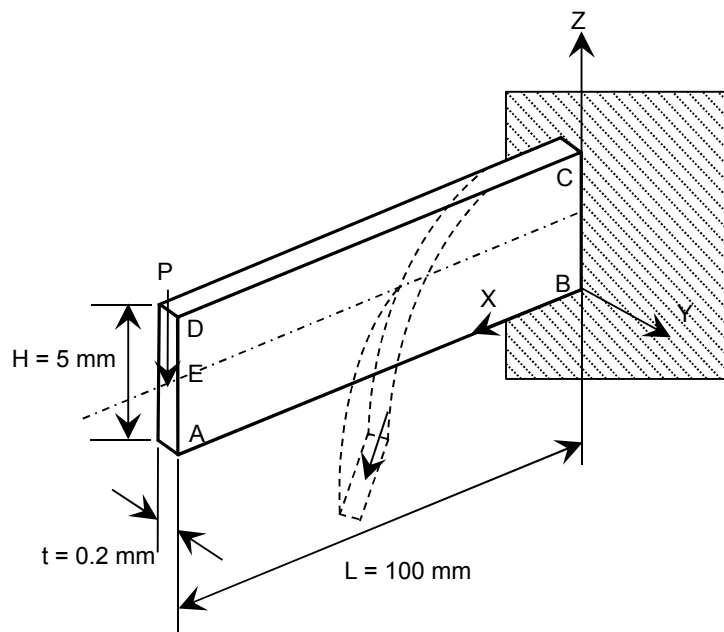


Torsional buckling of cantilever

REFERENCE Background to Finite Element Analysis of Geometric Non-linearity Benchmarks, Ref . R0065, NAFEMS, Glasgow, 1999

MODEL FILENAME Torsional buckling cantilever.nfx

Figure 1 shows a cantilever structure subjected to a point load P in the negative Z -direction at the neutral axis of the beam at the point E. A conservative load with no initial imperfection makes a linear buckling problem whereas a non-conservative load that follows the deformation with an initial imperfection produces instability. The cantilever structure is discretized using shell elements. The geometric imperfection is given in Table 1.



Test a : $P = 0.017$ N (conservative)
 Test b : $P = 0.032$ N (non-conservative)
 Initial imperfection in the out-of-plane y -direction

Figure 1. Cantilever model for torsional buckling

Material data	Young's modulus	$E = 10 \times 10^3$ N/mm ²
	Poisson's ratio	$\nu = 0.0$
Section property	Cross-sectional area	$h = 5$ mm $t = 0.2$ mm

