

Expression of interest for research cooperation

Description of institution

Interested institution:	Cracow University of Technology (CUT)
Department carrying out the proposed research	Chair of Bridges and Tunnels Construction Institute of Building Materials and Structures Faculty of Civil Engineering
Address and webpage	Warszawska 24, 31-155 Cracow, Poland www.l-16.pk.edu.pl/index.php/en/
Contact person (name, e-mail address, phone)	prof. dr hab. inż. Kazimierz Furtak Head of the Chair email: mosty@pk.edu.pl , kfurtak@pk.edu.pl Phone: +48 12 628 22 41 Fax: +48 12 628 20 24

Research offer

Brief description of the department (key research facilities, infrastructure, equipment)

The area of activity of the Chair are issues related to the mechanics of bridges and underground structures as well as the technological aspects of their construction.

In particular, the Chair conducts studies and researches on load bearing capacity of composite structures, load bearing capacity a different type of shear connectors used in composite concrete-steel and concrete-concrete elements, impact of long-term processes (shrinkage, creep, thermal loads) on composite structural elements, application of FRP composite materials in construction and strengthening of bridges and tunnels, environmental dynamic impact on bridges, dynamics of footbridges, protection of structures against vibrations.

The Chair own the qualified specialists and professional research equipment of reputable manufacturers enable to carry out the static and dynamic tests of bridges and tunnels or their structural elements, measurements of strain of the structural elements and non-destructive testing of concrete structures. The equipment contains: set of HBM Quantum MX840B-R universal measuring amplifier for static and dynamic laboratory or field tests of structures, set of displacement sensors and accelerometers, APS 420 Electro-Seis force generator, Pundit Lab+ the ultrasonic pulse velocity (UPV) instrument for testing the strength and uniformity of concrete, Profometer 5+ rebar locators, GalvaPulse GP-5000 device for measuring the corrosion rate of reinforcement in concrete, FDM-1.5 dynamometric platform for measuring the ground reaction forces generating by people, set of Trimble DiNi 0.3 Digital Levelers, engineering software for design and engineering computation).

Scientific area

<input checked="" type="checkbox"/>	Chemistry	<input type="checkbox"/>	Social Sciences and Humanities
<input type="checkbox"/>	Economic Sciences	<input checked="" type="checkbox"/>	Information Science and Engineering
<input type="checkbox"/>	Environment and Geosciences	<input type="checkbox"/>	Life Sciences
<input type="checkbox"/>	Mathematics	<input type="checkbox"/>	Physics

Research field

Main areas of interest of the Chair include:

- Mechanics of composite steel-concrete elements and structures.
- Load-bearing capacity of steel-concrete and concrete-concrete elements.
- Load bearing capacity of FRP composite elements and structures.
- Dynamics of long-span and railway bridges.
- Dynamics of light-weight footbridges including dynamic load models for footbridges.
- Protection of bridges and bridge structural components against vibrations.
- Requirements of serviceability limit state for bridges and tunnels.

The proposed research/project description

Propositions of research/project:

- Load bearing capacity of shear connectors in composite concrete-steel and concrete-concrete elements constructed using different type of shear connectors (headed studs, perfobond ribs, flexible connectors, glue, resin etc.).
- Slip and separation at interface of composite elements.
- Load bearing capacity of FRP composite laminates elements and structures.
- Estimation of degradation of FRP composite laminates.
- Application of composite FRP (CFRP, GFRP) rebars in concrete structural components of bridges.
- Dynamic load models for footbridges - impact of crowd on footbridges.
- Protection of light-weight footbridges against vibration.
- Estimation of tension force of cable stays in cable stayed-bridges by vibration method – influence of boundary condition on accuracy of force estimation.
- Parametric excitation of vibration of cable stays in cable stayed-bridges.

Additional information (key Persons and Expertise; additional trainings, research programme, other)

The Chair team is made up of specialists in bridge engineering, engineers with many years of professional experience, authors of numerous scientific papers, monographs, expert opinions and projects of road and railway bridges and tunnels. The Chair team has extensive experience in research projects, laboratory and field tests and static and dynamic analysis of engineering structures. The team has a wide variety of contacts with the business environment and experience in regular cooperation with design offices, construction companies and industry.

As a part of the Faculty of Civil Engineering the Chair of Bridges and Tunnels Construction cooperate with accredited Testing Laboratory operating within CUT: Testing Laboratory for Building Materials and Structures possessing the accreditation certificate for 23 characteristics and testing methods, Testing Laboratory of Structural Strains and Vibrations, Wind Engineering Laboratory with boundary layer wind tunnel.