Original Article: Effects of Establishing Occupational Health and Safety Management Standards and Environmental Management on Environmental Factors and Employee Satisfaction

Ebadollah Amouzad Mahdiraji*[1] Reza Kolbadinezhad[2]

[1]*Department of Engineering, Sari Branch, Islamic Azad University, Sari, Iran*
[2]*Medical Genomics Research Center, Tehran Medical Sciences Islamic Azad University, Tehran, Iran*

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ABSTRACT

This study aimed to investigate the impact of establishing occupational safety and health management system and environmental management system on environmental factors and employee satisfaction. This paper was a quasi-experimental study conducted in 2012 in Milad Industrial Complex based on the results of measuring occupational and environmental pollutants. Data collection was through a questionnaire. The validity of the questionnaire was confirmed by content validity and its reliability by Cronbach's alpha (r = 81%). The statistical population of the study using Cochran's formula (α = 95%) consisted of 100 employees by random sampling method. After the installation of the systems, the average sound intensity decreased from 54.79 dB to 72.51 dB, the percentage of stations with the allowable light intensity increased from 8.30% to 4.70% and the number of gases and vapors decreased from 14.2 to 11.4 mg/m3. In the evaluation of the number of suspended particles, carbon monoxide was reduced from 0.143 to 0.062, and carbon dioxide from 0.28 to 7.49 that was within the standard range. Employees' satisfaction analysis of the environmental conditions showed that the majority of employees in the statistical community (88.7%) were satisfied. The simulation results showed that with the establishment of occupational safety and health management systems, environmental factors in the organization can be controlled.

Introduction

Human labor is the product of many different variables. Sometimes work is affected by human variables such as personality, perception, attitudes, motivation, group, individual etc., and sometimes it is affected by variables that are physical in nature.

These variables are called work environment conditions [1-5]. Organizations of any kind

***Corresponding Author:** Ebadollah Amouzad Mahdiraji (ebad.amouzad@gmail.com)*

have processes that are interested in achieving and proving the proper functioning of occupational safety and health by controlling occupational safety and health risks consistent with their overall goals and occupational safety and health policy.

They do this in the form of increasingly stringent laws, the development of economic policies and other measures for good occupational safety and health activities, and the increase in stakeholder attention to occupational safety and health issues. [6-9]. Addressing the health of employees and addressing welfare and comfort issues and applying strategies to adapt the work situation to physical and mental conditions are not to, a great extent, considered as a priority today, while it is associated with a task and the higher the percentage of employee health care. If realized, the impact on the growth and development of organizations and society will be greater. Meanwhile, the role of management as a major factor in promoting the level of health and well-being of the organization and thus achieving organizational growth is more evident [10-14].

Safety and health require an active management system because safety and health cannot be achieved through coercive regulation or collective feeling or by an individual alone. Evidence of the importance of safety management system in increasing the level of safety and health of industries indicates that in 46% of cases of work accidents that lead to disability has been an organizational cause. According to studies, 50% of work accidents are caused by the lack of an efficient safety management system [15-19]. The establishment of occupational safety and health management system and environmental management should be considered, and maintained by the supervisors and senior management of the organization [20-25].

In the beginning, the senior management of the organization must coordinate and empathize to achieve this goal and be determined, believing, and hopeful to take personal action and work for the growth and strength of the environmental management system and occupational safety and health in the organization under their supervision. [26-29].

It is necessary to solve this problem or dilemma to move towards progress and excellence. To answer these problems, raising the level of health factors affecting the increase of health and satisfaction of human resources and eliminating the contradictions of environmental factors through the establishment of occupational safety and health systems and the environment can be effective [30-33].

This study focused on the current situation of Milad industry, the status of the establishment of occupational safety and health management systems and environmental on environmental factors and the level of employee satisfaction based on information extracted from the results of measuring health and environmental factors before and after Evaluated the implementation of the system [34-37].

Research method

This article was a quasi-experimental study conducted in 2018 in Milad Industrial Complex. Data were collected based on the results of measuring occupational safety and health pollutants related to the years 2014 and 2015. The statistical population of the study consisted of all formal and contract employees of the Milad Industry. The sample size was selected using Cochran's formula with a 95% confidence interval including 100 industry employees by random sampling method. To collect data before and after the establishment of occupational health and safety management system and environmental management system in the dimensions of occupational hazards, chemical agents, and air pollutants, a data collection form was used [38-41].

The researchers, while referring to the documents and audits performed, extracted the required information and recorded it in the data collection form. Then, using a researcher-made questionnaire, the level of employee satisfaction with the establishment of these systems was assessed.

The satisfaction questionnaire had 17 questions on a 5-point Likert scale from completely satisfied, satisfied, relative satisfaction, dissatisfied, and completely dissatisfied. The validity of the questionnaire was confirmed by content validity and its reliability was confirmed by calculation with Cronbach's alpha (α = 81%).

To evaluate the effect of induction of the systems on environmental factors and the level of employee satisfaction, paired test tests were computed through SPSS software [42-45].

Outputs from simulation

Evaluations from the study showed that in examining the status of occupational hazards in all factories, the sound condition decreased and the light intensity condition improved, also the condition of suspended particles decreased in all factories except factory 1 (Table 1).

Comparison of the results of measuring chemical agents before and after the establishment of management systems showed that gases and vapors significantly decreased after implementation and were standardized (Table 2).

Comparison of air pollutant measurement results before and after the establishment of management systems showed that the exhaust gases in factories one, two, three, and five had a significant reduction (Table 3).

The study of employees' satisfaction with environmental factors and the implementation of environmental systems and ISO showed that the level of employees' satisfaction with the intensity of sound and lighting was at a high level and in general, they were very satisfied with the implementation of environmental management systems (Table 4).

Table 1. Status of occupational hazards (sound, light, particulate matter) before and after the establishment of two systems of occupational safety and health management and environmental management

Average measurement of suspended particles			Percentage of standard light intensity measuring stations			Sound status			Factors to be measured
Changes	After establishment (mg /m^3)	Before deployment (mg/m^3)	Changes	Permissible after installation (lm/m2)	Permissible before installation (lm/m2)	Changes	After Deployment (dB)	Before Deployment (dB)	Measurement stations
0.0025	0.0205	0.023	٪26	٪73	٪47	-4.29	67.16	71.45	1
0.0185 -	0.0475	0.029	٪41	٪88	47٪	-2.49	72.9	75.39	2
0.0015	0.0125	0.014	٪33	٪83	٪50	-3.78	70.81	74./59	3
-0.1	0/14	0.40	٪43	٪43	0	-15.16	97.4	94/.56	4
0.0005 -	0.0175	0.017	٪60	٪70	٪10	-9.41	72.3	81.71	5

Table 2. Comparison of measuring results of chemical agents (gases and vapors)

Assessing factor	Standard limit (mg / m^3)	Post-establishment rate (mg / m^3)	Pre-establishment rate (mg / m^3)
Fium	5	11.2	**14.2**
Metacrozole	20	0.6	**0.66**
Dimethyl formaldehyde	150	1.6	**0.88**

Table 3. Comparison of air pollutant measurement results (exhaust gases)

Station number	Average air pollutants after deployment	Average air pollutants before deployment	The factor being measured
1	98.2	62.8	O_2
2	49.7	2.9	Co_2
3	143.0	062.0	CO
4	70	0450.0	HC
5	20.32	42 .34	FUEL

Table 4. Employees' satisfaction with environmental factors and implementation of environmental and ISO systems

General assessment	Satisfaction percentage			
	very much	Relatively high	Relatively low	very little
More than 60% are satisfied with the volume	8.2	43.3	17.5	**30.9**
More than 80% are satisfied with the brightness	6.2	45.4	42.3	**4.1**
More than 65% of chemical agents are annoying and more than 60% of chemical control agents are satisfactory	12.4	36.1	26.8	**24.7**
88.7% of employees consider the establishment of occupational safety and health management system effective	22.7	27.8	38.1	**11.3**

Conclusion

Analysis and comparison of the results of measuring occupational pollutants before and after the establishment of occupational safety and health management system and environmental, as well as the results of

employee surveys of environmental conditions showed that the establishment of standard occupational safety and health management system on factors had positive effects. Also, the establishment of occupational safety and health management systems and environmental management on employee satisfaction with environmental conditions was been high. The reduction of the noise level in the 4 factories mentioned in this study after the establishment of occupational safety and health systems and the environment was statistically significant and decreased from an average of 79.54 to 72.46 dB.

But in one of the factories, this decrease was not statistically significant. In the 4 studied factories due to the emphasis of the system auditors by the requirements of occupational safety and health systems and the environment on the establishment and implementation of preventive repair system, the exit of cooling and heating systems from inside the factory to outside the factory as well as the replacement of new and healthy equipment with used equipment had made a good improvement in the environment. In factory number two, due to the presence of a contractor outside the industry and their use of used equipment, as well as non-compliance with the requirements by the contractor and their forces and inadequate training and early relocation, little impact was made on improving environmental factors. Increasing the number of standard and authorized stations from 30.8% to 71.2% in terms of lighting intensity in all factories after the establishment of occupational safety and health systems and the environment according to field studies on the effect of measures such as determining the allowable intensity of lighting, reducing the height of lighting trays, the use of bright colors inside factories and the use of local lighting, as well as the independence of the lighting system modification, is independent of the contractor [46-50].

Numerous studies have confirmed the effects of establishing environmental standards on physical factors, whose results are consistent with the findings of the present study. The results of measuring the chemical agents in factory number five and quality control laboratories showed that the amount of fume was still reduced from 14.2 to 11.4 mg/m^3 despite the establishment of the research systems. It is more than the standard amount of 5 mg/m^3, which according to the researchers' research on the status of fume production and its place of production, is due to insufficient general ventilation and lack of local ventilation, which requires planning and the existing discrepancy can be resolved by the management [51-53].

The results of chemical laboratory chemical measurements in the studied industry showed that despite the increase in these values after the establishment of the research systems (Metacresol from 0.16 to 0.6 and dimethyl formaldehyde from 0.88 to 1.6), the measurement results are still within the allowable standard and the standard is 20 ppm Metacrosyl and 10 ppm dimethyl formaldehyde. Field studies have shown that the reasons for the increase in the amount of these chemicals due to the increase in the use of these substances in the laboratory result from the increase in the number of laboratory tests. In order to keep the mentioned values in the permissible and standard level, due to the requirements of occupational safety and health management systems and environment, the number of hoods in the laboratory has been increased from one device to two devices. Comparison of the measurement results of suspended particles and dust of the studied industry before and after the establishment of occupational safety and health management systems and the environment showed that according to the requirements of environmental management systems, the reduction of gases CO and CO_2 were statistically significant (CO_2 from 9.28 to 49.7 and CO from 0.143 to 0.062) and other gases either did not decrease or the decrease was not statistically significant [54-56].

This is due to the requirement of systems to conduct annual testing of fuel and diesel systems to control the number of polluting gases such as carbon monoxide and carbon dioxide and adjust these systems within the

permissible production of these gases. In examining the impact of the establishment of standards in Mexico, Chiarini concluded that the control of physical and chemical factors improved the situation by establishing standards due to the measurement and continuous monitoring of measurement activities [57]. The findings of Chen et al., Went Gartin et al., and Winder was consistent with the findings of the present study in the control of chemical agents. According to the results of measuring environmental factors and surveys of satisfaction with environmental conditions in this study, the establishment of environmental standards and occupational safety and health on environmental factors (light, sound, suspended particles, gases, and vapors) in the industrial environment had a positive result and reduced the number of non-standard cases, it also increased the number of stations within the allowable and standard levels. Still, the establishment of environmental and safety standards indicates the satisfaction of employees with the environmental conditions in the studied industrial environment. Zannah et al. In a study on determining the status of environmental management in factories in China reported the results of the establishment of the environmental management system to facilitate entry into global markets, standardization of environmental procedures, waste reduction, and resource storage and company image enhancement [23]. The results of this study were consistent with the results of the present study in the field of improving environmental conditions. In a study in Malaysia, Lee found similar results in improving environmental impact, reducing waste, and creating a better image of the company [24]. The results of this study were consistent with the findings of the present study. Due to social responsibility, industrial organizations should pay serious attention to environmental standards and consider their environment and human resources as key stakeholders. Adherence to these professional standards leads to the credibility and good reputation of institutions and indicates the degree of responsibility of companies. The establishment of occupational safety and health systems and the environment has a positive effect on environmental factors and can reduce and improve environmental factors. Also, the establishment of these systems indirectly, i.e. with the improvement of environmental conditions, can increase employee satisfaction. Continuous review and monitoring of management systems can have positive effects on improving employee performance.

Orcid

Ebadollah Amouzad Mahdiraji:

https://orcid.org/0000-0003-3777-4811

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