SAFETY MANAGEMENT IN INTERNATIONAL PROJECT: PROBLEMS ENCOUNTERED AND RECOMMENED SOLUTIONS

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Introduction

Every year there are thousands of accidents happening around construction sites worldwide. From the accident statistics of United States and United Kingdom, the trends of construction accidents throughout the world can be seen: the construction industry has more accidents happening than the average level of other industries and the figure of fatal injuries is much higher than the average figure of other industries[2]. So the construction companies need safety management to improve their efficiency and competence.

The interest in safety awareness among construction companies has greatly increased in the past decade. This increased awareness in safety can be attributed to many factors: the relation between risk management and return on investment, the ever-increasing cost of medical treatment, convalescent care, and the potential for lawsuits. Also the companies with has bad safety records are often prohibited from bidding on a certain kind of work.

Responsibility for Safety[5]

In general, every party involved in a project has a responsibility for safety, including the owner, the designer, the engineers, the major contractor and the subcontractors. The owner and the project designer have an indirect impact on the safety practices encountered on the job site. In fact, there is a trend in the construction industry to enhance safety by design because the designers clearly can and do influence construction worker safety through their design decisions. Therefore, if the design process takes the safety of the workers into consideration, the overall safety of the project can be impacted in a positive manner. It is the owner's responsibility to ensure the implementation of this design standard from project initiation, and to make safety a priority for the duration of the project. If this method of design is accepted, the overall safety of the project will be undoubtedly enhanced.

Different with the owner and the project designer, the engineers and the contractors have a direct impact on the safety of the job site. The engineers have a professional and moral obligation to take safety, health, and welfare under construction. It is their duty to superintend the contractors to carry out safety management policy. To ensure project safety, the contractors should play the most important role among all the parties. The Occupational Safety and Health Administration (OSHA) specifically requires that employers such as contractors are responsible for providing workers a place of employment free from recognized hazards. The contractors should produce their own safety policy and carry it out throughout the duration of the project. The major contractor has the responsibility of managing the safety of its own employees as well as the employees of the various subcontractors utilized for the project. This often places the major contractor in an awkward position and a lot of problems may be encountered during the project, since the company may not be competent in managing the safety of all subcontractors on the job site. The subcontractors are also faced with similar problems that they employ a lot of workers, it is their duty to ensure the employees' safety. Also, since the subcontractors may be small-to medium-sized company, their safety program may not satisfy both the requirements of the major contractor and the standards produced by OSHA. This paper will focus on the problems which may be encountered by the subcontractor of a international project and recommended solutions are given. Also, what the major contractor should apply in its safety policy is mentioned.

Safety in International Project

To most of the domestic powerful construction companies, they need to enter international project market. A lot of international project's characteristics make safety management to be one of the most important aspects that the contractor need to pay much attention to. To most of international projects, the job site may be in another country and they are operating in a social, economic and physical environment that is quite different from that on which the construction companies are based. In the job site of the project, there are employees from different countries. They are quite different in their living habit, working style and ideology. In this type of people, working accidents may have strong negative impact on the project. The death of those people due to working accidents or ill will bring great hurt to their family and friends, and the influence on the job site will last a long period of time. An international contractor will suffer economic loss and degrade of reputation in his field if working accidents happen on the job site.

Another character of international projects is that the major contractor often comes from the country different from the project's country. This foreign major contractor will employ large quantities of domestic workers to decrease the cost of project. In such case, the relationship between the employer and employee becomes a sensitive problem, especially in some countries. If the employer (foreign construction firm) can discreetly deal with the affair of safety and health of the employees, it will get the support and appreciation of those domestic employees. On the contrary, if the foreign construction firm does not respect domestic workers and pay little attention to their safety and health, once working accidents happen on the job site, the consequence will be very serious which may lead to strike on the job site.

The importance of safety in international projects is also emphasized in world wide use of FIDIC contract conditions. In the second part of the fourth edition of Conditions of Contract for Works of Civil Engineering Construction, [3] there are many conditions talking about the safety and health of employees, some are listed below:

(1) The Contractor shall have on his staff at the Site an officer dealing only with questions regarding the safety and protection against accidents of all staff and labor. This officer shall be qualified for this work and shall have the authority to issue instructions and take protective measures to prevent accidents.

(2) Due precautions shall be taken by the Contractor, and at his own cost, to ensure the safety of his staff and labor and, in collaboration with and to the requirements of the local health authorities, to ensure that medical staff, first aid equipment and stores, sick bay and suitable ambulance service are available at the camps, housing and on the Site at all times throughout the period of the Contract and that suitable arrangements are made for the prevention of epidemics and for all necessary welfare and hygiene requirements.

(3) The Contractor shall at all times take all reasonable precautions to prevent any unlawful, riotous or disorderly conduct by or amongst his staff and labor and for the preservation of peace and protection of persons and property in the neighborhood of the Works against the same.

Safety Practices and Problems Encountered

The safety practices and problems encountered on construction sites are as varied as the sites themselves, all construction sites have their own unique aspects of safety which must be considered. Most international projects are large sized projects and the major contractor usually is the world famous firm from developed country. These companies have reputations to uphold as well as safety records to maintain, also they are generally better prepared to manage the safety aspects of a project. But this does not mean that they will not encounter safety problems during a project because as the major contractor of a project, they are responsible for the safety of the whole project including the subcontractors' part. In general, those companies as subcontractors may not have enough experience and knowledge to ensure their safety policy. One of the problems the major contractor need to solve is that the major contractor itself does not have thorough knowledge of the subcontractors' safety procedures and will easily assume the burden of implementing a safety program for every subcontractor. As a result, the major contractor often leaves the responsibility of

safety to the individual subcontractors and may never take an active part in ensuring that the subcontractor is actually exercising all measures necessary to provide a safe working environment.

Although more and more Chinese construction firms enter into the first 225 international contractors of the world, most of the contracts they win are located only in the developing countries and the contract value are relatively small. To enhance the competence in international project market, our construction company should try their best to win the chance of cooperating with those famous companies as subcontractor. Now most of Chinese construction firms can not fully satisfy the requirements outlined by OSHA.

A construction company's emphasis on safety is proportionate to the size of the company. As an example, smaller companies may not place as high a priority on safety as larger companies. While there are smaller firms with excellent safety programs and records, and while there is no doubt that smaller firms would benefit from a more comprehensive safety program, it is nonetheless a difficult process for them because of the expense incurred in implementing such a program. Safety training is often left to an on-the-job learning exercise or taught by the employees' union or trade organization. But the best training is often acquired through experience, on-the-job training, and continuing education.

Some small sized construction firms may not have an adequate safety program. Implementation of their safety management programs is usually left up to the foreman or the project superintendent. Because of their normal work load, neither of these have time to put the best effort toward the program. As a result, the method employed is often a "just get by" approach, satisfying only the minimum requirements.

Most of the construction companies have special personnel and safety department to take charge of safety affairs of companies' all projects. This method is useful to domestic projects, but if the project is outside of the country, the job site may not be visited by the safety officer and the project team will receive little assistance from the headquarter.

One difficulty encountered by the subcontractor is that they can not, at times, place the proper emphasis on safety. At the beginning stage of the project, the quantities of workers on the job site may be a few, and some traditional safety management methods, such as daily "tool box" safety talks, [6] may have good effects. While when the project schedule is tight or at the summit stage of the project, these traditional methods are not enough.

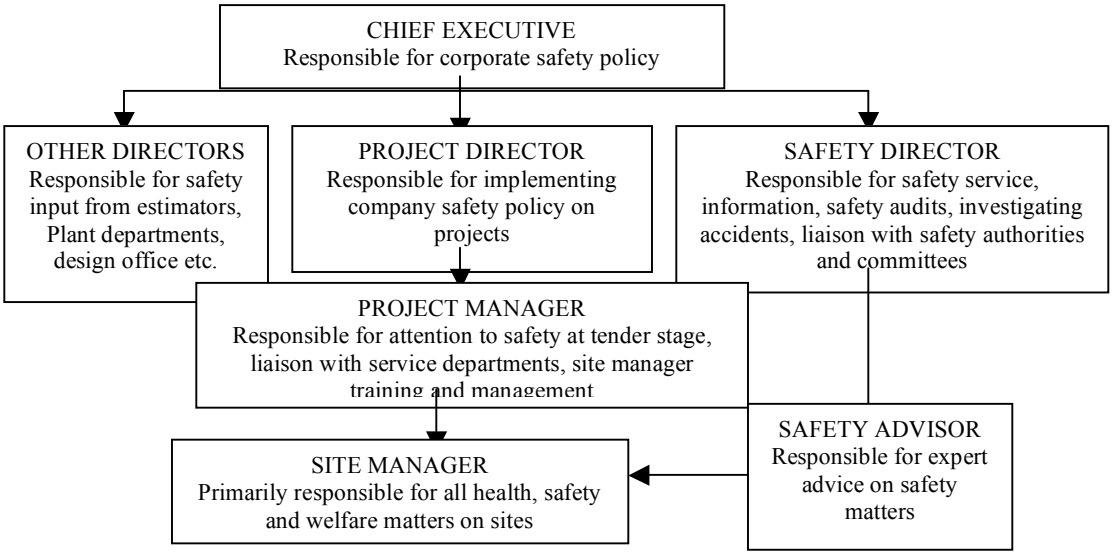
Another problem is how to deal with domestic labor. Managers are often dispatched from company's own country, they may not have the experience to deal with domestic affairs.

Suggestions And Solutions

On the job site of every project, the project manager shall establish a safety system to avoid any working accident. This work has four aspects of job:

(1) Establishment of safety organization

Each project needs a safety organization under the direct leadership of project manager. The typical construction organization is described in the figure below:[4]



It is important that the company has a full-time safety director or at least one person who is responsible for the company's safety program. Having full-time safety personnel relieves the pressure, somewhat, on the onsite construction project team. This allows the project personnel to focus their efforts on the project itself.

(2) Safety inputs storage[11]

In the financial system of international projects, the costs of ensuring safety are regarded as indirect cost. Some contractors regulate that safety cost be divided into two parts: the first part is withdrawn by the headquarter and used as accident treatment fare, when there are more accidents happening, this part will increase proportionately. The second part is retained by the project team and used as accident treatment fare on the job site. In such case, the project manager is obligated to take measures to avoid working accidents to decrease the cost of the project.

The project manager shall retain abundant money to make enough safety equipment and instruments available to deal with the emergencies that happen on the site. This equipment include:

a. First aid equipment and stores. When there are injured worker, the urgent treatment will be available, if the worker is seriously injured, suitable ambulance service should be available.
b. Enough safety instruments and equipment. For example, safety helmet, safety belt, special suit, special operating tools etc.
c. Enough extinguisher, special pipes and faucet to avoid fire disaster. Flammable materials need special storage and custody. Dynamite used in construction need full-time guard to ensure its safety.

(3) Establishment of safety regulations

First of all, the safety regulation of the project must correspond to the safety policy, law and specification of project's country, and the labor protection standard and safety technical regulation must be carefully carried out. Worker must abide by the safety operation regulation of his work species. So the management staff involved in an international project must study laws and regulations that relate to safety construction and labor protection and carry it out rigidly to avoid working accidents happening.

Every work aspect has its own safety regulation and special requirements. Training to all labors in the job site is necessary. Through training, workers on the site can get a complete knowledge of safety requirements and safety technique of their work aspect and enhance their ability of self-protection.

During the construction of an international project, other than the safety regulation and specification mentioned above, a complete safety system must be established which can be divided into four subsystems:

a. Safety conference should be held at intervals. At the various stages of the project, this interval can be changed relatively. A weekly safety meeting is recommended to the company and at this weekly meeting, appropriate safety information, project scheduling and cost are reviewed by the project manager. The importance of safety should be placed as well as the schedule and cost. Some potential hazards should be analyzed and pointed out to draw the attention of the foremen and site managers, the measures to avoid these hazards should be discussed and carried out during the following week's construction. The overall results of this method of safety conference are proved to be excellent by last international project practices.

b. Safety inspections should be carried out. In the job site of the project, the site manager and foreman usually put their best effort into the control of the progress and have no time to think about the safety affairs. So it is recommended that all staff should be involved in the safety inspections. Therefore, instead of the project manager being solely responsible, the enforcement of safety is to be shared. Workers can conduct self-inspection, foremen and site managers should inspect safety of their own part before the weekly safety conference of the project and listen to the suggestions and safety concerns of the workers. This is important so that at the weekly safety conference, these suggestions are discussed and solved by the project manager. Also the project manager, with his safety advisor, should inspect different parts of the project and get the first-hand safety information of the project. At the weekly safety conference, he should criticize the site manager who has safety problems and working accident and praise the one who has excellent safety performance and record. The above mentioned method has many advantages. One is that this method involve the workers on the job site with the safety issues of the job, once their problems are solved or their suggestions are adopted by the site manager or project manager, their working enthusiasm will be markedly increased. Another benefit this method provides is to educate employees on the various safety concerns of the different parts and how they may affect the project.

c. Putting the avoidance of working accidents the first place of safety construction. Every construction company should believe the policy that "construction must be safe and the safety is for construction". During the construction of a project, the project manager must abide by the thought that "the safety is at the first place and precaution is most important". The construction practices prove that if there are two job sites that have similar working conditions and scale, the one which carry out the principle of "precaution is the most important" has better safety performance and records and the working accidents are much less than another one. Safety training is the most effective method to carry out this policy. The facts prove that the lack of formal safety training is commonly the weakest part of accident prevention in construction. All personnel must receive formal safety training. This training should relate specifically to their responsibilities and should be repeated whenever their responsibilities or environment changes. In any case, the training should be repeated at regular intervals – ideally annually – to act as a refresher and to include changes in legislation or methods of construction. At the workface, site managers and foremen should receive short and specific safety instruction at regular intervals – ideally weekly, called "tool-box talks" and cover aspects of safety that will be encountered on a day-to-day basis. However, these short refresher talks should not take the place of more formal "off the job" training. The majority of accidents occur to people within their first few days on site, therefore prior to commencing work on a new site, or even visiting a site, each employee should receive a safety induction that will cover specific risks and location of hazards on that site, at that time. It is considered good practice to issue all personnel a safety handbook during their induction. This will enable them to take away a readily available guide to the safety aspects of the site. A typical safety handbook is covered by contents such as site rules, what to do in an emergency, how to respond to an accident, correct safety equipment, a site plan showing medical facilities and muster points, examples of typical warning signs and details of the safety award schemes etc.

d. Get a domestic safety expert as safety consultant. To most of the international projects, contractors come from different countries. Though the principles of safety management are universal, however, construction practice varies from country to country – furthermore each country has its own safety legislation. Before considering trading in another country it is essential that the full requirements of that country's safety legislation are understood. Because of the complex nature of much of the legislation and the significance of correct interpretation of the law it is advisable to obtain specific advice from a national safety consultant.

(4) Establishment of reward and punishment rules

During the construction of an international project, the happening of a working accident will result in great economic loss. If all the personnel are concerned about the safety construction, a lot of money will be economized. So it is helpful to enhance the safety of construction that reward the job team with excellent safety performance and records, at the same time, the one with bad safety performance will be punished.

The specific rules should be regulated according to the character of the project. To a international contractor, the following two rules are recommended:

a. The headquarters of the company should decide whether or not to reward a project team according to their safety performance and records. Usually different project team had various safety performance and records due to the different emphasis on it and the different ability of the project manager. So it is necessary to decide reward or punishment and how to implement them. The benefit of this method is that it will form the competence among the project teams and consequently develop the safety management ability.

b. Inside a project team, the project manager also should decide whether or not to reward a job team according to their safety performance and records. A safety inspection is recommended that the job team's safety records can be filed and the overall records are the safety performance of that job team. The reward or punishment should be regular, and the ideally intervals is quarterly.

Some Useful Suggestions for Major Contractor

Some useful suggestions to improve safety of an international project are listed below:

(1) Produce a site policy that includes and conditions, procedures, guidance notes and codes of practice. The policy should incorporate client requirements, where appropriate, and be included in the contract documents for the subcontractors.

(2) Set up the site organization for the management of health and safety.

(3) Ensure that subcontractors are briefed about anticipated construction methods, site/design factors, relevant hazards, precautions, general site safety rules and conditions, and clear about divisions of responsibility. Similarly the subcontractors should inform the major contractor, and interfacing subcontractors, about possible hazards arising from their own activities.

(4) Ensure that subcontractors have made plans to work safely, have priced their bids accordingly and have the necessary resources. Each subcontractor should produce a contract-specific safety policy.

(5) Ensure that subcontractors produce detailed method statements for high risk activities, to monitor the subcontractor's performance against the method statements and take action where necessary. It is good practice to consider safety as the first item on the agenda of the regular subcontractor progress meetings.

(6) Manage health and safety on site by coordinating activities, ensuring that planned procedures are implemented and monitoring performance so that revised arrangements can be made as necessary. The major contractor should ensure that he does not become remote from day-to-day problems on site.

(7) Consider the creation of a joint safety committee operating on a site-wide basis and involving representatives of management and operatives from all subcontractors.

(8) Carry out inter-inspection among subcontractors in turn. Each subcontractor has the chance of being the inspector of safety along with the major contractor's safety staff, and the records will be filed.

(9) Convene regular, site-wide coordination meeting, attended by both the major contractor's staff and each subcontractor's site management. Safety is the key aspects of coordination.

(10) Make site-wide arrangements for emergencies, fire prevention, safe access, lighting, etc.

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