CONCLUSIONS

STARTCON19
International Doctorate Students Conference
+ Lab Workshop in Civil Engineering

University of Beira Interior, Covilhã, Portugal
Venue: Room 8.1 - Faculty of Engineering
26 - 28 June 2019
VENUE
The University of Beira Interior (UBI) hosted the first edition of the International Doctorate Students Conference + Lab Workshop in Civil Engineering (STARTCON19), held at the Faculty of Engineering from 26 to 28 of June 2019. The conference was organized by the Scientific Committee of the PhD Course in Civil Engineering of the UBI with the support of the Department of Civil Engineering and Architecture (DECA).

The STARTCON19 had the participation of a relevant number of young researchers coming from national and international universities and research centers. The event allowed establishing an international platform for exchanging ideas and latest achievements in several areas of civil engineering and related areas, which can be use by young researchers for building up valuable networks for further collaboration.

PARTICIPATION OF COMPANIES AND THE MUNICIPALITY OF COVILHÃ
Several public and privates companies, as well as Portuguese Municipalities, have been supporting the Doctorated Course in Civil Engineering and several experimental work have been developed in infrastructures of these companies.

The conference had the participation of the Municipality of Covilhã, Águas da Covilhã EM, Beralt Portugal, Minas da Panasqueira and ICOVI EM, which have encouraged the young researchers to continue engaging in RD projects with companies. The municipality of Covilhã provided a reception and cocktail for the participants in the conference, encouraging them to continue working with the municipality.

WORKSHOP
A Workshop on “Waste-based CO₂ cured concrete and building materials” was setup in the 26th of June afternoon, allowing young researchers to prepare specimen for testing, consisting on mixing, moulding, compacting and submitting to CO₂ curing, for a specific short period of time, different mortar and concrete specimens, produced using a very fine powder waste steel slag as binder. Several mix compositions were used, and different specimens
were produced with different water content and compacting pressure to demonstrate its influence on the final compressive strength.

Results obtained during the laboratory workshop shown the feasibility to obtain building materials (mortar and concrete) using steel slag as binder and cured with CO₂, when compared with materials made with the same mixtures where Portland cement was used instead. Additionally, during the workshop, the researchers could verify that by changing the water content and the compacting pressure it influences the final compressive strength. This workshop was also served to enhance that the use and mineralization of CO₂ can be considered one of the most promising strategies to remove (or stop emitting) CO₂ and contribute to limiting global warming. These results show the potential of carbonated slag as a substitute for Portland cement for structural purposes, whether for prefabricated building elements or normal or high strength concrete structures. This technology has enormous potential for prefabrication of building materials and can be applied to all prefabricated building materials (e.g. blocks, tiles, lanyards, veneers and panels, among many others).

TECHNICAL SESSIONS
The technical sessions included eight sessions with the proposed works. A total of 26 works have been submitted, but only 21 works were orally presented at the conference. A total of 25 papers have been sent for a reviewing process to the members of the Scientific Committee (two reviewers for each paper), in order to evaluate the feasibility of being published in the conference proceedings.

The proposed works cover the areas of technologies and management, construction materials, energy and sustainable buildings, environmental sanitation, geotechnics, hydraulics and water resources, structures, roads, transports and urban and planning.

In the area of Construction there was works on methods of prompt quality assessment in rehabilitation projects and how they answer to the challenge of quality-assurance in building rehabilitation actions under different climate scenarios, evaluation of the importance of the directives creation for the evaluation of the buildings envelope conditions in condominium regimes, and the characterization of traditional buildings in the Gorongosa National Park. Other works included the analyse of the implementation of the standard performance in
Brazilian construction companies, and the proposal of a methodology for technical inspection and rehabilitation intervention in multi-family building of the 60’s. A multivariate data analysis of thermal performance in buildings, exploring the relationship between solar orientation, age and energy performance was presented in the area of *Energy and Sustainable Buildings*.

A work on numerical study of the effect of Vortex-Induced Vibrations on a circular cylinder mounted under elastic support for energy production was presented in area of *Hydraulic and Water Resources*. In the area of *Environmental Sanitation* there was works on evaluating the impact of pavements materials in the rain water quality during surface runoff and infiltration, and on the assessment of the levels of Cesium-137 at the water and sediments of the Rochedo dam (Goiás, Brazil), 31 years after the occurrence of a radiological accident.

The area of *Materials* gave us preliminary results on the effect of glass powder at early age compressive strength and its effect at strength retention coefficient after water immersion on magnesium silicate hydroxide cement pastes on carbonation curing. Another works shown results of studies on the effect of the increasingly compressing pressures on the properties of the low liquid-to-solid (L/S) ratio binary alkali-activated binders, the effect of the activator/precursor ratio on the rheological properties of alkali-activated pastes, the feasibility of using a calcined iron or overburden as precursor of alkali-activated binders, and the production of alkali-activated foams with low thermal conductivity.

In the area of *Structures*, there was an work on the application of the Rotating-Angle Softened Truss Model (RA-STM) in reinforced concrete and prestressed concrete membranes, including considering model changes for a better understanding of the influence of concrete in tension, the effect of shear combined with axial forces and cyclic loading, and the use of energetic criteria.

The areas of *Transports* and *Urban and Planning* brought works on good practices of bicycles use as soft mobility solution in mountain cities, and the use of WebGIS as a skill to ensuring the effectiveness of planning process, comprising e-Platforms of transferring accurate knowledge about the urbanization and building rules. Other works included the proposal of a methodology to carry out strategies and to pursuit strategies of rethinking informal housing settlements, the development of a set of good practice guidelines for the informal city regeneration (with a case study in East Timor), and the definition and design of cycling networks at hilly cities.
A proposal for pavement maintenance management system for an airport in Cape Verde, which uses GIS tools, was presented in the area of *Roads*.

In the area of Geotechnics there was works on a conceptual geohydraulic model developed for the management of the underground hydric resources of Meda municipality, a map methodology developed for identifying the degree of granites’ alteration, using cartographic data from open platforms combined with free SIG software and open code, and a proposal for rockfall hazard and risk assessment at the Algarve rocky coast.

**PUBLICATIONS**

After the reviewing process is finished, the reviewed papers will be published in the conference proceedings organized by Knowledge E, which will provide the following Crossref services: issuing DOIs, Crossref Similarity Check and CrossMark to the published proceedings. All papers will be subject to a round of copy editing. Conference papers will be available worldwide and indexed to the following databases: Google Scholar, Microsoft Academic Research, Crossref database, Directory of Open Access Resources (part from ISSN organization), Web of Science-Clarivate Analytics (formerly Thomson Reuters & ISI) and Scopus Elsevier.

List of papers sent for the reviewing process:

- Prompt quality assessment methods for rehabilitation projects: a contribution for the state-of-the-art  
  Catarina Mouraz, José Mendes Silva

- Constructive retrofit guidelines for social housing buildings in Beira Interior region, Portugal, for actual and future climate scenarios  
  Pedro Brandão, João Lanzinha

- A numerical study of the effect of Vortex-Induced Vibrations on a circular cylinder mounted under elastic support  
  Hugo Canilho, Cristina Fael, José Páscoa

- Early age compressive strength of waste-based-glass-powder magnesium silicate binders on initial carbonation curing  
  Erick Soares, João Castro Gomes

- Low Liquid-To-Solid ratio of mining waste and slag binary alkali-activated material  
  Naim Sedira, João Castro Gomes
The effect of activator/precursor ratio on the rheological properties of alkali-activated mining waste mud paste
Abdelhakim Benhamouda, João Castro Gomes, Luiz Oliveira

Contributions for conceptual geohydraulic model of the underground hydric resources of Meda municipality
Pedro Ferreira, Luís Ferreira Gomes, Alcino Sousa Oliveira

Analysis of the implementation of the Standard Performance ABNT NBR 15,575/2013: a case study with Brazilian constructors
Fernanda Silva Moreira, Rafaela Fujita Lima, Luís Felipe Cândido, João Lanzinha

Multivariate data analysis of thermal performance of Portuguese residential building stock
Rita Andrade Santos, Inês Flores-Colen, Nuno Vieira Simões, José Dinis Silvestre

Proposal of methodology for technical inspection and rehabilitation intervention for multi-family buildings of the 60's in Portugal
Inês Marcelino, João Lanzinha

Cycling mobility in slopping cities: Trondheim and other lessons
Isabel Matias, Ana Virtudes

Smart urban planning at local scale: e-master plan
Olga Gonçalves, Ana Virtudes

Housing planning for informal settlements: Pante-Macassar (East Timor)
Ana Santos, Ana Virtudes

The importance of the directives creation for the evaluation of the buildings envelope conditions in condominium regime inserted in a technical management model
Vitorino Neves, João Lanzinha

Evaluation of metals leaching in permeable asphalt pavement and conventional asphalt pavement
Márcia Afonso, António Albuquerque, Cristina Fael, Marisa Dinis-Almeida

Constructive characterization of Gorongosa National Park villages
Michael Mendes, Ana Ferreira, Dinis Gardete

Making cycling’s spaces in hilly cities
Isabel Matias, Bertha Santos, Ana Virtudes

Softened Variable Angle Truss Model (RA-STM): model description and refinement/optimization proposals
Benedito Filho, Luis Bernardo, Bernardo Horowitz

Rockfall hazard and risk assessment at the Algarve rocky coast
José Viegas, Luis Pais, Jean-Pierre Gonçalves
Proposal of an airport pavement maintenance management system for Cape Verde
Débora Lima, Bertha Santos, Pedro Almeida

Elaboration of geotechnical thematic maps in urban areas
António Monteiro, Luís Pais, Carlos Rodrigues

Stress-strain relationship in homogeneous and two-layered specimens
Gabriel Oliveira, Isabel Falorca

Use of iron ore overburden as a precursor for the synthesis of an alkali-activated binder
Marina Filizzola Oliveira, Naim Sedira, Ana Cláudia Guimarães, Fernando Lameiras, João Castro Gomes

Monitoring of reinforced concrete for decision support in maintenance management systems
Pedro Romano, João Castro Gomes, Paulo Brito

Development of porous tungsten mud waste-based alkali-activated foams with low thermal conductivity
Imed Beghoura, João Castro Gomes

FINAL REMARKS

The first edition of the International Doctorate Students Conference + Lab Workshop in Civil Engineering (STARTCON19) was a success. It joined dozens of young researchers from different areas of civil engineering and related areas, which shared information on their research works and established links for further collaboration. The laboratory workshop that was held in the first day, before the conference started, was important for young researchers start to know each other.

The success of the STARTCON19 conference is thanks to the support of the DECA and the involvement of the Scientific Committee of the PhD Course in Civil Engineering (Organizing Committee), international Scientific Committee and Secretariat of DECA.

University of Beira Interior, 28 of June 2019

The Organizing Committee