Faculty of Civil Engineering







pwr.edu.pl/en











History of the Faculty

The Faculty of Civil Engineering has a long-standing tradition dating back to **1945**. It was one of the four original faculties of Wrocław University of Science and Technology, established in September 1945 by the university authorities. At that time, it was called the Faculty of Construction and consisted of two Departments: Architecture and Civil and Water Engineering. In 1949, both departments became independent faculties, with the Department of Civil and Water Engineering forming the Faculty of Engineering, comprising the Civil and Water Construction Departments. The current name was adopted in 1990 by the University Senate, at the request of the Faculty Council, justified by the actual scope of scientific research and education conducted.







Faculty on the Campus



Faculty of Civil Engineering

pl. Grunwaldzki 11 50-377 Wroclaw building C-7







Faculty Leadership



Dean
PhD Eng. Adrian Różański, Associate Professor



Vice-Dean for OrganizationPhD Eng. Tomasz Trapko, Associate Professor



Vice-Dean for External Relations & Development
PhD Eng. Monika Podwórna, Associate Professor



Vice-Dean for Research & Scientific CooperationProf. Łukasz Sadowski, DSc, PhD, Eng.



Vice-Dean for Education
PhD Eng. Andrzej Batog



Vice-Dean for Student Affairs
PhD Eng. Magdalena
Piechówka-Mielnik





Figures

1476

1st degree students (full-time + part-time)

243

2nd degree students (full-time+part-time)

59

International students (1st +2nd degree)

399

24

Associated full-time PhD

Graduates

Professors on list World's TOP 2% Scientists

170

Departments

Academic staff



figures as of 31 December 2023



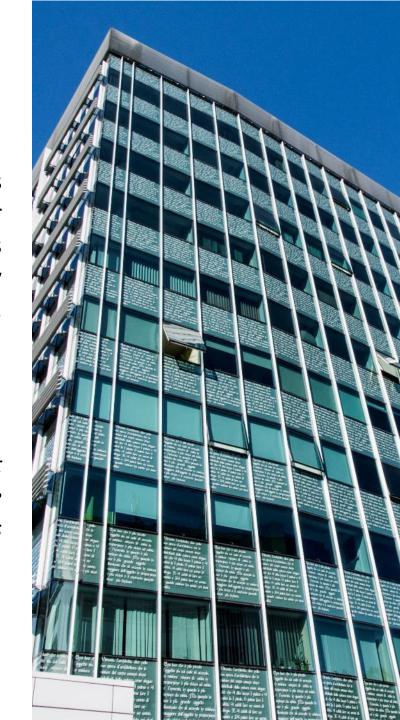
Mission and Strategy

The mission and values of the Faculty of Civil Engineering align with those of the University, as outlined in the Wrocław Tech strategy for 2023–2030. The Faculty development plan reflects the University target model, defined through values grouped under the themes of **excellence**, **collaboration**, and **openness**. It also aligns with the University's strategic goals and initiatives across five key strategic areas: **education**, **research & innovation**, **collaboration**, **community**, and **infrastructure**.

Mission of the Faculty:

by researching, teaching, and collaborating, we inspire and support the development of individuals who, grounded in knowledge and ethical standards, demonstrating sensitivity to social needs and global challenges, boldly and responsibly shape the future







Accomplishments

- In 2011 and 2016, the Faculty of Civil Engineering received an outstanding rating from the Polish Accreditation Committee after an evaluation of the quality of education in the Civil Engineering program.
- In 2012, the Faculty was awarded a distinction by the Minister of Science and Higher Education, Professor Barbara Kudrycka, as the best faculty offering Civil Engineering studies.
- In 2019, the Accreditation Committee of Technical Universities (KAUT) and the European Network for Accreditation of Engineering Education, in recognition of the high quality of education, granted accreditation to the Civil Engineering program at the Faculty of Civil and Environmental Engineering for the academic years 2018/2019 to 2022/2023, covering both undergraduate and graduate studies. The faculty received further accreditation for the years 2024–2029.







Priority Research Areas

List related to the faculty:

- PRA 1 Information Technology, Data Science and Artificial Intelligence
- PRA 2 Innovative Materials and Advanced Manufacturing
- PRA 3 Sustainable Living Environment
- PRA 4 Smart Cities and Future Society
- PRA 5 Health and Medical Technologies
- PRA 6 Extreme Technologies
- PRA 7 Basic Research for Technology and Innovation







Faculty Structure

Faculty of Civil Engineering

Department of General Construction

Department of Geotechnics, Hydrotechnics, Underground and Water Engineering

Department of Building Structures

Department of Structural Mechanics and Urban Engineering

Department of Roads, Bridges, Railways and Airports Department of Materials Engineering and Construction





Department of General Construction

A. Team of General Construction

- Non-destructive evaluation of compressive strength of ordinary and special concretes using artificial neural networks.
- Studies of the destruction mechanics of self-compacting concretes.
- Studies of the possibilities of using selected non-destructive methods for diagnostics of concrete structures and general construction objects.
- Assessment of methods for testing the moisture content of building materials, methodology of moisture testing and assessment of the effectiveness of forced drying of damp brick walls.
- Assessment of the usefulness and effectiveness of methods for performing moisture protection of buildings, including historic buildings.
- Repair and reinforcement of wooden and brick structures of curved structures in general construction objects, including historic buildings.





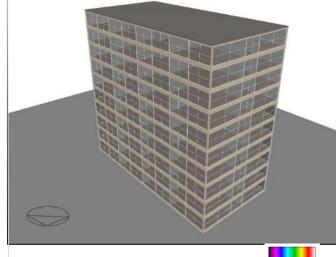
Contact: **Prof. Krzysztof Schabowicz, PhD Eng.** wbliw.pwr.edu.pl/en/faculty/structure +48 320 22 64

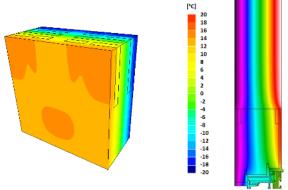


Department of General Construction

B. Team of Building Physics and Computer Design Methods

- Energy performance of buildings building energy simulations, building energy performance certification, 2D and 3D thermal bridges analysis,
- IR camera measurements thermal imaging and analysis of buildings with ITC level 2 qualifications,
- Thermal properties measurements of the thermal conductivity coefficient (λ) according to ASTM, ISO, EN 12664 standards, examinations of partitions and elements in two connected climatic chambers (30 m³ each),
- User thermal comfort and room microclimate measurements,
- Determination of "in situ" thermal resistance of building partitions using the HukseFlux TRSYS01 system.
- Structural optimization calculations, analysis and optimization of elements and entire building structures,
- FEM modeling numerical analysis using the finite element method of complex building structures,
- Monuments diagnostics, revitalization design of municipal and industrial buildings, including historic buildings.







https://kbo-wbliw.pwr.edu.pl/





Department of General Construction

C. Team of Construction Project Management

- Construction project management and quality management in construction engineering and supervision.
- Prediction of the course of construction processes under conditions of uncertainty.
- Qualitative and quantitative research of engineering buildings by probabilistic and fuzzy sets approach.
- Multi criteria feasibility studies of investment enterprises.
- Cost estimating of construction objects and works, calculation
 of valorization of construction contracts, scheduling in the construction
 industry.
- Occupational health and safety issues in construction processes, including modeling of the virtual construction environment in terms of work safety.
- Application of innovative technologies in construction, including BIM technology, virtual reality, 3D scanning, unmanned aerial vehicle.







Department Structural Mechanics and Urban Engineering

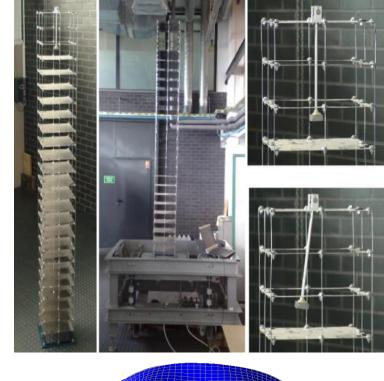
A. Team of Structural Mechanics

Basic areas of the research activities:

- analytical and numerical modelling of building structures and engineering objects and their loads in the issues of statics, stability and dynamics;
- static and strength analyses and the analyses of the dynamic state of effort of building structures and engineering objects;
- numerical simulations, measurements and the assessment of the harmfulness of vibrations of structures with regards to standard requirements;
- statistical modelling of the dynamic loads of structures and also their calibration based on empirical data;
- dynamic measurements, monitoring and the modal analysis of structures in the context of assessing their technical condition;
- development of digital twins of structures and their updating using machine learning techniques.



DSc, PhD, Eng. Monika Podwórna monika.podworna@pwr.edu.pl +48 71 320 48 49 https://k11-wbliw.pwr.edu.pl







Department of Mechanics of Structures and Urban Engineering

B. Team of Urban Engineering

Basic areas of the research activities:

- expert studies of existing facilities of technical network infrastructure, which are conducted in order to assess their technical condition and to plan renovations,
- expert studies of cubature facilities of the technical infrastructure of cities, in particular water and sewage facilities,
- tests and laboratory studies of materials that are used in the construction and renovation of water and sewage infrastructure facilities,
- laboratory studies of CIPP linings,
- studies of concrete parameters and concrete structure
- elements conducted in-situ and in the laboratory,
- studies of the moisture content of building materials
- and building elements.



DSc, PhD, Eng. Monika Podwórna monika.podworna@pwr.edu.pl +48 71 320 48 49 https://k11-wbliw.pwr.edu.pl







Department of Building Structures

Basic areas of the research activities:

A. Consultancy provided by experts

Laboratory, in-situ and theoretical studies on:

- ✓ concrete, spun concrete, fibre-reinforced concrete,
- √ reinforcing and pre-stressing steel,
- ✓ plain, reinforced concrete, spun concrete and pre-stressed structures,
- composite materials for reinforcing and strengthening.
- Expertises and technical state assessments of building structures of all type,
- Studies with the application of Digital Correlation Image (DIC) method,
- Non-destructive in-situ testing of materials and elements,
- Designs of structures, repairments and strengthenings,
- Implementation researches,
- Scientific supervisions,
- Trial loads,
- Numerical analyses etc.



DSc, PhD, Eng. Tomasz Trapko tomasz.trapko@pwr.edu.pl +48 71 320 34 04 https://kbb.pwr.edu.pl







Department of Building Structures

B. Testing and evaluation of raw materials, construction materials and products

- basic physical testing of construction materials,
- mechanical testing of construction materials and products,
- basic chemical testing of raw materials, construction materials and products, including chemical analysis of mineral raw materials,
- quality assessment of construction materials,
- assessment of the suitability of raw materials for use in construction,
- quality testing of cements,
- rheological tests on the rheology of materials based on mineral binders (grouts, mortars and concretes),
- tests on the characteristics of ready-mixed,
 special concretes and in precast concrete.

Contact:

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Department of Building Structures

C. Design and creation of building materials

- determining the composition of ordinary, high-quality and self-compacting concretes for use in different exposure classes,
- producing ordinary and special mortars,
- development of compositions and methods of producing materials with the assumed properties,
- assessing the suitability of minerals and industrial waste for the production of building materials.

D. Testing and diagnostics of components and structures

- testing of stone, brick and timber elements and structures, including historic buildings,
- determination of causes of material degradation in building structures,
- assessing the aggressiveness of environments towards building materials and structures,
- determining the corrosion resistance of building materials.



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Roads, Bridges, Railways and Airports Department - Transport Infrastructure Objects Research Laboratory (LBOIT)

Basic areas of the research activities:

- testing the strength and deformation properties of road materials
- designing the composition of mineral-asphalt mixtures and mineral-cement-emulsion mixtures
- identification of parameters of road and airport pavement models
- assessment of the load-bearing capacity of road and airport pavements and designing their reinforcements
- technical expertise in the field of assessment of the technical condition, load-bearing capacity and modernization of communication construction facilities
- material and construction site expertise
- visualizations and inventory researchers via using different techniques
 - terrestrial, air (drones) and others with precise georeferencing





DSc, PhD, Eng. Piotr Mackiewicz piotr.mackiewicz@pwr.edu.pl +48 71 320 45 57 lboit.pwr.edu.pl, k77.pwr.edu.pl





Department of Materials Engineering and Construction Processes

Basic areas of the research activities:

Diagnostics:

- Identification of degradation processes of buildings and building materials
- Development of repair processes and selection of repair methods in buildings, including historic ones
- Assessment of the technical condition of buildings and building elements using various test methods, including non-destructive ones
- Comprehensive assessments and tests of surface layers and finishes in buildings

Modelling and wastes management:

- Modelling and testing the properties of building elements and materials using computer methods and artificial intelligence
- Multi-scale testing and analysis of the properties of building materials, including recycled and waste materials
- Modelling of construction processes
- Safety management in construction

Drone and eye tracking technology:

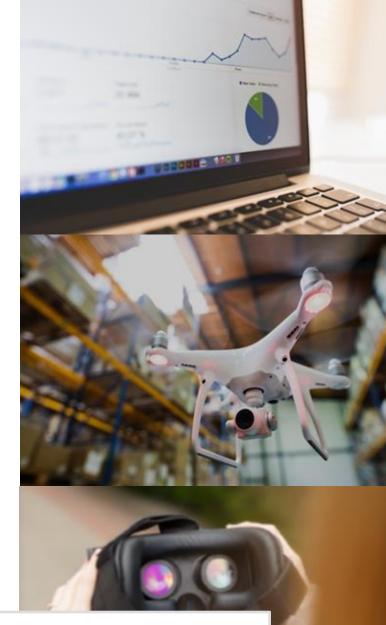
- Construction site inspections with the use of unmanned aerial vehicles in the field of spatial inventories
- Estimation of earth mass volumes or detection of inconsistencies in the construction of facilities
- The use of eye tracking technology in construction and architecture
- Modelling of the virtual building environment in terms of occupational safety

Contact: Prof. Łukasz Sadowski, PhD Eng.

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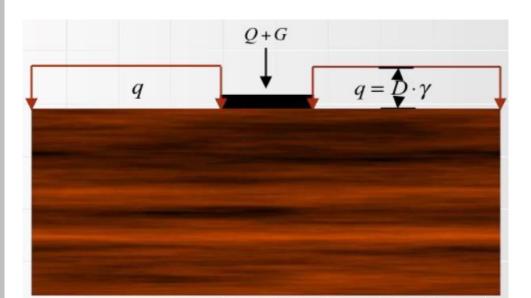


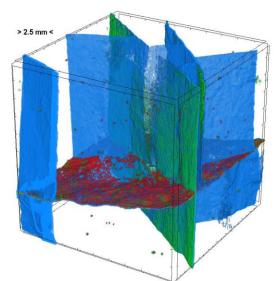
Department of Geotechnology, Hydro Technology, and

Underground and Hydro Engineering

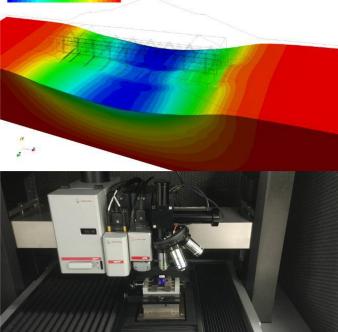
This department conducts scientific research, execute projects, and commercial contracts in the following areas:

- Laboratory and field soil testing
- Microscopic-scale research on heterogeneous materials and composites
- Numerical analysis of complex geotechnical and hydrotechnical problems (2D and 3D)









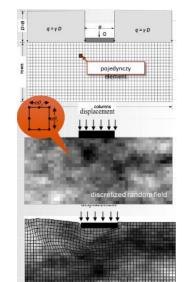




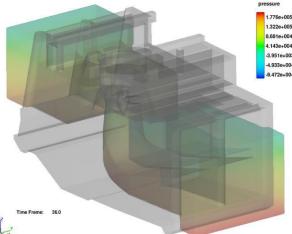
Department of Geotechnology, Hydro Technology, and Underground and Hydro Engineering

- Pile testing (integrity and load-bearing capacity)
- Inclinometer measurements
- Vibration measurements
- Measurements of forces in struts and anchors
- Vibration monitoring and CPT soundings
- Reliability analysis in geotechnics

- Investigations of hydraulic structures
- Numerical modeling of flows
- Specialized geodetic measurements of engineering structures
- Geographic information systems, advanced spatial data analysis
- Selected topics in engineering geology and hydrogeology











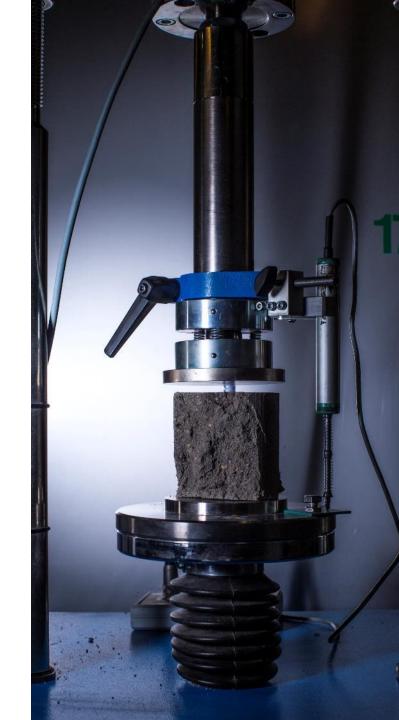


Laboratories



- Laboratory of General Construction
- Laboratory of Building Physics and Computer Design Methods
- Laboratory of Construction Project Management
- Laboratory of Engineering Structures Monitoring
- Laboratory of Eye Tracking
- Laboratory of the Department of Materials Engineering and Construction Processes
- Laboratory of Research on Nano- and Microstructures of Composite Materials and Engineering Structures
- Laboratory of Microstructures of Construction Composites and Soil/Rock Media
- Transport Infrastructure Objects Research Laboratory (LBOIT)







Laboratory of General Construction

Main areas of research

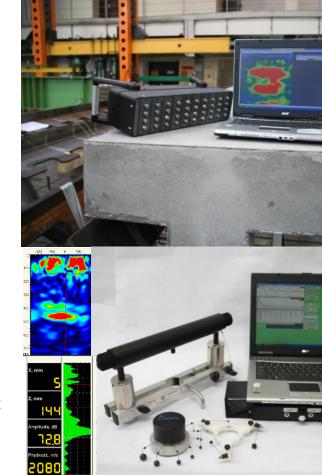
- comprehensive surveys and technical condition assessments of general and industrial construction facilities,
- laboratory and "in situ" tests of building materials and elements,
- non-destructive tests of materials and structures,
- technical expertise and designs of masonry buildings, timber frame buildings, prefabricated and monolithic reinforced concrete buildings,
- strengthening of masonry, timber, and reinforced concrete system buildings and structures,
- measurements of the accuracy of execution, using the metric and geodetic methods, of any building objects, as well as the evenness of plaster, floors, walls, floor slabs deflections, etc.
- design for moisture protection and thermal renovation of general construction objects and historic buildings,
- technical consulting, supervision and acceptance of works in the field of general construction,

Contact:

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- inspections of the technical condition of buildings,
- assessment of the technical condition of the building structures.









Laboratory of Building Physics and Computer Design Methods

Main areas of research

- Energy performance of buildings including influence of building enclosure design parameters on their energy efficiency and resilience to climate change
- Infrared thermography of building partitions using passive and active approach (infrared
- Measurements and simualtions of thermal comfort of users
- Measurements of microclimate in buildings,
- 2D and 3D calculations of thermal bridges and 2D hydrothermal analysis of the building partitions,
- Measurements of thermal conductivity coefficient of materials
- Optimisation tasks of building structures
- Numerical static-strength analysis
 of public buildings and historic structures.

Contact:

PhD Eng. Łukasz Nowak lukasz.nowak@pwr.edu.pl + 48 71 320 24 82









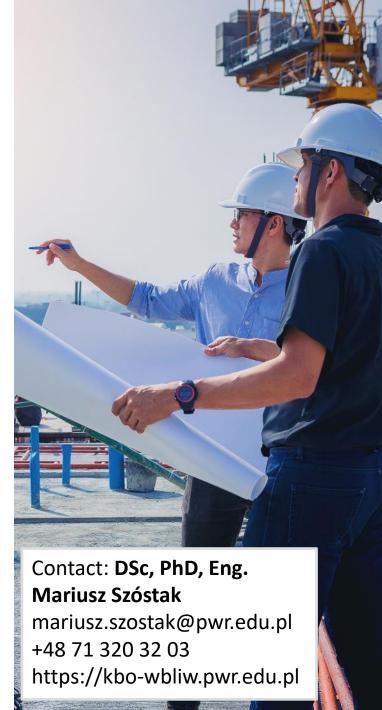


Laboratory of Construction Project Management

Main areas of research

- inspecting of existing building state (defects detecting, degree of technical wear estimation, renovation, major repairs, modernization, refurbishment, technical maintenance management),
- engineering consultancy (technical consulting and auditing services like Bank Investment Supervision, Feasibility Study, Technical Due Diligence, Civil Expertise, Technical Close Out Audit, Tenancy Management),
- analysis of the impact of time dispersion on the efficiency of construction processes. Research on the probabilistic nature of construction processes,
- verification of organizational methods that take into account time couplings in construction practice,
- modelling of the development of accident situations in construction and risk assessment of accidents, and dangerous incidents at workplaces,
- safety management in construction and analysis of the causes of occupational accidents at work in construction,
- multidimensional management of construction projects in accordance with the BIM Methodology.







Laboratory of Engineering Structures Monitoring

Structural Health Monitoring of Bridges:

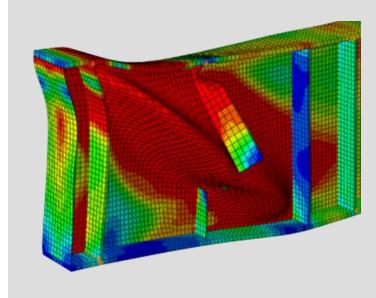
- actions and performance monitoring
- monitoring of degradation processes and damage identification
- advanced numerical analyses of structures with defects
- technical condition, safety and serviceability assessment
- Al based expert systems in infrastructure management

Contact:

prof. Jan Bień jan.bien@pwr.edu.pl +48 71 320 2356 k77.pwr.edu.pl









Laboratory of Eye Tracking

Main areas of research:

- pioneering use of eye-trackers in the teaching and research processes,
- training and workshops with the use of and in the field of eye tracking,
- cooperation with Student Research Associations,
- technology applicable in research in the fields of psychology, psycholinguistics, optometric, marketing, as an input device for human-computer interaction and in product design.

Head of Laboratory: **PhD. Eng. Arch. Marta Rusnak**marta.rusnak@pwr.edu.pl
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Laboratory of the Department of Materials Engineering and Construction Processes

Main areas of research:

- measurement of the peel-off strength of surface layers using the pull-off method,
- estimation of the thickness of concrete elements, their internal homogeneity (detection of delaminations, voids), estimating the depth of surface cracks,
- identification of problems in hard-to-reach places using an endoscope,
- locating reinforcing bars, measuring the concrete cover of reinforcing bars and estimating the diameters of reinforcing bars in concrete structures.

Contanct: **prof. Łukasz Sadowski** lukasz.sadowski@pwr.edu.pl +48 505 901 069 k82.pwr.edu.pl





World's TOP 2% Scientists (2023)



Prof. Łukasz Sadowski DSc, PhD, Eng.



Prof. Krzysztof Schabowicz DSc, PhD, Eng.



Eng. Arch. Anna Hoła university professor





Patents/know-how

- Kamil Krzywinski, Łukasz Sadowski: Patent. Poland, PL 243322, 07.08.2023.
 Epoxy resin-based composition for the manufacture of a coating.
- Łukasz Sadowski, Adrian J. Chajec: Patent. Poland, PL 242400, 20.02.2023.
 Method of reducing the amount of cement in cement mixtures and a cement mixture realised according to this method.
- Jacek M. Szymanowski, Łukasz Sadowski: Patent. Poland, PL 242399, 20.02.2023. Cement mortar for repair.
- Mateusz Moj, Łukasz Sadowski: Patent. Poland, PL 239988, 07.02.2022.
 Method for determining the abrasion resistance of floor underlays.
- Natalia Szemiot, Łukasz Sadowski: Patent. Poland, 20.09.2023. Cement mortar with low capillary rise.
- Marlena Rudner, Łukasz Sadowski, Adrian Chajec, Patent. Poland, P 439595 of 22.11.2021, Plastering mortar
- Łukasz Kampa, Łukasz Sadowski, Patent. Poland, P 437457, 30.03.2021.
 Priming agent for surface strengthening of concrete substrates.







Cooperation with Academia and Industry

- Unite! Cm.8 - Open Innovation Community for the Green Transition U!Train
- **Erasmus+**
- Improving Assessment, Optimization of Maintenance, and Development of Database for Masonry Arch Bridges, International Union of Railways (UIC) 28 partners from 14 countries
- Quality specifications for roadway bridges, standardization at a European level, **European Cooperation in the field of Scientific and Technical Research** – COST, COST Action TU1406, European Commission 45 partners from 34 countries
- **NAWA**











Cooperation with Industry































Cooperation with Academia



Savoie Mont Blanc University, France



TU Dresden, Germany



Wietnam





Technical University of Ostrava, Czech Republic

University of Trieste, Italy





Conferences organised and co-organized by the Faculty

CUTE 2024 conference The provides academic scientists, researcher, practitioners, educators and engineers worldwide for an opportunity to present and discuss the most recent innovations, trends, and concerns practical challenges encountered, solutions adopted and establishing new collaboration in the field of Civil, Urban and **Transportation Engineering** in term of sustainable development.





The event took place in Wrocław Tech on October, $14^{\text{th}} - 17^{\text{th}}$, 2024. The chairman of the conference's Organizing Committee was Adrian Różański, the Dean of Faculty of Civil Engineering.



Study at the faculty

BSc and MSc studies

- Civil Engineering
- Advanced Solid Mechanics

Doctoral Studies

 Civil engineering, geodesy and transport

About us - Doctoral School

Postgraduate Studies

Real Estate Management. Management –
 Maintenance – Valuation







Master Programs in English

Field of study:

Civil Engineering



Advanced Solid Mechanics



in cooperation with

the Faculty of Mechanical Engineering,
will offer a master's program
within the STRAINS program.

Specializations:

- The program is designed for students who wish to deepen their knowledge and skills in solid mechanics, focusing on material and structural modeling.
- It allows students to pursue studies in two engineering fields simultaneously: mechanics and civil engineering.
- Participants in the program can choose one of 18 study paths, requiring study at a minimum of three of the six participating universities—University of Lille and École Centrale in Lille, University of Calabria, University of Louvain, National Technical University of Athens and Wrocław University of Science and Technology.
- Graduates will receive a joint diploma from all partner institutions.

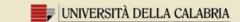
















Department of Materials Engineering and Construction Processes "Intelligent Technologies for Concrete Production Based on Waste
Copper Slag Enriched with CO2 Captured from Industrial
Production for Zero-Emission Construction (SPHERE)"

Duration: 2024-2028

 Programme: FIRST TEAM action funded by the European Funds for the Modern Economy 2021-2027, Foundation for Polish Science

Project Leader: Prof. Łukasz Sadowski

e-mail: lukasz.sadowski@pwr.edu.pl











Department of Geotechnology, Hydro Technology, and Underground and Hydro Engineering - "Probabilistic Limit **Analysis for Collapse Reconstruction and Stability** Assessment of Lunar Lava Tubes (PROMISE)"

Duration: 2024-2027

Programme: SONATA-19, National Science Centre (Poland)

Project Leader: PhD. Eng. Marcin Chwała e-mail: marcin.chwala@pwr.edu.pl











Department of Geotechnology, Hydro Technology, and Underground and Hydro Engineering – "BatFire" (a project focused on tunnel safety in the context of battery electric vehicles)

Duration: 2023-2024

Programme: SeedFund, UNITE! Alliance



Project Leader: PhD. Eng. Maciej Sobótka

e-mail: maciej.sobotka@pwr.edu.pl





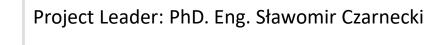




Department of Materials Engineering and Construction Processes - "Synergy of Plastic Waste, Demolition Waste, and Other Industrial Waste for Producing 100% Recycled Sidewalks and Bicycle Paths (SORCERER)"

Duration: 2024-2027

 Programme: Lider XIV, National Centre for Research and Development (Poland)



e-mail: slawomir.czarnecki@pwr.edu.pl









Erasmus+ Programme

Erasmus+ offers the opportunity for higher education institutions to send students and staff abroad (in other Programme countries or other Partner countries) to study, teach, or train at participating institutions, as well as to participate in a traineeship.

18 agreements:

- Universita di Bologna
- Universita Degli Studi Chieti Pescara
- Technische Universität Dresden
- Universitat Politècnica de Cataluña
- Universitat Politècnica de Valencia
- University of Ireland, Galway
- Universidade Nova de Lisboa
- Università di Pisa
- Universidad de Alicante
- Universidade do Porto









UNITE! network

Summer School on Safety of Underground Transport Infrastructure

Its first edition of the took place on 12-27.09.2024.

The event was organized in the Unite! network by representatives of universities from Darmstadt, Graz, Turin and, of course, Wrocław. Funds from the Unite! Seed Fund were allocated to prepare the School. 31 students took part in the School, including four students from Wrocław University of Science and Technology.







Student activities



Student scientific associations

- The Aquae Ductus Scientific Group
- Scientific Club of General Construction and Non-Destructive Testing EtaKsi





Scientific Club "KONKRET"



Scientific Association – Young Construction Managers



- Young Bridge Builders WUST
- Student Scientific Association of Mechanics





Scientific Association "NEWWAY"



Polish Association of Construction Engineers and Technicians Office



Scientific Club of Building Physics "RESTART"







Scientific Club Students of Rail Transport Infrastructure "Koło 1435"











Faculty of Civil Engineering pl. Grunwaldzki 11 50-377 Wroclaw building C-7, room 502

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