

IDEA StatiCa

Release notes Steel Version 10.1

September 2019



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Introduction

We are really proud to introduce a brand-new version of IDEA StatiCa 10.1. This version brings an exceptional volume of new features and improvements. All that with our focus to enable engineers to work faster, evaluate the requirements of the national code thoroughly and use the optimal amount of material.

To speed up the design process, our new **batch analysis** can be of help the structural engineer to code-check all connections in the project in one swing. We have implemented a long-desired manufacturing operation “**Negative volume**” and improved the meshing of the hollow sections. We have finally figured out geometrical nonlinearity (**GNMA**) for steel connections.

BIM workflows are crucial in everyday work of structural engineers and fabricators. We have updated IDEA StatiCa BIM links and re-worked the **IDEA Open Model (IOM)** interface. This public API can be used for creating a link between IDEA StatiCa and any FEA or CAD software.

Have you ever needed your colleague to export a connection from Tekla Structures but IDEA StatiCa license was not on his machine? Now he can get a **FREE plugin to export from Tekla Structures, Advance Steel and Revit**. Also, very helpful in coordinating engineering work with detailers.

We highly recommend checking out the new **IDEA StatiCa Member** application. This tool has been introduced in the BETA version and aims at resolving stability and buckling issues in the design of steel members.

We hope you will enjoy all our new features and improvements and would love to hear your feedback anytime.

Calculate yesterday's estimates!

Installation and licensing

IDEA StatiCa Version **10.1 will not overwrite 10.0 installation**. You will have both on your PC. All future versions of IDEA StatiCa will behave the same way to ensure a smooth transition between versions.

From September 2019, IDEA StatiCa no longer supports installation on Windows 7.

Version **10.1 does not require license update** or any other action from the end-users, just download the latest setup.

Single licenses – IDEA StatiCa 10.1 can be downloaded on all PCs of the one user (sharing the license with other users is forbidden according to EULA – no change from previous versions)

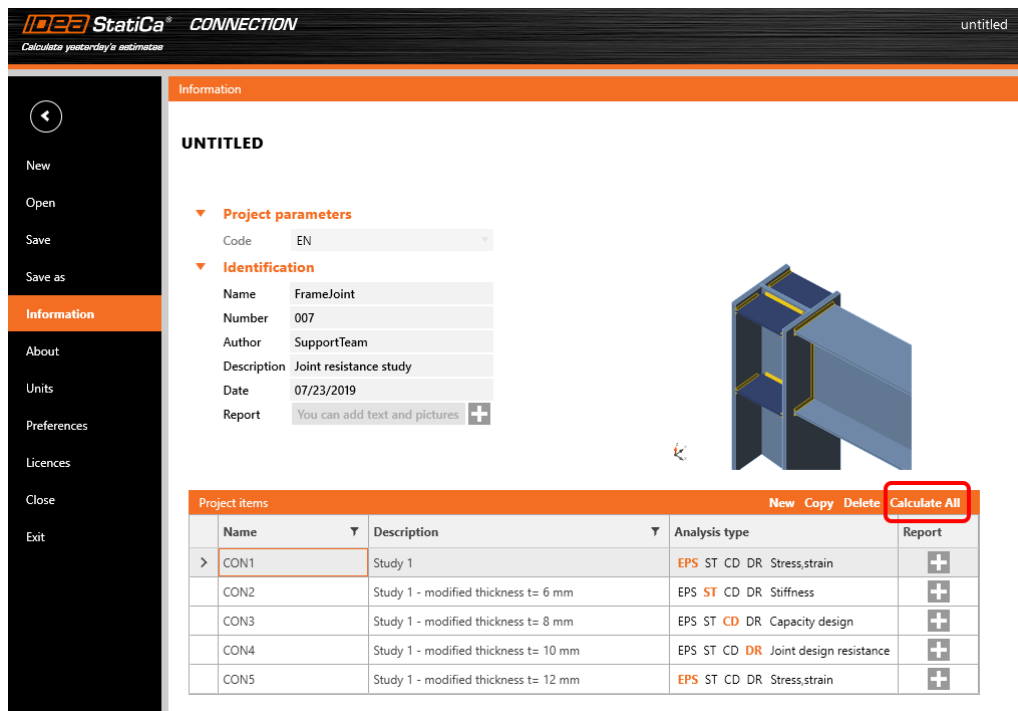
Network licenses – IDEA StatiCa 10.1 has to be deployed on all end-machines and multiple users can access it based on purchased number of seats

IDEA StatiCa Connection

Batch analysis process

The new batch feature for analysis of multiple-item projects is now available to calculate all the items at once.

All previously prepared project items can be analyzed in one batch by using the “Calculate all” command in the Project items table.

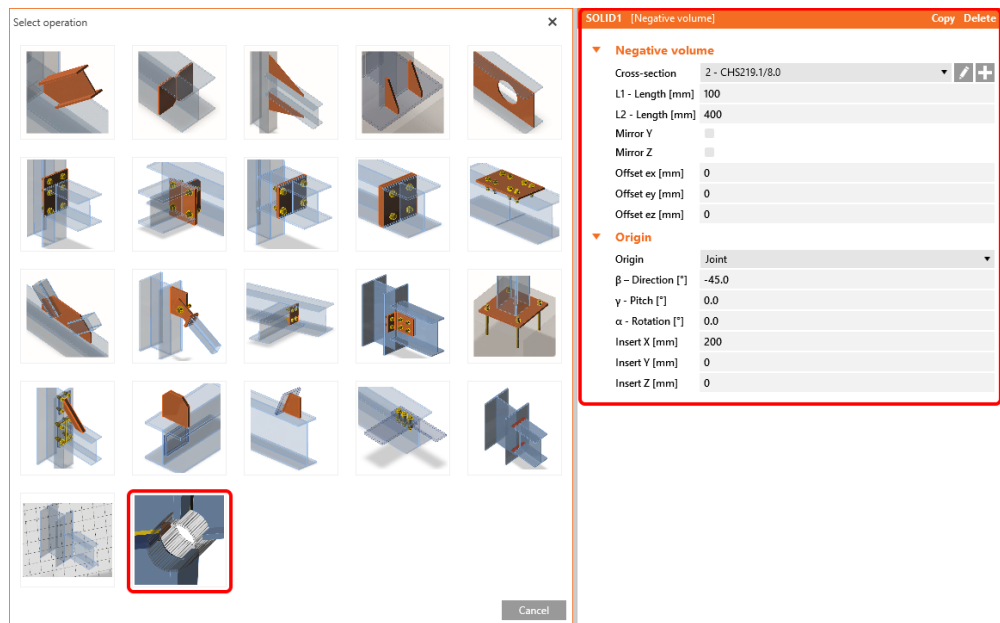


Batch calculation of all project items

New manufacturing operation: Negative volume

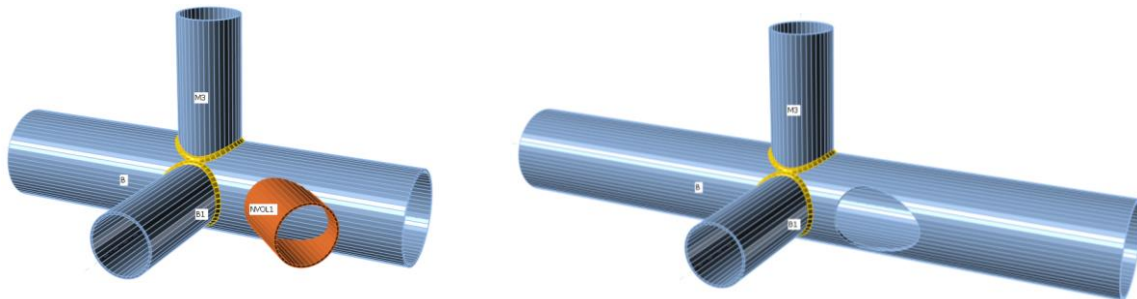
The “Negative volume” operation has been added to define an auxiliary member that enables subsequent advanced manufacturing operations.

The negative volume can be used to remove intersecting parts of members. This comes in handy especially for openings of irregular shapes.



A new manufacturing operation: Negative volume

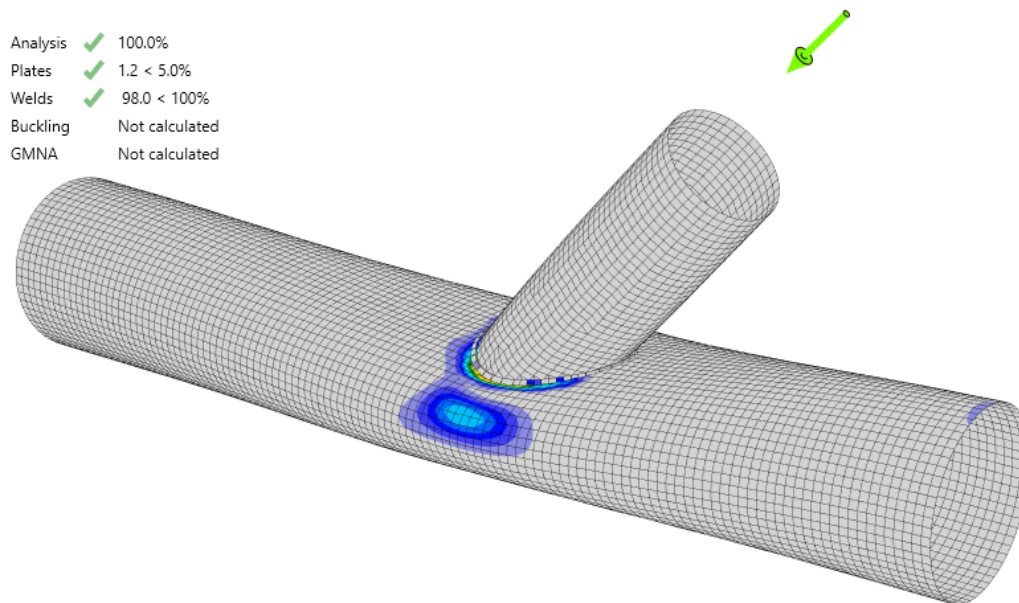
See an example of the “Negative volume” manufacturing operation used together with “Cut of member” to create an opening in the pipe.



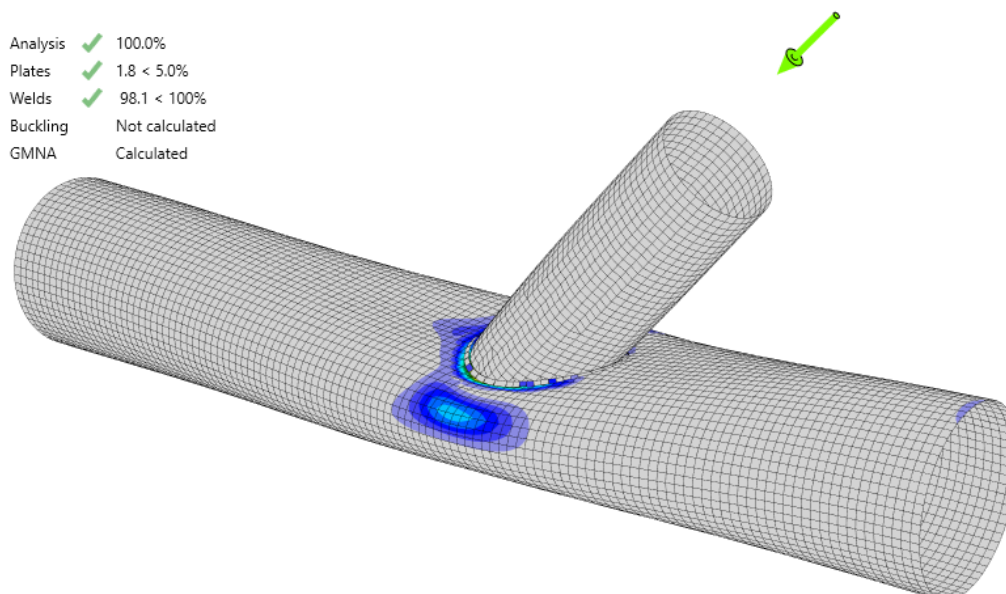
Auxiliary member (negative volume) and modeling of an opening in the pipe

Geometrically and materially nonlinear analysis (GMNA)

A brand new type of analysis for the hollow section members was implemented. Geometrically nonlinear analysis (GMNA) is an important part of the code-check for the hollow section members with significant influence on the calculated resistance of the whole connection. GMNA feature is turned on by default in all new projects where a bearing member has hollow cross-section assigned to it. Projects from previous versions keep their original settings. Users can switch into GMNA in the settings dialog.



Geometrically linear analysis of the hollow section joint



Geometrically nonlinear analysis of the hollow section joint

Until 10.0, CBFEM method has used the materially nonlinear analysis (MNA method, elasto-plastic working diagram). This solution is sufficient for the vast majority of connection cases.

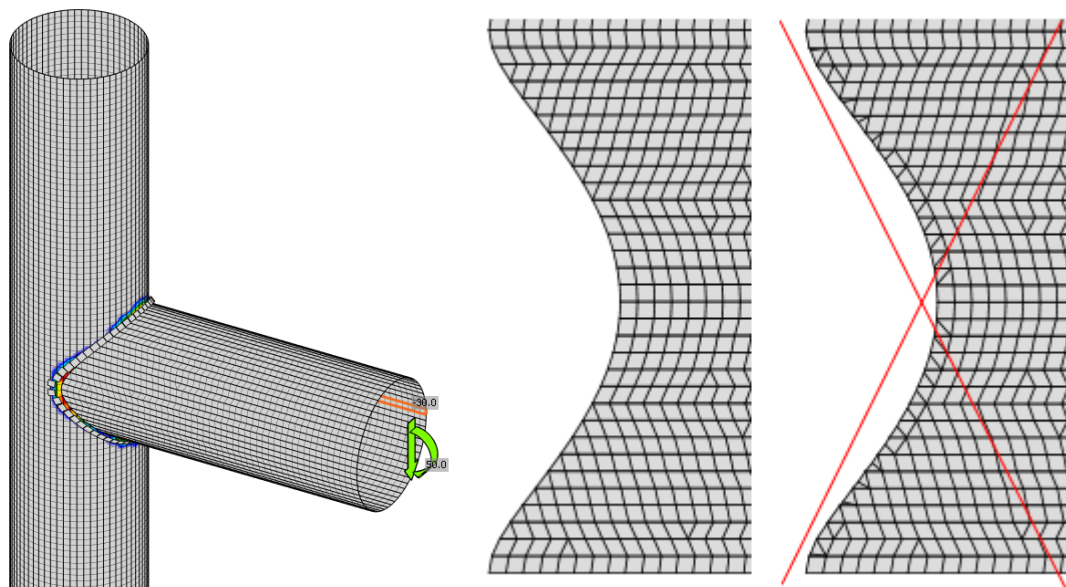
For specific hollow section members and/or members with extremely slender walls, point loading can cause high local deformations (especially of cross-sections) which influences the overall stability of the member. That is why we have developed a new and more advanced analysis based on the geometrically nonlinear solution which takes these effects into account. The new analysis is called GMNA – geometrically and materially nonlinear analysis. We have verified this approach using models from ANSYS and ABAQUS.

GMNA calculation brings results of the analysis closer to real behavior (but not necessarily to the code requirements). This might result in a scenario when a connection created in 10.0 and recalculated in 10.1 using GMNA gives different results. In general, results are less conservative for members in tension and more conservative for members in pressure.

It is possible that some connections designed in the previous version, especially those designed very aggressively and/or with border-line code-check values, will no longer pass the code-check in version 10.1. We recommend to recalculate them in version 10.1 and investigate the differences with the previous version together with your local support partner (reseller) or directly with IDEA StatiCa team.

Updated meshing of hollow section members

In the last versions, mapping the finite elements to the intersection of the hollow section members was a complicated task which often led to the uneven size of finite elements around the intersection edge. That caused high average maximum values and local extremes generated on the small triangular elements. The improved mesh generator can create more regular mesh around the edge at the intersection of the hollow members which will provide better results.



The improved meshing of hollow members cut edges

Russian design code – check of concrete block resistance

The Russian steel code was introduced already in the last version, now we have added some extensions to it. Code check of the concrete block resistance according to the SP 63.13330.2012, Cl. 8.1.44 has been implemented.

Analysis Plates Welds Anchors **Concrete block**

Check of contact stress in concrete for extreme load effect

	Status	Item	Loads	N [kN]	Rb,loc [MPa]	Ab,loc [mm ²]	Ut [%]
<input checked="" type="checkbox"/>	✓	CB 1	LE1	384.6	30.7	85227	19.6

Concrete block bearing resistance check (SP 63.13330.2012, Cl. 8.1.44)

$$\psi \cdot R_{b,loc} \cdot A_{b,loc} = 1961.5 \text{ kN} \geq N = 384.6 \text{ kN}$$

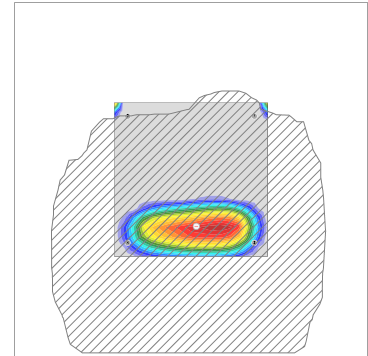
Where:

- $N = 384.6 \text{ kN}$ – local compressive force from an external load
- $\psi = 0.75$ – factor for non-uniform distribution of the local load across the bearing surface
- $R_{b,loc} = \varphi_b \cdot R_b = 30.7 \text{ MPa}$ – design compressive resistance of concrete in case of the local impact of compressive force
- $R_b = 14.2 \text{ MPa}$ – design value of concrete axial compressive resistance:

- $R_b = \frac{R_{ba}}{\gamma_b}$, where:
 - $R_{ba} = 18.5 \text{ MPa}$ – concrete compressive strength
 - $\gamma_b = 1.30$ – concentration factor taking into account the triaxial stress in concrete

$\varphi_b = 2.16$ – concentration factor

- $\varphi_b = 0.8 \cdot \sqrt{\frac{A_{b,max}}{A_{b,loc}}}$; $1.0 \leq \varphi_b \leq 2.5$, where:
 - $A_{b,loc} = 85227 \text{ mm}^2$ – application area of the compressive force
 - $A_{b,max} = 619231 \text{ mm}^2$ – maximum design area

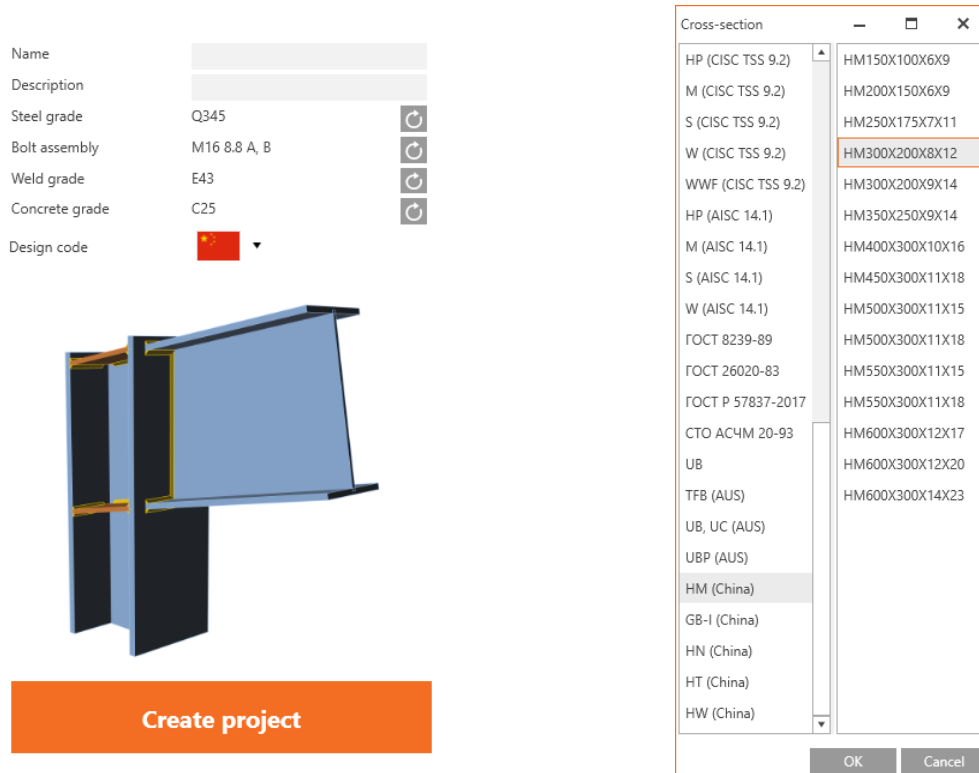


Concrete block check in SP code

Chinese design code

The Chinese steel design code (CHN) for steel-to-steel joints is now available alongside five other design standards. Component bolts, preloaded bolts, and welds are checked according to GB 50017 including detailing. Detailing check for bolts and concrete block resistance check has been implemented too.

Steel grades, bolt grades, and typical Chinese steel cross-sections are listed in the library.



Chinese standard and cross-sections

IDEA StatiCa BIM

List of latest supported versions

A lot of effort has been put to improve BIM procedures and workflows. Version 10.1 brings fine-tuned compatibility with the following FEA and CAD software:

IDEA StatiCa Connection	
Application	Supported version
Advance Design	2018, 2019
AxisVM	X5 2b
ETABS*	17
Midas Civil + Gen	2018, 2019
Revit	2019, 2020
RFEM	5.19
Robot Structural Analysis*	2019, 2020
RSTAB	8.19
SAP2000*	20.2, 21. 21.1
SCIA Engineer	18.1, 19
STAAD.Pro V8i	20.07.11.70
Tekla Structural Designer	2018i, 2019
Consteel	12, 13
SCADAPro	17
Modest	8

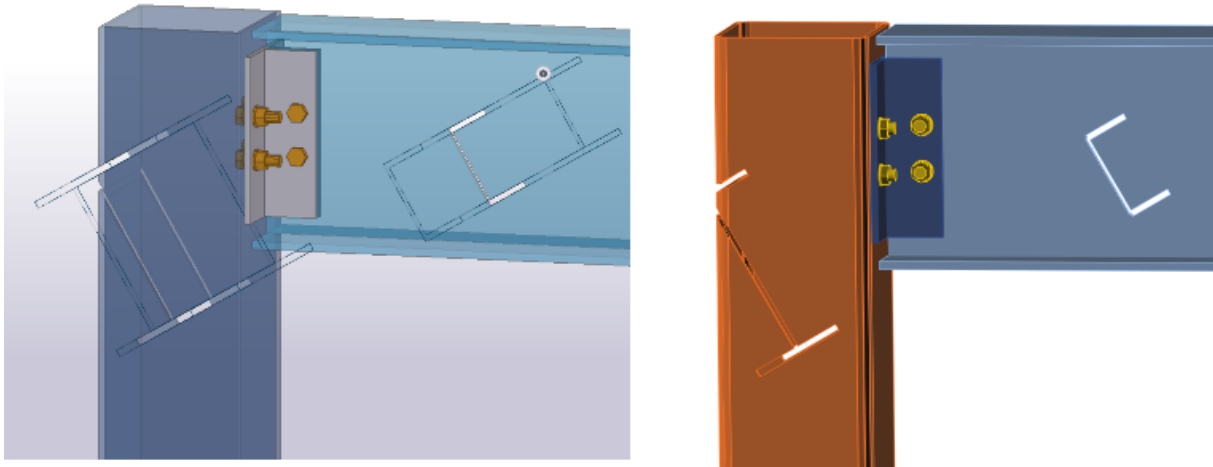
Advance Steel	2019, 2020
Tekla Structures	2018, 2018i, 2019
Advance Steel	2019, 2020

*For Robot Structural Analysis, SAP2000 and ETABS, version 10.1 supports only the direct export of connection/beam through the Code-check manager. The export of the whole model to IDEA StatiCa BIM is discontinued.

Improved export from Tekla Structures

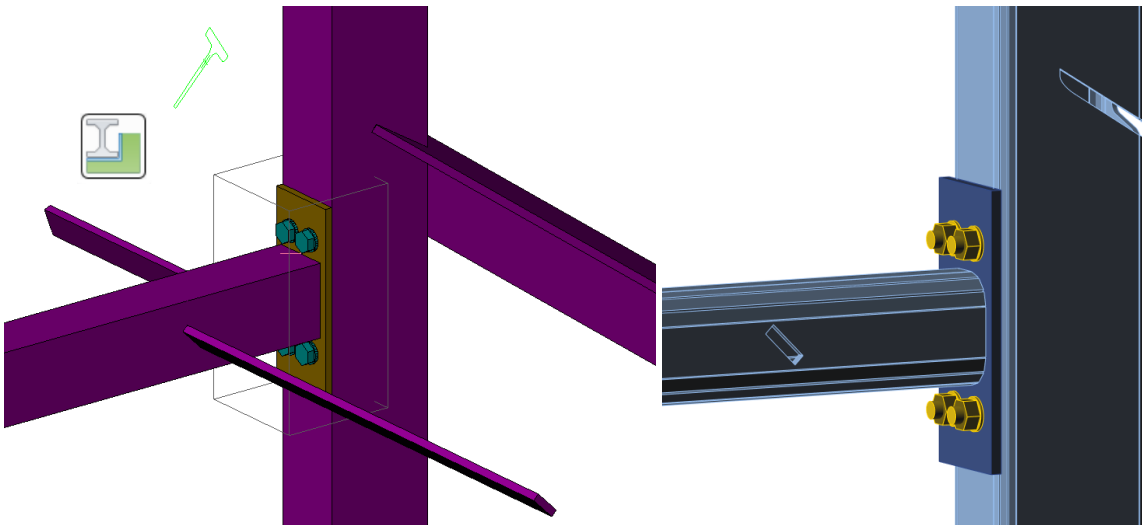
Negative volume manufacturing operation implemented in IDEA StatiCa Connection also improves the export process from Tekla Structures.

All properly modeled openings in Tekla Structures are now exported to IDEA StatiCa Connection.



Improved exports from Advance Steel

Negative volume manufacturing operation implemented in IDEA StatiCa Connection also improves the export process from Autodesk Advance Steel. All properly modeled openings using Element contour-UCS command are now imported to IDEA StatiCa Connection.



IDEA Open Model (IOM) API

We re-worked the IDEA Open Model (IOM) interface. This public API can be used for creating a link between IDEA StatiCa and any FEA or CAD software.

We have placed all information such as repositories and IOM-examples at GitHub community. The forum can be used for the resolving issues with implementation IDEA StatiCa IOM by third parties.

<https://github.com/idea-statica>

The screenshot shows the GitHub profile page for IDEA StatiCa. At the top, there's a navigation bar with links like 'Why GitHub?', 'Enterprise', 'Explore', 'Marketplace', and 'Pricing'. Below this, the profile header includes the IDEA StatiCa logo, the name 'IDEA StatiCa', a description 'Engineering software dedicated to structural design and code-check of joints, cross sections, beams and other details.', and location 'Brno, Czech Republic'. A tab bar shows 'Repositories' (2), 'Packages', 'People', and 'Projects'. A large banner promotes 'Grow your team on GitHub' with a 'Sign up' button. Below the banner, there are filters for 'Find a repository...', 'Type: All', and 'Language: All'. The repository list shows two items: 'iom' and 'iom-examples'. The 'iom' repository has a description, a C# language indicator, 0 forks, 1 star, 3 issues, and 0 pull requests, updated on Jun 25. The 'iom-examples' repository has a description, a C# language indicator, 0 forks, 0 stars, 0 issues, and 0 pull requests, also updated on Jun 25. On the right, a sidebar shows 'Top languages' with C# at the top and a 'People' section stating that the organization has no public members.

Why GitHub? ▾ Enterprise Explore ▾ Marketplace Pricing ▾ Search Sign in Sign up

IDEA StatiCa
Engineering software dedicated to structural design and code-check of joints, cross sections, beams and other details.
Brno, Czech Republic <https://www.ideastatica.com>

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Grow your team on GitHub Dismiss
GitHub is home to over 36 million developers working together. Join them to grow your own development teams, manage permissions, and collaborate on projects.
Sign up

Find a repository... Type: All ▾ Language: All ▾

iom
IOM interface can be used for the implementation of the link of any application with IDEA StatiCa products.
C# 0 1 3 0 Updated on Jun 25

iom-examples
IOM examples.
C# 0 0 0 0 Updated on Jun 25

Top languages
C#

People >
This organization has no public members. You must be a member to see who's a part of this organization.

IDEA StatiCa Member

There are many great tools for global analysis of steel structures – SAP2000, Robot Structural Analysis, STAADPro, etc. They cover the majority of requirements of structural steel designers. But share two blindspots:

- Connection design
- Stability and buckling

IDEA StatiCa now offers a solution for both of these issues:

- **IDEA StatiCa Connection** for checking connections of any topology
- **IDEA StatiCa Member** for solving stability and buckling of steel members

Design of a complex member or a segment of the structure is now easier than ever. The analyzed member and all members related to it are separated from the 3D frame and calculated using the unique CBFEM method:

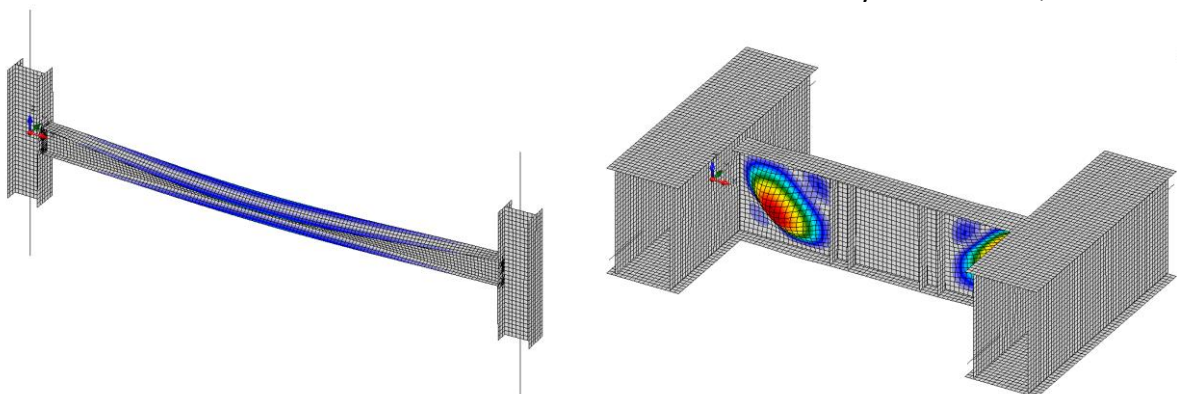
- Global analysis of the steel frame is done in an FEA program
- Analyzed member is loaded by calculated internal forces
- Nodes and connections are designed in IDEA StatiCa Connection
- Manufacturing operations can be applied to the member – transversal or longitudinal stiffeners, opening, cuts, etc.
- Loads are applied to members and at the ends of related members (equilibrium principle)
- Analysis model of Member is created automatically by CBFEM

IDEA StatiCa Member provides 3 types of analysis:

- MNA – Materially Non-linear Analysis
- LBA – Linear Buckling Analysis (buckling, stability)
- GMNIA – Geometrically and Materially Non-linear Analysis with Imperfections

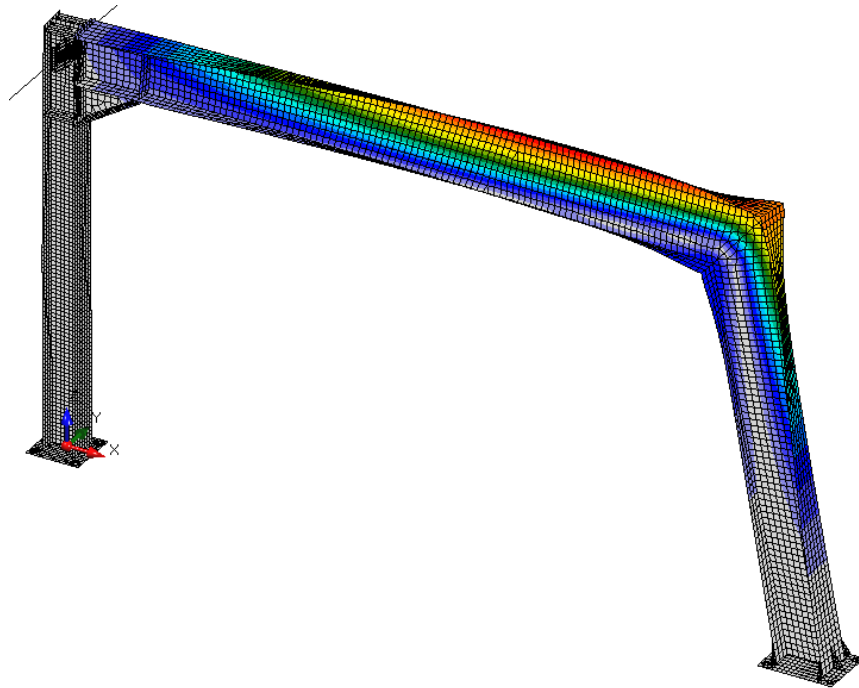
IDEA StatiCa 10.1 brings a BETA version of IDEA StatiCa Member for structural analysis and design of steel members (beams, columns, diagonals, etc.) to demonstrate the calculation possibilities.

BETA version of IDEA StatiCa Member is available to all users with any steel license,



Global and local buckling simulated in IDEA StatiCa Member

automatically, for free, part of the standard setup. More information, tutorials, sample projects and a lot more can be found at our [IDEA StatiCa Member](#) web page.



Buckling of a frame in IDEA StatiCa Member

IDEA StatiCa Viewer

New workflow for engineers and detailers without IDEA StatiCa license

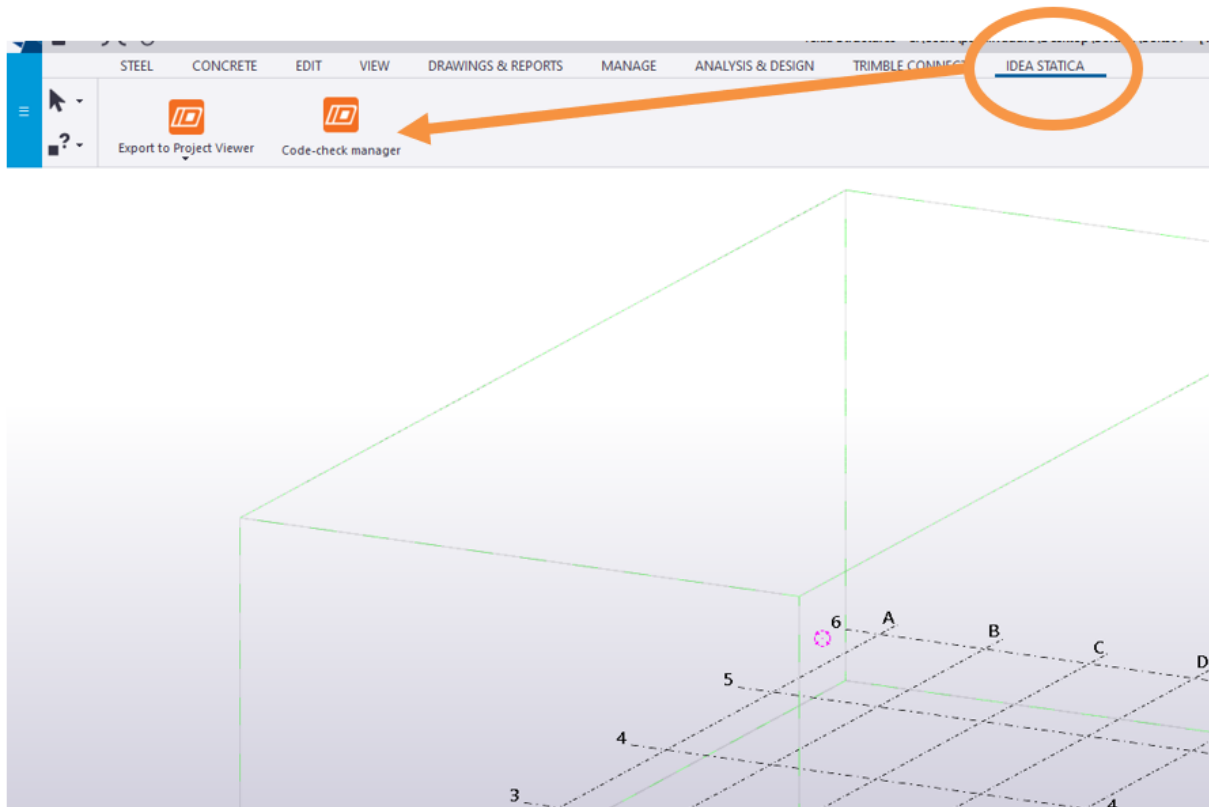
Have you ever needed your colleague to export a connection from Tekla Structures but IDEA StatiCa license was not on his machine? Now he can get a FREE plugin to export from Tekla Structures, Advance Steel and Revit.

Moreover, all detailers without IDEA StatiCa license can export a connection to the Project Viewer and send the .ideacon file to the structural engineer.

Export

IDEA StatiCa ribbon inside Tekla Structures or Revit now has two buttons:

- **Code-check manager** – this is the standard desktop integration activated while installing IDEA StatiCa setup (and it is paid). It enables to work with multiple connections at a time, synchronize models, etc.
- **Viewer** – new button to export any connection to the online environment of the IDEA StatiCa Viewer. This is FREE. That means it does not require a license of IDEA StatiCa. It gets activated by downloading a plugin from IDEA StatiCa website or Tekla Warehouse.



Export from Advance Steel

IDEA StatiCa is called using commands in Advance Steel.

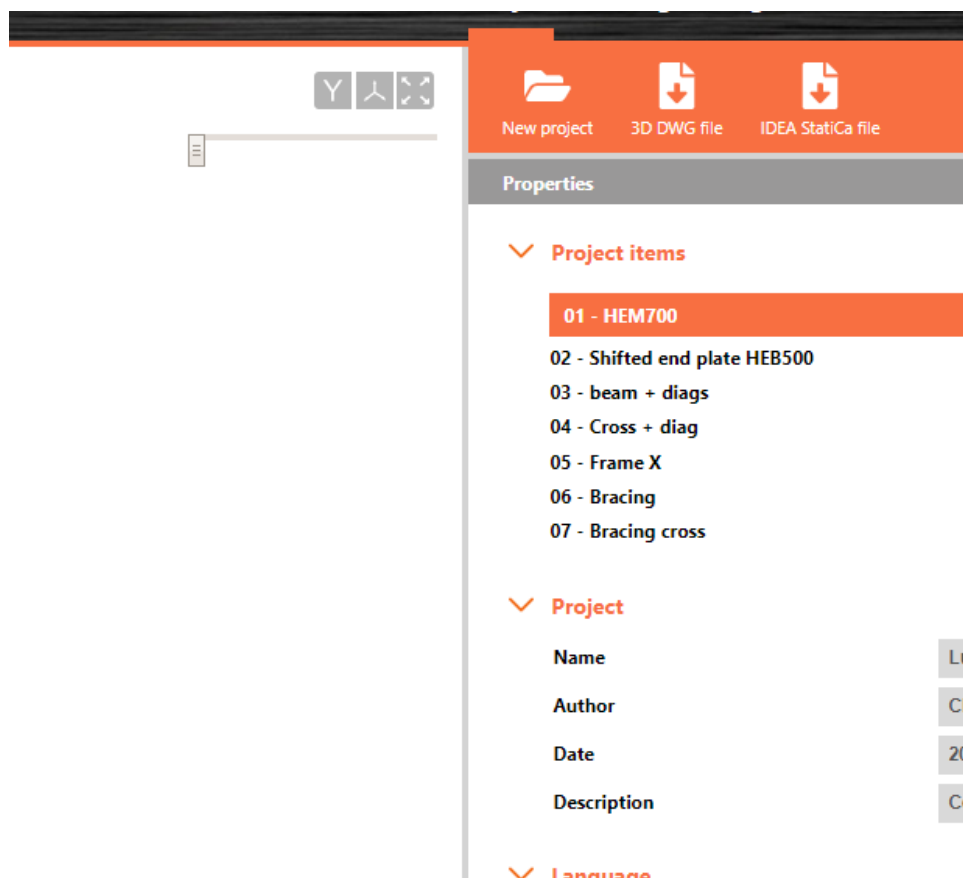
CONUI – launches the **Code-check manager**. This is the standard desktop integration activated while installing IDEA StatiCa setup (and it is paid). It enables to work with multiple connections at a time, synchronize models, etc.

There are now **six new commands** to export any connection to the online environment of the IDEA StatiCa Viewer. This is FREE. That means it does not require a license of IDEA StatiCa. It gets activated by downloading a plugin from IDEA StatiCa website or Autodesk App Store. They differ according to the desired design code:

- CONEXPORT-EN
- CONEXPORT-AISC
- CONEXPORT-CISC
- CONEXPORT-AS
- CONEXPORT-SP
- CONEXPORT-GB

Export options

IDEA StatiCa Viewer has a new export option – download IDEA StatiCa project:



This is accessible right in the main ribbon, next to the export to 3D Dwg.