FIDES DV-PARTNER

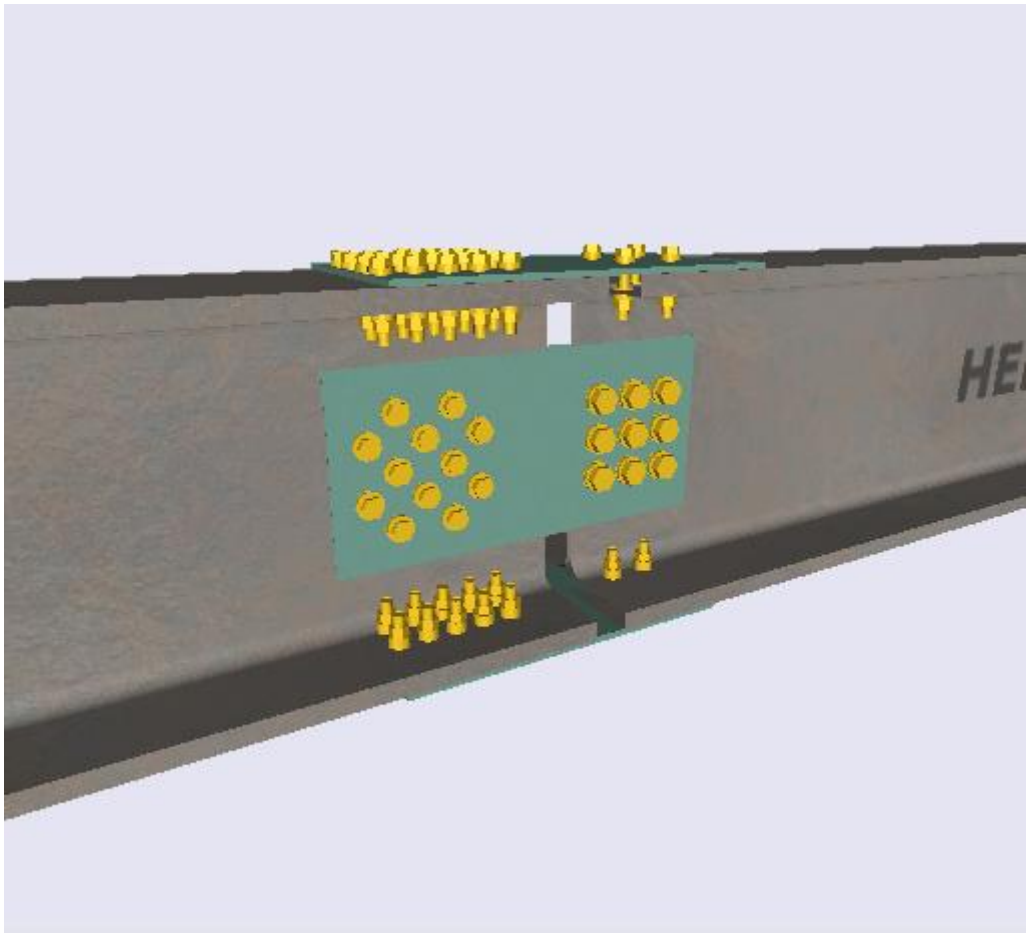
SteelCon

New version of program STeelCON 2020.324

Dear colleagues,

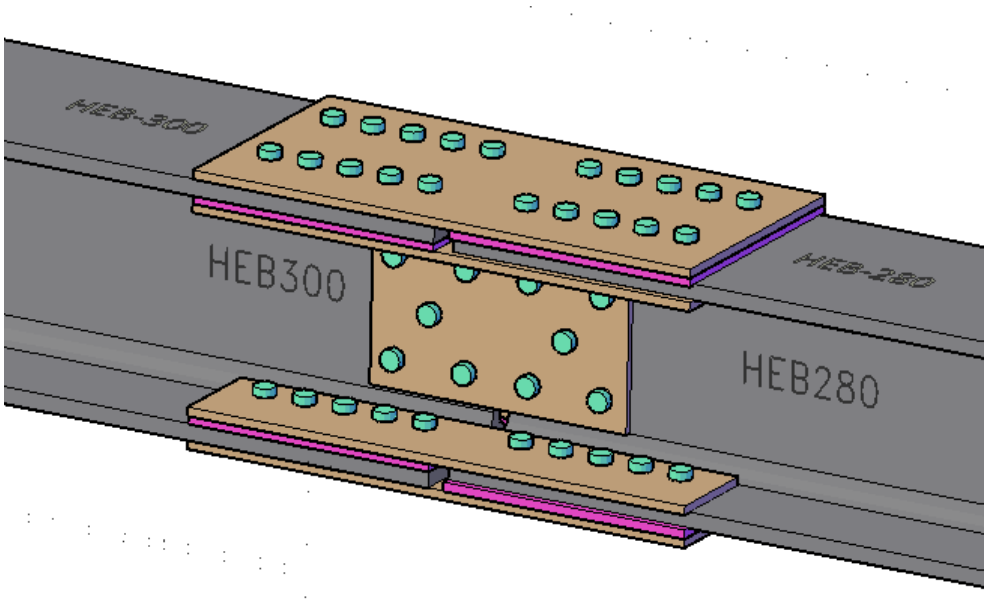
A new version of the "**STeel CONnections**" program for the design of beam splice connections has been released.

New Beam Splice connection



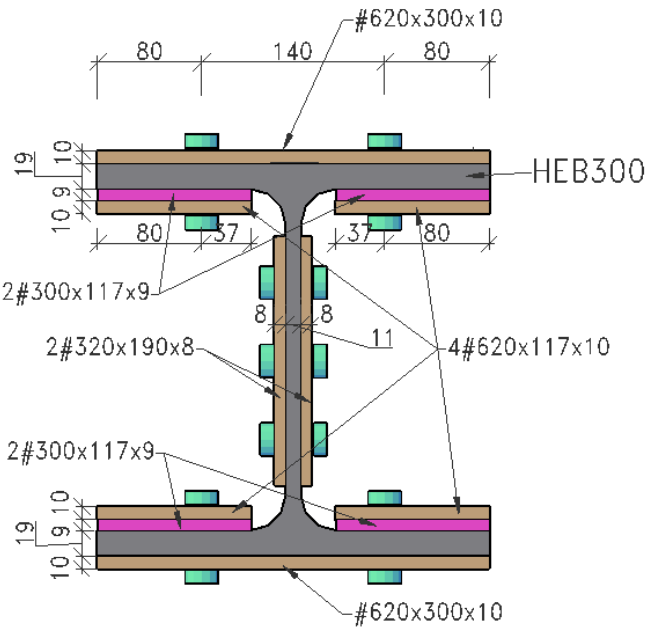
In this version of STeelCON a major enhancement of the beam splice connection has been implemented. The new splice connection offers more configuration options.

The beams can be different on each side of the connection.

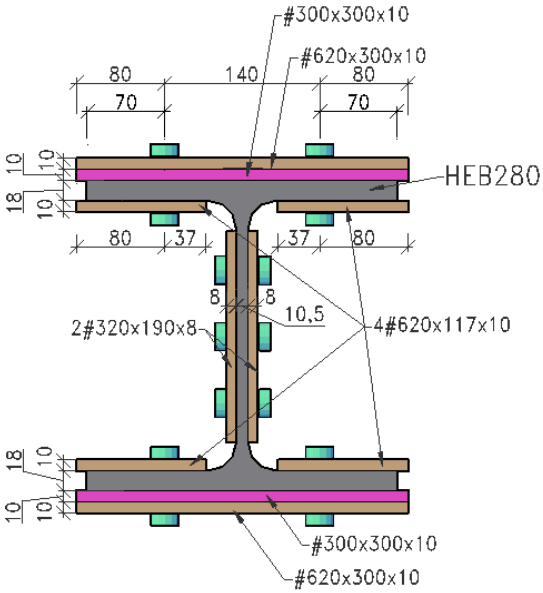


3-dimensional view

In these cases packings are used (plates of appropriate thickness), in order to provide a flush surface for the splice plates and the bolting. Packings are colored in magenta in the following pictures.

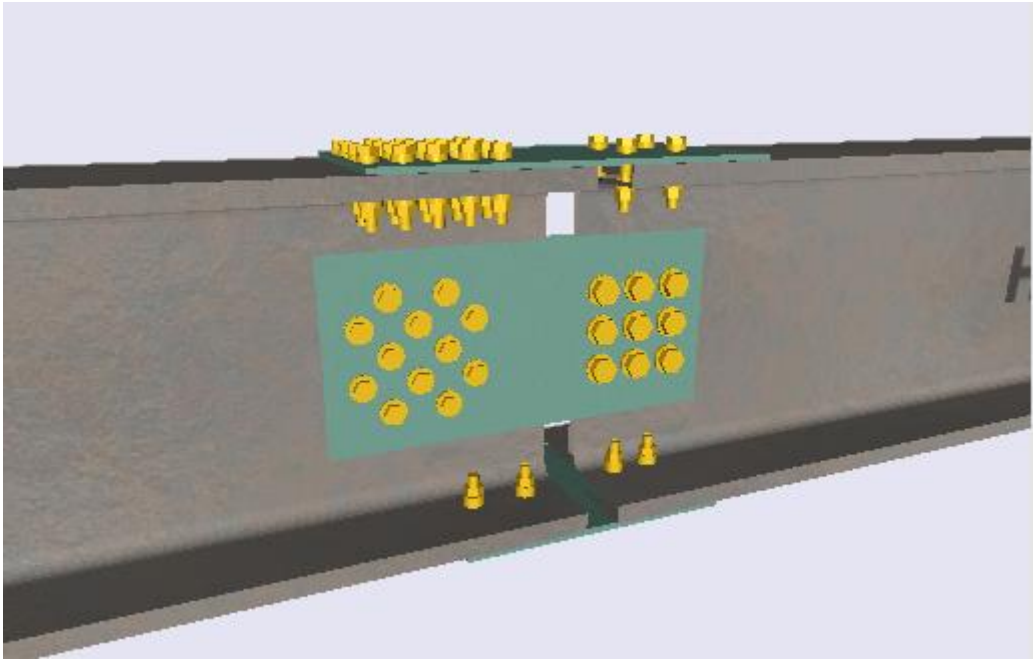


Cross-sectional view (Beam HEB-300)



Cross-sectional view (Beam HEB-280)

The connection is not symmetric in any axis



The arrangement of the bolts is not the same :

- for the left and right flange plates
- for the up and down flange plates
- for the left and right web plates

The steel quality of the bolts is not the same :

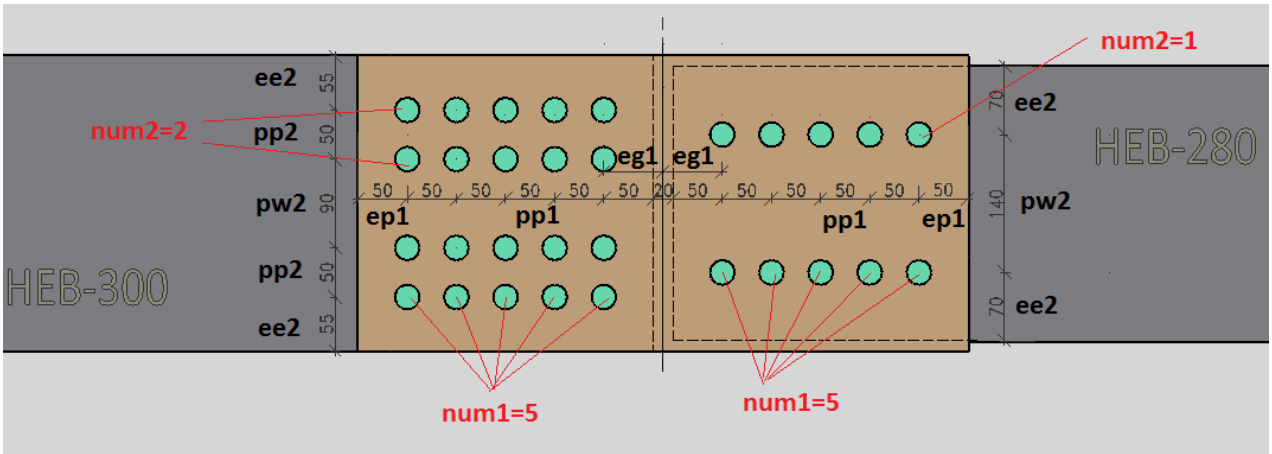
- for the left and right flange plates
- for the up and down flange plates
- for the left and right web plates

The diameter of the bolts is not the same :

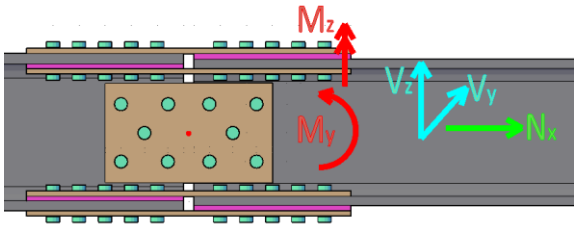
- for the left and right flange plates
- for the up and down flange plates
- for the left and right web plates

The cross section of the beam can have :

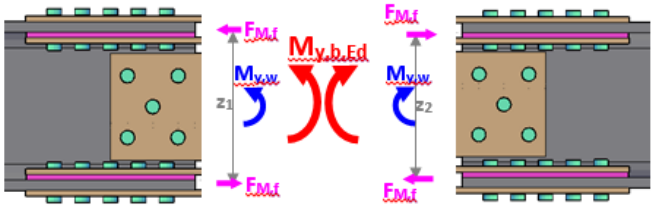
- different up and down flange lengths
- different up and down flange thicknesses



All internal forces are allowed.



Applied load definitions (point of application is the gap middle). The application is towards the left of the section.



Distribution of M_y

All the internal forces on the node can be applied in the calculations.

M_y	: is transferred through both flange and web plates.
M_z	: is transferred through flange plates.
V_z	: is transferred through web plates.
V_y	: is transferred through flange plates.
N_x	: is transferred through both flange and web plates

Major moment M_y and axial force N_x need to be distributed to web and flange components. This distribution will be based on beam section characteristics.

- If the two connecting beams are different, but have the same height, the mean values of the distributed forces and moments between the two beams will be considered.
- If the two connecting beams are different with different height and packing plates are used, the distributed forces and moments will be based on the beam with larger height (since packing plates on the smaller beam introduce more complicated mechanisms of force transfer)

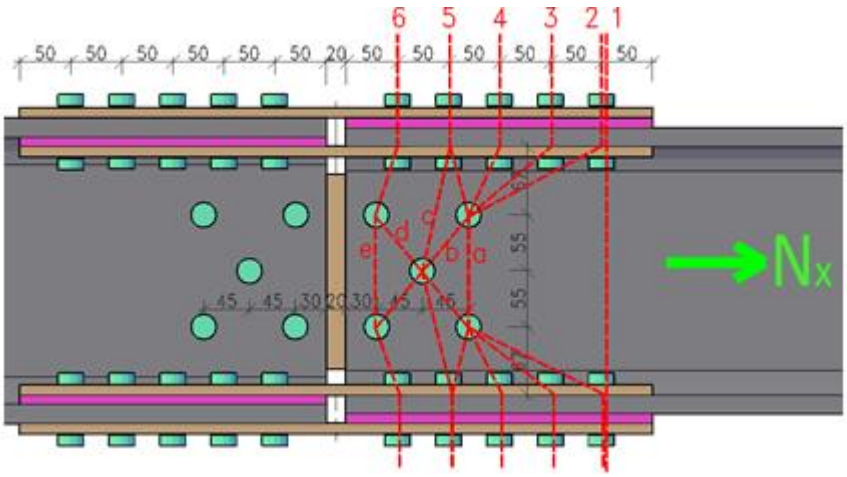
The distribution of major moment, will be either plastic or elastic, depending on the limit state and the beam section class:

- At ultimate limit state (STR), the distribution will be plastic for beam section class 1 or 2.
- At ultimate limit state (STR), the distribution will be elastic for beam section class 3 or 4.
- At serviceability limit state (SER), the distribution will be always elastic.

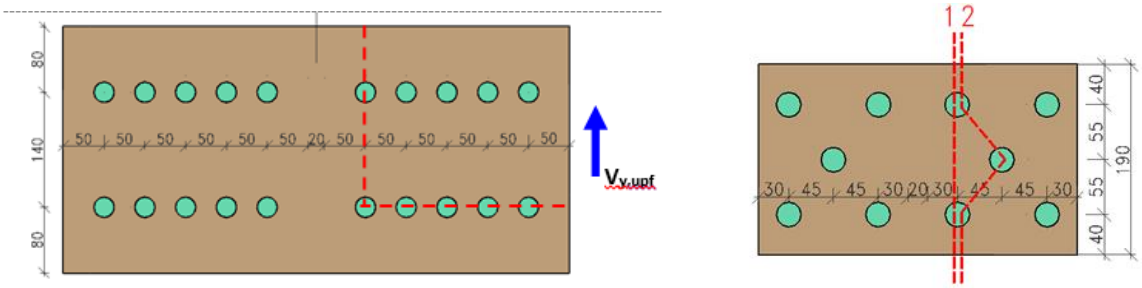
Minor moment M_z will be transferred through flanges only. Its distribution between the upper and lower flange (in case they are not similar) will be based on the same principles as with the major moment.

Minor shear force V_y will be transferred through flanges only. Its distribution between the upper and lower beam flange (in case they are not similar) will be proportional to their respective cross-section areas.

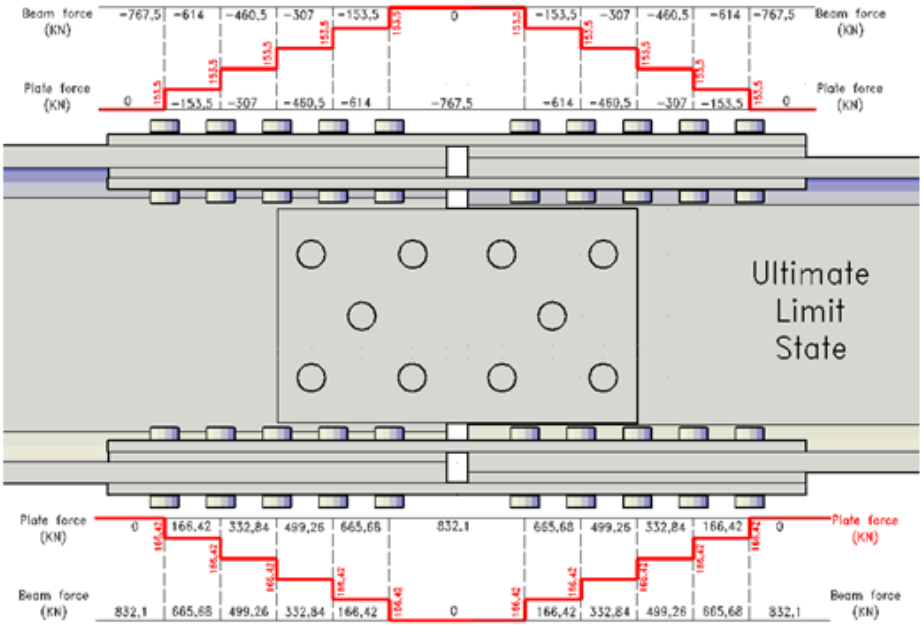
Advanced calculation methods



The net area of the cross section is determined by examining all the possible failure lines, in-plane and out-of-plane.



The possible failure lines are examined for the shear forces as well.



The the gradual flow of axial x-x forces, resulting from the applied axial force and moment, between the beam and the plates is calculated.

1.12.2020, Munich Germany