

## A STUDY OF IMPROVING SAFETY EDUCATION FOR OVERSEAS CONSTRUCTION WORKERS

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**Abstract :** Overseas construction markets reignited since 2003 overcoming the global economic crisis, while construction markets are growing in Asian developing countries such as Middle Eastern region, China, Philippine, etc. Many of Korean builders operating in such countries are carrying on abroad with around half the total construction orders. Most construction works currently engaged by these companies include projects hard of building for workers, such as skyscrapers, nonlinear structure, long-span structure, etc. This has caused an increase in both worker accidents and construction companies' desperate need for efficient safety education for their workers. This thesis will look into the safety present condition and safety awareness of foreign workers at construction sites and dwell on the best method of instructing safety management.

**Keywords:** *Occupational Health, Overseas Construction, OSHA*

### 1. INTRODUCTION

Continued stagnation in domestic construction market, slump in real estate market, and expanded size of overseas construction market focused on plant project are steadily increasing a new penetration in foreign markets of mid-sized enterprises as well as the existing large ones [1] (Nam Jung-tai, 2008). Especially, foreign construction orders for 2010 rose to US\$ 71.57 billion [Fig 1], breaking the historical record of annual amount of orders received and ascertaining the importance of overseas markets for Korean enterprises.

Due to such problems at the site, more effort is put to safety management at the site than ever before, but it is still far from a systematic and substantial safety education for workers. Therefore, in this thesis, the author will look into the safety actuality and awareness of foreign workers and then consider the best education method for safety management.



**Fig 1: Present condition of Korea's overseas construction orders (International Contractors Association of Korea, US\$ 71.67 billion for 2010)**

### 2. BACKGROUND

#### 2.1 Principle of disaster occurrence

Causes of disaster occurrence may differ by industry but its principle can be interpreted in the same context. To prevent disaster, one should understand the principle of disaster occurrence on how it comes up. Theories on the principle of disaster occurrence are shown in Table 1.

**Table 1: Theories on the principle of disaster occurrence**

Division	Content
Heinrich's theory of domino sequence	Disaster occurs from an accident due to unsafe action or state, which is caused sequentially by results of antecedent factors.
Bird Jr's theory of improved domino sequence	Five factors of loss control set off a chain reaction, bringing about disaster
Adams' theory of accident sequence	To Bird's theory of domino sequence adds the view that besides tactical error in worker's action and state of work, there is operation error made by the manager or supervisor.
Weber's theory of domino sequence	By combining the existing theories of domino sequence with the concept of operation error and accident sign, this principle theory insists that all accidents and disasters are the signs of operation error.
Zabetakis' theory of domino sequence	By combining the existing theories of domino sequence with direct cause of unexpected release of energy and dangerous substances, this causal theory insists that disaster occurs from unexpected move or release of energy.

Like this, principles of disaster occurrence vary, but it can be said, as Heinrich argued, that disaster always occurs from the chain reaction of accident factors [2].

**2.2 Types of construction disaster**

As the overseas construction work is gradually becoming larger, higher-rise and more complex, patterns of construction disaster are becoming ever diversified. Kinds of disaster occurring at the construction site can be largely divided into personal and material accidents, detailing in separation as Table 2.

**Table 2: Types of construction disaster**

Division	Content
Fall	-Falls pursuant to work at a height, scaffold, opening, etc. -Failure to install safety rail or zone
Drop/flying	-Drop or coming flying of construction materials -Uninstalled or poor prevention net keeping from drop or flying
Electric shock	-Electric shock by means of electricity, machinery or apparatus -Poor electric wiring, AC arc welder work, etc.
Collision/stricture	-Worker's collision or stricture at work caused by equipment -Unassigned equipment guide and lack of care
Collapse/destruction	-Washout caused by ground subsidence -Collapse and destruction of scaffold, supporting post and cast
Others	-Reversal of construction machinery -Fire, blasting, explosion -Sealed workshop, tunnel work, etc.

To understand disaster cases above and prevent construction disaster in future, education for construction safety is necessary.

**3. Comparison of safety and health system home and abroad**

**3.1 Analysis of Korea's safety and health system [3]**

Domestically, it is compulsory by law for employers to perform education for work environment, methods, etc. on the subject of their employed workers. Education consists of regular training, new recruit training, training pursuant to changed substance of work, special training, etc. while the content covers workers' safety and health for preventing industrial disaster.

To prevent disaster from harmful, dangerous work, the education has the purpose of building proper response

ability by enabling workers to acquire safety and health technique and related skills needed to make and keep their action and condition of facilities safe, and of reducing the occurrence of disaster to the minimum.

### 3.2 Analysis of the U.S. safety and health system [4]

In the U.S., Occupational Safety and Health Act (OSHA), the first of its kind in the world, was established in 1970 as an overall occupational safety and health law. For OSHA's official duties, OSHA, a government agency, is performing inclusive safety management system.

OSHA's core function is to establish safety-related regulations and standards and enforce these as strongly as possible. Since OSHA's superintendent is not allowed to notify of his visit plan in advance unless there is an urgent matter of danger, it is enough to make effective superintendence possible. Except that the organization does not make an ordinary regular checkout but focuses on the investigation of workplaces where an accident has occurred or ascertainment of the fact a worker has petitioned to.

### 3.3 Analysis of the U. K. safety and health system [5]

The U. K. has provided all those related to construction work safety with respective responsibilities by introducing Construction, Design and Management (CDM) system in 1994. Currently, this system is applied to all the sites in the U. K. with over 500 man days or 30 days of expected construction work period, or engaged by over 20 workers with a subcontractor.

This system, with a purpose to secure lasting safety for the entire process of construction work, such as planning, design, construction, etc., regulates that ordering body, safety superintendent, designer, prime contractor and subcontractor cooperate with each other in each phase of construction work to review safety and comply with obligations imposed to secure safety for each.

### 3.4. Analysis of Japan's safety and health system [7]

BY establishing Labor Safety Sanitation Act, Japan has stipulated on worker-related activity of safety and health specifically by machinery and apparatus, harmful substances and work form. System of screening a plan for preventing harm and danger of construction work is similar to the system of occupational safety and health act of our country. Except that they limit this to a large-scale or special construction work with no regulations on the construction work of a structure for construction safety.

## 4. Plan on safety education for overseas workers via analysis of safety and health system

To seek the most suitable method of education for overseas construction markets ever being enlarged and complicated by analyzing the safety and health education for construction workers of advanced countries, this study compared and analyzed safety and health systems home and abroad currently in force in Table 3.

**Table 3: Comparison of safety and health system home and abroad**

Division	Korea	U.S.	U.K.	Japan
Education on Worker safety and health	Occupational Safety and health Act	OSHA Act U.S. Federal Rules	Acts related to guaranteeing worker health, safety and welfare	Labor Safety and Sanitation Act
Government agency in charge	Ministry of Labor Korea Occupational Safety & Health Agency	OSHA	HSE POSPA TUC	Department of Labor
Agency in exclusive charge of education	Present	Present	Present	Present
Paying education fees	No	Yes	Yes	Yes
Education Support for small-size workplace	Education enforced but without an agency in exclusive charge	Yes	Yes	Yes

#### 4.1 Comparative analysis of safety and health systems home and abroad

As seen from Table 3, safety and health systems abroad involve an agency in exclusive charge of education for mostly paid, while in Korea, there is no state-level agency in exclusive charge of education, which is carried out for free.

#### 4.2 Plan on safety education for overseas workers

In order for safety education for overseas workers, an internationally unified safety education organ should be installed above all. At overseas construction work, builders, who comply with domestic construction safety and health system, manage workers in such diverse and complicated ways that it results in generating many difficulties as well as disorganized management. Organizing an internationally unified safety education organ can prevent in advance the workers' involvement in construction disaster, while piling up related data can make a large effect on preventing its recurrence.

In addition, construction companies should bear the education expenses for the international safety education organ in an effort to train the workers. To this end, at time of bidding, they should cover the content of worker safety education, and workers also should receive the education positively without neglecting it.

#### 5. Result

This study analyzed safety and health education of advanced countries for construction workers in order to consider the most suitable method for overseas construction markets characterized by added larger size and complexity.

As a result of comparing safety and health system between countries, the author confirmed the necessity for an international organ in exclusive charge of education. To relieve workers' burden of education costs, construction companies should endeavor to improve worker safety and quality of construction work including its expenses at the time of bidding.

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