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Master of Science in Engineering

Analysis of the Relationship between  
Job Stress and Disasters of  
Local/Foreign Construction Workers

by

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Department of Architecture & Architectural Engineering

The Graduate School

Seoul National University

August 2016

**Analysis of the Relationship between Job Stress  
and Disasters of Local/Foreign Construction  
Workers**

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**Analysis of the Relationship between Job Stress  
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**July, 2016**

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**Analysis of the Relationship between Job Stress  
and Disasters of Local/Foreign Construction  
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**by**

**Inyoung Bae**

**A thesis submitted in partial fulfillment  
of the requirements for the degree of  
Master of Science in Engineering**

**Seoul National University**

**2016**

## **Abstract**

# **Analysis of the Relationship between Job stress and Disasters of Local/Foreign Construction Workers**

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Seoul National University

In the past 10 years, the number of foreign construction workers has increased by more than 10 times, and 1349 work disasters occurred to foreign workers in 2014. Foreign construction workers who are brought to Korea assume physically demanding jobs that domestic construction workers avoid, and, due to the industry's structural problems, they are vulnerably exposed to poor circumstances, including insecurity, employment instability, receiving lower wage, wages being unpaid and overtime working. Moreover, although they may not intend to permanently stay in Korea, they still need time for social and psychological adjustment while they do their jobs in Korea. These inferior conditions can result in a significant job stress and consequently cause construction disasters. However, if the result is to derive a relationship

between the both, or when you want to find the results, control effect must be verified. Although moderator factors are the same operation and exposed individually, personal factors and environmental factors are causes because it bring difference in the way they respond to the situation.

Therefore, as a study on protracting elements of job stress as a way to prevent construction disasters of increasing foreign construction workers, this study has compared and analyzed job stress level of both domestic and foreign construction workers. To provide a guideline as a means to prevent associated construction disasters, we have analyzed 3 aspects of job stress: cause, meditation and consequences. We believe this research can serve as a basic guideline for the job stress management of foreign construction workers.

**Keywords:** Local and Foreign construction workers, Job stress, Construction disasters, Goal orientation, Social support, Acute reaction

**Student Number:** 2014-22629

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# Chapter 1. Introduction

## 1.1 Research Background and Objective

As the number of foreign construction workers has increased by 10 times in the past 10 years, the figure has now reached near 86 thousand in 2015 (CWMA 2015). Despite such increasing influx of foreign labor, foreign workers are more likely to be assigned to physically demanding or geographically unattractive job assignments. Also, due to cultural disparity and language barriers, foreign workers find it difficult to respond quickly whenever an disaster arises on a construction field (Choe and Kwon 2008, Son 2010). According to the statistics announced by Korea Occupational Safety and Health Agency (KOSHA) in 2014, 1349 foreign workers have experienced construction disasters and showed frequency rate of injury rate by 15.68%  $(=(\text{injured}/\text{workers}) * 1000)$ .

Especially, foreign workers have been brought to Korea as a government's measure to compensate the lack of man power in industrial areas due to industrial structure of domestic market, and most of them have been assigned to small or medium sized companies with high risks(Lee 2008, Lee and Chang 2012, Yi et al. 2012). Moreover, although they may not intend to permanently stay in Korea, they still need time for social and psychological adjustment while they do their jobs in Korea (Jeong et al. 2003). This can be a major cause of job stress to foreign workers and cause them to experience mental, physical and behavioral distress (Seok et al.

2003). These symptoms stir unstable behaviors and consequently result in construction disasters (Ahn and Son 2007). Hence, based on a due consideration on the characteristics of foreign workers, it is required to prevent disasters and manage jobs stress. However, according to a protocol provided for KOSHA for supervisors on the field, job stress management has been insufficient as it is generally applied to the entire construction workers, not specifically targeted on foreign workers.

Therefore, by examining the characteristics of foreign workers noticed based on the comparison of job stress level experienced by local and foreign workers, this research aims to analyze of the relationship between job stress and construction disasters for each group.

## 1.2 Research Scope and Process

This research has compared the job stress level experienced by domestic and foreign construction workers, and, to provide a guideline as a means to prevent associated construction disasters. There are 3 aspects have analyzed job stress: cause, meditation and consequences.

This research has conducted a survey on domestic/foreign construction workers working on 6 different construction sites over a capital area and the research procedure follows as

1) Based on the analysis of previous studies on correlation between job stress level and construction disasters, and draw major variables to be questioned in a survey.

2) After a survey, analysis the collected data. Compare the job stress level of local and foreign construction workers and conduct a regression analysis on moderator and mediator variables.

① The frequency analysis was conducted to evaluate the demographic characteristics of the respondents composed of two groups.

② Then skill level statistics and correlation analysis was conducted to investigate the relationship between the Job Stress, Achievement Goal commitment, social support, and acute reactions. And an independent-sample t-test was conducted for the verification of the main factors in the difference in magnitude of foreigners.

③ Multiple regression analysis and hierarchical regression analysis were conducted in order to verify the mediating effects and moderating effects of achievement goals will and social support and control efficiency.

2) Deduce a conclusion based on the protracted analysis and discuss measures to alleviate local and foreign construction workers' job stress and to prevent construction disasters.

## **Chapter 2. Preliminary Study**

In this chapter begins by comparison of the statues local and foreign construction disasters. Also, find the relationship of construction disasters and job stress. Limitations of previous research are discussed focusing on different point of target set. To deal with the limitations of past research, set the measurement job stress index.

## 2.1 Status of Local/Foreign Construction Disasters

### 2.1.1 The Status of Construction Disasters

The status of disasters in 2014 based on the construction industry accounted for 25.3% was in second place. Due to the peculiarities of the construction industry and the aging of the construction workers, the influx of foreign workers, construction disasters are increasing every year (Kim 2012). In the status (Table 2-1) of local and foreign construction disasters in domestic construction (KOSHA 2014), 157,737 disasters occurred recently there years (12-14) and 7678 disasters (4.87%) of them were foreign construction workers. Compare to dead rate and injured rate, dead rate is higher than injured rate of foreign construction workers.

Table 2-1. Injured and dead of total and foreign construction workers

Year	CWs(Total)		Foreign CWs		Rate(FCWs/CWs)	
	Injured	Dead	Injured	Dead	Injured	Dead
2012	23349	557	1237	38	5.30%	6.82%
2013	23600	567	1134	31	4.81%	5.47%
2014	23669	486	1349	35	5.70%	7.20%
Total	157737	3914	7678	276	4.87%	7.05%

(Unit: people)

### 2.1.2 The Status of Foreign Construction Injured

The number of foreign construction workers has increased more than 10 times in the last 10 years from 7,852 people in 2005 to 86,277 people in

2015(CWMA 2015). Thus, the number of foreign construction injured is increasing because of the rapid influx of foreign construction workers in domestic construction. From the data of KOSHA 2014 (Table 2-2), last 3 years (12-14), in comparison between the numbers of foreign construction disasters of nationality, the Korean-Chinese workers are the most (1066 people in 2014) and the Chinese workers are the highest disasters rate (5.10% in 2014). But, there were not many disasters of Southeast Asia workers. The reason is the portion of Southeast Asia workers is low in the construction industry.

Table 2-2. Comparison of nationality of injured foreign construction workers

Nationality	2012			2013			2014		
	Workers	Injured	Injured rate	Workers	Injured	Injured rate	Workers	Injured	Injured rate
Total	84734	1237	1.46	64355	1134	1.76	86029	1349	1.57
Korean Chinese	70238	1045	1.49	47090	914	1.94	70035	1066	1.52
Chinese	2613	139	5.32	2546	178	6.99	4443	227	5.10
Mongolian	312	4	1.28	229	9	3.93	217	3	1.38
Uzbek	944	11	1.17	865	8	0.92	613	11	1.79
Vietnamese	4146	9	0.22	5909	9	0.15	4462	7	0.16
Thai	2493	3	0.12	461	0	0	1075	8	0.74
Filipino	1221	2	0.16	2725	0	0	853	1	0.12
Others	2767	19	0.69	4530	16	0.35	4331	21	0.48

(Unit: people, %)

### **2.1.3 Relationship of Construction Disaster and Job Stress**

A direct cause of construction disasters can be categorized into two main categories (Heinrich 1931): “unstable condition” and “unstable behavior”. “Unstable behavior” can be considered as a major cause of construction disasters. There have been many previous studies conducted on jobs stress level that causes unstable behaviors either directly or indirectly from social and psychological perspectives (Ahn and Son 2007). Lim and Chi (2015) have proven that psychological conditions of construction workers and safety performance have an influence on the construction site. Leung (2016) have examined that of various job stress elements, organization’s safety culture, shows a strong influence on a worker’s unstable behavior and that an unstable behavior serves as a major cause of construction disasters. Love (2010) has proven that social/psychological factors like job stress and social support have an indirect influence on construction disasters. Moreover, Sobeih (2009) confirmed that there is a close relationship between most commonly observed musculoskeletal illness in work place and job stress level.

Table 2-3. Previous studies

<b>Authors</b>	<b>Object</b>	<b>Job stressors</b>	<b>Moderating Factors</b>	<b>Outcome</b>
Ja (1990)	Staff of the KEPCO	Job demand, leadership, Insufficient job control	Individual factors(age, gender, position, type A personality, achievement)	Psychic tension
Kim and Go (1992)	Manufacture labors	Job stressors(pressure, alienation)	Social support, Weness(intimacy, consideration)	Unsafe acts of people(omission)
Choe and Kwon (2008)	Construction Workers(in Korea)	Role ambiguity, Interpersonal relations, Safety	Self-esteem, Type A , Organizational support	Job burnout, Job attitude(job satisfaction, job engagement)
Kim and Ha(2011)	Foreign laborer(in Korea)	Acculturation, Organizational fairness	Social support	Organizational commitment
Lee and Chang(2012)	Shipbuilding workers, House managers, Apartment construction workers	Job demand, Insufficient job control, Interpersonal conflict, Job insecurity, Organizational system, Lack of reward	Individual factors(age, year of service, type of industry)	WAI(Work Ability Index)
Leung (2016)	Construction Workers(in Hong Kong)	Safety equipment, Supervisor support, Co-worker support, Job certainty, Job control		Disasters

## **2.2 Local/Foreign Construction workers' Job Stressors**

### **2.2.1 Job Stressors**

Job stress started to study by Hans Selye in mid-1930. It is composed of a variety of psychosomatic concept is structured as has been studied in physiology, medicine, behavioral sciences, organizational level in areas such as corporate business administration(Kim 2010). The National Institute for Occupational Safety and Health (NIOSH) defined work-related stress “As the harmful physical and emotional responses that occur when the requirements of the job do not match the capabilities, resources, or needs of the worker. Job stress can lead to poor health and even injury.” The Health and Safety Commission stated “Stress is the reaction people have to excessive pressures or other demands placed on them.” The Australian Government defined job stress as “A form of strain, a stats of negative emotions and arousal experienced in relation to the work role.”

Based on a variety of definitions, in this study job stress is following as; it is elated with stress factors and employee and it causes acute mental and physical situation. It should be defined as occurring in acute psychological reaction to a physical job stress and employee job-related stress factors caused by the interaction situation.

### **2.2.2 Job Stressors of Construction Workers**

Construction workers are hired on a project-to-project basis and may spend only a few months, weeks, or days on any single site (Leung at al.

2016). Arising from monotonous but demanding task conditions, inadequate interpersonal support, deficient organizational safety climates, poor physical environment (Lee 2011, Leung et al. 2016) such as working height, working in crowded places, and operating complicated plant and equipment, and unbalanced effort-reward systems, job stress can often easily manifest itself as tension or dissatisfaction and can influence the psychological health performance of individuals (Leung et al. 2010, Love et al. 2010). Because of the detrimental working environment, construction work is regarded as one of the most stressful occupations.

### **2.2.3 Job Stressors of Foreign Construction Workers**

By comparison with other countries, in Australia (Johnny et al. 2010), an estimated 20% of workers are born overseas, half of workers from non-English speaking countries. To recognition of the trend and issues, previous study had drawn the topic of cultural diversity management in the construction site. In the case of Malaysia (Salleh et al. 2012), the language problem issue among foreign workers in the construction industry. This issue is said to be contributing to the occurrence of disasters. On the other hands, In Japan (Masahiko 2010), the policy of hiring foreign construction workers is strict: the period is only 2 years. Because of policy, there are many illegal foreign construction worker in construction site, unfortunately. So, local construction workers get lots job stress. In Singapore, the policy of hiring foreign construction workers is also strict though, wage is same as domestic

workers. Therefore, there are not many problem form foreign construction workers.

In the case of Korea, Foreign workers, even if it temporary, they leave their homeland to work abroad and that requires a psychological adjustment as well as require adaptation in the social cultural aspects (Jeong et al. 2003). In other words, the situation of temporary employment abroad is a kind of occupational stress factors that cause considerable stress to workers, therefore migrant workers are often experience the psychological distress, such as depression, anxiety, physical disorder (Seok et al. 2003). Especially foreign construction workers in the construction industry are carrying out regional and physically tough task where the local construction workers avoid. In addition, it faced weak employment environment in terms of occupational safety and health in the absence of an immediate response to the disasters caused by cultural differences and language communication problems (Yi et al. 2012).

## **2.3 Job Stress Moderating Effect**

There are verifications of the effect but you can verify meditating effects if you want to verify on a particular theory about what makes it efficient. However, if the result is to derive a relationship between the both, or when you want to find the results, control effect must be verified (Lee 2015). Although arbitration factors are the same operation and exposed individually, personal factors and environmental factors are causes because it brings difference in the way they respond to the situation (Kim 2010). Personally factor modification means the potential factors and behavioral responses and personal resources. And environmental factors are emotional and social support that weaken the stress response, such as providing a means of identifying information of pride (KOSHA 2005). This study analyzes the factors around the individual's personal commitment and achievement goals of environmental factors and social support.

### **2.3.1 Individual Aspect: Goal Orientation**

The goal orientation is to accomplish the will, depending on what their value is important. And it is to set achievement goals you want to achieve through this indicates the extent of the purpose and the will to achieve a task (Yoon and Lee 2015). Nicholls (1984) is to perform well the task to exert their current skills, accomplishments aims to put others are visually recognized. In addition, Atkinson (1958) presented clearly that the external environmental factors are related with the will of achievement and affect

behavior. In other words, the reason that goal achievement can lead to behavioral commitment is because there was previous experience. Successful actions is delightful experience. And at this time, the one who has strong commitment to the achievement goals is optimistic even in small accomplishments clues. However, the construction workers are unpaid relatively more than other industries (KOSHA 2012) and it is not clear about rising wages depending age or experience. And delayed payment of wage is occurred compared to other business. Therefore, it is inadequate reward, though they achieved a goal.

### **2.3.2 Organizational Aspect: Social Support**

Social support can be emotional, informational, instrumental and of an appraisal nature (Lee et al. 2009). It defined “Emotionally or instrumentally sustaining quality of social relationships.” Some research showed buffering effects where social support reduces the negative effects of stressors and stress-related outcome. It is divided into two types; job-related sources and no-job-related source (Son 2013).

Social support of foreign workers may experience a change by migrating to another country due to being separated from family and friends. Therefore, foreign workers left family and friends in their country and moved to the foreign country and they feel the sense of loss and live busy. Therefore it is difficult to form new relationships (Joeng 2012). Thereby it affects depression, anxiety, hostility, and obsession (KOSHA 2012). In particular, conflicts often arise between the foreign construction workers while they are forced working

in vertical subcontracting structure due to problems of language communication firm (team leader, ohyaji, and foreman) and co-workers.

## 2.4 Job Stress Results

The result of job stress can be divided into individual aspects and organizational aspects (Kim 2010). Primarily, acute reaction appears in physical and psychological aspect and behavior aspect. Physical symptoms are headache, disease and psychological symptoms are instability, job satisfaction. Behavior symptoms are weight loss, organizational commitment, job performance, absenteeism or turnover. Those symptoms. These symptoms cause workers to show lowered concentration, loss of ambition, job dissatisfaction and poor work achievement. These factors can consequently result in construction disasters (Leung et al. 2016). Hence this research aims to examine the frequency of workers' acute response due to job stress in order to design a measure for work disasters prevention.

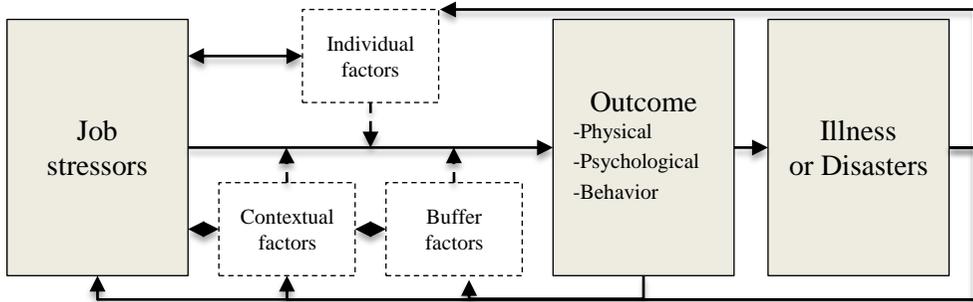


Fig. 2-1. Job Stress Model

## 2.5 Summary

The number of foreign construction injured is increasing because of the rapid influx of foreign construction workers at construction site. To find out the reason why the status, there have been many previous studies conducted on job stress level that cause unstable behaviors either directly or indirectly from social and psychological perspectives.

In the construction industry, because of the detrimental working environment, construction work is regarded as one of the most stressful occupations. Especially, foreign workers are carrying out regional and physically tough task where the local construction workers avoid. In addition, it faced weak employment environment in terms of occupational safety and health in the absence of an immediate response to the disasters caused by cultural differences and language communication problems.

On personal basis, although arbitration factors are the same operation and exposed individually, personal factors and environmental factors are causes because it brings difference in the way they respond to the situation. About the job stress result, there are two aspect: form personal factors and environmental factors.

## **Chapter 3. Measurement of Local/Foreign Construction Workers' Job Stress**

In this chapter, set the questionnaire development and find a data analysis methodologies. In the survey, there are 3 steps job stress factors; job stressors, job stress moderator factors and job stress outcome. To analyze the data, choose liner analysis.

## **3.1 Characteristics of Data**

### **3.1.1 Data Collection**

Before distributing the survey, through the G\*Power 3.1.9.2 the minimum sample size was calculated as 178 people (Fig. 3-1). A total of 400 surveys were distributed to local and foreign construction workers. Of the 400 surveys distributed, 332 construction workers returned completed surveys, giving a response rate of 83%. The survey has 3 translation language; Korean, English and Chinese. The reason why the survey written on just those three language is in the construction industry, there are not many of south Asia or European. Over 70% foreign construction workers are from Korean-Chinese or Chinese. Of all the responses we have collected, excluding 25 responses we found insignificant, we have analyzed 307 responses in total.

### **3.1.2 Demographic Information**

Demographic information (Table 3-1) consisted of nationality, gender, age, academic background, job title. Respondents of the study of 307 people in the local construction workers 235people (76.5%) and foreign construction workers (Korean-Chinese=66people (21.5%), Chinese=6people (2%)). Most of respondents were male (304 people, 99%). The majority respondents were aged over 50 (150 people, 49.3%), with 30.9%, 16.4%, 9% and 1% being aged 40-49, 30-39, 20-29 and under 19 years, respectively. Local and foreign construction workers are being aged. Over 50 years old local and foreign construction workers are 111people (47.6%) and 39people (54.9%). When we have analyzed the age distribution of overall foreign laborers, we have found

out that those in the 30s turned out to be the most common, consisting 35.2% of the total foreign labor force. This also proves that both domestic and foreign laborers are getting aged. Based on the survey result conducted on the Seoul, Kyeong-Ki construction sites, it has also turned out that foreign construction workers are relatively older. In the case of local construction workers, more than 19% of the respondents have education levels of college graduates or above. By contrast, only 1.4% college graduates are in the foreign construction workers. Half of the local construction workers (53.2%) has amassed over 11 years of experience in the construction industry, with 39.1% having 1-5 years of experience for foreign construction workers. This phenomenon is considered to be due to the duration of the foreign workers employment permit system (maximum 4 years).

Table 3-1. Personal information

Variable	Classification	Local	Foreigner	N (%)
Nationality (n=307)	Korean	235(76.5)	-	234(76.5)
	Korean Chinese	-	66(21.5)	72(23.5)
	Chinese	-	6(2.0)	
Age (n=304)	Under 19	1(0.4)	-	1(0.3)
	20-29	7(2.0)	2(2.8)	9(3.0)
	30-39	40(17.2)	10(14.1)	50(16.4)
	40-49	74(31.8)	20(28.2)	94(30.9)
	over 50	111(47.6)	39(54.9)	150(49.3)
Gender (n=307)	Male	233(99.1)	71(98.6)	304(99.0)
	Female	2(0.9)	1(1.4)	3(1.0)
Academic background (n=305)	Elementary school	2(0.9)	4(5.6)	6(2.0)
	Middle school	35(14.9)	26(36.6)	61(19.9)
	High school	151(64.5)	40(56.3)	193(62.9)
	College	46(19.7)	1(1.4)	47(15.3)
Work tenure (n=305)	Less than 1 year	15(6.4)	4(5.6)	19(6.2)
	1-5 years	38(16.2)	27(39.1)	65(21.3)
	5-10 years	57(24.2)	16(23.2)	73(23.9)
	more than 11 years	125(53.2)	22(31.9)	147(48.2)

(Unit: people (%))

## 3.2 Analysis Methodologies

This study included the three aspects (; job stress causes, moderations, outcomes factors) to suggest ways in comparison to the job stress of construction workers.

H1\_1: Goal orientation self-esteem level mediates the relationship between job stress and acute reaction.

H1\_2: Goal orientation recognition from others level mediates the relationship between job stress and acute reaction.

H2\_1: Immediate supervisor support level mediates the relationship between job stress and acute reaction.

H2\_2: Co-workers support level mediates the relationship between job stress and acute reaction.

H3\_1: Goal orientation self-esteem level moderates the relationship between job stress and acute reaction.

H3\_2: Goal orientation recognition from others level moderates the relationship between job stress and acute reaction.

H4\_1: Immediate supervisor support level moderates the relationship between job stress and acute reaction.

H4\_2: Co-workers support level moderates the relationship between job stress and acute reaction.

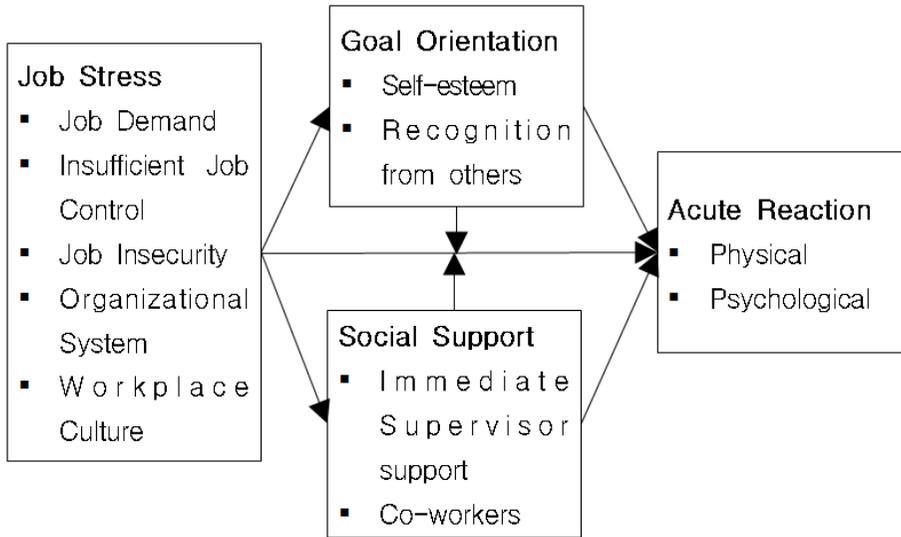


Fig. 3-1. Concept Model

### **3.3 Questionnaire Development**

The job stress, goal orientation, social support and acute reaction scales consisted of 47 items in total (Table 3-2).

#### **3.3.1 Job Stress**

Job stress measurement tools developed in the KOSHA (Korea Occupational Safety and Health Agency) shortened form Joeng (2014) modified for the construction site. 16 items 5 subscale, job demand (4 items), insufficient job control (2 items), job insecurity (2 items) organizational system (4 items) and workplace culture (2 items). Job demand, insufficient job control, job insecurity, organizational system and workplace culture. The third item of job demand subscale was excluded by validity and reliability analysis. Because it has under .4 commonality point. Responses were measured using a 4-point Likert-type scale ranging from 1(strongly disagree) to 4(strongly agree). The questionnaire was designed that the more stress a respondent suffers, the larger the score is (total score: 100). Cronbach's  $\alpha$  values of each factor in this study was found to be .714 job demand and insufficient job control .756, job insecurity .703, .752 organizational system, workplace culture .762.

### **3.3.2 Goal Orientation**

Goal orientation measurement tools consists Button (1996) proposed that the goals pursued by individuals create the framework for their interpretation and reaction to events or outcome. They have identified two subscale: performance goal (10items) and learning goals (3items). The first item of performance goal subscale was excluded by validity and reliability analysis. Because it has under .4 commonality point. However, after validity and reliability analysis results, they performed different commonalities with the existing measurement tools. So, redefined subscale (Table 3-2) based on the concept of Nicholls' goal orientation (1984): self-esteem goal (9items), recognition form other goal (3items). Responses were measured using a 6-point Likert-type scale ranging from 1(strongly disagree) to 6(strongly agree). The questionnaire was designed that the more goal orientation a respondent have, the larger the score is. Cronbach's  $\alpha$  values of each factor in this study was found to be .95 self-esteem goal and recognition form other goal .73.

### **3.3.3 Social Support**

Social support measurement tool based on the NOISH (National Occupational Safety and Health) job stress questionnaire. They have identified two subscale: supervisor support (3items) and co-workers support (3items). Responses were measured using a 5-point Likert-type scale ranging from 1(never) to 5(very often). The questionnaire was designed that the more social support a respondent get, the larger the score is. Cronbach's  $\alpha$  values

of each factor in this study was found to be .926 supervisor support and co-workers support .894.

### 3.3.4 Acute reaction

Acute reaction measurement tool based on psychometrics from the NOISH (National Occupational Safety and Health) job stress questionnaire. They have identified two subscale: physiological (9items) and psychological (3items). Responses were measured using a 5-point Likert-type scale ranging from 1(never) to 5(very often). The questionnaire was designed that the more acute reactions a respondent suffer, the larger the score is. Cronbach's  $\alpha$  values of each factor in this study was found to be .965 physiological reactions and psychological reactions .877.

Table 3-2. Alpha reliabilities of job stress, goal orientation, social support and acute reaction on construction workers

Factors			Validity analysis				Reliability analysis		
			Component	Commonality	Sig.	d	Alpha ( $\alpha$ )		
Job stress	Job demand	JA1	0.734	0.612	2.255	15.032	0.714		
		JA2	0.839	0.748					
		JA3	Delete						
		JA4	0.71	0.543					
	Insufficient job control	JB1	0.601	0.574	2.511	16.737	0.756		
		JB2	0.545	0.597					
		JB3	0.789	0.691					
		JB4	0.819	0.683					
	Job insecurity	JC1	0.831	0.733	1.717	11.449	0.703		
		JC2	0.812	0.748					
Organizatio	JD1	0.733	0.706	2.025	13.502	0.752			

	nal system	JD2	0.766	0.709				
		JD3	0.577	0.605				
		JD4	0.616	0.663				
	Workplace culture	JE1	0.868	0.794	1.687	11.249	0.762	
		JE2	0.832	0.788				
Goal orientation		GA1	Delete			6.043	50.358	0.95
		GA3	0.869	0.79				
		GB1	0.846	0.756				
		GB2	0.843	0.761				
		GA5	0.839	0.783				
		GA2	0.82	0.736				
		GA6	0.814	0.725				
		GB3	0.774	0.709				
		GA8	0.753	0.734				
	GA7	0.65	0.584					
		GA9	0.87	0.792	2.525	21.04	0.73	
		GA10	0.857	0.783				
		GA4	0.513	0.414				
Social support	Supervisor support	SA1	0.907	0.916	2.662	44.374	0.926	
		SA2	0.897	0.923				
		SA3	0.795	0.781				
	Co-worker support	SB1	0.8	0.853	2.457	40.956	0.894	
		SB2	0.83	0.813				
SB3		0.877	0.833					
Acute reaction	Physiologic al	HA6	0.78	0.794	5.696	47.463	0.965	
		HA7	0.803	0.759				
		HA8	0.772	0.806				
		HA9	0.765	0.776				
		HA10	0.679	0.802				
		HA11	0.8	0.779				
		HA12	0.673	0.765				
		HA14	0.711	0.804				
		HA15	0.703	0.824				
	Psychologic al	HB1	0.867	0.855	3.83	31.913	0.877	
		HB2	0.721	0.762				
		HA13	0.662	0.8				

Table3-3. Goal orientation factors

Factors	Sub-factors	Factor Loading		Communalities
		1	2	
Self-esteem	I'm happiest at work when I perform tasks on which I know that I won't make any errors.	.820	.252	.736
	The things I enjoy the most are the things I do the best.	.869	.190	.790
	I feel smart when I do something without making any mistakes.	.839	.280	.783
	I like to be fairly confident that I can successfully perform a task before I attempt it.	.814	.251	.725
	I like to work on tasks that I have done well on in the past.	.650	.403	.584
	I feel smart when I can do something better than most other people.	.753	.408	.734
	I do my best when I'm working on a fairly difficult task.	.846	.199	.756
	I try hard to improve on my past performance.	.843	.224	.761
	The opportunity to extend the range of my abilities is important to me.	.774	.332	.709
Recognition from other	The opinions others have about how well I do certain things are important to me.	.389	.513	.414
	Even if I know that I did a good job on something. I'm satisfied only if others recognize my accomplishments.	.185	.870	.792
	It's important to impress others by doing a good job.	.218	.857	.783

### 3.4 Summary

The questionnaire development sets 3 steps:

- 1) Job stress: Job stress measurement tools developed in the KOSHA.
- 2) Job stress moderator factors: for the personal aspect is the "Goal orientation" and for the organizational aspect is the "Social support".

The goal orientation measurement tools consists Button proposed that the goal pursued by individuals create the framework for their interpretation and reaction to events or outcome. And the social support measurement tool based on the NOISH job stress questionnaire.

- 3) Job stress result: examine the frequency of workers' acute response due to job stress in order to design a measure for work disasters relationship. Acute reaction measurement tool based on psychometrics from the NOISH job stress questionnaire.

A total of 400 surveys were distributed to local and foreign construction workers. Of the 400 surveys distributed, 332 construction workers returned completed surveys, giving a response rate of 83%.

## **Chapter 4. Result of Analysis Regarding the Job Stress of Local/Foreign Construction Workers' Job Stress**

In this chapter, the results of the data analysis are followed. First, comparison of local and foreign construction workers' job stress. Then, comparison of interrelationships between job stress evaluations. By linear analysis, testing for moderator and mediator effect of job stress.

## **4.1 Comparison of Local and Foreign Construction**

### **Workers' Job Stress**

#### **4.1.1 The main difference between validations of variables through the t-test**

The job stress, goal orientation, social support and acute reaction scales consisted of 45 items in total (Table 4-2). While there were no significant differences between the local and foreign construction workers in the job stress, the highest level of job stress was 'insufficient job control' (local: 3.00(SD=.75), foreign: 3.18(SD=.91);  $t=-1.609$ ). The lowest level of job stress was 'workplace culture' (local: 2.60(SD=.97), foreign: 2.65(SD=.90);  $t=-.366$ ).

By contact, one of the goal orientation factors was significant differences between the local and foreign construction workers ( $t=2.820$ ,  $p<.01$ ). It was revealed that local construction workers reported higher level of 'self-esteem goal orientation' than foreign construction workers. However, level of 'recognition from other goal orientation' was not significant differences. In social support factors, supervisor support was not significantly different between the local and foreign construction workers ( $t=.563$ ). By contact, co-workers support was significant differences the local and foreign construction workers ( $t=2.601$ ,  $p<.001$ ).

Lastly, acute reaction was not significant differences though, foreign construction workers reported higher level of acute reaction. It means that the foreign construction workers are worst physically and psychologically than local construction workers.

Table 4-1. Descriptive statistics of factors

(\*p<.05, \*\*p<.01, \*\*\*p<.001)

Factors		Local	Foreigner	t
		M(SD)	M(SD)	
Job stress	Job Demand	2.99(.84)	2.78(.78)	1.722
	Insufficient job control	3.00(.75)	3.18(.91)	-1.609
	Job insecurity	2.85(.89)	2.68(.90)	1.373
	Organizational system	2.99(.68)	3.11(.92)	-1.150
	Workplace culture	2.60(.97)	2.65(.90)	-.366
Goal orientation	Self-esteem	3.77(.73)	3.42(.94)	2.820**
	Recognition from other	3.30(.76)	3.13(.86)	1.554
Social support	Supervisor support	3.62(.88)	3.55(1.06)	.563
	Co-worker support	3.68(.83)	3.36(1.04)	2.601***
Acute reaction	Physiological	1.69(0.86)	1.90(.93)	-1.685
	Psychological	1.81(.88)	1.93(.93)	-1.006

#### 4.1.2 Interrelationships between Job Stress Evaluations

A Pearson's correlation analysis was then conducted to investigate the relationships between job stresses, goal orientation, social support and acute reaction for the local and foreign construction workers in this study. The result show the following interrelationships.

In the case of local construction workers (Table 4-3), job demand (HA: .190; P<.01, HB: .186; P<.01) and workplace culture (HA: .305; P<.01, HB: .259; P<.01) were positively related to acute reaction. By contact, insufficient job control (HA: -.038) was negatively related to psychological acute reaction. Goal orientation was negatively related to insufficient job control (GA: -.388; P<.01, GB: -.1284; P<.01) and organizational system (GA:

-.250;  $P < .01$ , GB: -.298;  $P < .01$ ) and positively related to social support (SA (GA: .599;  $P < .01$ , GB: .653;  $P < .01$ ), SB (GA: .504;  $P < .01$ , GB: .418;  $P < .01$ )). Social support was negatively related to organizational system (SA: -.250;  $P < .01$ , SB: -.298;  $P < .01$ ), workplace culture (SA: -.250;  $P < .01$ , SB: -.298;  $P < .01$ ) and acute reaction (SA: -.250;  $P < .01$ , SB: -.298;  $P < .01$ ).

In the case of foreign construction workers (Table 4-4), insufficient job control (HA: .330;  $P < .01$ , HB: .267;  $P < .005$ ) and organizational system (HA: .341;  $P < .01$ , HB: .320;  $P < .005$ ) were positively related to acute reaction. By contact, workplace culture (HA: -.078, HB: -.102) was negatively related to acute reaction. Goal orientation were negatively related to insufficient job control (GA: -.274;  $P < .005$ , GB: -.286;  $P < .005$ ) and organizational system (GA: -.430;  $P < .01$ , GB: -.267;  $P < .005$ ) and positively related to workplace culture (GA: .343;  $P < .01$ , GB: .429;  $P < .01$ ) and social support (SA (GA: .773;  $P < .01$ , GB: .503;  $P < .01$ ), SB (GA: .681;  $P < .01$ , GB: .584;  $P < .01$ )). Social support was negatively related to insufficient job control (SA: -.287;  $P < .005$ , SB: -.402;  $P < .01$ ), organizational system (SA: -.555;  $P < .01$ , SB: -.646;  $P < .01$ ) and acute reaction (HA (SA: -.417;  $P < .01$ , SB: -.444;  $P < .01$ ), HB(SA: -.396;  $P < .01$ , SB: -.439;  $P < .01$ )) but, positively related to workplace culture (SA: .319;  $P < .01$ , SB: .426;  $P < .01$ ).

As a result of comparing the relationship, it appeared to be mutually different between social support of foreign construction workers and work culture. In the case of local construction workers, the more the level of social is lower, job stress increases, however foreign construction workers is being

supported in society but job stress increases on work culture. And represents the physical symptoms and psychological symptoms of entries. And the foreign construction workers represent higher average degree than local construction workers.

Table 4-2. Correlation between job stress, goal orientation, social support and acute reaction of local construction workers

(\*\*, Correlation significant at the 0.01 level (two tailed), \*, Correlation significant at the 0.05 level (two tailed))

Factors		JA	JB	JC	JD	JE	GA	GB	SA	SB	HA	HB
Job stress	Job Demand(JA)	1										
	Insufficient job control(JB)	-.430**	1									
	Job insecurity(JC)	.231**	-.148*	1								
	Organizational system(JD)	-.055	.449**	.003	1							
	Workplace culture(JE)	.275**	-.088	.0418**	-.041	1						
Goal orientation	Self-esteem(GA)	.142*	-.388**	-.001	-.250**	-.044	1					
	Recognition from other(GB)	.081	-.284**	.045	-.298**	.063	.577**	1				
Social support	Supervisor support(SA)	-.031	-.257**	-.053	-.434**	-.199**	.599**	.504**	1			
	Co-worker support(SB)	-.066	-.239**	-.072	-.261**	-.264**	.653**	.418**	.724**	1		
Acute reaction	Physiological(HA)	.190**	.061	.149*	.117	.305**	-.188**	-.116	-.339**	-.359**	1	
	Psychological(HB)	.186**	-.038	.082	.065	.259**	-.129	-.084	-.287**	-.292**	.872**	1

Table 4-3. Correlation between job stress, goal orientation, social support and acute reaction of foreign construction workers

(\*\*. Correlation significant at the 0.01 level (two tailed), \*. Correlation significant at the 0.05 level (two tailed))

Factors		JA	JB	JC	JD	JE	GA	GB	SA	SB	HA	HB
Job stress	Job Demand(JA)	1										
	Insufficient job control(JB)	.024	1									
	Job insecurity(JC)	.162	-.160	1								
	Organizational system(JD)	.372**	.590**	-.115	1							
	Workplace culture(JE)	.132	-.194	.371**	-.339**	1						
Goal orientation	Self-esteem(GA)	.262	-.274*	-.022	-.430**	.343**	1					
	Recognition from other(GB)	.142	-.286*	.209	-.267*	.429**	.648**	1				
Social support	Supervisor support(SA)	-.084	-.287*	-.025	-.555**	.319**	.773**	.503**	1			
	Co-worker support(SB)	-.244	-.402**	.160	-.646**	.426**	.681**	.584**	.654**	1		
Acute reaction	Physiological(HA)	-.020	.330**	.018	.341**	-.078	-.320*	-.081	-.417**	-.396**	1	
	Psychological(HB)	.023	.267*	.088	.320*	-.102	-.327**	-.136	-.444**	-.439**	.940**	1

## 4.2 Testing for Moderator Effect of Job Stress

Multiple linear regression analysis with stepwise methods was used to further investigate the interrelationships among job stress, goal orientation, social support and acute reaction. It is sophisticated statistical technique allowing for the prediction of a single dependent variable (acute reaction) from a group of independent variable (job stress, goal orientation and social support). The assumptions for multiple regression analysis, including multicollinearity, outliers, and normality, were checked by inspecting variance inflation factor, Mahalanobis distance, and normal probability plot of the regression standardized residuals, respectively.

First, analyzing simple correlations among local construction workers and respective sub-components (Fig. 4-1), we have found out that the correlation between “organizational hierarchy” under job stress category and “support of boss” under social support category showed the strongest correlations by  $-.335$ . Next was followed by the correlation between “workplace autonomy” under job stress category and “self-esteem goal orientation” under goal orientation category,  $-.318$  in size. This implies that the lesser autonomy is provided to a worker, the higher a worker exhibits self-esteem goal orientation. Based on the simple correlation, the result (Table 4-5) factor analyzed the moderating effect on the three-step procedure: in model 1, co-worker support was negatively predicted by workplace culture ( $\beta: -.286$ ). Model2 showed that physiological acute reaction was predicted positively by

workplace culture ( $\beta$ : .251). To predict the physiological acute reaction of construction workers on-site, Model3 was developed using the independent variables of the 5 job stress and the co-worker support. This model showed that physiological acute reaction was positively predicted by workplace culture ( $\beta$ : .176) but, negatively predicted by co-worker support ( $\beta$ : -.266). All t-values and p-values for phase 1, 2 and 3 turned out to be significant with a given significance level. Also, the impact of an independent variable at phase 2 showed to be stronger than that of phase 3. Such results indicate that a support of colleagues wield significant influence to workers when the job stress level starts to result in physical disorder. Also,  $R^2$  value, intended to measure the goodness of fit, turned out to be 16.2%, 12.9% and 18.5% for respective phase 1, 2, and 3. For other sub-components, the mediated effect could not be tested as they did not satisfy conditions of each phase.

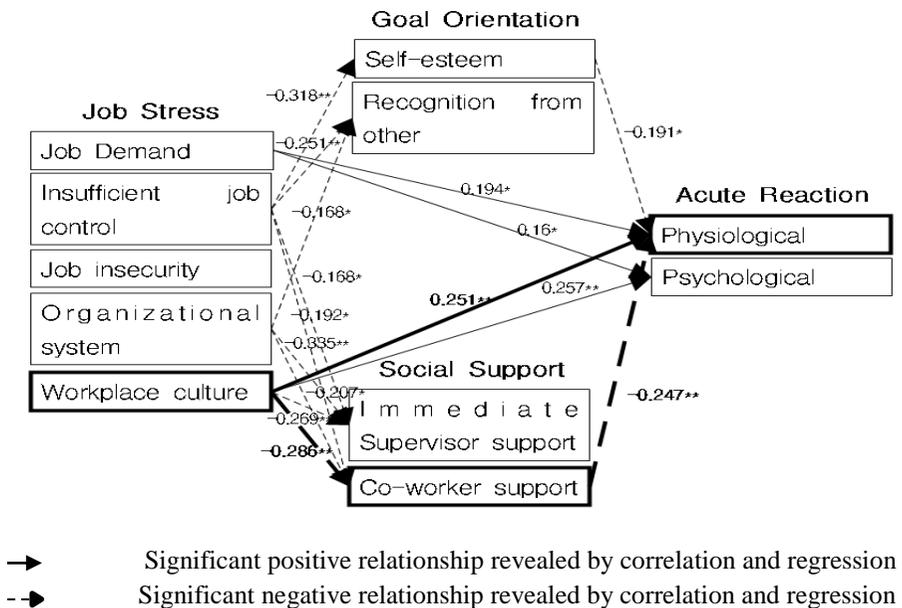


Fig. 4-1. Regression analysis of local construction workers

Table 4-4. Mediated effect model summary of local construction workers

Model	Independent	Dependent	$\beta$	t	p	R <sup>2</sup>
1	Job Demand	Co-worker support	-.069	-.938	.349	.162
	Insufficient job control		-.192	-2.361	.019*	
	Job insecurity		.040	.579	.563	
	Organizational system		-.207	-2.824	.005**	
	Workplace culture		-.286	-4.083	0**	
2	Job Demand	Physiological	.194	2.559	.011*	.129
	Insufficient job control		.144	1.713	.088	
	Job insecurity		.058	.807	.42	
	Organizational system		.078	1.035	.302	
	Workplace culture		.251	3.437	.001**	
3 (Independent)	Job Demand	Physiological	.174	2.36	.019*	.185
	Insufficient job control		.094	1.144	.254	
	Job insecurity		.067	.963	.337	
	Organizational system		.021	.282	.778	
	Workplace culture		.176	2.408	.017*	
3 (Parameter)	Co-worker support		-.266	-3.87	0**	

If we look over simple correlations among sub-components on foreign construction workers (Fig. 4-2), we have figured out that the correlation between “self-esteem goal orientations” under goal orientation category and “physical symptoms” under acute response category was most significant, showing -.465 in size. This indicates that in case of workers with strong sense of goal orientation, they are less likely to experience physical disorders. Next was followed by “organizational hierarchy” under job stress category and

“support from boss” under social support category by  $-.438$  in size. This indicates that those workers with low stress level on organizational hierarchy were more likely to be supported by colleagues. ON the other hand, there were some sub-components that domestic and foreign construction workers showed varying outcomes. In case of foreign workers, “job requirement” under job stress category and “self-esteem goal orientation” under goal orientation category, these factors showed a positive correlation by  $.425$ . This indicates that in case of foreign construction workers, contrary to domestic construction workers, those who show strong stress level are those who are more oriented to achieve their goals. Moreover, in case of foreign construction workers, job stress did not turn out to have a direct influence on physical and psychological disorder. Therefore, it was infeasible to conduct a test on mediated effect as these mediators did not satisfy required conditions for testing of each phase.

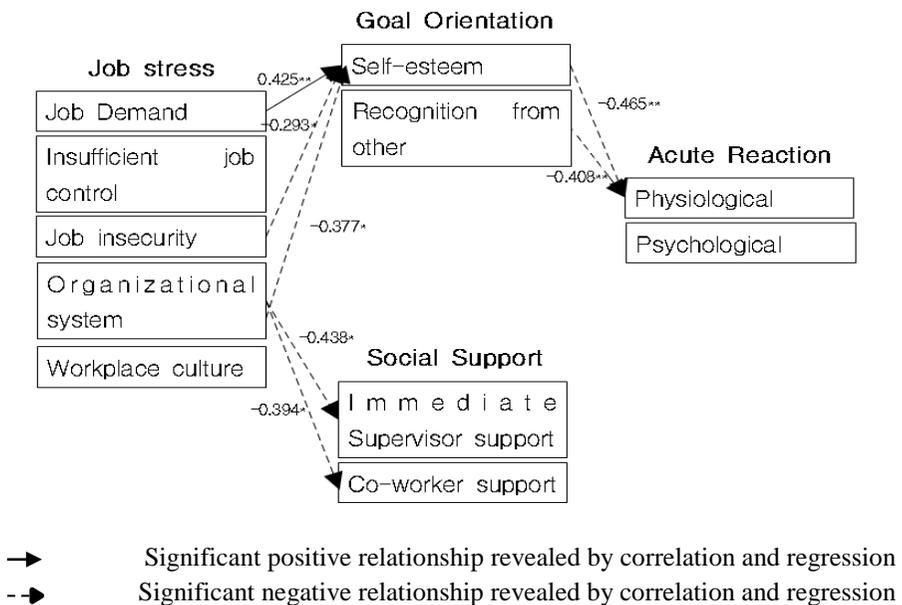


Fig. 4-2. Regression analysis of foreign construction workers

### 4.3 Testing for Mediator Effect of Job Stress

In order to examine whether an effect of job stress on domestic/foreign construction workers on an acute response is mediated by social support level, we have conducted hierarchical regression analysis. We have conducted a test on the mediated effect of all sub-components under job stress for model 1, sub-components under goal orientation and social support for model 2, and the interaction component of job stress and social support for model 3.

Analyzing the mediated effect on overall local-foreign construction workers (Fig. 4-3), we have observed a significant mediated effect on 2 components. First, an analysis of a mediated effect (Table 4-6) of “support of boss” on the correlation between “workplace autonomy” under job stress category and “physical symptom”,  $R^2$  values turned out to be 2.1%, 13.3% and 15.0% for respective phase 1, 2 and 3 models. This can be interpreted that there is a significant mediated effect as all values were smaller than .05. Hence, it has been examined that construction workers with low self-esteem goal orientation are less sensitive to psychological health issues arisen by job stress due to organizational hierarchy. Second, an analysis of a mediated effect (Table 4-7) of “self-esteem goal orientation” on the correlation between “organization hierarchy” under job stress category and “psychological symptom”,  $R^2$  values turned out to be 1.8%, 5.9% and 8.0% for respective phase 1, 2 and 3 models. This can be interpreted that there is a significant mediated effect as all values were smaller than .05. Hence, it has been

examined that a worker with strong support of boss is less likely to experience health issues despite high job stress level.

Table 4-5. Moderating effect model summary of construction workers

Model	R	R <sup>2</sup>	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square	F Change	df1	df2	Sig. F Change
1	.144a	.021	.017	.84986	.021	5.934	1	279	.015
2	.365b	.133	.127	.80098	.113	36.088	1	278	.000
3	.387c	.150	.141	.79463	.017	5.464	1	277	.020

a. (Constant), Job stress(insufficient job control)

b.(Constant), Job stress(insufficient job control), Social support(immediate supervisors support)

c.(Constant), Job stress(insufficient job control), Social support(immediate supervisors support), Job stress(insufficient job control)\*Social support(immediate supervisors support)

Table 4-6. Moderating effect model summary of construction workers

Model	R	R <sup>2</sup>	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square	F Change	df1	df2	Sig. F Change
1	.135a	.018	.015	.89348	.018	5.196	1	279	.023
2	.242b	.059	.052	.87651	.040	11.906	1	278	.001
3	.283c	.080	.070	.86813	.021	6.390	1	277	.012

a. (Constant), Job stress(organizational system)

b.(Constant), Job stress(organizational system), Goal orientation(self-esteem)

c. (Constant), Job stress(organizational system), Goal orientation(self-esteem), Job stress(organizational system)\*Goal orientation(self-esteem)

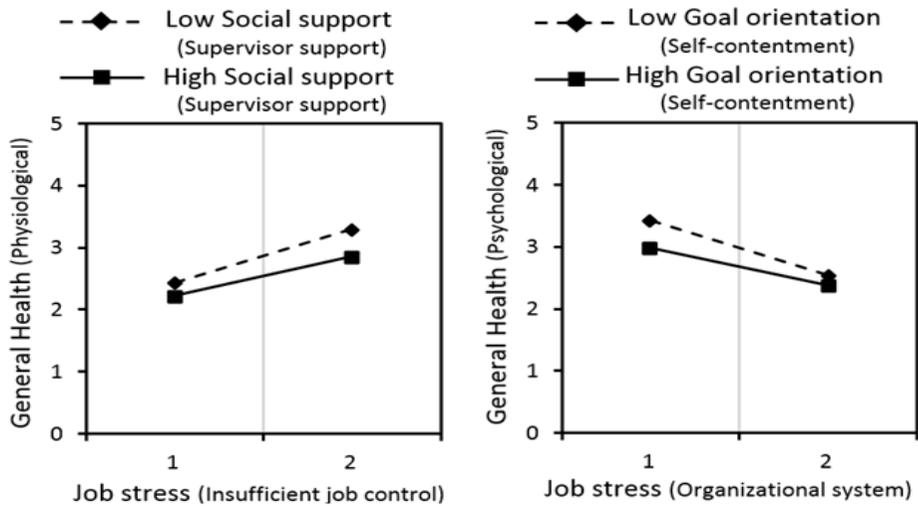


Fig. 4-3. Moderation effect of construction workers

When we have conducted a study on the effect (Table 4-8, Fig. 4-4) of “goal orientation to be recognized by others” on the correlation between “organizational hierarchy” under job stress category and “physical symptom” of local construction workers,  $R^2$  values turned out to be an increasing order by 9.3%, 11.3% and 12.9% respectively. As F-statistics for all phases turned out to be lower than 0.05 significant level, we can say that there is a significant mediated effect. Hence, construction workers with high self-esteem goal orientation will less frequently experience health problems due to high job stress level on organization culture.

In case of foreign construction workers (Table 4-9, Fig. 4-4), when we have conducted a study on a mediated effect of “self-esteem goal orientation” on the correlation between “workplace autonomy” under job stress and “psychological symptom”  $R^2$  values turned out to be 9.1%, 15.2% and 20.8% for respective phase 1,2 and 3 models, all lower than 0.05 significance level.

Thus, we can conclude that there is a significant mediated effect. Those with lower desire to be recognized by others turned out to be less sensitive to psychological health issues caused by job stress on insufficient job control.

Table 4-7. Moderating effect model summary of local construction workers

Model	R	R <sup>2</sup>	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square	F Change	df1	df2	Sig. F Change
1	.305a	.093	.089	.80404	.093	22.511	1	220	.000
2	.336b	.113	.105	.79690	.020	4.961	1	219	.027
3	.359c	.129	.117	.79147	.016	4.019	1	218	.046

a. (Constant), Job stress(organizational system)

b. (Constant), Job stress(organizational system), Goal orientation(recognition from other)

c. (Constant), Job stress(organizational system), Goal orientation(recognition from other), Job stress(organizational system)\*Goal orientation(recognition from other)

Table 4-8. Moderating effect model summary of foreign construction workers

Model	R	R <sup>2</sup>	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square	F Change	df1	df2	Sig. F Change
1	.302a	.091	.076	.89668	.091	6.011	1	60	.017
2	.390b	.152	.123	.87343	.061	4.237	1	59	.044
3	.456c	.208	.167	.85123	.056	4.117	1	58	.047

a. (Constant), Job stress(insufficient job control)

b. (Constant), Job stress(insufficient job control), Goal orientation(self-esteem)

c. (Constant), Job stress(insufficient job control), Goal orientation(self-esteem), Job stress(insufficient job control)\*Goal orientation(self-esteem),

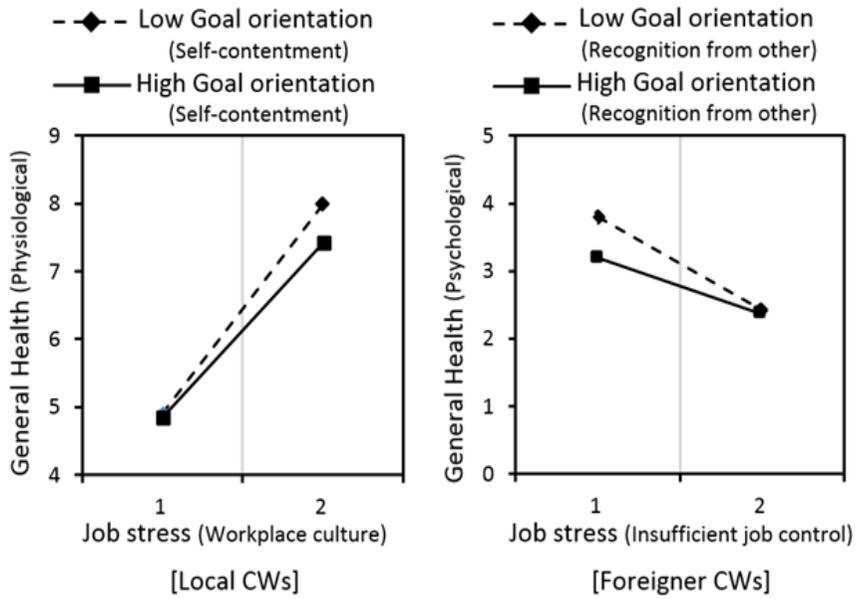


Fig. 4-4. Moderation effect of local and foreign construction workers

## 4.4 Summary

To analyze the tests of moderator effect and mediator effect of factors, do multiple linear regression analysis with stepwise methods was used to further investigate the interrelationships among job stress, goal orientation, social support and acute reaction.

- 1) First, the results of the moderator effect are that the support of colleagues wield significant influence to workers when the job stress level starts to result in physical disorder in the case of the local construction workers and contrary to the local construction workers, foreign construction workers who show strong stress level are those who are more oriented to achieve their goals.
- 2) Second, the result of the mediator effect are that the local construction workers with strong support of boss is less likely to experience health issues despite high job stress level and who with high self-esteem goal orientation will less frequently experience health problems due to high job stress level on organization culture. On the other hands, the foreign construction workers who with lower desire to be recognized by others turned out to be less sensitive to psychological health issues caused by job stress on insufficient job control.

# Chapter 5. Conclusions

## 5.1 Results and Discussions

This study, aiming at 307 people of local and foreign construction workers, investigated what impact the job stress they recognize would have on the construction disasters, and in the process, verified the mediated effect and regulation effect of the goal orientation and social support. The main results are as follows:

- 1) First, in the job stress level of respondents, it appeared that the foreign construction workers were higher on the insufficient job control, organizational system, and workplace culture among 5 sub-factors than local construction workers. For both two groups, the level of job stress on the 'insufficient job control' was the highest, and the lowest level appeared as the workplace culture. It seems to be expected that this is the result of targeting the lower-level construction workers in the organizational system where it is difficult to secure the insufficient job control. For the degree of goal orientation, the local construction workers appeared higher than the foreign construction workers. For both two groups, the level of self-esteem goal orientation appeared higher than that of the others-acknowledgement goal orientation, and in the level of self-esteem goal orientation, the local workers appeared meaningfully higher than the foreign workers. For the level of social support, the local

construction workers appeared higher than the foreign construction workers. For both two groups, the boss's support showed higher than the support of colleagues, and in the colleagues' support level, the local workers appeared meaningfully higher than the foreign workers. This means that for the interchange with the co-workers, the local construction workers are brisker than the foreign construction workers, which may be considered a phenomenon caused by the cultural differences, and linguistic differences. On the other hand, for the frequency degree of acute reaction, the foreign construction workers showed the higher level than the local construction workers. If these physical and psychological symptoms continuously would be repeated, it could lead to construction disasters. Therefore, for the acute reaction of foreign construction workers, the careful observation and management would be necessary. For the establishment of the primary management plan, as a result of the analysis of factors correlation, the "colleagues' support" was highest for the negation relation as a factor affecting the acute reaction of local construction workers, and in the case of foreign construction workers, the 'boss's support' appeared highest for the negation relation. Just like this, it is important to construct the organizational system, in order for the support of local and foreign construction workers' boss and colleagues to be made smoothly.

2) Second, in the case of local construction workers, it could be confirmed that the 'support of colleagues' may have the mediated effect in the relation with 'workplace culture' and 'physical symptoms', and it appeared that the 'self-esteem goal orientation' would have the regulation effect. These results show that when the 'physical symptoms' appears due to the job stress on the workplace culture of local construction workers, the colleagues' backing and support would affect it directly, the self-esteem goal orientation would have an indirect impact on it. Therefore, these two factors should be taken into consideration when managing the local construction workers. On the other hand, when it comes to the foreign construction workers, the factor having the mediated effect could not be confirmed, but in the relation with 'insufficient job control' and 'psychological symptoms', it could be identified that the 'others-acknowledgement goal orientation' would have the regulation effect. The higher the job stress on 'insufficient job control' would be, the lower the frequency of psychological symptoms appeared, and the lower the goal orientation wanting to get recognized by others would be, the greater this effect appeared. These results are considered that it would be the phenomenon only limited to the

foreign construction workers, and because having more insufficient when carrying out requires greater responsibility, it seems to be the result caused by greater psychological pressure due to that. Thus, it is respected that the workers, who have lower volition that they want to get recognition from others, would get more sensitive psychological reaction.

- 3) Third, as a result of verifying the regulation effect targeting the entire local and foreign construction workers, in the relation with 'insufficient job control' and 'physical symptoms', the 'boss's support' would have the regulation effect, in the relation between the 'organizational system' and 'psychological symptoms', it could be confirmed that the 'self-esteem goal orientation' would have the regulation effect. These results means that the boss's support and backing degree and the volition that the workers themselves hope to achieve the work would have an impact on their relation, which would be the factor required to be considered when managing it. It would be important to create the working atmosphere where the workers could trust and believe their bosses when doing their jobs and to establish the organizational system so that the workers could achieve it with the goals on the tasks for themselves. Based on these results, they should be reflected when establishing the measures for the improvement of the working environment and labor

conditions of local and foreign construction workers, and the appropriate countermeasures should be prepared by each group.

Based on the results acquired from this study, we can propose a guideline for the management of domestic/foreign construction workers' job stress and construction disasters. Management supervisors should align worker health centers, mental health care centers in advance so that workers suffering from job stress can alleviate their problems in an early stage.

## **5.2 Limitations and Further Studies**

The limitation of this research is the following. Although the research was conducted on both domestic and foreign construction workers, the number of response of foreign workers was fewer than that of domestic workers. As we were unable to conduct an interview on greater response pool, the research result cannot be generalized.

This study needs to expand a sample size on further studies. Also, the research could have protracted more accurate results if not only a quantitative but also in-depth qualitative research on job stress were addressed with respondents' job duties and difficulty of work weighted.

## Appendix. Developed Questionnaire

II. 응답자의 일반사항 回答者的一般情况 Personal Information	
다음은 <u>응답자의 일반사항</u> 에 관한 정보입니다. 본 항목은 표본특성을 파악하기 위한 것으로 연구목적의 자료로만 사용됩니다. 下面是关于回答者的一些问题，这部分仅作为把握本调查样本特性的研究资料。 These following questions are about <u>personal information</u> and please answer them. All the information is confidential.	
1. 귀하의 국적은? 您的国籍? Your Nationality	
① 한국 韓国 Korean                      ② 중국조선족 中国 (韩裔) Korean-Chinese                      ③ 중국 中国 Chinese ④ 필리핀 菲律宾 Filipino                      ⑤ 베트남 越南 Vietnamese                      ⑥ 기타 其它 Others : _____	
2. 귀하의 성별은? 您的性别? Your Gender	
① 남자 男 Male                                      ② 여자 女 Female	
3. 귀하의 나이는? 您的年龄? Your Age in Years	
① 20세 미만 未滿 20岁 Under 20                      ② 20-29세 20-29岁 20-29                      ③ 30-39세 30-39岁 30-39 ④ 40-49세 40-49岁 40-49                      ⑤ 50세 이상 50岁 以上 50 and over	
4. 귀하의 학력은? 您的学历? Your academic background	
① 초등학교 졸업 이하 小学 Elementary school                      ② 중학교 졸업 初中 Middle school                      ③ 고등학교 졸업 高中 High school ④ 대학교 졸업 이상 大学 College	
5. 귀하는 직무는 무엇입니까? 您的工作种类? How What is your job title?	
6. 귀하는 이 직업에 얼마나 오랫동안 종사하였습니까? 您从事该职业多久? How long have you worked in this job?	

III. 근로자의 직무스트레스 工作人员职务上的压力 Job Stressors	
다음은 <u>근로자의 직무스트레스 수준</u> 을 측정하기 위한 것입니다. 평가척도는 4점 척도이며, 각 문항에 대해 생각하시는 점수 란에 <u>√</u> 를 표시해 주시면 됩니다. 下面是测定工作人员在职务上的压力大小的问题，选项分为4个，填写评价项目之后，在后面相应的栏里面打勾。 Please indicate your agreement or disagreement with the following statement about level of <u>job stress</u> . Mark your answer by checking.	

평가 지 표 评价指标 Factors	평가 항목 评价项目 Description	평가 척 도 程度评价 Rating scale			
		강히 동의함 Strongly Agree	고정히 동의함 Agree	고정히 반대함 Disagree	매우 고정히 반대함 Strongly Disagree
직무요구 职务需要 Job	나는 일이 많아 항상 시간에 쫓기며 일한다. 我的工作特别多，经常需要在时间很紧的状态下工作 Due to many things to do, I always feel time pressure	①	②	③	④

	업무량이 현저하게 증가하였다. 工作量有明显的增加。 My job has become increasingly overloading.	①	②	③	④
Demand	업무 수행 중에 충분한 휴식(잠)이 주어진다. 在工作中有充足的休息时间。 Sufficient rest is provided during working hours.	①	②	③	④
	여러 가지 일을 동시에 해야 한다. 需要在同一时间内完成多件事。 I have to do various jobs simultaneously.	①	②	③	④
직무자유 职务自由 Insufficient Job Control	내 업무는 창의력을 필요로 한다. 我的工作需要创造力。 My work requires creativity.	①	②	③	④
	내 업무를 수행하기 위해서는 높은 수준의 기술이나 지식이 필요하다. 为了完成我的工作，需要高水平的技术能力和知识能力。 My work requires a high level of skill or knowledge.	①	②	③	④
	작업시간 업무수행과정에서 나에게 결정할 권한이 주어지며 영향력을 행사 할 수 있다. 在工作时间内完成工作的时候，我有自己做决定的权利。 I can make my own decision in my job and give influence over the work.	①	②	③	④
	나의 업무량과 작업스케줄을 스스로 조절할 수 있다. 关于自己的工作量和工作安排可以自己决定。 I can control my work pace and time schedule.	①	②	③	④
직무불안 정 职业的不 安定 Job Insecurity	직장사정이 불안하여 미래가 불확실하다. 职场很不安定，未来很不确定。 My future is uncertain because the current situation of my company is unsafe.	①	②	③	④
	나의 근무조건이나 상황에 바람직하지 못한 변화에 구조조정이 있었거나 있을 것으로 예상된다. 你可以预想到你的工作条件和情况将变坏，或者你的工作条件和情况已经变得比以前更坏。 Undesirable change (i.e. downsizing) will come to my job.	①	②	③	④
조직체계 组织体制 Organizational System	내국인과 외국인 근로자의 차별이 존재하지 않는다. 外国工人和韩国工人之间没有任何差异。 Local and foreign construction workers are treated fairly and reasonably at our construction site.	①	②	③	④
	업무수행에 필요한 인원 공간 시설 장비 훈련 등의 지원이 잘 이루어지고 있다. 工作中需要的人力、空间、设备和设施、培训等的供给十分充足。 Organizational support is provided including the sufficient number of staff, space, facilities and training.	①	②	③	④
	우리 부서와 타 부서 간에는 마찰이 없고 업무협조가 잘 이루어진다. 我们工作部门和其他工作部门之间没有摩擦，相互之间能够很好协作。 Our working team cooperates with other working teams without conflict.	①	②	③	④
	일에 대한 나의 생각을 반영할 수 있는 기회와 통로가 있다. 能够反映我工作中想法的机会和途径很多。 I have opportunities and channels to talk about my ideas.	①	②	③	④
직장문화 职务文化 Workplace Culture	회식자리가 불편하다. 聚餐的时候感觉很不方便。 I feel uncomfortable with a company dinner.	①	②	③	④
	직장의 분위기가 권위적이고 수직적이다. 职场等级存在。 The atmosphere of the workplace is authoritarian.	①	②	③	④

**IV. 성취목표의지 目标取向 Goal Orientation**

- 다음은 응답자의 성취목표의지 정도를 조사를 위한 것입니다. 평가척도는 6점 척도이며, 각 문항에 대해 생각하시는 점수 란에 V를 표시해 주시면 됩니다.

下面的内容是调查回答者的目标取向,选项分为6个,填写评价项目之后,在后面相应的栏里面打勾。

Please indicate your agreement or disagreement with the following statement about level of goal orientation. Mark your answer by checking.

평가항목 评价项目 Description	평가척도 程度评价 Rating scale					
	1 강하게 싫다 Strongly Dislike	2 강하게 싫지 않다 Dislike A little	3 보통 싫다 Dislike A little	4 보통 좋다 Like A little	5 강하게 좋다 Like A lot	6 매우 좋다 Like Very much
나는 내가 잘 못하는 작업보다 내가 잘할 수 있는 작업을 선호한다. 比起我干得差的我更喜欢干我干得比较好的事。 I prefer to do things that I can do well rather than things that I do poorly.	①	②	③	④	⑤	⑥
나는 실수 없이 작업을 마쳤을 때 매우 기쁘다. 我在工作中没有犯错误的会很开心。 I'm happiest at work when I perform tasks on which I know that I won't make any errors.	①	②	③	④	⑤	⑥
나는 내가 선호하는 작업에 대해서 최선을 다한다. 我会尽自己最大的能力去干我喜欢干的工作。 The things I enjoy the most are the things I do the best.	①	②	③	④	⑤	⑥
나는 내가 작업을 잘하는지 못하는지에 대한 다른 사람들의 생각이 중요하다. 我觉得在评价自己工作干得好或坏的时候,别人的想法很重要。 The opinions others have about how well I do certain things are important to me.	①	②	③	④	⑤	⑥
나는 어려운 작업을 수행할 때 최선을 다한다. 我会尽自己最大的能力去干比较难的工作。 I do my best when I'm working on a fairly difficult task.	①	②	③	④	⑤	⑥
나는 나의 작업능력(작업 숙련도)을 향상시키기 위해 노력한다. 我在为提高自己工作能力而努力。 I try hard to improve on my past performance.	①	②	③	④	⑤	⑥
나는 나의 작업범위(작업)를 할 수 있는 범위를 넓히는 것을 중요하게 생각한다. 我觉得拓宽自己的工作范围很重要。 The opportunity to extend the range of my abilities is important to me.	①	②	③	④	⑤	⑥
나는 내가 작업을 실수 없이 마쳤을 때 나 자신이 자랑스럽다. 我在工作中没有犯错误的会很自信或骄傲。 I feel smart when I do something without making any mistakes.	①	②	③	④	⑤	⑥
나는 내가 이전에 수행했던 작업에 대해서 자신이 있다. 对于那由以前我干过的工作,我很自信。 I like to be fairly confident that I can successfully perform a task before I attempt it.	①	②	③	④	⑤	⑥
나는 이전에 해왔던 작업을 수행하고 싶다. 我比较喜欢干以前干过的工作。 I like to work on tasks that I have done well on in the past.	①	②	③	④	⑤	⑥
나는 내가 다른 사람들보다 작업을 뛰어나게 수행했을 때 나 자신이 자랑스럽다. 我在比别人干得好的时候会很自信或骄傲。 I feel smart when I can do something better than most other people.	①	②	③	④	⑤	⑥
내가 작업을 성공리에 마쳤더라도 다른 사람들이 나를 인정해주어야 만족스럽다. 即使我觉得自己把工作完成得很好的时候,只有当别人承认我的工作成果的时候才会感到满足。 Even if I know that I did a good job on something, I'm satisfied only if others recognize my accomplishments.	①	②	③	④	⑤	⑥
나는 작업을 성공리에 수행해서 다른 사람들에게 인상을 주는 것이 중요하다. 我觉得自己成功完成任务并且能够对别人留下深刻的印象很重要。 It's important to impress others by doing a good job.	①	②	③	④	⑤	⑥

**V. 사회적 지지 社会方面的支援 Social Support**

- 다음은 응답자의 사회적 지지를 받는 정도를 조사를 위한 것입니다. 평가척도는 5점 척도이며, 각 문항에 대해 생각하시는 점수 란에 V를 표시해 주시면 됩니다.

下面是为了调查回答者的接受社会方面支援程度，选项分为5个，读完评价项目之后，在后面相应的栏里面打勾。

Please indicate your agreement or disagreement with the following statement about level of social support. Mark your answer by checking.

평가항목 评价项目 Description	평가척도 程度评价 Rating scale				
	전혀 그렇지 않다 完全 不同意 Strongly Disagree	그렇지 않은 정도 不太 同意 Disagree	그렇 지도 않고 그렇 지도 아니 않음 既不 同意 也不 反对	그 정도 同意 Agree	매우 그 정도 同意 Strongly Agree
나의 상사(오로지) 실장은 내 업무가 좀 더 쉽게 이루어 질 수 있도록 도와준다. 我的工作单位会帮助我让我的工作可以简单方便地进行 My immediate supervisor contributes an extra effort to make my work life easier.	①	②	③	④	⑤
나의 상사(오로지) 실장은 내 업무가 좀 더 안전하게 이루어 질 수 있도록 도와준다. 我的工作单位会帮助我更加安全地进行工作 My immediate supervisor contributes an extra effort to make my work life safer.	①	②	③	④	⑤
업무수행 중 어려운 일이 생기면 상사(오로지, 실장)에게 의지할 수 있다. 在完成工作时如果遇到困难，可以向我的工作单位寻求帮助 My immediate supervisor can be relied upon to help when a difficult situation arises at work.	①	②	③	④	⑤
나의 동료는 내 업무가 좀 더 쉽게 이루어 질 수 있도록 도와준다. 我的工作同事们会在工作中帮助我，让我能更加简单地完成任务 My co-workers contributes an extra effort to make my work life easier.	①	②	③	④	⑤
나의 동료는 내 업무가 좀 더 안전하게 이루어 질 수 있도록 도와준다. 我的工作同事们会在工作中帮助我，让我能更加安全地完成任 My co-workers contributes an extra effort to make my work life safer.	①	②	③	④	⑤
업무수행 주 어려운 일이 생기면 동료에게 의지할 수 있다. 在完成工作时如果遇到困难，可以向我的工作同事寻求帮助 My co-workers can be relied upon to help when a difficult situation arises at work.	①	②	③	④	⑤

**VI. 건강상태 健康状态 General Health**

- 다음은 근로자의 건강상태를 측정하기 위한 것입니다. 평가척도는 5점 척도이며, 각 문항에 대해 지난 한달 동안 아래의 항목을 얼마나 자주 경험하였는지 점수 란에 √를 표시해 주시면 됩니다.

以下是为了调查工作与健康状态的内容, 选项分为5个, 填写评价项目之后, 在后面相应的栏里面 打勾。

This portion of the questionnaire contains items that are related to general health. How often have you experienced any of the following during the past month? Please mark your answer by checking .

평가항목 评价项目 Description	평가척도 程度评价 Rating scale				
	한번 从不 Never	가끔 偶尔 Occasion ally	때때 有时 Some times	자주 经常 Faily Often	매일 总是 Always Very Often
피가 머리로 돌리는 것 같은 느낌을 받은 적이 있다. 我曾感到有血流进脑袋的感觉。 Your felt as if the blood were rushing to your head.	①	②	③	④	⑤
목에 덩어리가 있거나 무엇이 걸린 것 같은 느낌을 받았다. 我曾感到自己的喉咙有块状物或者被什么堵住了。 Your felt a lump in your throat or a choked-up feeling.	①	②	③	④	⑤
일을 못할 정도로 손이 심하게 떨린 적이 있다. 我曾感到手抖得比平时厉害以至于不能干活的感觉。 Your hands trembled enough to bother you.	①	②	③	④	⑤
심하게 입을 하거나 운동을 하지 않았는데도 숨이 가빠 고생스러웠다. 即使在没有剧烈运动或者过度工作的时候, 也会有呼吸急促的感觉。 Your were bothered by shortness of breath when you were not working hard or exercising.	①	②	③	④	⑤
심장이 심하게 고동치는 것을 느꼈다. 我曾感受到心脏很严重的震撼。 Your were bothered by your heart beating hard.	①	②	③	④	⑤
끈적거림과 축축함을 느낄 정도로 손에 땀이 났다. 我的手会流汗到手指黏糊糊的程度。 Your hands sweated so that you felt damp and clammy.	①	②	③	④	⑤
현기증을 느꼈다. 曾感到头晕。 You had spells of dizziness.	①	②	③	④	⑤
내가 하는 일에 집중할 수 없었다. 我无法集中于我的工作。 I had trouble keeping my mind on what I was doing.	①	②	③	④	⑤
가슴이 두근거리려 힘들었다. 心脏砰砰砰的跳得很厉害。 Your were bothered by your heart beating.	①	②	③	④	⑤
업무에 지장이 있을 정도로 건강이 나빠진 적이 있다. 你曾因为身体差到影响了自己的工作。 Your were in ill health which affected your work.	①	②	③	④	⑤
식욕이 떨어졌다. 食欲下降了。 You had a loss of appetite.	①	②	③	④	⑤
밤에 쉽게 잠을 이룰 수가 없었다. 晚上很难睡着或者睡眠质量不好。 You had trouble sleeping at night.	①	②	③	④	⑤

감사합니다. 谢谢您 Thank you. SALAMA Xin đa tạ. ขอขอบพระคุณครับ

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## 국 문 초 록

### 내외국인 건설근로자의 직무스트레스와 건설재해의 관계에 대한 분석연구

지난 10년간 10 배가 넘는 외국인 건설근로자가 증가하였으며, 2015년 약 8만 6천명을 육박하게 되었다. 이러한 현상에도 불구하고 국내 건설현장으로 유입되는 외국인 근로자는 내국인 근로자가 기피하는 지역 및 육체적으로 힘든 작업을 수행하고 있으며, 문화차이 및 언어소통의 문제로 인하여 재해발생 시 즉각적 대응에 어려움을 겪고 있는 등의 건설재해 위험에 과도하게 노출되어 있다. 또한 그들은 비록 일시적이라고 할지라도 자신의 고향을 떠나 해외에서 취합하는 상황을 겪으며 사회·심리적 적응을 요구한다. 건설재해의 주요 원인은 근로자의 불안정한 행동에서부터 발생하며, 이는 상당한 직무스트레스로 인해 유발되어 결국 건설재해로 이어질 수 있다. 그러나 똑 같은 작업환경에 노출된 개인이라 할지라도 그것을 지각하고 그 상황에 반응하는 방식에서 서로 다른 차이를 가져오는 중재요인에 영향을 받으며, 크게 두 가지로 개인적 요인과 환경적 요인이 해당된다.

따라서 본 연구에서는 개인적 요인인 근로자의 성취목표의지와 환경적 요인인 사회적 지지를 중심으로 분석한다. 분석요인으로

직무스트레스원인, 중재, 결과요인의 세가지 측면을 포함하며  
내·외국인 건설근로자의 직무스트레스를 비교하고자 한다. 이를  
통해 향후 외국인 건설근로자의 특징을 고려한 직무스트레스 관리  
방향제시를 위한 기초를 마련할 수 있을 것으로 기대한다.

**주요어:** 직무스트레스, 내·외국인 건설근로자, 건설재해,

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