IPL Project Annual Report Form 2017

1 January 2017 to 31 December 2017

1. Project Title (IPL-181)

“Study of Slow Moving Landslide Umka Near Belgrade, Serbia”

2. Main Project Fields

(1) Technology Development

Monitoring and Early Warning

3. Name of Project leader: Biljana Abolmasov, PhD

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Core members of the Project: Names/Affiliations

Svetozar Milenković, BSc, MSc, The Highway Institute Belgrade
Branko Jelisavac, BSc, MSc, The Highway Institute Belgrade
Uroš Djurić, PhD student, researcher, University of Belgrade, Faculty of Civil Engineering
Ass. Prof. Miloš Marjanović, University of Belgrade, Faculty of Mining and Geology
Ass. Prof. Marko Pejić, University of Belgrade, Faculty of Civil Engineering
Ass. Prof. Jovan Popović, University of Belgrade, Faculty of Civil Engineering

4. Objectives: (5 lines maximum)

The research objectives are directed towards continual monitoring of the proposed case study by combining different monitoring techniques. The ultimate goal would be aiding decision making and mitigation measures design for this particular case study.

5. Study Area: (2 lines maximum)

The study area is covering landslide Umka and surrounding area and it is located 25 km south west from Belgrade, Serbia.
6. Project Duration (1 line maximum)

Project duration - 2012-ongoing

7. Report

1) Progress in the project: (30 lines maximum)

Project IPL 181 – “Study of slow moving landslide Umka near Belgrade, Serbia” was approved in November 2012. Extensive archive documentation was collected from The Highway Institute as well as papers on Umka and Duboko landslides published on international and local scientific conferences. Results of field investigations and laboratory testing conducted in different phases were analyzed. Data from installed automated GNSS receiver, precipitation and Sava river level were analysed in parallel to these activities. Original paper submitted, accepted and published in Landslides Journal in 2015 (see references). Location of the GNSS sensor (object point) placed in the landslide body had to be changed after December 2013 due to the technical reasons and it was moved on nearby/ neighboring location after May 2014. Inclinometer case was installed in April 2017 and six series of measurements were performed, but due to unexpected construction activities inclinometers tube was broken in July 2017. GNSS sensor was moved from object point because of technical reasons (systematic error on modem). Precipitation data from Belgrade MMS and level of Sava River from a Beljin station are continuously collected throughout the entire period on a daily basis. Activities related to analysis of historical aerial photo images started in cooperation with Military Geographical Institute in May 2017, according to the Project Plan. Parallel to those activities analysis of Sentinel 1 and 2 satellite data was performed during September-December 2017. Additionally, data base of buildings and other constructions were established according to the field inventory and unified questionnaire form.

2) Planned future activities or Statement of completion of the Project (15 lines maximum)

Further research of the Umka landslide will focus on analysis of aerial photo and orthophoto images received from Military Geographical Institute (1959-2015), Sentinel 1 and 2 satellite data from 2015, and coupling the current surface monitoring GNSS system with additional near-real time inclinometer monitoring. This would support the geotechnical model and reveal the connection between ground displacement and actual displacement on the slip surface level. Finally, the continuation of the current monitoring campaign will further support the geotechnical model development and evaluation of the performed back analysis. For these activities it is necessary 12 months more. Additionally, PhD thesis for young researcher was defined and numerical simulation in Soil Vision software is planned for Umka landslide mechanism and dynamics, as well as quantitative landslide risk assessment for housing and transportation sector.

3) Beneficiaries of Project for Science, Education and/or Society (15 lines maximum)

a) Direct beneficiaries will be local community – owner and residents of the houses affected
by landslide Umka (about 1000 people)

b) Local and regional authorities – regional motorway is affected by landslide (about 10000 vehicles/day)

4) Results: (15 line maximum, e.g. publications)

The list of publications in the frame work the project is as follows:


– Abolmasov B., Pejić M., Šušić V. (2014). The analysis of landslide dynamics based on automated GNSS monitoring. Proceeding of the 1st Regional Symposium on Landslides in


Note:

1) If you will change items 1)-6) from the proposal, please write the revised content in red.
   Position - Core members of the Project
   We have changed one member Vladimir Šušić (PhD student) with Assistant Professor Miloš Marjanović, PhD, both from University of Belgrade, Faculty of Mining and Geology.
   Uroš Djurić changed job position - from Faculty of Mining and Geology to Faculty of Civil Engineering, both from University of Belgrade
   We added two new researches from Faculty of Civil Engineering, Department for Geodesy - Ass. Prof. Marko Pejić and Ass. Prof. Jovan Popović

2) Please fill and submit this form by 30 March 2018 to ICL Network <icl-network@iclhq.org>