



## Some issues and concern from 2013 rockslide disaster at Laipuitlang, Aizawl, Mizoram, India

Lalrokima Chenkual

*Disaster Management Centre, Administrative Training Institute, Aizawl 796001, India*

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### ABSTRACT

An abrupt rockslide on 11 May 2013 (Saturday 3:24 a.m. IST) forced a series of building collapse at Laipuitlang locality, Aizawl, Mizoram, all the way down to Ramhlun Venglai locality covering an area of about 1025 sq m, which have been very high landslide prone regions of Aizawl. The tragedy caused 17 casualties, injuring 8 persons from the collapse of 15 houses. The colossal damage could have been due to a combination of the soft and high porous rock bedding, the steep slope, heavy rainfall, thunderstorm, anthropogenic destruction of the rock bed and overweight constructions. The study brings out some issues and concerned arising from the incident and management of the situation from the angle of disaster management.

**Key words:** Disaster; landslide; anthropogenic; management.

### INTRODUCTION

On 11 May 2013 (Saturday) early morning around 3.24 a.m., a rockslide occurred at the confluence of Laipuitlang and Ramhlun Venglai locality located between 23°44'60" N & 92°43'16" S, i.e. at the eastern side of Aizawl, Mizoram, at 1120 m above mean sea level. 17 people died and 8 were rescued by the State Disaster Response Force. The rockslide completely destroyed 15 houses (7 RCC buildings and 8 Assam type buildings) including community hall

*Corresponding author:* Chenkual  
 Phone: +91-9436195861  
 E-mail: [kimamizo@gmail.com](mailto:kimamizo@gmail.com)

and an evacuated 4 storeyed RCC building of Public Works Department (PWD) of Mizoram. 17 vehicles, including 8 four-wheelers were buried under the debris.

Though benumbed at the colossal damage to lives, assets and livelihood at the initial stages, the state government quickly responded to the events and the people rallied behind the responders and the affected people in dealing with the situation. The papers is not only about mere recollections of the disaster but focus on the insights, lacunae, issues and concerned from the incidents so much so that the lesson learns were not forgotten and the mistakes not repeated in the future, thus providing scope for improve-

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Figure 1. Site and extent of rockslide at Laipuitlang, Aizawl, on 11 May 2013.

ment in the management aspect.

## **GEOLOGY AND HISTORY**

The area falls under Middle Bhuban Formation of Surma Group (Miocene to Upper Oligocene) of deltaic complex. The main rock type was soft sandstone intercalated by siltstone. The thickness of the rock bed was about 3 m, which is highly weathered and covered by thin soil. The general strike direction of the area was N45°E, and N40°E, and dip amount are 43° and 47° towards east respectively. The general slope of the ruptured surface was 48°. Groundwater was harvest at the toe region which was utilized even during dry season. Spring water was also occurred at the southern side of affected area along the Tuikhurhlu stream.

The area had experienced huge rockslides in 1957 and 1968 after unsafe cutting of rock bed for quarrying. Mizoram Remote Sensing Application Centre (2011) put this area as 'Very High' in hazard class at Micro Level Landslide Hazard Zonation Mapping of Aizawl City. On September 2012, after heavy rainfalls of about 2064 mm, cracks were observed at the rock bed and soil, retaining walls and State PWD owned RCC building which stood on top of the hillside (at the crown along the Laipuitlang road) had shown visible cracks following which it was declare unsafe and recommended for demolition. The building was thus vacated and 9 other families in the vicinity also vacated their dwelling, and steps are taken to demolish the building. But, before demolition works is carried out by the department and the contractor, the building slide down with the rock bed taking the other buildings down and thus cause the disaster.

## **CAUSATIVE FACTORS**

The major cause behind the instability of the area lies in the geology and tectonic structure mixed with anthropogenic activities. Due to the unfavorable geological conditions (favorable for landslide ?), steep slope and immature rock –

lithology, structure, heavy rainfall and series of severe storms accompanied by gales (just before and during the incidence), seepage of water from the surrounding area, absence of proper drainage system, unsafe cutting of rock bed at the toe region which decreased resisting force and, increased force of gravity of the unstable rock volume by huge 4-storeyes RCC buildings can be cited as the caused of disastrous rockslide. The colossal damage was triggered when a massive 4 storied concrete building of SPWD collapsed and slid down a hillside, destroying houses, including the local community hall, on its way down.

Survivors of the tragedy said they heard a loud cracking sounds a few minutes before the landslide, but many of them did not have a chance to flee as they were just waking up from deep sleep. The torrential rains, accompanied by strong winds also made it difficult for them to flee the buildings. Personnel of the State Disaster Response Force were engaged in around-the-clock rescue operations since early morning while inclement weather has hampered rescue works.

## **SOME LESSONS LEARNT**

1. Landslide, a natural phenomenon, becomes complex because of interplay of various natural (both inherent and external factors) and anthropogenic factors, such as improper land use, interference of infrastructure developmental activities etc. Landslide incidents are more prominent during the rainy/ monsoon season as the soil structure gets soften by heavy and continuous downpour, especially of high degree of slope. As such, rainfall threshold studies need to be undertaken. To prevent the occurrence of landslide, it would be logical to take steps which would counter the effects of the factors responsible for landslide occurrence.

2. Hazard zonation mapping and detailed geological and geotechnical studies of Aizawl city and other major town need to be undertaken. House pass/LSC may be issue and allotted considering the hazard, risk and vulnerabil-

ity of the area. Building regulation must be framed based on micro landslide zonation accordingly. Site development and slope modification work must be undertaken only under the supervision of the geologist. Building development permission may be issue only when building regulation complies which has to be strictly monitored.

3. Speedy execution of demolition work: If we had acted on time and demolished the SPWD building before monsoon sets in, such a major disaster could have been evaded. An Assam type building next to cement concrete building, which also belonged to the State Public Work Department was demolished by the local authorities at their own initiatives due to departments' inaction.

4. The Incidence response system was followed in managing the situation, but the general public and also the official still needs to be aware of the whole Incidence Response System methods.

5. Training of not only the Constable/Sub Inspector level but also higher ranking officer in State Disaster Response Force (SDRF) is requires for speedy and efficient decision making on the incident sites and more numbers of SDRF has to be trained in every armed police battalion. The SDRF may be equipped with more advance sophisticated materials. Meanwhile it has been observed that, but simple tools and machineries like saw, knife, hammer, hacksaw blade, iron bender, trowel, torch light etc. are still required for collapse structure search and rescue operation.

6. Community-based disaster risk reduction is still relevant even though there are a numbers of State Disaster Response Force as they (the SDRF) would not able to cover all the locality in Aizawl and all the settlement in Mizoram in case of large scale major catastrophe since they are less in number (424 all over Mizoram at that time, now 662) and their movement would be restricted by disruption of communication networks etc. Therefore capacity building of local community for disaster risk reduction should be a priority.

7. Media people should be given training on their roles in disaster management as they may hampered the rescue operation and dignity of the victims.

8. Canine squad: Trained dog squad may be established in some state disaster response force for search & rescue operation. And now Kennel Clubs of Mizoram comes out with a spirit of voluntarism so that they could be trained and mobilized for disaster response.

9. For reconnaissance damage survey and also for search and rescue operation, voluntary drone flier may be mobilized in an inaccessible area.

10. Psychological counselling: Psychological problems arising out of a disaster was never an issue before in Mizoram. But it have been observed that the survivors of the incidents as well as the people living nearby has suffered post disaster traumatic stress disorder and demonstrate various behavioural, physical, emotional, relational and cognitive symptoms and signs. Now the issue is taken up by the Department of Psychology, Pachhunga University College.

## CONCLUSIONS

Overall, the responses to the rockslide have been widely acclaimed however, there are still deficiencies and inadequacies that arise due to the enormity of the devastation which has to be manages with limited man and material resources. In retrospect, one can points to areas where there was scope to improve upon the existing system and procedure.

Issues and concerned arising from the incidents were noted and it would be worthwhile to address these and other aspects as a part of preparedness for any future disaster. Steps like formulation, execution and monitoring of bye laws, awareness generation, training and other capacity building of stakeholders has to be undertaken so that risk may be reduce and vulnerability is lessened. Further, effort has to be made for strengthening of the responders and community volunteers and procurement of necessary equipment for swift, well coordinated and effi-

cient response. Tlawmngaihna, a Mizo spirit of mutual help for the poor, suffering and the needy was express by collecting the donation to a tune of Rs. 100 lakhs from various branches of Young Mizo Association and other sources for the affected families which was evenly distributed to the affected families. Relocation work for the affected families is being taken up by the state government from fund received from National Disaster Management Authority by developing part of Ramhlun Sport Complex locality.

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