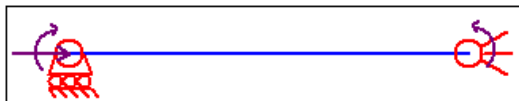


TEST SCHEDULE B 24	EN 1993-1-1: 2005 (EUROCODE 3)	Sargon ©, Cescoplus ©
BUCKLING	COMPRESSION + BENDING 2	EC3.BUC.NNM2.004



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
3500	$\beta_1=0 \quad \beta_2=1 \quad \beta_3=1$	SIMPLY SUPPORTED	HINGE

LOAD			
Type	Value	Point of application	
COMPRESSION	N=200.000N	LEFT END	
Type	Value	Point of application	
BENDING MOMENT M_2	M=40.000.000Nmm	LEFT END	
BENDING MOMENT M_2	M=-40.000.000Nmm	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	IPE 360	CLASS: $N \rightarrow 2 \quad M_2 \rightarrow 1 \quad N + M_2 \rightarrow 2$ (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]
7273	1,627E+08	1,043E+07	3,732E+05	9,037E+05	1,228E+05
W_{pl2} [mm ³]	W_{pl3}	i_2 [mm]	i_3 [mm]	i_t [mm]	
1,019E+06	1,911E+05	149,5	37,9	49,07	
h	b	t_w	t_f	r	
360	170	8	12,7	18	

OTHER DATA*				
	k_{yy}	k_{yz}	k_{zy}	k_{zz}
Method 1	1,022	/	0,549	/
Method 2	1,006	/	0,604	/

TARGET VALUES BASED ON PRELIMINAR COMPUTATIONS

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

$Tv_{method1}^{**}$	$Tv_{method2}^{***}$
3,179E-01	3,228E-01

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

$Cv_{method1}$	$(Cv_1 - Tv_1) / Tv_1$	$Cv_{method2}$	$(Cv_2 - Tv_2) / Tv_2$
3,179E-01	-1,055E-04	3,228E-01	3,023E-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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