

SELF-EVALUATION REPORT MODULE 3

EVALUATED UNIT: Faculty of Civil Engineering, Czech Technical University

FORD: 2. Engineering and Technology

MODUL 3 SOCIAL RELEVANCE

SOCIAL RELEVANCE / SOCIAL BENEFIT OF THE EVALUATED UNIT¹

3.1 General self-assessment of the social benefit of R&D&I in the fields of research at the evaluated unit, and of the evaluated unit as a whole

The evaluated unit gives a concise, general but informative account of the benefit of R&D&I in the fields in the 2014–2018 reporting period.

Civil engineering has to address many challenges including sustainability, energy efficiency, safety, development of novel tailored materials, and digitization, among others. These challenges have a direct impact on society. These priorities need to be addressed, and innovative solutions need to be disseminated and integrated in the education process.

HTML links to additional documentation:

APPLIED RESEARCH PROJECTS

3.2 Applied research projects²

The evaluated unit presents a maximum of the five most significant (from the perspective of evaluated unit) applied research projects in the 2014–2018 reporting period from the complete list in the appendix (tables 3.2.1 and 3.2.2), particularly with regard to the results achieved or a project's potential for application.

Self-evaluation:

1. DOPAS – Full Scale Demonstration of Plugs and Seals (EU 7FP). Project on testing the sealing systems of geological disposal facilities for radioactive wastes.
2. Identification and Presentation of the Historical Cultural Landscape of the Czech Republic (Ministry of Culture). The project focused on evaluating and developing systems for protecting and caring for the historical heritage.

¹ In accordance with Section 22(1) of Act No 111/1998 on universities, amending certain acts (the Universities Act), as amended.

² Under Section 2(1)(b) of Act No 130/2002, applied research is theoretical and experimental work aimed at gaining new knowledge and skills for the developing of new or substantially improved products, processes or services; applied research includes industrial research or experimental development, or a combination of both. Under Article 2 of Commission Regulation (EU) No 651/2014 of 17 June 2014 declaring certain categories of aid compatible with the internal market in application of Articles 107 and 108 of the Treaty, industrial research means planned research or critical investigation aimed at the acquisition of new knowledge and skills for developing new products, processes or services, or for bringing about a significant improvement in existing products, processes or services. It comprises the creation of component parts of complex systems, and may include the construction of prototypes in a laboratory environment or in an environment with simulated interfaces to existing systems as well as of pilot lines, when necessary for the industrial research and notably for generic technology validation; experimental development means acquiring, combining, shaping and using existing scientific, technological, business and other relevant knowledge and skills with the aim of developing new or improved products, processes or services. This may also include, for example, activities aiming at the conceptual definition, planning and documentation of new products, processes or services.

3. Centre for Effective and Sustainable Transport Infrastructure (Technology Agency of the Czech Republic). This project addresses the need for a cost-effective, material sustainable and energy sustainable, durable and accessible transport infrastructure.
4. Precise and Robust Navigation Enabling Applications in Disturbed Signal Environments (EU H2020). This project develops solutions enabling survey-grade GNSS-based positioning available in complex conditions.
5. Multiscale Modelling Platform: Smart design of nano-enabled products in green technologies (EU FP7). Development of an integrated multi-scale modelling environment for nanomaterials and systems by design.

HTML links to additional documentation:

<http://www.posiva.fi/dopas>

<http://www.cesti.cz/index.php?page=home&en=en>

<http://www.mmp-project.eu/doku.php>

3.3 Contract research³

The evaluated unit briefly comments on revenues from contract research for the 2014–2018 reporting period from the complete list in the appendix (tables 3.3.1 and 3.3.2).

Self-evaluation:

The total revenues from contract research in the reported period were €6240 k, with €1973 k revenues from research carried out for governmental/public institutions, €3765 k from Czech companies, and €515 k from abroad. From a total of 241 contracts, 16% of the total revenues was generated by 9 customers who are to important stakeholders, such as Metrostav (the largest building company in CZ), SŽDC (the dominant Czech railway owner and operator), and Skanska. The amount of annual revenues increased from €823 in 2014 to €1.658 k in 2018. In 2018, the revenues from contract research corresponded to approx. 8% of the total incomes, 60% of the revenue came from the government, and 32% came from research projects.

HTML links to additional documentation:

3.4 Revenues from non-public sources (besides grants or contract research) from research work

The evaluated unit briefly comments on revenues for the 2014–2018 reporting period for R&D&I from non-public sources, besides grants or contract research (e.g. licences sold, spin-off revenues, gifts, etc.). It presents a complete list in the appendix (table 3.4.1).

³ For a definition of contract research for the purposes of evaluation in the universities sector, see Article 2.2.1 of the Community framework for State aid for research and development and innovation (2014/C 198/01).

Self-evaluation:

The revenues from licensing show an increasing trend (€50k in 2014 to €100 k in 2018). The amount of gifts that were received increased from €14 k in 2014 to €52 k in 2018. Substantial efforts are being put into raising the licencing revenues, which are currently low.

HTML links to additional documentation:

APPLIED RESEARCH RESULTS**3.5 Applied research results with an existing or prospective economic impact on society**

The evaluated unit briefly comments on a maximum of the five most significant (from the perspective of the evaluated unit) applied research results that have already been applied in practice, or that will realistically be applied, in the 2014–2018 reporting period from the overview in the appendix (table 3.5.1).

Self-evaluation:

1. The invention and development of a bladeless hydropower turbine that can shift electricity production to creeks with an extremely low gradient and flow. The turbine is protected by international patents.
2. Durable concrete pavement (D1 highway, 4km) using a unique slow-hardening, slag-blended coarse cement. Expected lifetime 50 years, as compared to a traditional lifetime of 25-30 years. Verified technology.
3. Recycled micro-milled mechano-chemically activated rubber as an alternative admixture for rubber or bituminous binders. License sold to ARP Bohemia.
4. A Uniaxial Shear Tester for measuring the shear properties of asphalt mixtures using any Universal Testing Machine, with extremely low production and operational costs. Submitted US Patent.
5. A ditch lining block made of polymer and recycled plastic for stabilizing ditches in traffic structures. Compatible with a conventional concrete block, is significantly lighter, and is resistant to damage. Licence sold to Stabilplastik.

HTML links to additional documentation:

<http://www.ciexpo.cz/rodokmen/miroslav-sedlacek/?lang=en>

3.6 Significant applied research results with an impact other than an economic one on society

The evaluated unit gives a concise account of a maximum of the five most significant (from the perspective of the evaluated unit) applied research results with an impact other than an economic one on society in the 2014–2018 reporting period (typically results from disciplines in the humanities and social sciences) from the overview in the appendix (table 3.6.1).

Self-evaluation:

Along with its applied research results that provide economic and business benefits, the Faculty of Civil Engineering of CTU in Prague carried out many activities and produced results with an impact that was not directly or not exclusively economic. Selected results:

1. OOFEM.org, an open-source finite element code for solving multi-physics problems. Used worldwide, >500 registered users, twice awarded an A grade in a national evaluation.
2. National strategy for digitization in construction, describing a plan for implementing BIM in CZ in 2018-2027.
3. Design of the whitewater canoe course for the 2020 Olympic games in Tokyo, Japan. Set-up and analysis of a hydraulic model for an artificial slalom course.
4. A certified methodology for the assessment of flood control measures used by the Ministry of Agriculture, CZ.

HTML links to additional documentation:

<http://www.oofem.org>

COOPERATION WITH THE NON-ACADEMIC ENVIRONMENT AND TECHNOLOGY TRANSFER**3.7 The evaluated unit's most significant interactions with the non-academic application/corporate sphere**

The evaluated unit gives a concise account of the most typical users of its outputs. It explains whether and how it identifies them and how it works with them. It provides examples of a maximum of ten of the most significant interactions with the non-academic environment in the 2014–2018 reporting period.

Self-evaluation:

The faculty has established long-term cooperation and partnerships with industry, including large construction companies, national bodies, and also SMEs. The unit organizes and participates in various networking events and platforms to understand what is needed and to offer solutions for industry. Examples of significant interactions:

1. Nanocem, consortium of academic and industrial partners (incl. Heidelbergcement, LafargeHolcim, Sika) focused on nanoscale science of cement and concrete.
2. Meopta Optika (the largest hi-tech optics manufacturer in CZ), several joint research projects.
3. Capital Steel Buildings, UK, development of software-controlled manufacturing processes for a novel light gauge portal building (800 buildings sold annually).
4. River Basin Authorities, CZ, solving complex operational problems using mathematical and physical scale hydraulic models.
5. KNAUF Praha, design of layered facade panels from gypsum plasterboards and rock insulation.
6. Strix Chomutov, new materials, rock redevelopment processes and technologies, resulting in patents and applications.
7. Hilti, analysis and design of anchoring products.
8. SURAO, a mock-up experiment to design and validate a repository for spent nuclear fuel containers.

HTML links to additional documentation:

[Nanocem](#)

3.8 System and support of technology transfer and intellectual property protection (can be extended to the whole university, emphasising the specific features of the evaluated unit)

The evaluated unit gives a concise account of its system of technology transfer. It conducts an evaluation of the quality of its applied research and the effectiveness of technology transfer using the data presented in the appendix (table 3.5.1). This commentary will highlight the number of filed and granted patents (Czech and international) and licences sold.

Self-evaluation:

The Faculty follows the approach of the university to technology transfer. The faculty has an operational methodology for technology transfer of R&D results, aimed at identifying, protecting and commercializing the results. This process is further supported by the University Technology Transfer Unit. Further information in the links below.

HTML links to additional documentation:

[University Technology Transfer support document](#)

[Faculty Technology Transfer pages](#)

3.9 Strategy for setting up and support of spin-off firms or other forms of commercialization of R&D&I results (can be extended to the whole university, emphasising the specific features of the evaluated unit)

The evaluated unit gives a concise account of the practical use of its intellectual property in the form of setting up spin-off firms or other forms of commercialising R&D&I results (both with or without the participation of the university) established by the evaluated unit (university), another entity controlled by the evaluated unit (university), or an employee of the evaluated unit, presenting the model for their functioning and coordination, and control of intellectual property management of the evaluated unit (university).

Self-evaluation:

The exploitation of intellectual assets has been based primarily on commercializing the results by offering know-how in consultancies and in expert evaluations. The faculty did not have any spin-offs in the reported period, and there is definitely a space for improvement. These activities are primarily coordinated at university level, and we refer to the link provided below summarizing these activities. CTU operates the InQBay incubator, which was established in 2016. The incubator provides systematic support for start-up companies and thus increases the chances of projects emerging at CTU for successful entry into the commercial sphere.

HTML links to additional documentation:

[Supporting document with university Commercialization strategy](#)

[CTU InQBay incubator](#)

RECOGNITION BY THE SCIENTIFIC COMMUNITY

3.10 The most significant individual awards for R&D&I

The evaluated unit presents a maximum of ten examples of the most significant R&D&I awards received (in the Czech Republic and in other countries) in the 2014–2018 reporting period.

Self-evaluation:

1. M. Sedláček, Finalist for the European Inventor Award 2016, A unique rolling fluid turbine, 2016.
2. A. Kučerová: L’Oreal - UNESCO for Women in Science: An award for a project on Inverse problems in probabilistic engineering mechanics, 2017.
3. J. Pollert, International Olympic Committee Trophy awarded for innovative solutions shortening the time spent on the design and subsequent construction of the Rio 2016 Olympic Whitewater Canoeing Course.
4. F. Wald, Prize of the European Constructional Steelwork Association for an outstanding contribution to experimental, analytical and numerical knowledge of the behaviour of steel structures at elevated temperature during fire, and for his work on determining fire resistance, 2017.
5. K. Kabele, REHVA Professional award in science for outstanding achievements in science and for improvements in energy efficiency and in the indoor environment of buildings, 2016.
6. M. Hulec, Society of Czech Architects, Grand Prix - National Prize for Architecture, Honorable Mention for Restoration and Conservation of the Baroque Theatre at Valtice Castle, UNESCO World Heritage, 2016.
7. M. Šanda, TACR national award for the most useful solution: A station for microclimate measurements, 2014.
8. J. Witzany, Medal of the Senate of the Parliament of the Czech Republic for outstanding results of scientific work, 2014.

HTML links to additional documentation:

- <https://www.epo.org/learning-events/european-inventor/finalists/2016/sedlacek.html>
- <https://aktualne.cvut.cz/en/reports/20170609-anna-kucerova-was-one-of-the-laureates-of-the-loreal-unesco-prize>
- <https://www.canoeicf.com/ca/node/2036>

3.11 Recognition by the international R&D&I community

The evaluated unit provides the following information / examples demonstrating recognition by the international scientific community in the 2014–2018 reporting period, with a commentary:

It presents a maximum of ten examples of its academic staff's participation on the editorial boards of international scientific journals (e.g. editor, member of the editorial board) in the appendix (table 3.11.1),

It presents a maximum of ten examples of the most significant invited lectures by the evaluated unit's academic staff abroad in the appendix (table 3.11.2),

It presents a maximum of ten examples of the most significant lectures by foreign scientists and other guests relevant to the R&D&I field in the appendix (table 3.11.3),

It presents a maximum of ten examples of the most significant elected memberships of professional societies (table 3.11.4).

Self-evaluation:

The faculty members participated in >50 international journals as editors or members of editorial boards and delivered >70 invited lectures and >60 lectures by recognized international experts. The faculty staff were members of >60 professional societies. Selected examples are presented in Tables 3.11.1–3.11.4, illustrating the recognition of faculty members and their participation in the community of civil engineers.

HTML links to additional documentation:

POPULARISATION OF R&D&I

3.12 The most significant activities in the popularisation of R&D&I and communication with the public

The evaluated unit gives a concise account of its main activities in the area of popularisation of R&D&I and communication with the public in the 2014–2018 reporting period, and presents a maximum of ten examples that it considers the most significant.

Self-evaluation:

Popularization, dissemination and communication activities are an important part of faculty commitments. The faculty organizes conferences, seminars, workshops, public education and popularization events and participates in large-scale events for the public. Selected results:

1. INSPIRELI AWARDS, the world's largest global student contest in Architecture, Urban Design and Landscape, and Interior Design.
2. Public education & events (University of the Third Age, annual Summer School of Architecture, Week of Science, Girls Day, Children's University)
3. Technical Thursdays, open popularization talks and presentations on unique projects, designs and realizations with invited guests.
4. The Central European Towards Sustainable Building Annual International Conference, 2016.
5. Fishponds (Rybníky) conference, held every year since 2015.

HTML links to additional documentation:

[Link to faculty R&D Popularization Activities](#)

APPENDICES (TABLES)

3.2 Applied research projects

3.2.1 Projects supported by a provider from the Czech Republic

As the beneficiary						
Provider	Project title	Support (EUR thousand)				
		2014	2015	2016	2017	2018
MKO	New modern non-invasive methods of cultural heritage objects exploration	44,78	45,19	45,61		
MKO	Assessment of safety and working life of industrial heritage buildings	120,18	117,51			
MKO	Historical photographic material: identification, documentation, interpretation, record keeping, presentation, application, care and protection in the context of basic types of commemorative institutions	193,37	209,54	223,80	200,30	
MKO	Documentation, pasportization, archiving and proposal of chimney reservoir converting as endangered group of heritage of industrial monuments in the Czech Republic	47,29	44,90			
MKO	Methodology of determination of variable environment influence on degradation of historical masonry	157,16	157,31			
MKO	Design and Assessment of Timber Joints of Historical Structures	135,26	133,23			
MKO	A comprehensive methodology for the selection and processing of a stone intended for replacements and repairs of the ashlar masonry of historic buildings	142,99	146,39			
MKO	Progressive non-invasive methods of stabilization, conservation and strengthening of historical structures and their parts with fibre- and nanofibre-based composite materials	182,07	157,35			
MKO	Methodology and prevention and preservation tools of cultural heritage endangered by floods	195,15	176,45			
MKO	High-performance and compatible lime mortars for extreme application in restoration, repair and preventive maintenance of architectural heritage	140,05	139,94			
MKO	Traditional City Building Engineering and Crafts in the Turn of 19th and 20th Centuries					104,39
MKO	Documentation and presentation of technical cultural heritage on the Elbe-Vltava waterway					96,17
MKO	Development of the progressive rehabilitation methodology for restoration and conservation of military fortress objects from the 1930s					81,31
MKO	The methods for achieving the sustainability of industrial heritage steel bridges					123,78
MKO	Sustainable management of cultural heritage buildings					162,73
MKO	Vltava – transformation of historical landscape as a result of floods, dam creations and land-use					172,21

	changes along with cultural and social activities in the river neighborhood					
MKO	Evaluation of stability and technical conditions of the Broumov group of churches and proposal of remediation of this unique Europe culture heritage.			115,90	133,92	74,76
MKO	Research and development of materials, processes and techniques for restoration, preservation and strengthening of historic masonry structures, surfaces and systems for preventive care of heritage buildings exposed to anthropogenic and natural risks			174,79	199,32	203,41
MKO	Conservation, reparations and monitoring of historical pond dams as our cultural heritage			141,86	115,38	103,19
MKO	Interior thermal insulation systems for the architectural-heritage domain			68,18	131,48	150,41
MKO	Documentation, registration, presentation and proposals of smokestacks conversions as an endangered group of heritage of industrial monuments in the Czech Republic			64,33	80,33	88,60
MPO	Applied Research of Ultra-high-Performance Concrete (UHPC) for thin-walled shell structures	42,13	33,32			
MSM	Valorization of knowledge for innovative fastening solutions between steel and concrete	19,87				
MSM	Full Scale Demonstration of Plugs and Seals	338,72	86,17	38,62		
MVO	The use of engineered cementitious composites for increasing the resistance of civil and transport infrastructure against terroristic threat	116,84	70,30			
MVO	Reliability improvement of control structures installed on hydraulic structures for sustaining crisis situation caused by natural disasters and accidental operation	62,72				
MVO	Experimental development of high-performance concrete with improved resistance against shock loading and high explosion energy absorption and dissipation capacity	34,32				
MVO	Research and development of validated models of fire and evacuation and their practical application in fire safety of buildings			126,55	166,73	174,67
MZE	Restoration and building of ponds in forest areas as a part of sustainable water resources management in CR			67,40	69,65	71,52
MZE	Variability of short-term precipitation and runoff in small catchments and its influence on water resources management		97,06	98,03	127,95	
MZE	Using remote sensing for monitoring of soil degradation by erosion and erosion evidence.	48,67	56,01	76,20		
MZE	The impact of the expected climate changes on soils of the Czech Republic and the evaluation of their productive functions	112,41	119,12	102,10		
TAO	Multiple point automated disc infiltrometer and measurement method for routine field measurements of soil infiltration properties	31,24				

TAO	Tools for reliable design and construction of tunnels in urban development with emphasis on safety and lifetime	95,88				
TAO	Integrated tool for practical application of advanced computational models for geomaterials allowing for increase of safety and lifetime of traffic infrastructure	31,34	63,26	78,98	81,09	
TAO	Development of mechanically activated materials based on recyclable concrete for progressive stabilized or cold recycled structural layers	39,52	53,00	47,79		
TAO	The use of optimization processes for the efficient design of structures of cooling tower	29,78	60,11	71,76	73,68	
TAO	Development of functional bituminous binder for semi-warm asphalt mixes with increased content of reclaimed asphalt	44,82	73,31	62,44		
TAO	Biomechanical analysis of intraosseous parts of dental replacements and their interactions with living tissues - design, development and optimization of implant's shapes and bioactive surfaces	59,78	85,80	98,40		
TAO	Heat recovery from wastewater in combined sewer systems (enKAN)	62,47	53,59			
TAO	Optimized subtle frame for energy efficient buildings	111,50	112,96	114,01		
TAO	Atlas EROZE - a modern tool for soil erosion assessment	29,20				
TAO	Durable acoustic asphalt pavement courses with utilization of bituminous binders modified by rubber microfiller including innovative technology of rubber milling	75,29				
TAO	Application of multicriteria evaluation for selection of a level crossing type	47,94				
TAO	Multi-purpose demountable reinforced concrete prefabricated building system with controlled properties of joints and reusable components	135,00	120,26			
TAO	Multiple point automated disc infiltrometer and measurement method for routine field measurements of soil infiltration properties	31,24				
TAO	Tools for reliable design and construction of tunnels in urban development with emphasis on safety and lifetime	95,88				
TAO	Technology and system for physical and spatial characteristics determination for protection and formation of environment and for increasing of energy sources potential	54,81				
TAO	Applied Research of Ultra-high-Performance Concrete (UHPC) for precast units of structures	42,13				
TAO	Modifications of structures of precast panel houses		47,43	66,51		
TAO	Economic tools supporting sustainable stormwater management in urban areas			39,88	44,51	
TAO	Tools for Technical Economical Support of Activities	27,68	28,99			

TAO	Centre for Effective and Sustainable Transport Infrastructure (CESTI)	1 689,65	1 142,91	1 168,87	1 162,02	1 174,90
TAO	Finishing cycle structures for a multi-purpose demountable precast material- and energy-efficient building system				63,88	68,28
TAO	Subtle Concrete Furniture and Small Structures for the Railways Stations				97,91	102,56
TAO	New generation of roof windows (skylights)		35,00	69,91	72,54	54,21
TAO	Advanced procedures of steel and composite structure connections design and production					71,48
TAO	Advanced design of joints with steel elements in timber structures					39,66
TAO	Optimization of 3D-printed trabecular structures for use in implant dentistry and their mechanical analyses				35,47	60,13
TAO	Atlas HYDROLOGY - a modern tool for sediment and runoff calculating and anti-erosion measures dimensioning					66,29
TAO	Engineered barrier 200C					136,61
Total		4 869,14	3666,42	3 164,91	2 856,17	3 381,27
As another participant						
Provider	Project title	Support (EUR thousand)				
		2014	2015	2016	2017	2018
MKO	Czech Historical Atlas			61,70	64,11	72,07
MKO	Landscape reconstruction and database of vanished municipalities in the Usti region for preserving the culture heritage	22,55	30,83			
MKO	Protection and Management of Historic Cultural Landscape through Landscape Conservation Areas	31,78	32,62			
MKO	Water towers – identification, documentation, presentation, new utilization					100,69
MKO	A Transformation of rural architecture with emphasis on the development of the 19th and 20th centuries			28,34	28,90	28,97
MKO	Identification and presentation of heritage potential of historic cultural landscapes in the Czech Republic			36,66	37,79	38,69
MKO	Analysis and presentation of the values of modern architecture of the 1960s and 1970s as part of the national and cultural identity of the Czech Republic.			21,60	37,75	37,94
MPO	*Development and research -producing of systematization and financial optimization of sanitation measurement for soil sliding.	26,15				
MPO	In-situ research of bentonite stability during up to 95 oC long time heating experiment	61,31	31,19			
MPO	Solution of surface layers of brick buildings using brick rubbing dust	40,10	77,04	0,00		
MPO	Research and development of innovative 3D features to protect the stability of slopes threatened by erosion	51,87	52,34			

MPO	*Development and research -producing of systematization and financial optimization of sanitation measurement for soil sliding.	26,15				
MPO	*Development and research - systematization and financial optimization of sanitation prevention measurement for line construction against mudflow - mudstone flush.	26,15				
MPO	Energy efficient brick buildings	63,56	20,89			
MPO	Stimulation of rock massif to establish a fracture reservoir for capture of geothermal energy in the hot-dry-rock system	18,16				
MPO	Analyzers of Image Quality of Optical Systems	46,13	24,19			
MPO	Improving of durability of concrete structures exposed to extreme loading	67,56	31,45			
MPO	*Technology of measurement of aspheric surfaces in optics	21,07				
MPO	Advanced fiber reinforced building members and structures	13,62				
MPO	Development passportisation and monitoring system for the management of geotechnical risks					46,41
MPO	The application of the magnetoelastic method for increasing the reliability and durability of existing and newly built prestressed concrete structures.					21,60
MPO	Plasterboard recycling towards production of materials with added value					49,14
MPO	Recycled ecoforms based on mineral materials and by-product fillers					62,24
MPO	Possibilities of utilization of coal-ash from power stations stored at stock piles					56,16
MPO	Application of high performance cementitious composites at rehabilitation of concrete structures				11,39	58,50
MPO	Lightweight masonry materials based on micro-milled mineral by-products with controlled utility properties				21,80	47,97
MPO	Database of Digital Material Microstructures for Additive Manufacturing			13,32	56,97	58,50
MPO	Research and Development of Mobile Protective and Ballistic Barrier Made of Composite Board and Water Infill			20,53	62,02	63,18
MPO	Intelligent composite anchoring element			44,76	83,18	85,79
MPO	Starting of industrial production process of protective barriers made of high-performance concrete			46,87	50,02	49,41
MPO	Dissipated asphalt mixtures			27,56	57,27	54,28
MPO	Application of brick microparticles in building industry			27,63	58,83	61,73
MVO	Erosion runoff - increased risk of the residents and the water quality exposure in the context of the expected climate change	51,03	47,54			
MVO	Research, development, testing and performance assessment of critical infrastructure parts				20,89	21,45

MZE	Determination of the actual values of the protective effect of vegetation in order to quantification and efficiency improvement of erosion control of agricultural land in the Czech Republic		25,33	25,56	42,04	39,58
MZE	QJ1220233 Assessment of agricultural land in the areas of extinct fishpond systems with the aim of supporting sustainable management of water and soil resources in the Czech Republic.	19,54	18,91			
MZE	Creating a national database of parameters for the mathematical simulation model EROSION-3D and its standardization for routine use in the Czech Republic.					30,03
MZE	Development of automated tools for optimizing monitoring erosion of agricultural land using remote sensing methods				27,54	32,76
TA0	Software for prediction and modelling of durability and safety of transportation structures		24,48	24,71	25,33	
TA0	Progressive solution of the silent expansion joint with intelligent elements		28,15	35,51	30,38	
TA0	Operational diagnostics of the qualitative indicators of tracks rail by measuring of the spatial deformation	14,78	16,20	18,53		
TA0	Increasing the safety and reliability of culverts with regards to the transfer of flood flows	11,00	21,30	15,65		
TA0	Modern method for axial forces measuring in elements of civil engineering structures	8,35	16,86	17,02	8,74	
TA0	Transfer of granitic rock migration parameters from microscale to real scale in the rock massive (PAMIRe)	25,53	33,76	32,63	23,78	
TA0	Prediction and minimisation of structural damage caused by swelling of soils	5,56	10,26	9,32	9,08	
TA0	Recycling of stone mastic asphalts and development of special cellulose fibres for this type of asphalt mixtures	6,07	24,56	24,78	21,88	
TA0	Reducing material and energy costs of conventionally excavated tunnels using the interaction of primary and secondary linings to increase the efficiency of load-bearing elements of the structure of tunnels	40,53	36,51			
TA0	Computer model for highperformance fibre reinforced concrete material	24,77	25,00	25,23		
TA0	Determination of migration parameters of rocks with fracture permeability using fluorescent solutions	23,24	22,72	26,08		
TA0	Optimization of operating time of traffic lights depending on traffic volume during off peak period	21,07	23,57			
TA0	Transport infrastructure design optimization with respect to increased durability and operation safety	27,82	28,74			
TA0	Advanced software for optimal design of complex structural steel joints	34,79	34,67			

TA0	Software tools supporting design of reinforced concrete structures utilizing modern knowledge of adaptive and nonlinear analysis with respect to Eurocode standard requirements	59,71	60,26			
TA0	The most effective utilization of reclaimed asphalt pavement layers for production of new asphalt mixes	21,97				
TA0	Methods for the optimization of the measures in the reservoirs catchment area, leading to the effective reduction of eutrophication	6,83	7,73			
TA0	Methodology for traffic engineering procedures for assessing road	8,50				
TA0	Increasing the quality of track in switches by flexibility	39,95	40,32			
TA0	A multifunction gabion with utilizing of recycled materials	9,08				
TA0	Tre research on exposure of Czech population to radon and other natural ionizing radiation. The impact of the existing regulation system.	26,48				
TA0	Smart Regions - Buildings and Settlements Information Modelling, Technology and Infrastructure for Sustainable Development	152,33	193,75	205,82	202,24	207,62
TA0	CeSTaR - Computer simulation and experimental validation - complex service for flexible and efficient design of pre-cast concrete columns with innovative multi-spiral reinforcement					55,73
TA0	Hidden Connection of Laminated Glass Panes					11,58
TA0	Industrial research facilities for the treatment of Morbus Peyronie					55,69
TA0	Extending service life of concrete road pavements using mineral admixtures and blended cements					51,40
TA0	Research and development of 3D printers for use in construction industry					23,52
TA0	Response of reinforced and prestressed concrete structures of WWER 1000 units to extreme dynamic actions for selected scenarios of severe accidents				37,98	37,09
TA0	Modular external fixation apparatus for electronic distraction and continuous biomechanical stimulation accelerating the new bone tissue formation				32,43	32,41
TA0	Hierarchical additive fabrication of composite components with functionally oriented filling				53,21	55,10
TA0	Significant economic and material savings in the construction of underground line structures due to incorporating fly ash and secondary waste into the concrete tunnel lining				41,66	45,86
TA0	Advanced design of strengthening of steel structures under loading				39,65	40,09
TA0	Strengthening competitiveness by increasing features of prefabricated components made of Ultra-High Performance Concrete				29,09	31,00

TA0	Development of prefabricated parts intended for the construction of prefabricated airport runways				49,41	61,34
TA0	Integrated bentonite sealing for prevention of negative effect of hydrogeological wells on underground water				44,21	44,46
TA0	Development and industrial optimisation of manufacturing process of construction materials from coal ash for transport construction			0,00	72,58	66,61
TA0	Design of technical measures for slopes stabilization and soil erosion prevention				69,16	72,81
TA0	ConSlag - research and verification of construction applications with increased added value in case of steel slag					22,62
TA0	Application of image analysis for geotechnical purposes					57,25
TA0	Numerical modelling and laboratory characterisation of bentonite barrier in radioactive waste repositories in the Czech Republic					20,82
TA0	Non-solid radioactive waste permanent disposal technology					38,22
Total		1 155,09	1 041,16	789,81	1 451,31	2 148,27

3.2.2 Projects supported by a provider from another country

As the beneficiary						
Provider	Project title	Support (EUR thousand)				
		2014	2015	2016	2017	2018
EC	Multiscale Modelling Platform: Smart design of nano-enabled products in green technologies	187,32		102,17	36,85	
EC	Concepts of the Building faculty of CTU for Prague 2017					0,49
IVFund	Assessment of Recharge Dynamics in Sedimentary and Fractured Granitic Structures of Catchments in the Northern Czech Republic Using the Tritium-Helium-3 Dating Technique	7,50				
CEDR	FunDBitS - Functional Durability-based Bitumen Specifications		43,31	131,22		
ERA-NET	CoRePaSol - Characterization of Advanced Cold-Recycled Bitumen Stabilized Pavement Solutions	57,75	99,71	100,39		
NANOCEM	Micromechanical Analysis of Blended Cement-Based Composites	90,00	45,00			
Total		342,57	188,02	333,78	36,85	0,49
As another participant						
Provider	Project title	Support (EUR thousand)				
		2014	2015	2016	2017	2018
EC	Soil Hydrology research platform underpinning innovation to manage water scarcity in European and Chinese cropping systems					236,81
EC	Setting up national qualification and training scheme for craftsmen in the Czech Republic and developing the further offer of training courses in Slovakia, Austria and Bulgaria					58,45

EC	Innovative training schemes for retrofitting to nZEB-levels				4, 66	34, 97
EC	Bentonite Mechanical Evolution				68, 40	22, 80
EC	Multi-scale Composite Material Selection Platform with a Seamless Integration of Material Models and Multidisciplinary Design Framework				192, 86	83, 63
EC	PROFessional multi-disciplinary TRaining and Continuing development in skills for NZEB principles		54, 22	40, 32		
EC	Quality management for building performance - improving energy performance by life cycle quality management			80, 92	40, 58	58, 09
EC	Advanced Networking for Nuclear Education and Training and Transfer of Expertise			15, 12		4, 44
EC	Cement-based materials, properties, evolution, barrier functions		60, 57		39, 17	
EC	PROFessional multi-disciplinary TRaining and Continuing development in skills for NZEB principles		54, 22	40, 32		
EC	Full Scale Demonstration of Plugs and Seals	307, 70		132, 85	92, 39	
ESF	Cost Action maintenance	0,00	0,00	0,00	0,00	0,00
SNCZ	Development of Landuse Scenarios for a Sustainable Improvement of Water Quality and Erosion Protection in the Transboundary Neisse Catchment	73, 56	47, 90			
Total		381, 26	216, 90	309, 54	438, 06	499, 19

3.3 Contract research

3.3.1 Research work contracted by a client from the Czech Republic

Client	Research title	Revenues (EUR thousand)				
		2014	2015	2016	2017	2018
Architektonický atelier Aleš, s.r.o.	Expert opinion - construction of Jeseniova apartment building	0,00	0,00	0,00	0,00	5,15
Metrostav a.s.	Expert opinion, road pavement diagnostics, laboratory tests	9,62	12,76	0,51	1,22	21,39
Tensar International, s.r.o.	Laboratory testing with geosynthetics	0,00	0,00	16,05	0,00	4,87
Institut klinické a experimentální medicíny, p.o.	Expert opinion on the construction of IKEM buildings	0,00	0,00	0,00	9,23	13,31
Firesta-Fišer, rekonstrukce, stavby a.s.	Static and fatigue test measurements	0,00	94,91	78,79	1,29	21,41
Ministerstvo životního prostředí	Assessment parameters of a set of measures in hydrological units	0,00	0,00	0,00	1,90	53,04
Technická správa komunikací hl.m. Prahy, a.s.	Dynamic computational analysis of the Troja Footbridge structure	0,00	0,00	0,00	0,00	54,09
Ředitelství silnic a dálnic ČR	Expert opinion	0,00	0,00	0,00	7,01	4,70
Ministerstvo pro místní rozvoj	Study specifying payment for the use of an accommodation unit	8,64	0,00	0,00	0,00	7,67
DEK a.s.	3D printing preparation and performance	0,00	0,00	0,00	0,00	5,99
Povodí Ohře s.p.	Optimum use of the hydro power potential in the existing weir profile	0,00	0,00	0,00	0,00	4,68

Ředitelství silnic a dálnic ČR	Diagnostic investigation of bridges	0,00	0,00	0,00	4,96	10,52
MCE Slaný s.r.o.	Corrosion research into a steel bridge structure	0,00	0,00	0,00	0,00	4,48
Povodí Odry s.p.	Mathematical model of an unsteady non-uniform flow	0,00	0,00	0,00	1,65	14,62
Obermeyer HELIKA a.s.	Development of technical solutions in steel structures	0,00	0,00	0,00	0,00	16,50
Sweco Hydroprojekt a.s.	Physical hydraulic research into a dry polder combined structure	0,00	0,00	0,00	23,93	0,00
ATREA s.r.o.	Air flow image analysis	0,00	0,00	0,00	3,89	0,00
Povodí Vltavy s.p.	Water management design of reservoirs	0,00	0,00	0,00	40,24	0,00
SUDOP Praha a.s.	Assessment of navigation conditions during a railway bridge reconstruction	0,00	0,00	0,00	6,17	0,00
Ředitelství silnic a dálnic ČR	Expert assessment of major bridge structures	0,00	0,00	0,00	6,51	0,00
Výzkumný ústav vodohospodářský T.G.Masaryka, v.v.i.	Pilot study and erosion monitoring establishment	0,00	0,00	0,00	31,39	29,01
Správa železniční dopravní cesty s.o.	Model bridge sheet - railway bridges with extremely reduced building height	0,00	0,00	0,00	14,58	19,50
Pražské vodovody a kanalizace a.s.	Hydraulic behaviour assessment of secondary sedimentation tanks	3,17	0,80	2,82	9,87	0,00
Správa železniční dopravní cesty s.o.	Assessment methods for railway bridges	0,00	0,00	0,00	60,77	82,78
Správa železniční dopravní cesty s.o.	Increasing passenger movement safety	0,00	0,94	14,80	37,98	0,00
Pražská vodohospodářská společnost a.s.	New design parameters for operating optimization	17,81	0,00	0,00	115,81	75,10
Vitrablock, s.r.o.	Shear tests of mortar for joining glass masonry	0,00	0,00	4,37	0,00	5,48
Česká spořitelna a.s.	Design of a bikesharing project in Prague	0,00	0,00	11,10	0,00	10,44
Pragoprojekt a.s.	Ensuring international cooperation with CEN/TC technical committees	1,96	1,85	1,82	1,08	1,15
INSET s.r.o.	Determination of concrete properties	3,76	6,33	0,00	6,94	4,53
ČEZ, a.s.	Study into the effect of the Wild Water plan on ELI operation	0,00	0,00	0,00	9,57	0,27
Stabilplastik, s.r.o.	Design of a 3D model of a new type of pallets	1,09	0,55	6,19	0,00	3,00
Krajské ředitelství policie Středočeského kraje	Professional statement on mould appearance assessment	0,00	0,00	0,00	3,80	0,16
Ateliér Kprojekt, s.r.o.	Diagnostics of forest paths	1,26	0,64	1,43	0,00	1,32
BITUMAX, s.r.o.	Expert statement on the validity of a test protocol	0,00	0,00	0,00	0,00	0,23
Centrum dopravního výzkumu, v.v.i.	Cooperation on a project in railway and road transport	0,00	0,00	0,00	0,00	1,77
Pragoprojekt a.s.	Design of a new ČSN 73 6120 standard	0,00	0,00	0,00	0,00	3,12
Lázeňská investiční s.r.o.	Assessment of the condition of structures after an accident	0,00	0,00	0,00	0,00	5,76
Dopravní podnik hl.m. Prahy, a.s.	Design and verification of a rapid strength mix	3,28	0,00	3,63	13,22	3,90

Výzkumný ústav geodetický, topografický a kartografický, v.v.i.	Monitoring of EGNOS-EDAS service parameters	0,00	0,00	0,00	4,29	9,20
Nejvyšší kontrolní úřad	Expert opinion on the design for Supreme Audit Office headquarters	1,82	6,82	3,70	0,00	4,87
Škoda auto, a.s.	Testing track study	0,00	14,65	12,84	25,07	9,56
Povodí Labe s.p.	Elaboration of flood risk analysis	0,00	0,00	0,00	1,60	3,35
Saint-Gobain Construction Products CZ a.s.	Fire resistance assessment	0,00	0,00	0,00	0,00	6,63
Ústav chemických procesů AV ČR, v.v.i.	Assessment of a residual slag fraction from separation	0,00	0,00	0,00	0,00	4,03
Správa a údržba silnic Plzeňského kraje, p.o.	Opinion on a bridge structure (floodcontrol) design	0,00	0,00	0,00	0,00	1,91
N E K A P, spol. s.r.o.	Validation tests on supplied samples	3,72	0,00	0,00	0,00	0,12
Vysoké učení technické v Brně	Research and testing of physical and mechanical properties of materials	4,03	4,75	0,00	8,53	7,63
Povodí Ohře s.p.	Expert opinion on flood related damage and financial reserves for repairs to tangible property	24,35	2,27	53,43	0,00	4,31
Sweco Hydroprojekt a.s.	Analysis of erosion sediment and phosphorus transport	0,00	0,00	0,00	0,00	5,46
Výzkumný ústav meliorací a ochrany půdy, v.v.i.	Analysis of the contents of stable isotopes in water samples	0,00	0,00	34,38	3,14	0,34
Městská část Praha 6	Traffic mode analysis and optimization	0,00	0,00	0,00	0,00	4,21
TOP NOC SERVIS s.r.o.	Corrosion research and bridge steel tests	0,00	0,00	0,00	0,00	6,59
Ústav informatiky AV ČR, v.v.i.	Collecting spatial data on the energy properties of buildings	0,00	0,00	0,00	0,00	9,97
Brněnské vodárny a kanalizace a.s.	Assessment of secondary sedimentation tank function by a mathematical model	0,00	0,00	0,00	0,00	19,50
Exprojekt s.r.o.	Bridge static load test	0,00	0,00	0,00	0,00	3,75
ŠINDLAR s.r.o.	Hydraulic research into a polder spillway	0,00	0,00	0,00	0,00	17,55
Povodí Moravy, s.p.	Expert opinion on flood-related damage and financial reserves for tangible property repairs	4,17	0,00	1,74	0,00	3,59
Povodí Labe s.p.	Expert opinion on flood-related damage and financial reserves for tangible property repairs	8,60	0,00	18,76	0,00	3,59
Pracom s.r.o.	Measurements of the compressive strength of plasters	0,00	0,00	0,00	0,00	0,65
Škoda auto, a.s.	Elaboration of an interior environment study - design	0,00	0,00	0,00	0,00	8,64
Povodí Vltavy s.p.	Feasibility study - addition of roadstead dividing walls	0,00	0,00	0,00	0,00	5,46
SÚRAO (Rektorát ČVUT)	Special-purpose engineering geological zoning map	0,00	0,00	0,00	0,00	30,72
Astron Buildings, s.r.o.	Fire safety manual	0,00	0,00	0,00	0,00	3,90

Správa železniční dopravní cesty s.o.	Diagnostics of research into the condition of a bridge reinforcement	3,37	35,13	76,33	18,99	13,84
Státní úřad pro jadernou bezpečnost	Standardization of technical codes for the protection of buildings from radon	3,00	0,00	0,00	0,00	4,84
Česká agentura pro standardizaci	Literature search and comparison of classification systems	0,00	0,00	0,00	0,00	11,54
Městská část Praha 6	Complex design of a locality	0,00	0,61	1,33	3,80	1,87
Severní energetická a.s.	Altitude survey	0,36	0,37	0,37	0,00	15,56
Hlavní město Praha	Assessment of a river navigability project	0,00	0,00	0,00	0,00	18,71
Czech Pan s.r.o.	Static load tests	11,77	0,00	0,00	0,00	1,27
ÚJV Řež a.s.	Consultancy services	0,00	1,82	1,15	2,38	6,38
Skanska a.s.	Verification of a new formula for cement concrete structures	0,00	0,00	0,33	0,00	3,81
Technická správa komunikací hl.m. Prahy, a.s.	Expert assessment of the condition of a footbridge	0,00	0,00	0,00	0,00	50,70
Nejvyšší kontrolní úřad	Tender assessment methodology	0,00	0,00	0,00	0,00	8,97
Město Litoměřice	Design of urban studies	0,90	1,82	0,92	0,00	0,97
Froněk s.r.o.	Innovation voucher - asphalt mixes	0,00	0,00	0,00	3,72	1,56
Jihočeský vědeckotechnický park a.s.	Processing and application of concrete sludge wastes	0,00	0,00	0,00	9,49	8,19
Vágnér POOL s.r.o.	Measurements of the operating characteristics of the water in a physiotherapy centre swimming pool	0,00	0,00	5,52	0,00	0,00
Povodí Vltavy s.p.	Floodplain delimitation	77,40	32,58	28,81	24,23	34,51
AIR Station s.r.o.	Expert opinion and consultations	0,00	0,00	7,40	0,00	0,00
Správa železniční dopravní cesty s.o.	Methodological instruction for design, implementation and inspection of slope reclamation projects	0,00	0,00	1,85	11,01	0,00
Vodárenská společnost Táborsko, s.r.o.	Hydraulic physical laboratory research	0,00	0,00	0,00	7,22	0,00
ÚJV Řež a.s.	Mathematical modelling of rock medium brittle failure	0,00	0,00	23,18	95,22	7,18
Hlavní město Praha	Flood control of territories	0,00	60,33	0,00	87,35	0,00
Správa železniční dopravní cesty s.o.	Diagnostic tests on railway bridges	0,00	7,16	44,96	0,00	0,00
Ředitelství silnic a dálnic ČR	Independent quality control and supervision on a bridge construction site	0,00	21,98	23,22	15,09	1,22
Křístek, Trčka a spol., s.r.o.	Longterm monitoring of building stability	0,00	0,00	2,99	0,00	2,11
Ředitelství silnic a dálnic ČR	Landslide reclamation - stabilization of an area near the site	4,76	0,00	0,00	42,04	0,00
SMP CZ a.s.	Professional technical consultancy on passive reliability assessment of a structure under construction	2,18	4,08	0,59	1,62	0,00

Správa úložišť radioaktivních odpadů	Research into the DOPAS International Project	0,00	0,00	0,00	49,12	0,00
Český Caparol s.r.o.	Tests on exterior thermal insulation contact systems	0,00	0,00	0,00	5,70	0,00
Povodí Vltavy s.p.	Analysis of vibrations induced by a hydraulic structure	0,00	0,00	0,00	9,54	3,59
Městská část Praha 6	Elaboration of a feasibility study for a parking policy	0,00	0,00	0,00	10,89	0,00
Univerzita Karlova	Expert estimate of the median of the usual real price of a work task	0,00	0,00	0,00	3,80	0,00
SUDOP Praha a.s.	Tensometric measurements	0,00	0,00	2,48	4,10	0,00
Ředitelství silnic a dálnic ČR	Expert opinion for an economical building design	0,00	0,00	51,88	21,31	0,00
Povodí Ohře s.p.	Research into a spillway	0,00	0,00	0,00	11,23	0,00
Ředitelství silnic a dálnic ČR	Economic assessment of bridge options	0,00	0,92	0,00	3,95	0,00
Ředitelství silnic a dálnic ČR	Design of technical conditions - bridges	0,00	0,00	0,00	11,06	0,00
Povodí Moravy, s.p.	Measures for transferring a 1000-year flood wave - physical model	0,00	0,00	0,00	18,03	0,00
Valbek s.r.o.	Ensuring safety after a flood - project documentation	0,00	0,00	0,00	42,35	0,00
ÚJV Řež a.s.	Load-bearing capacity assessment of building structures	0,00	0,00	0,00	47,13	0,00
Úřad pro technickou normalizaci, metrologii a státní zkušebnictví	Expert opinions on standards	2,60	6,23	4,35	1,06	0,00
Sweco Hydroprojekt a.s.	Nature-friendly measures in stream basins	0,00	0,00	0,00	5,70	0,00
Povodí Odry s.p.	Assessment of flood-related damage and financial reserves for property repairs	0,00	0,00	0,00	3,49	0,00
Správa železniční dopravní cesty s.o.	Design of project documentation - bridge repair	0,00	0,00	0,00	7,47	0,00
Městská část Praha 6	Project documentation for a project - parking	0,00	0,00	0,00	6,84	0,00
Ředitelství vodních cest ČR	Research study	26,99	70,15	153,37	25,75	64,35
Státní úřad pro jadernou bezpečnost	Manual - radon prevention in new buildings	0,00	0,00	0,00	5,34	0,00
Státní úřad pro jadernou bezpečnost	ČSN new version	0,00	0,00	0,00	4,71	0,00
Ředitelství silnic a dálnic ČR	Assessment of LCC bridge options	14,53	0,00	0,00	0,80	0,00
Správa železniční dopravní cesty s.o.	Elaboration of a study for a run-off regime	0,00	0,00	0,00	4,71	0,00
PUDIS a.s.	Hydraulic model of a road with a street inlet	0,00	0,00	0,00	4,05	0,00
Technická správa komunikací hl.m. Prahy, a.s.	Bridge structure analysis	0,00	0,00	0,00	10,56	0,00

Ministerstvo kultury	Expert opinion - study of a newly-built farmhouse	0,00	0,00	0,00	7,60	0,00
Město Hranice	Elaboration of a technical economic study	0,00	0,00	0,00	4,97	0,00
Státní fond rozvoje bydlení	Economic expert opinion	2,37	2,39	4,13	1,39	3,48
Ministerstvo zemědělství	Expert opinions - flood prevention support	0,00	32,08	16,89	14,24	5,01
Ředitelství vodních cest ČR	Modifications of the ice phenomena module after the RIS database upgrade	0,00	6,36	0,00	0,00	0,00
ČEZ, a.s.	Analysis of the cause of the appearance of dynamic effects	0,00	8,29	0,00	0,00	0,00
Nejvyšší kontrolní úřad	Expert assessment of the costs for 4 alternative designs of Supreme Audit Office Headquarters	0,00	4,22	0,00	0,57	0,00
Povodí Vltavy s.p.	Design of a sectional physical model of a weir body	0,00	11,70	0,00	3,72	0,00
Výzkumný ústav meliorací a ochrany půdy, v.v.i.	Providing background materials for the design of measures on selected soil block units	0,00	36,65	0,00	0,00	0,00
Povodí Ohře s.p.	Spillway protection from floating solids	0,00	25,38	0,00	0,00	0,00
SPOLANA a.s.	Feasibility study	0,00	6,60	0,00	0,00	0,00
Sweco Hydroprojekt a.s.	Evaluation of the economic effectiveness of flood protection measures	7,93	3,87	5,92	0,00	0,00
Ředitelství silnic a dálnic ČR	Design of a web application for the assessment of offered bridge alternatives	0,00	5,66	0,00	0,00	0,00
Povodí Vltavy s.p.	Expert assessment of flood control measures	0,00	12,81	0,00	0,00	0,00
Město Sázava	Determination of the load-bearing capacity of bridges after floods	0,00	5,31	0,00	0,00	0,00
Valbek s.r.o.	A study of run-off conditions	0,00	10,45	0,00	0,00	0,00
KO-KA s.r.o.	Spillway design and assessment by hydraulic modelling	0,00	8,90	0,00	0,00	0,00
Tensar International, s.r.o.	Design of a verification laboratory model of a structure	0,00	15,66	1,72	0,00	0,00
Správa železniční dopravní cesty s.o.	Complex design of the sightline situation at railway crossings	0,00	38,12	0,00	0,00	0,00
Hlavní město Praha	Expert opinion on the National Heritage Institute's methodological instruction for repairs to Charles Bridge	0,00	21,44	0,00	0,00	0,00
Povodí Moravy, s.p.	Physical model of a spillway and an outlet channel	0,00	23,68	0,00	0,00	0,00
Státní úřad pro jadernou bezpečnost	An assessment of the documentation of the destruction and collapse mechanism of circulating water cooling towers	0,00	5,76	0,00	0,00	0,00
GISAT s.r.o.	Consultation and support in programme project processing	0,00	4,58	0,00	0,00	0,00
Filip Červinka	Expert opinion	0,00	0,00	0,00	4,94	2,03
Metrostav a.s.	Expert opinion	2,46	3,36	0,00	0,00	0,00
Město Plzeň	Expert opinion	0,00	0,00	0,00	0,00	19,11
Městská část Praha 14	Feasibility study of a pedestrian pavement	0,00	1,76	3,48	0,00	0,00
Městská část Praha 20	Basin and stream capacity assessment	0,00	0,00	21,23	0,00	0,00
Město Roudnice nad Labem	Expert opinion	0,00	5,50	0,00	0,00	0,00
Město Terezín	Flood protection study	0,00	5,77	0,00	0,00	0,00

Mavel, a.s.	Research and development of hydraulic turbines	6,54	6,60	4,99	4,56	0,00
Vintegra	Monitoring of bridge structures	0,00	0,00	0,00	3,99	13,81
CEHAS Protect s.r.o.	Experimental measurements and tests	0,00	0,00	0,00	6,27	0,00
ČSOP	Expert opinion	0,00	0,00	5,55	0,00	0,00
ELZACO s.r.o.	Computation of a mathematical model of an axial turbine	9,77	0,00	0,00	0,00	0,00
LAVARIS, s.r.o.	Experimental testing of concrete	7,41	0,00	0,00	0,00	0,00
Česká voda, a.s.	Measurement and calibration of a mathematical model of a treatment plant	0,00	0,00	0,00	14,81	0,00
EDI Liberec, a.s.	Expert opinion	0,00	0,00	0,00	0,00	5,85
EDIKT a.s.	Static and dynamic load tests	0,00	0,00	5,14	0,00	0,00
Skála	Approach to technical information and a database	11,99	0,00	0,00	0,00	0,00
Praha West Investment, k.s.	Energy concept optimization study	9,52	0,00	0,00	0,00	0,00
CONTEG, s.r.o.	Tests on the thermal behaviour of distribution boxes	6,77	0,00	0,00	0,00	0,00
Derter	Verification of the potential use of recycling granulate	0,00	6,23	0,00	0,00	0,00
Sport. Areály	Expert opinion	5,69	0,00	0,00	0,00	0,00
ProNemovitosti	Expert opinion	0,00	0,00	5,82	0,00	0,00
Metro	Expert opinion	0,00	5,50	0,00	0,00	0,00
Mpyreum, k.s.	Experimental testing and measurements	0,00	8,43	0,00	0,00	0,00
Sládek a P	Expert opinion	2,99	0,73	0,00	0,00	0,00
AWIGO s.r.o.	Expert opinion	0,00	6,04	0,00	0,00	0,74
SMP CZ a.s.	Expert opinion on a motorway bridge	7,41	0,00	0,00	4,52	0,00
Stavatelství - Trunec s.r.o.	Laboratory testing	0,00	0,00	0,00	0,00	9,36
Hotel Mandarín s.r.o.	Opinion on an interior water distribution system	0,00	0,00	4,25	0,00	0,00
Hydroka, s.r.o.	Discharge stabilization on a weir cascade	0,00	10,30	0,00	0,00	0,00
Vodní sklo, a.s.	Laboratory tests of defrosting agents	0,57	4,76	0,00	0,00	0,00
Global strategic consultants Europe s.r.o.	Development of cementitious mortars	0,00	5,72	0,00	0,00	0,00
ALGON, a.s.	Design and implementation of noise barrier structures	0,00	0,00	0,00	0,00	9,57
Project ISA s.r.o.	Monitoring in a catchment area in a sewer network	0,00	0,00	5,27	0,00	0,00
INTERPROJEKT s.r.o.	Chute and stilling basin assessment	4,04	0,00	0,00	0,00	0,00
Správa železniční dopravní cesty s.o.	Rail substructure related issues	16,53	9,90	48,09	45,12	29,25
GO parking	Expert opinion	5,44	0,00	0,00	0,00	0,00
KŠ Prefa s.r.o.	Sleeper prototype tests	0,00	0,99	3,82	0,00	0,00
ECOLOGICAL CONSTRUCTION GROUP s.r.o.	Mortar mix development	5,88	5,72	0,00	0,00	0,00
Pontex, s.r.o.	Boreholes for inspection monitoring - Petřín Funicular	0,00	0,00	5,19	0,00	0,00
Avers, s.r.o.	Expert opinion	8,48	0,00	0,74	0,00	0,00
FERRO OK, s.r.o.	Expert opinion	0,00	0,00	6,66	0,00	0,00
Guarant International, s.r.o.	Expert opinion on consultancy	0,00	0,00	3,46	0,00	0,00
Metroprojekt	Expert opinion	0,00	5,50	0,00	0,00	0,00

MONSTAV CZ, s.r.o.	Use of waste wires from rubber product recycling	6,17	0,00	0,00	0,00	0,00
VKM	Expert opinion	8,35	0,00	0,00	0,00	0,00
Hochtief CZ, a.s.	Expert opinion	0,00	0,00	0,00	0,00	3,90
Kooperativa pojišťovna a.s.	Expert opinion	0,00	0,00	0,00	0,00	44,81
Watrad s.r.o.	Multi-generational inactive tracers	0,00	0,00	0,00	0,00	38,61
Ministerstvo průmyslu a obchodu	Methodological instruction for Ministry of Industry and Trade internal assessors	0,00	9,02	0,00	0,00	0,00
Vodárny Kladno Mělník	Expert opinion	8,35	0,00	0,00	0,00	0,00
Tepelné hospodářství Ústí n./L.	Expert opinion	9,08	0,00	0,00	0,00	0,00
DBK Praha a.s.	Expert opinion	0,00	0,00	0,00	0,00	14,43
Europofil, s.r.o.	Expert opinion	0,00	0,00	5,55	0,00	0,00
PBS Group, a.s.	Rehabilitation - Bezděkov u Klatov Castle	0,00	0,00	0,00	0,00	46,80
PaS	Compact unit with a hydraulic micro turbine	0,00	10,26	0,00	0,00	0,00
Konstat, s.r.o.	Experimental tests of thin-wall cassettes	3,65	0,00	0,00	0,00	0,00
ReviSol	Static load tests	5,19	0,00	0,00	0,00	0,00
TSK hl.m. Prahy	Study on operation in the Capital City of Prague	15,87	0,00	10,73	0,00	0,00
Ředitelství silnic a dálnic ČR	Diagnostic investigation of bridge substructure No. 29-033	0,00	4,78	45,28	0,00	0,00
Správa úložišť radioaktivních odpadů	MOCK-UP demonstration experiment	45,40	91,63	46,24	0,00	0,00
Správa úložišť radioaktivních odpadů	MOCK-UP experiment assembly and evaluation	0,00	0,00	0,00	132,43	267,06
Státní fond dopravní infrastruktury	Opponent's opinion on determining an investment cost	0,00	0,00	5,55	0,00	0,00
Institut plánování a rozvoje hl.m. Prahy, p.o.	Flood protection of the Capital City of Prague	10,75	0,00	0,00	0,00	0,00
Údržba silnic Královéhradeckého kraje, a.s.	Diagnostic investigation, cold recycling technology design	0,00	0,00	0,00	4,48	0,00
Asociace krajů ČR	Methodology for strategic management and planning of Czech Republic districts	18,03	0,00	0,00	0,00	0,00
Mikroregion Košířsko	Expert opinion	0,00	0,00	9,21	0,00	0,00
Národní památkový ústav	Expert opinion - Olomouc Archbishopric	0,89	5,50	0,00	0,00	0,00
Diamo s.p.	Expert opinion	0,00	0,00	7,32	0,00	0,00
Správa úložišť radioaktivních odpadů	EPS experimental pressure plug	0,00	0,00	0,00	0,00	17,90
GEFOS, a.s.	Heritage building rehabilitation	0,00	5,86	0,00	0,00	0,00
ALGEO TEST, s.r.o.	Expert opinions - road pavement reconstruction	0,00	0,00	0,00	0,00	0,00
P3 Parks, s.r.o.	Expert opinion - road surface tests	0,00	0,99	0,00	0,00	11,05
SKANSKA Asfalt, s.r.o.	Testing asphalt mixes	1,29	4,37	0,30	0,61	2,07

TPA ČR, s.r.o.	Stiffness modulus determination of asphalt mixes	3,33	0,00	1,18	2,43	2,81
COLAS CZ, a.s.	Tests on the functional properties of asphalt mixes	209,33	6,17	0,00	0,00	8,98
USK s.r.o.	Experimental tests on a mix	3,58	3,60	4,54	5,24	6,10
PKB, a.s.	Experimental tests on permanent deformations	2,25	0,00	6,55	0,00	4,15
Woring s.r.o.	Road pavement diagnostic investigation	0,00	0,00	1,63	14,69	7,31
Pontex, s.r.o.	Dynamic experiment performance and evaluation	4,72	4,73	5,24	1,44	0,00
Pragoprojekt a.s.	Experimental tests on asphalt mixes and asphalt binders	7,09	28,47	33,13	2,01	0,00
JUTA a.s.	Radon diffusion coefficient determination in materials	0,00	4,17	1,04	0,00	0,00
FRONĚK s.r.o.	Experimental tests on mix optimization	2,46	0,00	0,00	3,72	10,77
MOTT MACDONALD CZ,s.r.o.	Diagnostics, road pavement reconstruction	0,00	0,00	0,00	7,13	6,24
UTILITA, a.s.	Testing a new technology for asphalt emulsions	6,17	0,00	0,00	0,00	0,00
ŘSD ČR	Experimental tests on bituminous mixes	9,01	8,61	8,06	30,67	12,36
Vodohospodářský rozvoj a výstavba a.s.	Spatial and regional planning landscape study	0,00	0,81	9,25	2,28	19,15
Other	Orders not mentioned above with performance below 3700 EUR	187,49	31,57	145,25	51,49	240,33
Total		935,39	993,67	1 195,73	1 471,77	1 789,65

Note: List and describe contract research work with the revenue for the calendar year in question.

3.3.2 Research work contracted by a foreign client

Client	Research title	Revenues (EUR thousand)				
		2014	2015	2016	2017	2018
Lulea Tekniska Universitet	Bottom Grid Structure (BGS) for the treatment of stormwater discharges	0,00	0,00	0,00	0,00	10,42
S2o Design and Engineering Ing.	Constructing and testing a physical model	0,00	0,00	0,00	0,00	49,71
NOVKOL a.d.	General consulting service	0,00	0,00	0,00	4,85	0,00
Lankhorst Engineered Products bv	Testing at the sleeper railseat	0,00	3,57	4,29	11,22	5,23
ASETS-LUX S.A.R.L.	OOFEM integration support within the ASET-LUX portfolio	0,00	0,00	0,00	4,44	0,00
Whitewater Parks International, LLC	Physical modelling investigations for a whitewater course	50,11	5,01	15,00	0,00	11,85
Stichting Nederlands Normalisatie-instituut	Preparation of a second generation of Eurocode 5	0,00	10,05	11,49	0,00	16,82
Lafarge Centre de Recherche	Numerical simulation of UHPFRC	0,00	0,00	0,00	1,95	10,05
Astrium GmbH	Creation of the status report - GNSS Technology	0,00	131,78	39,98	0,00	0,00
Lankhorst Engineered Products bv	Determination of the stiffness of a plastic girder	0,00	0,00	0,00	5,38	0,00
Turbinor SA	Study of the penstock bifurcation and junction	0,00	0,00	0,00	7,22	0,00
AXTER	Experimental assessment of the Manning's coefficient of a bitumen-based waterproof geomembrane	0,00	9,75	0,00	0,00	0,00
S2o Design and Engineering Ing.	Computational fluid dynamics a fish passage study	0,00	10,06	0,00	0,00	0,00
CSIRO	Research on the turbulent flow of a non-Newtonian fluid	15,90	16,16	0,00	0,00	0,00
TIX-Mexico	Drilled wells in the Gulf of Mexico	0,00	11,19	22,77	0,00	0,00
RFB	An assessment of effects carried out in the Ružbašská Milava hydraulic structure	0,00	5,58	0,00	0,00	0,00
Nederlands Normalisatie Instituut	CEN/2014-02 Grant Agreement	0,00	0,00	0,00	0,00	5,19
IOG SANITAS MANAGEMENT	Inspection of steel structures	9,26	0,00	0,00	0,00	0,00
Total		75,28	203,14	93,53	35,06	109,27

Note: List and describe contract research work with the revenue for the calendar year in question.

3.4 Revenues from non-public sources (besides grants or contract research)

3.4.1 Overview of revenues from non-public sources raised for the 2014–2018 reporting period

Revenue type	Revenues (EUR thousand)				
	2014	2015	2016	2017	2018
Licences sold	1.8	0	0	1.1	3.9

Gifts	14.8	137.5	39.9	51.8	51.8
Total	16.6	137.5	39.9	52.9	55.7

Note: List funds for R&D&I from non-public sources, besides grants or contract research (e.g. licences sold, spin-off revenues, gifts, etc.) in each calendar year.

3.5 Applied research results with an economic impact on society

3.5.1 Overview of applied research results in the 2014–2018 reporting period

List and describe the results that have already been applied in practice, or that will realistically be applied, with an existing or prospective economic impact on society. Under “patents” and “licences sold”, list all the results; under other results list a *maximum* of five items. Unless otherwise specified below, the definition of a result must correspond to the definitions under the Methodology for Evaluating Research Organisations and Research, Development and Innovation Purpose-Tied Aid Programmes, Appendix No 4: Definitions of Types of Results.

Results	Year	Title
European patent		
	2018	Rolling fluid pump
American patent		
	2016	Cement composite with enhanced ability to absorb mechanical energy
Czech licenced patent		
	2017	A dry prefabricated mixture of a multifunctional silicate composite
	2017	The internal structure of the deformation block, especially of a construction element of slip roads
	2018	No. 307338-A trench block made of recycled plastic
	2017	A fluid rolling pump
Other foreign patents		
	2018	Ultra high-strength steel fibre reinforced concrete
	2018	Rollflüssigkeitspumpe / Rolling Fluid pump (DE 60 2009 055 686.6 / EP2359008)
Licences sold		
	2018	A dry prefabricated mixture of a multifunctional silicate composite; a dry prefabricated mixture of multifunctional silicate composite, No. 1119000304 , Stachema CZ s.r.o.
	2017	The internal structure of the deformation block, especially of a construction element of slip roads; Deformation block internal structure, deformation block and deformation system, No. 1117000288 , Rieder Beton, spol. s r. ro.
	2017	Reinforced concrete frame with optimized static action No. 1117000254 , SUDOP PRAHA a.s.
	2017	(307338)-A trench block made of recycled plastic; Nr. (2017-129)- A trench block made of recycled plastic Ditch fitink, No. 1117000117 , Stabilplastik spol. s r. o.
	2017	EP 2359008-Rolling fluid pump No.1118000054 , P.F. Economy consulting, spol.s r.o.
	2017	A fluid rolling pump, No. 1117000141 , No. 1117000236 , P.F. Economy consulting, spol.s r.o.



	2016	(22142)-Glass and steel-made hybrid beam; (22143)-Glass and steel-made hybrid beam No. 1117000134; No.1117000272 , OGB s.r.o.
	2016	Asphalt binder modified by microground activated rubber; Asphalt binder modified by microground rubber and chemical additive for improving deformation behavior, No.1120000080 , Lavaris s.r.o., ARP Bohémia s.r.o.
	2016	Microground mechano-chemically activable rubber, No. 1120000107 , VŠCHT v Praze, Lavaris s.r.o., ARP Bohemia s.r.o.
Significant analyses / surveys / studies		
	2014	National Museum - An assessment of six price offers submitted by the tenderers in the tender procurement
	2015	Professional assessment procedure for a mantle recovery of cultural monuments on Charles Bridge
	2016	Physical hydraulic model research on Decin lock
	2018	Design of retention control measures for the Watershed Management Plans of the Vltava Catchment State Enterprise.
	2015	LCC assessment for 4 solutions of the seat of the Supreme Audit Office
Spin-off with a stake held by the evaluated unit		
Spin-off with no stake held by the evaluated unit		
Prototypes		
	2018	A Magnetoelastic Sensor with Two Secondary Coils Designated for Retrofit
	2017	Light Ballistic Barrier
	2015	Prototype of a low-rise structure made from a dismantlable prefabricated reinforced concrete building system with controlled joint properties consisting of spatial units (3D)
	2014	The LAV1/800-CA production line for Mechanical Chemically Activation of Mineral Waste Materials and By-products in the Construction Industry
	2014	Pressed Concrete Paving with Economic and Environmental Benefits
Varieties and breeds		
Other		
	2018	A method for homogenizing of high-performance or ultra-high-performance concrete
	2017	A method for rehabilitating masonry made of sand-lime bricks
	2016	A cement composite exhibiting increased ability to absorb mechanical, acoustic and thermal energies
	2015	A process for preparing cellular silicates from energy-bearing products without using an autoclave
	2014	A method for determining the biodegradation of inorganic building material by chemoorganotrophic microorganisms

Note: “Licence” refers to a licence for a result of R&D&I in the broadest sense of the word (licences for patents, utility models, industrial designs; copyright licences for software and other works, and any other licences).

For the purposes of this methodology, a “spin-off” is a juridical person established to commercialise knowledge, usually with the inclusion/transfer of the rights to this knowledge to such juridical person. List all instances of legal persons.

3.6 Significant applied research results with an impact other than an economic one on society

3.6.1 Overview of applied research results for the 2014–2018 reporting period with an impact other than an economic one on society

Result type	Name	Anticipated impact
Software	OOFEM.org	Open source finite element code used worldwide, more than 3600 downloads of the 2.4 version, >500 registered users on user forum. www.oofem.org
National strategy	National strategy for digitalization in construction sector.	This document summarizes the present status of BIM implementation in Europe and in the Czech Republic and defines the strategy and the plan for BIM implementation in CZ for 2018-2027.
Design	Design of the whitewater canoe course for the 2020 Olympic games in Tokyo	Contribution to Olympic sport activities, a presentation showcase of CZ.
Methodology	The certified methodology for the assessment of flood control measures used by the Ministry of Agriculture, CZ.	This methodology provides an objective and transparent assessment of all entries of flood events that unambiguously determines the order of the indicators of technical efficiency. Priority is given to flood measures in order to address the increased protection in areas with a significant flood risk with regard to the specific features of cultural heritage objects, based on plans for the management of flood risks.
Heritage restoration	Bečov Castle: an in-situ survey and an analysis of the disruption of the southern stone wall of the connecting wing, and a proposal for rehabilitation, 2017.	A direct application of research results with a significant contribution to the preservation of national cultural heritage

Note: List and describe a maximum of five results (in line with the Definitions of Types of Results) that have already been applied in practice, or that will realistically be applied. These are typically results from disciplines in the humanities and social sciences, for which you should briefly describe their anticipated impact.

3.11 Recognition in the international R&D&I community

3.11.1 Participation of the evaluated unit’s academic staff on the editorial boards of international scientific journals in the 2014–2018 reporting period

Name, surname and title(s) of the evaluated unit’s member of staff	Title, publisher, city(-ies) and country(-ies) of origin of the scientific journal
Pavel Demo, Prof. RNDr, CSc.	International journal - Crystals, MDPI, Basel, Switzerland, (Guest editor)
Josef Křeček, Doc. Ing. CSc.	International Soil and Water Conservation Research, Elsevier, (Associate editor)
Robert Černý, Prof. Ing. DrSc.	Journal of Building Physics, SAGE publishing, Thousand Oaks, USA, (Associate editor)
Jan Chleboun, Doc. RNDr, CSc.	Applications of Mathematics, Springer, (Associate editor-in-chief)

Tomáš Vogel, Prof. Ing. CSc.	Vadose Zone Journal, Soil Science Society of America, Madison, WI, USA, (Associate editor)
Milan Jirásek, Prof. Ing. DrSc.	International Journal for Numerical and Analytical Methods in Geomechanics, Wiley, (Editorial board member)
Petr Kabele, Prof. Ing. Ph.D.	Cement and Concrete Composites, Elsevier, Amsterdam, NL, (Editorial board member)
Karel Kabele, Prof. Ing. CSc.	Energy and Buildings international journal. Elsevier, Amsterdam, NL, (Editorial board member)
Jaroslav Kruis, Prof. Ing. Ph.D.	Computers & Structures, Elsevier, Amsterdam, Netherlands, (Member of the editorial board)
Daniel Rypl, Doc. Dr. Ing.	Advances in Engineering Software, Elsevier, Amsterdam, NL (Member of the editorial board).

Note: List a maximum of ten examples of academic staff's participation on the editorial boards of international scientific journals (e.g. editor, member of the editorial board, etc.).

3.11.2 The most significant invited lectures by the evaluated unit's academic staff at institutions in other countries during the 2014–2018 reporting period

Name, surname and title(s) of the evaluated unit's member of staff	Invited lecture title	Name of the host institution, conference or other event
Milan Jirásek, Prof. Ing. DrSc.	Regularized continuum damage formulations acting as localization limiters	International Conference on Computational Modeling of Concrete and Concrete Structures (Euro-C 2018), Bad Hofgastein, Austria, 26 February – 1 March 2018
Vít Šmilauer, Doc. Ing. Ph.D. DSc.	Engineering microstructures of slag-blended cements and alkali-activated foams - Experiments and modelling	5th International Slag Valorization Symposium. Katholieke University Leuven, 2017
Petr Hájek, prof. Ing. CSc., FEng.	Integrated life cycle design and assessment of concrete structures – A contribution to sustainability and resiliency in a changing world	The Fifth International Symposium on Life-Cycle Civil Engineering, IALCCE2016, Delft, Netherlands, 2016
Vaniček Ivan, prof. Ing. DrSc.	Sensitivity of soil structure interaction for NPP footing bottom on static and seismic loading	19th International Conference on Soil Mechanics and Geotechnical Engineering. Seoul: Korean Geotechnical Society, 2017
František Wald, prof. Ing., CSc.	Component based finite element method of joints	The British Constructional Steelwork Association (BCSA), London, 2015.
Pavel Fošumpaur, doc. Dr. Ing.	Assessment of flood damage, flood risks and economic efficiency of flood protection measures in the Czech Republic	Sächsisches Landesamt für Umwelt, Landwirtschaft und Geologie, Dresden, 2014
Michal Sněhota, doc. Ing. Ph.D.	How residual air affects water flow and solute transport in near-saturated soil	University of Nebraska–Lincoln, USA, 2014
Prof. Ing.Karel Kabele, CSc.	Energy efficient HVAC systems	National University of Singapore (NUS), 2017
Petr Štemberk, prof. Ing. Ph.D., D.Eng.	The effect of ionizing radiation on concrete and concrete structures	Nagoya University, 2016
Leos Hornicek, Ing., Ph.D.	Experience with geogrids and geocomposites positioned beneath a ballast bed in laboratory and operating conditions	6 th European Geosynthetics Congress, Ljubljana, 2016

Note: List a maximum of ten examples.

3.11.3 The most significant lectures by foreign scientists and other guests relevant to the R&D&I field at the evaluated unit during the 2014–2018 reporting period

Name, surname and title(s) of the lecturer	Lecturer's employer at the time of the lecture	Invited lecture title
Eva Jiříčná, Ing. Arch.	Eva Jiříčná Architects Limited, London	What is Architecture, 2017

<u>Zdeněk P. Bažant</u> , Prof. Ph.D., S.E., Dr.h.c.mult.	Northwestern University, USA)	Centurial durability of concrete structures: Creep, hydration and hygrothermal effects, 2018
John Schwartz, Prof.	Water Research Center, University of Tennessee, USA	Sediment transport modelling within the river network, 2016
Peter Fiener, Prof	University of Augsburg, Institute of Geography	Microplastics in agricultural soils – Evidence, detection and transport processes, 2017
Shih-Cheng Hu, Distinguished Professor, Dr.	National Taipei University of Technology. Taipei ROC (TAIWAN)	Opportunities and challenges of energy and indoor air quality
Barbara Kaltenbacher, Prof.	University of Klagenfurt, Austria	State versus control constraints in optimization problems for singular PDEs, 2015
Dan M.Frangopol, Prof.	Lehigh University, Bethlehem, USA	Optimum Life Cycle Management of Civil Infrastructure Systems, 2015
Dong-Soo Kim, Prof.	Korea Advanced Institute of Science and Technology	Development and application of a GIS-based tool for earthquake-induced hazard prediction
Ron Peerlings, Assoc. Prof. PhD.	Eindhoven University of Technology	Micromechanics of fracture initiation in multiphase materials, 2017
Johannes Koestel, Dr.	Swedish University of Agricultural Sciences, Uppsala, Sweden	Monitoring of the 3-D evolution of soil macropores networks

Note: Relevant solely for the R&D&I field. List a maximum of ten examples.

3.11.4 The most significant elected membership in foreign of professional societies relevant to the R&D&I field at the evaluated unit during the 2014–2018 reporting period

Name, surname and title(s) of the evaluated unit's member of staff	Name of professional society	Type of membership
Karel Kabele, Prof. Ing. CSc.	REHVA (Federation of European Heating, Ventilation and Air Conditioning Associations)	President 2013-2016
Petr Štemberk, Prof. Ing. Ph.D., D.Eng.	International Committee on Irradiated Concrete	Vice-chairman
Prof. Ing. Jan L. Vitek, CSc., FEng.	fib (International Federation for Structural Concrete)	Delegate representing the Czech Republic. Member of the Technical Council and General Assembly
Ivana Kabelková, doc. Dr. Ing.	Urban streams working group under IWA/IAHR Joint Committee on Urban Drainage	Head
Petr Hájek, prof. Ing. CSc., FEng.	fib (International Federation for Structural Concrete)	Member of Technical Council of fib, Chairman of Commission 7 - Sustainability
Jaroslav Kruis, Prof. Ing. PhD.	EU-MATHS-IN	Chairman of national network
Leos Hornicek, Ing., Ph.D.	International Geosynthetics Society – Technical Committee on Stabilization	Board member, secretary

Vojtěch Bareš, Dr.	International Water Association	Member of the Joint Committee on Urban Drainage (JCUD)
Ladislav Satrapa, doc. Ing., CSc.	Czech National Committee on Large Dams	Chairman
Mikuláš Hulec, prof. akad. arch.	Experts Committee of the Department of Historic Preservation, Municipal Government of the City of Prague	Chair

Note: List a maximum of ten examples.

SUMMARY LIST OF ADDITIONAL DOCUMENTATION IN MODULE M3

Document Title	Criterion	Location (HTML link)
DOPAS project (Full-Scale Demonstration of Plugs And Seals)	3.2	http://www.posiva.fi/dopas
Centre for Effective and Sustainable Transport Infrastructure (CESTI)	3.2	http://www.cesti.cz/index.php?page=home&en=en
Multiscale Modelling Platform: Smart design of nano-enabled products in green technologies	3.2	http://www.mmp-project.eu/doku.php
Miroslav Sedláček - inventor of the bladeless hydropower turbine	3.5	http://www.ciexpo.cz/rodokmen/miroslav-sedlacek/?lang=en
OOFEM: Object Oriented Finite Element Solver	3.6	http://www.oofem.org
Nanocem: a consortium of academic and industrial partners, all interested in fundamental research in the nanoscale science of cement and concrete.	3.7	https://www.nanocem.org
University Technology Transfer support document	3.8	https://evaluation-cvut.cz/files/H2020-Technologytransfer.pdf
Faculty Technology Transfer pages	3.8	https://www.fsv.cvut.cz/vvcen/dv_a_tt.php
Supporting document with university's commercialization strategy	3.9	https://evaluation-cvut.cz/files/H2020-Technologytransfer.pdf
CTU InQBay incubator	3.9	https://www.inqbay.cvut.cz/?lang=en
Miroslav Sedláček: Finalist for the European Inventor Award 2016	3.10	https://www.epo.org/learning-events/european-inventor/finalists/2016/sedlacek.html
Anna Kučerová was one of the laureates of the L'ORÉAL-UNESCO prize	3.10	https://aktualne.cvut.cz/en/reports/20170609-anna-kucerova-was-one-of-the-laureates-of-the-loreal-unesco-prize
IOC Trophy 2015 – Sport and Innovation was awarded to Jaroslav Pollert	3.10	https://www.canoeicf.com/ca/node/2036
Faculty activities in the popularization of R&D&I and communication with the public	3.12	https://www.fsv.cvut.cz/m17+/2019/modul3-3-12.pdf