航　運　季　刊
第二十二卷　第三期
民國 102 年 9 月
頁 65～頁 84

Maritime Quarterly
Vol. 22 No. 3
September 2013
pp. 65–84

An Evaluation of the OHSMS in the Container Terminal Operation Context - An Example in the Port of Kaohsiung

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Abstract

This study aims to evaluate the Occupational Health and Safety Management System (OHSMS) implementation in container terminal operations at the Port of Kaohsiung. A questionnaire survey was used to collect workers' perceptions of their employing companies' OHSMS implementation. Four factors were identified based on a factor, namely: management support, safety training, safety environment, and health activity. An analysis of variance (ANOVA) was used to examine the relationships among OHSMS dimensions and five performance measurements. The results revealed that all four dimensions significantly affected the performance measurements, and the most important dimension for improving safety performance and increasing employees' well-being was management support. Therefore, high commitment container terminal operation management has upon OHSMS implementation will not only improve safety behavior, but also reduce accident occurrence and increase employees' job satisfaction.

Keywords: Occupational health and safety management system (OHSMS), Port of Kaohsiung, Container terminal, Management support

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1. INTRODUCTION

Occupational accidents are a serious problem in both developed countries and developing countries. The Labor Department of the United States (2012) reported that there were nearly 3.0 million nonfatal occupational injuries and illnesses, and 4,609 occupational fatalities in the private industry sector in 2011. On average, 3.5 fatal work injuries cases occur in the US per 100 full-time equivalent workers, and almost 90 a week or nearly 13 deaths every day in 2011. Occupational accidents cause direct and indirect or hidden costs for the whole society (Al-Tuwaijri et al., 2008). A report published by the National Safety Council (2012) indicated that work accidents cost the US economy an estimated $1.38 million per fatal work death, as well as cause human suffering and loss of life. The Eurostat (Takala, 1999; Hamalainen et al., 2006) estimated that more than 600 million man-days of work are lost every year in Europe due to occupational diseases. Further, the financial cost of all occupational related health problems varies between 2.6% and 3.8% of the European Union's Gross Internal Product, and about 50% of this cost relates to musculoskeletal disorders (Hamalainen et al., 2006). According to statistics (2012) published by the Bureau of Labor Insurance of Taiwan, 35,317 workers were injured, 2,588 were disabled, and 301 died due to occupational accidents in 2009. Of those workers who were injured, disabled or died, 1,695, 104 and 26, respectively, worked for the transportation industry.

Governments worldwide have been looking for a rigorous management system to facilitate and ensure the occupational health and safety of workers. Following Zohar's (1980) study of safety climate in industrial organizations, subsequent research focused on examining the relationship between safety climate and safety performance (Griffin and Neal, 2000; Zohar, 2002; Huang et al., 2006; Smith et al., 2006; Lu and Tsai, 2008, 2010), and the relationship between safety culture and safety performance (Clarke, 1998, 1999; Pidgeon, 1998; Harvey et al., 2002). These studies provided a universal approach that an adequate Occupational Health and Safety Management System (OHSMS) can reduce occupational injuries and fatalities among workers and, in turn, enhance operational efficiency and create a good image for an organization in the industrial sector. Every labor governed organization should endeavor to improve the occupational health and safety of its employees, since effective management of occupational health and safety will

facilitate workers' safety, help reduce accidents occurrence, have a positive effect on shareholder interest, and create more business opportunities. Moreover, benefits will accrue at the product compliance and conformity level, bringing satisfaction to customers and a reduction in scrapped material with the implied environmental benefits. However, no universal safety culture and safety climate dimensions have been suggested for adoption within organizations.

Basic faults in organizational structure, climate and procedures may predispose an organization to an accident. Therefore, the labor administration of Taiwan referred to the guidelines of both BS8800 and OHSAS18001 to establish the Taiwan Occupation Health and Safety Management System (TOHSMS) in 2007 (Wang et al., 2008). A terminal operator in the port of Kaohsiung first employed the TOHSMS in compliance with ILO-OSH2001 and OHSAS18001 in 2008. Other terminal operators followed and employed the TOHSMS as a key management system to facilitate the occupational health and safety of their employees. Although the TOHSMS has been widely employed in this industrial context in Taiwan, to the researcher's best knowledge there is a lack of studies investigating the implementation of the OHSMS in Taiwan. The study presented in this paper aimed to address this gap and focused on the terminal operator context in Taiwan to examine implementation of the OHSMS. This paper is organized as follows. After providing background details to the study and explaining the rationale for undertaking it in Section 1, Section 2 presents a review of relevant literature. Section 3 describes the study sample, the development of the questionnaire used to elicit data relating to the sample's employing organizations' implementation of the OHSMS, and the techniques employed to analyze the data obtained from the questionnaire. The data analysis results are presented in Section 4. Conclusions drawn from the study findings are presented in Section 5. The study's limitations and suggested areas for future research are also to be found in this section.

2. LITERATURE REVIEW

The occupational health and safety of workers is an important and long-term objective of any organization. Damage to the worker, property, plant, products or the environment from accidents as well as production losses or liabilities, impose costs. The ultimate goal of any health and safety management system is to prevent injury and ill

health in the workplace. Bellamy et al. (2008) indicated that safety performance is dependent on the company's safety/organizational culture, safety management, and their human factors. People are the key resource in an organization and in the health and safety management system, thus the organization needs to have health and safety policies embedding health and safety in its human resource management, and to create an effective framework for maximizing the contribution of individuals and groups to improving the occupational health and safety of all employees. The components of the framework are needed to be carefully considered in order to establish an effective occupational health and safety management system.

Safety climate is believed to influence the safety behavior of workers at the individual, group, and organizational level (Zohar, 1980; Smith et al., 2006). Zohar (1980) indicated that safety climate can act as a frame of reference that guides normative safety behavior. Thus, many studies have focused on the association between safety behavior and safety climate (Guldenmund, 2000; Cooper and Phillips, 2004; Smith et al., 2006) as a predictor of employees' motivation to work safely, which affects subsequent occurrences of workplace accidents (Griffin and Neal, 2000; Lu and Tsai, 2010). Safety climate reflects the true priority of safety within an organization, and generally indicates how well safety-related policies, procedures and rewards, safety commitments, and safety training are implemented (Glendon and Litherland, 2001; Gillen et al., 2002). In general, workers determine the prioritization and importance of safety from looking at the actions of the supervisors (Zohar, 2000; Lu and Tsai, 2010).

Prior studies which have focused on safety climate and safety culture have identified the reasons for better safety performance and provided crucial suggestions for improving the structure of safety management systems. However, there are still many reasons why violations occur. The underlying causes often lie in systems which are designed without taking proper account of human factors, or violations are condoned implicitly or explicitly by management action or neglect. Top management should establish an approach which considers the objectives of employees' health and safety as important as other business objectives. It is also necessary to establish guidelines to help organizations to formulate an effective safety management system. The British Standards Institution issued the BS8800 guideline in 1996 which was officially released in 1999 (HSE, 2008), that congregated guidelines from a number

of standardizing organizations from different countries. Then, the Occupational Health and Safety (OH&S) management system integrated the management philosophy of ISO9000 and ISO14000 to form OSHAS18001 (Al-Tuwaijri et al., 2008) which is directed at the pro-active control of occupational risk enabling the organization to improve its safety and health related performance (Kogi, 2002; McDonald et al., 2003).

A positive health and safety culture is fostered by the visible and active leadership of senior managers. An effective management structure and arrangements should also be in place to support such culture. All staff members should be motivated and empowered to work safely in order to protect their long-term health, not simply to avoid accidents. There should also be a shared common understanding of the organization's vision, values and beliefs. Employees' commitment to work safely is crucial to the success of any OHSMS. Such system can assist an organization to implement, monitor, evaluate and improve procedures to ensure a positive health and safety culture exists in it.

Performance standards have been established and used to measure achievement (Steel, 1990; HSE, 1997, 2008; Bamber, 2003; Ridley and Channing, 2003). Specific actions to promote a positive health and safety culture have been identified to indicate what, when, where and how improvements are needed (Zohar, 1980, 2002; Chew, 1988; Shannon et al., 1997; Guldenmund, 2000; Neal et al., 2000; Glendon and Litherland, 2001; Barling et al., 2002; Stajkovic and Luthans, 2003). Bellamy et al. (2008) suggested that safety performance can be measured by leadership, culture, rewards, manning, communication, coordination, social norms and pressures. A successful health and safety management system should measure both hardware (premises, plant and substances) and software (people, procedures and systems) including individual behavior and performance (HSE, 1997, 1998, 2008). Reactive monitoring within the organization discovers why accidents, ill health or incidents could cause harm or loss. Active and reactive monitoring helps to determine the immediate causes of sub-standard performance; and to identify the underlying causes and their implications for the design and operation of the health and safety management system. This study therefore focused on the OHSMS that container terminal operator implemented in the port of Kaohsiung to reduce occupational accidents. The concept can be illustrated as follow in the figure 1:

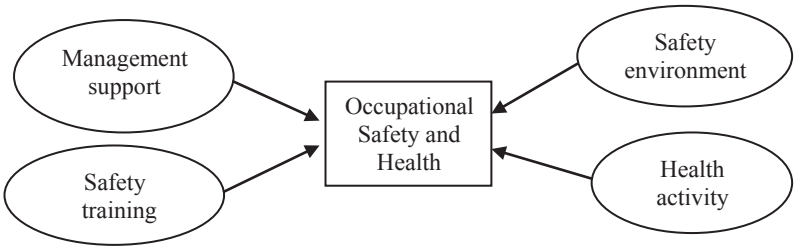

Figure 1 Research concept

3. METHODOLOGY

3.1 Study Sample

This study aimed to evaluate the implementation of an occupational health and safety system by container terminal operators in the port of Kaohsiung in Taiwan. The study sample was comprised of workers working in the container terminal context for carriers or their subsidiaries, outsourcing or collaborative companies, or tally or manpower dispatch companies. At first, a contact person in every target company was found to be in charge distributing questionnaire within their companies. A total of 350 questionnaires were distributed to workers working in 7 main terminal operators in October 2011. These 7 terminal operators were APL, Hanjin, HMM, NYK, OOCL, WHL, and YM located in the port of Kaohsiung. Two hundred and fifty-two questionnaires were returned, of which 45 were invalid due to incompletion. The actual response rate was therefore 59.1%.

3.2 Questionnaire Development

Questionnaire development was based on: (1) interviews with experienced workers and supervisors in container terminal operation companies who provided invaluable information about OHSMS implementation in their workplaces; and (2) a review of relevant literature. The literature review focused on OHSMS documentation (HSE, 1997, 1998, 2008; Al-Tuwaijri et al., 2008) and previous studies (Zohar, 1980, 2002; Chew, 1988; Shannon et al., 1997; Guldenmund, 2000; Neal et al., 2000; Glendon and Litherland, 2001; Barling et al., 2002; Stajkovic and Luthans, 2003) on safety climate and safety culture to help the researcher identify and clarify the dimensions and measurements for use in this study. A draft of the questionnaire survey was written in Chinese and piloted to confirm the wording of questions and the time taken to complete the survey. The questionnaire was divided into three

sections. The first section gave the reason for the questionnaire survey and explained how to answer the questionnaire items; the second section contained 28 statements relating to safety management, training, safety environment in the workplace, and occupational health activities. The other five self report measurements which were safety record (*The company's safety performance is better than others in the industry*), OHSMS familiarization (*Our employees are aware of the company's regulations of occupational health and safety*), work atmosphere in the workplace (*I feel happy and enjoy work in this company*), work stress (*I can get work pressure completely relieve from work*), and work security (*I feel work safety and job security in this company*). These five measurements were used as dependent variables to measure the effects of the dimensions of OHSMS in this study. Surveyees were asked to rate their level of agreement with each statement on a scale ranging from 1 which represented strongly disagree to 5 which represented strongly agree. The third section elicited information pertaining to respondents' type of employing company, gender, age, educational level, job tenure, department and title.

3.3 Data Analysis Techniques

Factor analysis makes it possible to reduce the number of items for more convenient general application and without sacrificing validity. Principal component analysis with varimax rotation was applied and calculated through the statistic software, SPSS 13.0 for windows, in current study. The Kaiser-Meyer-Olkin value indicated if the data were suitable for conducting factor analysis, and the Bartlett Test of Sphericity pointed to correlations among the measures. The total amount of variance and Eigenvalues greater than one were used as criteria to determine the number of factors (Benson and Nasser, 1998; Churchill and Iacobucci, 2004; Hair et al., 2006). The factor loading indicated the correlation between each variable and all other variables on a particular factor (Churchill and Iacobucci, 2004). Only factors with a loading of 0.50 or higher were extracted to assist interpretation (Hair et al., 2006). Cronbach's Alpha was used to identify items closely correlated with each other and therefore demonstrably measuring the same underlying component or dimension (Churchill and Iacobucci, 2004).

Criterion related validity should be established by correlating the scores with

outcome data, preferably collected by some method other than the questionnaire instrument. Factor analysis requires reasonably large data sets (of about 100) or a sample where there is a 10:1 ratio of participants to items (Guadagnoli and Velicer, 1988; Ferguson and Cox, 1993). The internal reliability data for proposed/ identified factors can also be assessed. A Cronbach's alpha score of 0.7 or higher is usually regarded as indicative of acceptable internal reliability (DeVellis, 1991). One-way ANOVA was used to identify whether perceived differences in the dimensions of OHSMS existed between the groups based on demographic variables, such as job title, age, and experience in their companies. The views of different group workers might be different. In addition, a Scheffe test was employed to identify perceived differences among groups based on their perceptions of critical OHSMS dimensions.

4. ANALYSIS RESULTS

4.1 Respondents

The terminal operation in Taiwan consists of three primary types of company: the carrier and its subsidiary, outsourcing and collaborative company, and the tally and manpower dispatch company (See Table 1). Over one-third of respondents (38.7%) worked for carriers or their subsidiaries, 39.3% worked in outsourcing or collaborative companies, and 22.0% of respondents reported that their companies were tally or manpower dispatch companies. More than 82% of respondents were male and only 18% were female. These results indicated that most workers in container terminal operations were male. As regards age, only 1.8% of respondents were 25 or less, and 42.9% of respondents were 41 years old or more. In total, almost 83% of respondents were aged 31 or more. With respect to length of job tenure in their current employing company, results presented in Table 1 show that 14.3% of respondents had worked in their employing company for 3 years or less, 14.3% had worked in it between 4 to 6 years, and 16.7% between 7 to 9 years. Notably, more than half (54.8%) reported they had worked in the same company for 10 years or more. These results suggested there is low turnover rate in the container terminal operation industry, and respondents had sufficient knowledge and experience to accurately assess the extent to which the Taiwan Occupational Health and Safety Management System had been implemented in their employing company. As

regards job title, 10.1%, 51.2% and 30.4% of respondents were supervisors, general staff, and tally or stevedore staff, respectively. Only 8.3% of respondents were drivers. This result demonstrates that drivers were working in isolated areas and were difficult to approach.

Table 1 Profile of respondents

Category	Characteristics	Frequency	Percentage (%)
Type of company	Carriers or their subsidiary	65	38.7
	Outsourcing or collaborative	66	39.3
	Tally or manpower dispatch	37	22.0
Sex	Male	135	80.4
	Female	33	19.6
Age	25 or less	3	1.8
	Between 26 to 30	26	15.5
	Between 31 to 35	32	19.0
	Between 36 to 40	35	20.8
	41 or more	72	42.9
Educational level	High school or below	70	41.7
	Collage or University	87	51.8
	Graduate or above	11	6.5
Job tenure	3 years or less	24	14.3
	Between 4 to 6 years	24	14.3
	Between 7 to 9 years	28	16.7
	10 years or more	92	54.8
Department	Documentation	45	26.8
	Container/Yard management	23	13.7
	Marketing	8	4.8
	Operations	92	54.8
Job title	Supervisor	17	10.1
	General staff	86	51.2
	Driver	14	8.3
	Tally or stevedore	51	30.4

Table 2 shows respondents' level of agreement with the 28 statements in the questionnaire. Respondents' level of agreement/disagreement showed the status of OHSMS implementation within their employing company. The five statements with which respondents most agreed were: "the company strengthens occupational safety training when a major accident occurs in the company or the industry"; "the company has

Table 2 Respondents' agreement level with occupational health and safety statements

Var.	Measures	Mean	S.D.
V3	The company strengthens occupational safety training when a major incident occurs in the company or the industry.	4.50	.800
V5	The company has dedicated occupational health and safety departmental staff.	4.45	.822
V2	The company regularly arranges job training in occupational safety.	4.40	.835
V4	My company attaches great importance to occupational safety education and the training of employees.	4.32	.839
V15	Operating machinery in my company is checked regularly.	4.31	.909
V1	The company arranged occupational health and safety training when I was a newcomer.	4.29	.910
V16	The company has clear and appropriate safety signs throughout the workplace.	4.28	.907
V18	This company has clear markings on dangerous cargo and dangerous machinery.	4.28	.890
V17	The company has a clearly marked safety operations flowchart.	4.25	.845
V6	The company emphasizes the importance of workers' familiarization with the OHSMS regulations.	4.24	.970
V12	I'm happy to make a recommendation when I find something dangerous in the workplace.	4.15	.890
V22	The company encourages employees to practise health management.	4.12	.970
V13	The company always gives a positive response to employees' suggestions for improving work safety.	4.11	.920
V25	The company attaches great importance to the mental health of employees.	3.82	1.059
V23	The company often organizes health management seminars.	3.81	1.018
V24	The company often organizes health management consultations.	3.78	1.019
V11	The company rewards those employees who make safety recommendations.	3.51	1.136
V28	I can participate in recreational activities without any pressure.	3.51	1.097
V27	The company regularly organizes staff travel.	3.45	1.109
V26	The company organizes recreational and sport activities.	3.16	1.119

dedicated occupational health and safety departmental staff"; "the company regularly arranges job training in occupational safety", "my company attaches great importance to occupational safety education and the training of employees"; and "all the operating machinery within my company is checked regularly". Their mean values were all higher than 4.0, which suggested that container terminal operators in Kaohsiung port were doing well in relation to these measures. The five statements with which respondents least agreed were: "the company organizes recreational and sport activities"; the company regularly organizes staff travel"; I can participate in recreational activities

without any pressure" ; the company rewards employees who make safety recommendations"; and "the company often organizes health management consultations". All these measures were related to health activities, except the measure "the company rewards employees who make safety recommendations". The results imply that terminal operators need to pay more attention to improving occupational health activities.

4.2 Factor Analysis

Principal component analysis with varimax rotation and Kaiser Normalization were employed to extract key dimensions. The KMO value was 0.916 which indicated the data were suitable for conducting factor analysis, and the Bartlett Test of sphericity figure was 2557.13, df =190, and significant at the 0.000 level, suggesting correlations existed among the measures (Stevens, 1992). The total amount of variance and an Eigenvalue greater than one were used as criteria to extract the dimensions. Only factors with a loading of 0.50 or higher were extracted. Eight measures related to management were subsequently deleted due to low factor loading, and four dimensions were extracted. They accounted for 72.19% of the total variance. The Cronbach alpha values of these four factors were 0.92, 0.91, 0.88, and 0.87, respectively, much higher than the Cronbach alpha value of 0.7 regarded as indicating acceptable internal reliability (Churchill and Iacobucci, 2004). The factor analysis results were as below:

Factor 1 contained seven measures related to management support activities and was therefore labeled a management support dimension. Factor 1 had an Eigenvalue of 9.89 and accounted for 22.10% of the total variance.

Factor 2 consisted of six measures related to safety training activities and was therefore labeled a safety training dimension. This factor had an Eigenvalue of 2.23 and accounted for 20.78% of the total variance.

Factor 3 comprised four measures related to safety environment activities and was therefore labeled a safety environment dimension. Factor 3 had an Eigenvalue of 1.32 and accounted for 16.44% of the total variance.

Factor 4 consisted of three measures related to health activities and was therefore labeled a health activity dimension. This factor 4 had an Eigenvalue of 1.00 and accounted for 12.86% of the total variance.

Table 3 Factor analysis results

Var.	Measures	F1	F2	F3	F4
V24	The company often organizes health management consultations.	**.773**	.297	.175	.237
V25	The company attaches great importance to the mental health of employees.	**.759**	.279	.162	.242
V23	The company often organizes health management seminars.	**.755**	.335	.130	.281
V11	The company rewards employees who make safety recommendations.	**.739**	.112	.109	.274
V13	The company always gives a positive response to suggestions about improving work safety.	**.665**	.263	.447	.055
V22	The company encourages employees to practise health management.	**.658**	.361	.383	.075
V12	I'm happy to make a recommendation when I find something dangerous in the workplace.	**.653**	.190	.353	.080
V2	The company regularly arranges job training in occupational safety.	.226	**.768**	.224	.118
V1	The company arranged occupational health and safety training when I was a newcomer.	.340	**.750**	.298	.064
V4	My company attaches great importance to occupational safety education and the training of employees.	.326	**.731**	.065	.032
V5	The company has dedicated occupational health and safety departmental staff.	.181	**.728**	.314	.144
V3	The company strengthens occupational safety training when a major accident occurs in the company or industry.	.112	**.714**	.438	.040
V6	The company emphasizes the importance of workers' familiarization with the OHSMS regulations.	.300	**.700**	.361	.042
V16	The company has clear and appropriate safety signs throughout the workplace.	.173	.287	**.807**	.155
V18	This company has clear marks on dangerous cargo and dangerous machinery.	.272	.318	**.728**	.198
V17	The company has a clearly marked safety operations flowchart.	.305	.271	**.702**	.204
V15	All the operating machinery within my company is checked regularly.	.246	.365	**.666**	.050
V27	The company regularly organizes staff travel.	.118	.039	.158	**.894**
V26	The company organizes recreational and sport activities.	.234	.057	.125	**.860**
V28	I can participate in recreational activities without any pressure.	.304	.132	.099	**.773**
Eigenvalue		9.89	2.23	1.32	1.00
Percentage		22.10	20.78	16.44	12.86
Cum. percentage		22.10	42.88	59.32	72.19
Cronbach's α		0.92	0.91	0.88	0.87

Note: F1: management support dimension, F2: safety training dimension, F3: safety environment dimension, F4: safety and health activities dimension.

4.3 ANOVA Results

ANOVA tests were carried out to examine the relationship among the four OHSMS dimensions and five performance measurements. Results in Table 4 showed that all correlation coefficients were significant at the 0.01 level, implying that management support, safety training, safety environment, and health and safety activity dimensions were strong correlated with the five performance measurements. The management support dimension had, overall, significantly higher coefficients with the performance measurements than the other three dimensions. This finding suggests that management support is the most important dimension when implementing the OHSMS in a company. The safety training dimension had significantly higher correlation coefficients with safety record (0.507) and OHSMS Familiarization within the company (0.583) and lower correlation coefficients with work atmosphere (0.400), work stress (0.275), and work security (0.434). Table 4 also showed the relationship between the safety environment dimension and the five performance measurements. The safety environment dimension had higher correlation coefficients with safety record and OHSMS Familiarization within the company (0.586 and 0.623, respectively) and lower correlation coefficients with work atmosphere, work stress, and work security (0.420, 0.363 and 0.438, respectively). However, the dimension of health activity has highest correlation coefficients (0.606) with safety record; it also has higher correlation coefficients with work atmosphere, work stress, and work security, the correlation coefficients are 0.593, 0.576, and 0.577, respectively. The results shown in Table 4 revealed that these four dimensions of OHSMS have high correlation and they could not be ignoring within their companies in the container terminal operation context. The results also demonstrated that these four dimensions have significant impact on the organization performance.

ANOVA tests were also carried out to ascertain whether respondents' perceptions of the four OHSMS dimensions significantly differed based on their type of employing company. Results shown in Table 5 show that there were no significant differences between respondents' perceptions, implying that the different types of container terminal operating companies did not significantly differ in their implementation of the four OHSMS dimensions. The results revealed that these four dimensions can represent OHSMS and can be applied to all organizations in container terminal operation context.

Table 4 Correlation matrix

	Management support	Safety training	Safety environment	Health activity
Management support	1			
Safety training	.665**	1		
Safety environment	.655**	.707**	1	
Health activity	.496**	.284**	.384**	1
Safety record	.706**	.507**	.586**	.606**
OHSMS Familiarization	.741**	.583**	.623**	.490**
Work atmosphere	.646**	.400**	.420**	.593**
Work stress	.565**	.275**	.363**	.576**
Work security	.654**	.434**	.438**	.577**

** Correlation is significant at the 0.01 level (2-tailed).

Table 5 Comparisons of the difference in respondents' perceptions of the four OHSMS dimensions by employing company types

Dimensions	Carrier and subsidiary		Collaborative company		Manpower dispatch		F Value	P Value
	Mean	S.D.	Mean	S.D.	Mean	S.D.		
Management support	3.88	0.80	3.99	0.84	3.83	0.77	0.58	0.56
Safety training	4.44	0.70	4.42	0.66	4.36	0.58	0.21	0.81
Safety environment	4.28	0.75	4.34	0.69	4.32	0.61	0.13	0.88
Health activity	3.43	0.92	3.19	0.99	3.52	1.10	1.69	0.19

Table 6 shows the results obtained from comparing respondents' perceptions of the four OHSMS dimensions based on their job title. They show that respondents' perceptions of the management support and safety environment dimensions significantly differed according to job title. Respondents who were drivers had the highest mean score on the management support dimension (mean = 4.55, S.D. = 0.85) and safety environment dimension (mean = 4.71, S.D. = 0.50) whereas general staff had the lowest mean scores on these two dimensions of 3.78 and 4.17, respectively. In general, the driver work in front line with high risk and they are familiar with the risk. When they got any little safety protection from company and supervisor, they can feel the environment change and protective safety directly. Whereas the general staff works in the office with low safety treat, they are not familiar with the dangerous environment in the container terminal. They always feel the support and protective are too little to avoid risk in their workplace.

Table 6 Comparisons of differences in respondents' perceptions of the four OHSMS dimensions by job title

Dimensions	Supervisory		General staff		Drivers		Tally/stevedore		F Value
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	
Management support	3.88	0.70	3.78	0.81	4.55	0.85	3.96	0.76	3.89**
Safety training	4.39	0.64	4.39	0.68	4.67	0.66	4.41	0.63	0.75
Safety environment	4.19	0.76	4.17	0.73	4.71	0.50	4.48	0.57	4.19**
Health activity	3.06	0.85	3.47	0.91	3.12	0.80	3.33	1.19	1.15

Note: ** significant at the 0.01 level.

Table 7 shows the results obtained from comparing respondents' perceptions of the five performance measurements by job title. They indicate that respondents' perceptions of the performance measurements of safety record and OHSMS familiarization significantly differed. Respondents who were drivers had the highest and the same mean score on these two performance measurements, namely, 4.57, whereas respondents who were supervisors had the lowest mean scores on these two performance measurements (mean = 3.53, S.D. = 0.72 for safety record) and (mean = 3.76, S.D. = 0.83 for OHSMS familiarization) implying that respondents in a supervisory role were least satisfied with these performance measurements. These results provided evidences indicate that different job title of employees have different perception of safety performance according to their different role within the organization.

Table 7 Comparisons of differences in respondents' perceptions of the five performance measurements by job title

Performance measurements	Supervisory		General staff		Driver		Tally/stevedore		F Value
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	
Safety record	3.53	0.72	3.78	0.91	4.57	1.09	3.94	0.88	4.03**
OHSMS familiarization	3.76	0.83	3.84	0.92	4.57	1.09	4.20	0.90	3.86*
Work atmosphere	3.65	0.86	3.63	1.02	3.79	1.19	3.53	1.17	0.25
Work stress	3.18	0.95	3.34	1.09	3.50	1.16	3.47	1.08	0.36
Work security	3.71	0.69	3.72	0.97	3.50	1.40	3.80	1.04	0.34

Note: ** significant at the 0.01 level; * significant at the 0.05 level.

5. CONCLUSIONS AND SUGGESTIONS FOR FURTHER RESEARCH

This study aimed to explore the status of OHSMS implementation in the container terminal operation context in the port of Kaohsiung in Taiwan. Data were collected by means of a questionnaire survey. Principal component analysis with varimax rotation was employed and yielded four main factors, namely: management support, safety training, safety environment, and health activity. ANOVA was used to examine the relationship among the four OHSMS dimensions and five performance measurements. Results indicated that while all the dimensions significantly affected the performance measurements, the most important dimension for improving safety performance and increasing employees' well-being in the container terminal operation context was management support. This finding is line with previous research (Griffin and Neal, 2000; Zohar, 2002; Huang et al., 2006; Lu and Tsai, 2010). The study findings highlighted that the health activity dimension not only facilitating the employees' well-being, but also were important to safety performance (Lu and Tsai, 2008, 2010). In addition, study results indicated that the different types of container terminal operating companies did not significantly differ in their implementation of the four OHSMS dimensions.

Further, results obtained from comparing respondent' perceptions of the five performance measurements by job title showed that respondents in a supervisory role were least satisfied with safety record and OHSMS familiarization. These imply that a driving force lies in the management system and facilitates the OHSMS improvement in the container terminal operation context.

As far as the author is aware, this is the first study to focus on the status of OHSMS implementation in Taiwan. Although, the dimensions of OHSMS were similar to the safety climate in previous studies (Griffin and Neal, 2000; Zohar, 2002; Huang et al., 2006; Smith et al., 2006; Lu and Tsai, 2008), the OHSMS concentrate not only on the safety performance, but also on the health of employees. The analysis results of this study highlight the safety and health is two faces of the employees. The company cannot employ traditional management concept that focuses on preventing accident occurrence to improve work safety. The study findings suggest a company should expand the dimensions of general safety climate that center on safety in workplace into OHSMS to simultaneously

care the employees' health (HSE, 1997, 1998, 2008; Kogi, 2002; McDonald et al., 2003; Al-Tuwaijri et al., 2008; Wang et al., 2008). The findings also suggest that if the management of container terminal operators has a high level of commitment to fully implementing the OHSMS in their companies, this will be a win-win management strategy since both the company and employees will benefit from that. Such commitment will not only facilitate safety behavior and reduce accident occurrence, but will also increase employees' well-being and job satisfaction. Therefore, the container terminal operators are suggested to fully employ OHSMS in their companies with high level commitments.

It needs to be acknowledged that there were several limitations to this study. The study specifically focused on the OHSMS adoption in the container terminal operation context in the port of Kaohsiung. Future studies could extend the approach to other ports or other industries to collect more data on the implementation of the OHSMS in order to seek universal dimensions for more effective implementation. Since the implementation of an OHSMS is a long-term and continuous process, it is suggested that a longitudinal study be carried out to find out the changes in safety performance and employees' well-being after the OHSMS has been implemented within a company for some length of time.

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