What's New Scia Engineer 2012

The structural Analysis & Design software Scia Engineer is attracting structural engineers all over the world for its versatile and international application. Upgrading to the new 2012 version will improve your work mainly in the following areas:

Multi-material design with new EN1995 Timber integration

Scia Engineer represents the comprehensive solution for analysis and design of multi-material structures on an international scale.

Advanced analysis with integrated design

Scia Engineer integrates modelling, finite element analysis and multi-material design in one application.

Interoperability with focus on Open BIM

The Open BIM approach integrated in Scia Engineer enables all partners to share smoothly and safely the project data across various platforms.

Maintenance, User experience & improvements

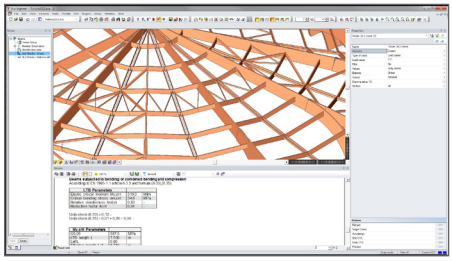
Every new version of Scia Engineer brings a range of new features and improvements for day-to-day work with the program.

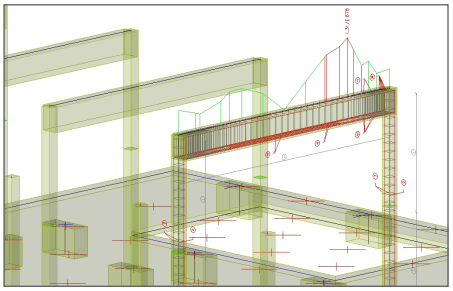
Multi-material design with new EN1995 Timber integration

Timber design - EN 1995-1-1

Scia Engineer 2012 presents the integrated solution for modelling, analysis and checks of timber members according to EC-EN 1995-1-1.

- Timber structure can be designed within the larger model, including the parts made of other materials
- Full integration of the Eurocode methodology including nationally determined parameters
- Second order analysis with reduced stiffness
- AutoDesign of cross-sections for the ultimate limit state
- Serviceability limit state check including creep





Improvements in concrete checks

Concrete checks in version 2012 offer a whole set of improvements:

- asymmetrical debonding length of strands, and asymmetrical geometry of strands,
- new faster algorithm for check of distance between reinforcement bars,
- extended outputs for shear check,
- option to swap in result diagrams between the real value and unity check,
- new possibilities for calculation of the beta factor for punching shear checks.

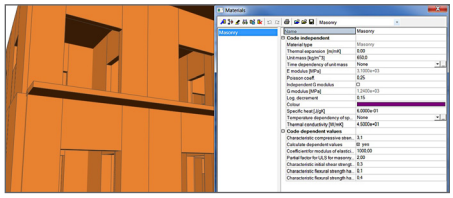
The newly published correction sheet - EN 1992-1-1/AC:2010 - is also added to Scia Engineer 2012.

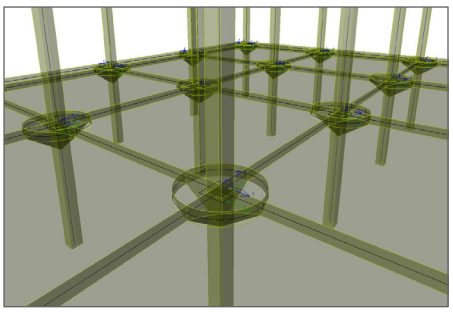
Masonry materials

In Scia Engineer 2012, a new material has been added to the library: Masonry according to EC6.

It is possible to model and analyse (internal forces and deformations) structures made of masonry and/or other materials.

If checks according to EC6 are required, then this is possible via the plugin ECtools.





Improvements for concrete code check ACI-318

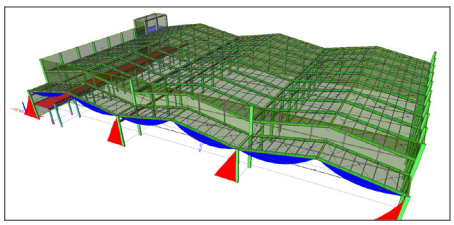
Scia Engineer extends the capabilities of the design of concrete structures according to the ACI code:

- Benchmark examples and a tutorial on the implementation of the ACI code in Scia Engineer
- New options for the calculation of the strength reduction factor phi
- New method for bi-axial bending for design of reinforced columns
- Update from ACI 318-05 to ACI 318-08
- Input of reinforcement for 1D and 2D members: longitudinal, stirrups, free bars and 2D meshes
- Definition of anchorage type and length; Reinforcement schemas and bill of reinforcement
- Conversion from 'size number' to 'diameter' of reinforcement bars when switching between measuring systems (US and Metric format)

Combinations according to Brazilian Code ABNT NBR 6118:2003

Ultimate and serviceability limit state combinations are implemented according to Brazilian Code ABNT NBR 6118:2003. It is possible to define five ultimate and three serviceability concrete combinations:

- Concrete – ULS – Regular
- Concrete – ULS – Special 0; Special 2
- Concrete – ULS – Exceptional 0; Exceptional 2
- Concrete – SLS – Infrequent; Frequent; Quasi-permanent



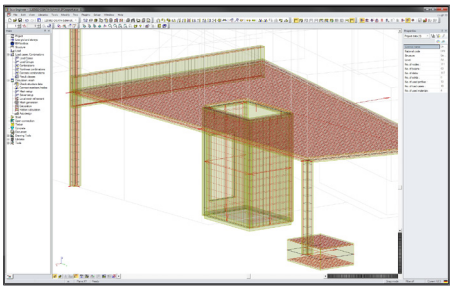
Interoperability with focus on Open BIM

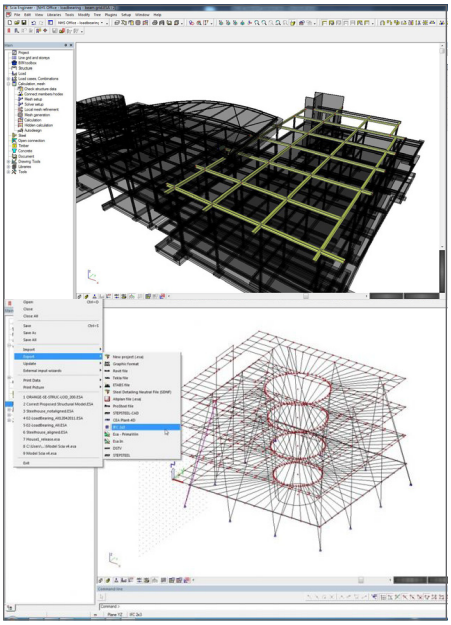
IFC improvements

Nemetschek Scia considers interoperability to be one of the main challenges for the future. More and more engineers are confronted with 3rd party 3D models. They can redo the work in Scia Engineer or save time and money by re-using the available information in the existing model.

Standardization is crucial for an neutral data-exchange format. That's why buildingSmart (buildingSmart is an international association, composed of various software manufacturers) has opted for the IFC-certification. Scia Engineer was the first CAE software with IFC 2x3 certification.

Scia Engineer version 2012 follows the development in the IFC format and extends its functionality, namely by the ability to export and import steel connections, footings, concrete steel reinforcement, etc.





Open BIM

Open BIM is a universal approach to the collaborative design, realization and operation of buildings based on open standards and workflows. Nemetschek group offers several high performance solutions.

- Allplan Engineering - general modelling software with a focus on structural detailing for concrete
- Allplan Precast - manufacturing and logistics software for the concrete precast industry
- Scia Engineer - multi-material structural analysis software

For more details about Open BIM, visit our website nemetschek-engineering.com.

Open BIM with ArchiCAD and Scia Engineer

ArchiCAD and Scia Engineer are both IFC 2x3 certified by buildingSMART and support the Open BIM program. The exchange of models between the architect and structural engineer is easy and automatic conversion of the structural model into the analysis one facilitates the design process.

Open Bim with Allplan and Scia Engineer

Allplan Engineering and Allplan Precast are both 3D modelling and detailing software in the Nemetschek portfolio with a strong focus on the concrete engineering industry. Data-exchange with other software is very easy when using the IFC protocol.

Open BIM with Vectorworks and Scia Engineer

Vectorworks is software for design professionals in the architectural industry. In Vectorworks you can create building models without giving up the creative and design freedom you need. Vectorworks and Scia Engineer are both IFC 2x3 certified by buildingSMART, which makes it easy to exchange the BIM models.

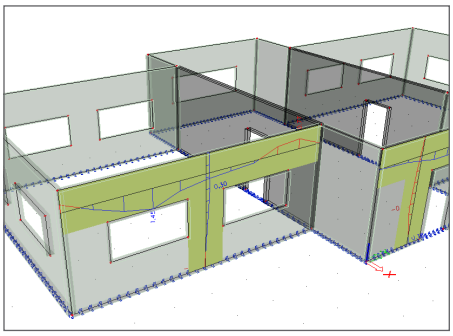
Advanced Analysis with Integrated Design

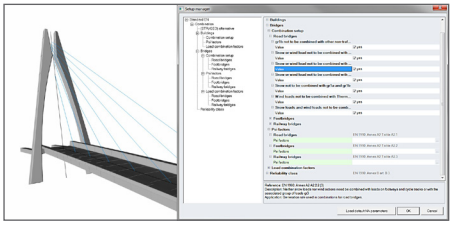
2D to 1D Update enhancements

Scia Engineer already for some time allows for export of internal forces from a 2D plate to a 1D beam. The main idea is that the structure can be analysed in a whole and the results can be used for a detailed assessment of e.g. one floor element (in case of floors composed of e.g. prefabricated elements laid one next to another.

The latest versions of Scia Engineer bring the following improvements:

- Parametric length of beam
- Division for 2D-1D upgrade
- Excel check
- Torsion
- Enabling of 2D-1D upgrade for integration strips





Bridge combinations

Bridge design requires specific calculation rules which are only needed for the analysis and design of this type of civil engineering structures. The combination rules for bridge specific loads are described in Eurocode 0. In Scia Engineer 2012 bridge combinations are automatically generated and the decomposed combinations are set out for having sufficient transparency during this process.

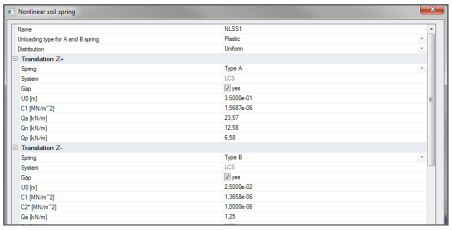
These combinations are available for 3 types of bridges: Road bridges, Footbridges and Railway bridges.

Next to this, design rules for prestressed and reinforced concrete bridges are implemented.

Nonlinear line support

The non-linear line support is a line support for 1D members. It is intended to model soil reaction using real soil parameters.

The model consists of six springs. Four of them are acting perpendicularly to the member axis and are used to model the soil loading and stiffness at the top, bottom, left and right side of the beam. The two remaining springs are used to model friction in translation along the local x-axis and rotation around the local x-axis. The nonlinear line support can be used in a nonlinear or nonlinear staged analysis.

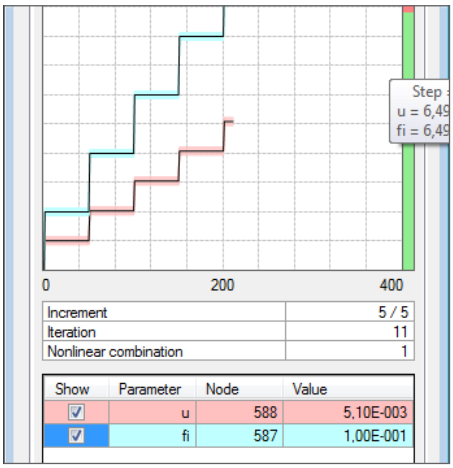


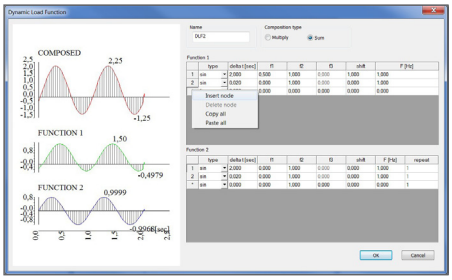
Solver improvements

The finite element solver, one of the fastest solvers in CAE applications, brings a whole set of improvements.

In the first place is a new graphical interface with e.g. optimised drawing of diagrams for nonlinear calculations. Other improvements include:

- better reporting of singularity, instability and other problems that may appear during calculation,
- modified calculation of coupler cross-links,
- new generation of intersections between walls and openings in slabs,
- modified convergence tests for dynamic relaxation,
- optional reporting of the total calculation time,
- option to calculate just one specific nonlinear combination, which reduces the calculation time in situations when the user needs to check only this specific combination,
- implementation of Lanczos method for calculation of eigen values, which is generally faster than the subspace iteration,
- implementation of a 3rd order Picard method for geometrically nonlinear calculations,
- and much more.





Dynamic Functions: Copy from clipboard + import via XML

With the arrival of the table editor in version 2011 it was the first time that clipboard support is available in Scia Engineer. Now also the tables for seismic spectrum and dynamic load functions support the copy/paste to/from the Windows clipboard.

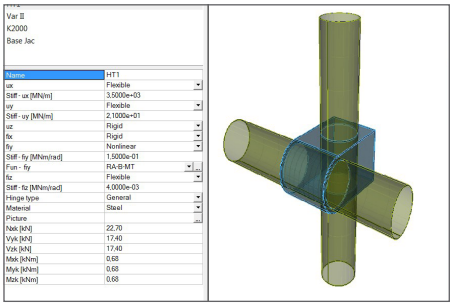
The general dynamics load case may subject a node to a Dynamic load function. The dynamic load functions sometimes represent an accelerogram that may contain thousands of lines when sending it to a text file. Therefore, a direct manual input is practically impossible.

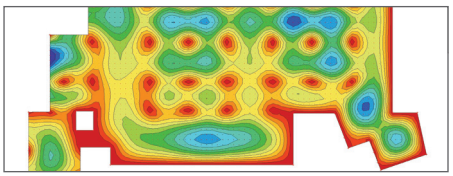
To help user tackle this issue, Scia Engineer now supports the update of dynamic load functions via a XML file.

Scaffolding

The latest versions of Scia Engineer have brought several smaller but important improvements for design and checks of scaffolding:

- The scaffolding check is expanded with separate Unity checks. This gives a more clear output for the scaffolding check.
- HAZ zones are taken into account for the scaffolding aluminium check.
- It is now possible to define the stiffness of translations. In addition, the number of hinge types in the coupler library for cross-links were reduced to 3 types: right angle coupler, swivel coupler and general. This means that types irrelevant to scaffolding are not displayed.
- 2 new coupler types have been added to the scaffolding coupler library: Layher Variante K2000+ and Layher Variante II.





Code Dependent Deformations

Calculation of code dependant deformations has been improved for two special cases:

- Correction of effective width for ribs. The calculation of deflection for ribs has been improved. The stiffness of the flange of the rib is not taken into account twice (for T-shape of the rib and for the slab).
- The direction of principal stresses instead of the direction of principal bending moment is taken into account (it allows for correction of the calculation of 2D members subjected to normal forces).

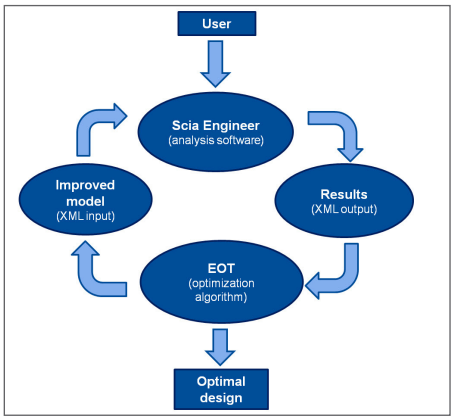
Scia Engineer Optimizer

A new module Scia Engineer Optimizer has been introduced already in Scia Engineer 2011. Nevertheless, it is still worth mentioning here for its revolutionary capabilities.

This unique optimization tool is cutting edge software for the overall optimization of civil engineering structures. It represents a combination of widespread structural analysis software (Scia Engineer) and an optimization engine (EOT – Engineering Optimization Tool).

The two programs have been integrated together and offer a versatile and complete optimization solution for all types of civil engineering structures.

Learn more about Scia Engineer Optimizer in our White paper or contact your local Scia representative and ask for free demonstration.



Other Nemetschek Group Products

New version of Frilo Statics

The new Frilo v2012 version is a maintenance update for the 6 modules which we already had in the portfolio. At the same time we extended the range and added some programs for steeldesign as well.

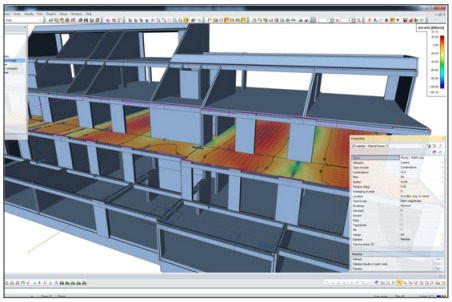
Currently we are offering tools for concrete, steel and masonry.

The setup will be available soon - You can try the software free of charge and without any restriction for 30 days.

Please contact your dealer and we'll notify you as soon as the setup is available for download

User Experience & General Improvements

New Scia Engineer layout



Scia Engineer 2012 comes with a whole set of changes in the graphical user interface:

- new visual style defaults for 3D scene,
- new default fonts: default system font is Segoe UI and the default documentation font is Calibri,
- new default predefined skin of User Interface is called "Microsoft Office 2010",
- transparency effect has been used for the Scia Engineer dialogues,
- antialiasing in the graphical window,
- tooltips now contain not only the name of the function, but also a short description and the name of the corresponding command and shortcut,
- tooltips have been also added to the Protection Manager.

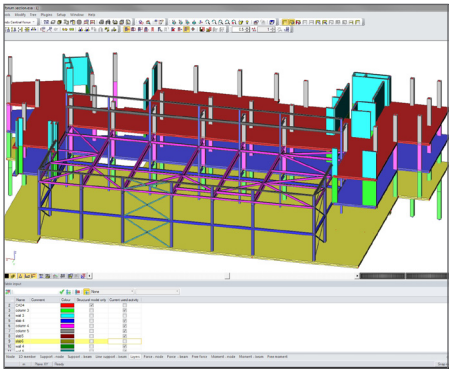


Table Input

Table Input that was introduced in the recent version of Scia Engineer enables the user to combine the advantages of numerical input with immediate graphical response. In version 2012 this useful tool has been extended by a filter on activity and organiser for the tabs.

Moreover, the table input can be used with advantage for a fast switching of activity for individual layers defined in the model.

Templates in New Project dialogue

During the start up of Scia Engineer a new dialogue is displayed. In addition to usual types of projects, it newly includes also several predefined templates.

They may be used as a guide for the specific type of structure and analysis and they facilitate the input of the model, loads and combinations.

Commands & Shortcuts

Scia Engineer features very clear and well-organised graphical user interface with menus, trees and toolbars. Nevertheless, experienced clients who use certain function really frequently will welcome a new option to start individual functions and actions from the command line.

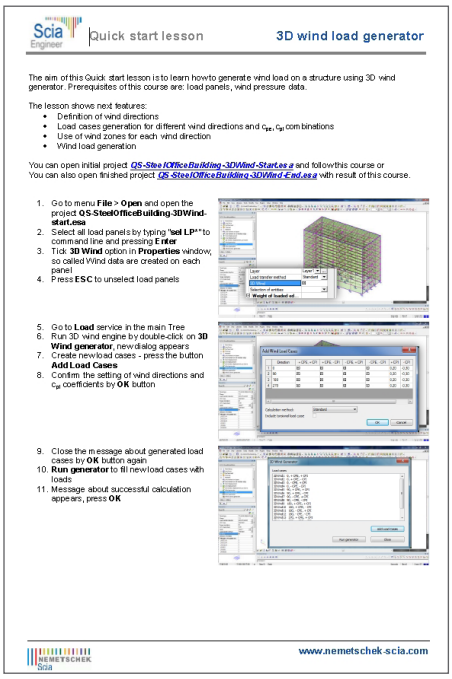
Scia Engineer introduces commands and also their shortcuts for all major functions. What's more, the user can even customise the shortcuts, which will speed up his/her work even more.

Scia Engineer Quick Starts

Scia Engineer is now accompanied with a new type of learning material called Quick Start. The main aim of the Quick Starts is to help potential clients and students evaluate the Try-out/Student version.

Each Quick Start consists of (i) a description of the structure and (ii) Quick Start Lessons focused on selected key features of Scia Engineer used in the particular model.

The Quick Starts are accompanied by Scia Engineer project files in which the user can test himself the presented features.



Quick start lesson — 3D wind load generator

The aim of this Quick start lesson is to learn how to generate wind load on a structure using 3D wind generator. Prerequisites of this course are: load panels, wind pressure data.

The lesson shows next features:

- Definition of wind directions
- Load cases generation for different wind directions and c_{pe}, c_{pi} combinations
- Use of wind zones for each wind direction
- Wind load generation

You can open initial project *QS-SteelOfficeBuilding-3DWind-Start.esa* and follow this course or
You can also open finished project *QS-SteelOfficeBuilding-3DWind-End.esa* with result of this course.

1. Go to menu **File > Open** and open the project **QS-SteelOfficeBuilding-3DWind-start.esa**
2. Select all load panels by typing "**sel LP**" to command line and pressing **Enter**
3. Tick **3D Wind** option in **Properties** window, so called Wind data are created on each panel
4. Press **ESC** to unselect load panels
5. Go to **Load** service in the main Tree
6. Run 3D wind engine by double-click on **3D Wind generator**, new dialog appears
7. Create new load cases - press the button **Add Load Cases**
8. Confirm the setting of wind directions and c_{pi} coefficients by **OK** button
9. Close the message about generated load cases by **OK** button again
10. **Run generator** to fill new load cases with loads
11. Message about successful calculation appears, press **OK**

www.nemetschek-scia.com

Installation from the web

The new installation procedure of Scia Engineer enables the user to download and install the software through the web. The setup.exe runs as usual with all necessary information to be filled in and during the installation phase, the setup only downloads the relevant and necessary files dependent on the user configuration.

Live support via Netviewer

Customers with a maintenance contract can send Scia their technical support questions through the online support ticket system. In some cases it is important to have a look at the Scia Engineer project. To prevent the exchange of the project and namely to speed up the whole process, our support team can look easily at your screen.

To facilitate this work method, a direct link to the Netviewer software has been added into the Help menu of Scia Engineer. Once the Netviewer has started, the client and the support member can share mutually their screens and discuss the issue in full detail.

Scia Engineer on Mac OS X

Nowadays various engineering companies use Mac computers for their daily jobs. This also implies a need for the use of Scia Engineer on Mac hardware.

Originally, Scia Engineer is written for Windows operating systems. But nevertheless, it is possible to analyze Scia Engineer projects on Mac computers.

To run the Scia Engineer software on Mac OS X virtualization software has to be used. Parallels Desktop 7 is recommended for this. When Parallels Desktop 7 is used, a Windows operating system may be installed as a virtual machine and Windows applications are used alongside Mac OS X applications. In this way, the user has 2 operating systems at the same time.

Nemetschek Scia nv - Industrieweg 1007 - B-3540 Herk-de-Stad (Belgium) - Tel.: +32 13 55 17 75 - Fax: +32 13 55 41 75 - info@nemetschek-scia.com
Nemetschek Scia ME - Dubai Silicon Oasis HQ Building - P.O. Box 341041, Dubai (U.A.E.) - Tel.: +971 4 5015744 - Fax: +971 4 5015777 - uae@nemetschek-scia.com
Nemetschek Scia North America - 7150 Riverwood Drive - Columbia, MD (USA) - Tel.: +1 410-290-5114 - Fax: +1 410-290-8050 - usa@nemetschek-scia.com
For a complete list of all our international agencies and partners, please visit our website **nemetschek-engineering.com**