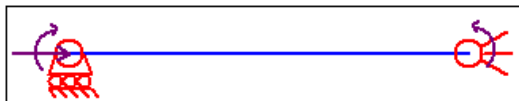


TEST SCHEDULE B 21	EN 1993-1-1: 2005 (EUROCODE 3)	Sargon ©, Cescoplus ©
BUCKLING	COMPRESSION + BENDING 2	EC3.BUC.NNM2.001



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
1000	$\beta_1=0 \quad \beta_2=1 \quad \beta_3=1$	SIMPLY SUPPORTED	HINGE

LOAD			
Type	Value	Point of application	
COMPRESSION	N=100.000N	LEFT END	
Type	Value	Point of application	
BENDING MOMENT M_2	M=2.000.000Nmm	LEFT END	
BENDING MOMENT M_2	M=-2.000.000Nmm	RIGHT END	

MATERIAL	S275					
f_y [N/mm ²]	f_u [N/mm ²]	E [N/mm ²]	ν	γ_{M0}	γ_{M1}	γ_{M2}
275	430	2,10E+05	0,3	1,1	1,1	1,25

CROSS SECTION	IPE 100	CLASS: $N \rightarrow 1 \quad M_2 \rightarrow 1 \quad N + M_2 \rightarrow 1$ (reclasses method****)			
A [mm ²]	J_2 [mm ⁴]	J_3 [mm ⁴]	J_1 [mm ⁴]	W_2 [mm ³]	W_3 [mm ³]
1032	1,710e+06	1,592e+05	1,202E+04	3,420e+04	5,789e+03
W_{pl2} [mm ³]	W_{pl3}	i_2 [mm]	i_3 [mm]	i_1 [mm]	
3,941e+04	9,145e+03	40,7	12,42	15,88	
h	b	t_w	t_f	r	
100	55	4,1	5,7	7	

OTHER DATA*				
	k_{yy}	k_{yz}	k_{zy}	k_{zz}
Method 1	1,068	/	0,618	/
Method 2	1,033	/	0,620	/

TARGET VALUES BASED ON PRELIMINAR COMPUTATIONS

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

$Tv_{method1}^{**}$	$Tv_{method2}^{***}$
7,279E-01	7,282E-01

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

$Cv_{method1}$	$(Cv_1 - Tv_1) / Tv_1$	$Cv_{method2}$	$(Cv_2 - Tv_2) / Tv_2$
7,277E-01	-2,133E-04	7,280E-01	-2,818E-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