

A Study on the Role of Safety Climate in the Safety Management System -focus on OHSAS 18000 certification-

Deng Hua *

등 화

Kim Chang Eun **

김 창 은

Abstract

The purpose of this research is to understand the role of safety climate in the safety management system. Based on the 121 responses from facilities got Occupational Health & Safety Assessment Series (OHSAS) 18000 certification, the results of statistic analysis show that there is significant relationship between safety climate, work attitudes and Organizational Citizenship Behaviors (OCB). The most important finding is the relationship between safety climate and organizational commitment will mediate the relationship.

Keywords: Occupational Health & Safety Management System (OHSMS),
Safety Climate

1. INTRODUCTION

After the industrial revolution in 18th century, many workforces threw themselves into industry from agriculture, and a new issue was created, that was "occupational safety". In numerous past researches, there have rare research addressed that the psychological effect is also very important to organizational performance, and the issues of how executives' attitude toward safety and the safety condition influence employees' psychological status and performance should be paid more attention.

* Department of Industrial Engineering, MyongJi University

** Professor, Department of Industrial Engineering, MyongJi University

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In recent decades, the issues of occupational health and safety (OHS) have become more and more important. It is due to the gradual complex operation process, the awareness of workers' welfare and executives begin to regard OHS management as a necessary way to ensure employees' productivity and the quality of products. Furthermore, many countries had legislated OHS law for protecting workers in the workplace from hazards. When workers experienced accidents in their jobs, they tend to be dissatisfied with their organizations. Further, the work environment, management safety practices, and supervisor safety will also relate to the occurrence of accidents, job satisfaction, and safety behaviors (Laitinen, & Rasa, 2000; Hayes, Perander, Smecko, & Trask, 1998). Because the OHS will affect the psychological status, how the psychological performance will be influenced should be noticed except the physical damage and direct lost time due to occupational hazards.

2. LITERATURE REVIEW

2.1 OHSAS 18000 and Safety Climate

Occupational health and safety assessment series (OHSAS) 18000 is a certification system that can help organizations to build their OHSMS and provides guidelines to implement it. OHSAS 18000 is also a continual improvement management approach which places emphasis on practices being proactive and preventive in nature through the identification of hazards, the evaluation and control of work-related risks, and prioritization of goals.

Zohar (1980) defined safety climate as the sum of shared perception of work environment. After this, many researches had proved that safety climate would indeed affect safety behavior and safety performance, and also management support or commitment to safety was thought as the most important factor of safety climate (e.g.: Dedobbeleer & Beland, 1991). Hayes et al. (1998) used the similar concept of safety climate to propose a Work Safety Scale (WSS) for measuring perceptions of workplace safety; and their result indicated that WSS could predict job satisfaction, accident rates, and employee's compliance with safety behaviors. Because management commitment, employee involvement and coworker safety seem to relative important between organization and employee. this research tries to use these 3 factors on explaining the effect of safety climate when organizations got OHSAS 18000 certification.

2.2 Organizational Citizenship Behavior

The terms of organizational citizenship behavior (OCB) was first introduced by Organ (1988), and he proposed the five dimensions of OCB: altruism, conscientiousness, civic virtue, courtesy and sportsmanship. Later some scholars suggested different dimension of OCB. Varied from their focused on the behaviors, Williams and Anderson (1991) accorded to who was benefited from OCB and divided it into OCBI (organizational citizenship behaviors beneficial to individual) and OCBO (organizational citizenship behaviors beneficial to organization). Although Organ's (1988) five-dimension framework was adopted in the greatest amount of studies due to its longest history and representative. However, when the independent variable which would take effect to OCB came from the level of organization, in order to make sure that the benefit of OCB can be reciprocated to specific organization or individual, William and Anderson's (1991) classification would be adopted (e.g.: Cropanzano et al., 2003). In this research, management commitment to safety and perceived work safety are what we concern when an OHSMS has been implemented; and how this actions or improvements that are taken by executive do take effect on OCB will be investigated.

2.3 Safety Climate, OCB, and Work Attitudes

In past research, when scholars talked about work attitudes, job satisfaction and organizational commitment were the two of most adopted (e.g.: Cropanzano et al., 2003; Van Dyne & Pierce, 2004). Williams and Anderson (1991) suggested that job satisfaction and organizational commitment should be considered together to address their relative effects on OCB.

Job satisfaction had been discussed for a long time, and it was reported in several studies to positively relate to accidents and injury (Holcom, Lehman, & Simpson, 1993). Hence, when scholars integrated job satisfaction into safety-related studies, they often take it as an antecedent to safety behaviors or accidents. Barling et al. (2003) suggested that high quality work reduced occupational injuries directly or through the mediating effects of job satisfaction. This research considers the adoption of OHSAS 18000 as executive's spontaneous behavior. It can raise the management commitment to safety and reduce accidents that is caused by human or machine. Hence, job satisfaction will be aroused.

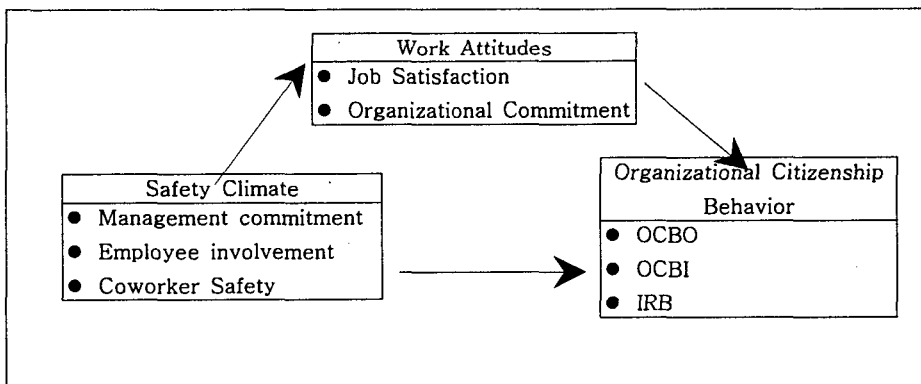
Organizational commitment is an important issue in the scope of management. It just likes a psychological contract that links employee to his/her organization. In

safety-related subjects, management may most interest in affective commitment since the objective is to inspire a willingness to reduce at-risk behavior, improve condition and control hazards (Meyer & Allen, 1997). Cropanzano et al. (2003) suggested that emotional exhaustion was a predictor of turnover intention, job performance, and OCB beneficial to organization and supervisor. In this research, they used organizational commitment as a mediating factor to operationalize the social exchange relationship.

3. RESEARCH DESIGN AND METHODOLOGY

3.1 Research Propositions and Hypotheses

The purpose of the study is to explore relationships among safety climate, work attitudes (including job satisfaction and organizational commitment), and organizational citizenship behaviors when an organization certificated by OHSAS 18000. This research constructs a conceptual framework as Figure 3.1. On the basis of the purpose, the propositions and null hypotheses are offered as Table 3.1.



<Figure 3.1> Conceptual Framework

3.2 Questionnaires Design

In order to increasing the validity and reliability, questionnaire was generated by some research and was done some revisal. However, due to the time constraint and the hardship of contacting subjects, the questionnaire of this study did not do pre-test but asked some experts for their advice. The questionnaire of the study is divided into five parts. Except for the part of individual information, the other four parts list as following:

<Table 3.1> The Summary of Hypotheses

Proposition1: Safety climate will be significantly related to work attitudes.
H-1-1: Safety climate is not significantly related to job satisfaction.
H-1-2: Safety climate is not significantly related to organizational commitment.
Proposition2: Safety climate will be significantly related to work attitudes.
H-2-1: Job satisfaction is not significantly related to OCBO.
H-2-2: Job satisfaction is not significantly related to OCBI.
H-2-3: Job satisfaction is not significantly related to IRB.
H-2-4: Organizational commitment is not significantly related to OCBO.
H-2-5: Organizational commitment is not significantly related to OCBI.
H-2-6: Organizational commitment is not significantly related to IRB.
Proposition3: Safety climate will be significantly related to OCB.
H-3-1: Safety climate is not significantly related to OCBO.
H-3-2: Safety climate is not significantly related to OCBI.
H-3-3: Safety climate is not significantly related to IRB.
Proposition4: Work attitudes mediate the relationships between safety climate and OCB.
H-4-1: Job satisfaction does not mediate the relationships between safety climate and OCBO.
H-4-2: Job satisfaction does not mediate the relationships between safety climate and OCBI.
H-4-3: Job satisfaction does not mediate the relationships between safety climate and IRB.
H-4-4: Organizational commitment does not mediate the relationships between safety climate and OCBO.
H-4-5: Organizational commitment does not mediate the relationships between safety climate and OCBI.
H-4-6: Organizational commitment does not mediate the relationships between safety climate and IRB.

① safety climate: the Safety Climate Scale developed by Fang D. P. & Lan R. X.(2002) will be hired in this part for measuring management commitment to safety, employees' involvement in safety and coworker safety.

② job satisfaction: we will use three items that was adopted by Barling et al. (2003) to assessment job satisfaction.

③ organizational commitment: there are eight items that consult from Allen and Meyer's (1990) Affective Commitment Scale.

④ organizational citizenship behavior: Van Dyne et. al's(1994) OCBO scale and Williams and Anderson's (1991) OCBI and IRB scale will be adopted.

4. RESEARCH RESULTS AND ANALYSIS

4.1 Questionnaire Retrieval

This research send questionnaires to facilities got OHSAS 18000 certification, and five questionnaires were sent to each facility for validity and representation. And since this research is interest in employee's citizenship behaviors, the participants will be first-line operators and supervisors. This research sent 940 questionnaires to 188 facilities. 138 questionnaires were returned but 121 were valid. The valid respond rate is 12.87%.

4.2 Reliability Analysis

The value of Cronbach's α is used to measure the reliability of the questions in the measures. α coefficient greater than 0.7 is high reliability while less than 0.35 is low reliability, which should be rejected.

Factor	Item	Item to total correlation	Alpha if item deleted	Alpha		
Safety Climate	Management Commitment	5	0.8060	0.9315	0.9400	
		6	0.8298	0.9299		
		7	0.7034	0.9374		
		8	0.7888	0.9323		
		9	0.7739	0.9354		
		10	0.8302	0.9287		
	Employee Involvement	11	0.8198	0.9296	0.9056	
		12	0.8051	0.9306		
		13	0.7004	0.8968		
		14	0.7132	0.8929		
		15	0.8089	0.8786		
		16	0.8113	0.8776		
	Coworker Safety	17	0.7785	0.8857	0.8865	
		18	0.6611	0.8997		
		19	0.8083	0.8325		
	Work Attitude	Job satisfaction	20	0.8028	0.8404	0.8969
			21	0.7677	0.8497	
		Organizational Commitment	22	0.6597	0.8929	0.8001
23			0.8147	-		
24			0.8147	-		
25			0.7117	0.7332		
26			0.4456	0.7956		
27			0.4696	0.7876		
Organizational Citizenship Behavior		OCBO	28	0.6293	0.7525	0.8916
			29	0.5976	0.7602	
	30		0.5091	0.7827		
	31		0.5091	0.7827		
	OCBI	32	0.7698	0.8658	0.9069	
		33	0.6425	0.8825		
		34	0.8073	0.8612		
		35	0.7202	0.8722		
		36	0.7152	0.8754		
		37	0.6461	0.8807		
IRB	38	0.5764	0.8918	0.9225		
	39	0.7542	0.8893			
	40	0.7351	0.8915			
	41	0.6090	0.9084			
	42	0.7244	0.8928			
	43	0.7178	0.8936			
	44	0.8013	0.8841			
	45	0.7377	0.8915			
	46	0.8118	0.9129			
	47	0.8590	0.8747			
	48	0.8594	0.8740			

<Table 4.2> Reliability Analysis

It should be noticed that when we deleted the 23rd, 41st and 44th item would cause the reliability to increase. However, the improvements were slight. In order to keep the entirety of questionnaire, this research preserved these items. Besides these three items, Cronbach's α of each dimension were greater than 0.8, that means the measures have high reliability.

4.3 Regression Analysis and Mediation Tests

Table 4.3.1 shows the regression result of safety climate. When job satisfaction is the independent variable, safety climate can significantly predict it, $\Delta R^2=0.532$, $p<0.001$. Organizational commitment can also be predicted by safety climate significantly, $\Delta R^2=0.189$, $p<0.001$. Hence, this research can reject Hypothesis 1-1 and 1-2. As the same table, it also shows that safety climate can significantly predict OCBO ($\Delta R^2 =0.233$, $p<0.001$), OCBI ($\Delta R^2=0.260$, $p<0.001$), and IRB ($\Delta R^2 =0.269$, $p<0.001$). This means when an employee felt well safety climate in his organization, then he would behave more discretionary behaviors that benefit the organizational effectiveness, and hypothesis 3-1, 3-2, and 3-3 can be rejected.

<Table 4.3.1> Regression Result

		JS	OC	OCBO	OCBI	IRB
SC	<i>b</i>	1.057	0.497	0.431	0.440	0.564
	<i>SE_b</i>	0.099	0.101	0.077	0.073	0.092
	β	0.733***	0.444***	0.491***	0.517***	0.526***
	R^2	0.537	0.197	0.241	0.267	0.277
	ΔR^2	0.532	0.189	0.233	0.260	0.269

ps. * $p<0.05$, ** $p<0.01$, *** $p<0.001$

Hypothesis 2-1, 2-2, and 2-3 was tested in upper section of table 4.3.2 Job satisfaction can significantly predict OCBO ($\Delta R^2 =0.341$, $p<0.001$), OCBI ($\Delta R^2=0.391$, $p<0.001$), IRB ($\Delta R^2=0.474$, $p<0.001$). After above analysis, Baron and Kenny's (1986) first two steps had been proved. Then safety climate entered the equation to predict OCBs with job satisfaction. Table 4.3.2 shown that when job satisfaction was controlled; safety climate would show a nonsignificant relationship with OCBs. These results supported that job satisfaction had significant mediating effects between safety climate and OCBs. It also rejected hypothesis 4-1, 4-2, and 4-3.

And later we can find out that this research could reject hypothesis 2-4, 2-5, 2-6, and hypothesis 4-4, 4-5, 4-6. After testing by statistic methods, all the results of hypotheses are significant.

<Table 4.3.2> Mediation Tests: Job Satisfaction

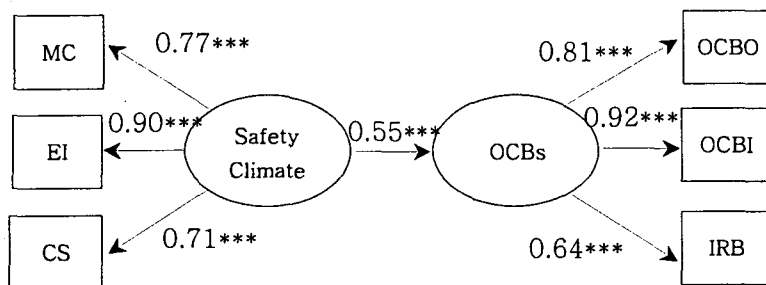
		OCBO	OCBI	IRB
JS	<i>b</i>	0.358	0.372	0.515
	<i>SE_b</i>	0.049	0.046	0.054
	β	0.589***	0.630***	0.692***
	<i>R²</i>	0.347	0.397	0.479
	ΔR^2	0.341	0.391	0.474
JS	<i>b</i>	0.301	0.320	0.493
	<i>SE_b</i>	0.072	0.068	0.080
	β	0.496***	0.542***	0.662***
SC	<i>b</i>	0.112	0.102	0.044
	<i>SE_b</i>	0.105	0.098	0.115
	β	0.128	0.119	0.041
	<i>R²</i>	0.355	0.403	0.480
	ΔR^2	0.342	0.391	0.469

ps. *p<0.05,**p<0.01,***p<0.001

4.4 LISREL Model

Although the hypotheses were tested above, this research would still interest in the relationships of three major dimensions of our framework. Hence, this research used LISREL to test the direct model that safety climate related to OCBs directly and indirect model that work attitudes were added to be a mediator.

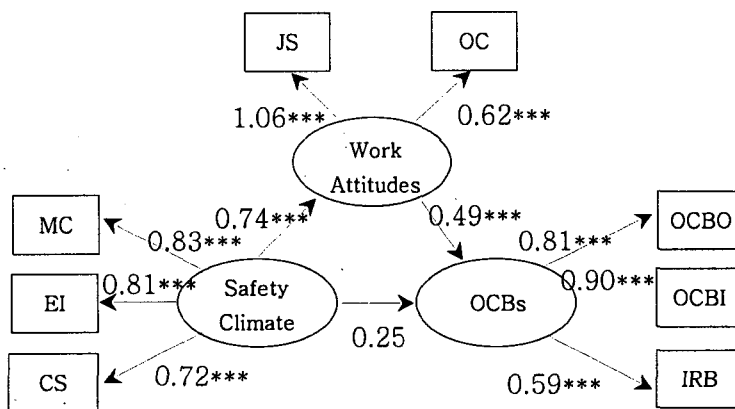
① Direct Model: in the direct model, the direct relationship between safety climate and organizational citizenship behaviors would be constructed. From Figure 4.4.1, it can be observed that the relationship is significant, and the path coefficient is 0.55. Thus we can conclude that the safety climate of organization would directly affect its employees' organizational citizenship behaviors. The data of model fit shows this model has good fitness, $\chi^2=0.571$, GFI=0.985, AGFI=0.948, RMR=0.020.



ps. *p<0.05,**p<0.01,***p<0.001

<Figure 4.4.1> Direct model

② Indirect Model: in the indirect model, work attitudes would enter for assessing the mediating effect that caused by them. And we could notice that, in Figure 4.4.2, when we put work attitudes into considering, the relationship between safety climate and OCBs became nonsignificant, and the path coefficient is 0.25. Thus, this research could still claim that the relationship would be mediated by work attitudes. The data of model fit shows this model has good fitness, $p=0.161$, $GFI=0.963$, $AGFI=0.898$, $RMR=0.039$.



ps. * $p<0.05$, ** $p<0.01$, *** $p<0.001$

<Figure 4.4.2> Indirect model

5. CONCLUSION AND DISCUSSION

5.1 Discussions

① The effect of safety climate on job satisfaction was tested and the result was significant. This result consisted with the previous researches that claimed workplace safety would affect on job satisfaction (Guastello, 1992; Hayes et al., 1998) and could be easily understood. When organization paid attention on the improvement of physical surrounding, risk avoidance, safety condition, and safety management system, employees would feel that the overall safety climate was good or excellent. Once employees felt them were treated well, their job satisfaction would increase. And this research also got a result that the safety climate that perceived by employees will effect their organizational commitment. It shows that when organizations are willing to improve safety condition by getting

OHSAS 18000 certification or establishing their OHSMS, employees will perceive the safety climate within the workplace is good and then they will be more emotional attachment and identification with organizations.

② The results of this research were consistent with the previous researches that suggested that job satisfaction and organizational commitment are the main antecedents of OCBs. When employees' work-related attitudes such as job satisfaction and organizational commitment were positive, they would behave more discretionary behaviors and improved organizational effectiveness. It was shown that when organizations adopt OHSAS 18000 certification and introduced OHSMS into their facilities, once their perception with organizational safety was well, they would have positive attitude toward organization and then behave positively.

③ The significant positive relationship between safety climate and OCBs shown that when employees felt the workplace was safety, the executives and management cared their safety, and they could understand organizational safety police, they could behave more citizenship behaviors toward organizations, individuals, and in-role behaviors. However, this relationship could not be connected straight; it would be mediated by work attitudes such as job satisfaction or organizational commitment. In this study, facilities that acquired OHSAS 18000 certification were seen as the executives cared about the safety of employees, had willingness to improve safety condition, and employees tended to feel a good safety climate. When employee felt the workplace was safety, they would more satisfy and commit to their organization, and then afford themselves to organizations by behaving more citizenship behaviors. Hence, the safety improvement made by organizations would cause the employees to reciprocate with their OCBs.

5.2 Suggestions

Safety is important to every employee, but unfortunately, it is costly to most organizations. In the past, firms would usually ignore the safety need of their employees and caused numerous work accidents and work diseases. However, with the awareness of labor right and the coming of knowledge economics, employees became most important asset within organizations. The safety policies and management systems were proposed to improve employees' safety in order to prevent the lost of productivity.

Beside these, this research claim that the safety perceived by employees will further influence their job satisfaction, organizational commitment, and their discretionary behaviors with making firms more effective. This is important for those firms that were not yet establish their safety management systems and

lower accident rate. Once they can understand the good safety climate can inspire their employees to perform better, there will be more incentive for them to introduce a safety management system or announce the safety polices to employees.

5.3 Limitations and Suggestions for the Future Study

In this study, there are some limitations that could influence the result of research. And these limitations are listed below:

- ① The response rate of the questionnaire was only 12.87%, numbers of questionnaire retrieval were only 121. This result might be because the safety condition is a sensitive question to firms.
- ② The safety management systems are various, this research only use OHSAS 18000 as sampler. Future study can compare between different systems or take them into account and make a comprehensive analysis.
- ③ The effect of difference between industries was not counted in this research. According to historical statistical data, construction industry was more dangerous than other industries and the fatal rate was much higher. It suggests future study can consider the difference between industries.

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저 자 소 개

등 화 : 현 명지대학교 산업공학과 박사과정
관심분야는 TPM, ERP, 경영혁신, 안전관리

김 창 은 : 현재 명지대학교 산업공학과 교수로 재직중
관심분야는 CMMS, TPM, 경영혁신, ERP