TU 1404
COST ACTION

TOWARDS THE NEXT GENERATION OF STANDARDS FOR SERVICE LIFE OF CEMENT-BASED MATERIALS AND STRUCTURES

1ST WORKSHOP
OF COST ACTION TU 1404

FOCUS ON EXPERIMENTAL TESTING
OF CEMENT BASED MATERIALS

[CALL FOR PARTICIPATION]

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1ST WORKSHOP - SLOVENIA

COST ACTION TU1404

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FOR SERVICE LIFE OF CEMENT-BASED
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[CALL FOR PARTICIPATION]

DATE OF WORKSHOP
April 16-17, 2015

Place of workshop
University of Ljubljana,
Faculty of Civil and Geodetic Engineering
Ljubljana, Slovenia

ACTION CONTACTS

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Action websites	http://www.tu1404.eu	http://www.cost.eu

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1. INTRODUCTION

1.1. ABOUT COST

Founded in 1971, COST – European Cooperation in Science and Technology – is the first and widest European framework for the transnational coordination of nationally funded research activities. It is based on an inter-governmental agreement between 35 European countries. COST enables break-through scientific developments leading to new concepts and products and thereby contributes to strengthen Europe's research and innovation capacities. It is a unique means for European researchers to jointly develop their own ideas and new initiatives across all scientific disciplines through trans-European networking of nationally funded research activities.
COST key features are:

- Building capacity by connecting high-quality scientific communities throughout Europe and worldwide;
- Providing networking opportunities for early career investigators
- Increasing the impact of research on policy makers, regulatory bodies and national decision makers as well as the private sector.

Through its inclusiveness, COST supports integration of research communities, leverages national research investments and addresses issues of global relevance. As a precursor of advanced multidisciplinary research, COST plays a very important role in building a European Research Area (ERA). It anticipates and complements the activities of the EU Framework Programmes, constituting a "bridge" towards the scientific communities of emerging countries. It also increases the mobility of researchers across Europe and fosters the establishment of scientific excellence in the nine key domains:

- Biomedicine and Molecular Biosciences
- Food and Agriculture
- Forests, their Products and Services
- Materials, Physics and Nanosciences
- Chemistry and Molecular Sciences and Technologies
- Earth System Science and Environmental Management
- Information and Communication Technologies
- Transport and Urban Development
- Individuals, Societies, Cultures and Health

In addition, Trans-Domain Proposals allow for broad, multidisciplinary proposals to strike across the nine scientific domains. COST is funded through the EU RTD Framework Programmes.

1.2. COST ACTION TU1404

1.2.1. ABSTRACT

Cement-based materials (CBM) are the foremost construction materials worldwide. Therefore, there are widely accepted standards for their structural applications. However, for service life designs, current approaches largely depend on CBM strength class and restrictions on CBM constituents.

Consequently, the service life behaviour of CBM structures is still analysed with insufficiently rigorous approaches that are based on outdated scientific knowledge, particularly regarding the cumulative behaviour since early ages.

These results in partial client satisfaction at the completion stage, increased maintenance/repair costs from early ages, and reduced service life of structures, with consequential economic/sustainability impacts. Despite significant research advances that have been achieved in the last decade in testing and simulation of CBM and thereby predicting their service life performance, there have been no generalized European-funded Actions to assure their incorporation in standards available to designers/contractors. Therefore, the main purpose of COST Action TU1404 is to bring together relevant stakeholders (experimental and numerical researchers, standardization offices, manufacturers, designers, contractors, owners and authorities) in order to accelerate knowledge transfer in the form of new guidelines/recommendations, introduce new products and technologies to the market, and promote international and inter-specialty exchange of new information, creating avenues for new developments.

1.2.2. ACTION TU1404 WORKING GROUPS

In order to adequately achieve the objectives of the Action, three Work Groups (WG) have been defined as follows:

WG1: Testing of CBMs,

WG2: Modelling of CBMs and the behaviour of structures,

WG3: Development of recommendations and products.

WG1: TESTING OF CBMS

Chair: Gregor Trtnik [SI] **E-mail:** grega.trtnik@igmat.eu
Co-chair: Marijana Serdar [CRO] **E-mail:** mserdar@grad.hr

WG1 deals with determination of different properties of early age and hardened cement based materials with the following main objectives: (1) to recommend new advanced techniques which have been developed during the last years to become standard in the (near) future, (2) to test the ability of using different waste, recycled, and by-products as raw materials to design sustainable concrete mixture, (3) to prepare a database of concrete mixtures which could serve designers and engineers to better predict lifespan, durability, and serviceability of concrete mixtures and structures, and (4) to provide input data needed for modelling phase of the Action (WG2). In order to achieve these objectives several Group Priorities have been specified to perform the experimental program systematically and Round Robin Testing (RRT) has been organized among the laboratories included in the Action. To determine properties of fresh and hardened materials, various modern experimental techniques have been used within RRT with a special focus on using self-developed, advanced (non-destructive) testing techniques which have been developed during the last years.

WG2: MODELLING OF CBMS AND THE BEHAVIOUR OF STRUCTURES

Chair: Mateusz Wyrzykowski [CH] **E-mail:** mateusz.wyrzykowski@empa.ch
Co-chair: Farid Benboudjema [FR] **E-mail:** farid.benboudjema@dgc.ens-cachan.fr

WG 2 deals with modelling of cement based materials and structures, with particular focus on durability and service life-related aspects. Modelling complements the parallel experimental studies by allowing for virtual testing of a variety of material parameters and boundary conditions on one hand, and extending beyond the time and space scales available in real experiments, therefore enabling long-term predictions of material or structural behaviour. WG2 will benefit from the synergistic cooperation with the other two WGs of this COST Action. The objectives of the WG are trifold: (1) to support unified approaches for conducting numerical experiments for material properties of CBM and (2) unified approaches for macroscopic modelling of CBM behaviour during the life cycle. The final objective is (3) to integrate the conclusions from different modelling scales (from cement paste to structural level) to create a set of general instructions to be used in designing software for CBM and reinforced concrete structures.

WG3: DEVELOPMENT OF RECOMMENDATIONS AND PRODUCTS

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Co-chair: Terje Kanstad [NOR] **E-mail:** terje.kanstad@ntnu.no

An adequate determination of the service life of concrete structures, namely in its less developed fields related to analysis and control of imposed deformations and control of their induced effects in combination with (loading) actions, requires accepted determination of relevant physical quantities. Proposals for comprehensive and upgraded test standards and development of associated devices thus constitute a first objective of WG3 based on the results of WG1. Moreover, after WG2 results in terms of check and comparison of computational methods to address control of structural deformations and cracking (as well as overall service life behaviour) and assessing associated typical precisions in their prediction ability, WG3 will draw general lessons and propose a methodology compatible with the Eurocode standard format to address thermo-hydro-mechanical coupled effects in serviceability design, including transient construction phases. In sum, WG3 will focus on identified shortages of present reference documents and on mature developments of tests, products and methods, to contribute to standards and guidelines improvement in the field of concrete service-life design.

2. WORKSHOP 1: FOCUS ON EXPERIMENTAL TESTING OF CEMENT BASED MATERIALS

2.1. OBJECTIVES OF THE WORKSHOP

The 1st workshop has several objectives. Most of them are related to the tasks of WG1, specifically Round Robin Testing (in the following "RRT") as follows:

- to make a scientific discussion on the proposed plan of RRT procedure, called "Call for Participants" and to provide final comments/suggestions by RRT participants;
- to define of all the activities together with a detailed time schedule necessary to adequately start with the RRT procedure (i.e. to define transportation logistics, amount of basic materials that need to be transported to specific laboratory, etc.);
- to present the leaders of GPs of WG1 and to allow them to express their ideas, demands, strategies, and expectations related to their GP in the form of short presentations;
- to allow other RRT participants to present some contributions relevant for a specific GP (e.g. their experiences related to previous RRT programs, etc.);
- to present expectations of WG2 and WG3 members related to the results of RRT;
- to invite relevant speakers not included in COST TU1404 Action – invited speakers;
- to allow the participants (i.e. members of RRT) to present themselves, their organizations, their scientific work and contributions;
- to get acquainted with other RRT participants and WG members, etc.

2.2. WORKSHOP PROGRAMME

Thursday, April 16th, 2015

8:00-9:00	Registration
9:00-9:10	Welcome session
9:10-10:10	Session for GP1a,b
10:10-10:40	Coffee break with poster session
10:40-11:40	Session for GP1a,b
11:40-12:10	Invited speaker: CEN TC250-SC2
12:10-13:20	Lunch break with poster session
13:20-13:30	Presentation of Igmat
13:30-14:30	Guided visit to the labs, poster session
14:30-16:00	Session for GP1c,d
16:00-16:30	Coffee break with poster session
16:00-16:10	Voting on behalf of attendants for best poster
16:30-18:00	Session for GP1c,d
18:10-19:00	Guided tour around town
20:30	Common dinner. Awards for best poster announced during the banquet.

Friday, April 17th, 2015

8:00-9:30	Think tank breakfast
9:30-10:30	Session for GP1e,f
10:30-11:00	Coffee break
11:00-12:00	Session for GP1e,f
12:00-12:30	Invited speaker: H2020 and other European funding opportunities for TU1404
12:30-14:00	Lunch break
14:00-14:30	Presentation of RRT program
14:30-15:00	Discussion on RRT program
15:00-16:00	WG2 session: What input would I really like to get from an experiment?
16:00-16:30	WG3 session: Product development: from idea to the market
16:30-16:40	Closing of the 1st workshop
16:40-	Open discussions for each WG (parallel meetings)

2.3. LOCATION, DATES, AND TRAVELING

2.3.1. LOCATION AND DATE OF THE WORKSHOP

The 1st workshop of COST TU1404 Action will take place at University of Ljubljana, Faculty of Civil and Geodetic Engineering (in the following UL, FGG). UL, FGG is located in a heart of Ljubljana, the capital of Slovenia. The workshop will be organized between 16th -17th April, 2015 (please refer to http://www.tu1404.eu/meetings).

2.3.2. HOW TO GET TO UL FGG

From Slovenian National Airport Jože Pučnik

FGG is located in the heart of Ljubljana, which is approximately 30 km away from Slovenian national Airport Jože Pučnik. If possible, the participants eligible for reimbursement are encouraged to use public transport due to the COST reimbursement rules. Numerous public transportation connections are available from the airport to the heart of Ljubljana. Bus (approx. 4 EUR/person for one direction) or shuttle (approx. 9 EUR/person for one direction) are preferable options which can be easily reimbursed but the passengers can also use taxi (approx. 25 EUR for one direction) in the case of early/late arrivals/departures.

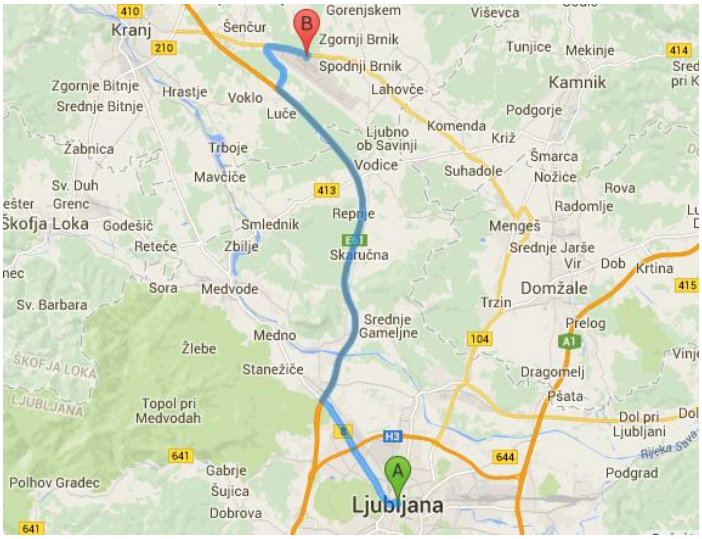

Figure 1. Travelling from the airport to FGG.

From Other nearby Airports

1) From Graz Airport

Graz AirPort is a minor international airport in Graz, the second-largest city in Austria. It is located in the municipalities of Feldkirchen and Kalsdorf, 5 NM (9.3 km; 5.8 mi) south of Graz city center and mainly serves flights to European leisure and some metropolitan destinations. Graz is approximately 200 km away from Ljubljana (around 2 – 2.5 hours by car or bus). It is also possible to travel by train to Ljubljana, which costs approximately 20 EUR/person.

2) From Venice Airport

Venice Marco Polo Airport is an international airport located on the Italian mainland 8 km north of Venice, in Tessera, a *Frazione* of the Comune of Venice nearest to Mestre. Venice is approximately 180 km away from Ljubljana (around 2-2.5 hours by car or bus). It is also possible to travel by train to Ljubljana (very time consuming, though), which costs approximately 22 EUR/person.

2.4. ACCOMODATION

Local organizers suggest to use City Hotel for accommodations. Several rooms with special price will be available for the participants through following the link to the hotel booking site available in http://www.tu1404.eu/meetings (only available until 17th March). The hotel is located in downtown and is only 20 minutes walking distance to the workshop location (UL, FGG). Until March 9th 2015 additional rooms (only single) were reserved also in Best Western Premier Slon Hotel. In case you prefer this alternative, please use the reservation form available in http://www.tu1404.eu/meetings. Be aware that road construction work in front of the Slon Hotel can be still carried out in April 2015.
The participants can also use other hotels if relevant.

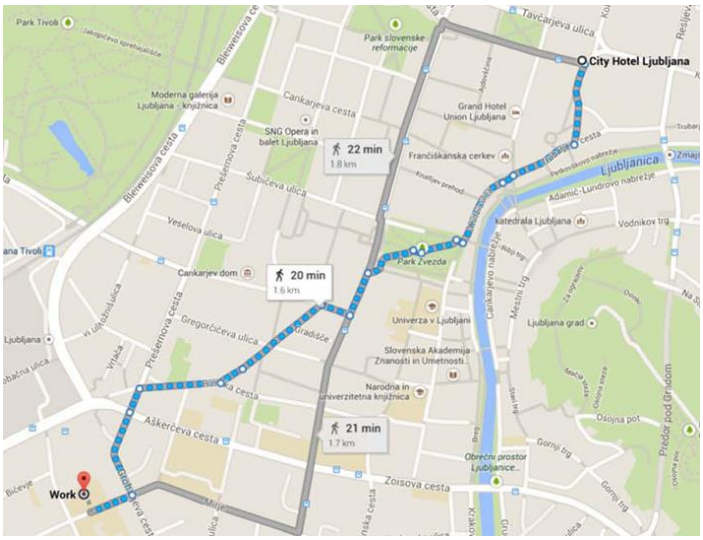

Figure 1. Walking from City Hotel to FGG.

2.5. IMPORTANT DEADLINES

Table 2.1 summarizes important deadlines. All the participants are kindly asked to respect these dates.

Table 2.1. Important deadlines.

Activity	Responsible	Deadline	Notes
Registration	All the participants	March 15th, 2015	See Section 3.1
Poster submission	All participants	March 30th, 2015	See Section 3.3
Presentation submission (1st submission)	GP leaders, other relevant speakers suggested by GP leaders, invited speakers	March, 30th, 2015	See Section 3.4

2.6. SCIENTIFIC COMMITTEE, ORGANIZING COMMIITTEE, WORKSHOP SECRETARIAT

2.6.1. SCIENTIFIC COMMITTEE

An executive scientific committee consisting of the Action's Core Group (refer to the Table below and Core Group) and an enlarged scientific committee consisting of all MC members (refer to MC members) are defined.

Table 2.2. Executive scientific committee of the workshop.

Name	Surname	Organization	Position in COST TU1404	e-mail
Miguel	Azenha	Univ. Minho	Chair	miguel.azenha@civil.uminho.pt
Stephanie	Staquet	Univ. Libre de Bruxelles	Co-chair	sstaquet@ulb.ac.be
Dirk	Schlicke	TU Graz	General Secretary	dirk.schlicke@tugraz.at
Gregor	Trtnik	Igmat	Leader of WG1	grega.trtnik@igmat.eu
Marijana	Serdar	Univ. Zagreb	Co-leader of WG1	mserdar@grad.hr
Mateusz	Wyrzykowski	EMPA	Leader of WG2	mateusz.wyrzykowski@empa.ch
Farid	Bendoudjema	ENS CACHAN	Co-leader of WG2	farid.benboudjema@ens-cachan.fr
François	Toutlemonde	IFSTTAR	Leader of WG3	francois.toutlemonde@ifsttar.fr
Terje	Kanstad	NTNU	Co-leader of WG3	terje.kanstad@utnu.no
Violeta	Bokan Bosiljkov	Univ. Ljubljana	STSM	violeta.bokan-bosiljkov@fgg.uni-lj.si

2.6.2. WORKSHOP SECRETARIAT

Name	Surname	Organization	Position in COST TU1404	e-mail
Kinda	Al Mansour Kranjec	Igmat	-	kinda.a.kranjec@igmat.eu
Sonia	Esteves	Univ Minho	Secretary of Grant Holder	sonia.esteves@civil.uminho.pt info@tu1404.eu

3. HOW TO PARTICIPATE

3.1. REGISTRATION

Potential attendants are kindly asked to make early registration (please refer also to section 3.2). **Deadline for registration is March, 15th, 2015.** All the participants are kindly asked to use the online Registration Form.

Each team (i.e. each lab, organization, etc.) are supposed to actively participate to the workshop by preparing two posters:
(1) Poster 1: Institution description
(2) Poster 2: Research related poster
Instructions for preparing posters can be found in section 3.3.

Please note: Each institution has to prepare only one poster of type 1 – strong communication and cooperation between attendants coming from the same institution is therefore necessary in order to avoid duplicate posters

3.2. FUNDING AND REIMBURSEMENT

COST organization provides certain amount of financial means for organizing such meetings. An estimated budget of 700 EUR per person allows approximately 55 participants to be reimbursed. This includes for example accommodation costs, meals, transport expenses, etc. For more information about travel reimbursement request please visit the following webpage.
Since Core Group of the Action, GP leaders, and invited speakers are automatically included, a limited number of additional participants will be reimbursed due to the limited financial means provided by COST Association. Remaining seats for reimbursement will be given to highly suitable applicants and early applications will be treated preferential.

3.3. INSTRUCTIONS AND TEMPLATES FOR POSTERS, BEST POSTER AWARD

3.3.1. GENERAL INSTRUCTIONS AND TEMPLATES FOR PREPARING POSTERS

Poster authors must be available at their posters during poster session's (please refer to workshop programme). All posters have to be prepared in **A1** format (portrait orientation). **The participants are kindly asked to use the templates available at http://www.tu1404.eu/meetings in order to ensure adequate coherency.**
The following guidelines may also be helpful in the preparation of the posters:

- Use a large font size, and bullet your major points. Font size of no less than 28 is preferable. Please use of the following text styles: Arial, Times New Roman, Calibri, Trebuchet.
- Keep the text to a minimum - most posters contain far too much text.
- Attractive charts, tables and graphics will greatly increase the effectiveness of any poster. Illustrations and tables should be kept relatively simple to maximize legibility. Avoid "artsy" style and keep captions brief.

- Lines in graphs should be heavy. Choose colours that are easily distinguishable from one another. Symbols, letters and numbers should be large enough to be seen from a distance of six feet.
- If possible, please arrange information in vertical columns rather than horizontal strips.

3.3.2. SPECIFIC INSTRUCTIONS FOR PREPARING POSTER 1 – INSTITUTION DESCRIPTION

The objective of this poster is to present your institution (lab, research organization, institute, etc.). This is necessary to know each other a little bit better which is essential to achieve quality collaboration between the institutions included in the Action. Therefore, these posters have to include mainly:

(1) basic data of the organization including gender balance, number of young scientists and researchers, etc.,
(2) main research equipment and testing techniques used to evaluate properties of cement based materials and concrete structures,
(3) a list and (if possible) very brief presentation of potential self developed advanced testing techniques used to evaluate properties of cement based materials and concrete structures,
(4) a role of the institution in this COST Action,
(5) others.

3.3.3. SPECIFIC INSTRUCTIONS FOR PREPARING POSTER 2 – RESEARCH POSTER

The objective of this poster is to give the attendants an opportunity to present their recent and/or most important research achievements related to the COST Action TU1404. These posters may include for example:

(1) presentation of potential self developed advanced testing techniques used to evaluate properties of cement based materials and concrete structures,
(2) presentation of recent and/or most important scientific/research projects related to the COST Action TU1404 (e.g. PhD project, postdoc projects, etc.),
(3) a list of recent and/or most important scientific/research papers related to the COST Action TU1404,
(4) possible open positions for STSM,
(5) others

3.3.4. BEST POSTER AWARD

A special award will be given for the best research oriented poster (type 2) and two honorary awards will be given. In order to select the best posters, the following main criteria are taken into account:

(1) Scientific relevance in the scope of TU1404
(2) Originality, appearance of the poster and presentation quality
(3) Voting on behalf of all participants (see workshop programme)

Awards for best posters will be announced during the common diner at the evening of 16th April.

3.4. INSTRUCTIONS AND TEMPLATES FOR PRESENTATIONS

The participants are kindly asked to use the presentation templates available at http://www.tu1404.eu/meetings in order to achieve some degree of coherency.

3.5. COPYRIGHT AGREEMENT, ISBN E-BOOK

The participants are kindly asked to accept copyright and publishing rules in order to allow Workshop organizers to publish and disseminate their posters and presentations. This is determined by ticking off a specific paragraph provided in the online Registration Form.
In order to disseminate some posters and presentations, an ISBN indexed E-Book will be published after the Workshop.

4. SOCIAL EVENTS AND LOCATION DETAILS

4.1. SOCIAL EVENTS

4.1.1. TOUR AROUND LJUBLJANA

In addition to the scientific events, some social events are also planned. A short tour around Ljubljana with a professional guide will be organized at the end of the first day which will take us about one hour. Please refer to section 4.2.1 for more information about Ljubljana.

4.1.2. VISITING MAIN LABORATORY OF UL FGG OR LABORATORIES OF IGMAT

On the basis of the time available, a brief guided tour to the main laboratory of UL FGG or main laboratories of Igmat will be also organized. Please refer to the following sections for more details about UL FGG and Igmat.

4.2. LOCATION DETAILS

4.2.1. ABOUT LJUBLJANA

Ljubljana, the capital of Slovenia, is a relatively small city (with a population of around 300.000) but pretty, easy to get around, full of surprises, and full of attractions. While during winter it is its dreamy central European character that prevails, during summer it has a relaxed Mediterranean feel to it. It is remarkable for its rich tradition, youthful vibrancy, cultural creativity, feel for entertainment, and numerous green spaces.

Ljubljana has preserved evidence of all the five millennia of its history, including, among others, the remains of the Roman city of Emona and the old city center with its medieval castle and beautiful buildings with Baroque façades, decorative portals and uneven roofs. Other significant bits in the mosaic of Ljubljana are its picturesque bridges across the river Ljubljanica and its vast Tivoli park, stretching into the very city center.

In the second half of the 20th century, it was the world famous architect Jože Plečnik that put an indelible personal stamp on his native city, and the so called Plečnik's Ljubljana ranks among the 20th century's most prominent total works of art. Ljubljana's appearance was further shaped by Plečnik's pupils and a whole new wave of renowned young Slovenian architects.

Ljubljana is a vibrant center of creativity where cultural activity has become a way of life. It boasts one of the world's oldest philharmonics. Each year it host more than 10,000 cultural events, from prestigious music, theatre and art events to those pertaining to alternative and avant-garde culture.

Ljubljana's surrounding areas, packed with natural beauty and cultural sights bearing witness to the city's dynamic history, are well known for their walking, hiking and cycle trails and traditional culinary delights. As distances within Slovenia are short, Ljubljana is a perfect base for exploring Slovenia's diverse beauty. Within a single day you can visit the coast and high mountains and experience the Mediterranean, Alpine and continental climate.

4.2.2. ABOUT UL FGG

University of Ljubljana was founded in 1919, which makes it the oldest university in Slovenia. At that time it consisted of 5 faculties: Faculty of Arts, Faculty of Medicine, Faculty of Law, Faculty of Theology

and Technical Faculty. Within the Technical Faculty the Department of Civil Engineering found its place. Today the University of Ljubljana consists of 3 academies and 23 faculties, among them also Faculty of Civil and Geodetic Engineering.

There are about 45,000 students currently studying at the University of Ljubljana within over 300 different undergraduate and postgraduate study programs, which places it among the largest universities in Europe. The University of Ljubljana is renowned for its quality social and natural sciences and technical study programs, structured in accordance with the Bologna Declaration. Its projects keep pace with the latest developments in the areas of arts, sciences and technology at home and abroad. In 2014, the University ranks among 500 best universities in the world according to Academic Ranking of World Universities (ARWU – "Shanghai ladder") and top 4% of European universities.

The Faculty of Civil and Geodetic Engineering (hereinafter: UL FGG) provides as its basic mission undergraduate and postgraduate education according to the needs of the Slovenian economy from the areas of civil engineering, geodetic engineering, water management and environmental engineering.

The Faculty has good 1000 students studying in 5 undergraduate, 5 graduate and 1 doctoral programmes. The Faculty employs close to 200 full-time employees, over 90 of them are academic staff. Beside the main education activity the Faculty's employees are also involved in research and professional activity. Additional information are available in Slovenian and in English on the UL FGG web pages.

4.2.3. ABOUT IGMAT

Igmat Building Materials Institute (www.igmat.si) is the biggest private owned institute registered for testing and certification of building materials. It employs 40 highly qualified experts with long-term experience. Our central laboratory is located in Ljubljana and there are also several smaller labs located on all major construction sites around the country. We started more than 50 years ago and have developed into an independent, highly qualified institution for building materials quality control and civil engineering. Our accreditation is SIST EN ISO/IEC 17025 in SIST EN ISO/IEC 17065. Moreover, we are a notified body for Construction Products Directive of the Council of Europe.

Igmat possesses the following six main departments: (1) Asphalt Department, (2) Concrete Department, (3) Waterproofing Department, (4) Department for Geomechanics, (5) Department for Information Technologies, (6) Research Department.

WWW.TU1404.EU