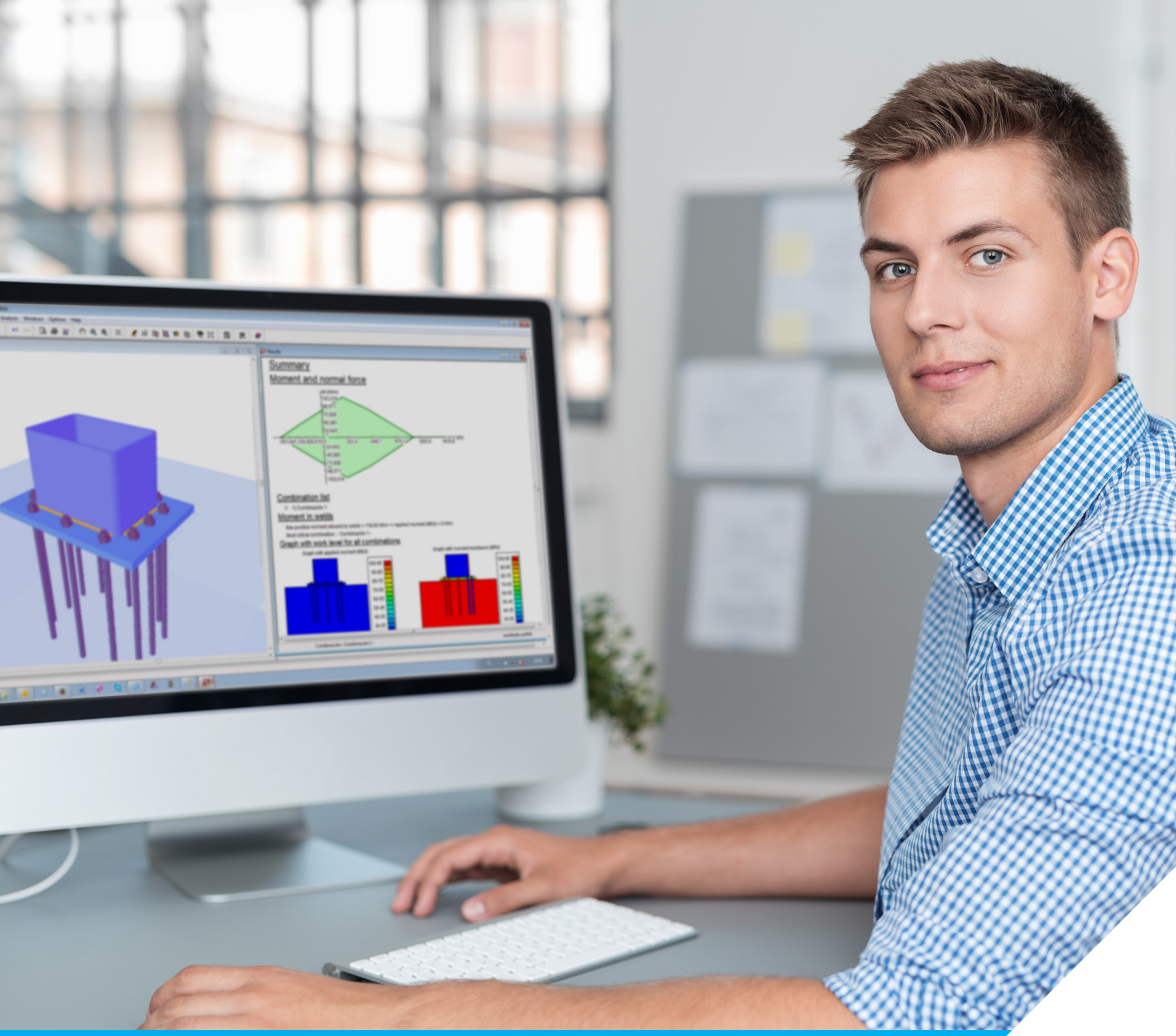
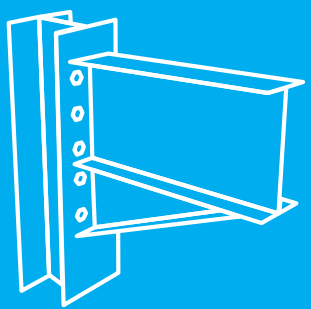


PowerConnect

STEEL CONNECTION DESIGN SOFTWARE



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BuildSoft
structurally loved by engineers

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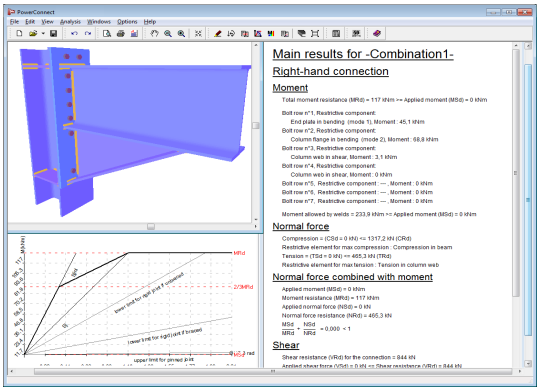
PowerConnect by BuildSoft

PowerConnect

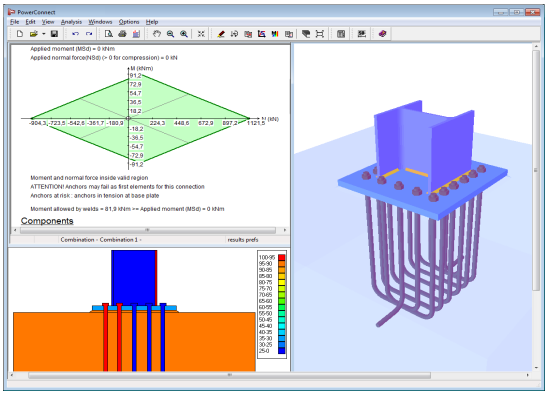
An engineer's best choice

PowerConnect is easy to use software for calculating steel connections. As a designer, you calculate welded and bolted moment, column-base, shear and tubular connections fast and efficiently. PowerConnect uses the latest calculation methods according to Eurocode 3 and AISC design codes. Thanks to graphic input and smart default settings, each connection is defined in no time, so you can focus entirely on making optimal connections.

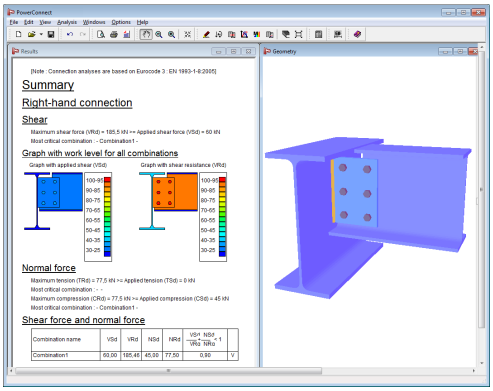
Moment connections



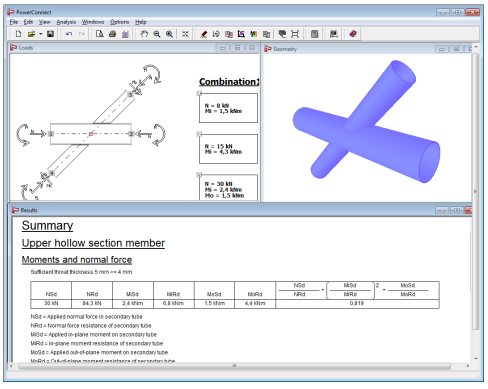
Column base connections



Shear connections



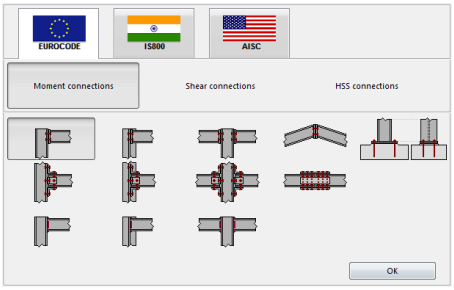
Tubular connections

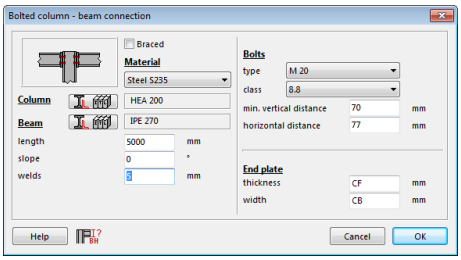


PowerConnect

Steel connection design, fast and efficient

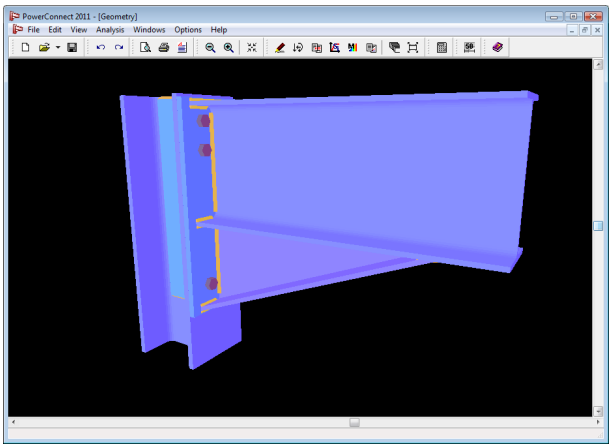
The user-friendly PowerConnect environment lets you define single- or double-sided connections in a jiffy for a wide range of practical purposes. Once you've selected the standard, you can choose between moment connection, column base, shear connection or tubular connection. You then choose the type of connection (column flange to beam, column web to beam, beam to beam, etc.) and the connection element, e.g. simply welded or with a bolted end plate, shear plate or angle.



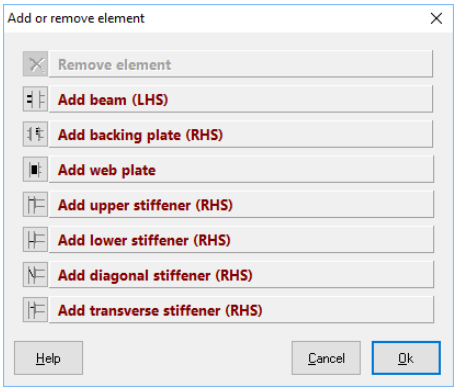


A handy wizard guides you through the definition of the various connection components. You specify the material, as well as the beam and column cross-section, bolt diameters & bolt grades, and the size of the connecting element. You also have a short-cut option here by clicking on 'OK' to leave all settings on default. For default values, PowerConnect uses smart references to the measurements of used cross-sections so that your connection turns out realistic, even with default settings.

Alternatively you can import your connections directly from Diamonds or BIM Expert. You no longer need to define different parameters: the connection is immediately available in the 3D representation.



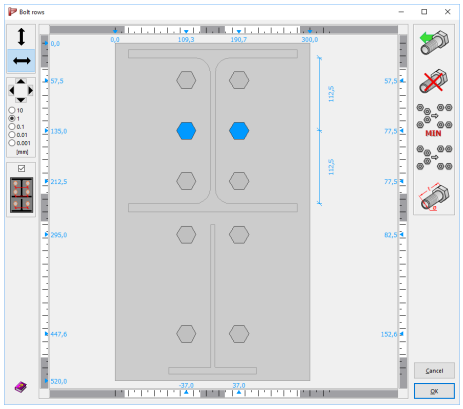
In the 3D representation, you can then adjust the connection as you like. Each component of the connection is accessible and can be changed, so you can quickly test different options to design the most optimal connection.



With a moment connection you could also add stiffening elements such as haunches. Again, smart references are used so that your input is minimal and you can quickly assess the effect of the stiffener.

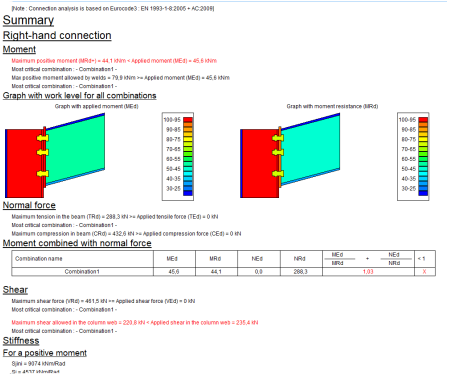
You can very easily adapt the characteristics and positions of the bolts. Each row can be placed perfectly using displacement tools or by directly entering the position coordinates you want. Rows of bolts can be moved individually or as a group. You also have the possibility to optimize bolt positions with regards to minimum distances

Steel connection design

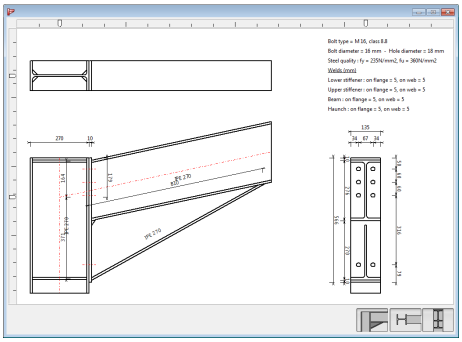


and requirements imposed by the design codes: you can either opt for a uniform distribution of bolt rows, or choose to keep distances between all rows down to the minimum. In this case, bolts will be placed as high and close together as possible.

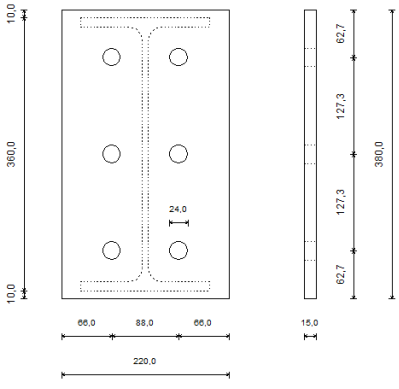
In the next step, you'll define one or more combinations of loads and calculate them. PowerConnect will analyse for you the strength, and in the case of moment connections or column bases, also the stiffness. You will get a complete summary of the calculations, comparing the applied load with the resisting forces. For each component of the connection, you will see the capacity utilisation, indicated with a handy colour scale. You will recognise the most critical components in the connection at a glance, so you can optimize them in a targeted way. To do this, you will return to the 3D representation and add or change components, insert or remove bolts, modify bolt positions (and if necessary optimize) and recalculate the connection, etc.


Summary
Right-hand connection
Moment
Graph with work level for all combinations
Normal force
Moment combined with normal force
Shear
Stiffness
For a positive moment

PowerConnect also has detailed results available for each combination, which gives insight into the applied analytical formulas of the relevant standard as well as the importance of the various design parameters. For moment-resistant joints, PowerConnect establishes a tri-linear stiffness diagram with an initial stiffness value of Sj,ini and an ultimate value of Sj. Both strength and stiffness diagrams can be sent back to Diamonds or BIM Expert.

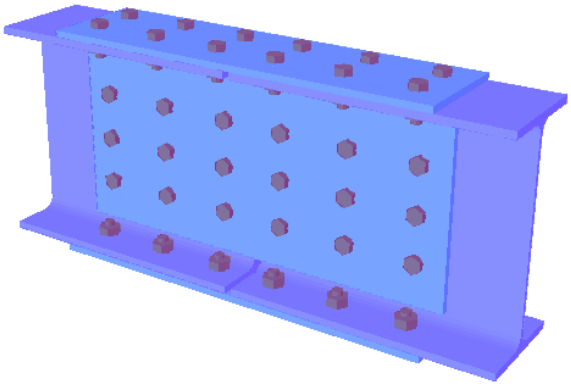


PowerConnect provides an overall view of each connection, as well as a drawing of each individual component in the connection, with measurements of all relevant distances and indications of chamfers, bolt holes, welding, etc. You can make a scaled printout of these plans (scale can be set by the user), which can then be used for workshop and final assembly. You can as easily export these plans and views to a DXF file to open them in a CAD program. All of these data can of course also be assembled in a clear report.



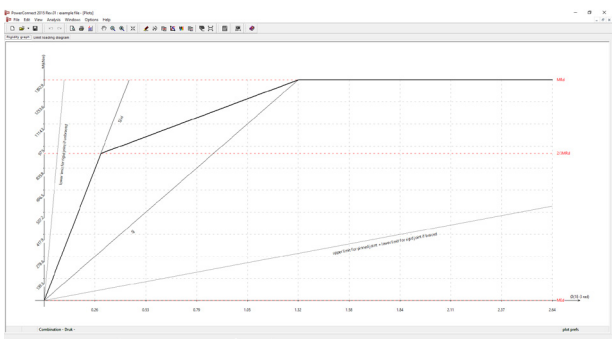
Moment connections

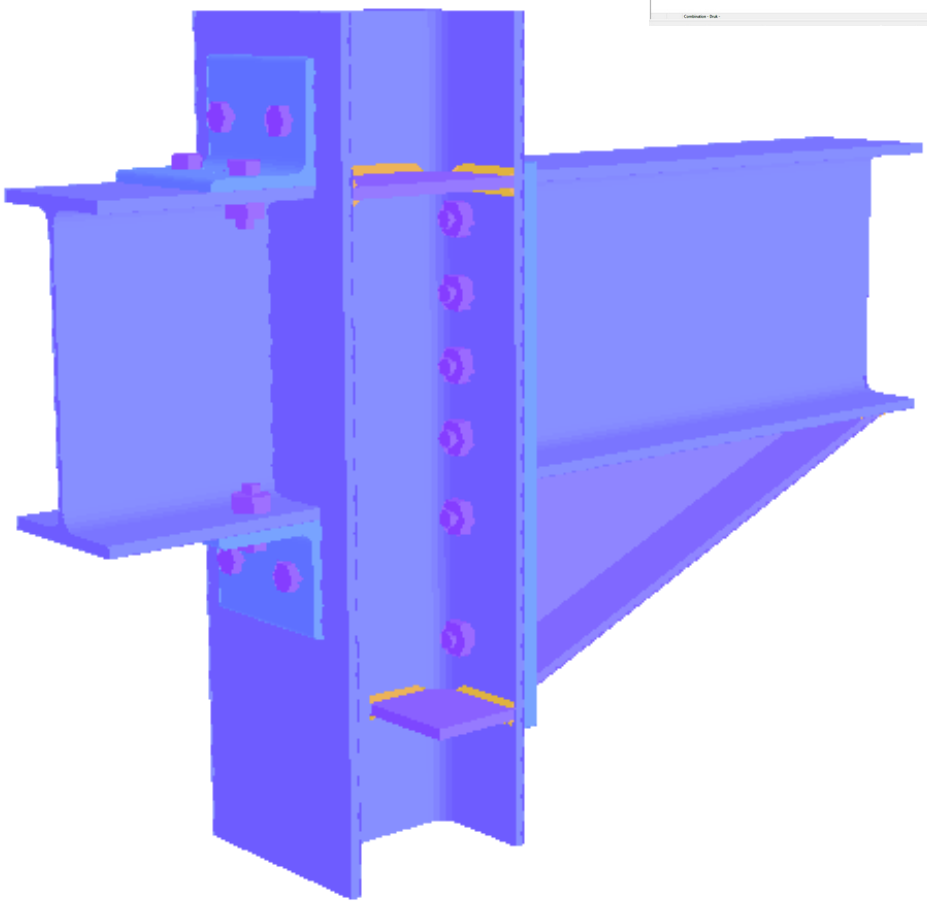
For moment connections, you may choose between column flange to beam, column web to beam, beam to column to beam, or beam to beam with an I or H profile. You have a wide choice of joint components such as bolts, welding, end plate and L profile, as well as stiffening components such as stiffeners, backing plates, web plates, haunches, diagonal stiffeners, etc.



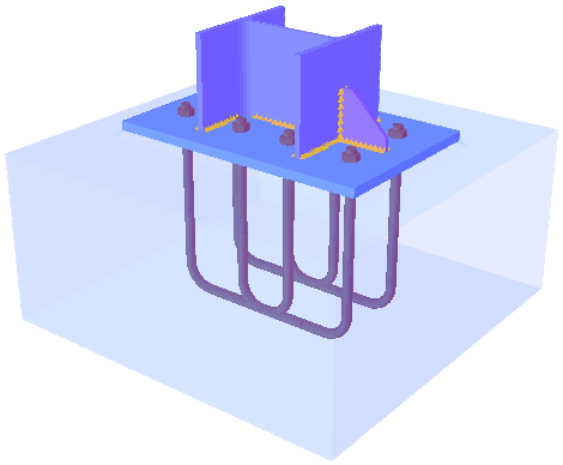
In 1 single move you can optimize the position of bolts, according to the chosen design standard.

PowerConnect calculates the resisting moment, normal force, shear and actual rotational stiffness for rigid and semi-rigid joints according to Eurocode EN 1993-1-8, AISC-LRFD and IS800. You will get a clear overview of the most loaded and most critical components in the joint.



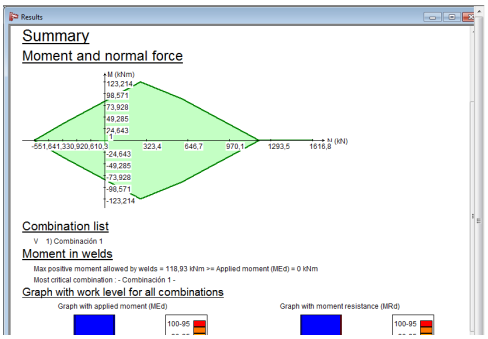


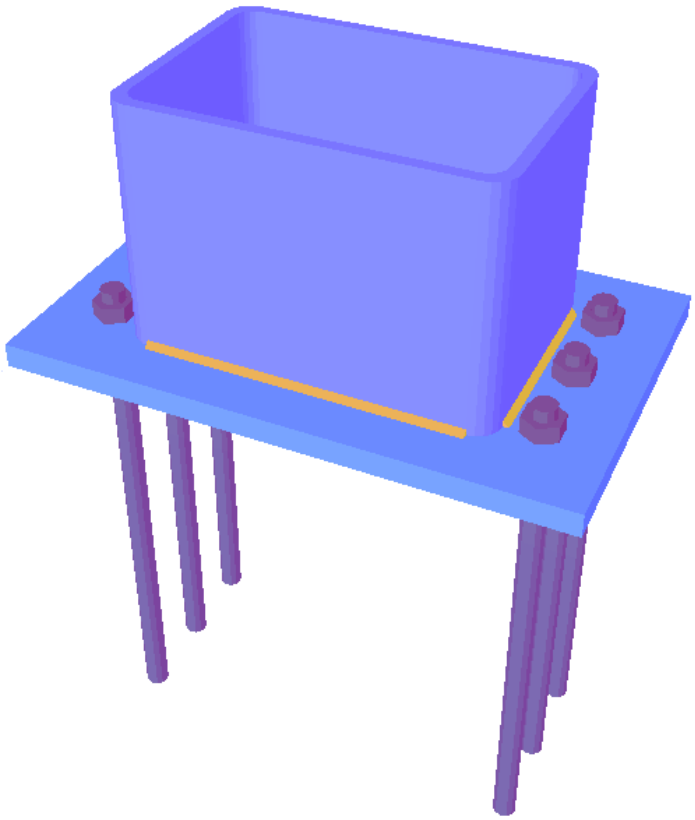
Column base connections



You can analyze simple column bases with I or H sections, rectangular and square tubular profiles. As anchors you have a choice between straight anchors with or without anchor plates and bent anchors. Anchors can be placed inside or outside the flanges of I profiles. With 1 click, you can add front, back, left and right stiffeners or cramp to the base plate.

PowerConnect calculates the work area of moment resistance and normal force, the shear capacity and actual rotational stiffness. The stiffness diagram represents the real rotation capacity, taking the various components into account.





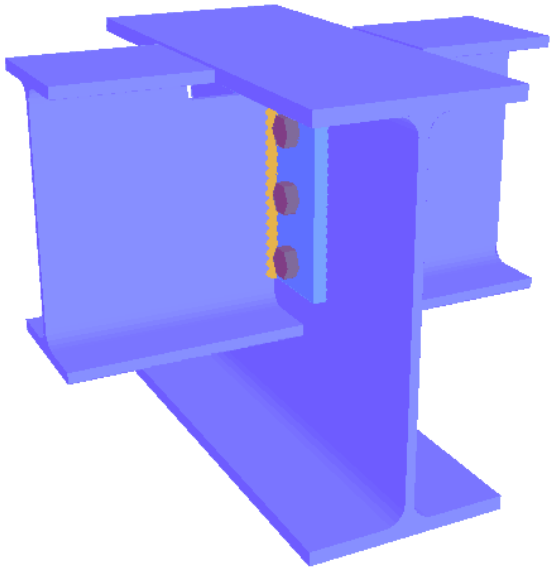
Shear connections

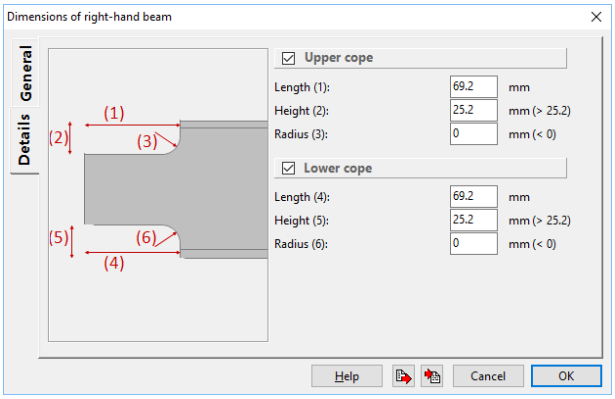
For hinge connections, you can choose between column to beam, beam to beam, beam to column to beam, and beam to beam to beam with an I, H, rectangular or square tubular profile as bearing element. You have a choice between various connecting components e.g. flexible end plate, shear plate and angle cleats.

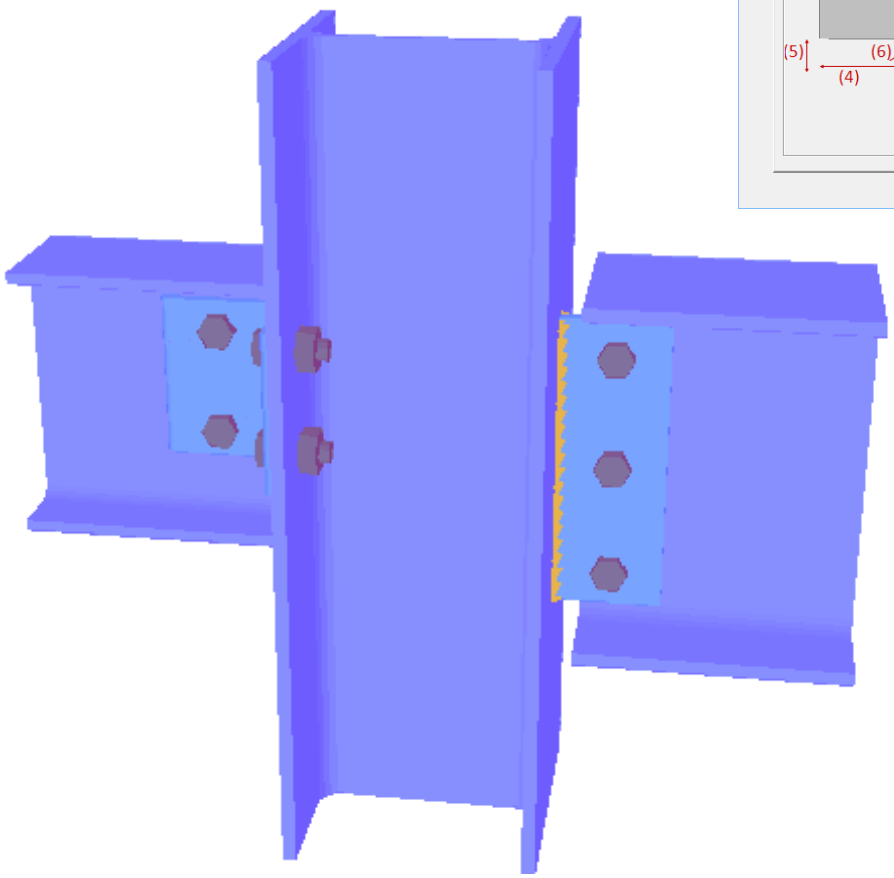
Connecting beam elements can be coped and aligned with the main profile at the bottom or at the top.

PowerConnect analyses the normal force resistance and shear force. The utilisation rate in the connection is indicated with a colour code, so you can quickly locate under- and oversized elements.

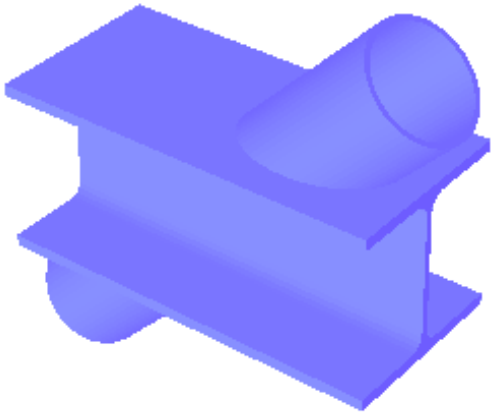
PowerConnect thus allows optimal design of each component in a connection, resulting in lighter joints.





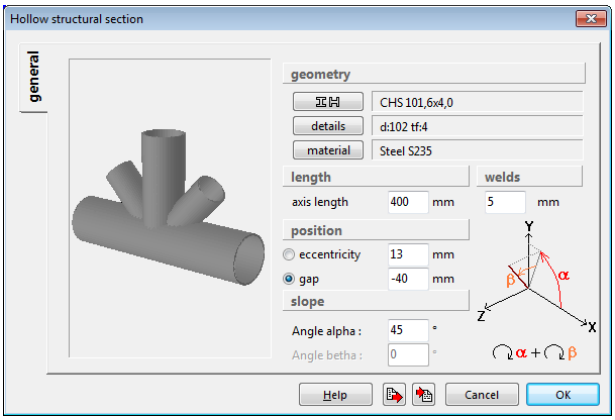


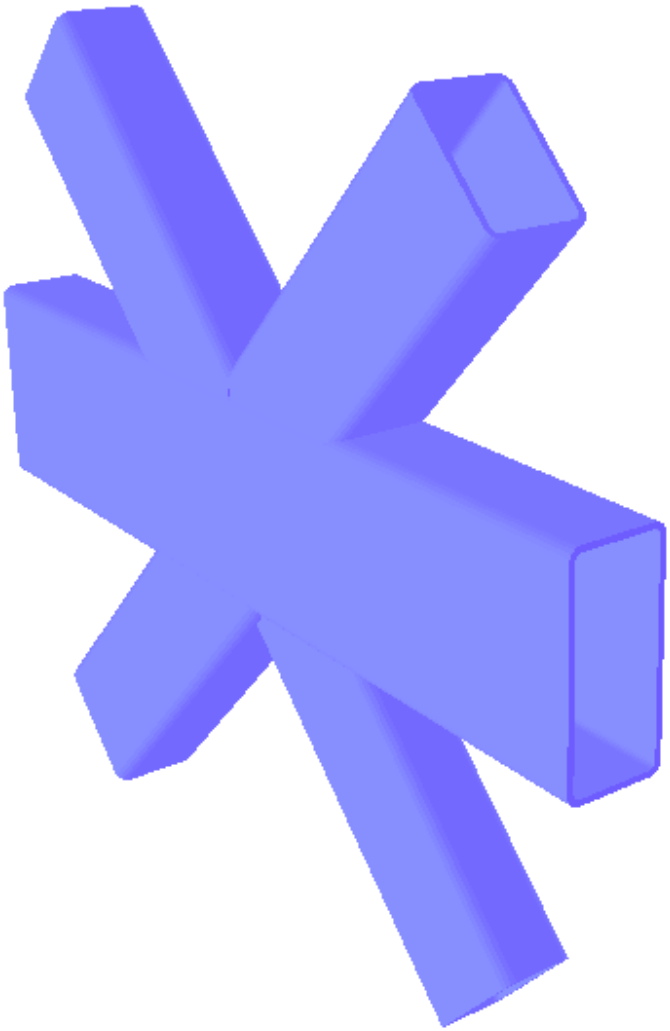
Tubular connections



Welded tubular joints can consist of 2, 3, 4 or 5 connected elements. For the cross-sections, you have the choice between rectangular, square or round tubular profiles and I or H profiles.

PowerConnect calculates the normal force resistance and in-plane and out-of-plane bending moment resistance.

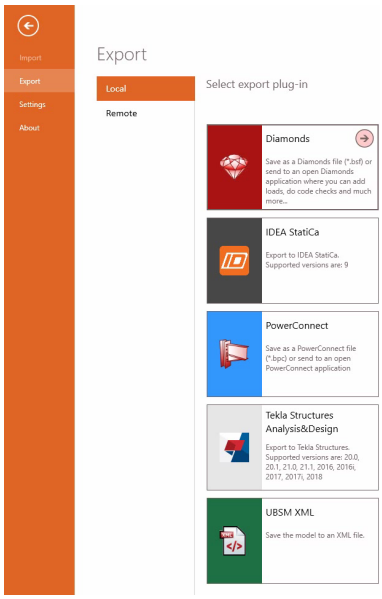




Interoperability

Exchanging BIM models with BIM Expert

BIM Expert is an easy-to-use program for sharing analysis&design and drawing models between different software packages. It can be linked both to the BuildSoft product range and to external software like Tekla Structures, Idea Statica, etc. BIM Expert is the ideal tool to synchronise model geometry, cross-sections, materials, boundary conditions and loads effortlessly between your different software products. We guarantee a short learning curve so you can start using BIM Expert in no time.



PowerConnect plug-in

BIM Expert gives you access to a wide range of plug-ins to communicate between various software products. Start with a model in one of the BuildSoft programs or in a modelling software program like Tekla Structures. Then send your model to BIM Expert via the relevant plug-in that is installed on your device.

Tekla and Tekla Structures are registered trademarks of Trimble Solutions Corporation.

IDEA STATICA is a registered trademark of IDEA RS s.r.o.

The CSI Logo®, SAP2000®, CSiBridge®, ETABS®, and SAFE® are registered trademarks of Computers &. Structures, Inc

thanks to BIM Expert

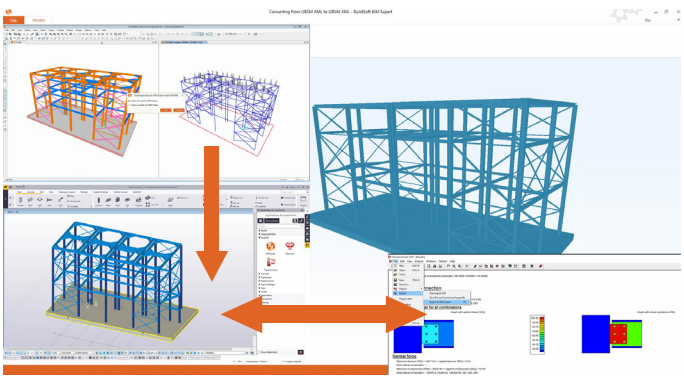
Synchronise locally and via the network

As easily as you can synchronise your models locally on your own device, you can also send them to colleagues, in your company or even elsewhere. Simply choose the user and see if they are logged on. If you are sending your models to a colleague who is absent, the BIM Expert Service will ensure that they remain available until the colleague logs on again. Once your colleague has received the model, he or she can decide to which software to transfer it, by selecting the relevant target plug-in.

Thanks to the well-designed structure for the local as well as network use of BIM Expert, it is not necessary for all users in your company to have all of the BIM Expert plug-in licenses, or for all users to have all of the target software licenses themselves.

This new way of sharing analysis and drawing models is a revolution in co-working between designers and draftsmen. The two parties can be in the same office, or on opposite sides of the globe. With the BIM Expert Server edition, all drawing and analysis models are just 1 click away, no matter where in the world you are.

Exchange example:
SAP2000 > Tekla Structures < > PowerConnect



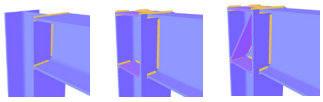
Send the calculation model with loads and results from SAP2000 to BIM Expert via the SAP 2000 plug-in. You can then send this model with BIM Expert to Tekla Structures via the Tekla plug-in. In Tekla Structures, you complete the model with connection components like end plate, fin plate or column base connections. You can choose between different connection components (14, 24, 29, 40, 41, 77, etc.). From here, you can send the adjusted model back to BIM Expert via the Tekla plug-in and check the connections with PowerConnect using the PowerConnect plug-in. You load each connection separately in PowerConnect. PowerConnect will recognise the geometry so that the connection can be optimised. The present loads are those calculated from SAP2000, with detailing attributed by the Tekla Structures connection component. PowerConnect calculates the connection and compares the strength with the related loads. If the connection is insufficient, you can make changes in the bolt configuration and add extra stiffening components such as haunches, web plates and stiffeners etc. You send all adjustments back to Tekla Structures via BIM Expert, with recognition and retention of Tekla components. If another connection component is a better match for the adjusted component from PowerConnect, for example with the addition of a haunch, the connection component will automatically be updated to the best match.

Eurocode connections

MOMENT CONNECTIONS - COLUMN BASE CONNECTIONS - SHEAR CONNECTIONS - TUBULAR CONNECTIONS

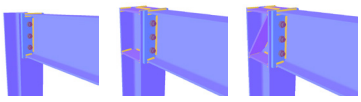
Beam - Column flange

Welded

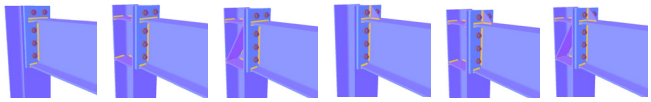


Bolted moment end plate

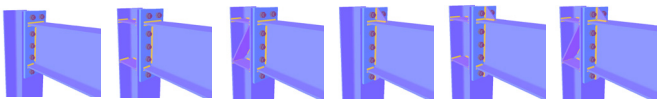
flush end plate



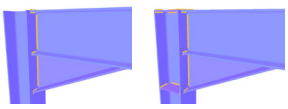
extended end plate on 1 side



extended end plate on 2 sides

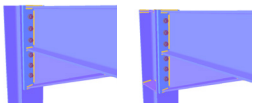


Haunched beam welded

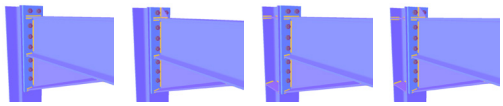


Haunched beam end plate

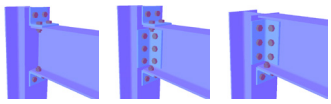
flush end plate



extended end plate

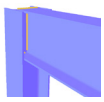


Bolted angle cleats



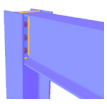
Beam - Column web

Welded

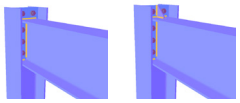


Bolted moment end plate

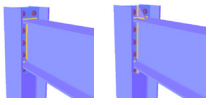
flush end plate



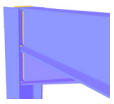
extended end plate on 1 side



extended end plate on 2 sides

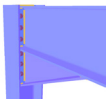


Haunched beam welded

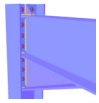


Haunched beam end plate

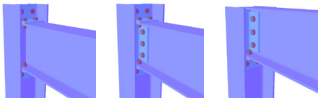
flush end plate



extended end plate



Bolted angle cleats ((on beam flanges and/or beam web)

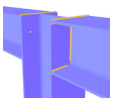


Eurocode connections

MOMENT CONNECTIONS - COLUMN BASE CONNECTIONS - SHEAR CONNECTIONS - TUBULAR CONNECTIONS

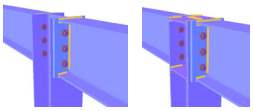
Beam - Column flange - Beam

Welded

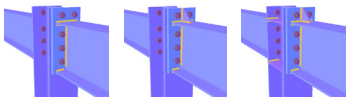


Bolted moment end plate

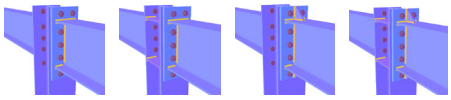
flush end plate



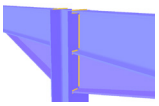
extended end plate on 1 side



extended end plate on 2 sides

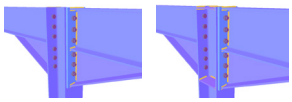


Haunched beam welded



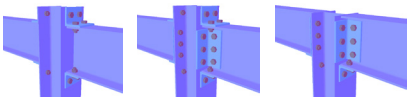
Haunched beam end plate

flush end plate



extended end plate

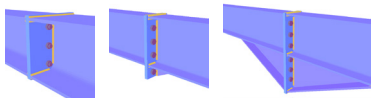
Bolted angle cleats ((on beam flanges and/or beam web)



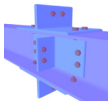
Beam - Beam

Welded

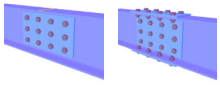
Bolted moment end plate



Bolted angle cleats



Bolted splice



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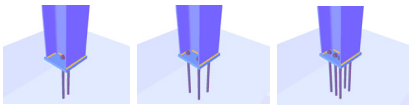
Eurocode connections

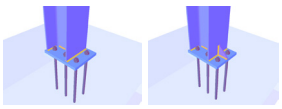
MOMENT CONNECTIONS - COLUMN BASE CONNECTIONS - SHEAR CONNECTIONS - TUBULAR CONNECTIONS

I or H cross-section

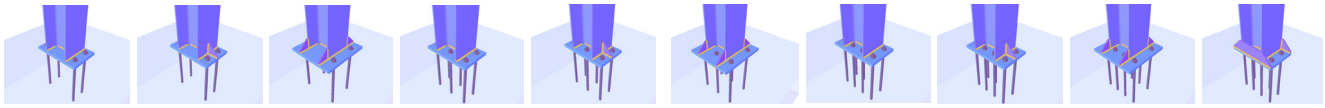
Flush base plate



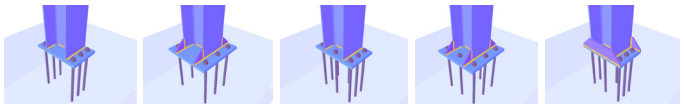
Extended base plate (1-sided)



Extended base plate (2-sided — 2 anchor bolts)



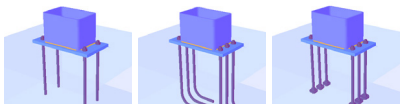
Extended base plate (2-sided — 3 anchor bolts)



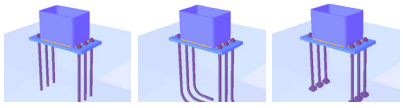
Rectangular or square cross-section

Extended base plate in 1 direction

2 anchors: straight, bent and with anchor plate

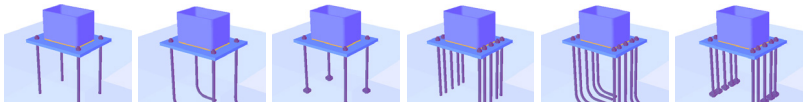


3 anchors: straight, bent and with anchor plate

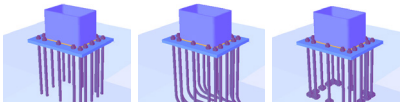


Extended base plate in 2 directions

Anchors in 1 directions: straight, bent and with anchor plate



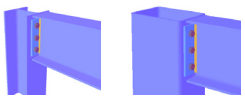
Anchors in 2 directions: straight, bent and with anchor plate



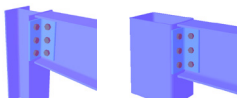
Eurocode connections

Beam - Column flange

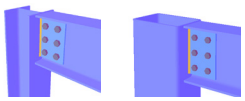
Flexible endplate



Bolted angle cleats

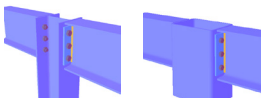


Fin plate

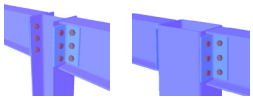


Beam - Column flange - Beam

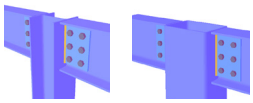
Flexible endplate



Bolted angle cleats

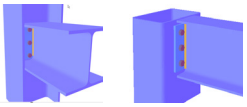


Fin plate

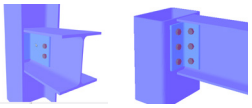


Beam - Column web

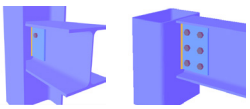
Flexible endplate



Bolted angle cleats

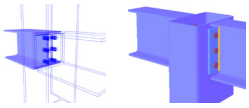


Fin plate

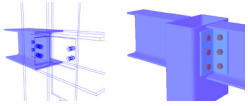


Beam - Column web - Beam

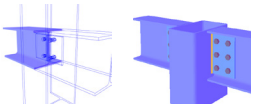
Flexible endplate



Bolted angle cleats

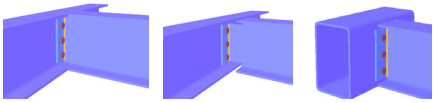


Fin plate

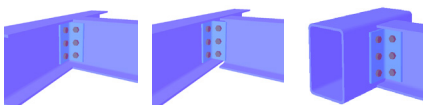


Beam - Beam web

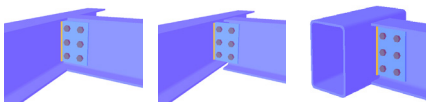
Flexible endplate



Bolted angle cleats

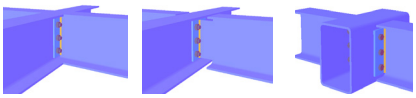


Fin plate

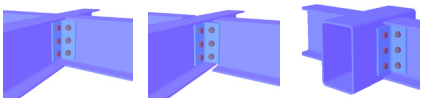


Beam - Beam web - Beam

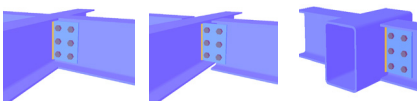
Flexible endplate



Bolted angle cleats



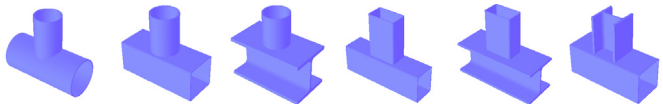
Fin plate



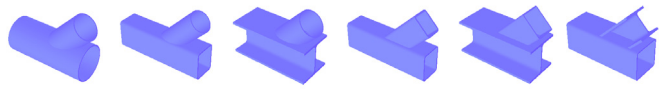
Eurocode connections

MOMENT CONNECTIONS - COLUMN BASE CONNECTIONS - SHEAR CONNECTIONS - TUBULAR CONNECTIONS

T – Connections



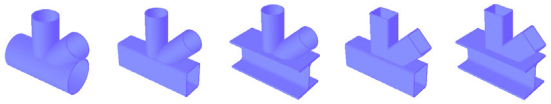
Y – Connections



X – Connections

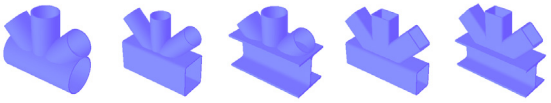
DY – Connections

N – Connections



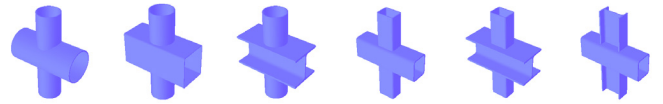
K – Connections

KT – Connections



DK – Connections

TT – Connections



AISC connections

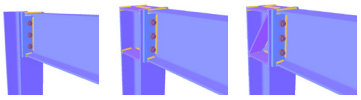
FULL MOMENT CONNECTIONS - PARTIAL MOMENT CONNECTIONS - SHEAR CONNECTIONS - TUBULAR CONNECTIONS

Beam to column flange

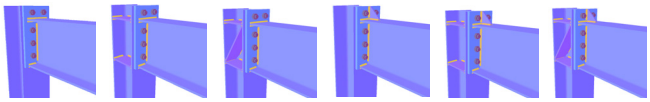
Welded

Bolted moment end plate

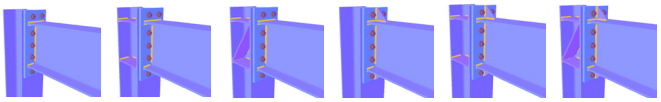
flush end plate



extended end plate on 1 side

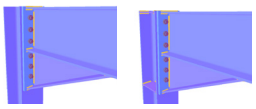


extended end plate on 2 sides

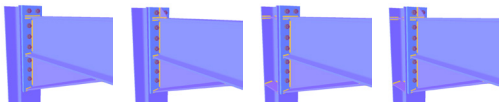


Haunched beam end plate

flush end plate

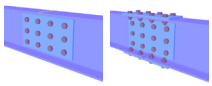


extended end plate



Beam to beam

Bolted splice

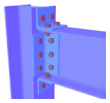


AISC connections

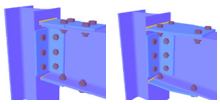
Beam to column flange

Bolted angle cleats on web

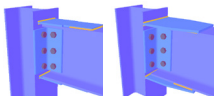
bolted angle cleats on flanges



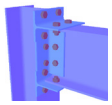
bolted connection plate on flanges



welded connection plate on flanges

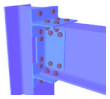


bolted T on flanges

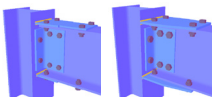


Bolted T on web

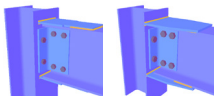
bolted T on flanges



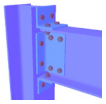
bolted connection plate on flanges



welded connection plate on flanges

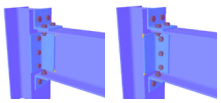


bolted angle cleats on flanges

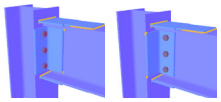


Welded angle cleats on web

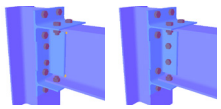
bolted angle cleats on flanges



welded connection plate on flanges



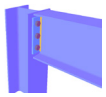
bolted T on flanges



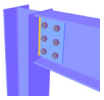
AISC connections

Beam to column flange

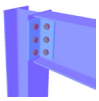
Flexible end plate



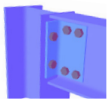
Fin plate



Bolted angle cleats



T section

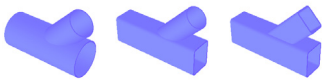


BuildSoft - structurally **loved** by engineers

AISC connections

T - Connections

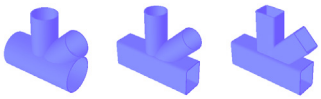
Y - Connections



X - Connections

DY - Connections

N - Connections



K - Connections

DK - Connections

TT - Connections

About BuildSoft

BuildSoft is a Belgian company specialized in software solutions for the structural design analysis of buildings and the calculation of structures in reinforced concrete, steel and timber. BuildSoft develops specialized calculation software according to the latest Eurocode, American and many local standards. We highly invest in the user-friendly and intuitive quality of our analysis software. The software is meant for structural engineers, architects, contractors and building companies.

User-friendly

Started in 1989 with the software ConCrete for continuous beams in concrete, BuildSoft has developed several time-saving programs. From the beginning, the usability was a key feature. With the increased capacities of the computers, the BuildSoft products have evolved from a 1D program to the powerful and reliable 3D finite element software Diamonds.

VIP support

"Our unique mix of power, usability and service, appeals to the customers. We give you answers to your questions. Because we have a wide technical expertise on structural analysis and Eurocodes" , says Geert Goossens, CEO of BuildSoft.

Worldwide

BuildSoft continues to innovate and invest in powerful user-friendly analysis software. The BuildSoft software is being used today in over 50 countries. With the help of resellers in Southern-Europe, Scandinavia, South America, India, Middle East and China, there are over 4000 BuildSoft licenses in use. For example, with a product like PowerConnect, for steel connection design, BuildSoft distinguishes itself from the market with both simplicity and performance and draws new customers worldwide.

References

Examples of projects calculated with BuildSoft software and a complete list of our customers (engineering offices, contractors, governments and education) can be found on our website:
http://www.buildsoft.eu/en/references

In numbers

2000	30	4000	75%	3000
customers use BuildSoft software in more than 60 different countries	years of experience in structural design analysis and design codes	licenses in use with customers	of the Diamonds customers have a maintenance or subscription contract	student registrations every year for a free educational license

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