What's new in Consteel 15?

2021.11.22.

version: 15.0

Content

Superbeam

Consteel has broadened the concept of traditional bar members with the Superbeam concept, which allows performing the analysis on two consistently generated calculation models (bar and shell model). The member model in Consteel 15 is still built-up with conventional 1D bar members, however, with the help of a simple switch, it is possible for any bar member with welded I-section to switch between using a conventional 7DOF bar or a shell finite element for the analysis (other section types are coming later). This makes it possible to examine certain structural parts more thoroughly with the accuracy of the 2D shell model while keeping the possibility of simple modeling and modification offered by 1D bar members. It is important to note that this finite element model change is fully automatic and can be reversed at any time.

Extended modeling of the bar members also allows the incorporation of details such as web cutouts and stiffeners into the model. The placed detail objects are also automatically converted into shell members and participate in the stress and buckling analysis.

It is possible to place three types of stiffeners:

- perpendicular plate
- perpendicular profile
- parallel plate

The cutouts that can be placed anywhere on the web can also take three forms:

- circle
- rectangle
- hexagon

(Note: Structural design (global or member level) is available only for members calculated with beam finite elements. For members calculated with shell finite elements

- similarly to other 2D members defined with shell elements - deformation and stress results are available.)

Watch here our feature preview of the Superbeam!

We created various learning materials how to use the Superbeam feature, all of them can be found in our Knowledge Base.
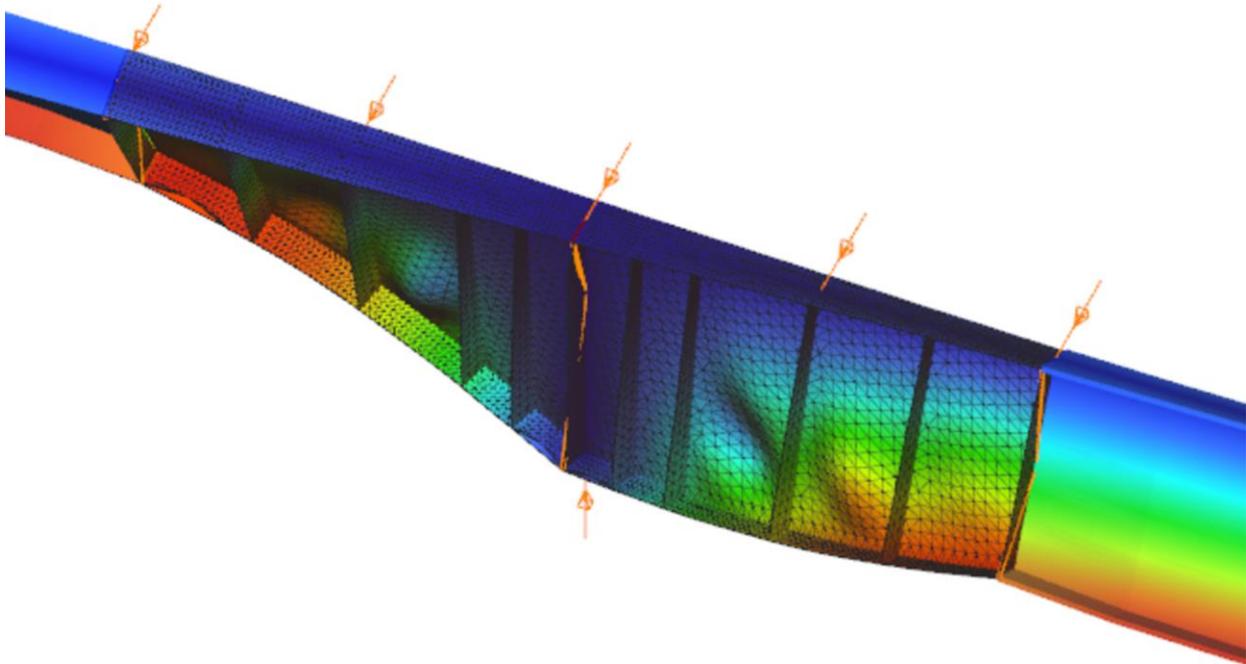

*Stiffeners converted into shell members*

Project Center

From now, the new Project Center unites all the functionalities for model and account management, supplemented with easy access to personalized information and learning materials. Here you can create new models, easily browse your recent models, and open models stored on your computer or in your cloud storage. Searching for recent models is also facilitated by auto-generated preview images, which always show the

most recently saved status of the models. Models from the cloud can be shared with other Consteel users with multilevel authorization, allowing full access to the shared model - view, save as and execute operations or calculations - or view-only access. In license info, you can view the details of the license you are accessing, set your preferences on the protection and software launch settings, or borrow an online protected license for offline use for a pre-determined period of time. In the new Info Hub area, customized information is provided highlighting news, upcoming events, software updates, release notes, blog articles, or learning materials. The learning center offers various learning materials and example models from the Knowledge base to deepen your expertise in using Consteel.

Watch our feature preview [here](#)!
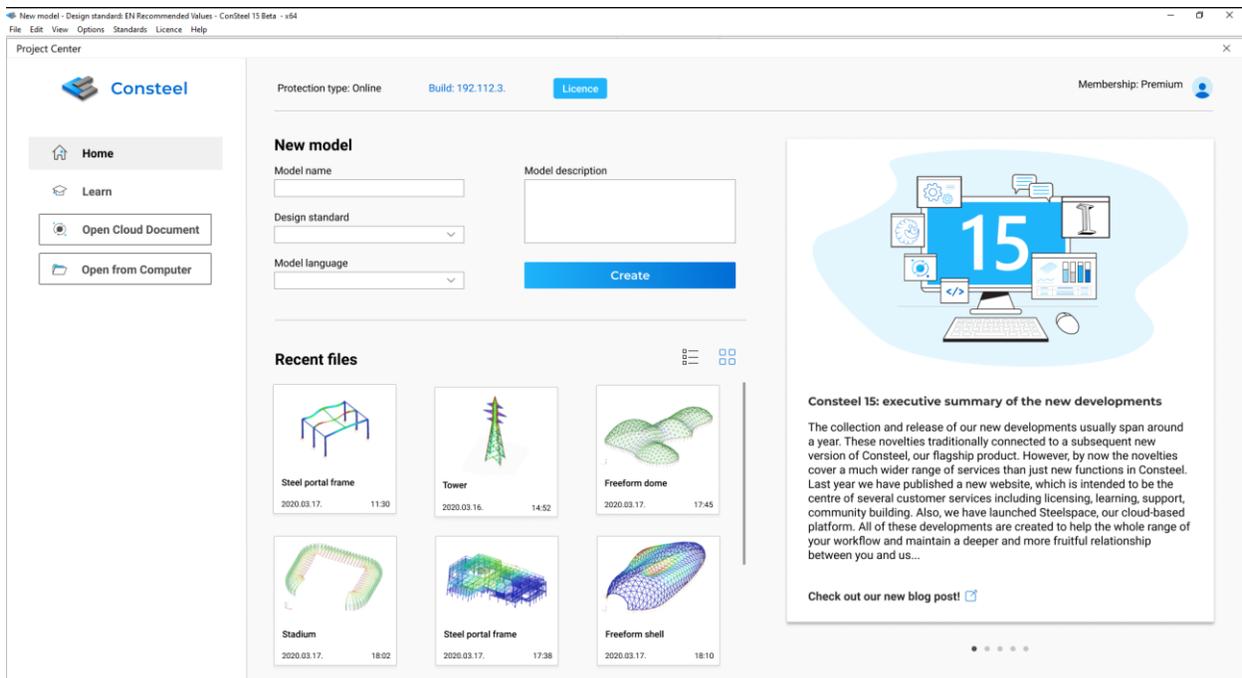
*Home screen of the Project Center*
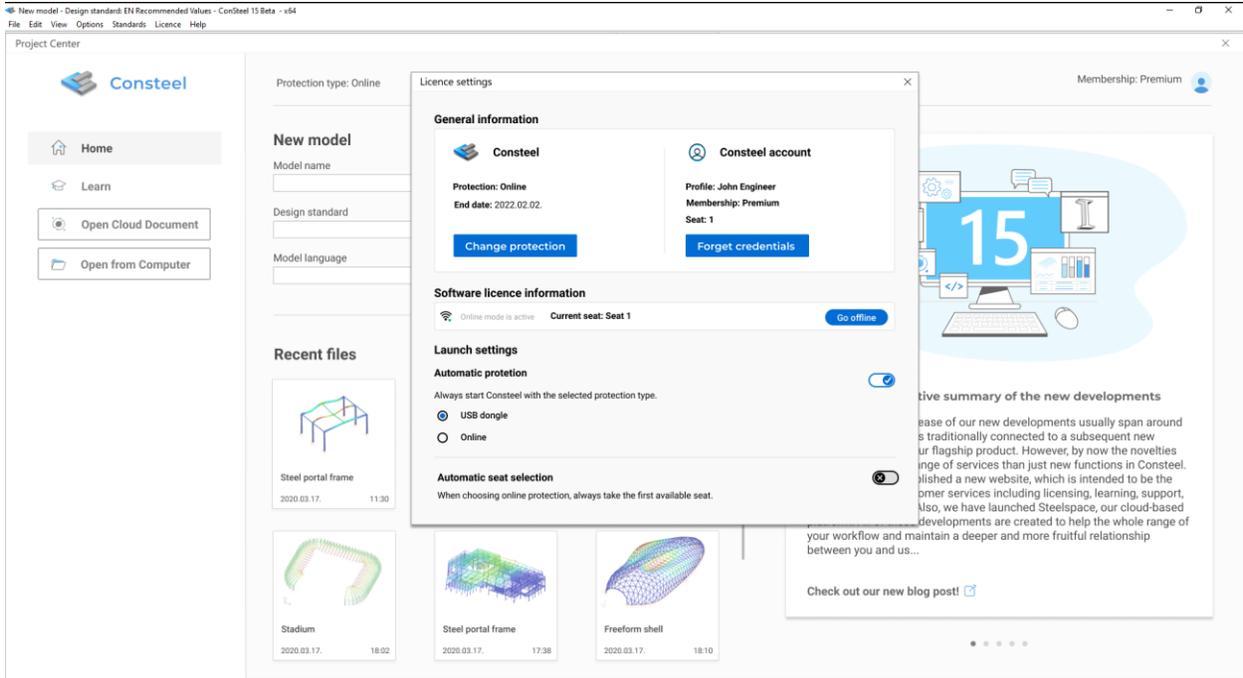
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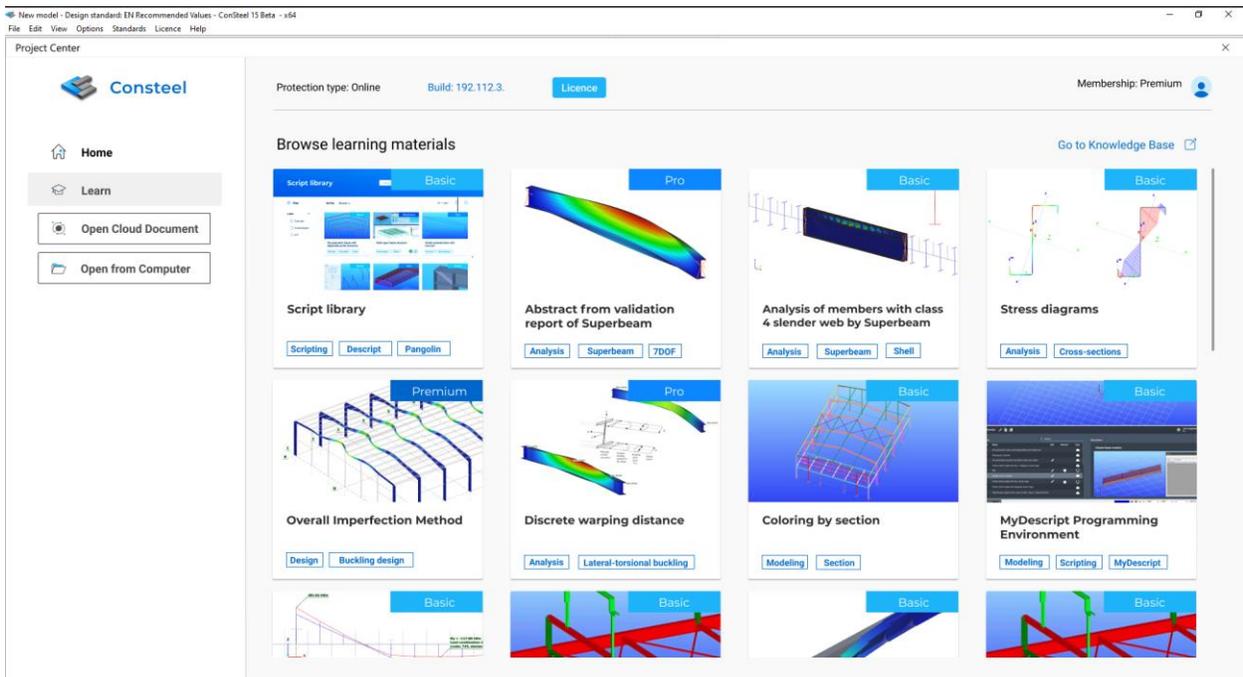
Learning center

Cloud services[Beta]

No more file transferring is needed. Save and store your Consteel model and result files in the cloud and share them with others from Consteel to make collaboration easier.

Steelspace, your cloud service platform, will provide your models storing, sharing, and commenting options. With the new cloud-save and cloud-open possibilities, you can manage your models as if you had personal cloud storage right on your desktop. Your cloud-saved models will accumulate in this store and you can quickly view, access, open or share them also directly from Consteel. It is also possible to control the authorization level for shared models to ensure full access or more strict usage for a shared model.

Watch how cloud save works here!
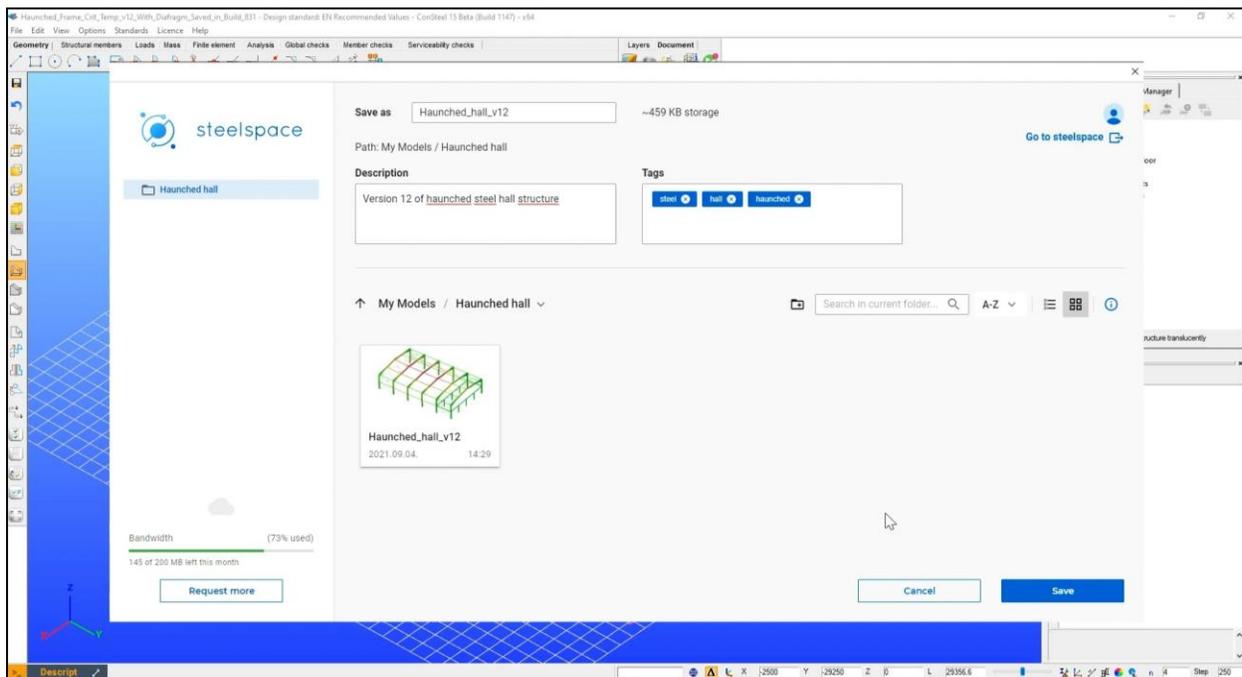
Cloud save

Service Center

A place where you can easily access our structured knowledge and experience in structural analysis, standard design methods, and the recent modern technologies of the construction industry.

User Manuals: include detailed descriptions of [Consteel features](#) and [Descript functions](#) to get familiar with them in a new online form with easy navigation between topics, search, detailed guides, and feedback options to share your ideas and needs with us. Watch how the Online Manual works [here](#)!

Knowledge Base: a well-curated collection of learning materials and models of different types and levels to help your understanding of how to develop an effective design workflow in Consteel. It includes guides for how to start with Consteel, tips & tricks for best practices, example models to try out features, user guides for in-depth theory and application theory backgrounds for diving into the scientific background of a specific Consteel solution, and many more. Watch how to browse in the Knowledge Base [here](#)!

Script Library: an all-around selection of multilevel scripting solutions. Includes a wide range of prepared **Descript** examples which are ready to go to use in Consteel and speed up the workflow. Covers also many Grasshopper scripts to utilize parametric design with **Pangolin** and show the best practices. Introduces also various scripts for advanced users to take advantage of the power of **Consteel API**. Watch [here](#) how the Script Library works!

Access for users to the Service Center materials is based on the [Consteel Community Membership](#) levels.

Online protection and license management

The online software protection system has been expanded to all users from students, individual professionals to design offices with greater teams.

The new developments ensure smooth and convenient license management to cover all necessary services coming with the new Subscription plans and Consteel Community Membership system as well. It has been also integrated into Consteel therefore one can always check the actual license status either in Consteel or in the personal account on our website.

Customers with Team subscriptions can use a new online license management tool to control the allocation of software seats and accesses to end-users, providing much more flexible and optimal software use within the company.

Watch how the online account works here!

License information

User management for teams

Consteel API

API is the acronym for Application Programming Interface, which is a software intermediary that allows two applications to talk to each other.

Why Consteel API matters in steel design?

With the power of coding, the API supports actions such as retrieving and creating cross-sections, structural members, supports, link elements, loads, and much more

types of model objects. The API can read and write model files and even communicate with a running Consteel instance and enables users to interact with the Consteel model through their own code instead of the graphical user interface, making complex tasks less time-consuming.

If you would like to enhance your workflow with the Consteel API, don't hesitate to contact us.

MyDescript Programming Environment

A custom-built and now updated programing language and personal scripting environment used directly inside Consteel to speed up your workflow.

The Descript script language (former csPI) was designed to assist the needs of a structural engineer and to be a powerful tool to create access, and manipulate flexibly model objects and operations or calculations on them. Allows for automation of tedious or hard tasks that do not have specific preexisting solutions, but which can be done with Descript's toolset. The MyDescript interface, the personal scripting environment in Consteel gives the opportunity to create or add your own Descript files or gain access with your online account to more scripting solutions from the Script Library. A detailed Descript manual is also provided to help get started with scripting.

Watch how capable Descript is and how the MyDescript interface works!
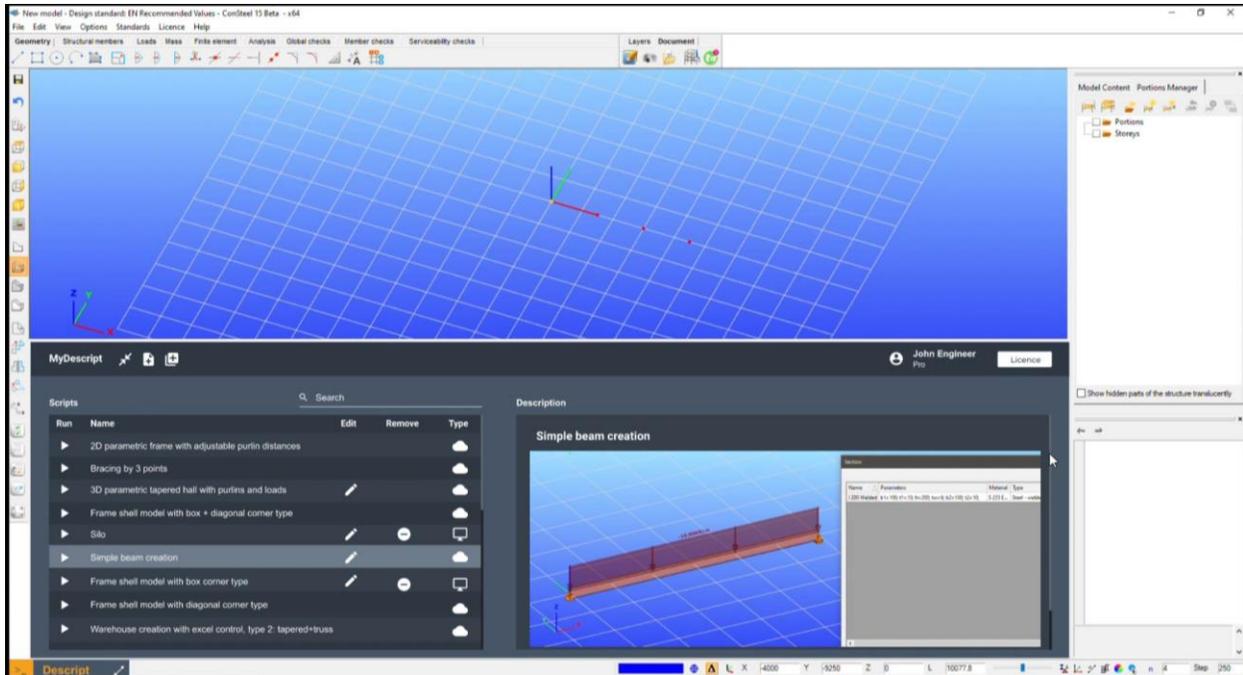
MyDescript interface

Pangolin 2.0

The Pangolin plugin integrates the creation and analysis of Consteel models into Rhino / Grasshopper parametric modeling environment.

The Pangolin plug-in allows you to create a Consteel model directly in Grasshopper, with profiles, supports, loads, and all the features and functions available in Consteel. This model can then be uploaded to the cloud via Steelspace, or even directly to Consteel. The live connection between Grasshopper and Consteel also allows us to supplement the model built in Consteel with additional elements and loads in Grasshopper, of course also in a parametric way.

The new 2.0 update includes:

Load the results of the first and second-order analysis and the global design (code-design) back into the Grasshopper model. The transfered data includes stresses, buckling eigenvalues, deformations, deformed shapes, including buckling shapes. The

Consteel

design results include the dominant results, along with the resulting load combination, as well as all sub-results for each finite element checked.

Download Pangolin and try for free from [here](#). (Rhino-Grasshopper will be needed.)

Read our guide [here](#) how to get started with Pangolin.

You can find [example models](#) in the Script Library as well.

Open SAF models

A new file format has been added to the range of formats that can be read by Consteel. This is SAF (Structural Analysis Format), an Excel-based, open exchange format developed by the Nemetschek Group and already supported by many other engineering and architect software as well. It is intended to improve the collaboration between structural engineers on the one hand, and different disciplines on the other, by developing an open exchange format for exchanging structural analysis data (static model and loads) between FEA and CAD programs.

With Consteel 15, engineers are now able to open structural analysis models exported in SAF format (files have a .xlsx extension in this format) that are directly converted to a Consteel model in the process.

Member-coloring by cross-sections

A new possibility has been added to the visualization of the structural model: the representation of the model colored according to the sections. In Consteel 15, each section is automatically assigned a unique color when the section is loaded, which can of course be changed later. Colors are also assigned when models from previous versions are opened. On the right side of the status bar is a new switch to toggle between default and section-based coloring.

Learn how to use this feature [here](https://consteelsoftware.com)!
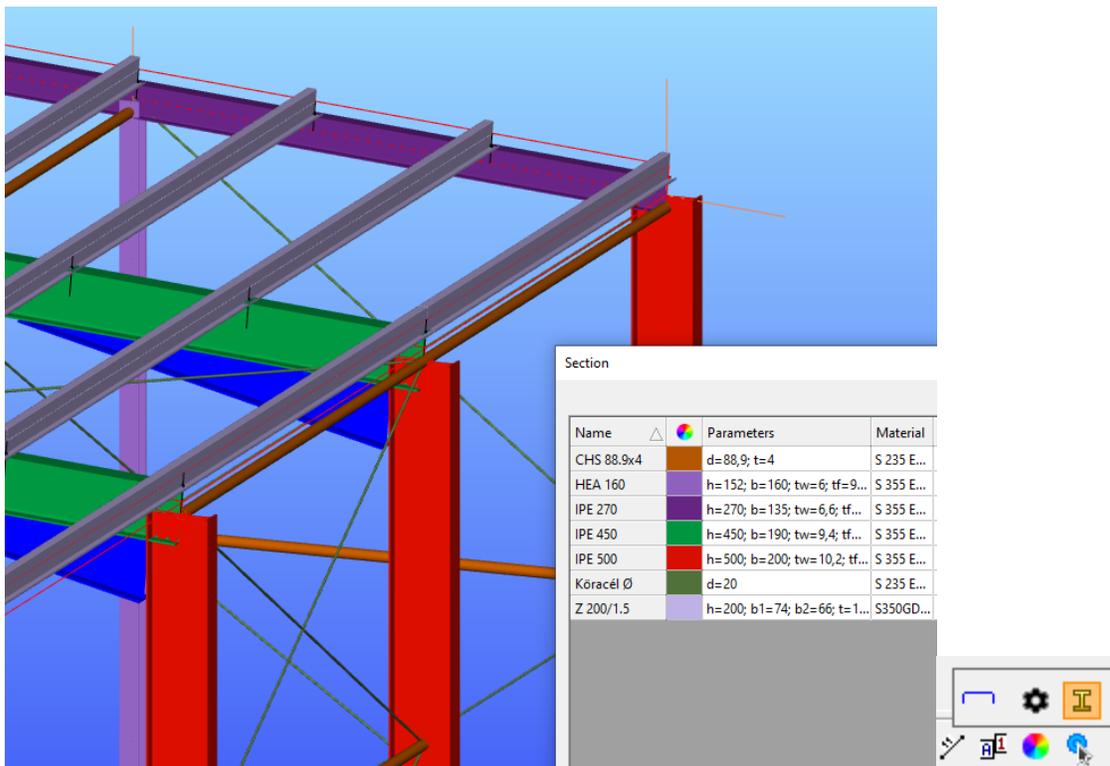
Member-coloring by cross-sections

More informative visualization of results

We have further developed the visualization of the model and the results for easier interpretation and better visual appearance.

Projected stress diagram

In the section module, the stress diagrams can now be displayed in a new, three-dimensional representation, thus helping to better understand the stress state of the section.

Watch how stress diagrams work [here](#)!
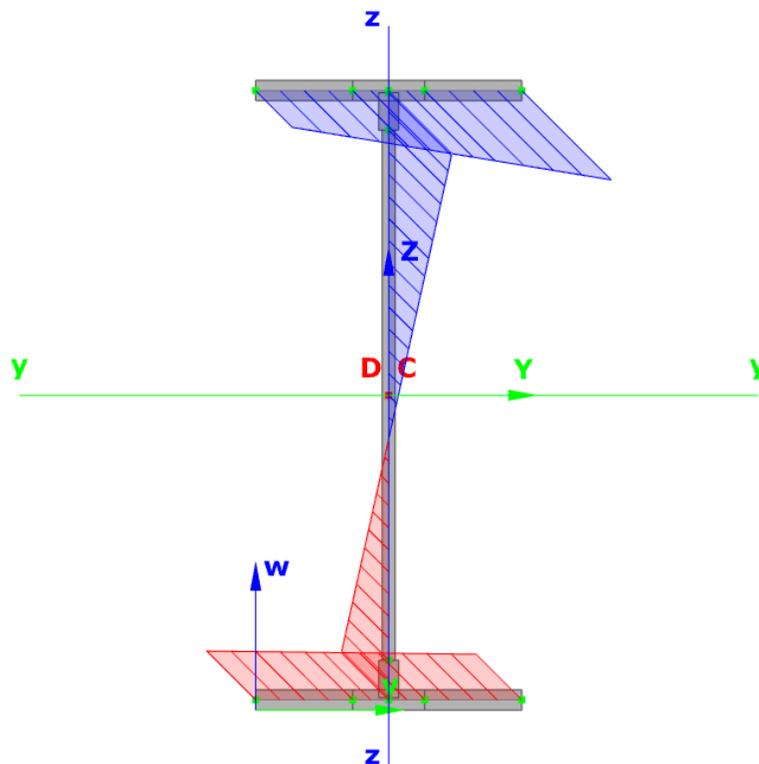
Stress diagram

Smooth and realistic deformation representation

In Consteel 15, the real 3D behavior of the structure can be better seen thanks to our improvements in the representation of the deformations. In the new version, we no longer depict the displacement of the finite elements and their twisting around its axis, but the actual displacements of each corner point of the cross-section, including the effect of the section distortion due to the seventh degree of freedom. All these results in continuous, clearer and nicer deformation shapes, and as well as deformation shapes similar to the plate model, even in the case of bar members.

Watch here how the new improvements can help your work!
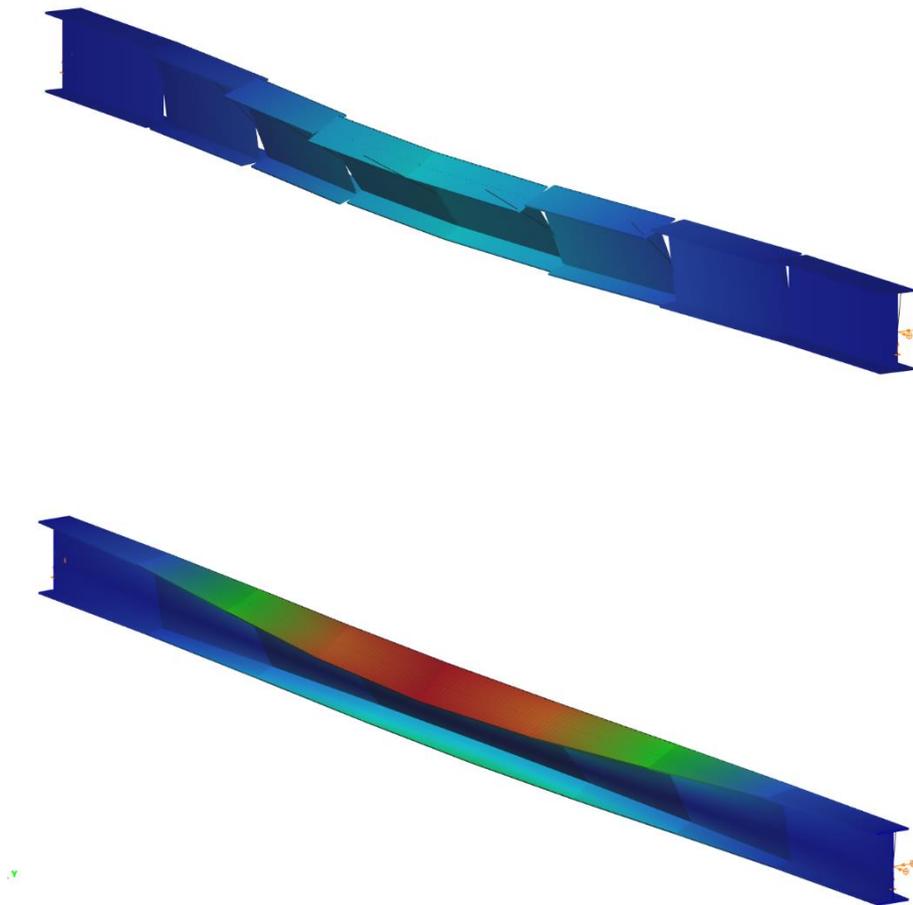
Realistic like deformation representation

Consteel

Colored internal force diagrams

Among the ways of displaying internal force and displacement diagrams, the possibility of colored diagrams has appeared. Negative values are displayed in blue and positive values in red, providing better comprehensibility when reviewing results.
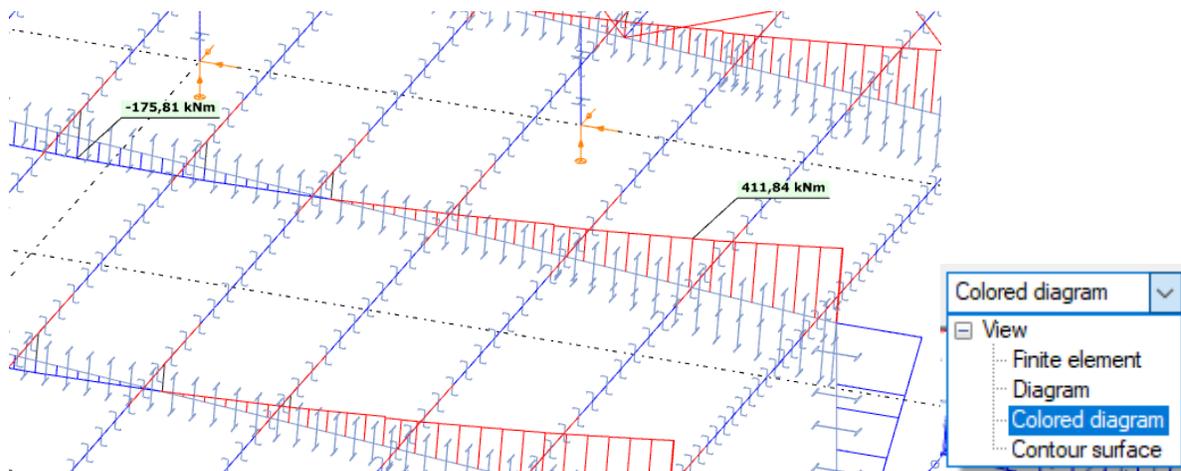
Colored internal force diagram

## Buckling sensitivity results

The results of the buckling sensitivity analysis are aided by the fact that they can now be seen on the actual buckling shapes. In this way, the critical elements can immediately show the mode of deflection that caused it.

Watch here how informative visualizations help better understanding of your model!

Additional improvements

Multiplying loads into new load cases

The creation of moving loads has been made easier by a new option in the copy function, which allows you to copy the selected loads within the same load case or into new load cases, as well. In the latter case, each copy of the load is placed in a new load case that is automatically generated within the same load group.
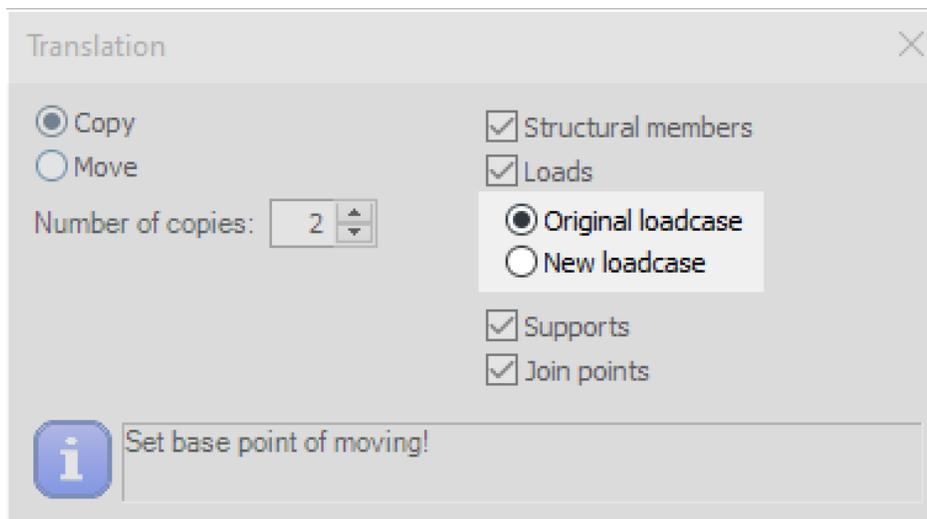
Multiplying loads into new load cases

Constraint elements

In connection with the Superbeam concept, the constraint element was also introduced in Consteel. These elements cannot be created manually at this time, they can only be created automatically by the following functions and displayed in the finite element model:

- frame corner: the constraint element existed also before but was not visible to the user.

- converting a bar member to a shell finite element calculation model, the constraint elements are placed and displayed to define the shell-bar transition.

Renewal of member releases (hinges)

The modeling of the member end releases (hinges) was also renewed with the introduction of a new zero-length finite element. The handling of the member end releases is removed from the member finite element and transferred to a new release finite element located between the member end and the connecting structural elements. This does not involve any change for the user during modeling, everything happens automatically during the creation of the finite element model. However, this change, which was needed to make the deformations more realistic (see above), has some changes that are also visible and positive for users:

- Loads causing a change in length (temperature, fire, tension) can now be applied to a member whose axial end displacement is released
- Different displacements of members with different end releases connecting into the same node can also be displayed more realistic.
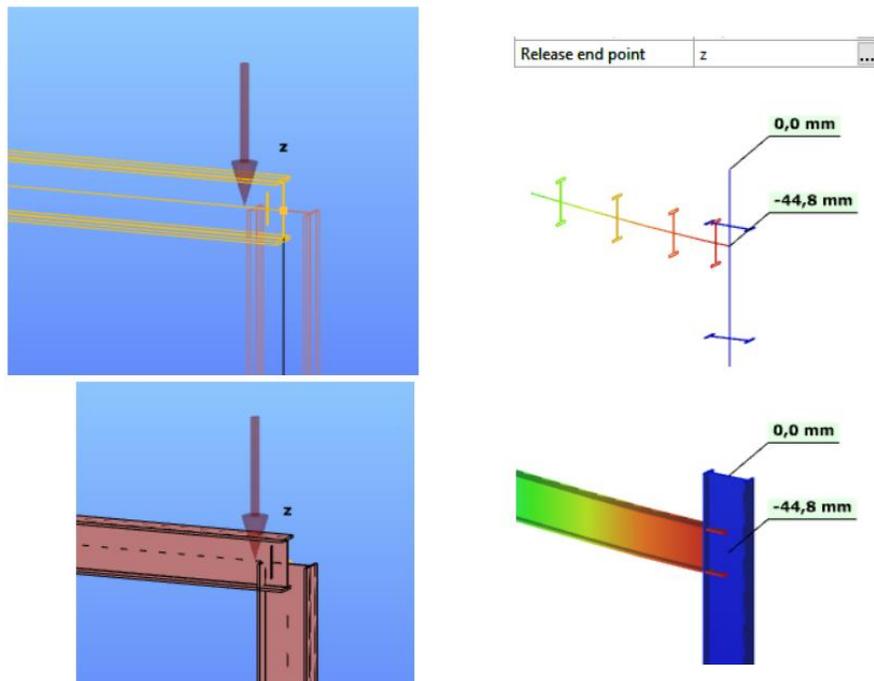
Expanding the visibility switches

We have expanded the number of visibility switches that control the display of model objects. 6 new switches have been added to the new, expanded settings window, so you can now control the visibility of all structural objects. The new switches are:

- constraints (new object)
- rigid body
- diaphragm
- purlin line
- stiffener (new object)
- cutout (new object)

Consteel 14:

Consteel 15:

Improvement of load transfer surfaces

The load distribution control algorithm of the load transfer surfaces has been further developed to encounter as few error messages as possible, usually due to modeling inaccuracies, in the day-to-day work of the engineer.

As a result, we can also encounter fewer problems with models that we have imported into Consteel from other programs and often contain small inaccuracies that may have caused an error in the finite element model.