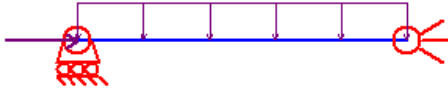


| | | |
|---------------------------|---------------------------------------|------------------------------|
| TEST SCHEDULE B 30 | EN 1993-1-1: 2005 (EUROCODE 3) | Sargon ©, Cescoplus © |
| BUCKLING | COMPRESSION + BENDING 2 | EC3.BUC.NN3.003 |



Program: WEURO © version October 2007 for Sargon and Cescoplus
Keywords: EN 1993, Eurocode 3, example, validation, benchmark, reliability, quality control, error measure. **Parole chiave:** Eurocodice 3, esempio, validazione, test ,affidabilità, controllo di qualità, misura dell'errore
Tv=exploitation target value, **Cv**=exploitation computed value
Authors: Ing. Marco Croci, Ing. Paolo Rugarli

| BEAM | | | |
|-------------|---|----------|-----------|
| Length [mm] | Buckling factors | Left end | Right end |
| 4000 | $\beta_1=0 \quad \beta_2=1 \quad \beta_3=1$ | FREE | FIXED |

| LOAD | | |
|------------------------|--------------|----------------------|
| Type | Value | Point of application |
| COMPRESSION | N=1.000.000N | LEFT END |
| Type | Value | |
| DISTRIBUTED LOAD q_3 | q=300N/mm | |

| MATERIAL | | S235 | | | | |
|----------------------------|----------------------------|------------------------|-------|---------------|---------------|---------------|
| f_y [N/mm ²] | f_u [N/mm ²] | E [N/mm ²] | ν | γ_{M0} | γ_{M1} | γ_{M2} |
| 235 | 360 | 2,10E+05 | 0,3 | 1,1 | 1,1 | 1,25 |

| CROSS-SECTION | HE 300 M | CLASS: N → 1 M ₂ → 1 N + M ₂ → 1 (reclasses method****) | | | |
|-------------------------------------|-------------------------------------|---|-----------------------------------|-----------------------------------|-----------------------------------|
| A [mm ²] | J ₂ [mm ⁴] | J ₃ [mm ⁴] | J _t [mm ⁴] | W ₂ [mm ³] | W ₃ [mm ³] |
| 30308 | 5,920E+08 | 1,940E+08 | 1,408E+07 | 3,482E+06 | 1,252E+06 |
| W _{pl2} [mm ³] | W _{pl3} [mm ³] | i ₂ [mm] | i ₃ [mm] | i _t [mm] | |
| 4,078E+06 | 1,913E+06 | 139,8 | 80 | 89,49 | |
| h | b | t _w | t _f | r | |
| 340 | 310 | 21 | 39 | 27 | |

| OTHER DATA* | | | | |
|-------------|-----------------|-----------------|-----------------|-----------------|
| | k _{yy} | k _{yz} | k _{zy} | k _{zz} |
| Method 1 | 0,990 | / | 0,531 | / |
| Method 2 | 0,966 | / | 0,580 | / |

TARGET VALUES BASED ON PRELIMINAR COMPUTATIONS

$$\left. \begin{aligned}
 Tv_{1,j} &= N / (\chi_2 A f_y / \gamma_{M1}) + k_{yy} M_2 / (\chi_{LT} W_{pl2} f_y / \gamma_{M1}) \\
 Tv_{2,j} &= N / (\chi_3 A f_y / \gamma_{M1}) + k_{zy} M_2 / (W_{pl2} f_y / \gamma_{M1})
 \end{aligned} \right\} Tv_{\text{method } j} = \max(Tv_{1,j}, Tv_{2,j})$$

| Tv _{method1} ** | Tv _{method2} *** |
|--------------------------|---------------------------|
| 8,423E-01 | 8,257E-01 |

CHECKER'S RESULTS (COMPUTED VALUES) AND COMPARISON WITH THE TARGET

| Cv _{method1} | (Cv ₁ -Tv ₁)/Tv ₁ | Cv _{method2} | (Cv ₂ -Tv ₂)/Tv ₂ |
|-----------------------|---|-----------------------|---|
| 8,425E-01 | 2,913E-04 | 8,258E-01 | 8,372E-05 |

(*) formulae given in EN 1993-1-1 6.3.3, annex A and annex B

(**) more accurated

(***) easier to use

(****) P. Rugarli, *Strutture in acciaio, La classificazione delle sezioni, Commento all'Eurocodice 3*, EPC Libri, 2007

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