ČERVENKA CONSULTING

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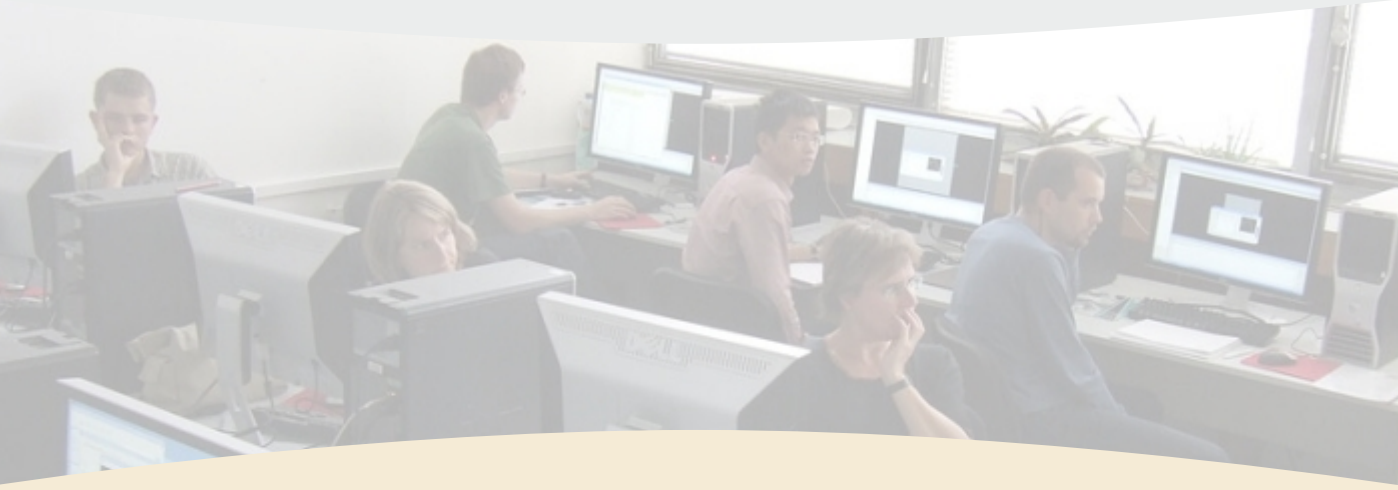

HOT NEWS

ATENA Advanced User Seminar 2010

you can still register for the regular ATENA Advanced User Seminar 2010 to be held in Prague, Czech Republic on September 8-10, 2010. For more information and on-line registration you can follow the link bellow: http://www.cervenka.cz/news/atena-advanced-user-seminar-2010

ATENA New Version 4.2.6

we are continuously improving and developing our software ATENA, the leading solution for the simulation of real behavior of reinforced concrete structures. You can always download the latest ATENA Version 4.2.6 directly from our web site: http://www.cervenka.cz/downloads.

AmQuake - New Product

Program for seismic design of masonry buildings based on pushover analysis according to Eurocode 8 with Wienerberger products.

More at: www.amquake.eu

Only for 390 €

ATENA Advanced User Seminar 2010

Czech Republic, September 8-10, 2010 Faculty of Civil Engineering at the Czech Technical University in Prague

The seminar will strongly focus on the features of the ATENA version 4. The main focus will be on the package ATENA Science which includes a new and robust GiD interface and supports new analysis types such as nonlinear dynamic and eigenvalue analysis.

Program:

Day 1: Advanced ATENA topics
Concrete material model
Fiber-reinforced concrete
Reinforcement bond
Interface modelling
Fatique material
Strengthening
ATENA SARA
- probabilistic modelling
- reliability analysis

Day 2: ATENA-GiD interface
GiD preprocessing
Running analysis with AtenaWin
Post-processing in AtenaWin, ATENA 3D, GiD
ATENA Science practical examples
- Static analysis
- Thermal analysis

Day 3: Creep, Dynamic, and Fire Analysis
ATENA Science advanced analyses
- Creep analysis
- Dynamic analysis
- Eigenvalue analysis
- Seismic analysis
- Fire analysis

Registration

Please, register on-line at web http://www.cervenka.cz/news/atena-advanced-user-seminar-2010 or by e-mail by filling in the registration forem, and please send it to the address cervenka@cervenka.cz.
The registration fee is 480 EUR payable to the bank account in the registration form. It is recommended to register as soon as possible. The number of participants is limited!

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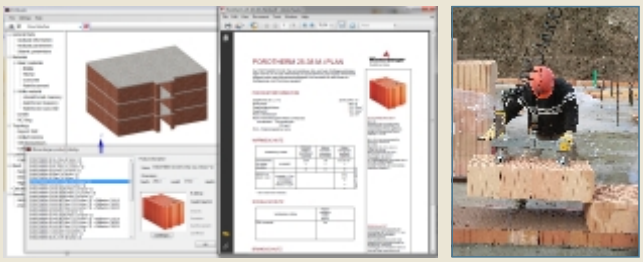
Our New Products

AmQuake

AMQUAKE program allows European engineers to design safe masonry buildings in seismic regions in accordance with the latest European standards and modern seismic assessment methods. The introduction of Eurocode 6 and 8 in March 2010 in the European community requires to verify almost all new masonry buildings for seismic safety. In the future, this will guarantee safer buildings for the population, but introduces higher demand on engineers today.



Engineers can directly import a building plan from their favourite CAD program. AMQUAKE automatically generates a numerical model, using the equivalent frame approach. Material properties are assigned using a database of Wienerberger masonry products and Eurocode concrete or reinforcement properties.

AMQUAKE automatically performs the necessary safety checks for seismic design as well as the verification for static loads. It is based on the pushover analysis according to Eurocode 8 and offers potential to exploit a higher load-carrying capacity. More at www.amquake.eu

ATENA Ver 4.2.6

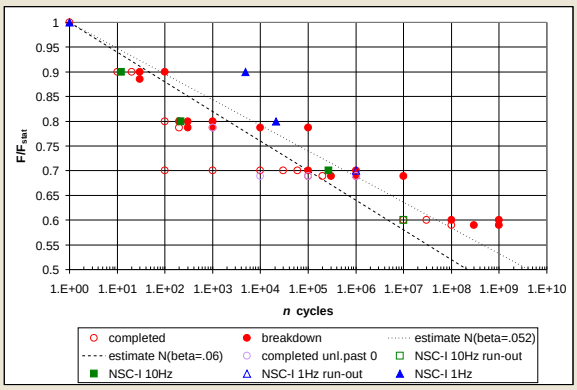
• We are continuously improving and developing our software ATENA, the leading solution for the simulation of real behaviour of reinforced concrete structures. This version brings you the following new features:

- Improved dynamic capabilities
- Automatic pushover analysis according to EN1998-1
- Improved concrete material model using the Modified Compression Field theory for shear and compressive strength of cracked concrete
- User material interface in C++ and FORTRAN that allows you to include your own material models
- Improved GiD support for dynamic, thermal, and creep analysis
- Improved support for materials with random fields (i.e., random distribution of parameters)
- Implementation of various user suggestions and improvements such as no tension reinforcement or various problem fixes

ATENA is being used by engineers all over the world to better understand the behaviour of their structures. Please check our website for various examples of successful ATENA applications.

Fatigue of Concrete in Tension

Although fatigue damage of concrete is an important problem in structures subjected to cyclic loading, there are not many high-cycle fatigue models available for use in conjunction with advanced concrete material models and nonlinear finite element analysis. The available models that are published in the literature usually deal with the low-cycled fatigue and numerical nonlinear analysis is performed throughout the history of all cycles. This approach is definitely not applicable to high-cycle fatigue with millions of cycles. The available high-cycle fatigue models are based on linear fracture mechanics considerations and they are not readily applicable to the finite element analysis using the smeared crack approach.



Numerical results for load levels 0.9, 0.8, 0.7, and 0.0 F_{stat}

The three-dimensional fracture-plastic model in ATENA has been extended to capture fatigue damage in tension (however, the model can be easily modified to also consider damage from compressive and tensile-compressive loads). To keep the material model as simple as possible, the implementation is based on a classical stress-based model (S-N or Wöhler curve). The S-N curve serves as a primary criterion for the crack initiation. In existing cracks, the additional fatigue damage depends on cycles of crack opening displacements (delta COD). This method enables to simulate crack propagation due to fatigue loads.

We are cooperating with the Czech Academy of Sciences (AV CR) and the Brno University of Technology (VUT Brno) on this topic. Experiments on concrete samples under high-cycle load conducted in Brno are used to validate and further develop the fatigue model.

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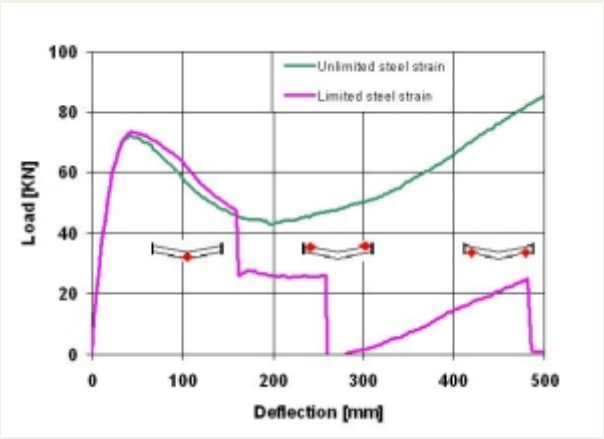
Our Current Projects

Remaining Structural Capacity Due To Large Deflections

Similar behaviour, with even more pronounced effect of membrane action can be observed in two-way slab. The membrane action of reinforcement provide a significant hardening after a snap-through.
An analysis of such problem was recently performed with ATENA for beam and slab structures.



Load-displacement diagram of beam under large displacements

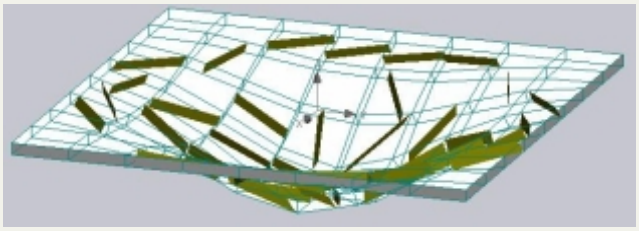
Concrete compressive stress due to arching action

Stress in reinforcement due to arching action

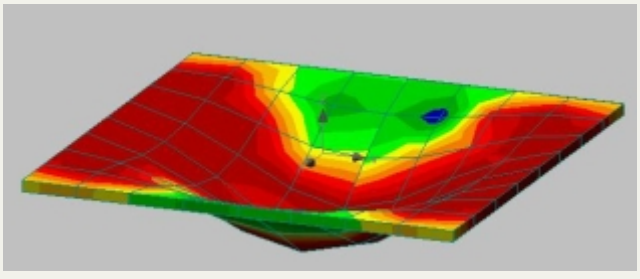
Stress in reinforcement due to large deflection

A load-deflection response of the beam is shown below (cross section 0.2 x 0.4 m. Length is 8.4 m, reinforcement is by 2ø20 in bottom and in top). The load-displacement diagram reflects the first maximum of bearing capacity due to arching action of concrete beam followed by the unstable softening and by the hardening due to engagement of the reinforcement action in tension. However, such resistance can be ensured only by large steel ductility. In case of limited ductility the rupture of reinforcement can prevent hardening response. Alternatively, the green curve shows the response in case of unlimited ductility of reinforcement.

Similar behavior, with even more pronounced effect of membrane action can be observed in two-way slab. The membrane action of reinforcement provide a significant hardening after a snap-through.



Visualization of cracks inside of slab due to large deflections



Yield stress in top Y-reinforcement due to large deflections

ATENA allows a visualization of cracks inside the concrete as well as on the surface and evaluation of reinforcement yield stress and plastic strains. Analysis is performed taking into account of large deformations, where equilibrium is established on the deformed structure.

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Past Events, Exhibitions and Presentations

ATENA Advanced User Seminar

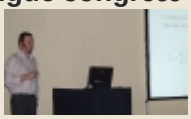
CVUT Prague, Faculty of Civil Engineering
June 23-25, 2010

International Conference on Modelling and Simulation

Czech Technical University in Prague
June 22 - 25, 2010

10th International Fatigue Congress

Prague Congress Center
June 6 - 11, 2010



The 3th International Congress and Exhibition *fib* Washington, USA

Gaylord National Resort, Washington, USA
May 29 - June 2, 2010

Concrete Day 2010 Vienna, AUSTRIA

Austria Center Vienna
April 22 - 23, 2010

Computational Modelling of Concrete Structures, AUSTRIA

Erlebniswelt Centre Rohrmoos/Schladming
March 15 - 18, 2010

Where You Can Meet Us

First International Workshop DESIGN OF CONCRETE STRUCTURES USING EN 1992-1-1 (CZECH REPUBLIC)

Prague, September 16-17, 2010

This First International Workshop focuses on the application of EN 1992-1-1, since this standard has been introduced and accepted as the national standard in many European countries and there already are some practical experiences with its use. The workshop topics will be upgraded on the applicant's demand. Recognized experts and specialists in design of concrete structure from all over Europe will participate, thus offering a unique opportunity to share their experience and acquired knowledge. Vladimir Cervenka from Cervenka Consulting will present a paper on Nonlinear Analysis in Design of Concrete Structures and you are also welcome to visit our exhibition stand.

CCC 2010, 6th Central European Congress on Concrete Engineering (CZECH REPUBLIC)

Marianske Lazne, September 30 – October 1, 2010

The main purpose of the 6th CCC Congress MARIANSKE LAZNE 2010 is to give participants an idea of new construction projects in infrastructure network and current development in relevant concrete structures in the Central European region in respect of the existing challenging economic times. Exchange of experience and practice in design and technology of concrete structures are among the principle objectives of the congress.

We will present our ATENA software and current projects, we look forward to your visit at our stand. Radomir Pukl from Cervenka Consulting will present a paper on Reliability and risk assessment of bridges for infrastructure.

17th Concrete Days (CZECH REPUBLIC)

Hradec Kralove, November 23 - 24, 2010

The Concrete Days conference gradually builds an exclusive position among domestic conference events in this field due to its professional level, range of program and even a rich social part that enable an exceptional opportunity to meet before the end of the year for all those who work professionally or are interested in this field of concrete, concrete structures and building construction. We will present us at the Exhibition CONCRETE 2010 in the ALDIS Congress Centre in Hradec Kralove. ATENA software will take part in the traditional professional exhibition in the conference.