Construction Blasting: From the

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Dato' Soam Heng Choon

In construction work, blasting hard materials such as rocks and boulders at construction sites sometimes cannot be avoided.

"If we can avoid it, we will," said Dato' Soam Heng Choon, Deputy President of REHDA Malaysia. "One of the effects of blasting work is the increase in cost of construction. Blasting of hard materials is not only costly but is also time consuming. There are also other concerns, such as the levels of dust, noise, vibration and structural damage caused by blasting works," added Dato' Soam.

The public, he continued, will raise these concerns as well. "That's why when developers buy land, they try to avoid sites with rocky structures which require blasting to level the land. But sometimes, underground hard materials are only discovered much later when drilling and other construction works have begun."

"When this happens, the first hurdle that we need to go through is to ask these questions: Is blasting necessary and is it acceptable? If blasting needs to be done, noise, vibration and dust cannot be avoided," said Dato' Soam, who is a civil engineer by profession and has extensive experience in construction and property development.

He further shared: "Land is becoming more scarce and expensive. In many cities, flat land is almost all gone. For example, in Penang – there are the sea and the hills. When we have to develop land here, we have only two ways to go, either we reclaim the sea or we cut the hills. Both may result in a lot of environmental destruction and the public will make a lot of noise but Penang has clear-cut guidelines – land above 250 feet cannot be developed, below that height, we can."

"If rocky areas have to be developed, rock blasting comes into play. Noise, dust, pollution, vibration or structural damage cannot be avoided if we want to have more areas developed. There will always be public complaints which we just have to deal with." It is in this respect that collaboration with the Local Authorities becomes crucial for developers to mitigate all potential problems of construction blasting.

Dato' Soam stressed that the adverse effects of construction blasting can be mitigated.

"We take all the precautions based on advice by consultants, including civil and mining consulting engineers. However, not all site inspections automatically require blasting as this depends on certain criteria such as the size and volume of rocks at the site. If blasting works must be done, then a mining consulting engineer (blasting consultant) will come in to assess the site and its surroundings and recommend the suitable blasting design and method," he explained.

ROCK BLASTING TECHNIQUES

Rock blasting using explosives is one of the techniques to excavate, break down or remove rocks. It is the most often used technique in mining, quarrying and civil engineering works such as construction of roads and dams. Besides rock blasting, other available techniques include chemical cracking blasting or gas pressure pyrotechnics, bolder blasting technique and hydraulic machine splitting technique. Dato' Soam mentioned that controlled blasting using explosives is more efficient and cost effective. It is also a faster technique to break rocks found at construction sites compared to other techniques. The amount and type of explosives needed depend on the size, quality and nature of rocks at the site.

"Blasting becomes a harder choice when we have to build in brown areas, where there is development and residential areas around. To break down rocks near built-up and densely populated areas with houses and other buildings around, we will consider controlled blasting as it can be conducted safely according to the blast design and it is more effective compared to other rock cracking/splitting techniques."

The process of determining whether or not rock blasting is practical is usually complex particularly when the risks are high. The risks involved, among others are the safety of workers and the public, the impact on surrounding structures and the environment as well as engaging qualified people (licensed shotfirer) to carry out the blasting work. Developers usually engage the services of mining consultants to assess the feasibility of carrying out controlled blasting technique to facilitate and minimise the risks resulting from construction blasting.

Dato' Soam said trial blasting is first conducted on a small scale before the actual blasting. This may be done in many stages – from small to large scale.

"The different stages are very expensive and time consuming, and we may not even get the desired result such as the ideal surface for building. But if it is something we have to do, then we will do it after taking all the necessary steps and precautions," he added.

PROCEDURES AND GUIDELINES

Before construction work begins, all developers must submit their development plan and get it approved by the Local Authority. The planning permission, building plans and endorsement of land development applications process have been facilitated with the setting up of the One-Stop Centres (OSCs) which come under the purview of the Ministry of Urban Wellbeing, Housing and Local Government. The OSC is directly responsible to the head of the Local Authority while the OSC Secretariat is headed by a Town Planner and supported by Technical Officers from planning, architecture and engineering fields.

"The Local Authorities have mapped out which areas can or cannot be developed, so when we submit our development plans, we have to take this into consideration. For geologically sensitive areas, there are geological maps to guide the Local Authorities in giving development planning permission.

As some of the Local Authorities are quite well versed, they can advise us accordingly," said Dato' Soam, adding that the geology varies from area to area so the Local Authorities operating in geologically sensitive areas would be more exposed to the needs of collaborating with the Mines and Geoscience Department (Jabatan Mineral dan Geosains or JMG).

"If massive blasting has to be done, these

Perspective of REHDA Malaysia

of the Institution of Engineers Malaysia, by Putri Zanina)

Local Authorities will consult JMG. However, only the Local Authorities hold the power to issue stop work order to developers in cases involving serious problems or public complaints," he said.

JMG, which comes under the Ministry of Natural Resources and Environment, covers the usage and safety procedures concerning mining and quarrying. Although the JMG's roles do not encompass construction, its involvement in this field is always sought by the Local Authorities in terms of getting the proper advice and expertise concerning blasting works at construction sites of development projects. Some of the Local Authorities particularly those operating in geologically sensitive areas have put this as a requirement stipulated by their OSCs in processing and approving development planning proposals.

"JMG's advice can include trial blasting before the actual blasting is carried out under the supervision of blasting consultants. We also need to get the approval of the Police before carrying out site blasting using explosives," he said. The use of explosives comes under the Explosives Act 1957. The Police needs to ascertain that all persons who handle explosives for construction purposes do not have criminal records. This is enforced by the Police for security reasons.

If new development projects are located near houses or other existing development, developers and contractors will first engage structural engineers to conduct independent dilapidation surveys on the existing structures so as to determine their condition and identify if these have any structural damage. The surveys are done before the start of any construction work, even those that do not involve blasting. The surveys are necessary in order to mitigate any problems, such as house owners' complaints of structural damage after the construction work has begun. Slope conditions for hillside development are also assessed and work will be carried out based on the engineers' estimation and recommendations.

Dato' Soam reiterated that REHDA members are advised to comply with the proper procedures. "We know that our members also work out the best and intensive methods when it comes to carrying out blasting works. Their approach involves getting the most effective results on a case to case basis, based on the advice of their consultants and professional assessments. We do not base on fixed distances to carry out blasting."

JMG's blasting work guidelines stipulate the safe distances or minimum distances to observe for blasting works. "Whether far or near is not the solution," argued Dato' Soam. "The effectiveness of controlled blasting does not depend on keeping to distances alone. The blasting guidelines can be further improved, such as determining the acceptable levels of noise, vibration and dust as well as achieving the desired results."

"There are mitigation measures to reduce/control noise and vibration from exceeding the limits, for example. The technical aspects can be worked out and more appropriate guidelines can be developed," he said.

Dato' Soam also thinks that it would be onerous to regulate based on distances as the characteristics of sites, including the quantity and nature of rocks vary from place to place.

"REHDA's stand is that there should not be blanket regulations for blasting works. These should instead be assessed on a case to case basis and carried out with expert consultations. Before carrying out rock blasting in sensitive areas, our members are encouraged to get the advice and help of JMG," he said.

However, not all developers and contractors know that JMG offers such services. As such, he suggested that JMG increases awareness on this aspect of its services and conducts discussions with the industry players and other Local Authorities.

"REHDA encourages our members who encounter rocks at their construction sites to consult JMG and ask the department to assist them and make work better so as to help reduce problems with the public and other stakeholders. Together they can articulate problems especially concerning the public. We at REHDA want this as well."

He said REHDA is open to the idea of collaborating with JMG and the Institution of Engineers, Malaysia (IEM) to develop standard procedures or guidelines for blasting works.

"In undertaking development projects, REHDA members engage the services of engineers – civil, mining and other fields – and these engineers are members of IEM as well. So it is appropriate for IEM, which is multi-discipline – from mining and quarrying to construction – to come out with the guidelines to mitigate some of the problems encountered in development projects."

Dato' Soam recognises the suitability for IEM to initiate the development of proper guidelines for blasting works. He said REHDA also meets regularly with IEM as well as with other relevant associations, including the Malaysian Institute of Architects (PAM), Master Builders Association of Malaysia (MBAM), the Royal Institution of Surveyors Malaysia (RISM), the Association of Consulting Engineers Malaysia (ACEM) and the Malaysian Institute of Planners (MIP), which together with REHDA and IEM are all members of the Building Industry President's Council (BIPC).

"All the relevant sectors are therefore involved and this is good. We discuss and deliberate on issues affecting our industry. Since the Government does not clearly assign a department to monitor the issue of construction blasting, which now falls under the Local Authority, all of us can play a role. We can be proactive in helping to come out with the guidelines through IEM," he said.

Collaboration with the Local Authorities becomes crucial for developers to mitigate all potential problems of construction blasting

"Having guidelines is now preferred over developing standards for construction blasting. Problems associated with blasting do not have one fixed solution, therefore what REHDA needs more are guidelines on which blasting methods to use rather than standards."

"Now it is okay for the Local Authority to act as the government agency to control, monitor and issue approval as well as stop-work order for construction blasting. We cannot have many parties to issue stop-work orders. Let the Local Authorities have the power to do so. But it is also good to get JMG into the system to provide advice when necessary," he said.