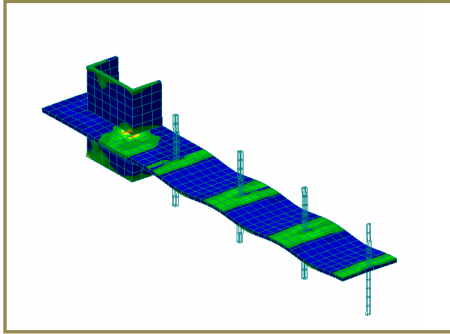


Newsletter 2/2008 - December

ATENA Program Version 4

The new version of ATENA was released in October 2008 and it included many exciting and new features:

The version 4 has two products:



ATENA Engineering

It is suitable for the static nonlinear analysis of structural elements. It uses our standard and user-friendly graphical interface. It is an excellent tool for checking reinforcement detailing, verifying crack widths or checking the ultimate load capacity of structural elements.

Model of deflections and crack widths of RC slab.

ATENA Science

Covers broad range of material behavior in time. It is suitable for analysis of complex structural problems, such as:

- ❖ dynamic implicit analysis
- ❖ dynamic eigenvalue analysis
- ❖ static stress analysis
- ❖ creep analysis
- ❖ transport of heat and fluids,
- ❖ fire analysis

Model of prestressing cables in a nuclear containment vessel.

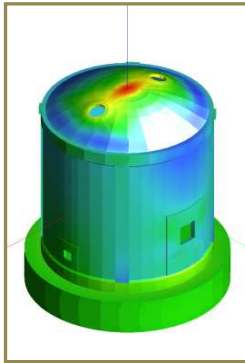


The coupling of the above effects can be often achieved through the simultaneous solution of various constitutive models. Thus, dynamic analysis can capture non-linear material response due to cracking, etc. In an eigenvalue analysis vibration frequencies reflect the stiffness changes due to material damage. In creep analysis the cracking of concrete and redistribution of stress due to plastic deformations is reflected. In fire analysis material response is strongly dependent on changing temperature fields.

It combines **AtenaWin** runtime interface with the powerful GiD pre and post-processor program (www.gidhome.com). There are various new and exciting features in this program version as well. The most interesting ones are:

- ❖ new and more user friendly version of the ATENA – GiD interface
- ❖ import of CAD data, dxf, IGES, Parasolid, Acis, etc.
- ❖ crack display, easier handling of data output, view saving

Our Current Projects



BARC Containment Model Round Robin Analysis

Bhabha Atomic Research Centre in India, [BARC](#), has launched a project on testing a model in scale 1:4 of 540 MW pressurized heavy water reactor containment made of prestressed concrete. ATENA is one of the 16 participants in this project. The aim is to simulate the test and to predict the failure.

Numerical model of nuclear containment

Damage Analysis of Reinforced Concrete Due to High Temperatures

Fire or other events causing high temperature remain one of the serious potential risks to most buildings and structures. With the current state of knowledge, it is not possible to accurately predict the deformations due to high temperatures, which in many cases decide the structural failure mechanism. This was well documented by results of recent European research projects or studies by NIST. Spalling is another phenomenon that cannot be predicted or modelled. The research project is funded by Czech Grant agency number 103/07/1660 and the goal is to develop models and methods for coupled hydro-thermo-mechanical analysis of reinforced concrete structures subjected to high temperatures. The developed methods and models should be applicable to practice and will reflect the current level of knowledge on this subject. The goal is to use a balanced approach, in which the same accuracy and modelling detail in all parts of the model (thermo-hydro-mechanical) will be represented. <http://www.cervenka.cz/research-and-development-projects>

I-SSB

The I-SSB is a collaborative research project partly funded by the European Commission, under the [6th Framework Programme - Priority III - NMP4](#). It started in January 2007 and it will last for 4 years. 22 [partners](#)-industry-led-from 11 countries are collaborating to develop a new modular lightweight multi-level building concept based on multi-functional, load bearing dry-wall systems coupled with smart steel-stud/frame components. Cervenka Consulting provides ATENA Science software to predict and model the behavior of drywall buildings under seismic conditions.

Global Safety Formats in Nonlinear Analysis

Cervenka Consulting is starting a research project dealing with the safety formats used in non-linear analysis of concrete structures. The project is motivated by the activity of *fib* SAG5 (Model Code), where the recent safety formats proposed by Joint Committee on Structural Safety are adopted. In this context an appropriate safety format is sought for nonlinear analysis. All present approaches, including partial factors, global factors and probabilistic analysis are investigated. The project is based on the cooperation of three research groups: Cervenka Consulting headed by Dr. Vladimir Cervenka, Prof. Milan Holicky, TU Prague and Prof. Drahomir Novak, TU Brno. The financial support is provided by the Czech Grant Agency.

Publications

We are proud to announce the publication of our new concrete material model in the premier scientific journal of Plasticity in its December issue:

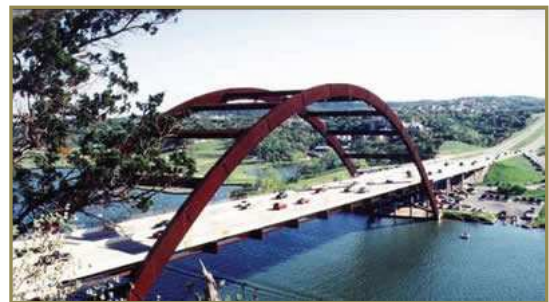
Three Dimensional Combined Fracture–Plastic Material Model for Concrete
Jan Cervenka, Vassilis K. Papanikolaou, Int. Journal of Plasticity, Volume 24, Issue 12, December 2008, ISSN 0749-6419

Where you can meet us?

In the near future it is possible to visit our representatives at the following events and exhibitions where you can learn about our news and services.

- ✓ **STRUCTURES Congress '09**
Austin, Texas, April 29 – May 2, 2009

The 2009 STRUCTURES CONGRESS will be held in Austin, Texas, one of the most exciting and dynamic cities in the United States. Austin is the capital of the Lone Star State with the largest statehouse in the nation. We will take place at the Technical Exhibition. You can read more on the web <http://content.asce.org/conferences/structures2009>



- ✓ **ICOSSAR 2009**
Osaka, Japan, September 13 –17, 2009

ICOSSAR'09 will encompass aspects of safety and reliability of structures and civil engineering systems. Special focus will be devoted to advanced technologies, analytical and computational methods of risk analysis, probability based design, life cycle cost analysis and damage assessment. We will participated in the Scientific Program of the Conference with the paper Assessment of structural performance considering spatial variability of material properties. More information about the conference you can read on the web: <http://www.sc.kutc.kansai-u.ac.jp/icossar2009>

