

IMPLEMENTING AN HSE MANAGEMENT SYSTEM WITHIN THE DRILLING DIVISION OF SONATRACH

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Abstract : Sonatrach aims to achieve high industry standards in health, safety and environmental. Sonatrach's management believes that good HSE performance is an integral part of efficient and profitable business management. Sonatrach has adopted a very comprehensive policy "HSE Policy", which consider five main principles as pillars for the implementation of the policy. These are:

- Comply with legislations and legal requirements regarding HSE and make its own standards.
- Develop a preventive risk management approach for HSE.
- Ensure continuous performance improvement in HSE;
- Ensure adequate HSE training for all Sonatrach employees.

Develop the information and communication plan regarding HSE with its employees, partners and other third parties.

Such broad goals can not be approached without a structured HSE Management System

A Health Safety and Environment Management System (HSE-MS) describes the way an organisation is managed with respect to its stated objectives. HSE-MS provide continuity, identify areas for improvement and can be used to demonstrate that controls supported by procedures and documentation are in place. helps the Drilling Division to control the progress of the HSE-MS implementation.

Sonatrach has recognised the importance and the synergy that it will be gained through managing health, safety and environmental issues all together. It is currently studying how an HSE-MS can be implemented successfully within its different divisions.

As long as the Drilling Division is one of Sonatrach upstream divisions, it has to apply Sonatrach HSE policy through the implementation of an HSE-MS. This Study shows how to facilitate a successful implementation of an efficient HSE-MS within the Drilling Division of Sonatrach. It began by discussing the different steps needed to ensure an efficient preparation of the groundwork, and then it describes the HSE-MS of the E&P forum model and summarizes its requirements in a checklist that can be used for both the preliminary review and the implementation process of the HSE-MS. This study ends with explaining a method that can be used to quantitatively measure the performance of the HSE-MS and helps the Drilling Division to control the progress of the HSE-MS implementation.

1. INTRODUCTION

During the last decade management of safety health and environment (HSE) has progressively moved from reaction to an incident towards prevention of the incident occurring. HSE management has moved from being a side-issue to being an integral part of the business to be managed in the same way as other critical issues. Incidents which in the past may have been viewed as unfortunate events are now recognised as costly and avoidable events. Organisations need to manage HSE with the same degree of expertise and to the same standards as other core business activities, if they are effectively to control risks and

2. AIMS AND OBJECTIVES

2.1 Aims

The aims of this project are:

- To determine where the management of HSE issues within the Drilling Division are now, and the extent to which the implementation of an integrated HSE-MS would contribute to overall improvement of the business.
- To facilitate the implementation of an HSE-MS
- To implement an effective HSE-MS in the Drilling Division of Sonatrach
- To ensure a continuous improvement of the HSE-MS.

2.2 Objectives

The above aims lead to the following objectives:

- To give a method that enable the DD to identify, reduce or eliminate where possible, the gaps in the current system of managing HSE.
- To determine the steps that should be done beforehand to prepare the groundwork for a successful implementation of an HSE-MS
- To identify how each element (E&P Forum model) will be implemented in the Drilling Division.
- To enable the DD to set a plan and estimate the budget for the implementation of the HSE-MS
- To set a quantitative method that enables the Drilling Division to control and monitor the performance of the HSE-MS.

3. THE BENEFITS OF IMPLEMENTING AN HSE-MS WITHIN THE DRILLING DIVISION OF SONATRACH (HASSI MESSAOUD REGION)

The implementation of an HSE-MS in the DD will have great benefits; among them:

- The requirements of health and safety and of environmental protection are not always in harmony. For example, measures necessary to safeguard personnel in emergencies may have adverse environmental effects, and vice versa. However, joint consideration of health and safety and environmental matters through the implementation of an HSE management system provides a framework within which such issues can be resolved [2].
- HSE-MS will ensure that the activities of the DD are done in compliance with law [2].
- Identify responsible parties and ensure that those roles and responsibilities are communicated and understood [3].
- The HSE-MS will help DD to manage its operation efficiently and economically;
- Improves drilling performance, quality & cost control [3].
- Reduces duplication of effort in terms of hazard identification, development and maintenance of controls required, auditing, etc [4].

- Identification of Cost-Saving Opportunities relating to waste reduction, pollution prevention and conservation of natural resources

4. HSE-MS IMPLEMENTATION COSTS

The implementation cost of the HSE-MS can be recapitulated into three categories:

- Staff time which represents the major cost of the implementation process.
- Cost of technical resources: resources required to analyse HSE impact and the resources required to implement changes and improvement options.
- Costs of outside consultants if they are used.

5. MANAGEMENT OF CULTURE CHANGE

It should be known that any strategy of change passes by various stages: refusal, resistance, exploration and engagement (commitment). Nevertheless, if the Drilling Division (DD) wants to control the various phases of the implementation process of the HSE-MS, it is useful to identify well the stages which will be necessary.

The implementation of an HSE-MS can seem complex, difficult to control, calling upon multiple competences; in fact, during the implementation phase an insurmountable problem will not be encountered, in condition that the implementation is done with a methodical approach [5].

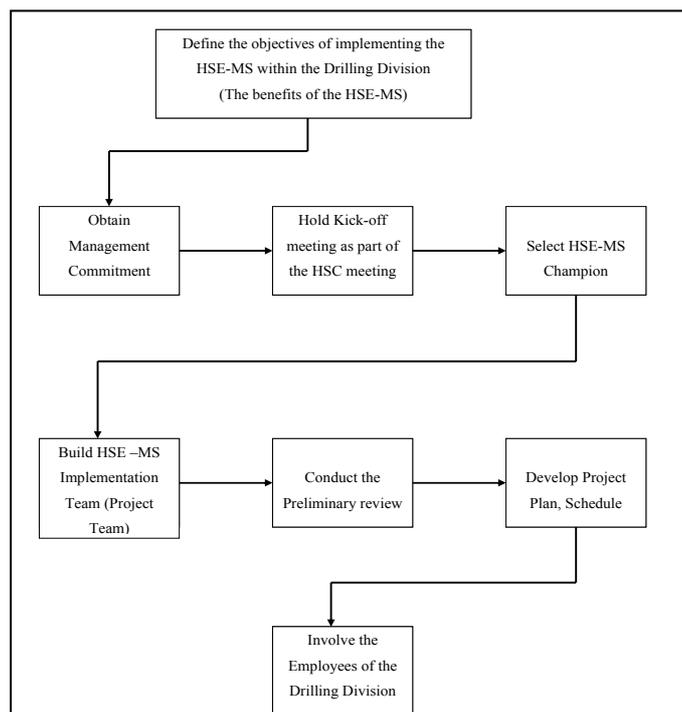


Figure 1. Implementation Steps

6. IMPLEMENTATION STEPS

This study shows the essential steps that enable the Drilling Division to effectively prepare the groundwork to ensure a successful implementation of the HSE-MS within the division. Figure.1 below shows systematically all the needed steps.

6.1. Obtaining Management Commitment

This is the very first step and the most critical one in the planning process that needs to be accomplished. Top managers of the DD must be on board.

To obtain the buy-in and support of the managers of the Drilling Division, a briefing should be prepared for DD top management describing, the benefits of an HSE-MS and what are the costs of developing and implementing the HSE-MS in the division.

If the top manager of the DD accepts to implement an HSE-MS within the division, then an HSE-MS Kick-off meeting should be carried on.

6.2. The Kick-off Meeting

The Kick-off meeting will be conducted by those responsible for obtaining the commitment of the Drilling Division managers.

The topics that could be discussed in the Kick-off meeting can be summarised in the follow points:

- Introduce the HSE-MS (explain the elements of the HSE-MS; ... etc)
- The selection of the HSE Champion

- Explain the responsibilities of the DD management and their roles in the implementation process.
- A conceptual idea of how the HSE-MS will be developed and implemented within the DD and what are the different steps.

6.3. The Selection of the Champion

A champion is a management representative who will be in charge of leading the effort of developing and implementing the HSE-MS within the DD. The champion should have the following characteristics: [6]

- The necessary level of authority;
- An experience in implementing management systems or other similar projects;
- An understanding of the drilling division organization;
- He should have the skills of project management;
- He should have the time to commit to the HSE-MS building process;
- Clear communication abilities.

The Mission of the Champion:

- Draft an action plan ;
- Carry out the action plan by assigning tasks to specific people within the DD;
- Manage the overall project;
- Report the progress of the HSE-MS implementation;
- Schedule periodic reviews by the management team;
- Direct the meetings of the HSE team.

6.4. The Selection of the HSE Team (Project Team)

Using a team approach for planning and developing the HSE-MS is an excellent way to promote commitment and ensure that the objectives, procedures and other HSE-MS elements are realistic, achievable and cost-effective.

The HSE-MS Champion should develop a conceptual list of various departments/services of the DD that should be represented at the HSE team.

Once this conceptual list is developed the Champion should communicate with the appropriate head of departments/services to select representatives to participate on the HSE team. The size of the HSE team should be kept under a controlled number (Around ten to twelve people) in order to keep meetings manageable [5].

At the first meeting of the HSE team, the champion should conduct an introductory HSE-MS training session in which he will explain (to the team members) the elements of the E&P forum model (which will be adopted by the DD) and its requirements. The training should seek to provide the HSE team members with an overview of the E&P model and the process the DD will follow in developing and implementing the HSE-MS. Consideration should be given to invite the DD Managers (regional manager and the general manager of the DD) to this initial training session in order to familiarize them with the basics of the process [6].

The Mission of the HSE Team:

- Develop presentations to convey the key concepts of an HSE-MS to all the employees of the DD
- Guide the development of the HSE-MS
- Identify HSE hazards
- Evaluate the significance of the HSE hazards identified
- Develop detailed HSE objectives and targets
- Create HSE management programs (action plan)

6.5. The Preliminary Review

A preliminary review “Gaps analysis” of the current HSE programs should be conducted by the HSE team to compare the current situation against the criteria of the HSE-MS which will be implemented by the DD. Understanding DD’s approach to HSE concerns will help in identifying areas for improvement.

The principle of the preliminary review is show in Figure.2

This review is best developed through discussions in a group representing different functions of the DD, especially line managers and line workers. Employees that have the day-to-day working knowledge of DD’s operations should be involved. People who have direct knowledge of as many relevant functions as possible should be included. This inclusion is important for two reasons. First, it allows employees from different departments/services within the DD to become exposed to the HSE-MS development process. Second, it allows each employee to bring their specific knowledge about HSE practices in their functional area to the HSE-MS process.

In this way, they can explore possible changes that strive to improve both HSE management and cost savings for the drilling division [7].

6.6. The Planning of the Implementation Process

Based on the results of the preliminary review, the plan should describe in detail *what* key actions are needed, *who* will be responsible, *what* resources are needed, and *when* the work will be completed [6].

6.6.1 Development of the Project Plan and Schedule

The preliminary review of the current HSE activities within the DD gives some idea of what will need to be done. This study shows the necessary steps which enable the DD to effectively plan the HSE-MS development and implementation. The Project Plan steps are -as shown in Figure.3 bellow

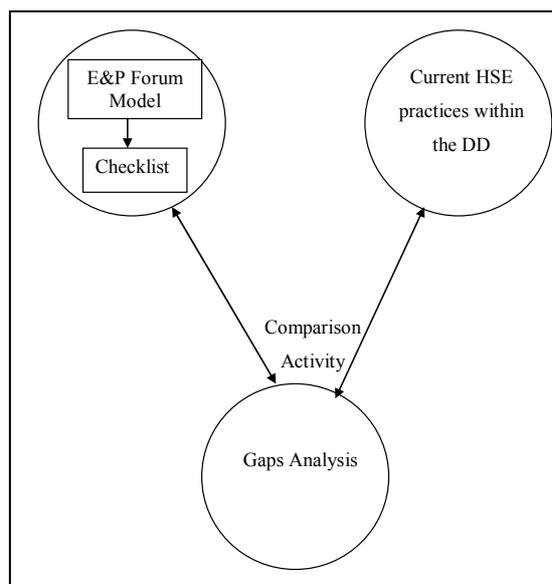


Figure.2 Gaps Analysis Principle

6.7 Employees Involvement

In any successful system, employees should be provided an opportunity to participate in establishing, implementing, and evaluating the HSE-MS. The participation of employees will enable them to develop and/or express their HSE commitment to themselves and/or their fellow workers [8]. On the other hand the involvement of the employees of the DD will make them feel that they are the owner of the project which is an essential thing for the success of the system.

The employees of the DD and those of its contractors are a great source of knowledge on HSE issues related to their work areas as well as on the effectiveness of current processes and procedures. They can help the HSE team in drafting procedures [6].

To fulfil and enhance employee participation, DD management should implement some form of the following elements:

- Regularly communicating with all employees concerning HSE matters
- Providing employees with access to information relevant to the HSE system
- Providing ways for employees to become involved in hazard identification and assessment, prioritizing hazards, safety training, and management system evaluation
- Establishing procedures where employees can report work-related incidents promptly and ways they can make recommendations about appropriate solutions to control the hazards identified
- Providing prompt responses to reports and recommendations
- Develop a recognition or rewards programs to encourage employees to contribute to the successful implementation of the HSE-MS.

This step of involving employees of the DD is intended to get people to think about and discuss the ways in which an HSE-MS will benefit the DD. First, times should be set up to discuss the HSE-MS with both the managers and the employees of the DD. Presentation sessions should be carried out, to show to the employees of the DD, what an HSE-MS is and why the division is developing one. These presentations sessions should include a short presentation from DD top level management (regional director and/or general director of the DD) that conveys their support for the HSE-MS concept. These presentations will help to develop support and understanding of the HSE-MS within the division [7].

7. THE ELEMENTS OF THE HSE-MS (E&P FORUM MODEL)

The elements of the E&P forum Model are shown in Figure.4 bellow.

This study summarises the requirements of each element of the HSE-MS in the form of tables. This Appendix can be used by the Drilling Division to:

1-Conduct the preliminary review: in this step the Appendix helps the DD to:

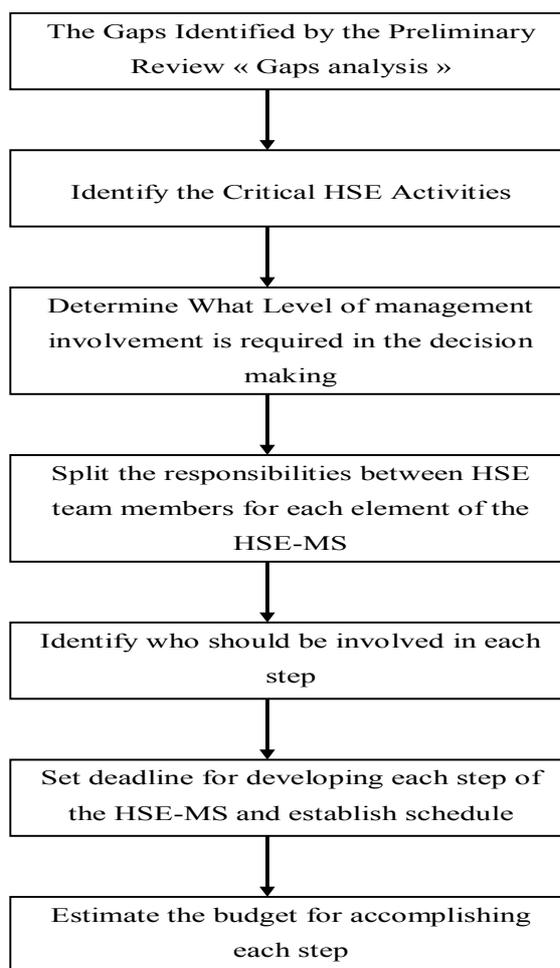


Figure3. Project Plan Steps

- Compare its current management practices regarding HSE issues to the requirements of the HSE-MS (E&P forum model) and identify areas for improvement.
- Allocate responsibilities between HSE team members to carry out the gaps analysis for each element of the HSE-MS.
- Set a deadline for accomplishing the Gaps analysis
- Determine the resources needed for the Gaps analysis (Gaps analysis budget)

2-Make schedule and plan for the implementation process of the HSE-MS: after conducting the preliminary review and identifying the gaps in the current system of managing HSE issues within the Drilling Division, the Appendix can be used by the DD to:

- Allocate responsibilities to overcome the gaps identified
- Estimate the time and the resources needed for accomplishing each gap

- Estimate a budget and make a schedule for the implementation process of the HSE-MS



Figure.4 The Elements of the HSE-MS (E&P Forum Model)

8. QUANTITATIVE METHOD FOR MEASURING THE PERFORMANCE OF THE HSE-MS

A key step in any management system is measurement; it is the base of the continuous improvement of the system. If measurement is not performed in a correct manner, the efficiency of the HSE-MS is undermined and there is no credible data that enable the managers to be informed about the effectiveness of the control measures of the HSE risks [9].

'You can't manage what you can't measure' - Drucker

'If you don't know where you are going, chances are you will end up somewhere else' - Yogi Berra

8.1. Description and Application of the Method

The guidelines which are given by the E&P forum to measure quantitatively the performance of each element of the HSE-MS model are composed of seven parts, each part deal with one element the HSE-MS. Each part is analyzed for potential metric content. Relevant elements have been extracted into an "outline or menu" type format.

In order to enable the DD to apply this method the following steps are needed: [10].

1. Group Selection: The HSE team that is built to implement the HSE-MS within the DD can be used to conduct the application of this method.
2. Selection of an element from the menu: The HSE team should select an item (from the menus) to be measured. The selection of the item from the menu should be based on the item that will have the highest return for the effort spent.
3. Find out the method which will be used to develop the metric: surveys, interviews, focus groups, and observations
4. Determine the depth of the analysis: The HSE team should decide if the analysis of the issue will need an easy qualitative analysis of the information or a complicated numerical analysis where a consultant would be required.
5. Identify the focus of the metric: The HSE team should determine the size and discipline of the population to be surveyed, and the content of the questions to be asked.
6. Create the questionnaires or determine the item to be observed: The HSE team should create questionnaires and/or determine the item to be observed.
7. Create a calculation plan: The final step is the calculation and interpretation of the collected data. In this step the HSE team will use mathematics, graphs, charts, etc.

8.2. Measuring the Performance of the HSE-MS Elements:

To develop a metric from the menu the following sections are included:

- *Purpose*: what are the aims and objectives behind measuring the selected element?
- *Results*: what are the outcomes resulted from the measure?
- *Metric Frequency*: how many times this measure can be taken?
- *Target Group*: to which level of the DD hierarchy the survey, observations or interviews will be focus?

- *Metric Description:* what are the means which will be used to conduct the measure: checklists, questionnaires ... etc.

- *How to Calculate the Metric:* how to use the mathematics to present and analyse the data gathered?

Actions: after analysing the data gathered, what are the actions that are needed to be taken in order to overcome the deficiencies founded?

In this study; the author selects one element from the menu (that is given under each HSE-MS element) and develops it as an example because the selection of the element should be done by the HSE team as sited previously. The purpose of this example is to clarify the above development sections to enable the HSE team to understand the development process easily. The examples developed are shown in Appendix C

9. CONCLUSIONS

In conclusion a number of key points are worth noting. These key points are:

- Successful implementation of an HSE-MS requires careful planning beforehand. This planning should consider:
 - a)Obtaining the commitment of the DD managers to support the implementation of the HSE-MS.
 - b)Designation of a competent person who will be responsible for leading the HSE-MS development and implementation effort.
 - c)Building an HSE team that represents the different departments and services of the DD.
 - d)The Conduction of a preliminary review (Gaps Analysis) that enables the DD to identify where it is currently against where it wants to be.
 - e)The involvement of the employees of the DD in the development and implementation process of the HSE-MS
- In order to enable the DD to compare its current practices regarding the management of HSE issues to the criteria of a structured HSE-MS, it is vital to select the system which will be used for the comparison.

This study uses the E&P forum model which is adopted by many companies that are leaders in HSE such as: BPAmoco, Shell, Halliburton, Schlumberger ...etc. These companies have used the E&P forum model as a framework to develop their own HSE-MS. On the other hand, The E&P forum model adopts principles from the international standard on quality system (ISO 9000) and environment system (ISO 14001). Thus by successfully implementing the HSE-MS, the DD can register for the accreditation of both ISO14001 and ISO 9000 certificate.

- The analysis of the E&P forum model enable the DD to bridge the gaps identified in the preliminary review and fulfil the requirements of each element of the HSE-MS by identifying the resources needed and efficiently allocate responsibilities for accomplishing different tasks.
- The plan (schedule) and the estimated budget of HSE-MS implementation include the following:
 - a)The budget and time needed to: obtain management commitment, select the champion and the HSE team, and involve employees.
 - b)The budget and time needed to carry out the preliminary review
 - c)The budget and time needed to correct the deficiencies identified in the gaps analysis.
- Measuring the performance of the HSE-MS by using a quantitative method will help the DD to integrate the HSE performance into the drilling performance. In other words, quantitatively measuring the performance of the HSE-MS will enable the DD to set measurable, realistic goals to achieve the desired level of performance.

The Drilling Division will not start the implementation of the HSE-MS from scratch, much already exists in the way of legislation, rules, regulations, procedures, work instructions and common practice which must find a recognised place in the system, or be challenged on their relevance. For example, the DD has already an important element of the HSE-MS which is the HSE policy of Sonatrach. What is needed by the DD is a mean by which it will reorganise and structure their management regarding HSE matters and identify areas for improvement, thus the DD use the E&P forum guidelines as the framework document for the development of its HSE-MS.

In the long term, the aim of implementing the HSE-MS within the Drilling division is to achieve a culture where individuals at various levels regardless of Drilling Division or contractor personnel play their role to promote, practise and participate in HSE.

10. RECOMMENDATIONS FOR FURTHER STUDIES

Additional research should be conducted to determine:

- How the management of contractors could be added as a key element to the HSE-MS of the Drilling Division (this issue is addressed as a sub-element in the E&P forum model)
- How can the software DIMS (Drilling Information Management System which is used by the Drilling Division) help the DD in the implementation and development of the HSE-MS
- How the Drilling Division uses its HSE-MS to obtain international certifications such as ISO 9000, ISO 14001 ... etc
- How to generalise the HSE-MS model of the DD to be used by all the other divisions of Sonatrach such as: Production Division, Transport Division ... etc in order to get a common system of managing HSE.

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