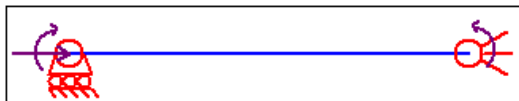


<b>TEST SCHEDULE B 27</b>	<b>EN 1993-1-1: 2005 (EUROCODE 3)</b>	<b>Sargon ©, Cescopius ©</b>
BUCKLING	COMPRESSION + BENDING 3	<b>EC3.BUC.NNM3.002</b>



**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
1000	$\beta_2=1$ $\beta_3=1$	SIMPLY SUPPORTED	HINGE

LOAD			
Type	Value	Point of application	
COMPRESSION	N=10.000N	LEFT 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 <sup>2</sup> ]	$f_u$ [N/mm <sup>2</sup> ]	E [N/mm <sup>2</sup> ]	$\nu$	$\gamma_{M0}$	$\gamma_{M1}$	$\gamma_{M2}$
275	430	2,10E+05	0,3	1,1	1,1	1,25

CROSS SECTION	O 54x3,2	CLASS: N → 1 M <sub>3</sub> → 1 N + M <sub>3</sub> → 1 (reclasses method****)			
A [mm <sup>2</sup> ]	J <sub>2</sub> [mm <sup>4</sup> ]	J <sub>3</sub> [mm <sup>4</sup> ]	J <sub>t</sub> [mm <sup>4</sup> ]	W <sub>2</sub> [mm <sup>3</sup> ]	W <sub>3</sub> [mm <sup>3</sup> ]
510,7	1,654e+05	1,654e+05	3,308e+05	6,126e+03	6,126e+03
W <sub>pl2</sub> [mm <sup>3</sup> ]	W <sub>pl3</sub> [mm <sup>3</sup> ]	i <sub>2</sub> [mm]	i <sub>3</sub> [mm]	i <sub>t</sub> [mm]	
8,269E+03	8,269E+03	18	18	0	

OTHER DATA*				
	$k_{yy}$	$k_{yz}$	$k_{zy}$	$k_{zz}$
Method 1	/	0,608	/	1,013
Method 2	/	0,624	/	1,039

#### TARGET VALUES BASED ON PRELIMINAR COMPUTATIONS

$$\left. \begin{aligned}
 T_{V1,j} &= N / (\chi_2 A f_y / \gamma_{M1}) + k_{yz} M_3 / (W_{pl3} f_y / \gamma_{M1}) \\
 T_{V2,j} &= N / (\chi_3 A f_y / \gamma_{M1}) + k_{zz} M_3 / (W_{pl3} f_y / \gamma_{M1})
 \end{aligned} \right\} T_{V_{method\ j}} = \max(T_{V1,j}, T_{V2,j})$$

T <sub>Vmethod1</sub> **	T <sub>Vmethod2</sub> ***
5,796E-01	5,924E-01

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

C <sub>Vmethod1</sub>	(C <sub>V1</sub> -T <sub>V1</sub> )/T <sub>V1</sub>	C <sub>Vmethod2</sub>	(C <sub>V2</sub> -T <sub>V2</sub> )/T <sub>V2</sub>
5,796E-01	<b>3,997E-05</b>	5,924E-01	<b>-1,940E-05</b>

(\*) 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