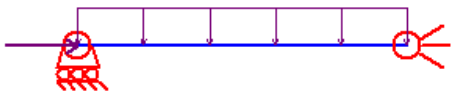


TEST SCHEDULE B 29	EN 1993-1-1: 2005 (EUROCODE 3)	Sargon ©, Cescopius ©
BUCKLING	COMPRESSION + BENDING 2	EC3.BUC.NNQ3.002



Program: WEURO © version October 2007 for Sargon and Cescopius
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	
4000	$\beta_1=0$	$\beta_2=1$	$\beta_3=1$	FREE		FIXED
LOAD						
Type		Value		Point of application		
COMPRESSION		N=700.000N		LEFT END		
Type		Value				
DISTRIBUTED LOAD q_3		q=30N/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 ⁻ →1 M ₂ →1 N ⁻ + M ₂ → 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	1,060	/	0,578	/		
Method 2	1,049	/	0,629	/		

TARGET VALUES BASED ON PRELIMINAR COMPUTATIONS

$$Tv_{1,j} = N / (\chi_z A f_y / \gamma_{M1}) + k_{yy} M_2 / (\chi_{LT} W_{pl2} f_y / \gamma_{M1})$$

$$Tv_{2,j} = N / (\chi_3 A f_y / \gamma_{M1}) + k_{zy} M_2 / (W_{pl2} f_y / \gamma_{M1})$$

$$Tv_{method\ j} = \max(Tv_{1,j}, Tv_{2,j})$$

Tv _{method1} **	Tv _{method2} ***
8,649E-01	8,609E-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
8,653E-01	4,293E-04	8,609E-01	3,984E-06

(*) 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