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December 2010

## Latest News &amp; Events

## ► Nemetschek Engineering

## User Contest 2011

Prolonged until 31/12/2010!

Take part and put your project(s) in the picture!



## ► Allplan 2011.

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## ► Join our new IQ Platform and contribute to the future evolution of Scia Engineer!

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## Software Update

## ► Customers can download the latest service packs from our secured download section.

- Scia Engineer 2010.1.400c
- Scia Steel 2010 SP1
- Allplan 2009-2-2
- Allplan Precast 2008.2a5

## ► Get an automatic notify through RSS when a new Scia Engineer Service Pack is available.



## Training

## ► Free interactive eLearning.



## ► Group trainings for Scia Engineer, Scia Geotechnics, Allplan... Consult our training agenda and register online...

## ► Interested in an individual customized training at your offices? Please contact Mrs. K. Verhille.

## ► Online training calendar 2010 / 2011. Subscribe online...



## ► Any questions? Put it on the Scia Forum! Register...

## Software Gallery

## ► Allplan Engineering Bridge Weil am Rhein

Dear eNews reader, this is the last eNews of this year and we present you the following topics:

- Tunnel Design and Detailing with Nemetschek Software
- Bridge over the Berounka River near Prague - NOVAK & PARTNER
- Allplan Tips & Tricks: How to reinforce double curved elements?

## Tunnel Design and Detailing with Nemetschek Software

Nemetschek has two main software products for designing tunnels: Allplan Engineering and Scia Engineer.

A new **Gotthard tunnel** is under construction; with a length of **57 km** it will be the **largest tunnel in the world**, planned to open for high speed train traffic in 2017. It is planned to travel from Zürich to Milan in less than three hours. One of the main engineering consultants is Gähler & Partner (Ennetbaden, Switzerland) who designs several parts of the tunnel with crossings, subterranean constructions and various installations in open air (access, maintenance, water treatment). To precisely plan the geometries of the tunnel sections (cross sections, crossings) and buildings, Gähler & Partner is using **Allplan Engineering**. Up to today more than 1 000 project plans have been worked out to detail the steel reinforcement and the steel profile parts, necessary to withstand the high earth pressure (at some sections 2 400 m deep).

[Read and download the full story here.](#)



The second product is **Scia Engineer**, which enables the static and dynamic analysis as well the design to several building codes. One of the pioneer users is the consulting company ILF with their main office in Innsbruck (Austria) and several branches worldwide. In Innsbruck ILF has adopted Scia Engineer as one of the primary design tools for tunnels; in addition to static and dynamic calculations, also the effects of high temperature (due to accidental fire) are examined to evaluate the security before and after fire.

Designing and constructing tunnels are demanding challenges for geotechnical and structural engineers. To reduce costs in construction materials and in execution time, detailed modelling and drafting of the structure and its surrounding are imperative.

For the latest news on these products, click [www.allplan.com](http://www.allplan.com) and [www.scia-online.com](http://www.scia-online.com)



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## Bridge over the Berounka River near Prague - NOVAK &amp; PARTNER

## About the company

The company **NOVAK & PARTNER** was established in 1992 as a design and engineering office. Today it is composed of a Transportation Structures Department, Bridges Department and a Buildings Department. It also employs specialists for foundations and engineering.



## About the project

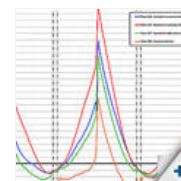
The project described is the longest elevated highway in the Czech Republic - the bridges span the Berounka river valley. The whole bridge - a cast-in-place segmental cantilever construction - over the Berounka River has a monolithic load bearing structure made of prestressed concrete with a box section. A separate load bearing structure has been designed for each direction. The total bridge length is 2054.5 m and is divided into five sectors, separated by expansion joints. The typical span lengths are 72,0 / 84,0 / 101,0 / 114,0 / 72,0 m. The cross-section height of the load bearing structure in the middle of the spans and above the outer supports is 3.0 m. The height at the piers is increased through a parabolic haunch up to 5.2 m and 6.5 m in the short and long spans respectively.



Location of sections for check of piers



Construction



Time distribution of deflection curve



Complete structure

## Analysis

The time analysis of construction stages taking into account the effect of creep and shrinkage on deformation and internal stresses of the structure was made on a planar frame model in Scia Engineer. The creep and shrinkage were considered in accordance with the CSN EN Code. The calculation procedure is based on a time discretization method implemented in the TDA module of Scia Engineer. In total, 180 construction and operation stages of the bridge were defined. To respect the 3D behaviour of the structure, a shell model of the load bearing structure was prepared. It was used to evaluate the importance of shear effects on the deformation of the load bearing structure and to determine the impact of asymmetrically applied mobile load. The calculation results were continuously compared with the measurements of deformation made during the construction, i.e. with the stress (strain) values read on the gauges mounted in the structure.

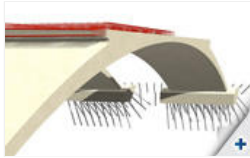
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## Allplan Tips &amp; Tricks: How to reinforce double curved elements?

Reinforcement is usually positioned according to a regular linear or circular schedule or in a flat surface. However, situations can occur where reinforcement has to be placed in a double curved surface, or along an arbitrary curve. The method "Custom polygonal placement" can often offer a solution, but also some other functions can do the trick ...

## "Read properties":

with this reinforcement functionality it is possible to adopt the geometry from another object, but also from a 3D line. This way it is possible to draw the reinforcement bar as a 3D line directly in the model: that makes it easy to draw '3D shaped' reinforcement bars or



in case of '2D shaped' reinforcement bars to highly restrict the number of sections. When adopting the geometry, you can set the diameter and choose for a length 'Per meter' or a fixed bar length with overlap.

#### "Copy along element":

this functionality allows the copying of a bar according to an arbitrary 2D element, e.g. an ellipse. Here you have the possibility to enter an intermediate distance or a number, further it is possible to determine if the bar whether or not rotates with the curve. This function is also very convenient to use within the associative views and cuts itself, more precisely for positioning bars according to an arbitrary 2D element.

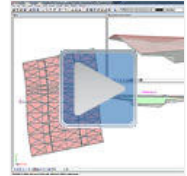
In the **two video clips**, these functions are shown:

#### Movie Bridge

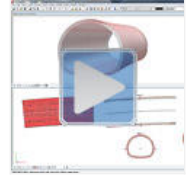
- Part 1 (00:00-03:10): model created with "**Bridge/civil engineering component**"
- Part 2 (03:11-07:48): reinforcement bars placed with "**Read properties**" (on a 3D line) and "Custom polygonal placement"

#### Movie Tunnel

- Part 1 (00:00-02:46): model created with "**Bridge/civil engineering component**"
- Part 2 (02:47-05:06): reinforcement bars placed with "**Read properties**" (on a 2D line) and "In rotation"
- Part 3 (05:07-08:25): reinforcement bars placed with "**Copy along element**"



Movie Bridge



Movie Tunnel

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