

Open BIM solutions

Open BIM is a universal approach to collaborative design, realization and operation of buildings based on open standards and workflows. This means that Open BIM and even BIM in general are all about processes and not about software.

Still, we need software to enable BIM. 3D modelling and adding information to these 3D models require dedicated software.

As far as the engineering market is concerned, the Nemetschek group offers several high performance solutions.

One of them is **Scia Engineer**: the well-established and state-of-the-art structural engineering software for all types of constructions and materials, completely in conformity with the latest Eurocodes.

Open BIM and Scia Engineer

The “i” in BIM is probably the most important part when it comes down to exchange of data. **Scia Engineer** is taking this very seriously and offers you various ways to import and export building data.

Whereas for CAD software the additional data in a BIM model is often equally important as the geometrical data, the CAE model can do with far less. A general CAE model is built up out of centre lines (1D), mid planes (2D), cross sections, code compliant materials, supports... No need for textures, catalogue-ID's, unit prices...

Scia Engineer, however, is unique in its kind as it offers you two (parallel) models in the same project. On the one hand, you have the analysis model dealing with all the information which is related to the analysis. On the other hand, you have the structural model at your disposal, which is dealing with all geometrical relations in the model.

Exchanging the structural (CAD) model

CAD models primarily focus on the geometry. When importing them into a CAE software, there is little interest in irrelevant additional data. And when it comes down to importing or exporting the geometry, the **IFC format** is the best way to go.

Nemetschek Scia - and the entire Nemetschek Group - is on the cutting edge of the implementation of the IFC standard in their products. **Scia Engineer was the first CAE software to be IFC 2x3 certified** and will be recertified as well for future versions (IFC 2x3 Coordination view 2.0).

Open BIM drives on the IFC format. That is why we strongly believe that IFC is the way to go and that is why we fully support it.

All imported IFC models can be converted into the analysis models and fine-tuned for structural analysis purposes. We call this process **Structure2Analysis**. Scia Engineer is packed with features which guide you through the whole conversion and make it a piece of cake. The structural model, however, remains as it is, allowing you to export it with or without changes.

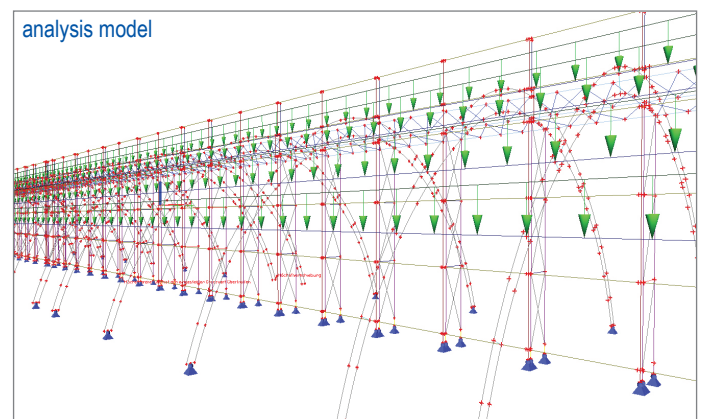
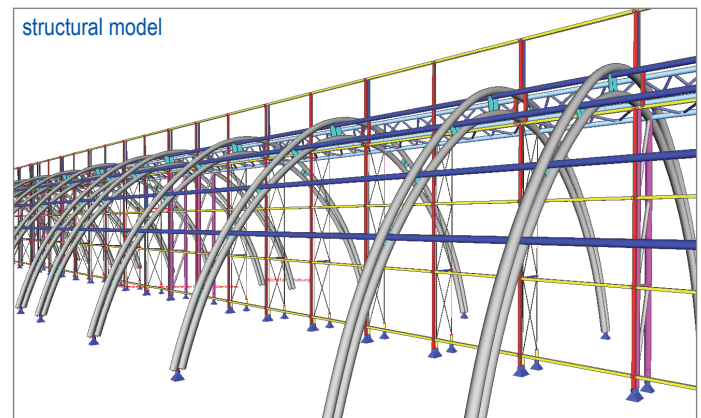
Exchanging the analysis (CAE) model

As IFC does not yet support analysis models, we have a number of proprietary links at your disposal.

- ETABS
- Steel Detailing Neutral File (SDNF)
- Prosteel
- STEPSTEEL
- DSTV
- general XML

Next to this we also link directly to some CAD-oriented software programs which have the analysis model.

- Allplan Engineering
- Tekla Structures
- Revit Structure



Open BIM in action with Tekla Structures and Scia Engineer

Introduction

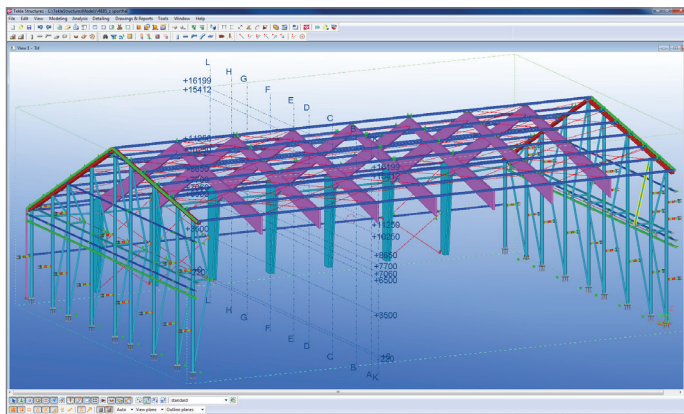
Nemetschek subsidiaries and Tekla are both part of **buildingSMART** alliance and actively promote IFC as the preferable format for data exchange of 3D building data.

With the new **Open BIM** collaboration we commit ourselves to improving the level of our IFC support.

The Tekla model

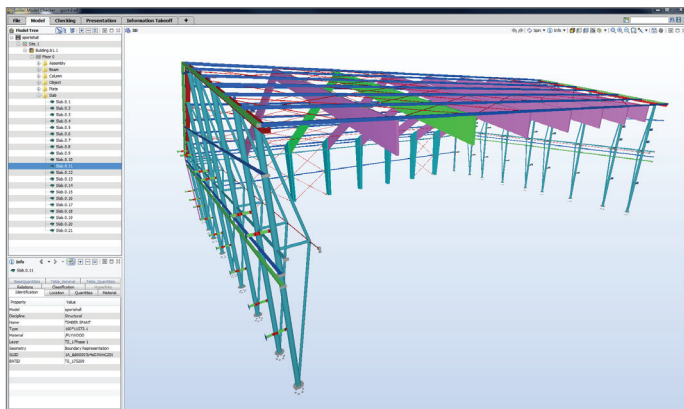
The following Tekla model was sent to Scia Engineer via IFC for structural analysis purposes.

This model is an extension of an existing sports centre. The bearing structure is composed of glue-laminated girders and columns. The roof and facades are a traditional steelwork.



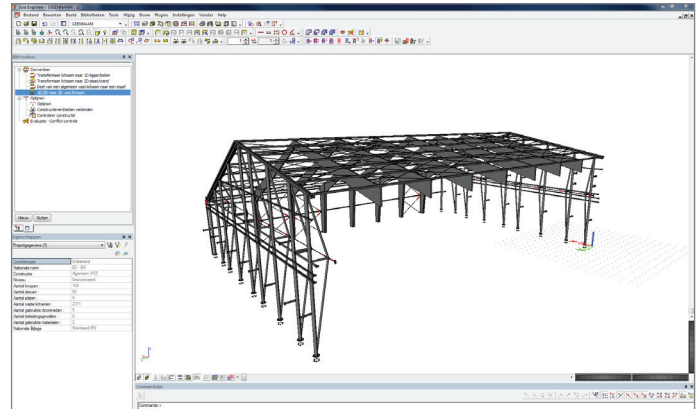
Quality assurance in Solibri

We can export this model to an IFC file and check it in Solibri. **Quality Assurance** is one of the most powerful aspects for using Solibri. In this case we are, however, only interested in verifying whether the exported geometry is really the same as the original model. Solibri's free viewer is very useful for that. This model checking can eventually also be done by means of Tekla BIMsight.



Importing the IFC into Scia Engineer

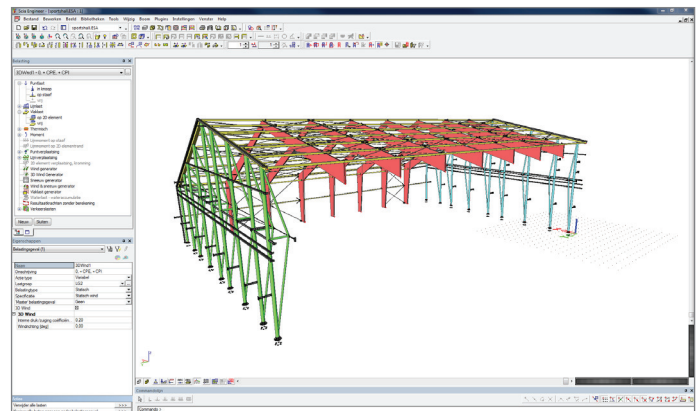
The next step is importing this IFC file into Scia Engineer. The procedure is pretty straightforward. Click import, optionally specify a mapping table for materials and you are set to go.



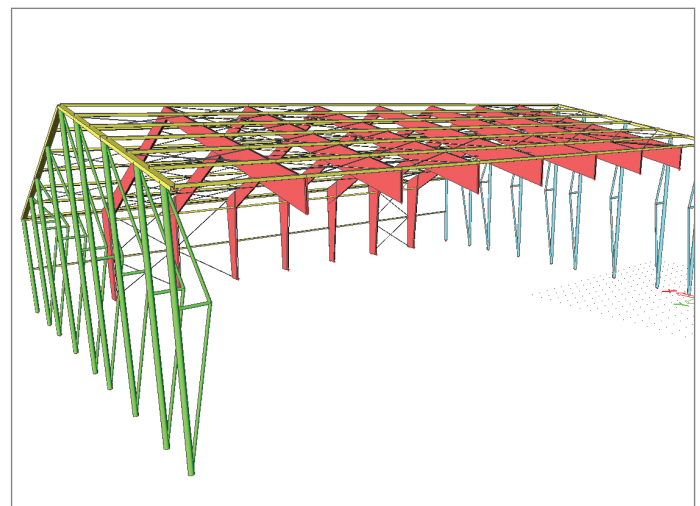
Part of the geometry can be converted into analysis objects right away. Entities which are exported as BRep (Boundary Representations) can be converted interactively in Scia Engineer into 1D or 2D members.

You might notice that we did not convert everything. The engineer needs to make a wise decision on which entities are required for the structural analysis and which can be kept as a reference model. All the small bits and pieces are redundant for the calculation, but we keep them anyway, in a separate layer (auxiliary pieces).

Converted model with auxiliary pieces

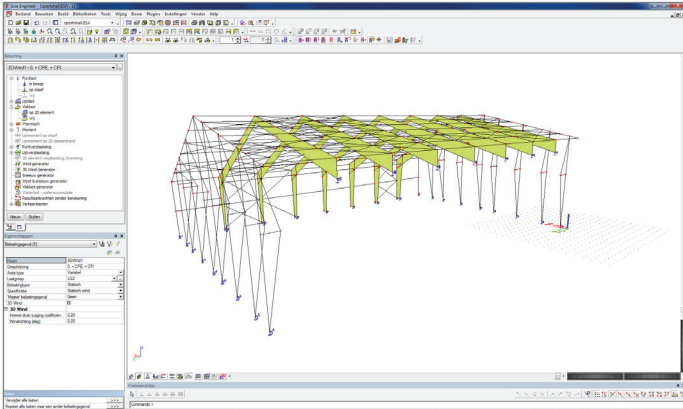


Converted model without auxiliary pieces



Preparing the model for analysis

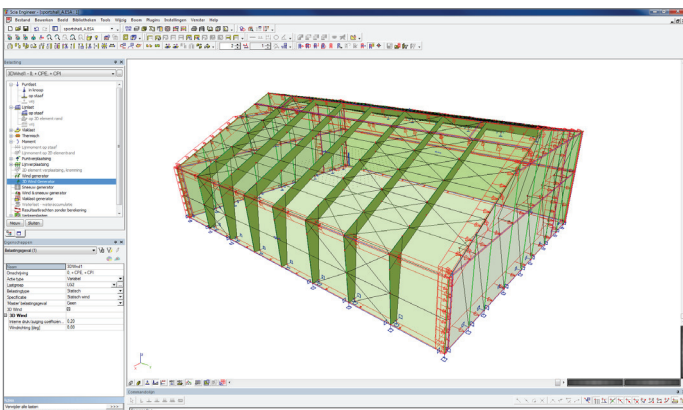
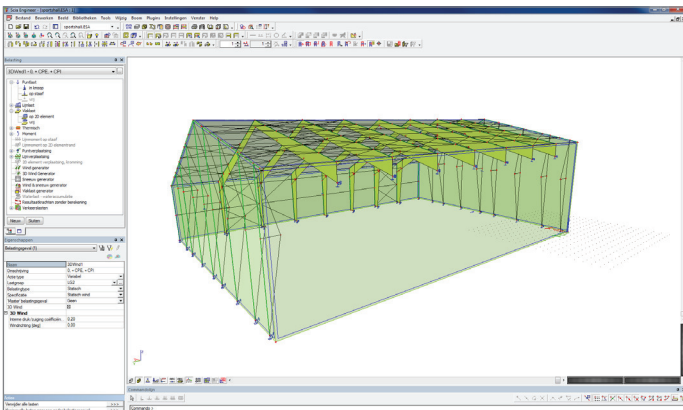
Preparing the model for the analysis is basically about linking all the nodes together. As we are importing the physical model, we need to make sure all members are connected. Scia Engineer offers you a nice and user friendly tool - the BIM Toolbox - to assist you with this inevitable task.



Once the analysis model is ready, you can start adding supports, load cases and loads, combinations etc. For the loading of the structure Scia Engineer is equipped with powerful generators for wind and snow loads, just to name some of them.

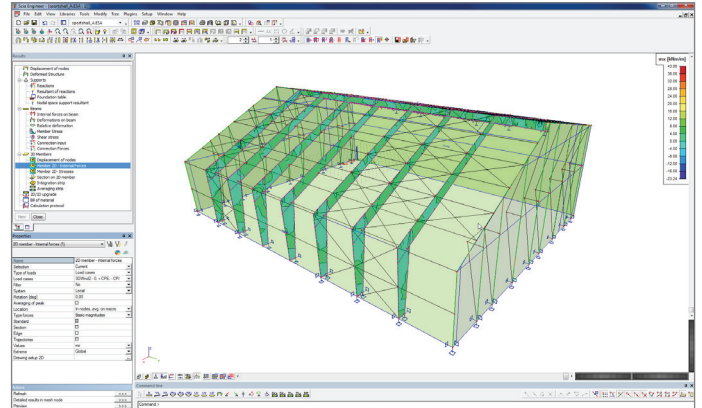
Generating wind loads

By means of load panels we can use Scia Engineer's 3D Wind generator to determine 16 additional load cases.



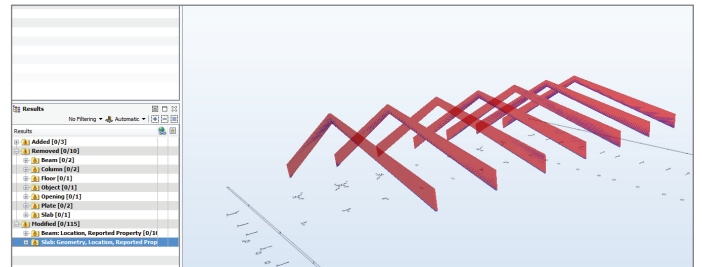
Calculation results

Once the model is prepared, you can launch the calculation and interpret the results, e.g. the internal forces in the glue-lam girders.

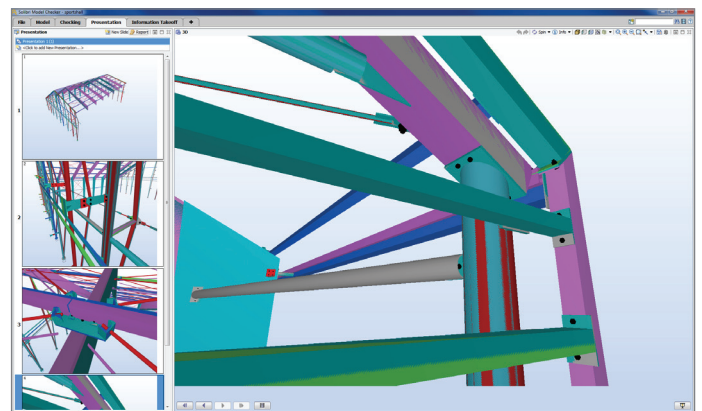


Design changes

Design changes are likely to occur. The final concept can then be compared with the original model in Solibri (or Tekla BIMsight).



The required modifications or issues can be communicated in a clear way to the Tekla modeller by means of a presentation view in Solibri or as a PDF with slides representing the issue and comment.



Or you can directly import this Scia Engineer model as an IFC into Tekla - as a reference model - and do the comparison in Tekla Structures.

Open BIM Partners

Open BIM represents a modern approach to interdisciplinary collaboration for all members of the AEC industry. The Open BIM community welcomes all software vendors, AEC practices (designers, engineers, constructors) as well as building owners, as the Open BIM logo is the guarantee for successful and streamlined collaboration on BIM projects - anywhere in the world!

GRAPHISOFT®, Tekla® and other members of the buildingSMART® alliance launched a global program to promote Open BIM in the AEC industry. The Open BIM community is constantly growing. To enjoy all these benefits, you are most welcome to join the Open BIM community today!

You want to know more about the Nemetschek BU Engineering software business?

Engineering software is a core business of Nemetschek right from the start in 1963. Today, Nemetschek has a broad product portfolio towards the structural engineering market with engineering structural analysis & design (Frilo Statics and Scia Engineer), structural detailing (Allplan Engineering & Precast), fabrication management and logistics (Technical Information Manager Precast and Steel) and interoperability solutions in BIM (Building Information Modelling). All construction materials are designed (steel, concrete, timber, bricks, aluminium...) with a unique offer for detailing (for concrete).

With over 40 000 users, the Nemetschek BU Engineering - consisting of Frilo, Scia, Engineering Precast, Glaser and a division of Allplan - is an important player active all over Europe and with increasing presence in South America (Brazil), Asia and USA. With over 35 Million revenues and a staff of 250 specialists, Nemetschek is a leader in structural engineering software. The staff is located in BeNeLux (20%), Germany (25%), Czech Republic (25%) and Austria (10%) with the remaining percentage distributed in Europe, Middle East, Brazil, USA and the rest of the World.

A variety of clients from engineering consulting offices, contractors & fabricators rely on Nemetschek technologies for 3D modelling, static and dynamic finite element analysis, detailed code design of all types of structural parts, drawing of reinforced concrete structures (in situ and precast) and fabrication management.

Nemetschek is launching today the new website with a wealth of information inviting visitors to learn about its solutions.

Enabling Engineering Freedom is our vision.

