

Comparison of Environmental Performance-HSEQ Management System, Regarding the International and Iranian Oil and Gas General Contractors

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Abstract: The ever-increasing significance of the health, safety, environment and quality Management system has led general contractors including those involved in the oil and gas industry to place the implementation of this integrated system on their agenda, in a way that the implementation and execution of this system is considered as one of their operation and development strategies. The purpose of the present study is to evaluate the environmental performance of the oil and gas upstream (exploration and production) general contractors, which is deemed as one of the major dimensions of the system. To carry out this research, in addition to evaluate of the environmental performance of international and Iranian contractors under the foregoing system, a comparison is ultimately drawn between the performances of the two groups of contractors. To gather information, a questionnaire was used to measure 31 indicators whereby the variables related to the environmental performance were evaluated. The indicators were then weighted according to HSEQ professionals' views and the value and score of each variable as well as the environmental performance were educed. Comparative statistical tests were used to analyze the findings. The results of these tests showed that the environmental performance of international contractors is superior to that of Iranian contractors. The reasons behind this superiority, based on the mentioned tests, might be described as follows: 1) Environmental risks reduction measures; 2) Management process; 3) weakness in the implementation of the health, safety, environment and quality management system including the lack of a particular and independent department, non-preparation of the relevant guideline and the inefficiency of the relevant department. In consideration of the foregoing as well as the mentioned weak points and shortcomings, which are seen when a comparison is drawn with international contractors, it is recommended that Iranian contractors set up a particular and independent department which might prepare managerial procedures and establish the required enforcement guarantee.

Key words: Health, Safety, General Contractors, Oil and Gas Upstream Industry, Integrated Management System, Environmental Performance

INTRODUCTION

Exploration, exploitation and production of oil and gas are governed by a wide range of laws and regulations related to health, safety, environment and quality (HSEQ) issues and all companies involved in this field follow a specific strategy in order to meet their legal and operational requirements. To this end, world-renowned oil companies, particularly in Europe, have designed the HSEQ management system strategy, which makes up part of their comprehensive management and pursue all the activities related to these four factors simultaneously and under the Integrated Management System [1]. The HSEQ Management System is a managerial tool to control and improve issues related to health, safety, environment

and quality in all development plans and industrial/infrastructural projects [2]. By analyzing these four factors simultaneously, this system provides appropriate grounds for the implementation and execution of the Environmental Management System (ISO 14000), Occupational Health and Safety Assessment Series (OHSAS 18000) and ultimately the Quality Management System (ISO 9000) [3]. In the occupational health section, all the actual and potential factors such as chemicals used at the various stages of the project and also the period of exposure to such chemicals, which influences the health of the personnel, contractors, visitors and others present within the organization's environment, are investigated. Moreover, all the specifications of hazardous factors (including transportation risks, extinguishment method,

contact with the body, first aid, maintenance, physiological effects..) are determined. In the safety section, the entire process is examined in terms of safety and the potential risks and dangerous points of the project are specified. In addition, preventive measures are suggested and taken to reduce such risks. The risks, which can cause incidents, are specified and appropriate methods are employed to reduce, control and eliminate such risks. The environment section seeks to investigate all the impacts on the environment resulting from the implementation of the project at different stages. In other words, the environmental aspects arising from the project implementation in the project area are determined and the ways for achieving the defined standards are delineated [4]. In the quality section, in addition to controlling all activities for removing defects and quality-related changes, measures are taken toward enhancing the efficiency and yield of activities and processes of a project in order to secure greater advantages both for the organization and its customers and clients [5].

The HSEQ Management System forms part of the current management system in an organization and the same as the latter system, consists of such elements as leadership and commitment; policy and strategic objectives; organization, resources and documentation; evaluation and risk management; Planning; implementation and monitoring; and auditing and reviewing [6].

The role of the HSEQ Management System in the oil and gas upstream (exploration and production) industries can be summarized in achievement of the following advantages [1, 7]:

- * Setting objectives for the HSEQ System as well as adopting a systematic approach to the relevant issues.
- * Creating a definite and specific structure for HSEQ management, which also indicates the scope of responsibilities.
- * Greater confidence in the management by the personnel resulting from efforts made toward creating a safe and healthy workplace and consequently, enhancement of motivation for a more desirable performance of organizational roles and duties.
- * Reduction of losses arising from incidents.
Promoting the level of awareness and knowledge about HSEQ issues and preparation of grounds for a sound and effective competition.
- * Providing the possibility of self-assessment by the organization in order to conform with the HSEQ Management System and creation of grounds for continuous improvement in the organization.
- * Creation of grounds for the organization's productivity and sublimity, whose most important result is achieving the goals of sustainable development.

In this way, regarding to the HSEQ management system's significance in upstream oil and gas industries projects and the role of general contractors as the operators of such projects, the necessity for observing and managing all issues related to this integrated management system by oil and gas contractors is obvious and evident [8].

From among the dimensions of the HSEQ system, this article focuses on the environment section and the purpose of the present study is to evaluate the environmental performance of international and Iranian oil and gas general contractors and to compare their performance, thereby in addition to identification of weaknesses and strengths, some recommendation can be proposed to improve environmental performance of Iranian contractors.

MATERIALS AND METHODS

Based on the topic and objectives of this study, the research method employed at the primary stage was the survey approach, whereby the status of the population is described by means of the descriptive method, which is one of the aspects of the survey approach. The subsequent stage in which comparison is drawn between the environmental performance of international and Iranian companies used the comparative method and data collection was carried out through the field method.

The scope of the study comprised the two groups of international and Iranian contractors and the group of companies that were available made up the population of the study. According to the above-mentioned methods, questionnaire and interview were used to gather information. As a result, in addition to gaining information on the environmental performance of the companies, the defined indicators were weighted on the basis of HSEQ professionals' views and the variables concerned were deduced

In the present study based on the 31 defined indicators, 7 variables were determined as follows:

- * Awareness of the existing environmental laws, regulations and standards in the field of oil and gas (3 indicators)
- * Identification of persistent and major environmental impacts (5 indicators)
- * Training managers and staff to promote the environmental knowledge and culture levels (3 indicators)
- * Environmental risks reduction measures (6 indicators)
- * Long term reduction of project costs and expenses (4 indicators)
- * Management process (7 indicators)
- * HSEQ implementation (3 indicators)
- * At the data analysis stage, parametric and non-parametric comparative tests were used.

RESULTS

As the purpose of this study is to evaluate the environmental performance of international and Iranian contractors under the HSEQ Management System and ultimately to compare the performance of these two groups, a questionnaire was used for measuring 31 indicators whereby 7 variables related to environmental performance were evaluated. Table 1 and 2 indicate the selective international and Iranian companies. After weighting the indicators based on the experts' views, the score of each indicator was multiplied by the given weight and in this way the weighted score of each variable was calculated. Table 3 indicates in summary the sum of weighted scores for the variables of environmental performance of international and Iranian contractors and Greek letters on the mentioned table presents selective companies. Figure 1-3 demonstrate

the environmental performance of international contractors, environmental performance of Iranian contractors and a comparison of the performance of the two groups. For analyzing findings, the statistical tests including Comparison Two Samples, Mann-Whitney and Least Significant Difference were used. The results of these tests showed that the environmental performance of international contractors is superior to the environmental performance of Iranian contractors. The performance subcategories revealed that the reasons behind this difference relate to three variables as follows: (1) Environmental risks reduction measures (2) management process and (3) weakness in the implementation of the health, safety, environment and quality management system including the lack of a particular and independent department, non-preparation of the relevant guideline and inefficiency of the relevant department.

Table 1: Selective International Companies

Name of the company	Country	Field of activity in Iran
BP Iran Ltd.	Britain	Seismic survey, exploration
Eni Iran B.V.	Italy	Exploration and drilling, oil and gas production
Foster Wheeler Energy Ltd.	England	Exploration and drilling, oil and gas production, energy study
OMV(Iran) Onshore Exploration Gmbh.	Austria	Seismic survey, Exploration and drilling, oil and gas production
statoil	Norway	Oil and gas production
Total (Elf Petroleum Iran)		Seismic survey, Exploration and drilling, oil and gas production

Table 2: Selective Iranian Companies

Name of the company	Field of activity
Petropars	Seismic survey, exploration and production, gas production, construction of refinery and production platforms
PetroIran	Exploration and drilling, marine platforms construction
PIDECO	Oil and gas production, construction (refinery, installations...)
Zolal Iran	Industrial and municipal wastewater treatment plant
MAPNA	Construction of gas and combined cycle power plant
Well Service	Seismic survey, exploration and drilling

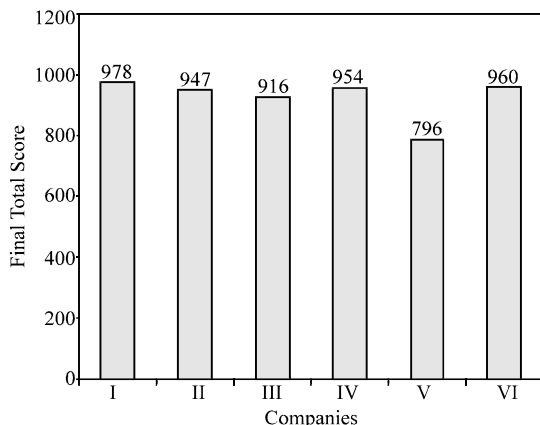


Fig. 1: Environmental Performance of International Contractors

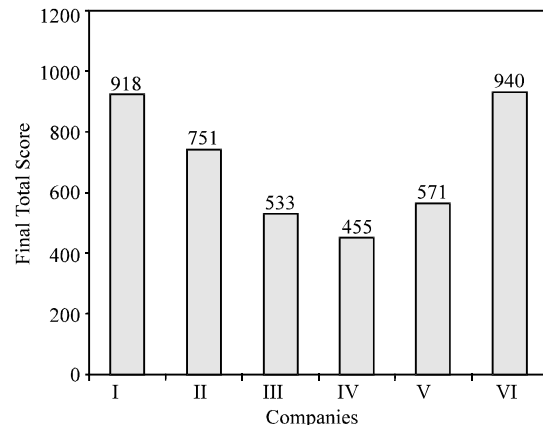


Fig. 2: Environmental Performance of Iranian Contractors

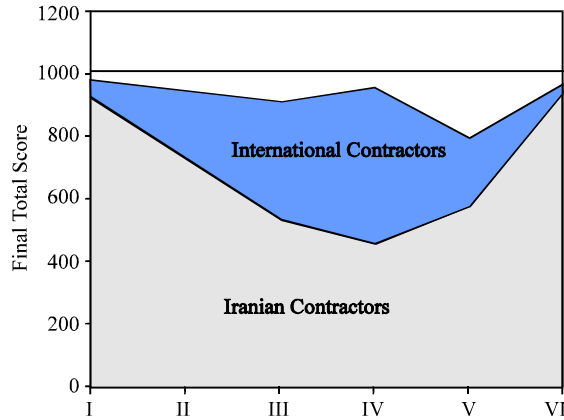


Fig. 3: Comparison between Environmental Performance of International and Iranian Contractors

DISCUSSION AND CONCLUSION

The analyses and results of the statistical tests conducted for comparing the environmental performance of international and Iranian contractors under the HSEQ Management System showed that the total performance of the two groups are different and the performance of international contractors is significantly super than the performance of Iranian contractors.

On finding reasons behind the difference in the performance of the two groups based on the foregoing tests and analyses, it was found that the reasons relate to Iranian contractors’ weaknesses in the following aspects:

- * HSEQ implementation: Lack or inefficiency of a particular and independent department in the area of activities related to the HSEQ Management System which is itself a function of weak laws, regulations and requirements and lack of a feeling of need and necessity for the issue.
- * Management process: Weakness in the management process including weakness or non-compilation of policies, lack of sufficient efforts toward expediting the specified operational objectives related to the environment, inadequacy and inefficiency of the structure and organization of the environmental department, lack of monitoring and reviewing the executive environmental activities for the purpose of identifying weaknesses and strengths as well as reasons and factors behind failure in expediting the executive activities and the most important of all, lack of enough attention to preparing the required plans for mitigation methods or improving the situation of the environment.

Table 3: The Sum of Weighted Scores for the Variables of Environmental Performance of International and Iranian Contractors

Variable	Awareness of the existing environmental laws, and standards in the field of oil and gas	Identifica-tion of persistent and major environment al impacts	Training managers and staff to promote the environmental issues	Environ-mental risks reduction measures	Long term reduction of project costs	Manage-ment process	HS EQ Imple-menta-tion	The sum of Weighted scores (Total perfor-mance) (X)	
Company	(x ₁)	(x ₂)	(x ₃)	(x ₄)	(x ₅)	(x ₆)	(x ₇)	(X)	
International companies	I	102	151	50	207	128	240	100	978
	II	107	157	40	207	108	230	98	947
	III	101	147	50	197	110	216	95	916
	IV	110	160	43	210	110	221	100	954
	V	83	118	29	190	96	185	95	796
	VI	104	151	46	202	120	237	100	960
	Total	607	884	258	1213	672	1329	588	5551
Iranian companies	I	110	156	50	193	125	190	94	918
	II	110	143	5	207	57	160	69	751
	III	77	93	20	88	70	115	70	533
	IV	75	101.5	11.5	76.5	37	89	64	455.5
	V	88	104	32	80	67	111	89	571
	VI	110	157	45	196	120	215	97	940
	Total	570	754.5	163.5	840.5	476	880	483	4167.5
Max. score	110	160	50	210	130	240	100	1000	

- * Environmental risks reduction measures: Lack of enough attention to required measures for minimizing the environmental risks including non-preparation of reports on the past environmental incidents and not reviewing and analyzing reasons for the occurrence of such incidents and lack of sufficient efforts toward preventing the occurrence of such events, non-preparation of an emergency response plan, inadequate special training for managers and staff at the time of incidents and the most important of all, inadequate efforts toward reducing pollutants in the environment.

Based on these reasons and for the purpose of improving the environmental performance of Iranian contractors, following recommendations are highlighted:

- * Establishing a strong management system in connection with the implementation, execution and monitoring of the integrated HSEQ Management System.
- * Organizing and staffing an independent department for improving the efficiency of the environmental performance of Iranian contractors.
- * Providing guidelines and defining procedures to monitor and evaluate the performance of companies, contractors, units and management administrations of the oil and gas industry according to the desirable HSEQ criteria and to set encouragements.
- * Enforceable compliance and regulatory requirements to put HSEQ laws, regulations and standards into effect.

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