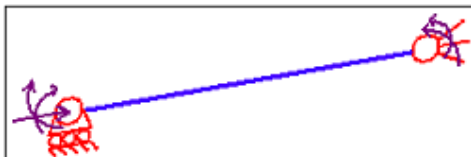


TEST SCHEDULE B 37	EN 1993-1-1: 2005 (EUROCODE 3)	Sargon ©, Cescoplus ©
BUCKLING	COMPRESSION + BENDING 2 + BENDING 3	EC3.BUC.NNM2M3.003



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
4500	$\beta_1=0 \quad \beta_2=1 \quad \beta_3=1$	SIMPLY SUPPORTED	HINGE

LOAD		
Type	Value	Point of application
COMPRESSION	N=1.500.000N	LEFT END
Type	Value	Point of application
BENDING MOMENT M_2	M=150.000.000Nmm	LEFT END
BENDING MOMENT M_2	M=-150.000.000Nmm	RIGHT END
Type	Value	Point of application
BENDING MOMENT M_3	M=60.000.000Nmm	LEFT END
BENDING MOMENT M_3	M=-60.000.000Nmm	RIGHT END

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 M₂→1 M₃→1 N[°] + M₂ + M₃→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	1,003	0,648	0,544	0,976
Method 2	1,035	0,706	0,621	1,176

TARGET VALUES BASED ON PRELIMINAR COMPUTATIONS

$$\left. \begin{aligned}
 T_{v1,j} &= N / (\chi_2 A f_y / \gamma_{M1}) + k_{yy} M_2 / (W_{pl2} f_y / \gamma_{M1}) + k_{yz} M_3 / (W_{pl3} f_y / \gamma_{M1}) \\
 T_{v2,j} &= N / (\chi_3 A f_y / \gamma_{M1}) + k_{zy} M_2 / (W_{pl2} f_y / \gamma_{M1}) + k_{zz} M_3 / (W_{pl3} f_y / \gamma_{M1})
 \end{aligned} \right\} T_{v \text{ method } j} = \max(T_{v1,j}, T_{v2,j})$$

$T_{v \text{ method } 1}^{**}$	$T_{v \text{ method } 2}^{***}$
5,317E-01	5,743E-01

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

$C_{v \text{ method } 1}$	$(C_{v1} - T_{v1}) / T_{v1}$	$C_{v \text{ method } 2}$	$(C_{v2} - T_{v2}) / T_{v2}$
5,317E-01	-4,061E-05	5,743E-01	-5,128E-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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<http://www.castaliaweb.com>
staff@castaliaweb.com