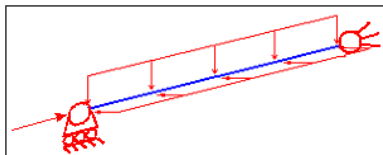


TEST SCHEDULE B 45	EN 1993-1-1: 2005 (EUROCODE 3)	Sargon ©, Cescoplus ©
BUCKLING	COMPRESSION + BENDING 2 + BENDING 3	EC3.BUC.NNQ2Q3.004



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=300.000N	LEFT END	
Type	Value		
DISTRIBUTED LOAD q_2	$q=15\text{N/mm}$		
Type	Value		
DISTRIBUTED LOAD q_3	$q=25\text{N/mm}$		

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 240 A	CLASS: $N \rightarrow 1 \quad M_2 \rightarrow 1 \quad M_3 \rightarrow 1 \quad N + M_2 + M_3 \rightarrow 1$ (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]
7684	7,763E+07	2,769E+07	4,155E+05	6,751E+05	2,307E+05
W_{pl2} [mm ³]	W_{pl3} [mm ³]	i_2 [mm]	i_3 [mm]	i_t [mm]	
7,446E+05	3,517E+05	100,5	60	69,28	
h	b	t_w	t_f	r	
230	240	7,5	12	21	

OTHER DATA*				
	k_{yy}	k_{yz}	k_{zy}	k_{zz}
Method 1	1,038	0,728	0,551	1,036
Method 2	1,004	0,727	0,602	1,211

TARGET VALUES BASED ON PRELIMINAR COMPUTATIONS

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

$T_{v \text{ method } 1}^{**}$	$T_{v \text{ method } 2}^{***}$
1,018E+00	1,127E+00

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

$C_{v \text{ method } 1}$	$(C_{v1} - T_{v1}) / T_{v1}$	$C_{v \text{ method } 2}$	$(C_{v2} - T_{v2}) / T_{v2}$
1,019E+00	8,730E-04	1,127E+00	-2,169E-04

(*) 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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