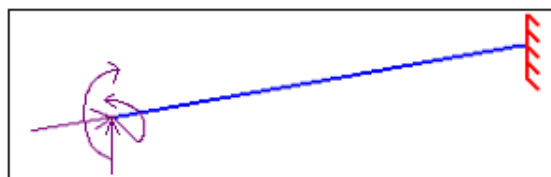


TEST SCHEDULE R 45	EN 1993-1-1: 2005 (EUROCODE 3)	Sargon ©, Cescoplus ©
RESISTANCE	COMPRESSION+BENDING2+BENDING3+SHEAR3	EC3.RES.NNM2M3T3.002



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	$M=300.000\text{Nmm}$	LEFT END	
Type	Value	Point of application	
BENDING MOMENT M_3	$M=250.000\text{Nmm}$	LEFT END	
Type	Value	Point of application	
COMPRESSION	$N=50.000\text{N}$	LEFT END	
Type	Value	Point of application	
SHEAR T_3	$T=16.000\text{N}$	LEFT END	

MATERIAL	S690					
f_y [N/mm ²]	f_u [N/mm ²]	E [N/mm ²]	ν	γ_{M0}	γ_{M1}	γ_{M2}
690	780	2,10E+05	0,3	1,1	1,1	1,25

CROSS SECTION	Tsh 20	CLASS: N⁻ →1 M₂ →1 M₃ →1 N⁻ + M₂ + M₃ →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]
144	5,028e+03	2,752e+03	7,680e+02	3,709e+02	2,752e+02
W_{pl2} [mm ³]	W_{pl3} [mm ³]	i_2 [mm]	i_3 [mm]	i_t [mm]	
6,688e+02	4,640e+02	5,909	4,372	5,774	
h	b	t_w	t_f		
20	20	4	4		

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]	$A_v = (H - t_f) t_w$ [mm ²]	$V_{pl3} = A_v * f_y / \sqrt{3} / \gamma_{M0}$ [N]
90.327	419.520	29.1055	64	23.178
$S_3 > 0,5 V_{pl3} ?$	$\rho_3 = (2T_3 / V_{pl3} - 1)^2$	a_{v3}	$N_{pl,v} = N_{pl} (1 - a_{v3} \rho_3)$ [N]	$w_{2,3}$
YES	0,1449	0,444	84.511	1
$w_{3,3}$	$M_{V2} = M_{pl2} * (1 - \rho_3 w_{2,3})$	$M_{V3} = M_{pl3} * (1 - \rho_3 w_{3,3})$	$M_{2MAX} =$ [Nmm]	
0,172	358.743	283.785	316.000	

TARGET VALUES BASED ON PRELIMINAR COMPUTATIONS

$$TV = N / N_{pl,v} + M_{2MAX} / M_{V2} + M_3 / M_{V3}$$

T_v
2,353E+00

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

C_v	$(C_v - T_v) / T_v$
2,353E+00	-1,865E-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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