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April 2009

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Dear eNews reader,

In this eNews you will discover a interesting example of how Scia Engineer has been used by the Consulting Engineers ILF to work out the research of fire resistance of tunnels, as project we present the extension of an industrial precast structure by Structo nv and finally, our support department wants to share the different ways of transferring an Allplan model to Scia Engineer. Enjoy reading!

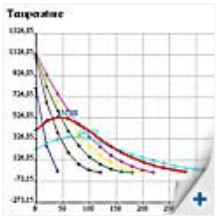
Topics of this month:

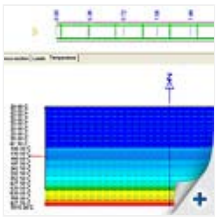
- Traffic tunnels designed with Scia Engineer to withstand fire
- Structo nv – Extension Volvo Cars Gent (B)
- Transfer of general 3D volumes to Scia Engineer

Traffic tunnels designed with Scia Engineer to withstand fire

The **consulting engineers ILF** with headquarters in Innsbruck (Austria) and 30 offices worldwide (Europe, USA, Asia, see www.ilf.com) has a dedicated team for designing and checking tunnels.

Dr. Dipl. Ing. Klaus Schmid is leading this work and has **published a research paper together with the German Federal Ministry of Traffic** (Bundesanstalt für Strassenverkehr / BASt) **on the safety design of tunnels** (research project #15.428).





Scia Engineer **has been extensively used to work out this research** at an early stage of the release of the new function "fire check of concrete".

Dr. K. Schmid explains: “A tunnel cross section is modelled with beam members, on which a temperature-distance curve is applied to simulate the effects of a fire. The high temperatures across the tunnel walls decrease the strength resistance significantly; in Scia Engineer a simplified layered approach is implemented to model the material behaviour. Finally the remaining strength of the tunnel section is calculated with due account of concrete cracking and reduced material strength.”

A deeper understanding of fire resistance of tunnels is necessary to decide on evacuation and repair strategies. **ILF initiated the development at Scia on fire safety**; in the Euronorm EN 1992-1-2 fire resistance for reinforced and pre-stressed concrete is generally being imposed.

Moving limits is the claim of Scia; offering the advanced feature of fire simulation in a general purpose engineering software is certainly moving limits.

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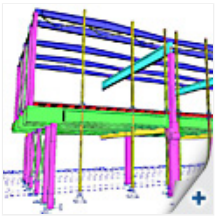
Structo nv – Extension Volvo Cars Gent (B)

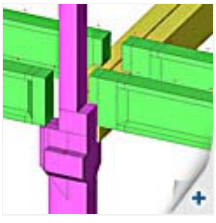
About Structo nv
The company was set up in 1948 and is a specialist in **prefabrication**, from the **preliminary study up to and included the assembly**. Structo nv is actively involved at the basis of many buildings, industrial and other, as well as in the field of infrastructure works.

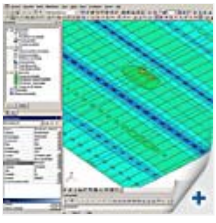
Description of the building
It regards an extension of an existing building with a ground surface of 24 m by 54 m and with a height of 20 m. It is a typical **industrial structure** on a raster of 12 by 18 m, with an intermediate floor at a height of 8m. This construction was built on against an existing building with a similar construction. On the floor was required a mobile load of 1 ton per square meter. For the intermediate floor was opted for the use of TT-elements with a concrete pressure layer of 120 mm. Each element has a length of 6 m and weighs 5.5 ton. This **self-bearing** floor is supported through **secondary level beams** of 18 m long, with a height of 1.60 m and a weight of 24 ton each.

Since this construction has been coupled to an existing building, some of these beams are lying in an oversailing position. The secondary floor beams are supported through single primary girders.

Technical tour de force
The large difficulty of this assignment was the connection of this new annex to the existing building. This implied the use of **expansion bearings** and heavy **counterbracing**. The oversailing beams of the prestressed concrete formed another obstacle. Where compressive stress was created at the bottom of the beam, also occurred more pressure. Conversely, on top of the beam, a large tensile stress occurred as a result of the negative moment.







Latest News

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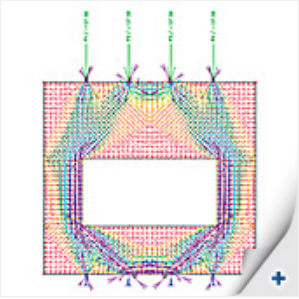
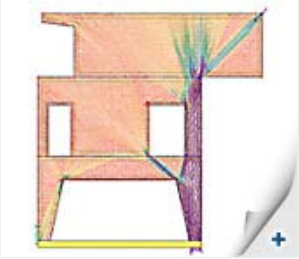
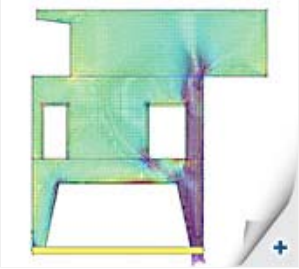


Non-Linear Analysis



Linear Analysis



Scia Engineer
With Scia Engineer we were able to cope in a fast and accurate way with every modification we encountered. An omitted point of support, a range of columns that shifted one metre… every possible situation could be adapted in a flash. The programme recalculated the new situation and the new results were available at once!

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Transfer of general 3D volumes to Scia Engineer

There are several ways to transfer the Allplan model to Scia Engineer.

On the one hand we have the format-neutral way through an IFC-file; in this way intelligent building parts (wall, column, floor, beam, …) are transferred one by one, its parametric properties are included. Such an IFC-file will also take along the general 3D volumes and visualize them in Scia Engineer.

On the other hand we propose our own link, that is either a direct coupling (Round-Trip) or an indirect one (via a standalone esa-file). It is a misconception that this operating procedure can only transfer architectural elements; it is definitely possible to also transfer 3D volumes to the calculation environment. And even more: with this method it is possible to already activate the Scia Engineer form recognizer (Recn'go) on the 3D volumes during the conversion; in this way rather strange looking architectural objects as well as building parts, which are created via Allplan 3D-modeller, are prepared for the analysis.

(image 1)

The transfer from 3D volumes via Round-Trip or indirect exchange can only be done if the option is activated in the Round-Trip settings.

On top of the Allplan-window, in the menu **Plug-In** you find the Round-Trip-settings (image 1). In the subsequent dialogue we select the **Geometry export method** and we activate the option **Use member recognizer**.

(image 2)

This action quickly produces result. The next example includes some standard architectural objects, a few architectural objects, which have been formed through 'custom plains' and a few 3D volumes.

Let us apply 'Round-Trip': once **without** the **member recognizer** (image 2) and once **with** the **member recognizer** (image 3). You especially notice the difference with regard to circular walls and beams; with the **member recognizer** these forms come out much better. The same situation is valid for the roof shaped floor plate. So if you want to 'Round-Trip', we suggest you to activate this **member recognizer**.

(image 3)

Archive Tips & Tricks

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