MINUTES OF THE WORKSHOP ON RESILIENT LEVEES – 30 JUNE UNIVERSITY OF PISA (PACINOTTI ROOM – SCHOOL OF ENGINEERING, LARGO LUCIO LAZZARINO 1, PISA)

The morning session was opened by the presentation of the Pisa Unit. The post-doc Barbara Cosanti gave the presentation which mainly illustrated the research activities underway. These activities concerned the investigation criteria and tools for mechanical characterization of levee system, monitoring systems for the saturation degree of levees, full scale tests for overtopping and advanced methods for quality control of existing and new levees (more details can be found in her presentation).
Dr. Andrè Koelewijn gave a general overview of Deltares mission and structure. Deltares is located in Delft and Utrecht and was founded under Dutch law, with a staff of 840 people and an annual turnover of 113 millions euros. The main fields of expertise are Geotechnical Engineering, Hydraulic Engineering and Environmental Engineering. The presentation commented the main facilities, open-software, projects, collaborations and competitive projects of Deltares. The innovative technology for preventing piping phoenomena was in particular commented. Among the competitive projects it is worthwhile to mention: FloodProBe (2009-2013 in the framework of FP7; UrbanFlood (2010-2012) in the framework of FP7 as well as other projects in the framework of "critical infrastructures". Other details can be found in the ppt presentation.
Prof. Marcos Arroyo introduced UPC and CIMNE Barcelona. Unit. He pointed out the capability of that Unit in numerical analysis of complex physical phoenomena involving the air – water – soil interaction. Such a capability has been applied, in practice, for studying the behaviour of railway embankment and dam rockfill under various conditions (heavy rainstorm, evaporation, overtopping, seepage, etc.). Among the numerical tools, prof. Arroyo pointed out the Kratos framework providing details. Moreover he pointed out the capability of physical modelling (CEDEX, LIM, Altamira)
Dr. Giulia Bossi gave an overview of the research activities underway at the University of Padua and the collaborations with IRPI and public bodies. She mainly focused on the monitoring of the structural "Health" of levee systems and the capability of innovative monitoring systems. In particular the effectiveness of using (active or passive method) optical fibers was discussed. A case study concerning a 500 m long dyke, located in Salorno (BZ - Italy) and subjected to backward erosion piping was discussed (more details can be found in her presentation).
Prof. Krysztov Radzicki gave an overview of the Technical University of Cracow. He mainly focused on internal erosion phoenomena and monitoring systems with special attention to temperature sensors and their active/passive use. In particular he showed monitoring systems from single point measurement, till a quasi 3D system. Monitoring of vertical displacement by hydroprofile meter was also discussed. The main purpose of monitoring and numerical approach is to predict dimension of piping and backward erosion development from hydro - thermal field.

The afternoon session was opened by Prof. Antonio Viana da Fonseca. He gave a general overview of the University of Porto and of the Department of Civil Engineering with special attention to the Geotechnical and Hydraulic Laboratory and their more recent competitive projects. In particular the H2020 Hydrolab+ contract is worth of mentioning (overtopping measurement and analysis). The possible case study (Mondego River levee system) and potential contributions of the Porto Unit to the project were reconfirmed (more details in the ppt presentation). Prof. Viana suggested to consider the call KIC climate that have a project about flood.
Prof. Paola Rizzi gave a presentation of the University of L'Aquila Unit which consists of Hydraulic Engineers and Urban Planners. As for the Hydraulic Engineering the availability of large scale physical modelswas emphasized. Most of the presentation concerned some fundamental concepts for increasing the urban resilience. The proposal look at the resilience as an outcome and a process of disaster - preparedness and recovery. The presentation focused on post-tsunami and post

earthquake recovery. The dual space concept and active participatory design involving population were stressed.

After each Unit has completed the presentation (some discussion was allowed after each presentation), the afternoon brainstorming session started with an introduction of prof. Lo Presti. He summarised the possibilities of joint proposal for the next calls. In particular, the SC5 and SC7 of H2020 and PRIMA (2018-2028) calls were considered. SC7 focuses on critical infrastructures but levees are not considered as infrastructures and the last call was considering both natural hazards and cyber attacks. PRIMA is for Mediterranean countries and actually both the Netherlands and Poland are not supporting this call. SC5 has a specific call that could be considered.

LC-CLA-04-2018: Resilience and sustainable reconstruction of historic areas to cope with climate change and hazard events

Specific Challenge: European historic areas12 and their surroundings, both in urban and rural environments, are increasingly affected by climate-change and various natural hazard events. Increasing their resilience through 'preparedness' interventions and securing their sustainable reconstruction in case of damage or destruction is essential to preserve their identity and economic, social and environmental functionality and to seamlessly transmit their historic value to new generations. However, interventions in historic areas are quite difficult and hence costly due to specific characteristics associated with heritage sites (such as artistic values, denser urban fabric, higher vulnerability of materials and structures, difficulty in accessing the damaged areas, high symbolic values for communities involved, traditional lifestyles, etc.). Knowledge- and evidence-based resilience enhancement and reconstruction approaches are needed to increase the cost-effectiveness of such operations while at the same time rendering the historic living environments more resilient to future environmental threats. Scope: Actions should implement the principle of 'building back safer' in sustainable reconstruction where damage and/or destruction has occurred, rendering reconstruction and recovery an opportunity to increase resilience from a social, economic and environmental point of view. Furthermore, actions should:

- develop, deploy and validate tools, strategies and plans for disaster event preparedness;
- test and pilot novel cost-effective, resource and energy efficient solutions to enhance the resilience of buildings and whole historic areas to climate change related events and other natural hazards, while at the same time fully respecting the historic value of the reconstructed places;
- provide science- and evidence-based guidelines and models to local authorities for and for carrying out sustainable reconstruction within a participatory and community–based context, while adopting new governance and finance models;
- develop models to predict direct and indirect impacts of climate, global and environmental change and related risks on historic cities and settlements;
- review existing experiences and good practices in Europe and globally, and recommend how historic areas can be rendered more resilient and better prepared to face future disaster events.

The participation of social sciences and humanities disciplines such as architecture, archaeological sciences, cultural anthropology, law, economics, governance, planning, cultural and historical studies, is essential to properly address the complex challenges of this topic. Actions should cover various climate conditions and/or hazards relevant to different regions of Europe.

Actions should take into account activities addressed by other initiatives such as the EU Copernicus Climate Change Service and Copernicus Emergency Management Service, and provide added value. Actions should envisage resources for clustering with other cultural heritage relevant projects funded under previous, current and future Horizon 2020 calls within Societal Challenge 5. The Commission considers that proposals requesting a contribution from the EU of between EUR 5

million and EUR 6 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.
Expected Impact: The project results are expected to contribute to:

- enhanced resilience to climate change and natural hazards of historic areas;
- reduced vulnerability of historic areas to climate change and multiple hazards;
- improved reconstruction and economic and social recovery of historic areas by local
- authorities and communities through the use of new knowledge and tools.

Type of Action: Research and Innovation action

A debate among participants took place considering how much appropriate is the SC5 call as for the competences of the various Unit. It was concluded that such a call requires a non University beneficiary for each University partner. Therefore, within the end of July contacts with potential non – University beneficiaries should be under way with a preliminary positive answer. As for the hazards not only floods but also earthquakes should be considered.