

Comparison Analysis of Worker Consciousness Levels at Construction Sites in Vietnam and Korea with a Particular Consideration of Safety Management of Construction

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Abstract: As is well known, there are certain economic, cultural and historical differences between Vietnam and Korea. These differences create some variances in the consciousness of the people, particularly workers at construction sites. Consciousness, particularly safety consciousness is the most important factor related to ensuring safety at construction sites. Many possible factors related to these issues will be considered in this study. They will be statistically analyzed after more than (100) questionnaire survey sheets are distributed to workers at construction sites of major (6) cities each in Korea and Vietnam. Worker's awareness of penalty-related regulations such as the actual penalties their level of understanding their obligations with regard to HSE, the advice of safety managers about penalties, the correlation between the issuance of a penalty and ensuring safety at construction sites and the level of awareness of penalties were also considered in this study. In contrast, more than 70% of Korean workers do not agree to the issuing of penalties at construction sites. Vietnamese workers agree to pay some penalty for violating HSE regulations which should be followed at construction sites but they do not want to pay it themselves, i.e., out of their own pay.

Key words: Consciousness level, Vietnam and Korea, constructions sites, correlation analysis, economic, obligations

INTRODUCTION

The Korea, government and the Vietnamese government have engaged in active mutual exchanges in various areas over the last 10 years and up to the present. KOICA also has a good relationship to support safety in Vietnam through KOSHA, an organization under the Ministry of Labour in Korea. The Vietnamese government makes an effort to establish basic Health and Safety Enforcement regulations (HSE) (Bae *et al.*, 2010).

As is well known, there are certain economic, cultural and historical differences between Vietnam and Korea. These differences create some variances in the consciousness of the people, particularly workers at construction sites. Consciousness, particularly safety consciousness is the most important factor related to ensuring safety at construction sites (Zhang and An, 2014; Choi, 2016).

Therefore, this consciousness matter given its connection to accidents should be improved and decreased. Furthermore, the differences between two countries given their different cultures and consciousness level can be very useful factors related to accidents and

safety which are continuing concerns. Many possible factors related to these issues will be considered in this study (Ko and Lee, 2018).

They will be statistically analyzed after more than (100) questionnaire survey sheets are distributed to workers at construction sites of major (6) cities each in Korea and Vietnam (Uhm *et al.*, 2017).

MATERIALS AND METHODS

The level of conscientious compliance with the laws on the occupational safety and health of workers working at construction sites in South Korea is much higher than that by these workers in Vietnam. This means that training systems for occupational safety and health in Korea are better communicated to employees. These systems are very good and efficiently run.

Furthermore, legal remedies and administrative penalties for violations of legislation pertaining to occupational safety and health in Korea are higher and heavier than those of Vietnam. (In the documented regulations affecting administrative penalties against violations of legislation pertaining to occupational safety

and health of Vietnam at present, the government only punishes employers when their employees violate these laws at construction sites. Employer's also can penalize their employees when they violate HSE laws and rules at construction sites).

All of the survey sheets were distributed in six regional areas in Vietnam and six in Korea to avoid large deviations due to possible prejudice stemming from the use of only one construction site. General information about the respondents such as their age, smoking condition, drinking condition, health, work type, work experience, salary and educational background were included on the surveys.

Worker's awareness of penalty-related regulations, such as the actual penalties, their level of understanding, their obligations with regard to HSE, the advice of safety managers about penalties, the correlation between the issuance of a penalty and ensuring safety at construction sites and the level of awareness of penalties were also considered in this study.

Frequency, variance and correlation analyses were conducted to find significant statistically items to compare each critical result in the study

RESULTS AND DISCUSSION

Vietnam case

Analysis of frequency: The experience of the workers represents one of the most relevant factors in the study. In this case, 22.98% had <5 years, 42.86% reported 6~10 years and 14.91% had 11~15 years. Educational background was also a highly relevant factor. The consciousness of workers is directly related to this. Regarding education, 13.4% had a high school education, 42.24% reported that had graduated from college and 32.92% had graduated from university, shown in Table 1.

Analysis of correlation: The correlation between a worker's experience level and their level of understanding of their duties at construction sites was also reviewed with a proper technique. This correlation factor was 0.331, with a p value of 0.000, meaning that there is a significant correlation, i.e., the more experience a worker has the better they know their duties, shown in Table 2 and 3.

Analysis of variance: Many of the respondents are involved in the following six types of work: concrete work, scaffolding work, electrical work, plumbing work, steel work and form work. An analysis of variance was done to find if there were certain differences in the average values. It was found that there were no significant differences in these values, shown in Fig. 1.

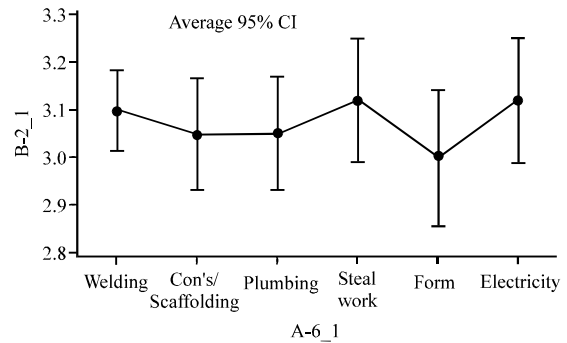


Fig. 1: Result of analysis of variance, Vietnam. *pooled standard deviation is used for calculating interval value (B-2_1 and A-6_1 interval)

Table 1: Result of frequency analysis, Vietnam

Questions/Answers	Frequency	Percentage
Your work type		
①Welding	41	25.47
②Con's/Scaffold	21	13.04
③Plumbing	20	12.42
④Steel frame	17	10.56
⑤Mold/Woodworking	14	8.70
⑥Civil	9	5.59
⑦Worker (labor)	4	2.48
⑧Painting	8	4.97
⑨Electricity	17	10.56
⑩Etc.()	10	6.21
Your work experience		
① less 5 years	37	22.98
② 6~10 years	69	42.86
③ 11~15 years	24	14.91
④ 16~20 years	16	9.94
⑤ 20 years more	15	9.32
Your monthly salary (average) (unit:USD)		
① less \$1,000	161	100.00
② \$1,000~1,500	0	0.00
③ \$1,500~2,000	0	0.00
④ \$2,000~2,500	0	0.00
⑤ \$2,500over	0	0.00
Your educational background		
①Elementary school	0	0.00
②Middle school	0	0.00
③High school	21	13.04
④College	68	42.24
⑤University or more	53	32.92

Table 2: Result of correlation analysis

Parameters	Experience	B2
Experience		
Pearson correlation factor	1	0.331**
Significance probability		0.000
(both side) N	161	161
B2		
Pearson correlation factor	0.331**	1
Significance probability	0.000	
(both side) N	161	161

**Correlation factor is significant with 0.01 level

Korea case

Analysis of frequency: Workers who do not undergo health checks who enter construction machinery operation areas without authorization and who neglect

Table 3: Result of correlation analysis

Parameters	Experience	C2	C4	C7	C8	C9
Experience						
Pearson correlation factor	1	0.303**	0.062	0.218**	0.238**	0.210**
Significance probability (both side) N	161	161	161	161	161	161
C2						
Pearson correlation factor	0.303**	1	0.321**	0.453**	0.393**	0.474**
Significance probability (both side) N	161	161	161	161	161	161
C4						
Pearson correlation factor	0.062	0.321**	1	0.392**	0.233**	0.187*
Significance probability (both side) N	161	161	161	161	161	161
C7						
Pearson correlation factor	0.218**	0.453**	0.392**	1	0.727**	0.628**
Significance probability (both side) N	161	161	161	161	161	161
C8						
Pearson correlation factor	0.238**	0.393**	0.233**	0.727**	1	0.780**
Significance probability (both side) N	161	161	161	161	161	161
C9						
Pearson correlation factor	0.210**	0.474**	0.187*	0.628**	0.780**	1
Significance probability (both side) N	161	161	161	161	161	161

**Correlation factor is significant with 0.01 level. *Significant values

Table 4: Result of frequency analysis, Korea

Questions/Answers	Frequency	Percentage
Your work type		
①Welding	17	17.0
②Con'c/Scaffold	14	14.0
③Plumbing	23	23.0
④Steel frame	15	15.0
⑤Mold/Woodworking	12	12.0
⑥Civil	7	7.0
⑦Worker (labor)	4	4.0
⑧Painting	2	2.0
⑨Electricity	3	3.0
⑩Etc. ()	3	3.0
Your work experience		
①less 5 years	14	14.0
②6~10 years	33	33.0
③11~15 years	41	41.0
④16~20 years	9	9.0
⑤20 years more	3	3.0
Your monthly salary (average) (unit:USD)		
①less \$1,000	2	2.0
②\$1,000~1,500	12	12.0
③\$1,500~2,000	29	29.0
④\$2,000~2,500	12	12.0
⑤\$2,500 over	45	45.0
Your educational background		
①Elementary school	3	3.0
②Middle school	16	16.0
③High school	57	57.0
④College	22	22.0
⑤University or more	2	2.0

signal notices should be penalized but it was noted that more than 70% of all respondents considered this to be unreasonable. This penalty-denying mindset could be a cause of accidents in the future, Table 4 and Fig. 2-4.

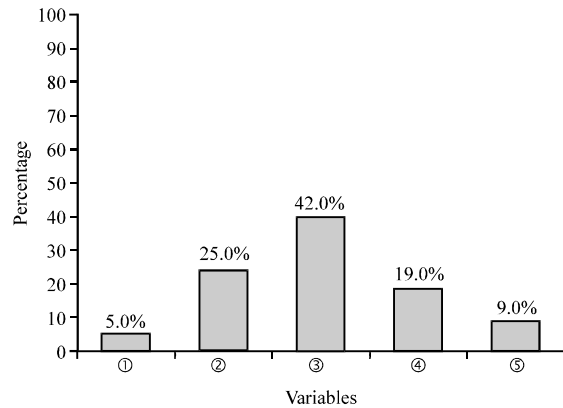


Fig. 2: Result of questionnaire

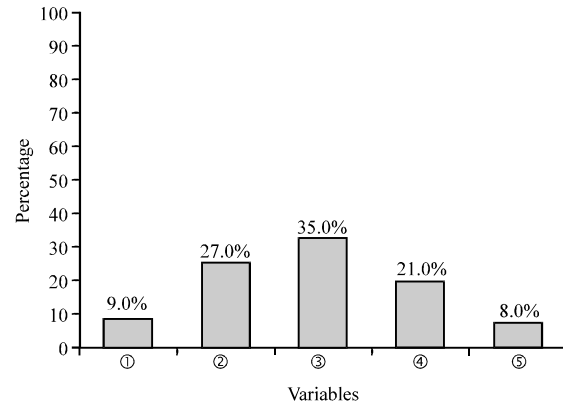


Fig. 3: Result of questionnaire

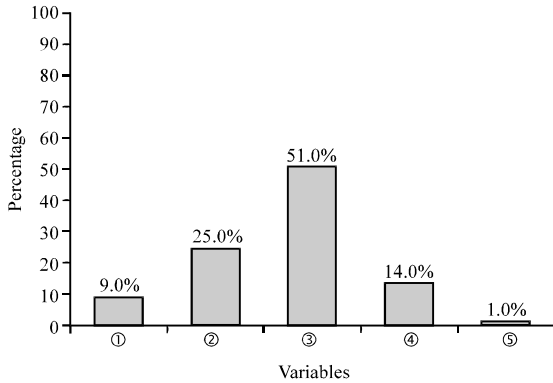


Fig. 4: Result of questionnaire

Do you think that the imposition of penalties will help to guarantee workers' safety on construction sites? ① No ② Do not know ③ Perhaps ④ Yes, it could help and ⑤ Indifferent.

If you violate regulations and receive a penalty, will you pay it yourself straightaway? ① No ② Do not know ③ Yes ④ Will ask to company and ⑤ Indifferent.

Do you think it is reasonable for the government to fine a \$50 penalty for the first offence, \$100 for the second offence and \$150 for the third offence when workers do not follow the OSHA regulations according to which workers must follow the rules made by their employer according to the Ministry of Employment and Labor Act (Articles 23, 24, 38)? ① Very unfair ② Unfair ③ Unsure ④ Right and ⑤ Absolutely right.

Analysis of correlation: The correlation between a worker's level of experience and their level of understanding of their duty at construction sites was reviewed. It was found that the correlation factor in this case is 0.080 for a p value of 0.428, indicating the absence of a significant correlation. Thus, more experience in a worker is not correlated with their level of understanding of their duties shown in Table 5 and 6.

Analysis of variance: According to the results, there were no significant differences in terms of penalty recognition by work type except for plumbing worker's who recognized that the penalty level may be reasonable.

Analysis: It is shown that the safety consciousness of workers at construction sites is not greatly influenced by their level of experience. This was found by both an analysis of variance and a correlation analysis.

Table 5: Result of correlation analysis, Korea

Parameters	Experience	B2
Experience		
Pearson correlation factor	1	0.080
Significance probability (both side) N	100	0.428
B2		
Pearson correlation factor	0.080	1
Significance probability (both side) N	100	0.428

All of the workers at the construction sites in Vietnam replied with the answer "Will ask the company" when presented a hypothetical scenario in which they violated HSE regulations and must pay a penalty, thus, hoping not to have to pay it themselves. Social and economic levels could be closely related to having a reasonable mindset about this.

An initial fine of USD 100, a second fine of USD 200, and a third fine of USD 300 may be reasonable for workers at Vietnam at sites according to 93% of the respondents, except for crane operators and excavator operators who considered this at a rate of 79%. Most workers felt that violations by construction workers meant that they should pay for their violations, generally but operators using hazardous machinery and equipment agreed with this at a decreased level of nearly 20%, especially, in cases of greater fines such as USD 500 or USD 1000.

About 10% more of these workers agreed to issuing someone in their company the fine in cases of high fines such as USD 3000 or USD 6000. Specifically, all workers who replied to the questionnaire survey agreed that the penalty system should mean less money for them to pay and more money for their company to pay.

More than 70% of Vietnamese workers agree with the issuing of penalties against their violations. In contrast, more than 70% of Korean workers do not agree to the issuing of penalties at construction sites.

Vietnamese workers at construction sites replied to the question stating "The imposition of penalties will help to guarantee worker's safety at construction sites" by agreeing it was "helpful". Specifically, they agreed to the imposition of a penalty onto themselves but they would eventually like to avoid paying the penalty themselves. This psychological idea may be closely related to ensuring safety at construction sites.

Vietnamese workers agree to pay some penalty for violating HSE regulations which should be followed at construction sites but they do not want to pay it themselves, i.e., out of their own pay.

Table 6:Result of correlation analysis, Korea

Parameters	Experience	C2	C4	C7	C8	C9
Experience						
Pearson correlation factor	1	-0.118	0.029	-0.010	-0.106	-0.049
Significance probability (both side) N	100	100	100	100	100	100
C2						
Pearson correlation factor	-0.118	1	0.556**	0.341**	0.377**	0.418**
Significance probability (both side) N	100	100	100	100	100	100
C4						
Pearson correlation factor	0.029	0.556**	1	0.430**	0.373**	0.396**
Significance probability (both side) N	100	100	100	100	100	100
C7						
Pearson correlation factor	-0.010	0.341**	0.430**	1	0.762**	0.671**
Significance probability (both side) N	100	100	100	100	100	100
C8						
Pearson correlation factor	-0.106	0.377**	0.373**	0.762**	1	0.851**
Significance probability (both side) N	100	100	100	100	100	100
C9						
Pearson correlation factor	-0.049	0.418**	0.396**	0.671**	0.851**	1
Significance probability (both side) N	100	100	100	100	100	100

**Correlation factor is significant with 0.01 level

CONCLUSION

It is thought that any reasonable countermeasures against accidents at construction sites could be established regardless of the worker's levels of field experience. It should be noted that economic differences can influence a worker's consciousness level at construction sites.

It is thought that construction workers with insufficient experience at construction sites should receive additional training, so as to concentrate on prevention measures to decrease field accidents.

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REFERENCES

- Bae, Y.J., 2010. Researcher, construction economy series: Strategy of advance and an investment climate in vietnams construction markets, ser. Korea Res. Inst. Hum. Settlements Korea Winter, 1: 98-104.
- Choi, B.Y., 2016. The Effect of Construction Field Workers Safety Climate, Environmental Satisfaction and Safety Awareness on the Musculoskeletal Disorder. Seoul National University of Science and Technology, Seoul, South Korea,.
- Ko, K.H. and K.O. Lee, 2018. Determining efficient safety patrol team operations on construction sites. J. Eng. Appl. Sci., 13: 2732-2736.
- Uhm, T.H., J.H. Kim and G.Y. Lee, 2017. Effect of attitude education to perform cardiopulmonary resuscitation. J. Eng. Sci., 12: 7677-7681.
- Zhang, Z. and S.H. An, 2014. Improving the safety awareness of construction workers. J. Korea Inst. Build. Constr., 14: 451-457.