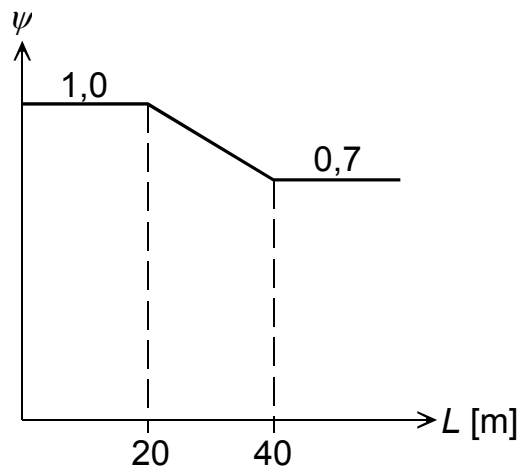


Figure E.2: Combination factor dependent on span length L

## NA 3 DECISION ON USE OF THE INFORMATIVE ANNEXES A, B, C, D and E

### NA 3.1 Annex A

Annex A may be used.

### NA 3.2 Annex B

Annex B may be used.

### NA 3.3 Annex C

Annex C may be used.

### NA 3.4 Annex D

Annex D may be used.

### NA 3.5 Annex E

Annex E may be used.

## NA 4 REFERENCES TO NON-CONTRADICTORY COMPLEMENTARY INFORMATION

None



**NA to  
CYS EN  
1993-2:2006  
(Including  
AC:2009)**

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