SCIA scientific software

December 2007

<printable version>

NEWS

Working hours during the end of season holidays
- 24 & 25 December + 1 January: offices of Belgium and the Netherlands are closed (no support)
- 26 December: Dutch office closed
- 31 December: Belgian office closed from 15.00 h. on

We kindly invite you to read our White Papers:
- **Round-trip Engineering**, step-by-step
- **Parametric Modelling**, a basic B.I.M. property implemented in SCIA•ESA PT 3D Modeller
- **AutoDesign and Parametric Structural Optimisation** Breakthrough technology in SCIA•ESA PT 2008

more ...

UPDATES

Customers can download the following **service packs** in our free **download section.**

- **SCIA•ESA PT 2007.1.121**
- **ESA-Prima Win 3.100.121**
- **Allplan 2006.2_3**

TRAINING

- **SCIA•ESA PT** Basis course (23, 24, 25 January 2008)
- **Allplan** Basis course (21 & 22 January 2008)

Agenda and online registrations ...

SCIA TRIBUTE

"**Carl Friedrich Gauss, the founder of modern mathematics** was born 230 ago... A tribute to the prince of mathematicians by our development partner Dr. ir. Eduard Hobst" **more ...**

GALLERY

'Composite steel-concrete beam and slab design' in SCIA•ESA PT

Dear eNews reader,

Step by the step the year reaches its end ...
Time flies so fast that we hardly have the time to give a moment's thought to some evolutions.

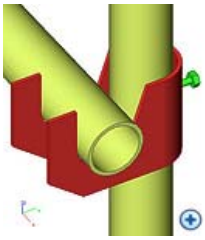
The other day, one of our colleagues was searching for an article in the eNews' archives and in the edition of December 2005 she read that at that time 11.000 readers were signed-up for the newsletter. Nowadays **we have a readership of more than 16.000**! This can only mean that you appreciate the choice of topics we come up with every month.

Before you start reading this eNews, **the entire SCIA team wishes you all the best and a warm and cosy 'end of the year'**.

Corporate News: SCIA gets deeper into modelling

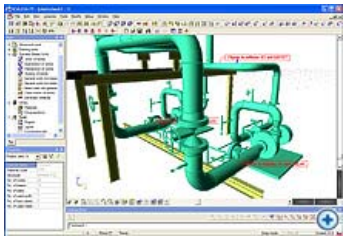
A strong element of the SCIA technology is the capability of 3D modelling. A multitude of applications are using this advanced functionality: visualization, interference & clash detection, importing & exporting architectural models, Round-trip Engineering, ...

In the new Allplan 2008 version, SCIA has realized extensions, based on the techniques that were originally implemented in the SCIA•ESA PT (professional technology) platform. It comprises: 3D grids, 3D volumetric modelling with Boolean operations (union, division, subtraction, intersections), free form modelling for complex surfaces, template technology (steel & concrete building components), parametric modelling, revision management ...



Open Connections

Free form Modeler



Collision check

The modelling technology gets a wider application field for detailing the full structural work independently of the fact if an engineer or a draftsman performs this work. **In the concept of B.I.M.** (Building Information Modelling) **the sharing of model data is essential to realize interoperability**. SCIA is addressing the full structural modelling in its ongoing development work with a focus on structural members (steel, concrete, aluminium, ...).

For a correct engineering design, it is essential that a structural engineer is able to manipulate the structural work model, for composing the analysis model and for adding his details. The conversion of a geometrical 3D model to an analytic model demands engineering judgment, e.g. for structural member recognition (conversion of 3D data to members), for alignment of axes lines in-between members, etc.

Merely relying on an analytic model generated within a pure CAD program has proven not to be functioning very well. The structural engineer cannot waive his liability on the correctness of his analytic model.

Therefore the need for modelling capabilities in structural software must be clear!

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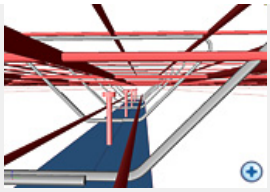
Product News: Allplan 2008 BIM

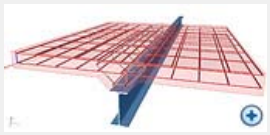
In the near future Allplan 2008 will be available for the Benelux market.

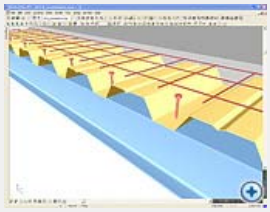
During the installation, you will notice the word BIM right away. Is this a large turnabout? Not really, because as you already know, Allplan was capable of performing **Building Information Modelling** from the beginning.

The well-considered project management system, used by Allplan, already allowed splitting the model in different disciplines and the Workgroup Manager gave the users the opportunity to work together on the same project. Nevertheless, with the new version Nemetschek wants to go further into this élan and fully take on its role of pioneer.

A few innovations underline this philosophy.







SCIA USER CONTEST

SCIA Quick Poll

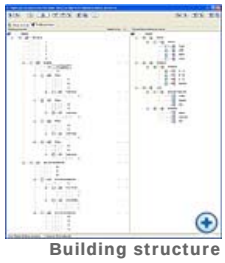
What should we add more to this website?

- References
- Software files
- Tutorials
- Movies

Vote

View Results

There is a **building structure** and a **surface manager** available that allows you to better manage the model and standard reference surfaces. A hierarchical subdivision simplifies the grouping of building components and the management of sections and views.


Building structure

Those who are familiar with file format **IFC2x3** (the appropriate neutral format for the interoperability between different software) will definitely see particular resemblances. However, Allplan takes further steps forward and adds a few additional levels. Nevertheless, this doesn't mean that you have to give up on your familiar way of working. The traditional structure with layer and layer sets is still available.

Allplan 2008 also has **full PDF-support**. After the strategic partnership with Adobe, the original PDF-libraries were implemented in the new version, so you can generate (export) and read in both 2D and 3D PDF-files. Now it is even simpler to process data from manufacturers (technical data in digital form) in your model.

Also towards the user efforts were made. The **graphical user interface** has been modernized and all functions are now ergonomically organized in **pallets**.

Regarding Engineering big changes can be noticed too. Apart from the possibility to reinforce in the familiar frame model with linked views and sections, the user can also **place reinforcement directly into the architectural model**. The module Associative Views was extended with the necessary functionalities. They make the implementation of modifications, both in the architectural model as regarding the reinforcement, more user-friendly and well-organized.


Surface manager

In this 2008 version the user comes in first: 2D, 2,5D, 3D or a complete object-oriented approach ... Allplan enables it, but the user decides.

So there are quite a few innovations to discover and to look forward to in Allplan 2008 BIM.

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Infrastructure works in India: 100 billion dollars of investments to be expected

Ernst & Young estimates the amount of the investments to be done in India within the next five years to be about 100 billion dollars; currently the infrastructure with regard to roads, airports, ports and power installations is in a deplorable state.

"We expect that the amount of private investments in infrastructure projects will exceed the limit of 4.000 billion rupees (100 billion dollars) in the next five years" as indicates Kuljit Singh of the Indian branch of Ernst & Young. According to the company, investments in road and railway transport, in the distribution network for water and energy as well as in ports and airports is estimated to account for 9% of the national production of richness from now up to 2012 against only 5% currently.

The Prime Minister of India, Mr Manmohan Singh has also recognized that the infrastructure of his country is in a lamentable state, especially if it is compared with the one of China or with the countries of Southeast Asia.

Two examples:

- there are no real motorways in India, only a few good four-lane roads
- the international airport of New Delhi has not been renovated within living memory and its runways are completely worn out.

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The winning project: the footbridge of Evry by Schroeder & Associés (L)

About Schroeder & Associés

The company was founded 1961 and is active on all areas of the construction industry, civil engineering, infrastructures as well as in specific related domains.

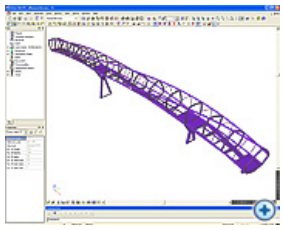
The engineering office **Schroeder & Associés** offers a wide range of services and employs about 190 engineers, academics, technical engineers, designers, inspectors and administrative personnel.

The Project
The project regards **the reconstruction of a pedestrian bridge in the city of Evry (Luxemburg)**. The footbridge connects the "place des Miroirs" with the Pyramid quarter.

The steel footbridge creates a volume enclosing the pedestrians.
The supporting structure of the pedestrian bridge is composed of a set of diaphragms, connected by 4 tubular, helicoidally formed beams. Its structure has a length of 62m and a width of 3m and rests on 3 bays with spans on 24,4m, 26,3m and 11,3m. The intermediate X-shaped columns are built of boxed steel sections. The whole structure is composed of 55 tons of steel S355.

The modeling and the statical analysis of the main structure have been realized by a global finite elements model using the **SCIA•ESA PT and ESA-Prima Win** software. The model encompasses the supporting structure of the footbridge with intermediate X-shaped columns and takes the characteristics of the supports into account.
The geometrical definition of the work is based on the designs of **"DVVD ingénieurs architectes designers"** (**www.dvvd.fr**) and has been elaborated with the help of AutoCAD. The 3D wire structure has been recaptured in a DWG-format in SCIA•ESA PT. The verifications of the ultimate limit states have been realized, with the help of a global elastic analysis, in accordance with the Eurocodes. Based on certain combinations in the verification of the diaphragms and frames, an analysis of the global stability has been performed.

The ESA-Prima Win software was used for the temporary analysis of the dynamic behavior. The first 6 proper modes have been calculated, the following modes have a proper frequency that is higher than the one of the frequencies of the track of the pedestrians, i.e. > 4 Hz. The evaluation of the answer on acceleration is based on ISO 2631-1 on an effective value of the balanced acceleration, i.e. on the basis of an average acceleration with a certain time interval. The limit of this reaction is 0,9m/s² for a pedestrian as well as for a group of 6 pedestrians walking or running over the footbridge.



The dynamic load has been modelised with an oscillatory load of a pedestrian walking (according Fourier) during the theoretic time span over the footbridge. Due to specific modes of the footbridge, the analysis is restricted to a pace with a step frequency of 2,9 Hz (second mode) and the journey with a running frequency of 3,75 Hz (fifth mode). The results of the analysis have shown that the dynamic behavior is acceptable, neither reinforcement nor a damper had to been foreseen.

The facility and the modeling capabilities of the SCIA•ESA PT software, especially the importation of the 3D wire definition in DWG-format as well as the variable bar sections have contributed to a good result of the design and the calculations.

We invite you to read the complete story with all technical details in the SCIA User Contest book 2007 at page 68 and 69. **You can still order a hard copy of this book**.

Quote from the Jury
"The aesthetics and techniques of this project are marvellously in equilibrium. We noticed a very original design, especially when it comes to taking up the torsional effects, while also achieving a good dynamic control".

Other nominated projects in the Category 3 'CAE Civil Works':


ABT België
Museum at the Stream in Antwerp


Ingenieursbureau Stendess N.V.
Bridge 'Olsene' across the 'Leie' river


Victor Buyck Steel Construction
Combination bridge in Utrecht

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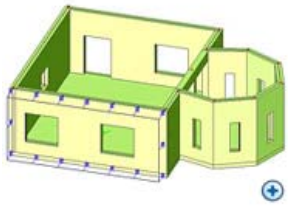
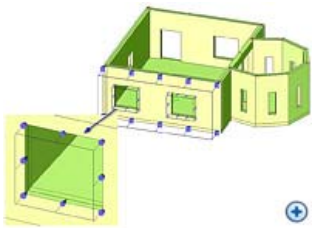
Load panel for openings in SCIA•ESA PT

The option **'opening'** in SCIA•ESA PT can be found under **'2D member components'**.

In the previous versions, the load cases, applied on the relevant member 2D, were limited to the mesh elements of the plate element.



However, in most cases **it is desired that the force is transferred to the borders of the opening**. Imagine a window or an opening of a door.

In order to obtain this transfer of forces, **SCIA has provided an extra option in the properties of an opening, namely the load panel**.

Opening panels are special variants of loaded surfaces. If a surface with openings is subjected to a certain force and if the opening is defined to resist the load, then the surface load is recalculated on the opening as a number of line loads on the edges of the opening.

Archive Tips & Tricks

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