

PROKON Support Portal

Portal > Knowledgebase > Analysis > A03:Frame analysis > Alignment of beam elements

Alignment of beam elements

Andrew - 2019-04-02 - 0 Comments - in A03:Frame analysis

The local axis of a beam element in Frame is defined as shown in Figure 1 below.

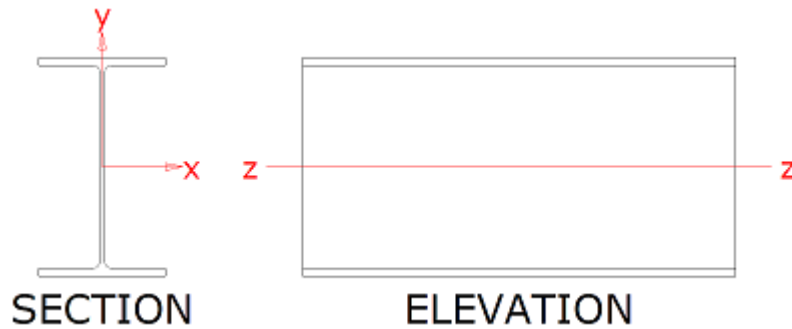


Figure1: Alignment of local axes - I & H sections.

The alignment of the local axes for beam elements in Frame can be considered for two cases:

1. Beams: By default, Frame sees the local y-z plane of a beam as vertical. This means that the web of the beam element will always be vertical. Entering a value for the β -angle will then rotate the beam element around the z-axis.
2. Columns: When beam elements are used as columns, the orientation of the column is determined by aligning the web (y-z plane) parallel to the global X-axis.

Consider the model in Figure 2:

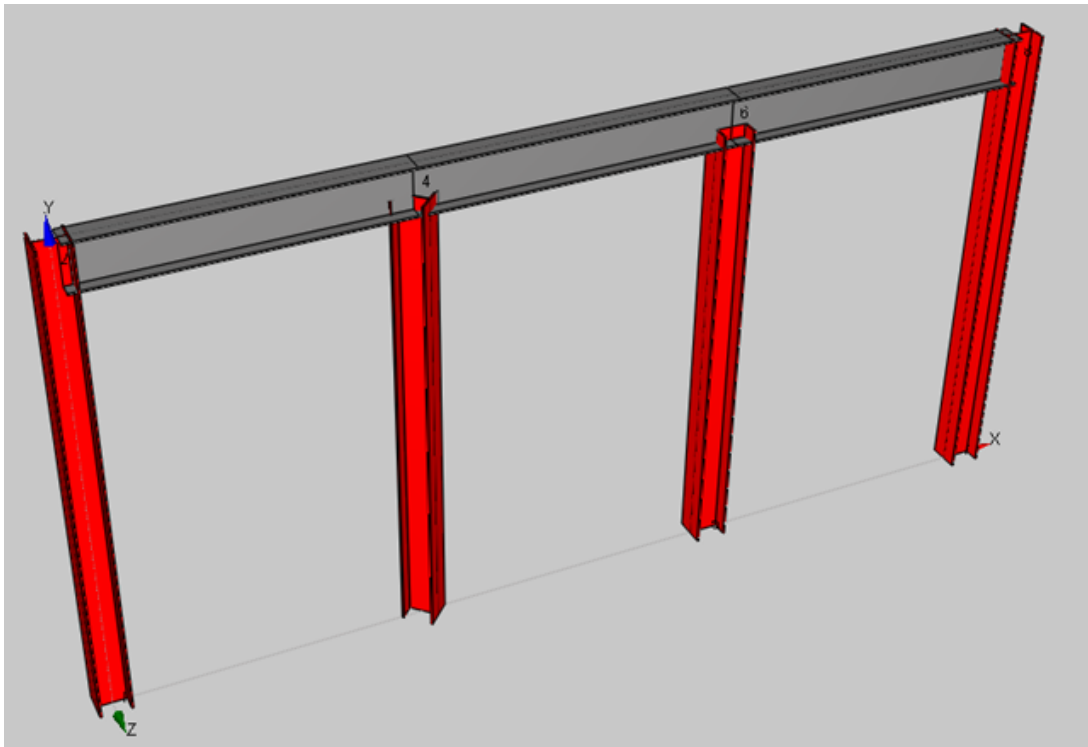


Figure 2: Frame model - Column appears to be rotated.

All four columns consist of the same beam section and the β -angle for all columns is equal to zero. Yet one of the columns appears to be rotated. Upon closer inspection, the nodes for the "rotated" columns are not vertically aligned.

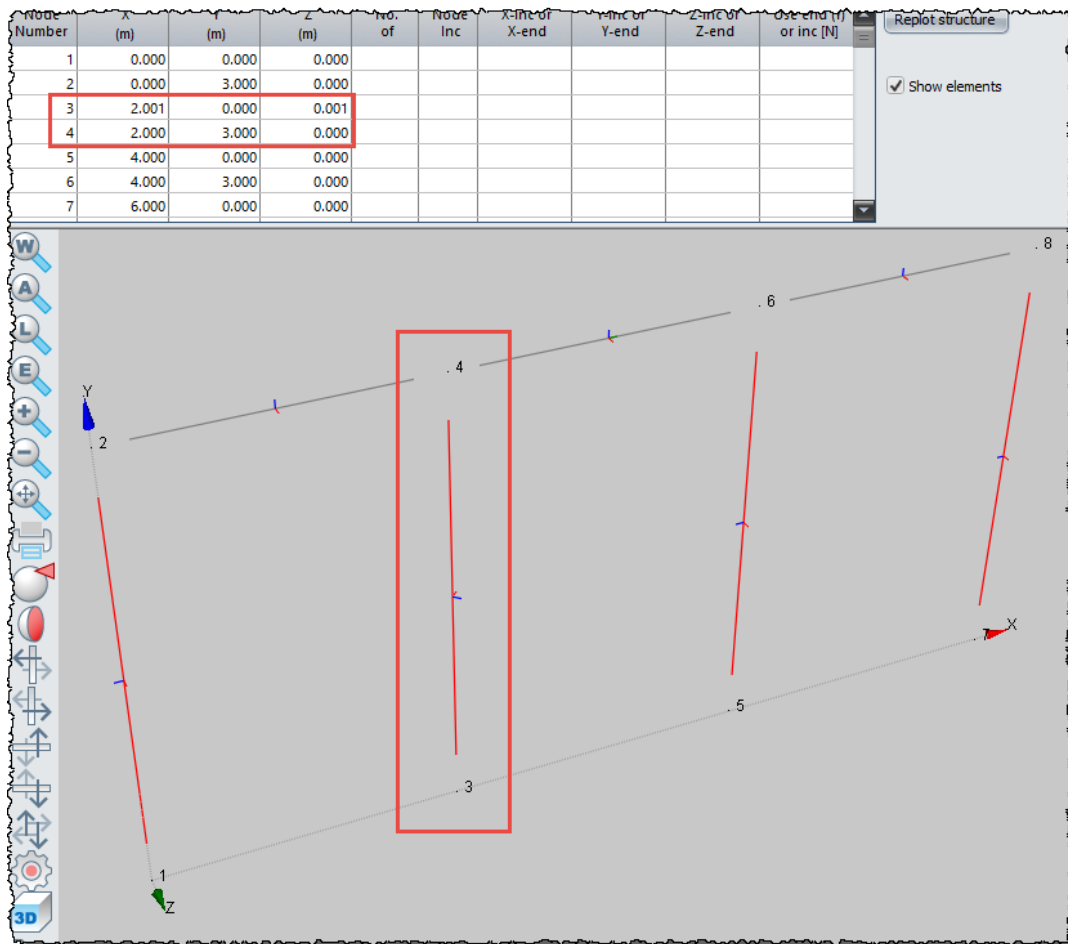


Figure 3: Nodes "3" and "4" are not aligned vertically.

Since the nodes that define the "rotated" column are not vertically aligned, column 3-4 is no longer seen as a column (even though the nodes differ by only 1mm in both the X and Z directions). The two nodes are now connected by the beam element and the web (y-z plane) is aligned vertically. This seems to be a small difference but can potentially lead to large differences in certain analyses.