

Date of Submission	<u>30.12.2019</u>
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IPL Project (IPL - 238) Annual Report 2019
1 January 2019 to 31 December 2019

1. Project Number (approved year) and Title,

IPL-238 (2018) Landslides Threatening Russian Cultural Heritage Sites

2. Main Project Fields: Targeted Landslides: Mechanisms and Impacts

B. Landslides Threatening Heritage Sites

3. Name of Project leader: Denis Gorobtsov,

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Core members of the Project

Igor Fomenko – Ph.D., professor of engineering geological department of Russian State geological Prospecting University;

Daria Shubina – master, Senior Lecturer of engineering geological department of Russian State geological Prospecting University;

4. Objectives: Development and approbation of the landslides modeling methodology within historical natural-technical systems

5. Study Area: different objects of Russian cultural heritage, including UNESCO cultural heritage sites

6. Project Duration 3 years

7. Report

- 1) Progress in the project: After the project submission in December 2018, the project participants carried out a computer simulation and assessed the stability of the rock foundation of the swallow nest castle (Crimea). The results of this work supplemented the database required for systematization of information about landslides on historically important sites. Thus, the project participants completed the formation of the system of knowledge about the features of landslide development within the historical natural-technical systems, which was stated in the work plan. Some field works were carried out in May – August 2019. The article about landslides at historical sites of Moscow was presented on the ICL-IPL conference in Paris (September, 2019). In

November 2019 we presented an article on the project topic in all-russian engineering-geological conference.

Now we are processing the field data, performing reconstruction of the historical landslide process evolution on chosen landslide-hazardous sites, which are in Moscow, Moscow region, Nizhny Novgorod.

2) Planned future activities or Statement of completion of the Project

We plan to proceed the field works and collecting real data about current state of landslides hazardous slopes in historical natural-technical systems.

We plan to explain how the probabilistic analysis works in case of historical natural-technical systems, showing some examples of performed modelling.

3) Beneficiaries of Project for Science, Education and/or Society: Ministry of Culture of Russian Federation, Russian Orthodox Church, UNESCO

4) Results: Modeling and stability assessment of The Swallow's Nest castle rock foundation

Modeling and stability assessment of the slope in Lyalovo with the Church of the Nativity of the blessed virgin Mary

Creation of the registry of all landslide hazardous sites with cultural objects in Moscow.