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A MULTIFACTORIAL ANALYSIS ON THE ROLE AND EFFECTIVENESS OF SAFETY REPRESENTATIVES IN PETROLEUM INDUSTRIES OF EGYPT

By

[1] Hosny G, [1]Youssef M and [2]Moselhi M.

[1]Department of Environmental Studies, Division of Environmental Health, Institute of Graduate Studies and Research, [2]Department of Occupational Health, High Institute of Public Health, University of Alexandria, Alexandria, Egypt.

Abstract

Introduction: The industrial safety management is an open complex giant system with the complex characteristics of multidisciplinary, multi-factor, complexity and multi-scale. One of the important participants in the industrial safety management is the safety representatives (SRs). SRs have an important role in application of safety management systems and there are many factors that may affect the role of SRs at their firms. **Aim of the work:** to present a multifactorial analysis on the role and effectiveness of safety representatives into workplace health and safety practices in petroleum and petrochemical industries in Egypt. **Materials and Methods:** Data collection was accomplished utilizing a self-structured predesigned questionnaire sheet of nine domains including 55 questions, mapping the SRs' and managers' attitudes towards their own rights, duties and obligations. The questionnaire was distributed to 32 petroleum companies targeting SRs and their managers (186 SRs and 51 managers). **Results:** revealed a huge gap in opinions and understanding between the two major parties and a lack of consistency between identified problems in the role of safety representatives and proposed measures of improvements in their role and functions. **Conclusion:** The distance between the two parties in their view on the safety representative's role and position must be taken seriously, and could itself be a threat to safety. The detected gaps between points of views of SRs and their managers on SRs' role put emphasis on the requirement of mutual understanding and acceptance of the SRs' contribution to safety performance which are fundamental for mutual trust and constructive collaboration between the parties.

Key words: Occupational health, Safety management systems, Safety representative, Safety behaviors and Management commitment.

Introduction

With the rapid development of economic globalization and regional economic integration, industrial safety has become the common problem that all the countries are facing. Industrial safety is an important part of national economic security. The industrial safety management is an open complex giant system with the complex characteristics of multidisciplinary, multi-factor, complexity and multi-scale. As a special case of complex system, the industrial safety management system involves all kinds of comprehensive and ever-changing factors of nature, society, ecology, economy, culture, and so on (Li et al. 2014). The pressure for higher production and demands that production not proceed at the cost of the health of people or the integrity of the environment make a challenge for application of regulations of occupational health and safety. Because of the enormous pressure on businesses to improve their efficiency, many businesses are forced to refocus on safety as a means of attaining competitiveness among rival organizations (Labouschagne, 1999; Ayomoh, 2006).

It is very important for occupational health and safety professionals to explore attitudes, motivations, behaviors and information needs on employee health investment. Labor is one of the key factors of production and so employee health is an indirect component of any organization's production function. Failure to comply with legal (or even ethical) requirements for employee health may indeed have economic consequences in terms of longer-term customer loyalty and attracting and retaining talented employees (HSE, 2012).

The position as safety representatives (SRs), generates a vital role for any industrial organization, which includes: periodical occupational measurements; site inspections , surveys and safety , health audit reports and present findings and concerns effectively; risk assessment and risk analysis, risk-protection and prevention measures; accident investigations and reporting of dangerous occurrences and apply root cause analysis; supervision of the provision and use of protective clothing and equipment; planning and organizing of safety and health training; seeking

solutions to safety and health issues which arise; attend safety committee meetings and record recommendations and follow up the application of these recommendations and so on. In order for their role to be accomplished, SRs need training, education and qualifications, management commitment, management support, budget and resources, law, codes and standards, and dialogue between safety representatives and management should be strengthened (HAS, 2006).

In reality, safety representatives are working under pressure due to several factors such as they do not have enough time to fulfill their safety functions; the position of safety representatives have low status; there is a limited understanding among employers for the role of the safety representative; safety representatives do not report deviations from safety requirements in fear of negative career consequences; the main safety representative of an installation is not well known or acknowledged by all entrepreneurs and subcontractors working on site; the role of safety representative is difficult due to conflicting expectations from employer and colleagues (Walters et al., 2005; Hovden et al., 2008).

Aim of work: To present a multifactorial analysis on the role and effectiveness of safety representatives into workplace health and safety in petroleum and petrochemical industries in Egypt, through investigating the operational conditions for the employees' influence on occupational health and safety (OHS) performance, reflected by SRs themselves and their corresponding managers and determining the factors affecting the role of SRs that may influence their performance.

Materials and Methods

-Study design: Across sectional survey study

-Place and duration of study: 32 petroleum companies in Egypt (refining, petrochemical, distribution, maintenance, transportation, storage petroleum industries) accept to undergo within the survey. The work was done during the period from January to December 2015.

-Study sample: The study population constituted 186 SRs and

51 managers from different petroleum companies.

- Study tool:

Questionnaire:

The survey was based on a self-structured predesigned questionnaire to obtain information on factors affecting the role and effectiveness of SRs at petroleum installations in Egypt. Plenary discussions were performed through invitations of personnel (safety representatives and managers) from different petroleum installations to assess factors affecting the SRs' role, validate and elaborate the comprehension of the statements in the questionnaire, to reveal the rationale behind viewpoints, and to sum up results from the group discussions to construct the questionnaire sheet. The questionnaire was constructed to have 55 statements. The statements in the questionnaire reflected a number of dimensions: (1) availability of resources and training, (2) functional status of safety representatives, (3) participation in planning, modifications and changes in work practices, (4) relationship between safety representatives and their management, (5) effect of safety representatives in workplace, (6) the need for modifications in laws and regulations in the field of health and safety, (7) dealing with official and legal local authorities, (8) application of occupational health, safety and environmental management systems, and (9) the role of general petroleum corporation and holding companies. The questionnaire was distributed to the companies to get the feedback of perception from SRs and their managers to determine the factors affecting the role of safety representatives at these companies.

Statistical analysis:

After data were collected, data were revised, coded and fed to statistical software IBM SPSS version 20. The given graphs were constructed using Microsoft excel software. All statistical analysis was done using two tailed tests and alpha error of 0.05. P value less than or equal to 0.05 was considered to be statistically significant. Scoring for discrete statements was summed together to produce the scores for each dimension which in turn was summed together to produce the overall scores for each respondent. All scores were transformed into score % as follow:

Score % = (the observed score/ the maximum score) x 100. Then score % was transferred into categories as follow:

Unsatisfactory: Score % < 60%

Satisfactory: Score % ≥ 60%

Descriptive statistics in the form of mean and standard deviation were calculated for each statement to describe the categorical data, respectively. Analysis of numeric data was performed using unpaired t-test and ANOVA to compare the mean scores for each domain between employees and their managers to test for any statistical difference.

Analysis of categorical data was performed utilizing Mc-Nemar chi square test to test for the association (or relationship) between the categories of each dimension (domain) for both SRs and their manager to find out discrepancies. Degree of agreement was calculated using Kappa test of agreement to find out the agreement of responses of SRs and their managers. Value above 0.5 is acceptable level of agreement.

Advanced statistical models of cluster, factorial and component analysis were also used to discover and identify items having most effective role in contributing at discrepancies between SRs and managers' points of views at the same company. A multivariance cluster analysis with Dendrogram Ward's method for opinions of SRs and their managers was adopted in order to cluster the studied questionnaire domain variables into groups of similar characteristics and to combine the two variables which were closest together to form a new one group, after computing the distance between the groups. Therefore, groups which are closest together were then combined. This analysis enable to point out to variables that directly influence the present status for safety representatives and need to be further enforced for proper settlement of the role of safety representatives among their participated companies.

Ethical consideration Local ethical approval from authorized personnel in the involved companies was obtained to undertake the study. Confidentiality was maintained.

Results

Comparison of the overall perceptions for SRs' role in occupational safety practices among SRs and their managers.

A comparative analysis of mean score percentages for perceptions of safety representatives and managers toward the nine studied domains measuring occupational health and safety practices was conducted to calculate levels of satisfaction. The hypothesis was put to have a borderline score percent of 60% for minimal satisfaction. Numbers of satisfied and unsatisfied respondents of SRs and their managers for each of the nine domains were statistically analyzed using a Mc-Nemar test for related samples.

Table 1. A comparative analysis of levels of satisfaction of SRs and managers for the nine studied domains evaluating the role of SRs on different occupational safety practices.

Domain		Employee		Manager		X^2_{mc} (P)	Kappa Agreement
		No	%	No	%		
Availability of resources and training	Unsatisfactory	122	65.6	17	33.3	17.1 (0.001)*	0.25
	Satisfactory	64	34.4	34	66.7		
Functional status of safety representative	Unsatisfactory	73	39.2	10	19.6	6.7 (0.009)*	0.29
	Satisfactory	113	60.8	41	80.4		
Participation in planning, modifications and changes in work practices	Unsatisfactory	53	28.5	7	13.7	4.6 (0.032)*	0.46
	Satisfactory	133	71.5	44	86.3		
Relationship between safety representatives and their management	Unsatisfactory	61	32.8	10	19.6	2.3 (0.081)	0.62
	Satisfactory	125	67.2	41	80.4		
Effect of safety representatives in work place	Unsatisfactory	67	36.0	6	11.8	11.0 (0.001)*	0.27
	Satisfactory	119	64.0	45	88.2		
The need for modifications in laws and regulations in the field of health and safety	Unsatisfactory	92	49.5	11	21.6	11.4 (0.001)*	0.24
	Satisfactory	94	50.5	40	78.4		
Dealing with official and legal local authorities	Unsatisfactory	127	68.3	17	33.3	20.4 (0.001)*	0.14
	Satisfactory	59	31.7	34	66.7		
Application of occupational Health, Safety and Environmental management systems	Unsatisfactory	99	53.2	15	29.4	9.1 (0.003)*	0.26
	Satisfactory	87	46.8	36	70.6		
The role of general petroleum corporation and holding companies	Unsatisfactory	147	79.0	18	35.3	26.7 (0.001)*	0.17
	Satisfactory	39	21.0	33	64.7		
Overall assessment	Unsatisfactory	91	48.9	9	17.6	16.0 (0.001)*	0.28
	Satisfactory	95	51.1	42	82.4		

X2 mc : Mc-Nemar test for related samples

* $P < 0.05$ (significant)

Unsatisfactory: Score % < 60% Satisfactory: Score % ≥ 60%.

Table 1 shows the comparative analysis of levels of satisfaction of SRs and managers for the nine studied domains of different occupational safety practices. Analysis of overall assessment of levels of satisfaction for the nine domains examining perceptions of SRs and their managers for the different topics in health and safety unsatisfactory levels in 48.9% of SRs and 17.6% of managers. On the other hand, the satisfactory levels in 51.1% of SRs and 82.4% of managers were calculated. The levels showed a statistical significant difference at $p<0.05$, utilizing Mc-Nemar test for related samples, and a Kappa agreement of a weak correlation (0.28), indicating overall strong disagreement between perceptions of SRs and their managers toward all examined domains. The overall comparative analysis examining levels of satisfaction for perceptions of SRs and their managers for overall domains evaluating the role of SRs in the different studied companies revealed overall strong disagreement between perceptions of SRs and their managers toward different safety practices.

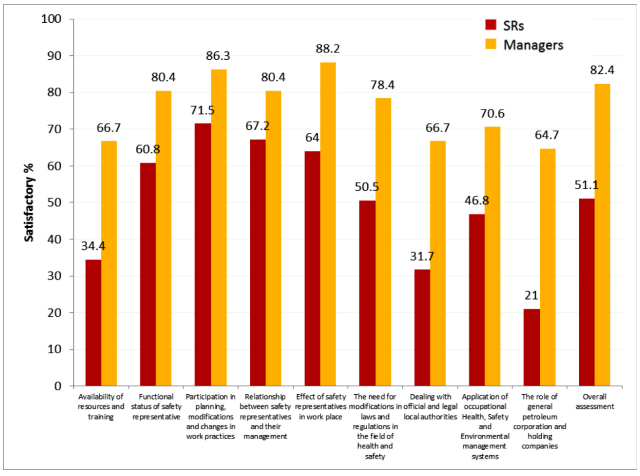

Figure 1: illustrates levels of satisfaction of SRs and managers for the nine studied domains of different occupational safety practices. For SRs, the lowest level of satisfaction was for domain number 9 (The role of general petroleum corporation and holding companies). The highest level of satisfaction was for domain number 3 (Participation in planning, modifications and changes in work practices). For managers, the lowest level of satisfaction was for domain number 9 (The role of general petroleum corporation and holding companies) and the highest level of satisfaction was for domain number 5 (Effect of safety representatives in work place).

2. Factorial and principal component analysis for points of views of SRs and managers on role of SRs

Factor analysis is used to identify and group variables by their common dimensions. It is often used with pre-designed questionnaires to examine the cohesiveness of variables. Principal components analysis is often used in conjunction with multiple correlation matrix in an attempt to reduce the number of predictor variables. This is important because it helps to reduce future data collection. Usually, most of the variation in a large group of variables can be captured with only a few principal components. A major goal of factor analysis is to represent relationships among sets of variables parsimoniously yet keeping factors meaningful. Factor analysis usually proceeds in four steps: 1st Step: the correlation matrix for all variables is computed; 2nd Step: Factor extraction; 3rd Step: Factor rotation; and 4th Step: make final decisions about the number of underlying factors.

Table 2. Correlation matrix between domains from points of views of SRs and managers.

Correlation Matrix										
	Domains	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Correlation	**1**	1.000	.693	.668	.684	.688	.787	.641	.479	.771
	2	.693	1.000	.743	.797	.703	.791	.593	.476	.657
	3	.668	.743	1.000	.805	.744	.753	.500	.624	.610
	4	.684	.797	.805	1.000	.787	.807	.548	.567	.621
	5	.688	.703	.744	.787	1.000	.771	.654	.557	.622
	6	.787	.791	.753	.807	.771	1.000	.698	.509	.726
	7	.641	.593	.500	.548	.654	.698	1.000	.351	.626
	8	.479	.476	.624	.567	.557	.509	.351	1.000	.460
	9	.771	.657	.610	.621	.622	.726	.626	.460	1.000

Domains:

1. Availability of resources and training
2. Functional status of safety representative
3. Participation in planning, modifications and changes in work practices
4. Relationship between safety representatives and their management
5. Effect of safety representatives in work place
6. The need for modifications in laws and regulations in the field of health and safety
7. Dealing with official and legal local authorities
8. Application of occupational Health, Safety and Environmental management systems
9. The role of general petroleum corporation and holding companies

Kaiser-Meyer-Olkin and Bartlett test of sphericity for factor analysis correlation matrix between domains for perceptions of SRs and managers.

KMO and Bartlett›s Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.935
Bartlett›s Test of Sphericity	**Approx. Chi-Square**	1867.055
	Df	36
	Sig.	0.000

Table 2 presents the correlation matrix of the nine investigated domains from points of views of SRs and managers together. Examining the correlation matrix revealed acceptable correlation as values exceeded 0.3 that clarifies that data have a good principle component structure. A strong correlation was seen between domains (4) "Relationship between safety representatives and their management", and (6) "the need for modifications in laws and regulations in the field of health and safety"; domains (4) "Relationship between safety representatives and their management" and (3) "Participation in planning, modifications and changes in work practices". The Kaiser-Meyer-Olkin (KMO) to measure the sampling adequacy. It compares the magnitude of the observed correlation coefficients to the magnitude of the partial correlation coefficients. The magnitude of KMO measure is close to 1 (0.935) indicating a sizeable sampling adequacy. Reasonably large value revealed a good factor analysis. Bartlett test of sphericity to test the hypothesis that the factor analysis correlation matrix is an identity matrix (all diagonal terms are 1 and all off-diagonal terms are 0) showed a large value (1867.055) for the test with associated small significance level, indicating significant sphericity, and it is unlikely that the population correlation matrix is an identity, indicating variations in perception of SRs and managers.

Table 3. Principal components analysis for variance in points of views of SRs and managers.

Component Matrix(a)	
	Component
	1
The need for modifications in laws and regulations in the field of health and safety	0.919
Relationship between safety representatives and their management	0.888
Effect of safety representatives in work place	0.874
Functional status of safety representative	0.867
Participation in planning, modifications and changes in work practices	0.863
Availability of resources and training	0.858
The role of general petroleum corporation and holding companies	0.813
Dealing with official and legal local authorities	0.746
Application of occupational Health, Safety and Environmental management systems	0.655
Extraction Method: Principal Component Analysis.	
a 1 components extracted.	

Table 3 shows principal components analysis for variance in the points of view of SRs and managers which extracted one component. Principal components analysis formed linear combinations of the observed variables. The 1st principal component is the combination that accounts for the largest amount of variance in the sample (1st extracted factor), is the domain of "The need for modifications in laws and regulations in the field of health and safety" (0.919). The 2nd principle component accounts for the next largest amount of variance and is uncorrelated with the first (2nd extracted factor) is the domain of "Relationship between safety representatives and their management" (0.888). Successive components explain progressively smaller portions of the total sample variance, and all are uncorrelated with each other. The principal components analysis categorized questionnaire domains into factors successively affecting the role of SRs as follows: "The need for modifications in laws and regulations in the field of health and safety"; "Relationship between safety representatives and their management"; "Effect of safety representatives in work place"; "Functional status of safety representative"; "Participation in planning, modifications and changes in work practices"; "Availability of resources and training"; "The role of general petroleum corporation and holding companies"; "Dealing with official and legal local authorities"; and "Application of occupational Health, Safety and Environmental management systems".

Table 4. Factor analysis of principal components for variance in points of views of SRs and managers.

Total Variance Explained						
Component	Initial Eigen values			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.275	69.728	69.728	6.275	69.728	69.728
2	.776	8.618	78.346			
3	.509	5.654	84.000			
4	.428	4.759	88.758			
5	.269	2.988	91.747			
6	.221	2.454	94.200			
7	.204	2.265	96.466			
8	.175	1.943	98.408			
9	.143	1.592	100.000			
Extraction Method: Principal Component Analysis.						

Table 4 shows Eigen values for verifying the factor analysis of principal components to decide on how many factors can affect and represent the data, with 2 statistical criteria: the determination of the number of factors is usually done by considering only factors with Eigen values greater than 1; and factors with a variance less than 1 are no better than a single variable, since each variable is expected to have a variance of 1. Factor analysis indicated that the "Need for modifications in laws and regulations in the field of health and safety" was the most important item is explaining discrepancies between SRs and manager responses as it was the most important factor shows heavy loading (values greater than 1) on differences between the two groups. This was followed by variables of "Relationship between safety representatives and

their management" and "Effect of safety representatives in work place". "Application of occupational health, safety and environmental management systems" was the least variable of discrepancy between the two categories.

3. Multivariance cluster analysis for points of views of SRs and managers on role of SRs

A multivariance cluster analysis with Dendrogram Ward's method for opinions of SRs and their managers was adopted in order to cluster the studied questionnaire domain variables into groups of similar characteristics and to combine the two variables which were closest together to form a new one group, after computing the distance between the groups. Therefore, groups which are closest together were then combined. This analysis enable to point out to variables that directly influence the present status for safety representatives and need to be further enforced for proper settlement of the role of safety representatives among their participated companies.

Table 5. Multivariance cluster analysis for different studied domains among SRs and their managers.

Final Cluster Centers	ANOVA*				
	Cluster*		Cluster	F	Sig.
	1	2	Mean Square		
Availability of resources and training	5.29	1.38	810.878	261.447	0.000
Functional status of safety representative	4.22	1.08	523.037	376.820	0.000
Participation in planning, modifications and changes in work practices	4.61	1.76	430.146	328.423	0.000
Relationship between safety representatives and their management	5.55	1.63	815.506	557.685	0.000
Effect of safety representatives in work place	5.23	2.10	518.962	304.171	0.000
The need for modifications in laws and regulations in the field of health and safety	6.10	2.09	854.053	389.898	0.000
Dealing with official and legal local authorities	2.68	0.91	165.848	133.262	0.000
Application of occupational Health, Safety and Environmental management systems	5.08	2.39	384.996	106.326	0.000
The role of general petroleum corporation and holding companies	3.13	0.84	277.888	164.767	0.000

ANOVA test showed significant differences between clusters at $p<0.001$.

*Safety representatives in cluster 1 from 18 companies and in cluster 2 from 14 companies; while managers in cluster 1 from 28 companies and in cluster 2 from 4 companies.

Table 5 shows the multivariance cluster analysis using Dendrogram Ward's method to cluster the perception for the studied nine safety domains into groups of similar characteristics among SRs and their managers for evaluating the role of SRs. The cluster analysis illustrates the discrimination in opinions between SRs and their managers . The final cluster centers for opinions responding to the nine domains of the questionnaire among SRs and their managers form groups of cluster centers (5.29; 4.22; 4.61; 5.55; 5.23; 6.10; 2.68; 5.08; and 3.13) far from other centers (1.38; 1.08; 1.76; 1.63; 2.10; 2.09; 0.91; 2.39; and 0.84). The discrimination in values of cluster centers for opinions of SRs and managers for the different studied domains reflect the differences and gaps between their points of views to role and work obstacles for SRs. The information collected through application of the questionnaire sheet was designed to map the safety representatives' and managers' attitudes towards their own rights, duties and obligations. Multivariance cluster analysis revealed a huge gap in opinions and understanding between the two major parties. The employers rely more on the capacity of the formal health and safety management systems, than do the safety representatives who put more emphasis on the need for daily and continuous health and safety consultations. The climate of participation and collaboration is assessed by the safety representatives as being less conducive to the overall objectives of the health and safety regulations than perceived by the managers. The results also demonstrated a lack of consistency between identified problems in the role of safety representatives and proposed measures of improvements in their role and functions. The distance between the two parties in their views on the safety representative's role and position must be taken seriously, and could itself be a threat to safety. A close dialogue, mutual understanding and acceptance of the safety representative's contribution to safety performance are fundamental for mutual trust and constructive collaboration between the two parties for better safety climate in organizations. Analysis of variance for cluster centers of perception for the studied nine safety domains among SRs and their managers. ANOVA

test illustrated a highly significant differences between the nine domains among SRs and mangers at $p<0.001$, indicating significant gaps between perception of SRs and managers for the studied domains.

Discussion

Employee representation and consultation in occupational health and safety (OHS) is deemed vital to any workplace health and safety policy (Walters & Frick, 2000, Cameron, et al. 2006). Lindoe et al. (2001) argued that the occupational health and safety (OHS) regime contains three different collaborating arenas or structures within the company: (1) a working environment or safety committee with balanced representation from the parties, (2) safety representatives elected by the employees and (3) in-house or external health and safety experts employed by and representing the management.

The starting point for the study was due to the worry about the level of performance in the field of HSE at petroleum industries, due to massive hazards found in these industries. These hazards may affect workers, environment, production or assets. These hazards include but not limited to fire, explosions, exposure to hazardous toxic chemicals, gas leaks, accidents, injuries etc. One of the main control measures that reduce the effects of these hazards is the presence of SRs at these industries because they have very important role in training, site inspections, communication with managements and employees and so on. Assessment of the role of SRs and the factors affecting this role is very important to get a frame work for authorities to solve these problems. The underlying study shows significant differences in opinions between SRs and their managers on evaluating SRs' role. The same results were concluded by Hovden (2008) and Meld (2002) where they find that neither safety representatives' role nor resources are satisfactory to execute their tasks. In addition, SRs evaluate the functional status of safety representative lower than managers do.

It was clear from the results that SRs are unsatisfied with the mandatory safety training in Egypt in contrast with a study of Bahn (2011) in Australia where he concluded that mandatory

training has had a positive effect on safety culture change and gradually reduced work-related injury in the industry.

There is a strong disagreement in perceptions of SRs and their managers for participation in planning, modifications and changes in work practices although a quantitative research on the strength of associations between participation and outcomes in terms of working environment and health was conducted, one of them is a meta-analytic review of research on participation's effects on job performance and satisfaction (Wagner 1994; Hopkins, 2005) concluded that participation had statistically significant associations with those effects..

To prevent depressive disorders, it may be important to focus on reducing the work role conflict, as well as enhancing employees' job control and better rewarding their efforts in the workplace . Reduced work-related stress and increased job satisfaction are associated with better physical health and higher quality of life among SRs (Honda, 2014).

The relationship between SRs and workers from the study seems to be dependent on the punishment not on the prevention, so this means that the workers not valuing the role of SRs as high as it must be, this referring the lower attitude of workers in general and the need for increasing the level of awareness of workers in behave of safety. Applying incentives and punishments rules on the workers for using safety equipments and applying safety rules and relate it to employee appraisal and promotion is vital (Hosny et al. 2014). In this study, SRs and managers argue that there is a need for modification in law and regulations of health and safety in contrast to results of Hovden (2008) that concluded that there is no need to do any modifications.

Analysis of levels of satisfaction for domain 7 examining perceptions of SRs and their managers for dealing with official and legal local authorities showed high level of unsatisfaction although Shapiro and Rabinowitz (1997) mentioned that regulators must distinguish between 'bad' and 'good' firms and employ the tools of punitive and cooperative enforcement, there by maximizing the virtues of the cooperation while minimizing their infringement.

OHSAS 18001 certification leads to reduction of the accidents and improve productivity, safety, and health of employees. It was revealed that both SRs and their managers value the certification of OHSAS-18001 and ISO 14001 (Vinodkumar & Bhasi, 2011). In addition, it is clear from the results that the role of general petroleum corporation and holding companies is very weak in supporting the SRs at work, as there were no periodical meetings between authorities and companies, no exchange of information, no workshops, and no participation in issuing new laws. Good control measures should be applied to protect workers from different hazards existing in work place of petroleum industries. Communication must be done with other centers that interest to industrial injuries specially petroleum industries to open lines of information between them (Odea & Flin, 2001; Parker et al., 2007).

The oil and gas companies should be forced to adjust to a collaborative mode in a framework of high level cooperative, consensus oriented bodies representing the authorities, the companies and the unions (Ryggvik, 2006). The international research literature shows that successful representative participation needs trade union support (Walters & Gourlay, 1990). The results revealed difference in opinions between SRs and managers (factor and principal component analysis). The important factor that showed heavy loading on differences between SRs and managers' points of views was the need for modifications in laws and regulations in the field of health and safety. The distance between the two parties in their view on the safety representative's role and position must be taken seriously, and could itself be a threat to safety performance.

Conclusion and Recommendations

Although the level of health and safety at petroleum industries in Egypt seems to be at a high level compared to other industrial sectors, the underlined study put a spot and revealed some weaknesses and shortages that face the SRs at their companies that included: there is an urgent need for modifications in the laws and regulations concerning HSE; perceived scarcity of resources; role dilemmas seem to undermine a balanced participation on behalf on the safety representatives; low perceived social

status at the workplace; relationship between SRs and managers needs to be strengthened; low participation in planning at the workplace; the feeling of too little influence contributes to a weakening of the strategic position for the safety representative that put the role of the safety representative under pressure; dealing with official and legal local authorities seems to be the most problematic issue during the study; application of occupational health, safety and environmental management systems needs more efforts from petroleum and governmental authorities; and the role of general petroleum corporation and holding companies must be strengthened and to have higher participation in HSE issues at the petroleum companies.

Conflict of interest:

Authors have declared that no conflict of interests exists.

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