IPL Project Annual Report Form 2011

1. Project Title: Landslide hazard zonation in Kharkov region of Ukraine using GIS

2. Main Project Fields: (1) Technology Development
   B. Hazard Mapping, Vulnerability and Risk Assessment

3. Name of Project leader: Oleksandr M. Trofymchuk, Grand Ph.D., Professor
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Core members of the Project: Names/Affiliations: (4 individuals maximum)
Iurii I. Kaliukh, Ukrainian State Research Institute of Building Constructions;
Michael G. Demchishin, Institute of Geological Sciences of National Academy of Sciences of Ukraine;
Evgenii O. Yakovlev, Institute of National Security Problems under Council of National Security and Defense of Ukraine;
Hanna S. Hlebchuk, Institute of Telecommunications and Global Information Space of National Academy of Sciences of Ukraine

4. Objectives: (5 lines maximum):
   The main goal is to develop the instrument for landslide hazard forecasting with the purpose of minimizing an impact of landslide activation on people and tangible objects including constructions, transportation services, pipelines etc.
   Objectives:
   (1) to determine the landslide-hazardous slopes over Kharkov region of Ukraine;
   (2) to develop a database containing the engineering-geological information relevant to descriptors (passports) of landslide sites;
   (3) to develop targeted GIS on landslides in Kharkov region.

5. Study Area: (2 lines maximum):
   Kharkov region, Ukraine

6. Project Duration (1 line maximum):
7. Report

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

The work plan for 2011 included the following types of activities:

1. A structure of the information system intended for landslide-prone slopes monitoring was designed, including development of the data base of landslide areas descriptors and target GIS.

2. Particularly the data base of Kharkov region landslide areas and precipitation data taken from regional weather stations was developed. The main goal of the developed data base is a supply of data for rapid risk assessment of landslide formation. This data base contains information about landslide plot location, main natural factors (geomorphologic conditions, geological structure, hydrogeological features, soil properties), main anthropogenic factors (cutting, load, water influx of a slope), geodynamic activity features, risk assessment, corresponding guidelines for slope stabilization and its engineering protection, meteorological data.

3. Fifty two landslide plot descriptors (passports) were worked up for Kharkov region.

4. Target GIS, which enable estimation of discrete natural and anthropogenic factor impact on landslide formation and expansion, detection of interrelations and expansion trends was developed based on performed data analysis. GIS includes multilayer information about Kharkov region, notably about relief, slopes steepness, drainage network, road network, landslide areas, seismic data.

5. The following maps of Kharkov region were worked up:
   - a map of the drainage network;
   - digital relief model;
   - a map of territory gradation according to slopes steepness;
   - a map of actual spreading of landslide plots;
   - a map of underflooding and location of landslide areas;
   - a map of territory seismic regionalization with a period of recurrence equal once in 5000 years for medium soil conditions and probability of exceeding of estimated intensity equal 1% during 50 years;
   - a map of landslide location relative to road network;
   - a sketch map of spacing among landslide plots and road network.

6. Diagrams of landslide density dependence on river network density, road network density, level of underflooding, and diagram of landslide plots quantity dependence on relief energy were constructed. There were established following interrelations: "landslide density – area underflooding", "landslide density – river network density", "landslides – slopes steepness", "landslides – tectonics", "landslide density – road network density".
7. There was prepared a report on the work done (final report on the project).

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

Work on the project (IPL Project #153- Landslide hazard zonation in Kharkov region of Ukraine using GIS) was successfully completed. A report and two articles, namely «Modelling of landslide hazard in Kharkov region of Ukraine using GIS» and «Mathematical and GIS-modeling of landslides in Kharkov region of Ukraine», were prepared based on work done.

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

Stakeholders are:
1. Government officers of the Kharkov local authorities including Kharkov Regional State Administration.
2. Government officers of the Ministry of Environmental Protection and its Kharkov Regional Branch.
4. Consulting engineers of the Kharkov City State Administration and District State Administrations.
5. Environmental NGOs.

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


