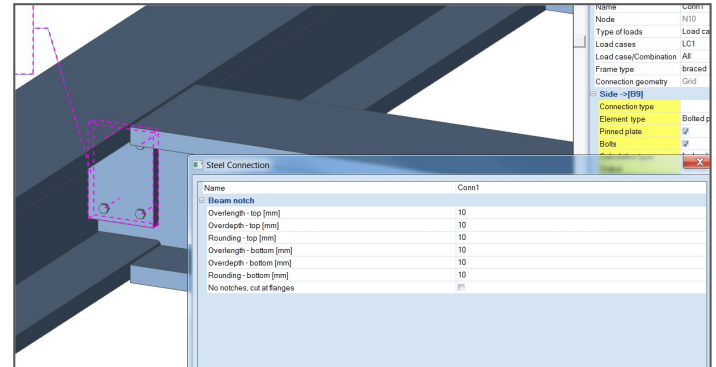


Connection Grid Pinned

PE esasd.08

The esasd.08 "Grid Pinned Connections" module is an interactive, graphical tool for the design, verification and drawing of grid pinned connections between intersecting steel beams. The analysis may be performed according to EN 1993-1-8, DIN 18800 or BS 5950-1:2000.



Highlights

Clear and simple definition of the connection geometry - the user selects the relevant beams and sets options for the connecting elements (for web cleats or header plate, for stiffeners, bolts, welds and notches). Clear and detailed dialogue windows are provided per type of connecting component

Visualisation in the 3D graphical window of SCIA Engineer

Seamless integration with structural analysis

Simple design, fast assessment, detailed calculation report and clear drawings

Both bolted and welded connections may be checked according to normative regulations

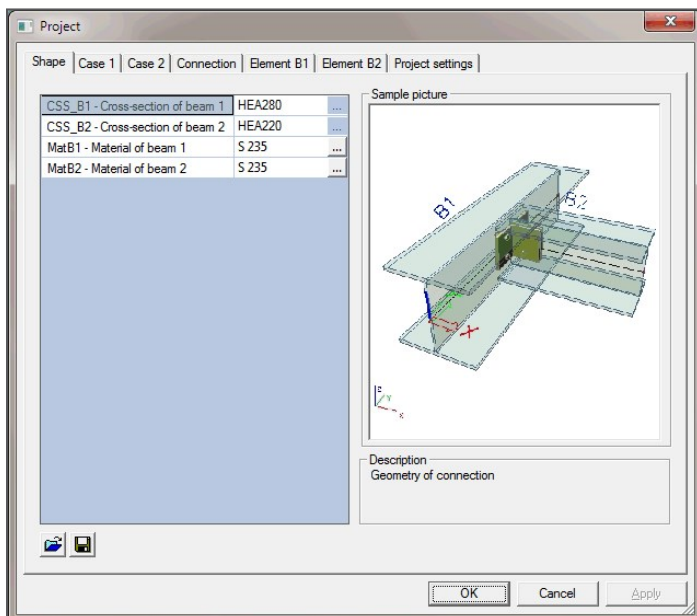
The design

- Geometrical defaults (default values for distances/spacing in function of the beam size) ensure limited effort is required to obtain an adequate connection;
- Subsequent changes to the geometry, material, and bolt arrangement are entered in an interactive way;
- Bolted and welded connections may be designed. Bolted connections may be designed with snug-tight or pre-stressed bolts. Slip factors are automatically calculated for preloaded bolts. The necessary torque is mentioned in the calculation report;
- Bolt libraries that conform to product specifications facilitate the choice of connecting elements;
- After each change in the connection configuration, normative prescriptions (e.g. for spacing between bolts and for edge distances) and conditions related to the practical feasibility are checked.

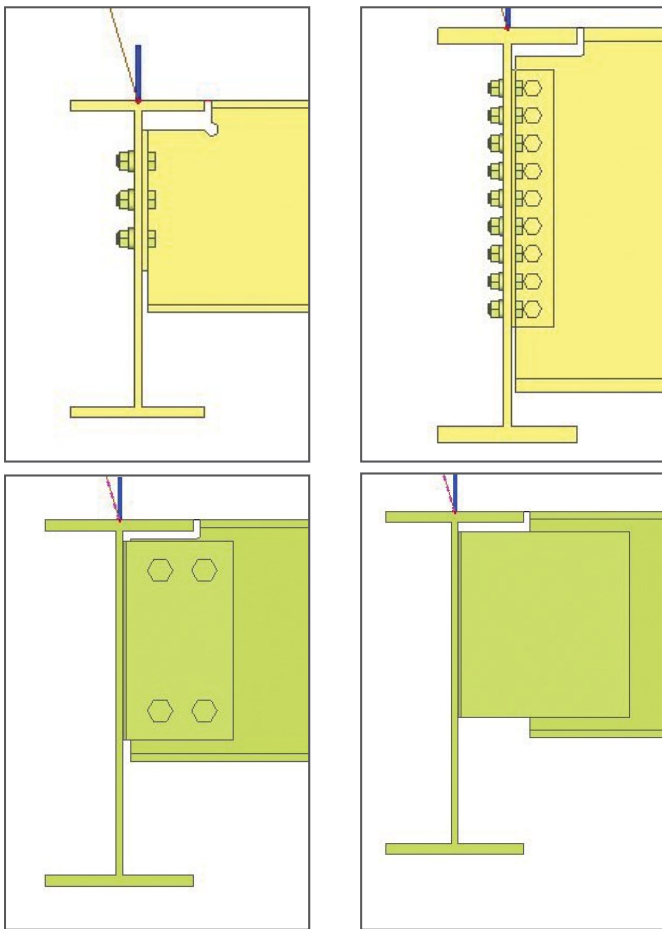
Calculation method

Grid pinned connections do not transfer bending moments due to the gap between main and secondary beam.

- ULS design checks for a grid pinned connection are performed according to EN 1993-1-8, DIN 18800 T1, or BS 5950-1. The choice of national code is done via the Project Data. When another code is selected via Project Data (NEN, ÖNORM, CSN, etc.), the EC3 principles are applied by default.
- The underlying connection parts are checked according to the component method, under the action of internal shear and normal forces;



- Connection templates provide a quick and easy way to define the connection;
- The following checks are performed (notches in the secondary beam taken into account):
 - Web of primary and secondary beam in shear;
 - Web of primary and secondary beam in tension;
 - Connecting element (Plate, angle section, or header plate) in shear;
 - Connecting element (Plate, angle section, or header plate) in tension;
 - Block shear in secondary beam web and in connecting element;
 - Compression/tension resistance of the beams/connecting element;
 - Bolts in tension, shear and bearing;
 - Weld size;



Supported connection types

The module supports the design of grid-pinned connections with the following connecting elements:

- A plate welded to the webs of both secondary beam and primary beam;
- A plate bolted to the secondary beam web and welded to the primary beam web;
- Web cleats bolted to the secondary beam web and bolted to the primary beam web;
- A header plate welded to the secondary beam web and bolted to the

primary beam web;

- Notches may be defined in the secondary beam.

Results

- Allowable connection forces are compared to calculated forces in the connection (obtained from the critical load case or combination);
- The limiting component(s) in the connection are indicated (insufficient bolt diameter, plate or profile gauge, etc.);
- The connection can further be optimised in an interactive manner;
- A detailed calculation report is added to the project documentation;
- The Detailed Connection Drawing wizard (in module esadt.02) automatically generates detailed drawings of all connection parts with dimensions.

Project: Examples to EC3
 Part: Example 3.1.7
 Description: Beam to beam connection with cleat
 Author: CVL

Details connection analysis: Side-> [B2]

2.8.Design block shear resistance VRd - Connection element on column side

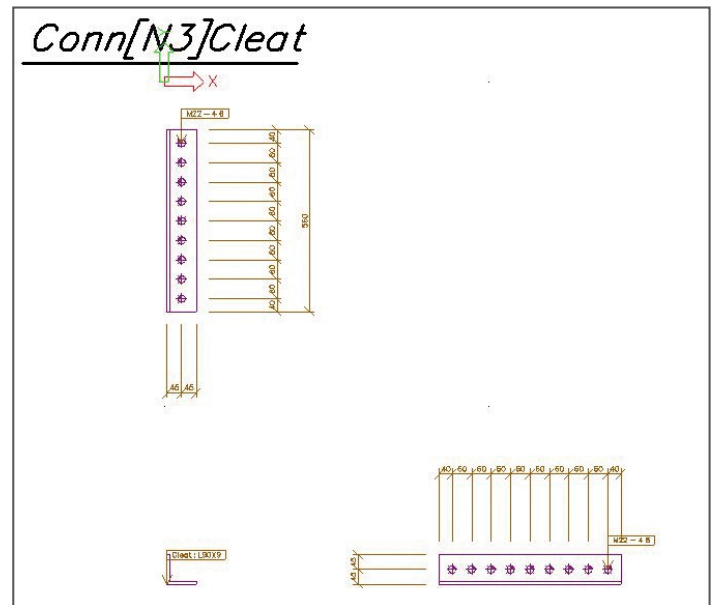
data		
k	0.50	
a1	40.00	mm
a2	45.00	mm
a3	40.00	mm
L1	40.00	mm
L2	51.60	mm
L3	537.89	mm
Lv	480.00	mm
Lv,eff	537.89	mm
Av,eff	4841.02	mm ²
VRd	1397.48	kN

2.9.Critical design shear resistance VRd = 1164.61 kN

3. Design tension/compression resistance NRd

3.1.Design compression/tension resistance NRd for connection element

data		
A	10080.00	mm ²
NRd	2520.00	kN



Required modules

esas.00, esas.01