

# Beam Data Output in LS-DYNA (Type 2 – Resultant Beams)

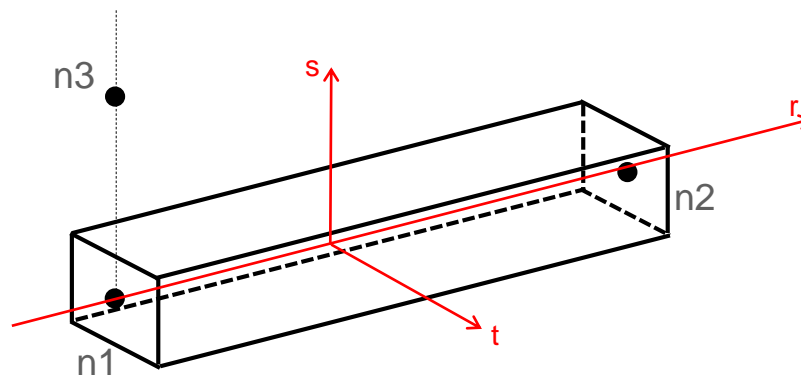
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The orientation of the beam  $y$  and  $z$  ( $s$ ,  $t$ ) axis is controlled by the third node defined on the **\*ELEMENT\_BEAM** card.



To correctly plot a bending moment diagram in Oasys D3PLOT the information about how the triad rotates during an analysis has to output to the ptf file.

In order to do this each beam element has to have a unique third node which is not connected to anything else in the model, and the **NREFUP** option on the **\*CONTROL\_OUTPUT** card has to set to 1 so that the position of the third nodes will be updated as the beam rotates.

For a type 2 resultant beam the following data components are calculated by LS-DYNA.

- FX – Axial force
- FY – Y Shear force
- FZ – Z Shear force
- MXX – Torsional moment
- MY1 – Y Bending moment at node 1
- MY2 – Y Bending moment at node 2
- MYD – Y Bending moment distribution
- MZ1 – Z Bending moment at node 1
- MZ2 – Z Bending moment at node 2
- MZD – Z Bending moment distribution
- MDM – Bending moment magnitude distribution

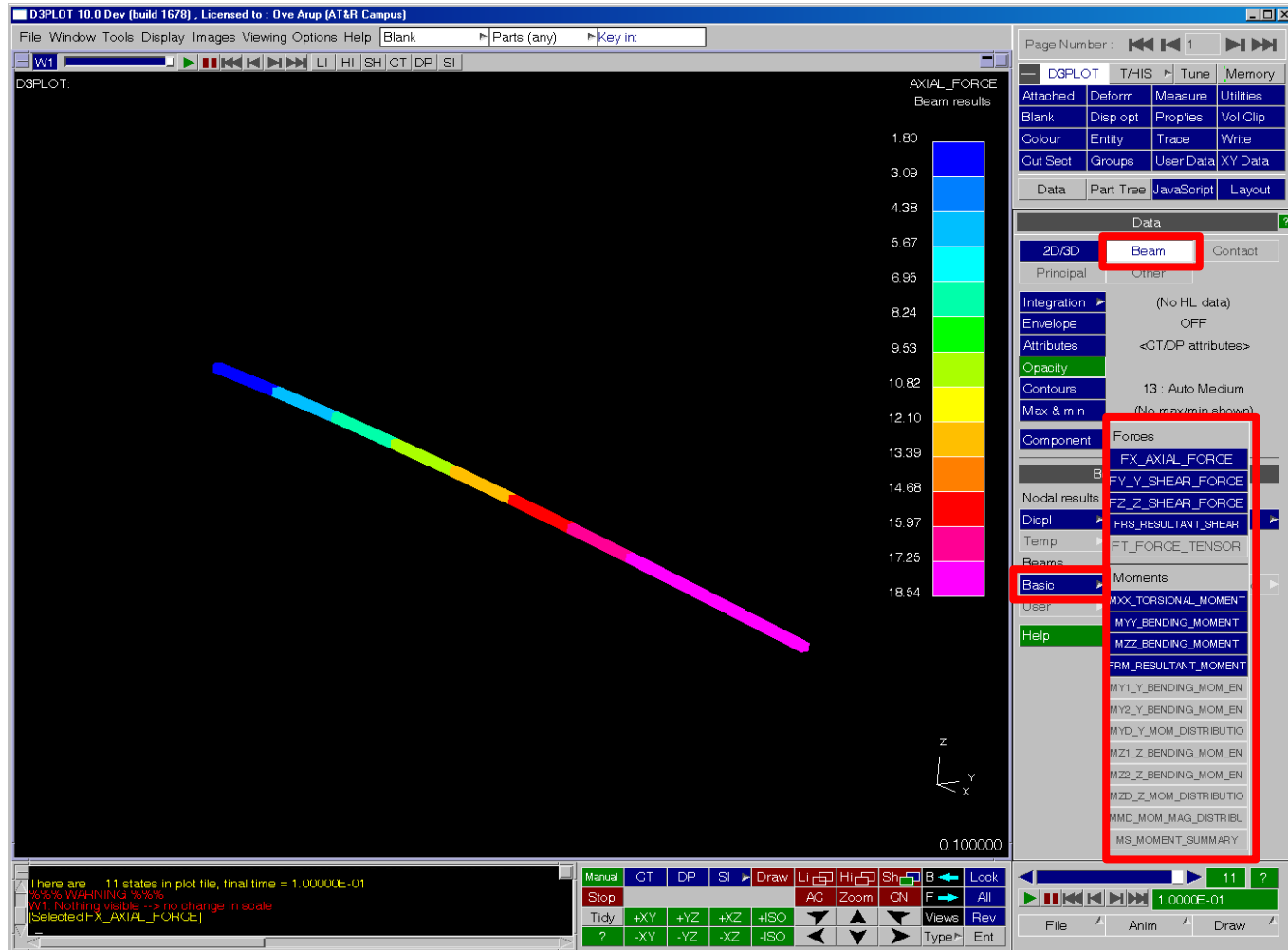
However by default only the following data is output to the ptf file.

- FX – Axial force
- FY – Y Shear force
- FZ – Z Shear force
- MXX – Torsional moment
- MYY – Y Bending moment  
(using data component MY1 – Y Bending moment at node 1)
- MZZ – Z Bending moment  
(using data component MZ1 – Z Bending moment at node 1)

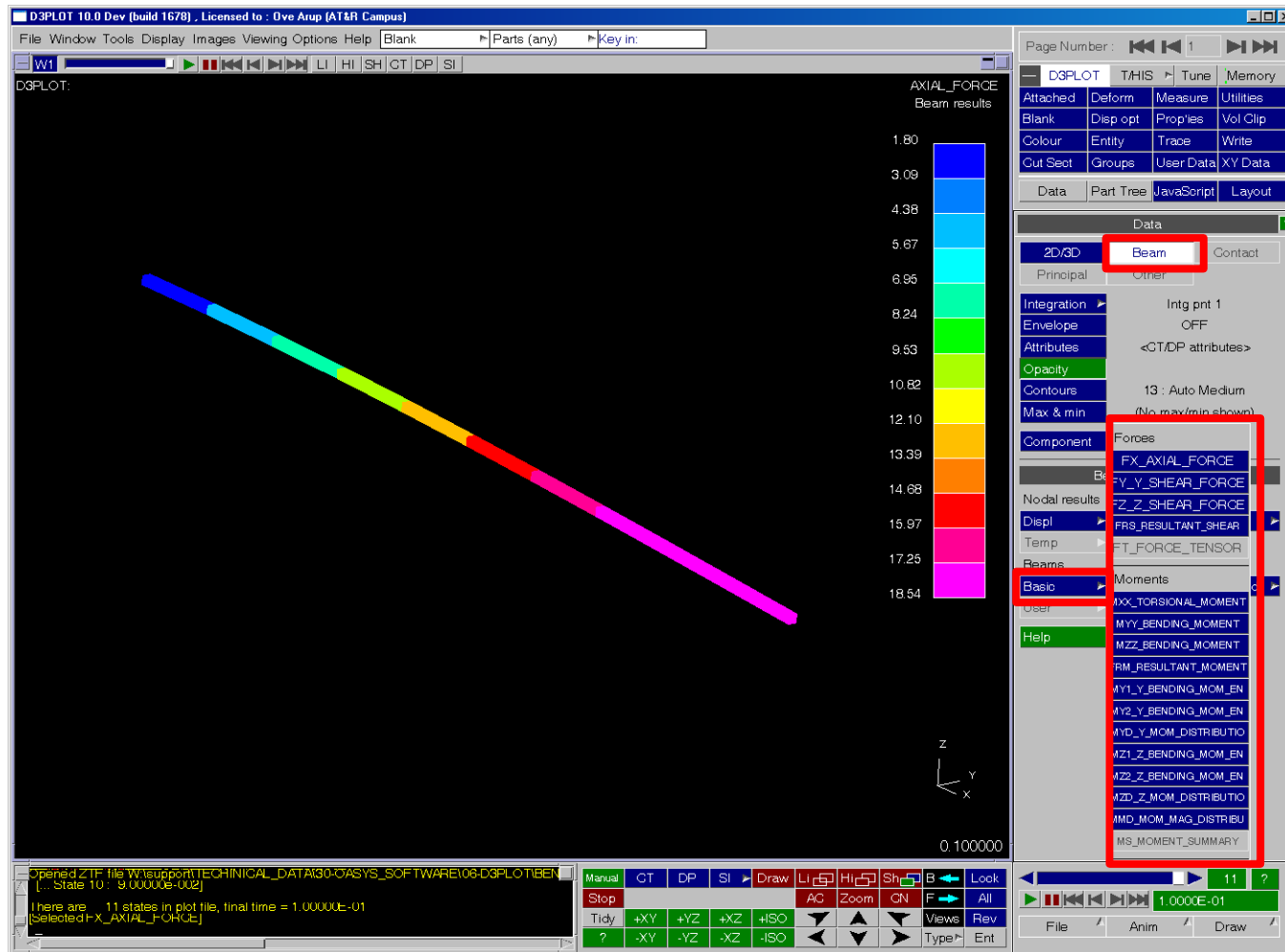
As only the bending moment data for node 1 is output the maximum bending moment in a beam may not actually be output.

In order to output the full set of data components for a type 2 beam the **BEAMIP** option on the **\*DATABASE\_EXTENT\_BINARY** card has to be set to 3.

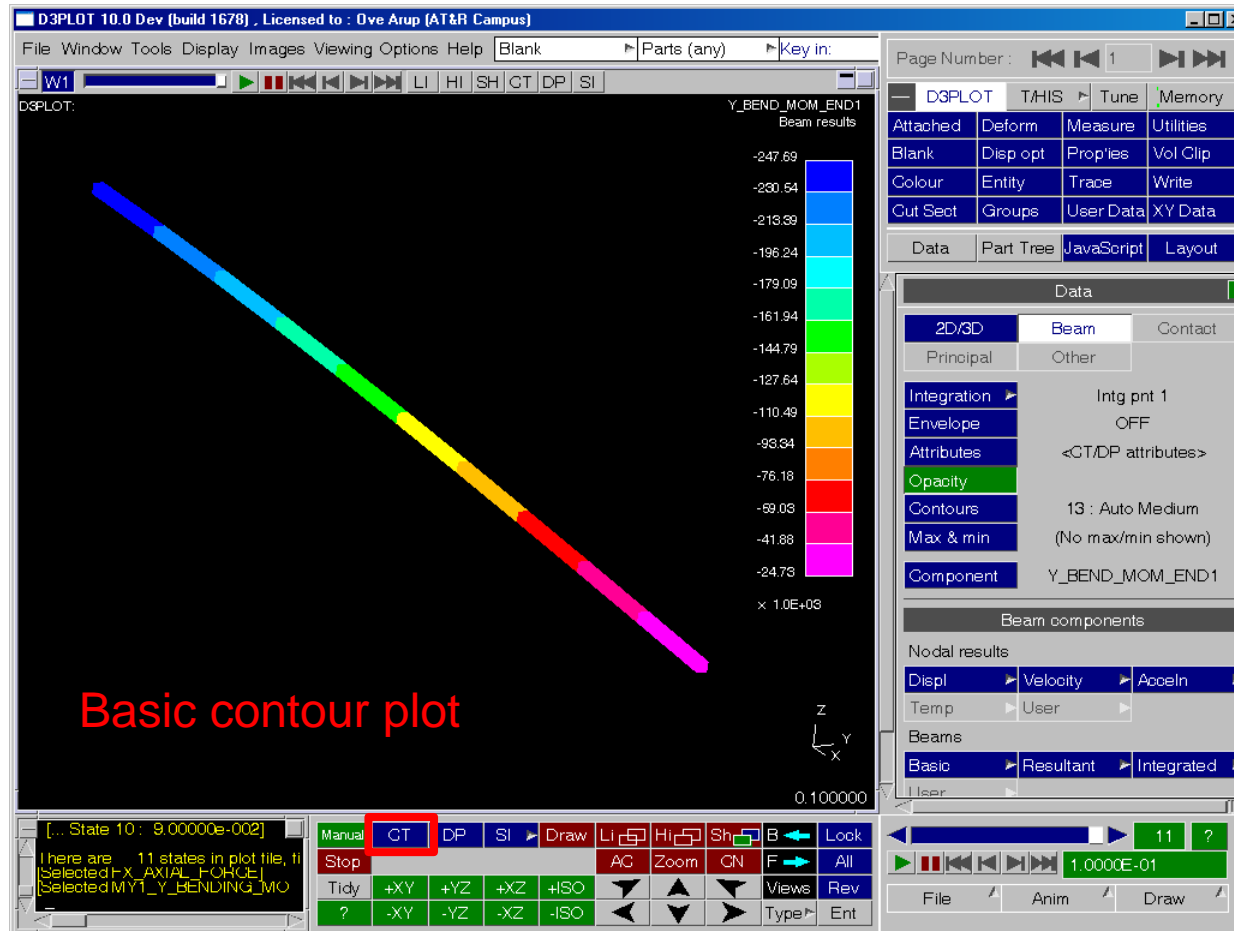
If the **BEAMIP** option is not set the following data is available in Oasys D3PLOT.



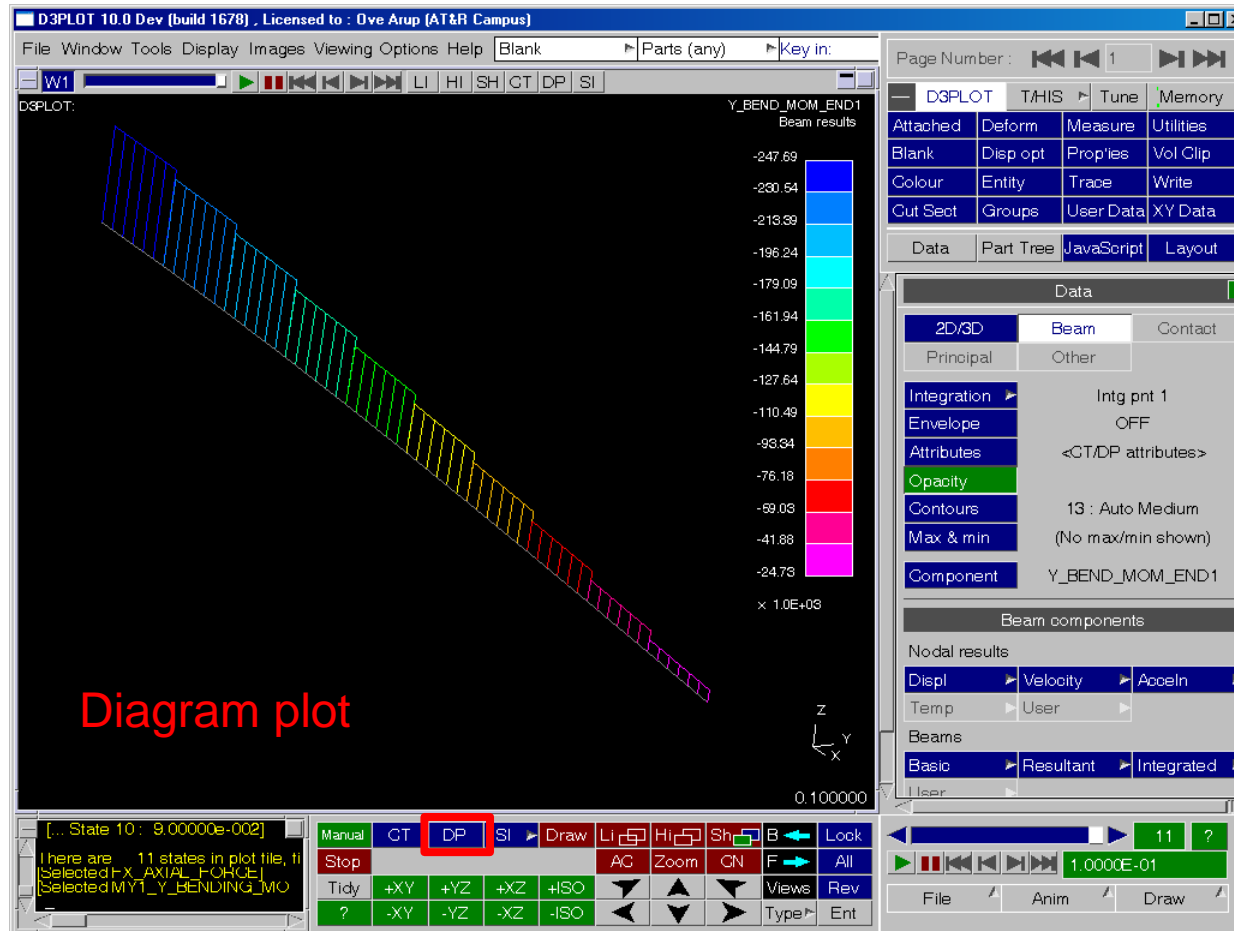
If the **BEAMIP** option is set the following data is available in Oasys D3PLOT.



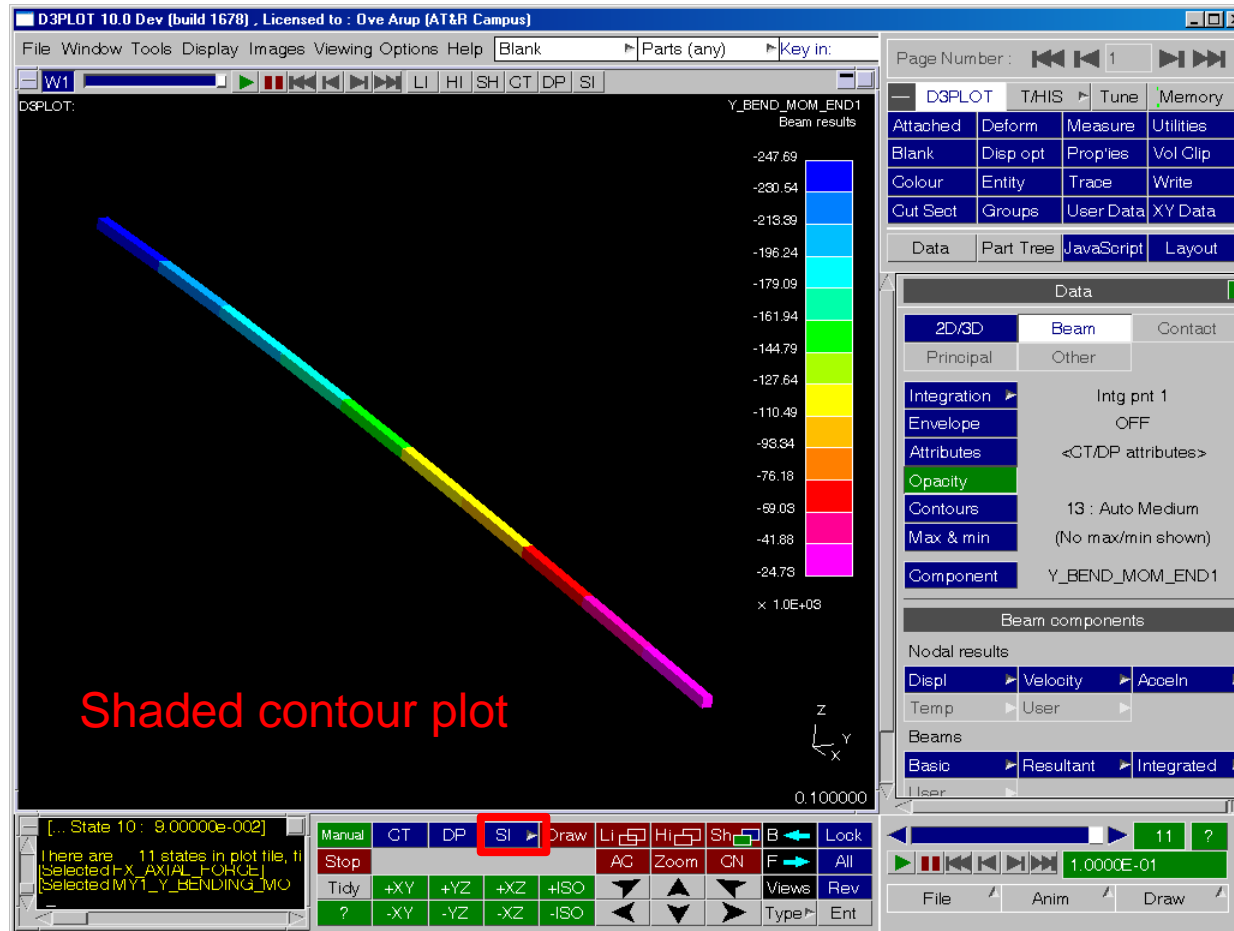
There are 3 different ways the data can be plotted



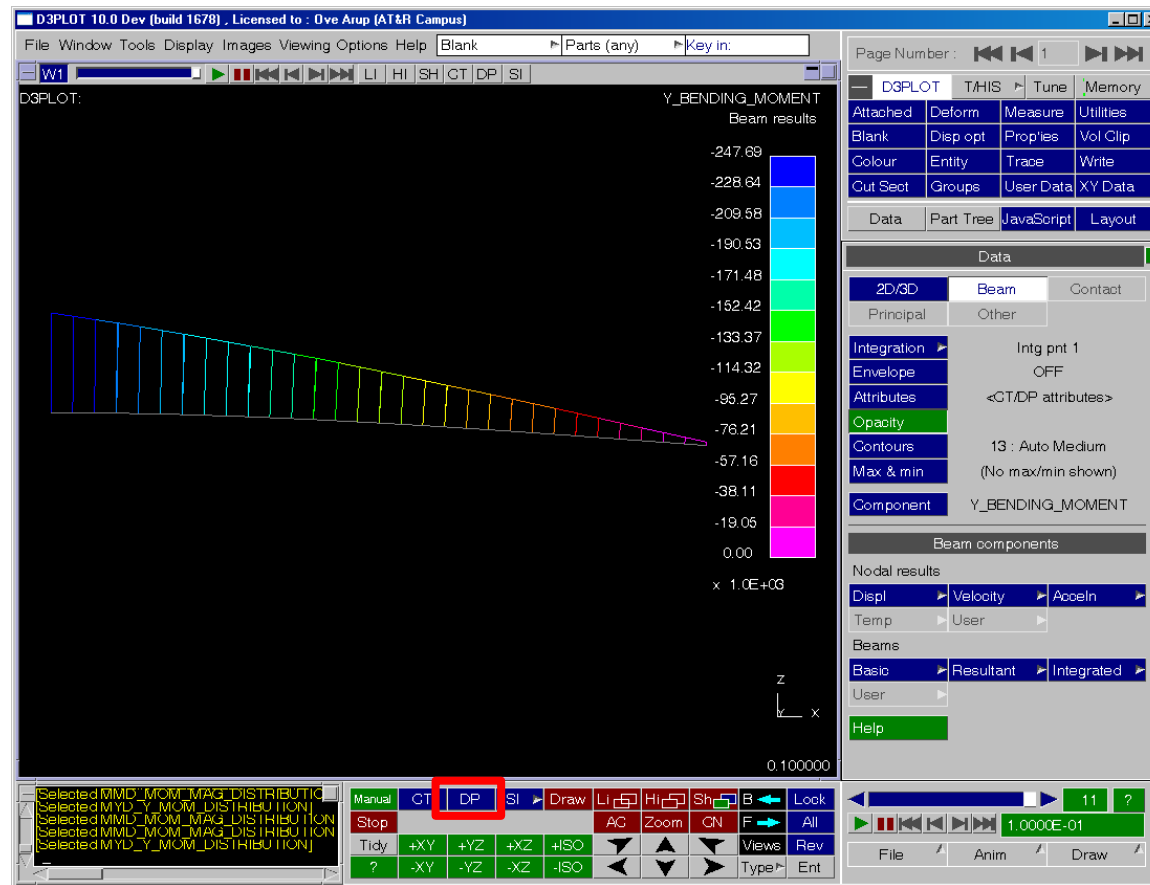
There are 3 different ways the data can be plotted



There are 3 different ways the data can be plotted



The Diagram Plot can be used in combination with the **MYD – Y Bending moment distribution** and **MZD – Z Bending moment distribution data components** to create a bending moment diagram for the element local y or z axis.





[www.arup.com/dyna](http://www.arup.com/dyna)

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