Univerzita Pardubice
Dopravní fakulta Jana Pernera

Department of Transport Structures

Research Profile

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08.12.2016

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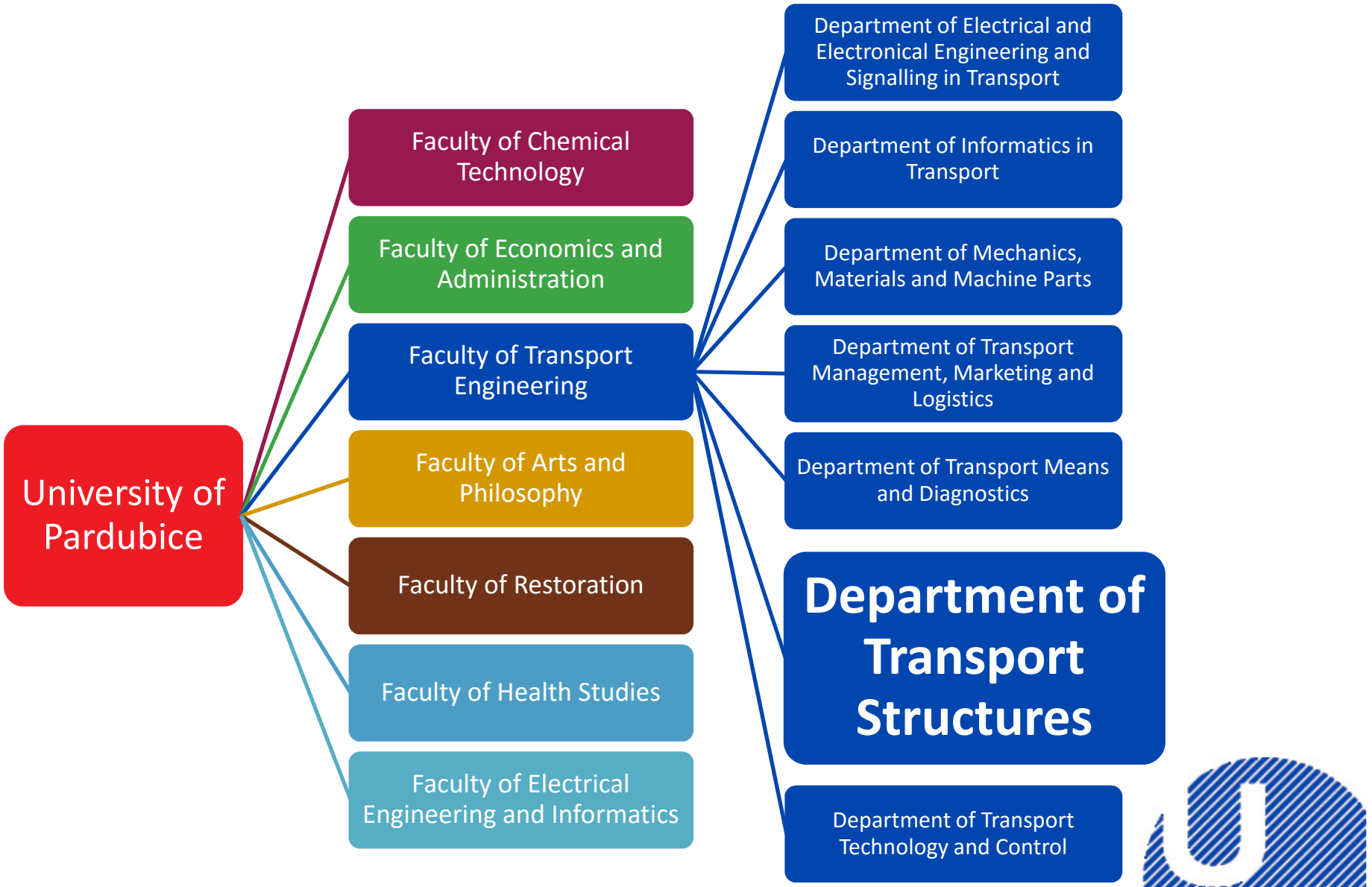

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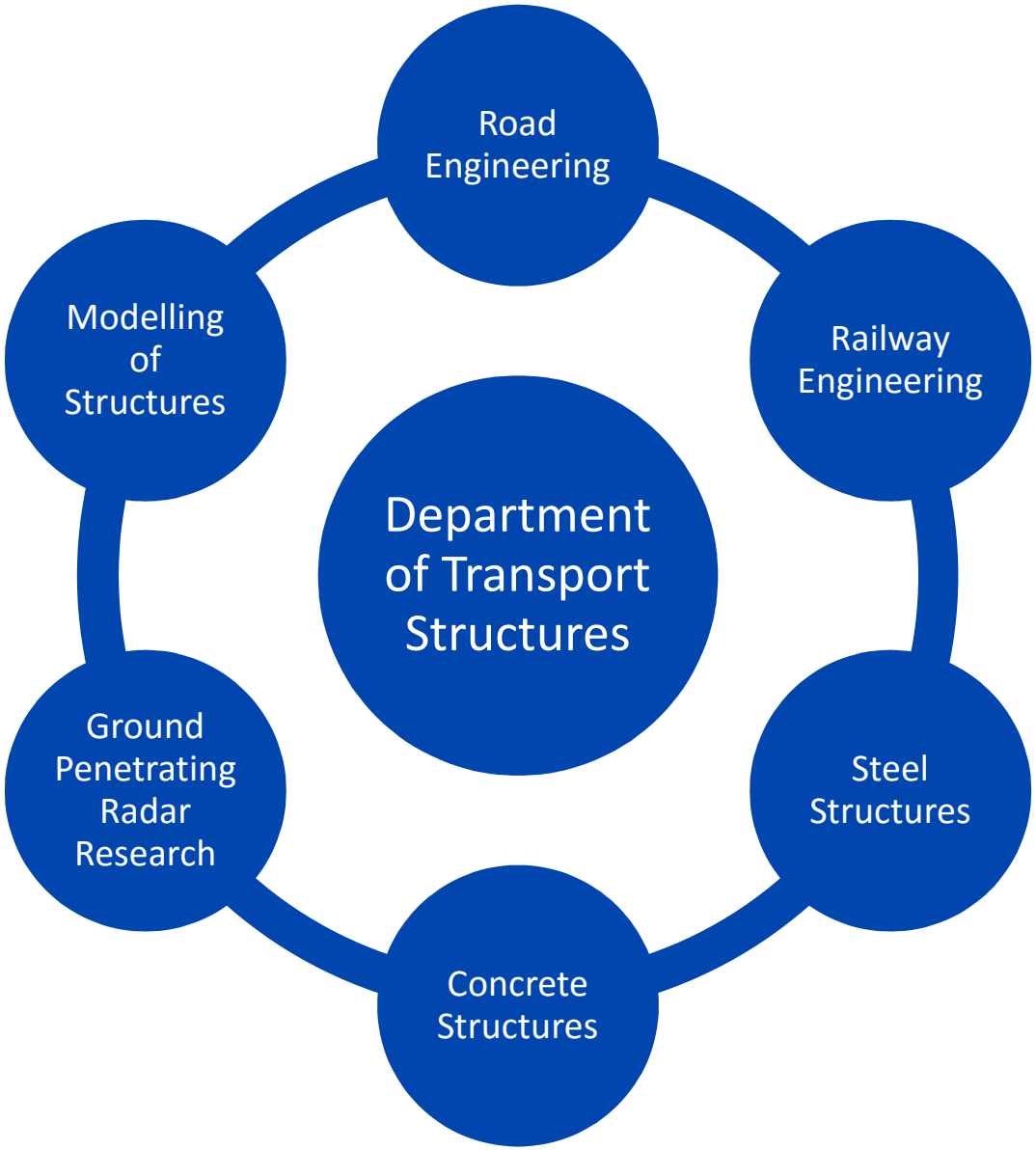
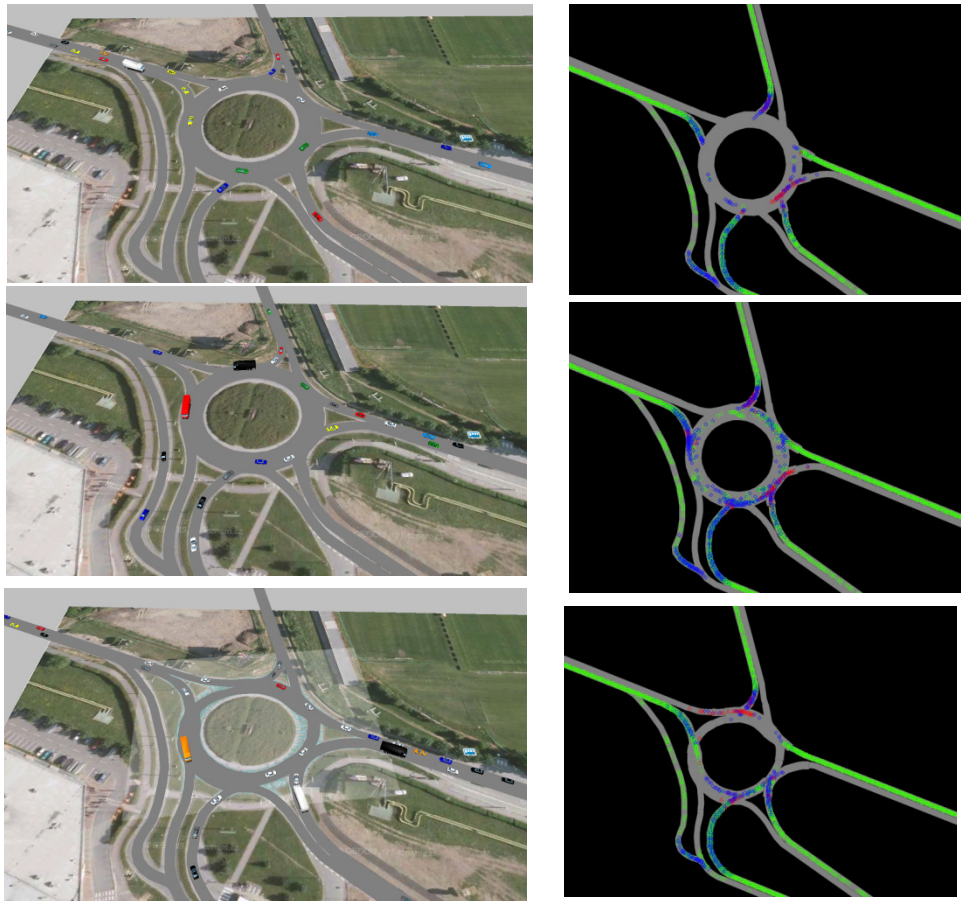


Road Engineering Research

- Traffic safety & traffic conflicts
- Research of technical salts



Traffic safety – simulation and testing of traffic control

PTV VISSIM - Analysis in SSAM (Surrogate Safety Assesment Model)

Railway Engineering Research

- Track sub- and superstructure optimization
- Stress evaluation in continuously welded rails

Steel Structures Research

- Dynamic and static Properties of steel structures
- Fatigue tests
- Life-time expectancy calculations
- Accredited investigator in realization of static loading tests of bridges

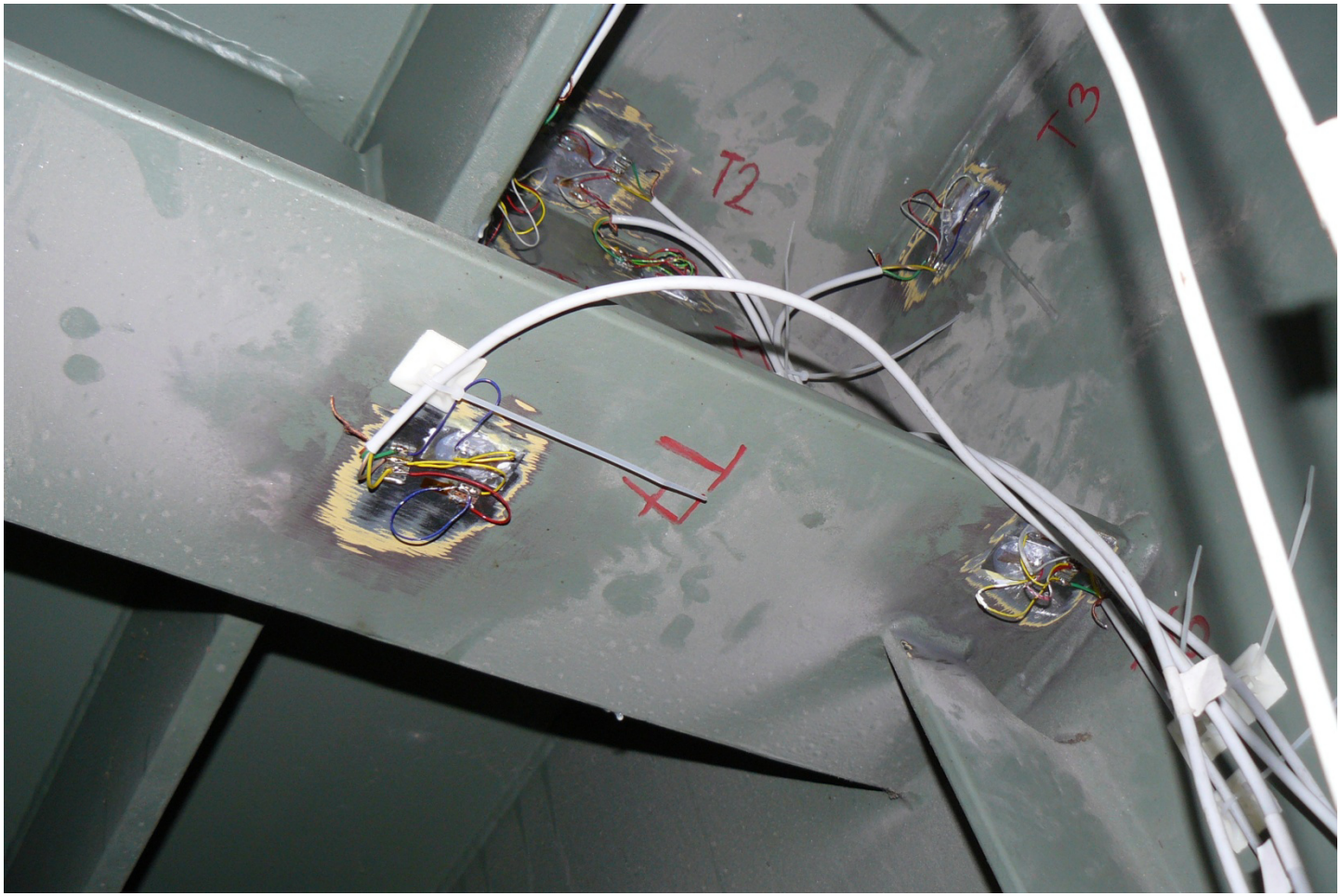
Steel Structures Research

- Experimental measurements in laboratories
  - Within the scope of the Educational and Research Centre in Transport
- Experimental measurements in-situ
- Numerical calculations

Fatigue Tests of Metal Bridge Structure in Collaboration with University of Ghent, Belgium

Realization of Static Loading Test of a Road Bridge

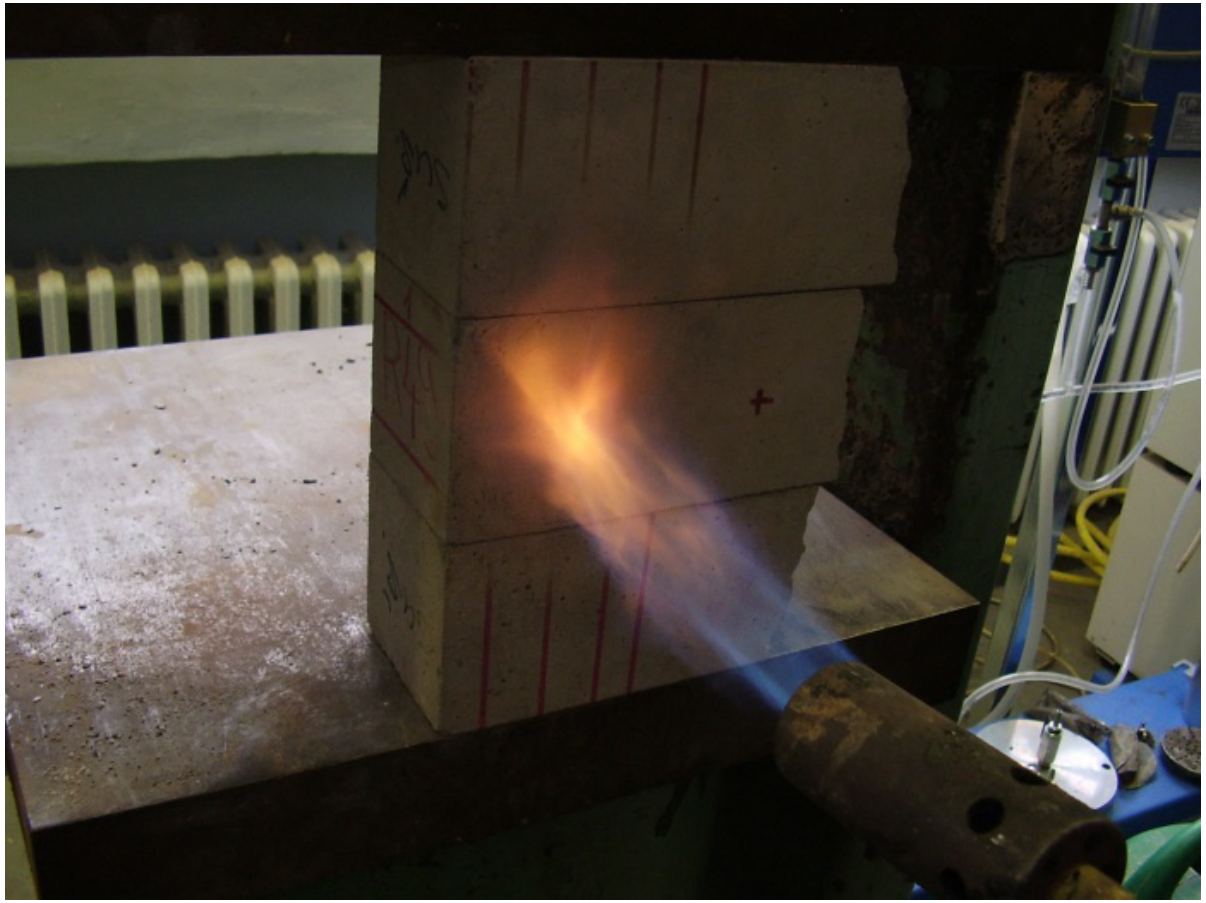
Realization of Static Loading Test of a Railway Bridge



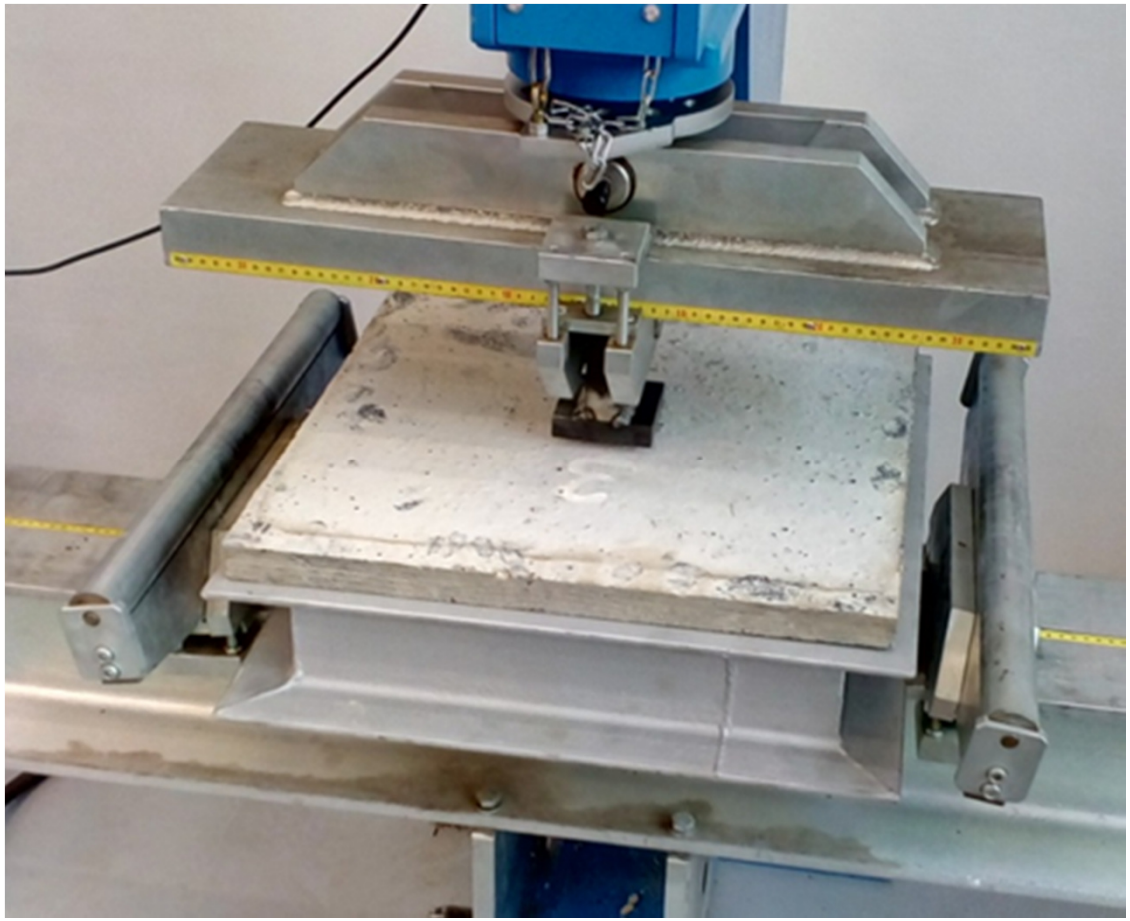
In-Situ Strain Gauge Measurement Realization

Concrete Structures Research

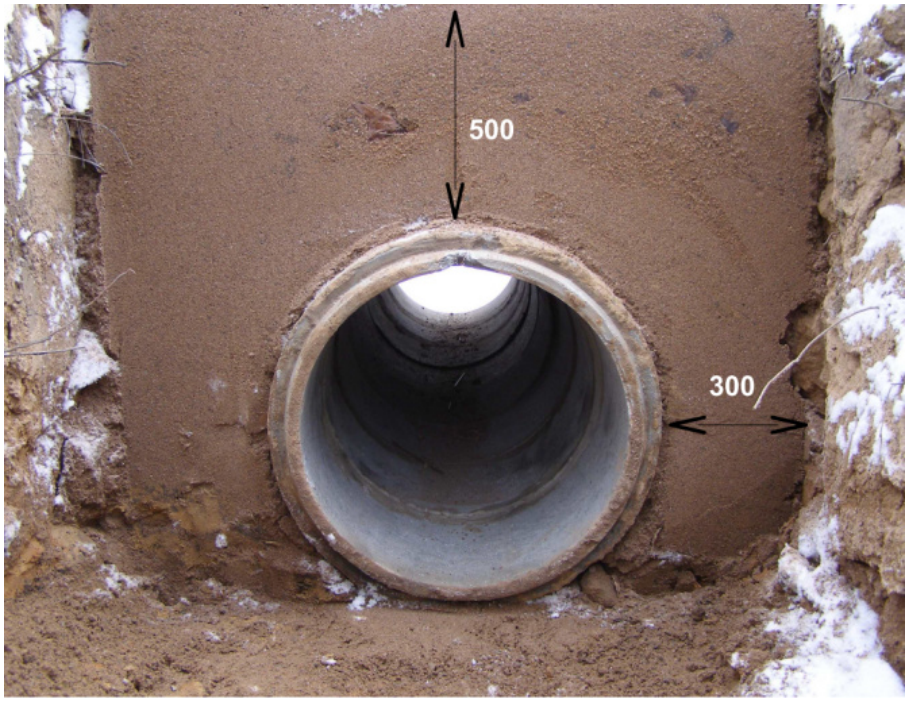
- Technology of concrete production
- Destructive and non-destructive testing
- Experimental analysis of special concretes
  - Fiber and cut wire reinforced concrete
  - Self-compacting , lightweight, watertight & high performance concrete



Experimental Simulation of Local Fire Loading on a Concrete Body



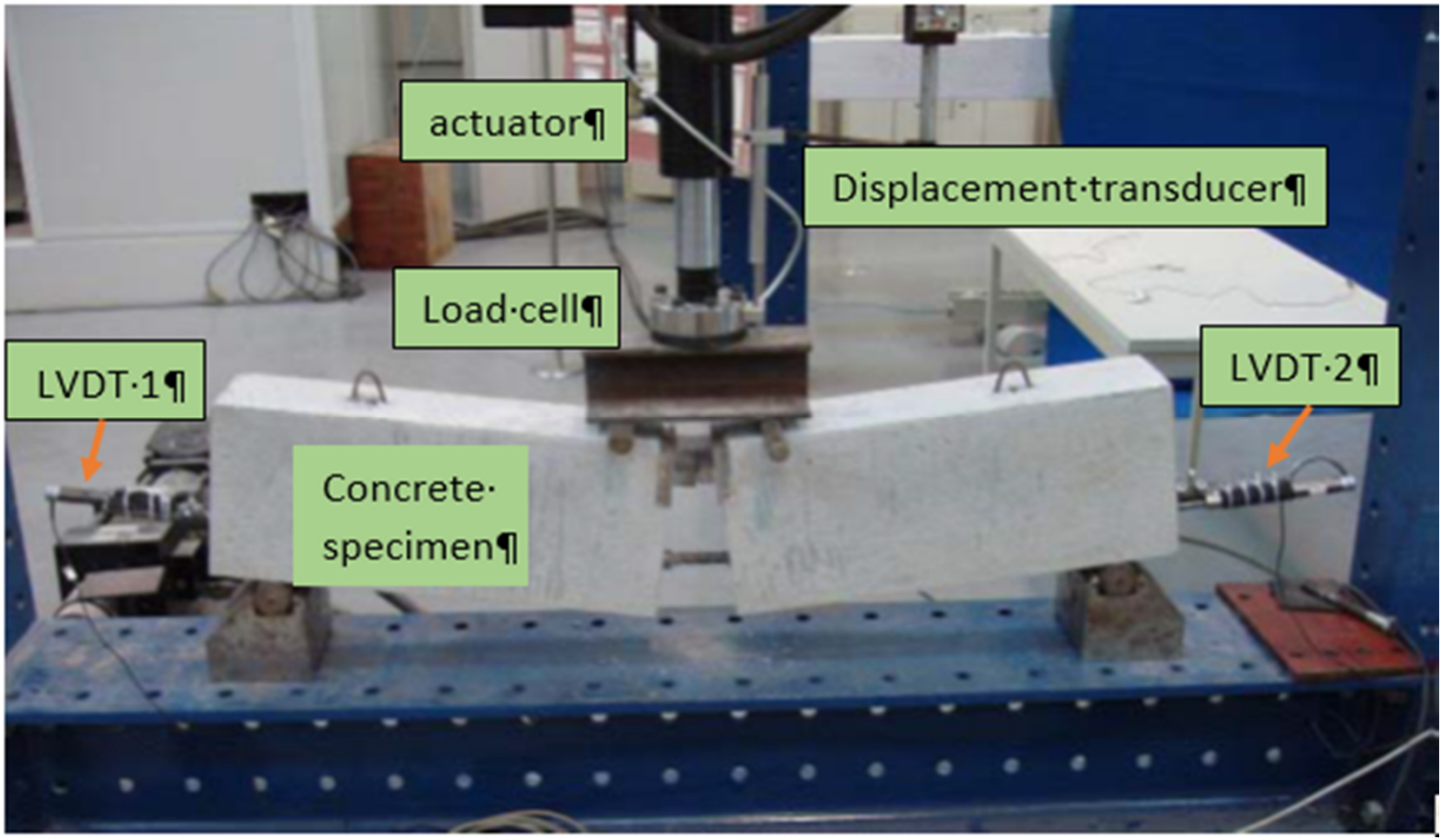
Penetration of Test Slabs



Experimental Simulation of Tunnel Lining Endurance in the case of Explosion

Ground Penetrating Radar Research

- Non-destructive diagnostics of transport structures
- Combination with other non-destructive testing methods
  - Falling weight deflectometer
  - Reflection coefficient method



A Probabilistic Model for Estimation of the Bond-Slip Failure of the Reinforced Bar in the Fire Exposed Beam-Column Joint Specimen

Modelling of Structures

- Team of Dr. Řoutil – chosen topics:
  - Stochastic modelling of concrete structures
  - Fracture mechanics of cement based composites
  - Fully probabilistic approach to the structural design

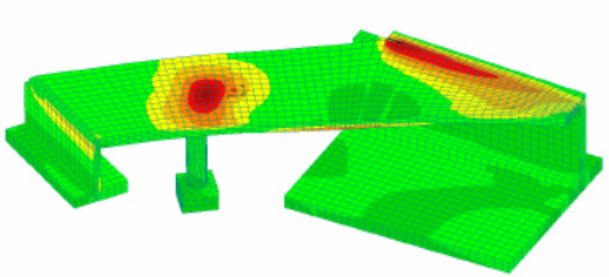
Bridge Nr. 2-2043-15
E4 Kristineberg, Stockholm

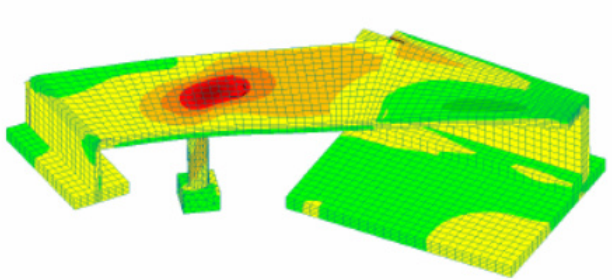
The reinforced concrete bridge has a two-span frame structure. Total bridge length is 26 m; bridge deck has a width of 7 m. The bridge deck has inclination 2.5% in both longitudinal and transverse directions. There are two lateral abutments and one intermediate support. The abutments have a significant inclination with respect to road axis and they have a different shape and size.

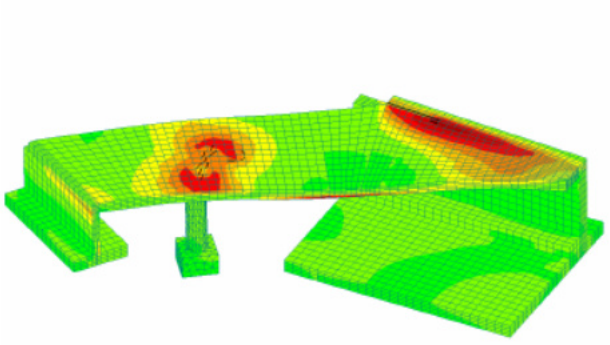
Self weight

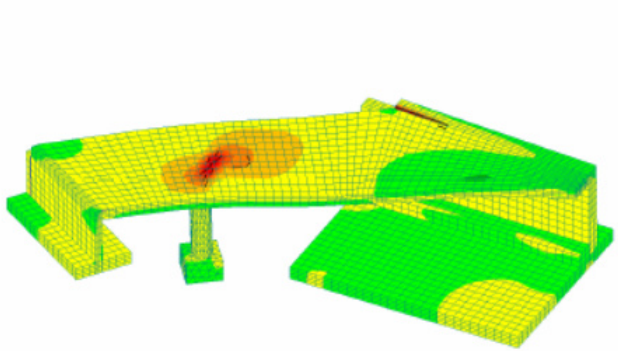
Load case 1

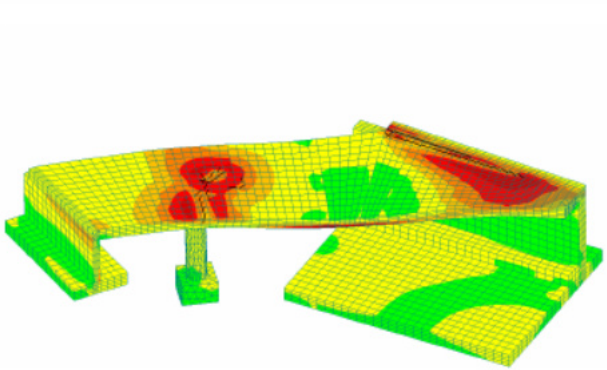
Load case 2

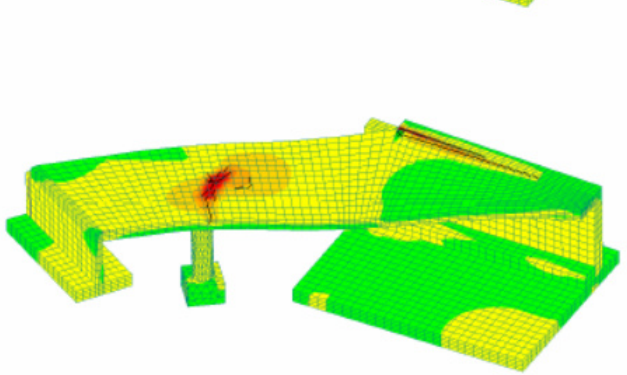








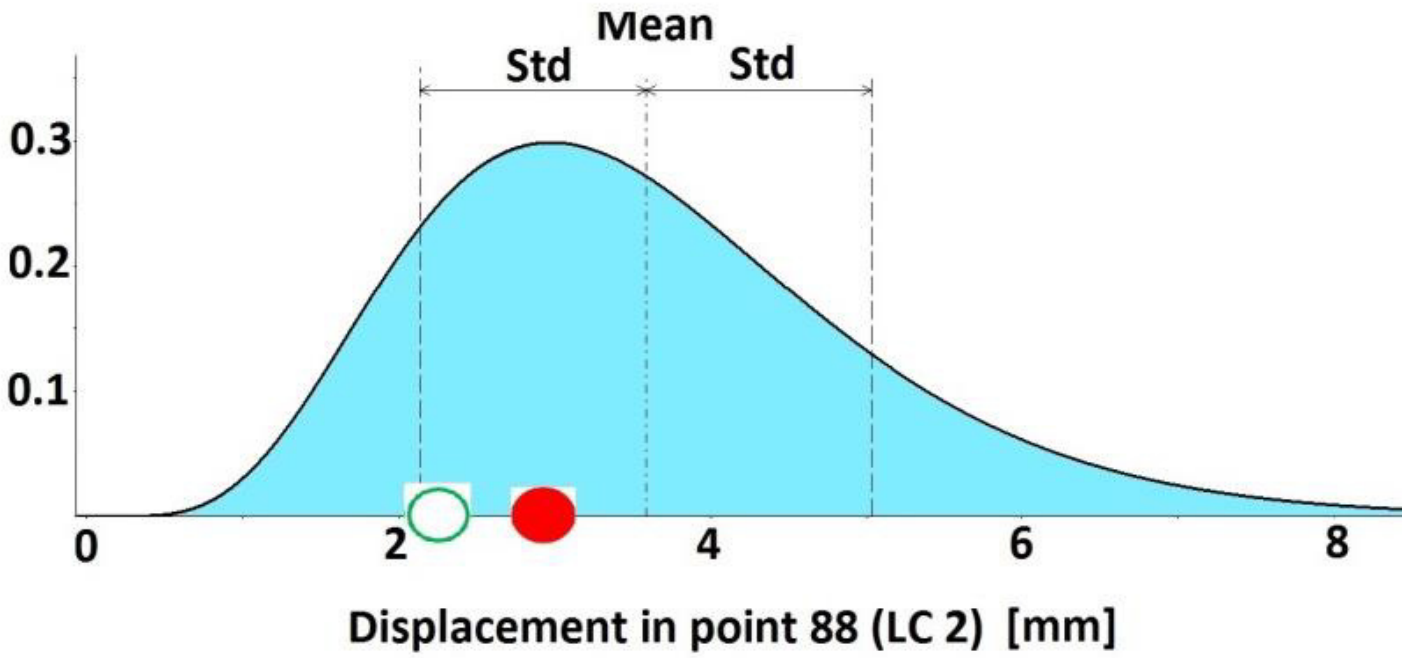




Isoareas of principle stress

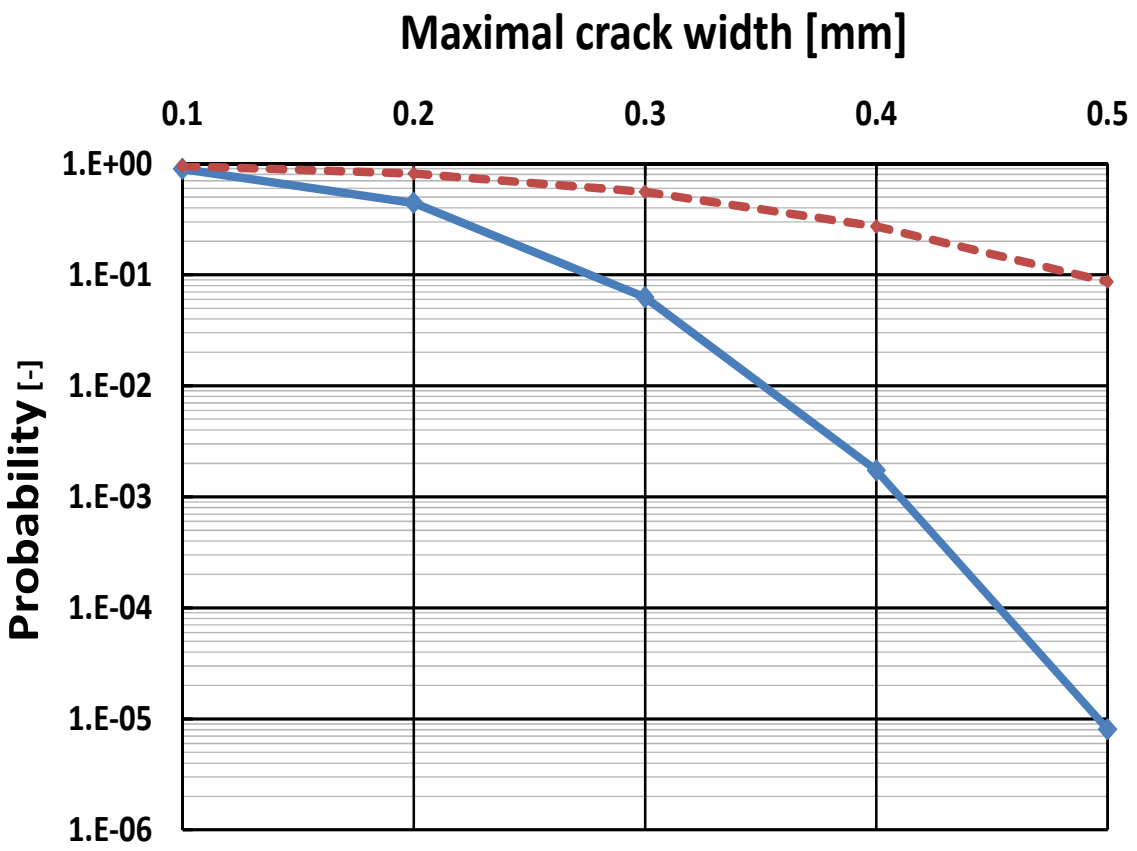
Strain ε_{xx}

Deformed shape – enlarged 150x



Example of graphical output

Experiment (empty green symbol), deterministic simulation (full red symbol) and *PDF* of perpendicular displacement for selected monitoring point – Nr. 88, loading case 2.



Probability of exceedance of crack width (full blue/broken red line – loading case 1/2).

Other Activities

- Labe – Odra canal
  - Grant bid preparations
- Experimental assessment of stability, bearability and life-time expectancy
  - Based on our own method of “Combined Modeling”
  - Partly physical model, partly mathematical model
- Expert opinions in the field of transport structures

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