

Remote Observation and Surveillance Equipment (ROSE) for Landslides

Ridhima Dogra



Ridhima Dogra of Class VI from Sadhu Vaswani International School for Girls made the school proud by winning reputed INSPIRE-MANAK award for the year 2021-22 under the guidance and leadership of the Head of the School - Ms Santosh Vyas and Ms Yamini Bisht (PGT-Biotechnology). The motivation and support from Ms Vyas has been encouraging students to win this highly reputed award every year.

The reputed INSPIRE-MANAK award is one of the most popular and highly reputed award schemes, executed by the Department of Science and Technology (DST) with National Innovation Foundation – India (NIF). The aim of this scheme is to motivate and promote the best ideas and innovations (related to real-life problems of the community) designed and developed by students of Classes VI to X nationwide.

Ridhima Dogra observed the problem of unpredicted landslides in the hilly areas of Northern India, leading to loss of lives. She worked on unmanned remote monitoring and alerting systems for landslides and hence developed Remote Observation and Surveillance Equipment (ROSE) for landslides. She won a cash prize of INR 10,000 under the INSPIRE –MANAK award scheme for developing her project.

Objective

The project focuses on unmanned remote monitoring and alerting systems for landslides. This stand-alone system will predict landslides for better understanding of the phenomena and pass real time information to the Disaster Management Team for rescue at remote locations.

Introduction

Northern part of India is a hilly terrain and is one of the highest mountain ranges in the world and is prone to landslides. This is a young mountain range, thus there have been huge number of landslides. These mountain ranges are difficult to monitor for landslides and even more difficult to launch rescue missions on time. These landslides cannot be stopped; therefore, it is not humanly possible to watch critical areas and landslides. Therefore, there is a requirement of a stand-alone, Solar Powered and Interactive Data Collection System. This is being done by harnessing already developed technologies, like Solar Energy, Proximity Switches and available Communication Network. The project can help save human life from sudden landslides without any human interference, automatically.

Ms. Ridhima Dogra, Student of Class VI, Sadhu Vaswani International School for Girls, New Delhi, India

Materials Required

The materials for making this project are cheap and easily available. Following materials will be required for the working of the project –

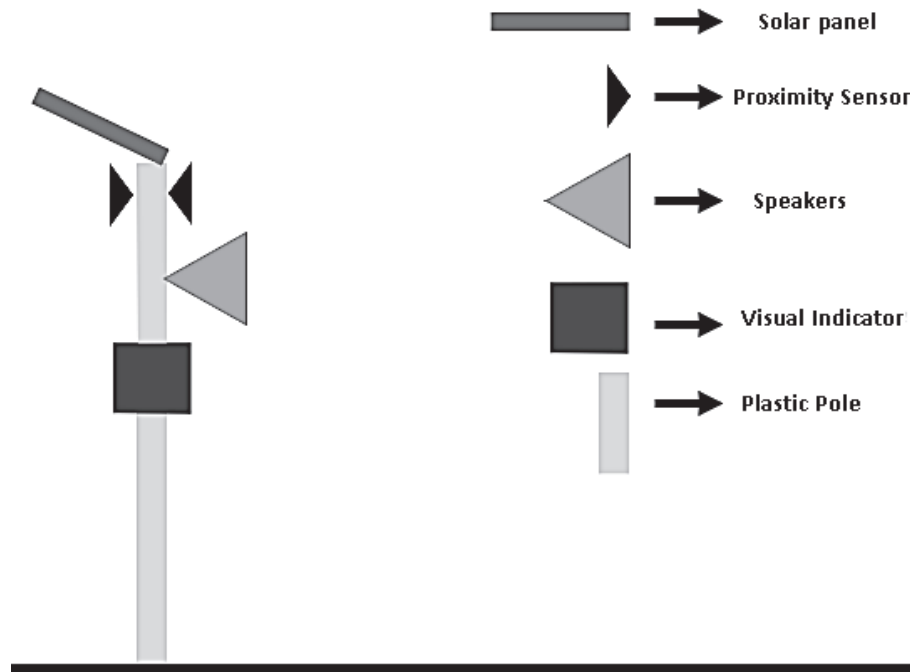
1. Plastic poles
2. Proximity sensors
3. Solar Panels
4. Cellular communication

Procedure

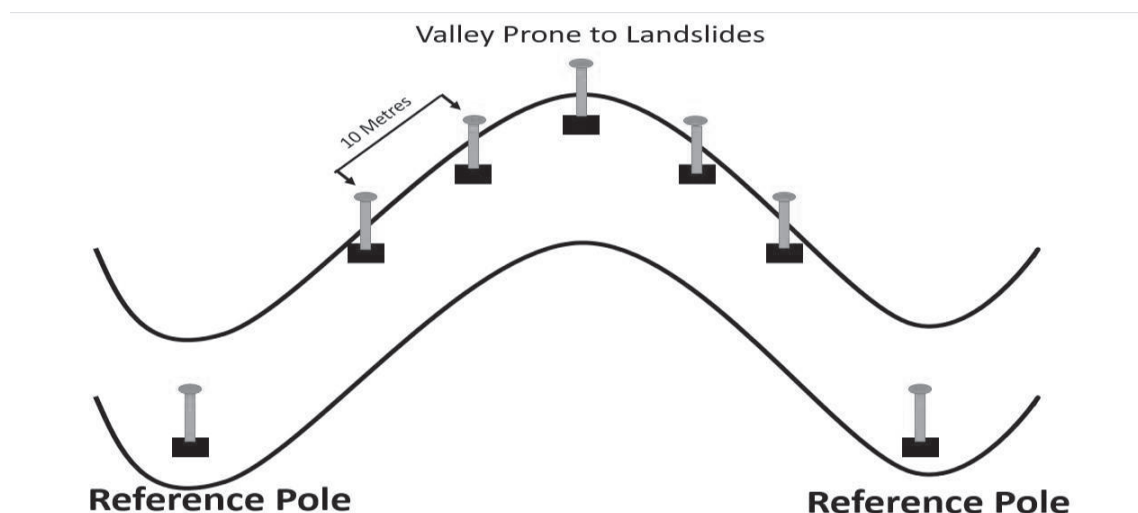
A particular area with high-risk zones will be identified. There would be two poles inserted for reference in the areas where landslides are not expected. In between of the reference poles, as per the capability of proximity switches, a number of similar poles will be installed. These poles will communicate with each other and the reference poles. The reference poles will collect data after a fixed interval of time. This data will be shared with a command centre in real time. In case there is a sudden large relative movement between the poles or the poles begin to move at the same time, then there will be an audio-visual alarm in the area and the same will be communicated to the rescue and rehabilitation centre of that particular area.

Construction

Pole construction:



Placement of poles: -



Data Collection

The data will be collected at a command centre from all the unmanned, stand alone, independent systems. The command centre can also store this data. This will help in analysing the categorization of zones against landslides. In case landslides are coming in the area then a software can help us to study the pattern of the incoming continuous landslides.

Utility of the Project

As the project is self-sustaining, it requires routine check-up/maintenance only; it can work without any help of humans. The requirement of the system is in remote locations where continuous supply of energy may not be available or may not be economical, so it is proposed that—

The electric supply/energy supply for the project is based on Solar energy. As nowadays, mobile data connectivity is available everywhere in India, therefore, communication with the command centre will not be a hindrance to the project. It will save lives and property and provide treasure of data for future studies.

Cost Effectiveness

Easily available Solar Panels, Small batteries, cheap mobile data, no use of manpower and low maintenance cost; all these features of the project make it cost effective.

Conclusion

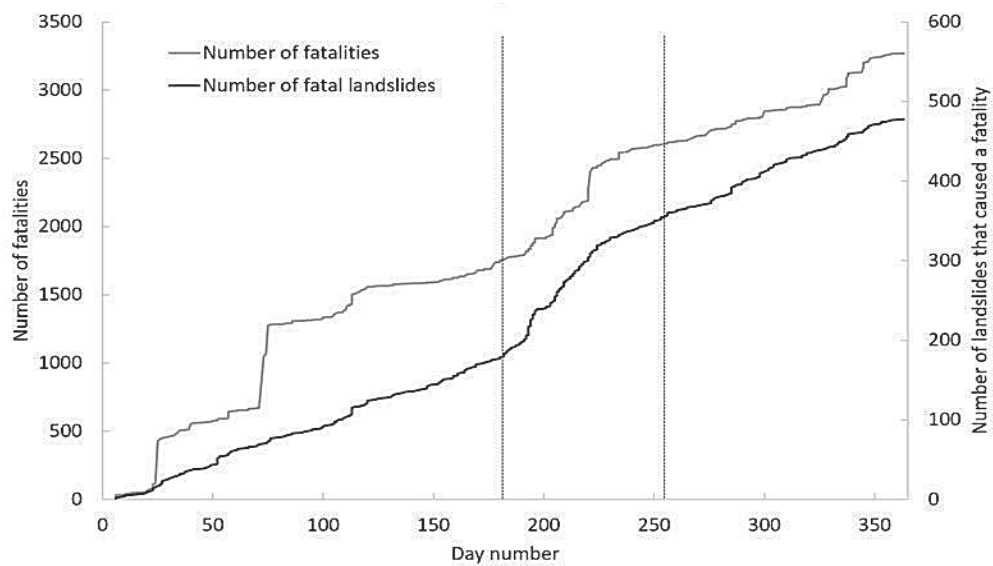
The project concludes that it can help in rescue and rehabilitation missions. The project can also help in making timely preparations for the incoming disaster. By implementing this project, large areas can be monitored by a very small team of experts and can save manpower.

Further Research/Development of the Project/Model

The project's future use could be to analyse and predict the incoming landslides. Data collected, after being analysed, could help us to prepare for the incoming landslides and create structures that can help us to prevent extensive damage.

In future, more sensors can be added to study better about landslides

Usage of Charts/Diagrams



Number of Fatalities Worldwide Due to Landslides

