Official Statement on Bukit Antarabangsa Landslide Incident on 6 December 2008

THE Institution of Engineers, Malaysia (IEM) extends its deepest condolence to the families who have lost their loved ones as a result of the landslide at Bukit Antarabangsa. IEM is sad that so many have been affected by the massive landslide.

It is understood that after the conclusion of the search and rescue efforts, a thorough investigation into the causes of the landslide will be conducted by technical experts, in particular, engineers among others. IEM is certain that the real causes leading to the failure will be determined. Before the investigation is concluded, it is inappropriate to speculate on the causes of failure, as premature statements can lead to confusion.

In general, development on hill sites like the one in Bukit Antarabangsa involves, principally, four key parties, *i.e.* local authorities, planners, engineers and developers; and all parties must play their parts to ensure safe hill site development.

The local authorities have a duty to enforce the required level of safety by way of regulations in relation to the planning, design, construction and maintenance with residential and commercial buildings on hill sites. It is known that these authorities are not well staffed by engineers and rely on other agencies like JKR, DID, IKRAM, etc. to provide advice.

However, due to the nature of these consultations, it is foreseeable that third party engineers, who may not be well versed with the given project, may not take a holistic approach in the implementation of the design, construction and maintenance with regard to hill site development. Moreover, available guidelines are varied across the country and are, thus, inconsistent. A harmonised regulatory framework for the whole country is required to facilitate safe hill site development.

Planners shall take into consideration the overall Master Plan and coordinate the infrastructure facilities of hill site development, including buried services. Land usage on the site concerned in relation to neighbouring developments shall be properly integrated, coordinated and incorporated into the Master Plan.

Engineers who are involved in such high risk and difficult development must be carefully selected with a proven track record to carry out the works at a high level of expertise. Due diligence report is of the utmost importance because of the complex nature of hill site development. Even steep hill sites can be built to a satisfactory level of safety required by the authorities provided only competent engineers are engaged.

Developers shall allocate a higher than normal budget for construction on hill slopes to ensure adequate safety. They shall commission experienced engineers to work on their projects due to the highly complex technical nature of hill site development.

The above mentioned four key parties have to find a collective way to improve the level of public safety in order to mitigate the current unsatisfactory situation. One such way would be to study and model the systems used successfully by other countries to develop hill sites. Hong Kong is one such country where a relatively successful system has been implemented.

Malaysia needs to develop her own comprehensive slope safety system, which should include Master Planning, reviewing and improving regulatory frameworks, upgrading substandard and ageing hill slopes, regular maintenance of slopes and getting the public involved on the awareness and prevention of hill slope failures.

IEM agrees that all existing hill site projects be reviewed. Projects on Class 3 slopes (above 25 degrees of inclination) which have not commenced work should not be approved until a safe system of planning, design, construction and regulatory control of hill site development is enforced. In addition, all completed development on hill sites should be systematically assessed, maintained or enhanced to ensure safety.

IEM is ready to assist the authorities in whatever way required so that future landslides will be minimised and mitigated. ■

ANNOUNCEMENT

NOMINATION PAPERS FOR COUNCIL ELECTION SESSION 2009/2010

8th Announcement

Nomination papers for the election of Council Members for the Session 2009/2010 are now available and posted on the IEM website (www.iem.org.my) effective from **Monday, 22 December 2008**.

All Corporate Members who are interested to serve the Institution are encouraged to submit their nomination to the Honorary Secretary of the IEM **not later than 12.00 p.m. on Wednesday, 21 January 2009**.

Thank you.

Landslide Incident of 6 December 2008 at Bukit Antarabangsa

Comments from The Geotechnical Engineering Technical Division (GETD), IEM

THERE has been a lot of media attention on the incident as it had resulted in the unfortunate loss of lives and property. Many press statements have been made by different individuals and organisations. The GETD drafted a Press Statement on the landslide incident which was handed to the Media by the President on Dec 9, 2008. The transcript is included in this issue of the Jurutera. The Statement basically addresses two issues i.e. (i) the roles of Professionals involved in Hill-site developments; (ii) IEM recommendations for developments on hill-sites – past, present and future. It also reminds engineers not to speculate on the cause of failure whilst technical investigations are yet to be completed.

The Government must take the lead by stipulating the level of safety and acceptable risk required for Hill-site development. They should setup and implement a workable system that can achieve the level of safety stipulated. IEM had suggested to the Government in 2002 that a "Hill-site Engineering Agency" be set up to oversee development on hill sites. Local Authorities, Developers and Professionals would be required by legislation to comply with the Technical requirements and Guidelines issued by this Agency. The system setup in Hong Kong is the most relevant as they have a similar environment to us. Their form of Hill-site Agency is the "Geotechnical Engineering Office (GEO)" who have looked at landslip problems for the last 30 years. They have come a long way in hazard identification and risk reduction for their slopes. Malaysia do not need to wait 30 years but can learn from them and adapt their guidelines to suit our local situations. It is obvious that much political will and hard work have to be exercised before an effective system can be set in place. To get a clearer picture of how the slope management system works in Hong Kong, the GETD interviewed the Head of GEO (Hong Kong) on Dec 12, 2008 and excerpts from this telephone discussion is published in this issue of the Jurutera. It is clear from the interview that Malaysians must first and foremost understand our own landslide problems before adopting any guidelines from Hong Kong or others.

The Geotechnical Engineering Technical Division has formed a committee to update the IEM Position Paper on Mitigating the Risk of Landslide on Hill-site Development. Some of the areas requiring extensive updating from the original Position Paper drafted in 2000 will be addressed. ■

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Interview with the Head of Geotechnical Engineering Office (GEO), Hong Kong, Mr. Raymond Chan Conducted on 12 December 2008

by Engr. Yee Yew Weng, MIEM, P. Eng. (GETD) and Cik Hariati Azizan (The Star)

How was GEO started?

The GEO was set up in Hong Kong in 1977 after a series of landslides that triggered public concern. The Hong Kong government at that time was determined to solve the problem. They brought in an international panel of experts in 1976 to study and identify the problem. One of the recommendations was that we need a dedicated authoritative body to deal with development on slopes. Another key recommendation is to exercise control on new developments involving both private and public slopes. They also recommended freezing new slope development so that we don't cause more problems before the root of the problem has been addressed. In 1977 we were named Geotechnical Control Office, *i.e.* to "Control" hillside development.

There have been numerous statements in the media that Malaysia should follow Hong Kong's GEO management system to oversee hillside development. How can Malaysia go about setting up a similar agency like GEO?

There are many things that we can do but it depends on how much resources you want to allocate and the extent of the problem that you want to solve. Malaysia is very different from Hong Kong in terms of law and geology. The problem has to be identified. Without proper identification of the problem, it is premature to talk about solutions. Hong Kong is a city with the size of 1,100 km^2 while Malaysia is a big country. So you may need to focus on a few areas first. We have 250 geotechnical engineers and about 30 earth scientists and geologists. It is very well-manned by experts and we also use external consultants. Our annual recurring expenditure on slope maintenance HK 300M and on average HK900M is spent on upgrading slopes per year.

When you talk about risk, there are two aspects: hazard (landslide) and consequence (fatalities). When we were first established in 1970s, there were 50,000 squatters living in illegal structures on hillside, they were vulnerable to landslide. At that time we did not do anything to stop landslides, but carried out an ambitious plan to relocate the squatters first, by moving them to permanent housing estate *i.e.* we moved the consequence.

Land use planning is important. We need landslide mapping to identify areas with high risk. Whenever a developer wants to develop land, we conduct a study and if it is dangerous, we advise them on what to do. The developers are required to get GEO's consultation to advise them on any slope that they want to develop. If they insist on developing the area that we have identified as hazardous or have a lot of geotechnical constraint, they will be required to improve the slope first. With proper engineering, we can build many safe structures, but it will not be cheap.

Information management is very important. We have a system to accumulate data, knowledge and experience. This is extremely important or you will not see any progress in slope management.

Malaysia is also looking at implementing Dangerous Hillside Order (DHO) for existing Hill-sites. What does it involve?

It is the legislative power under the Buildings Ordinance which control private development on private slopes. Legislation was passed in 1980 under which it is stated that if the authority regards any private land or private slope as dangerous or liable to become dangerous then they will issue a statutory order to get the owner to fix the slope within a certain time limit. Private owners and leaseholders have a duty to maintain the slope condition within their lot boundary. Slopes located outside their boundary but were formed by them during the development of their property (no matter how old they are) makes them liable to maintain the slope as well. Anybody who cuts the hillside next to the development will be responsible to maintain that slope.

The ordinance also empowers the authority to carry out the maintenance on behalf of the owner if the owner ignores the order. If they don't have the money, there is a government loan system. In HK, about 25% of owners ignore the order, so we carry out the work first and charge the cost to them later which also include administration cost. If they don't pay, we will register the bill under their land title and whenever there are any transactions, the government will deduct the money first. The ordinance also empowers us in case of emergency – if there is a risk of something falling - we will go in and do the work first and bill them later.

(To be continued at page 12)

For the Dangerous Hillside Order, who will decide that a slope is dangerous? How do you make sure the inspection is standardized? Will an inspector be stricter than another?

We are the technical authority to inspect the slopes and decide if it is dangerous, but the administration of the Order is done by the Building Authority. We only send reports to the Building Authority. We also have a safety screening programme and every year we do a safety screening for 300 slopes according to their ranking. We will then send a report to the Building Authority.

There is a conference in GEO to screen our reports. The executive chairpersons of GEO need to approve the report before it is submitted to the Building Authority. But DHO will be issued in various other circumstances (i) if there is a landslide, we may issue a DHO. (ii) if there is a genuine complaint, we may issue a DHO; (iii) if there are any slope problems - we can issue a DHO. We have set up an appeal system so that those who disagree with DHO can appeal.

Could owners conduct their own slope study? Is it practical to tell all owners to submit their own slope safety report to the authority?

The government need to do the initial study first. You can't issue DHO to all landowners. It is not practical. It is difficult to convince people to spend money unless you declare that the slope is dangerous. It is also complicated because there are many lands that are partially owned by Hong Kong's government- houses are adjoining each other, which makes it difficult to ascertain who is responsible. Incidentally, there are 57,000 slopes registered and 19,000 (one third) of the slopes are private slopes. Hence, the authorities have to do the groundwork first.

How often is the safety screening done?

Only once but the owners are responsible in maintaining the slope. It is not mandatory but the Government are using different methods to compel owners to maintain the slope such as when purchasing property insurance, owners would need to produce a safety slope report.

What sort of control do you have on development located next to an existing property?

If it is a new development and they have to acquire the land, there is a clause in the land acquisition law which requires the new owners to improve the slope. Within GEO, if there are development plans for slope of 35 deg and above, GEO will object. They need to get consent to commence work. After they complete the work they need to certify their completion, and they need to get occupation permit before they can sell their properties. Without the occupation permit, they will not be able to sell their properties. We also have a supervision package which we can employ to supervise the slope. We have stringent legislation and the authorities will stop any project that they think are dangerous.

Aerial view at Bukit Antarabangsa, Kuala Lumpur (Source: Cawangan Kejuruteraan Cerun, JKR)

What agencies do GEO work closely with?

Legislative Council, District Council and most of the government departments such as highway department, work departments, *etc*. They consult GEO before they carry out any development. There is no problem working with the different departments and every government department has its own maintenance agent to do routine yearly maintenance to ensure that they don't deteriorate – for example the highway department, building department *etc*. We have auditing to ensure that they carry out their maintenance work. GEO is the central authority on slope safety but once we have conducted a study, we pass the responsibility of maintaining the slope back to the individual maintenance unit of each department.

What about Public Education?

We have a landslip warning system during periods of heavy rainfall and typhoon to reduce consequences through the media. We advise people on what to do during heavy rain in order to save them from landslides. Landslides are inevitable in Hong Kong because of heavy rain but we can do many things to protect ourselves. We try hard to prevent landslides but we know that they cannot be totally eliminated. Public information is important because some people want zero-risk but this is not achievable. We can only reduce the risk and this is also dependant on the available budget. We need to be transparent and honest with the public so that they will be concerned about the safety of their slope and understand that if they don't take precautions to improve their slope, they will endanger their own lives. ■