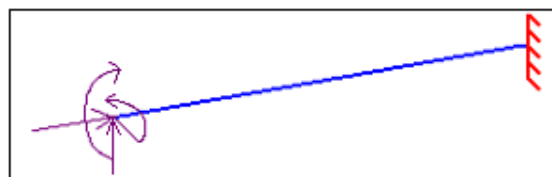


TEST SCHEDULE R 46	EN 1993-1-1: 2005 (EUROCODE 3)	Sargon ©, Cescoplus ©
RESISTANCE	COMPRESSION+BENDING2+BENDING3+SHEAR3	EC3.RES.NNM2M3T3.003



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]	Left end	Right end
1 (*)	FREE	FIXED

LOADS			
Type	Value	Point of application	
BENDING MOMENT M_2	$M=2.000.000\text{Nmm}$	LEFT END	
Type	Value	Point of application	
BENDING MOMENT M_3	$M=1.000.000\text{Nmm}$	LEFT END	
Type	Value	Point of application	
COMPRESSION	$N=270.000\text{N}$	LEFT END	
Type	Value	Point of application	
SHEAR T_3	$T=90.000\text{N}$	LEFT END	

MATERIAL	A242/50					
f_y [N/mm ²]	f_u [N/mm ²]	E [N/mm ²]	ν	γ_{M0}	γ_{M1}	γ_{M2}
345	483	2,000e+05	0,3	1,1	1,1	1,25

CROSS-SECTION	UPN 120	CLASS: N⁻ →1	$M_2 \rightarrow 1$	$M_3 \rightarrow 1$	$N + M_2 + M_3 \rightarrow 1$ (reclasses metod*)	
A [mm ²]	J_2 [mm ⁴]	J_3 [mm ⁴]	J_t [mm ⁴]	W_2 [mm ³]	W_3 [mm ³]	
1698	3,642e+06	4,320e+05	4,15e+04	6,071e+04	1,106e+04	
W_{pl2} [mm ³]	W_{pl3} [mm ³]	i_2 [mm]	i_3 [mm]	i_t [mm]		
7,268e+04	2,127e+04	46,31	15,93	15,88		
h	b	t_w	t_f	r		r_1
120	55	7	9	9		4,5

OTHER DATA					
$N_{pl,Rd}=A f_y / \gamma_{M0}$ [N]	$M_{pl2}=W_{pl2} * f_y / \gamma_{M0}$ [Nmm]	$M_{pl3}=W_{pl3} * f_y / \gamma_{M0}$ [Nmm]	$A_v=A-2bt_f+(t_w+r)t_f$ [mm ²]	$V_{pl3}=A_v * f_y / \sqrt{3} / \gamma_{M0}$ [N]	
532.555	22.795.091	6.671.045	852	154.278	
$S_3 > 0,5 V_{pl3}$?	$\rho_3=(2T_3/V_{pl3}-1)^2$	a_{v3}	$N_{pl,V}=N_{pl}(1-a_{v3}\rho_3)$ [N]	$w_{2,3}$	
YES	0,0278	0,502	525.127	0,347	
$w_{3,3}$	$M_{V2}=M_{pl2} * (1-\rho_3 w_{2,3})$	$M_{V3}=M_{pl3} * (1-\rho_3 w_{3,3})$			
1	22.575.401	6.485.617			

TARGET VALUES BASED ON PRELIMINAR COMPUTATIONS

$$T_v = N/N_{pl,V} + M_2/M_{V2} + M_3/M_{V3}$$

T_v
7,569E-01

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

C_v	$(C_v - T_v)/T_v$
7,568E-01	-1,859E-04

(*) length is only 1mm in order to diminish the increase of moment along the beam

(*) P. Rugarli, *Strutture in acciaio, La classificazione delle sezioni, Commento all'Eurocodice 3*, EPC Libri, 2007

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