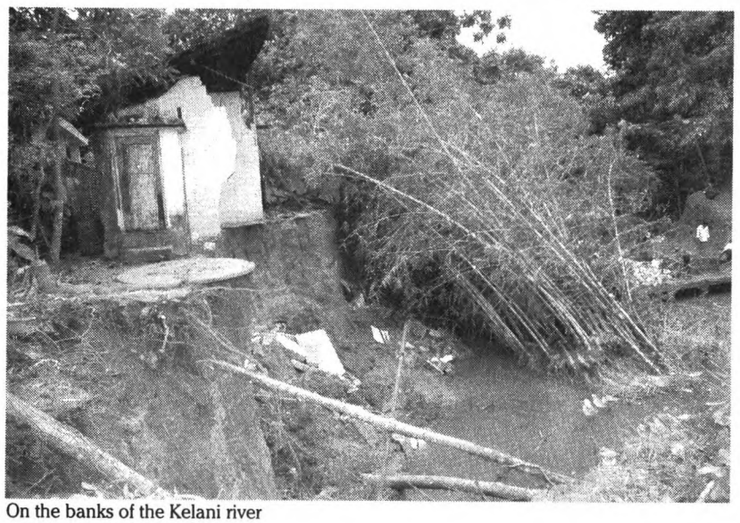
# Automated rain gauge

## Landslide Early Warning System





On the banks of the Kelani river

The frequent occurrences of natural disasters which beset the country recently demanded the need of improving disaster management and early warning systems for various disasters like tsunamis, earth quakes and landslides.

Apart from the catastrophic tsunami of 2004, recent landslides which occurred in the country caused heavy damage to public property and resulted in several fatalities. This emphasized the importance of having an early warning system for landslides, which could give an indication of the imminent disaster without any delay. Thus the setting up of an early warning system to minimize the effect of landslides was initiated by the National Building Research Organization (NBRO), Department of Meteorology, Disaster Management Centre (DMC).

The Landslides Studies and Services Division of the NBRO, after a long and laborious process has prepared the Landslide Hazard Zonation Map (LHZM) for the entire country.

The process was based on six key factors; i.e. geology, hydrology, slope, landform, land use and soil thickness and early landslides in an area. Using the LHZM the degree of the landslide hazard has been evaluated and the whole land area of the country has been categorized as High, Medium and Low hazard areas. The map could be effectively used for planning purposes, such as at the outset of a construction project. From the map the vulnerability of the area to landslide could be predicted and this information can be effectively used for decision-making.

Though the LHZM helps to decide the vulnerability for the landslides in an area it does not forecast a landslide. Much thought to this was given by the project team and after some deliberation, a dynamic computer modeling software or a computer model was created using the LHZM and it was decided to add a rainfall data layer overlapping the LHZM and forge a relationship between rainfall and landslide vulnerability of the area.

In implementing this step, the need of the hourly rainfall data arose. As the technical partner in the project the Electro Technology Section of the ITI researched, designed, and manufactured an automated rain gauge which not only table the rainfall data continuously but transmit the data to designated locations such as NBRO and Meteorology Department. The data collected from this device can be sent as a SMS message to these locations on an hourly basis. The Meteorology Department and NBRO are the base stations for collecting and storing this data. Any given base station capable of handling such data can receive data from many remote places at any given time.

The automated rain gauge designed is powered through the national power grid. In the case of a power failure, rechargeable lead-acid batteries allow the system to run smoothly for 3 days. Lightening and surge protection systems come together with the rain gauge as special features. The rain gauge monitors and reports on the rain rate as well as the total rainfall. This automated, low cost, reliable and sturdy rain gauge assures a trouble free operation and requires minimum maintenance.

With this model, landslides could be forecasted and warning could be issued to the people in the area. The ARGSoft software package used at base stations indicates the rainfall graphically for all five stations. Alerts will be generated automatically according to the threshold values given in order that necessary action could be taken. Usually a rainfall more than 70 mm in 24 hours is considered as the alert level of rainfall, and at or above 100 mm a landslide warning will be issued and at or above 150 mm the evacuation warning will be issued to the people residing in the vulnerable areas.

Presently a pilot project is being successfully carried out in the Ratnapura district and five automated rain gauges were installed in Kalawana, Deraniyagala, Peimadulla, Kahawatta and Elapatha areas. The project, which will cover the whole country, will be completed at the end of the year.

Presently the discussions are underway between the organizations concerned on various matters such as who will issue the warning to the people of the area and the logistics of initiating an alarm system.

The Meteorology Department has already commenced using the automated rain gauge and rainfall data is being methodically recorded. The versatiliy of the equipment indicates that it could be used for forecasting other disasters in addition to landslides, caused by heavy rain.

With the recent rains, an ideal opportunity arose to test the efficacy of equipment.

On 8th August the rainfall data obtained through the automated rain gauge was used to prevent floods, which could have occurred in Kalutara due to the heavy rainfall in Ratnapura. On this particular day the rainfall recorded a value above 100 mm and this information was communicated to the Met Department within a short time through this equipment. Due to the timely intervention of the officials of the Forecasting section of the Met Department who informed the DMC Kalutara district co-ordinator and the Irrigation Department, necessary action was taken to prevent flooding of the area by clearing the river mouth at Kalutara, and releasing the water to the sea..

This is a clear indication as to how the instrument could be utilized effectively. In addition to this, the Met Department also expects uses this facility to fine-tune their instruments such as Doppler radar, which are to be used in weather forecasting.

Currently a small version of this rain gauge and a fully sophisticated weather station is under development to collect weather data for various applications in agriculture, irrigation and environment monitoring.

*-Source: ITI*

Sunday Observer - 16th of March, 2008