# Examples of Capabilities in the SOLVIA® Finite Element System
Lateral Buckling of a Frame due to End Moments

The 3D co-rotational BEAM element in SOLVIA is very effective. The rotations can be small or very large and the BEAM element can be used for buckling analysis. The nodes and the shear center need not coincide with the centroid so the BEAM element may, for example, be used for U-section beams and for stiffeners.

In example B102 from the Nonlinear Verification Manual the BEAM element is used to model an extreme frame under end moments. This is a severe test regarding modeling of large 3D rotations. Note the width to thickness ratio of 50 for the cross-section. The results below are in good agreement with a reference beam solution.
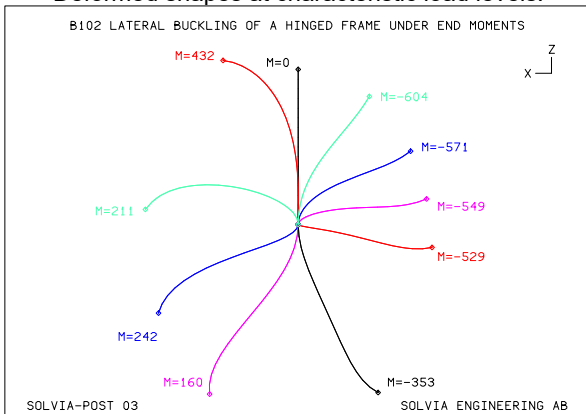
Right-angle frame under applied end moments.
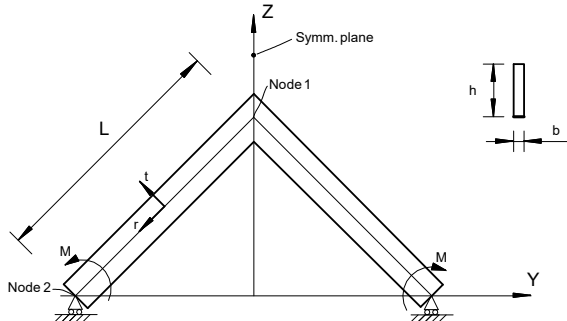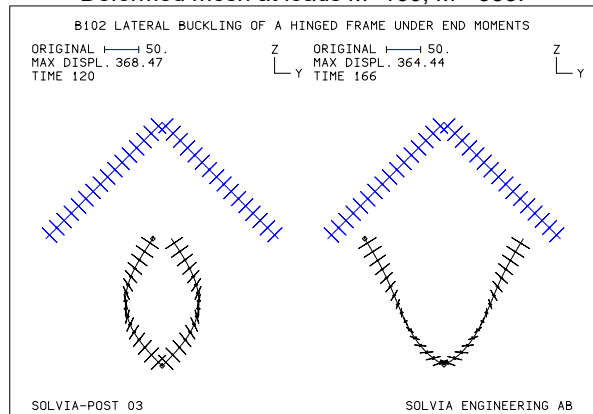

Dimensions: L=240, h=30, b=0.6
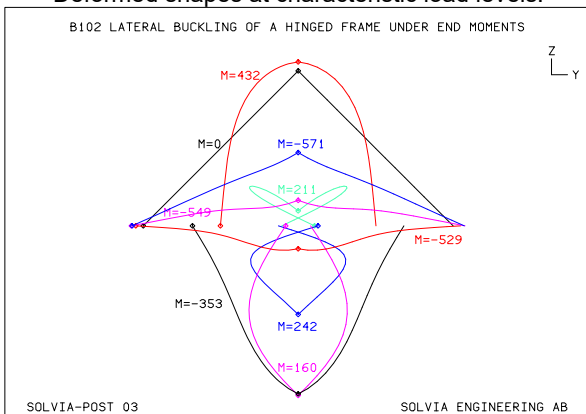
Moment at node 2 vs X displacement of the apex.
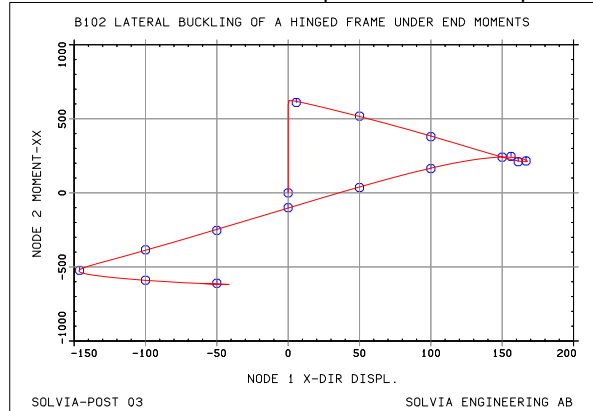
Deformed shapes at characteristic load levels.
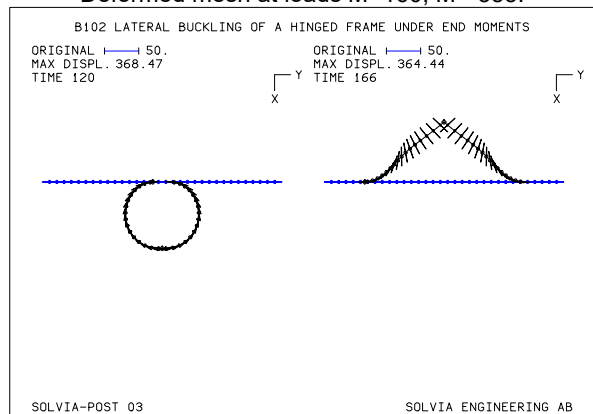

Deformed mesh at loads M=160, M=-353.

Deformed shapes at characteristic load levels.

Deformed mesh at loads M=160, M=-353.

SOLVIA Engineering AB
engineering@solvia.se   www.solvia.com
Phone: +46 21-144050