

Applications of LiDAR for Geohazard Inventory and Characterization

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DURATION: 4 hours (approximately)

TIME SCHEDULE: 9 a 13:00 hs.

ROOM: Atlantis

PURPOSE:

The use of Airborne light detection and ranging (LiDAR) surveys provides a quick and efficient solution to generating very high quality bare earth digital elevation models, even on steep slopes with dense vegetation cover. Acquisition of LiDAR is becoming standard practice on new pipeline development projects to aid in pipeline routing and design. A full appreciation of the power of LiDAR for geohazard inventory and risk management is still emerging in the pipeline industry.

The purpose of this half day workshop is to provide participants with an overview and understanding of how airborne LiDAR surveys can be used to facilitate the work typically performed to route a pipeline. The work shop will provide an oversight of the tasks that can be undertaken with the help of LiDAR and provide practical examples of its application to perform tasks such as detailed landslide inventory, morphological mapping, preliminary hazard prioritization, and change detection analysis. These results can feed directly into a geohazard management program, as part of an operator's pipeline integrity management program to be used during operation, and can improve route selection and planning of detailed investigations on new development projects. Participants will gain insight to LiDAR survey specifications and quality control procedures and how these will influence the quality and utility of the survey results. They will gain hands-on experience with landslide morphological mapping using LiDAR from Peruvian and North American projects. An introduction to the theory and applications of change detection analysis using repeat LiDAR surveys to map erosion and landslide movement will also be presented. An introduction to the value of combining LiDAR and In-line survey data for interpretation of landslide activity will also be discussed. Participants will also be introduced to the establishment of soil loading conditions for pipeline stress analyses.

EXPECTED PARTICIPANTS:

Geoscientists, geotechnical engineers and mechanical engineers who are responsible for landslide assessment, pipeline integrity management, and procurement and interpretation of LiDAR.

OUTLINE:

LiDAR Basics – what is it, how it is collected, and how the data is processed to generate DEMs Typical LiDAR acquisition specifications, and common errors in acquisition and processing.

Significance of landslides to pipeline integrity - pipeline loading conditions and failure rates Landslide inventory and characterization - landslide morphology, estimating age, depth, movement mechanism and movement vectors.

Preliminary ranking based on interpreted landslide activity and pipeline vulnerability criteria Change detection analysis - theory, applications and limitations.

Introduction to in-line survey data interpretation in landslide-prone terrain.