IPL Project Annual Report Form 2014

1 January 2014 to 31 December 2014

1. Project Title

Study of slow moving landslide Potoška planina (Karavanke Mountain, NW Slovenia) (IPL-188)

2. Main Project Fields

Monitoring and Early Warning
Catastrophic landslides

3. Name of Project leader

Marko Komac, BSc, MSc, PhD

Affiliation: Assistant Professor, University of Ljubljana and University of Nova Gorica, both Slovenia;

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Core members of the Project: Names/Affiliations: (4 individuals maximum)
Tina Peternel, PhD student, young researcher, Geological Survey of Slovenia
Jernej Jež, BSc, MSc, PhD, Geological Survey of Slovenia
Blaž Milanič, BSc, researcher, Geological Survey of Slovenia
Mateja Jemec Auflič, BSc, MSc, PhD, Geological Survey of Slovenia

4. Objectives: (5 lines maximum)

The main objectives and actions are directed towards periodical monitoring of the landslide dynamic using different monitoring techniques. The main purpose of the periodic monitoring is to provide near-real time spatial and temporal measurements of the landslide dynamic and to ensure the continued assessment of the landslide activity. The goal is to improve our understanding of the causes of ground failure and to assess the dynamics of the landslide for the purpose of mitigation measures design for this particular case study.

5. Study Area: (2 lines maximum)

The Potoška planina landslide is located in the Karavanke mountain ridge (NW Slovenia), above
the village Koroška Bela.

6. Project Duration (1 line maximum)

3 years (2013 – 2016)

7. Report

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

Project “Study of slow moving landslide Potoška planina (Karavanke Mountain, NW Slovenia)” was approved in November, 2013. In this time period periodical monitoring system using different high resolution surveys techniques and in-situ measurements was established. The observation of landslide dynamics is a highly important task in the investigation and monitoring of landslides. To understand the specific sliding processes, the entire landslide extent, superficial displacement rates and changes in the surface topography of the Potoška planina landslide, we applied near-real time periodic monitoring system using different and independent survey techniques. First, the monitoring measurements were established at the lower part of the Potoška planina landslide, at its toe, which represents the most active part of the landslide. The dynamics of landslide within observation periods was estimated using two different and independent survey techniques, UAV photogrammetry using structure-from-motion (SfM) and multi view stereo (MVS) photogrammetric techniques and the tachymetric geodetic measurements. The upper part of landslide (at its minor scarp) has been investigated using terrestrial laser scanner (TLS). The purpose of the periodic monitoring was to provide spatial and temporal measurements of the landslide displacements and to ensure the continued assessment of the landslide activity. In the future, the periodical real-time monitoring of the study site will be continued using presented techniques, and sufficient data will be provided for the assessment of the behavior and dynamics of the landslide movements in the study site in relation to precipitation patterns.

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

The further activities will include the continuation of periodical monitoring of the Potoška planina landslide using different high resolution surveys techniques (e.g. TLS, LIDAR, etc.) and in-situ equipment (rain-gauge station). It would be also necessary to establish geotechnical measurement and monitoring system that would provide even better and more detailed assessment of landslide dynamics. Up to now we could not provide geotechnical measurements due to lack of funding.

Based on this activities the following research will be focus on correlation between amount of precipitation (provide by rain-gauge system) and landslide daily displacements (provide by GNSS antenna) to assess the precipitation/displacement relation. The second stage will be determination of failure mechanisms and analysis of dynamic of slope mass movements of the
Potoška planina landslide. One of the further research will focus on estimating the probability that the Potoška planina landslide may completely or partially mobilize to form debris flows.

3) Beneficiaries of Project for Science, Education and/or Society (15 lines maximum)
   a) Beneficiary is local community and inhabitants of Koroška Bela settlement that potentially could be threatened by the potential debris-flow.
   b) Public infrastructure: In case of debris-flow event also major railway line could be affected in addition to a local road and possibly also steel factory.
   c) A significant contribution in the fields of science:
      - to understand the dynamics and behavior of the slope mass movements of Potoška planina landslide and to emphasize the engineering geological aspect by evaluation of different techniques for monitoring landslide movements,
      - important contribution in the field of integration and comparison of obtained results/models using in-situ measurements, remote sensing techniques and terrestrial surveys techniques. Moreover the integration of 2-dimensional and 3-dimensional data will be carried out.

4) Results: (15 line maximum, e.g. publications)
   In the frame of ongoing project the following publications were published:

Note:

1) If you will change items 1)-6) from the proposal, please write the revised content in Red.
2) Please fill and submit this form by 1 March 2015 to ICL Network <icl-network@iclhq.org>