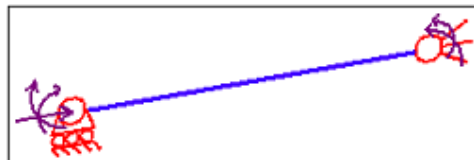


TEST SCHEDULE B 40	EN 1993-1-1: 2005 (EUROCODE 3)	Sargon ©, Cescoplus ©
BUCKLING	COMPRESSION + BENDING 2 + BENDING 3	EC3.BUC.NNM2M3.006



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=3.000.000Nmm	LEFT END	
BENDING MOMENT M_2	M=-3.000.000Nmm	RIGHT END	
Type	Value	Point of application	
BENDING MOMENT M_3	M=1.000.000Nmm	LEFT END	
BENDING MOMENT M_3	M=-1.000.000Nmm	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	2 UPNH 140 10	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]
4073	1,209E+07	3,323E+06	1,051E+05	1,728e+05	5,112e+04
W _{pl2} [mm ³]	W _{pl3} [mm ³]	i ₂ [mm]	i ₃ [mm]	i _t [mm]	d
1,728e+05	9,188E+04	54,49	28,56	17,32	10
h	b	t _w	t _f	r	r1
140	60	7	10	10	5

OTHER DATA*					
	k_{yy}	k_{yz}	k_{zy}	k_{zz}	
Method 1	1,005	0,691	0,492	0,952	
Method 2	1,001	0,614	0,601	1,023	

TARGET VALUES BASED ON PRELIMINAR COMPUTATIONS

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

$T_{v \text{ method } 1}^{**}$	$T_{v \text{ method } 2}^{***}$
1,986E-01	1,959E-01

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

$C_{v \text{ method } 1}$	$(C_{v1} - T_{v1}) / T_{v1}$	$C_{v \text{ method } 2}$	$(C_{v2} - T_{v2}) / T_{v2}$
1,987E-01	3,113E-04	1,959E-01	4,060E-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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