NATIONAL ANNEX TO CYS EN 1993-1-5: 2006 (Including A1:2017 and AC:2009)

Eurocode 3: Design of steel structures

Part 1-5: Plated structural elements

CYPRUS ORGANISATION FOR STANDARDISATION

NATIONAL ANNEX

TO

CYS EN 1993-1-5: 2006+A1:2017+AC:2009

Eurocode 3: Design of steel structures

Part 1-5: Plated structural elements

This National Annex has been approved by the Board of Directors of the Cyprus Organisation for Standardisation (CYS) on 14.06.2019.

INTRODUCTION

This National Annex has been prepared by the CYSTC 18 National Standardisation Technical Committee of the Cyprus Organization for Standardisation. (CYS).

NA 1 SCOPE

This National Annex is to be used together with CYS EN 1993-1-5: 2006 (Including A1:2017, Corrigendum AC:2009). Any reference in the rest of this text to CYS EN 1993-1-5:2006 means the above document.

This National Annex gives:

(a) Nationally determined parameters for the following clauses of CYS EN 1993-1-5: 2006 where National choice is allowed (see Section NA 2):

- 2.2(5)
- 3.3(1)
- 4.3(6)
- 5.1(2)
- 6.4(2)
- 8(2)
- 9.1(1)
- 9.2.1(9)
- 10(1)
- 10(5)
- C.2(1)
- C.5(2)
- C.8(1)
- C.9(3)
- D.2.2(2)

(b) Decision on the use of informative Annexes A, B, C, and D to CYS EN 1993-1-5: 2006 (see Section NA 3).

(c) References to non-contradictory complementary information to assist the user to apply CYS EN 1993-1-5: 2006 (see Section NA 4).

NA 2 NATIONALLY DETERMINED PARAMETERS

NA 2.1 Clause 2.2(5) Effective width models for global analysis

The recommended value of the parameter $\rho_{\text{lim}} = 0{,}5$ shall be used.

NA 2.2 Clause 3.3(1) Shear lag at the ultimate limit state

Shear lag effects at the ultimate limit state shall be determined using the recommended method of elastic-plastic shear lag effects allowing for limited plastic strains to be taken into account using A_{eff} as follows:

$$A_{eff} = A_{c,eff}\,\beta^{\kappa} \geq A_{c,eff}\,\beta$$

where β and κ are taken from Table 3.1 of CYS EN 1993-1-5: 2006.

The above expression shall also be applied for flanges in tension in which case $A_{c,eff}$ should be replaced by the gross area of the tension flange.

NA 2.3 Clause 4.3(6) Effective cross section

The recommended value of $\varphi_h = 2,0$ shall be used.

NA 2.4 Clause 5.1(2) Basis

The recommended value of $\eta = 1,20$ shall be used for steel grades up to and including S460. For higher steel grades $\eta = 1,00$ shall be used.

NA 2.5 Clause 6.4(2) Reduction factor χ_F for effective length resistance

For webs with longitudinal stiffeners the following rules shall apply:

For webs with longitudinal stiffeners k_F shall be taken as

$$k_F = 6 + 2\left[\frac{h_w}{a}\right]^2 + \left[5,44\frac{b_1}{a} - 0,21\right]\sqrt{\gamma_s} \qquad (6.6)$$

where b_1 is the depth the loaded subpanel taken as the clear distance between the loaded flange and the stiffener

$$\gamma_s = 10,9\frac{I_{s\ell,1}}{h_w t_w^3} \le 13\left[\frac{a}{h_w}\right]^3 + 210\left[0,3 - \frac{b_1}{a}\right] \qquad (6.7)$$

where $I_{s\ell,1}$ is the second moment of area of the stiffener closest to the loaded flange including contributing parts of the web according to Figure 9.1 of CYS EN 1993-1-5: 2006.

Equation (6.6) is valid for $0,05 \le \frac{b_1}{h_w} \le 0,3$ and $\frac{b_1}{a} \le 0,3$ and loading according to type a) in Figure 6.1 of CYS EN 1993-1-5: 2006.

NA 2.6 Clause 8(2) Flange induced buckling

No further information is given on flange induced buckling.

NA 2.7 Clause 9.1(1) General

No further requirements are given on stiffeners for specific applications.

NA 2.8 Clause 9.2.1(9) Minimum requirements for transverse stiffeners

The recommended value of the parameter $\theta = 6$ shall be used in equation (9.4) of CYS EN 1993-1-5: 2006.

NA 2.9 Clause 10(1) Reduced stress method

No stress limits of application for the methods are given.

NA 2.10 Clause 10(5) Reduced stress method

No further information is given on the use of equations (10.4), (10.5) and (10.5(a)) of CYS EN 1993-1-5: 2006. In case of panels with tension and compression, equations (10.4) and (10.5) shall apply only for the compressive parts.

NA 2.11 Clause C.2(1) Use

Conditions for the use of FEM analysis in design are not defined.

NA 2.12 Clause C.5(2) Use of imperfections

Geometric imperfections may be based on the shape of the critical plate buckling modes using 80 % of the geometric fabrication tolerances.

NA 2.13 Clause C.8(1) Limit state criteria

The recommended limiting principal strain value of 5 % shall be used

NA 2.14 Clause C.9(3) Partial factors

Partial safety factor values of γ_{M1} and γ_{M2} used shall be as specified in relevant parts of CYS EN 1993.

NA 2.15 Clause D.2.2(2) Shear resistance

For sinusoidally corrugated webs the recommended equation shall be used for the calculation of $\tau_{cr,\ell}$:

$$\tau_{cr,l} = \left(5{,}34 + \frac{a_3\ s}{h_w t_w}\right)\frac{\pi^2 E}{12(1-\nu^2)}\left(\frac{t_w}{s}\right)^2$$

where w length of one half wave, see Figure D.1 of CYS EN 1993-1-5: 2006

s unfolded length of one half wave, see Figure D.1 of CYS EN 1993-1-5: 2006.

NA 3 DECISION ON THE USE OF INFORMATIVE ANNEXES A, B, C, AND D

NA 3.1 Annex A

Informative Annex A may be used.

NA 3.2 Annex B

Informative Annex B may be used.

NA 3.3 Annex C

Informative Annex C may be used.

NA 3.4 Annex D

Informative Annex D may be used.

NA 4 REFERENCES TO NON-CONTRADICTORY COMPLEMENTARY INFORMATION

None

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NA to CYS EN 1993-1-5:2006 (Including A1:2017 and AC:2009)

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