

HOME BUILDING QUALITY

Collaborative Effort in Enhancing Building Quality

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Introduction

As a result of the recent adjustment of the property market in Hong Kong, there has been a marked change in the expectation of housing standards. Most flat purchasers nowadays are genuine homebuyers instead of property speculators. They are more concerned about the quality of their homes for which they regard as once in a life time investment than ever before. Recently there were a number of incidents reported about the quality problems such as inferior workmanship, foundation deficiency and water leakage resulting from typhoons. Coupled with the downturn of property prices, there is a louder cry for better quality housing from the public. This public demand has now escalated to such a level that it warrants some reform from the construction industry to squarely address the quality problems.

General Views on the Quality Problems

Housing quality problems have recently been widely covered by the media. The general public is led to believe that the building quality has suddenly deteriorated to an extremely low and unacceptable level, whereas the housing prices are still too high. Nevertheless, given the amount of construction output produced in Hong Kong and the number of adverse reports received, the building quality is by and large not as poor as the public may believe. In fact, they have been misconceived, to a certain extent, by the exaggerated comments made in the press.

We do agree that building quality is a concern and that the construction cost is too high. Working efficiency is very often less than satisfactory. There are many underlying factors causing these problems and we would like to take this opportunity to address those concerns raised by the media. Some of the quality problems are due to contractors who have not executed the works in accordance to standard workmanship, or they have not followed the design drawings or specifications correctly. The contractors may have failed to build according to proper working procedures and method statements. Other problems may be due to design oversight or inappropriate selection of materials. All of these must be addressed by different approaches and the concerted effort of all parties involved in the industry, namely the Government, building developer and consultants, as well as contractors and sub-contractors, must be integrated to produce quality buildings.

Roles of Developers and Consultants

In general, the structural standard of the building construction in Hong Kong attains fairly high quality by international standards and relatively few problems have been reported. The majority of quality issues involve architectural works or services. We need to point out that not every quality problem is attributable to inferior workmanship. The architects and consultants could help to resolve many of the workmanship problems by preparing their designs thoughtfully. The designers are sometimes too concerned about the aesthetic intent or are under pressure to control cost. They tend to select lower grade materials and simply rely on the contractor's performance and specifications to achieve the desired end result. Insufficient attention is given to the workability of some important details that would have profound impact on the performance of the works. The developers and architects are too inclined to believe that quality is always workmanship-related, and by holding the contractors responsible for the outcome to solve the quality problems.

Selection of Materials Hong Kong is located on the southeast coast of China facing the South China Sea. Because of its geographical location, buildings in Hong Kong are subject to high humidity, saline atmosphere, intense rainstorms and strong gusty winds during typhoons. All of these severe environmental conditions require special attention to design and call for more durable materials. Unfortunately, not all of these are taken into account in the building design. The specifications that most architects adopt are in line with British Standards or other countries' practices that are not entirely applicable to local conditions. Our experience shows that if the designers provide more thoughts on refining the details and selection of the right materials, many of the workmanship problems could be avoided. This past September saw the first tropical cyclone signal no.10 hoisted in sixteen years, and there were many incidents of water leakage reported all over the territory. Among the projects undertaken by us, we observed that there was one common feature to these problems. The specifications simply called for thin and shallow aluminum sections but required the windows meeting stringent performance criteria in both wind and water tests. These contradictory requirements illustrate that the developers' and architects' strong desire to save cost and hope that the contractors could come up with something cheap but fabulous in term of building materials, which we all know is impossible. In fact, in many cases, selection of inappropriate materials resulted into long-term maintenance problems and thereby higher costs.

It is commonly understood that much resource is spent on the research and development of materials engineering overseas. Many consultant firms have their own technical departments which study the properties and use of

materials under different conditions. The study is supplemented by testing of materials conducted in laboratories. We share the view that these are important steps necessary to be taken in the selection of the right materials. However this approach is not so commonly adopted by local consultant firms. It is suggested they should review their design strategy and adopt similar approach to improve their building design.

Standardization of Design Building projects usually feature many repetitive and similar units and details. If the dimensions of these similar units could be standardized, the works could be carried out more straightforward with less attention to variations in dimensions. The productivity would be increased and the quality would be easier to control. This kind of design practice has been widely adopted in the public housing projects. Designers in the private sector are recommended to adopt this practice as well such that the quality of the product can be better enhanced with saving in construction costs.

Use of Prefabricated Materials Another area that developers and designers could help improve building quality is to promote the use of buildable designs and prefabricated building components. This would enhance better quality control and reduce the requirement of manual labour on site. The productivity will also be increased. The Housing Authority has been working extensively on the use of prefabricated materials and the results are encouraging. One of the prominent examples is the use of prefabricated external facade. The facade with the windows and external finishes installed at fabrication yards before the unit is fixed in the final position has proven to help a great deal to minimize leakage along the window frames and also enhance quality of finishes. However the practice of adopting prefabricated building components receives little support from the developers and consultants in the private sector. They should realize that those developers who embrace and achieve high buildability for their projects would have higher quality products. The initial costs may appear to be higher but, in the long term, the product would become more attractive and the cost would be lowered with increasing engagement of this construction method.

Having said the above, we do not mean to suggest that the architects and consultants are largely responsible for the quality issues. In fact we do have many outstanding architects and designers who have contributed a great deal in shaping the building industry. It is a pity that most of the projects are developed on a fast track schedule and completed in two to three years_ time. The pace is so fast that the time allocated for design planning, detail design, selection of materials and drafting of specification is always insufficient. In this regard the developers are urged to take this into consideration when preparing their development programme or they have to accept inferior building quality.

Initiatives by Contractors

As a general contractor, we are aware of the heavy demand for improvement in building quality. This is a good opportunity for us to re-evaluate ourselves, assess our past performance and identify any shortcomings in our management. We cannot hold on to old work processes and unproductive construction methods. We must strive to improve our performance in order to maintain our competitiveness. For us it is a time of great challenges and we must forge ahead to meet these challenges as we stride into the next century.

Main Contractors_ Management We all understand that the main contractor is responsible for the overall management of a site including site planning, works co-ordination, provision of site facilities and supervision, and most importantly for the overall contractual liabilities. Unfortunately, we have to admit that not too many of us can take up the role as main contractors and fulfill our obligations. Many site management teams are not up to the standard nor do they pay enough attention to their duties. They are used to assigning all their works responsibility to the sub-contractors and rely on their performance to achieve building quality. They fail to take up the leading role and guide the sub-contractors to execute the works in the proper manner. They also do not possess enough understanding of the specification requirement and method statement, not least initiatives to innovate the construction method. Very often they just casually follow the architect's instructions and drawings. They fail to plan ahead carefully and are unable to detect any foreseeable problems. The architects are not alerted early enough to avoid site problems although it is not entirely the contractor's obligation.

It is therefore time for us to adjust our management strategy and to speed up the training for management staff. It is also necessary to uplift our awareness of our legal and contractual liabilities, and our public obligations towards society as a whole. We have to improve our management skill including risk management and have better control of the sub-contractors.

Management Improvement To improve our management, we should consider restructuring the project organization. More technical staff with the right qualifications should be recruited to reinforce the project management team and to step up site supervision. More training should be provided to upgrade the quality of frontline site staff. It is important that they understand the method statement and use the plant and machinery correctly. There are many remarks about the poor discipline of site staff which have somewhat lowered the working efficiency. Through training, the site staff should be reminded of their obligations and duties. On the project management side, the project team should spend more time on understanding the contract requirements and architect's design intent. They should have studied the site conditions carefully before coming up with detailed site planning. All these are important steps for the project team to plan the works and devise the method statement more appropriately.

Supervision by Technically Competent Persons In 1997, the Buildings Department introduced a Site Safety Supervision Plan System under which building professionals and contractors are required to submit to the Building Authority supervision plan before consent is granted. The system also stipulates that supervision and inspection should be carried out by Technically Competent Persons (TCP) who should possess certain qualifications and experience. This has also brought to the attention of the contractors the necessity of having a team of qualified and competent supervisory staff to carry out site supervision. However we believe the tasks of the TCP should not be limited to site safety only but also extended to cover the permanent works. The System is promulgated under the Buildings Ordinance and is therefore applicable to private projects only. We strongly suggest that the government and the Housing Authority adopt similar requirements of TCP and call for supervision undertaken by these personnel. It will then develop a consistent and acceptable supervision system applying to the whole industry across different sectors.

Sub-contracting System For decades, the execution of works on site used to be sub-contracted by main contractors to sub-contractors, including nominated and specialist contractors. The sub-contractors would in turn sublet their works to sub-sub-contractors who usually further sublet the works to others, wholly or partially, and so on. As a result the works is executed by the skilled workers whose identities the main contractors or the sub-contractors have no knowledge, let alone control of their quality. Although sub-contracting is widely accepted, locally and worldwide, as a cost effective and efficient way of works execution, the number of tiers in the sub-contracting chain is considered too excessive. This has unnecessarily created management problems and increased construction cost, and should therefore be reduced.

The quality of the sub-contractors is also causing a lot of concern and needs to be addressed. Most of the sub-contractors are not properly set up nor are they serious enough about their management, quality control, site safety and care of their workers. They may just produce the shop drawings if required but do not train the workers to carry out the works according to the correct procedure and method statement. In some cases, they act as brokers and sublet the entire works to others with a few percent of mark-up.

For those contracts where the sub-contractors are selected by the employers, the selection is usually based on the submitted prices with little consideration of the sub-contractors' performance. Employers and architects used to think that the main contractor was responsible for the performance of the selected sub-contractors and therefore it was not their concern. Our experience proves that many problems have arisen from this arrangement. We stress that the technical performance of the subcontractors should be assessed before they are appointed. There is an old saying that good things never come cheap.

While the main contractors are required to be registered under the Buildings Ordinance or included on an approved list of contractors in the case of the public sectors, we suggest that the registration system should be applied to sub-contractors of key trades as well such that the standard of these sub-contractors could also be maintained. The registration could either be undertaken by the government or professional bodies recognized by the industry. Apart from financial capabilities, the sub-contractors should have to demonstrate that they have sufficient management staff, plant resources and working experience before they are registered. With the establishment of such registration system, the sub-contractors would then be selected from the register and the main contractor could be assured that the sub-contractors they appoint meet certain minimum standards.

Training and Registration of Workers Under the present system of sub-contracting, the sub-contractors or sub-sub-contractors let out the works to various gangers who recruit workers and labourers through personal contact and acquaintance. There is no consideration given for the skill and knowledge required for the task at hand. Any worker can just turn up and make claims that he possesses the required skill and knowledge, and would be employed by the gangers. For years, the construction workers in Hong Kong have been enjoying high wages but lack proper training and education. They are often criticized of poor discipline. As the sub-contractors usually have little concern about the site management, there is no proper system to monitor the performance of the workers. Many workers fail to understand the works requirement and proper procedure and they have omitted some critical steps, either intentionally or unintentionally. The situation is worsened if the workers wages are calculated in accordance with the quantity of work done since omitting works procedure would give rise to faster and better return irrespective of workmanship. This ends up with sub-standard product and creates many quality problems. In the extreme case life span of the building is jeopardized and public safety is compromised. Some of the problems can only be identified at a later stage such as through checking by supervisors and this cause a lot of belated rectification and unnecessary repair works. Others may not be detected and become latent defects.

Given this situation, an extreme close supervision system may be required to safeguard quality, which however is an inefficient method requiring a lot of administrative works and escalates the construction cost. It is therefore more appropriate and fundamental to ensure that the quality and skill of the workers are up to the standard and meet the requirement. More effort should be spent to train and educate the would-be or on-job workers. It is only through long-term training programmes that the standard of various trades can be uplifted and the workers understand the proper working procedure and their duties. As the construction of a site usually lasts for about two to three years, it is not possible for the main contractor or sub-contractors to arrange such training. Training for workers should therefore be centralized. The Government must take a leading role in providing institutional

training for workers by formulating policies and guidelines to emphasize education and training. It is therefore most crucial that the Government tackle this problem with a long-term perspective.

The high quality of buildings that we see in developed countries is a direct result of joint efforts by their governments, trade unions and various institutions in uplifting building standards and in particular promoting training and education in the construction industry. At present industrial training for workers is mainly provided by the Construction Industrial Training Authority (CITA). However only short-term courses are available for the training of workers and the skill and standard of the graduates fall short of industrial requirement. Whilst the number of traditional skillful craftsmen has been diminishing due to retirement, current graduates from CITA cannot fill the vacancies left by these craftsmen. Such frustrated candidates accounts for the high drop-out rate. The training programmes offered by CITA therefor need to be reviewed and intensified. The Government should allocate more resources to the Authority to achieve this objective. If necessary, other statutory organizations such as Vocational Training Council (VTC) could be called in to share the workload and to speed up training of workers. Through the training courses, the safety concern and environmental awareness of the workers would definitely be increased. On the other hand, trade tests should be arranged for certifying the workmanship standard achieved by the workers. It is imperative to ensure the industry is supplied with adequate qualified workers in the earliest possible.

When the pool of qualified workers in various key trades are built up to sufficient sizes, they should be registered by a statutory registration body. At present the Hong Kong Construction Association in conjunction with the Government and other concerned parties is studying and planning the establishment of such a system. It is expected that the system would further enhance the standard of the workers with their professional competence being properly recognized. Once the system is set up, only those registered workers could be recruited to carry out those key trades. By doing so the main contractors and sub-contractors could be assured that the workers they employ have been trained and would understand the correct procedure and the right use of materials. Only curtailed checking would then be required. This would in turn save a lot of abortive works and unnecessary waste of materials. On the other hand the supervision requirement could be lowered so that more supervisory staff could be allocated to look after other more worthwhile issues such as planning, devising more innovative construction methods and cost reduction exercises.

Long-term Employment of Workers The industry is also actively pursuing long-term employment of workers. It would promote the sense of belonging and provide job security to the workers. Quality of works could be better controlled but working efficiency would be slightly lowered. The pace of increasing the amount of long-term workers should therefore be carefully studied and a striking balance to be worked out. In the meantime, this issue deserves less priority than those identified before.

Conclusion

Building construction is one of the biggest industries in Hong Kong. The average annual output amounts to more than HK\$120 billion. We have seen many prestigious and quality buildings that we can be proud of. By any international standard, Hong Kong has the highest volume of quality buildings on a city by city basis. The recent remarks on building quality only represent a minor fraction of the building works. We should not necessarily take them as the general standard of the industry and undermine our self-confidence of producing quality buildings.

In my opinion, there is a lot of works to be done to enhance building quality. Simply strengthening site supervision would help but cannot solve all the existing problems. In a matter of 3 to 5 years most main contractors would have achieved their reform, and architects' design solution and client's intentions could be accomplished. However reformation of current subcontracting system and training of the workers will take at least 5 to 10 years. It is highly crucial that the client, the consultants and the main contractors must collaborate into a tri-party partnership and work hand in hand to provide assistance to the sub-contractors and the workforce to improve building quality. In fact such co-operation and partnership has been the international trend in solving construction problems and cutting contractual disputes. Together with government support, such partnership will generate a great leap forward within 5 to 10 years in the construction industry.

Finally, as a main contractor I must emphasize that building quality must take first priority despite our heavy workload. Our endeavour for the new millennium is one of upholding those sound construction principles incorporating the trinity of SAFETY, ENVIRONMENTAL CARE and QUALITY.

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