



Blasters and Explosives Engineers: The Job and the Malaysian Law

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INTRODUCTION

In Malaysia and also most part of the world, blasters and explosives engineers are rare breed. In the commercial world, their jobs are mainly in the mining industry, quarrying industry, demolition and also construction industry where they are employed to blast rock to foundation levels before building can be erected. They are there in the road and highway construction, trenching, blasting ponds, in housing development and many more. In the mining and quarrying, for example, they are required to fragment rocks to a size suitable for further processing such as crushing and screening to marketable sizes. They are small in numbers and they are the essential elements in the development of the nation. In Malaysia, UK and former British colonies, they are known as 'shot firers' but in US they are better known as 'blasters' and sometimes as 'explosive engineers'.

They are there working with the engineers but not that many engineers know what they are doing very well. This write-up is written with the intention of giving brief introduction into this profession which is increasingly important in national development especially in non-mining related engineering profession. The blasting technology is increasingly being applied to the construction industry. The knowledge can be very useful to the project managers, civil engineers, etc. who are likely to require their services.

WHO ARE THEY?

In the olden days, the blasters are the daredevils who learn their trade through experience by being apprentices to the existing blasters. They start learning by being assistants to the blasters, by being drillers and eventually team boss and many of them ended as blasting contractors. On the way they attended explosives and blasting courses conducted by the explosive



Blasters on the job

manufacturers. If they have problems, the explosives company service team were there to help them. A few actually came from the military such as from Engineering and Ordnance Corp. Those with explosives training in the military have an advantage and with retraining in commercial application they can become competent in a shorter time. To obtain formal certification, years ago they used to apply to the then Mines Department to test them and obtain a Letter certifying they had passed the examination. The Malaysian Police also regularly ask the Mines Department to test them when they apply for the explosives permit to purchase and store explosive issued under the Explosives Rules 1923. The Malaysian mining engineers were then mostly employed in the tin mining sectors especially working on the dredges where no explosives were required leaving the explosive knowledge that they learn at the university in the books.

Explosives being security material can be handled only by those who are

free from criminal record. As such they, the blasters, must be security screened by the Police.

On the job, they must be sober, i.e. not drunk or under the influence of drug and fit physically and mentally. They must be above 21 years in age, able to communicate and write well.

Currently, to practice as Shot firer they need to sit and pass Shot firer's Theoretical and Practical examination set by the Department of Mineral and Geoscience. This is actually a formal Government examination. Alternatively they can sit for less strenuous examination set by the Malaysian Police.

TRAINING AND CERTIFICATION

To obtain Certification, now they need to pass the Shot firer's Examination Theoretical and Practical conducted by the Department of Mineral and Geoscience. This formal examination with standardised syllabus was introduced in early 1992 to standardise the examination methodology instead of just oral interview before that. The duration of the Course is six days. The syllabus was similar to that of EPIC Shot firer examination, United Kingdom, with some modification to the available technology in Malaysia then. In United Kingdom then, the candidates had to attend a six- day basic Shot firing Course and later had to attend a three- day Blast Design Course.

After more than 15 years, the syllabus probably needs updating to accommodate advancement of technology and new regulation locally and internationally. For the time being, only Institute of Quarrying, Malaysia regularly conducts this Course. The course is aimed to the practitioners rather than the managers or engineers.

Similarly in early 2000 the Malaysian Police also introduced a similar but less intensive Course (four- day course) to those who need license to purchase

explosives and those who work as blasters in states not under the jurisdiction of DMG. Unfortunately neither department recognise the certificate issued by the other, partly because of the differences in syllabus.

All the Courses content actually were tailored to the Quarrying Industry. Therefore those who practice blasting work at construction sites, tunnels and other specialised application need to do their readings or learn from the engineers and consultants or rely on technical service support from the explosive manufacturers. Probably in the future, advance courses for special application need to be introduced to cater the requirement of the industry. Alternatively, they can also attend courses conducted by professional organisation overseas such as in U.K and also USA.

The local courses were designed in such a way it is more suitable to those who are already working in the industry. Before they can attend this course they need to have security clearance from the Police because the Police do not want the practitioners to used to use their knowledge in illegal activities.

Unfortunately most of the Course participants were from the management who want to know how the Shot firers or blasters work but do not want to practice, leaving the dirty jobs to the less educated Shot firers. As a result, until now there are shortages of competent practicing Shot firers in Malaysia.

At the University level, Blasting Technology is taught only to those who take undergraduate course in Mineral Resources Engineering at USM. Overseas, such as Australia, USA and United Kingdom, this particular subject is taught only at mining schools.

FUTURE NEEDS

With the improvement in education levels, the public begin to notice that even though blasting is a necessity, it is also a nuisance if not properly conducted. Blasting results in flyrocks, ground vibrations, airblast and also dust. With it there is a need to expand the expertise of the blasters to the subject of environmental controls, blast monitoring and probably safety and health.

However, this subject is probably beyond the reach of ordinary blasters who have minimal academic qualification. This is particularly important to the quarry operators whose quarries are near residential areas or other structures of critical importance and also to those who do blasting work at construction sites and other critical workplace such as near power plants, factories, airport etc. Alternatively, we need to train professionals such as engineers in Blasting Technology and add the subject of environmental effect of Blasting and Blast monitoring and control.

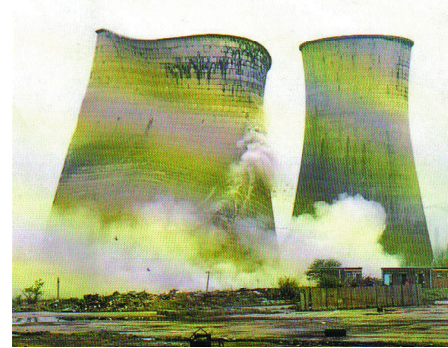
Proper recording of Blasting work is also essential for internal evaluation, editing and also as a record of compliance with the operational conditions. It is also needed as the protection against complaints from the public especially when there is litigation.

Here is where the Professional Engineers, who are well versed in Blasting Technology, are required but lacking in Malaysia.

DEMOLITION

As the saying goes, anything that goes up must eventually come down. As Malaysia progresses, more and more high rise building are being built in Kuala Lumpur and other big cities. Eventually all these building will get old and need to be torn down. In US and United Kingdom for example, many old building, bridges, factories and also high rise structures such as chimneys are brought down by using explosives. They are cheaper and faster and if properly done they are safer also. The preparation for the blast may take weeks but it takes less than a minute to bring the structure down. These are specialised jobs and the blasters who do this job are called demolition engineers. In certain cities in US and Britain they are required to work together with structural engineers to ensure that they charge explosives at right places to get the maximum effect.

In Malaysia today there are very few building and structures that are old enough for demolition as Malaysia is considered as a young country. Therefore anybody who want to specialise in demolition will have very little job to do. While it is relatively easy to bring a



Demolition work

building down but it is extremely difficult to bring down safely if the building is surrounded by other building as well. But it can be done. It takes a lot of practice to become an expert in demolition, but how can we become an expert unless we are given the chance to practice the trade.

LAWS AND RESPONSIBILITY

Using explosives is a very serious responsibility. The number one concern is the security. The explosives must not fall into the wrong hand and misused. The Shot firer must therefore make sure that all the explosives and accessories brought to site are accounted for. Equally important is the safe transportation, handling, storage and finally safe use of the explosive. The blaster must also be well versed with the relevant laws and regulation governing explosives.

The main Law governing explosives is the Explosives Act 1957 which is under the responsibility of the Police to enforce. Under the Act is the Explosives Regulation 1923 that regulate the explosives manufacture, storage, transport, import and export and purchase of the explosives. Many of the provisions in the Regulations are already outdated. It is however the only law in Malaysia that requires the issue of Permit for the purchase of explosive. Under normal condition, only those persons who possess Shot firer's Certificate are allowed to apply for the permit and that person must have contract of work that requires him to use explosives.

There are a few other Laws as well that govern the use of explosives on site. At the construction site for example the provision of Factory and Machinery Act 1967 on explosives actually applies. This

Law actually says that the blasting work must be carried out under the supervision of the competent person which means the Shot firer. For the purpose of safety of operation at the site, the Shot firer must work together with the site Safety Officer and others and complies with the requirement of OSHA (Occupational Safety and Health at Work Act, 1994) which is actually the governing law on all works at the construction site.

On Mining Land the governing law is actually the Mineral Development Act 1995. However, without the Regulation, the Provision of Mining Rules 1934 still applies. In fact it is a requirement that only the Shot firer tested and certified competent by the Department of Mineral and Geoscience (DMG) are allowed to work as Shot firer. The current Shot firer's Certificate issued by the Department evolves from this need for competent Shot firer.

In the States of Perak, Selangor, Kelantan, Pahang and Sabah where the State's Quarry Rules are enforced by the Department of Mineral and Geoscience, only those Shotfirers approved by the DMG are allowed to work as competent Shot firers at the Quarry.

For blasting work at construction site from legal point of view, it is actually under the jurisdiction of Department of Occupational Safety and Health (DOSH). There is no Regulation under OSHA that govern Blasting work at Construction Sites therefore the Provision under Factory and Machinery Act 1967 (Part XV-Blasting and Use of Explosives, Section 135-146 of Factory and Machinery, Building Operation and Work of Engineering Construction (Safety) Regulations 1986) still applies. Regulation 135 specifically mentioned the requirement of a competent blaster. However the Department do not have officer with expertise in explosives and blasting work.

The Police only issue Licence to Remove Explosives (Rules 58) and Permit to Purchase Explosives (Rule 74) under the Explosives Rules 1923. The Police, though are competent in the handling of military explosives, do not have enough officers with sufficient expertise and experience in application of commercial explosives in blasting work.

The only Department that have officers with knowledge of commercial explosives for blasting work is actually Department of Mineral and Geoscience because virtually all officers who have degree in mining and mineral resources engineering learned Blasting Technology at undergraduate level. Even though the Department do not have the authority over blasting at construction site their advice are frequently sought by the State's authority by virtue of technical expertise.

Other Departments such as Department of Environment and the Local Authority have only indirect authority by virtue that the use of explosives may cause disturbance to the public or the environment. No wonder the public are so confused, who is actually in charge.

CONCLUSION

Blasters' or Explosives Engineers job are actually a much specialised job that not many people want to do because they work in a very unfriendly, hot and tough environment. There are many complaints against them because the nature of their job may cause disturbance to the public in the form of noise, ground vibration, dust and sometimes flyrock but there are not that many people who are willing to offer help to them in time of trouble. They work with Civil Engineers at Construction Sites, such as housing project, tunnels, dam, airport etc. These people want them to do many things but cannot help them to achieve those things. They are frequently asked to help earthwork contractor do blasting work at earthwork rate because the contractor never thought they would have to remove rock at their given site in the first place. With working conditions getting tougher and tougher they actually need help from the other engineers.

With almost all flat land in cities taken up or already developed, more and more hilly areas are being targeted for future development. This results in the need for more removal of rock and hence requirement for blasting work. There is therefore reasonably good future for competent blaster's or explosive engineer but they have to learn new expertise to cater for new and more difficult environment. The local construction companies also need to give chance to the

local engineers to practice their expertise instead of calling for foreign consultant when there is a problem.

The blasters or those with better qualifications in explosives engineering also want the competency certificate that they earned to be recognised by the authority. There is therefore a need to standardise the syllabus and the examination for Shot firers Certificate issued by both Department of Mineral and Geoscience and the Police. The industry is not very happy under the current arrangement where the Police do not recognise the DMG Certificate and vice versa. There is a need probably for the introduction of specialist examinations in the field of construction blasting, tunnelling, demolition, etc. All the government departments particularly the Police, DMG, the Department of Environment and DOSH therefore need to come up with a common syllabus that satisfies the requirement of the industry and each individual Department.

In the era of globalisation, the syllabus must also be regularly updated to keep pace with new regulations and also development of technology internationally. ■

NOTE:

1. The Author, when he was working as a government engineer at the Mines Department, was given many opportunities to evaluate applications to do blasting work in KL City area, Selangor and some other States and also investigate many blasting accidents. He now works as Blasting Engineer/consultant at quarries and construction sites and had worked together with many blasters. The Author learned the trade through attending many in house training course organised by the Mines Department and also attending Blasting and Explosives course at Queen University in 1995, Kingston Canada and also Royal Military College of Science, Cranfield University, UK in 1990.
2. In Malaysia, a Blaster is not considered as engineer as they do not need to have a basic engineering degree. Explosives Engineering for commercial use is actually under the specialisation of mining or mining related degree and hence in Malaysia at least, a mining engineer qualifies as "explosives engineer" as well. In some states in US only those who are graduates with explosives training are considered as "explosives engineer".