Investigation the Impact of Culture & on the Overall Health & Safety from the Oil & Gas Sector

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Abstract— This review attempts to describe a cultural approach towards understanding SIS. It aims to help the reader understand SIS from a cultural viewpoint, and how SIS culture can be assessed as part of a process of organizational improvement. The aim is to convey up-to-date information on this complex topic in a straightforward, condensed way, trying to build a bridge between research and practice. The review is intended as an informative text for business managers in general, and as a practical guide for SIS practitioners. This is because much of the academic research related to the topic is published in scientific books and journals that are often less accessible for non-academic SIS professionals. Furthermore, in the course of this study, data was collected through open-ended Questionnaires to the workers and the Occupational Health Doctor. Also, Environmental Monitoring/Surveillance was carried out in seven main units of the Refinery. The questionnaire was administered to the workers randomly and was used to identify the Health Hazards, determine the awareness of the workers of the Health Hazards and evaluate the Occupational Health Practice that exists in the Refinery. Environmental Monitoring/Surveillance which includes the use of specialized equipments and good housekeeping were used to identify the different Health Hazards, and also, to assess the risk associated with the Health Hazards identified. Hazard Risk Assessment Matrix was used to identify the Health Hazards and the risks associated with them. A total of 85 respondents participated in the study. Most of the respondents were in the age range of 31- 40 years and approximately 31% run Shift Duty. Majority of respondents (82.4%) were males, married (64.7%) and had completed tertiary education (81.2%) respectively. Majority of respondents were able to identify the Health Hazards: Physical Health Hazard (74.2%); Chemical Health Hazard (70.9%); Mechanical/Ergonomics Health Hazard (78.8%) but the level of awareness of Psychosocial Health Hazard (48.3%) and Biological Health Hazards (9.6%) were low especially that of the latter. For the evaluation of Occupational Health Practice most of the respondent (78.1%) agree that management is committed to the health and well-being of their workers. With the Environmental Monitoring, it was deduced that the above named first three Health Hazards and the Biological Health Hazard are prevalent in the Refinery. With the Hazards Risk Assessment Matrix, the level of risk these identified Health Hazards pose on the workers was 3D, 5E, 3C and 0A respectively. However, workers' susceptibility to work related-diseases depends on a lot of factors, and it usually takes some time before the manifestation of the illnesses and diseases on the worker could be diagnosed. Consequently, Health Effect Management Process which is an element in Occupational Health and Safety Management System (OHS-MS) amongst others is recommended management protocol that would assist the management of an Oil and Gas Refinery protect, promote and rehabilitate the health and well-being of their workers.

Key words: Hazards, HIV/AIDS, Health & Safety, Oil, Gas, Radiation

I. INTRODUCTION

Since the discovery of the Ekofisk field in 1969 in the North Sea and up to today, there has been an overwhelming, unexpected and profitable oil adventure in Norway. The industry has contributed to over 10.000 billion kroner during the past 40 years of activities (Berthelsen 2014). Approximately 42% of the recoverable oil and gas on the Norwegian Continental Shelf has been sold since the start of production in 1971. Oil industry stood for 22% of the value creation in 2013 in Norway, which was more than twice as large as the industry on land.

In order to prevent accidents at workplaces, the Norwegian government has developed a number of measures. One of these measures that came into practice during the 1970s is the requirement for operators to implement Safety Management Systems (henceforth: SMS) (NOU: 2005:14). Initially, the purpose of SMSs was to systematically prevent large, potential accidents through documentation, supervision and coordination. Today SMSs also include prevention of occupational accidents, health, and internal and external environment pollution through measures as internal reporting. The requirement of SMSs is not limited to offshore activities, but also includes other onshore industries in Norway (ibid.).In order to comply with relevant regulations in practice and systematically prevent accidents and emissions, organizations need a safety information system (henceforth: SIS) often integrated in the overall SMS (Kjellen 2000). A SIS constitutes a process that consists of three phases, including data collection, processing and distribution of processed information (ibid.). Employees use a SIS to report on hazardous conditions, operational failures, near-misses and accidents. Information submitted into a SIS is further processed and distributed to relevant decision makers within an organization so that corrective measures can be implemented.

SISs are commonly implemented as means within contemporary safety management that is "all measures being implemented to achieve, maintain and further develop a safety level in accordance with defined goals. Formal systems like SISs continuously steer, sustain and improve safety level in relation to predefined goals within an organization. However, to have an effectively functioning SIS is not necessarily an easy task. A SIS's effectiveness is influenced by a number of factors. One is related to employees' willingness to report (Reason 1998). Accurate reporting at all organizational levels contributes to more adequate prevention of accidents. Another crucial factor for effective functioning of the SIS is well-developed organizational safety culture

(Stock, McFadden and Gowen 2007). However, whether the right safety culture is established within an organization will depend on how formal, organizational measures directed at safety are institutionalized within a given organization (Reason 1997).

II. LITERATURE SURVEY

MD Copper et al. [4] Culture can be seen as a concept that describes the shared corporate values within an organization which influences the attitudes and behaviors of its members. Safety culture is a part of the overall culture of the organization and is seen as affecting the attitudes and beliefs of members in terms of health and safety performance. It is likely, as suggests, that the status of the safety officers is a reflection of management's commitment to safety.

HSE et al. [5] Safety systems encompass aspects of the organization's safety management system, including safety committee, safety officers, safety equipment and policies. Overall, there has been little research into how the status of the safety officer and safety committee influence employee's safety behavior. The work suggests that safety advisors should have status and competence within the organization in order to advise management and employees. If a senior manager does not see the importance of safety it is unlikely that the safety officer will be given management status. The effectiveness of safety committees is also likely to be influenced by management commitment. If the senior executive sees safety as less important than other aspects of the organization e.g. production he/she is unlikely to support the committee through attending meetings and implementing suggestions for change.

Kathryn Mearns et al. [6] proposed that a type of human factors training (Crew Resource Management), first developed in the aviation industry and now expanded to other domains, may play an important role in improving industrial safety by teaching relevant skills such as communication, leadership, team-working, personal limitations and decision making. CRM may help to break down the barriers that exist between subcultures, allowing personnel with different perspectives on the work situation to share information and work together as a team to resolve problems.

T-Rundmo et al. [7] the concept of risk is often included in safety climate scales under the guise of self-reported risk taking, perceptions of risks within the workplace as well as attitudes towards risk and safety. Research has shown that offshore workers appraise the risks they face fairly accurately, although this may not impact on workers behavior. They found that management priorities of safety over production were an indirect effect on risk behavior, whilst acceptability of rule violations was found to be the strongest predictor of behavior. This research again highlights the role of management attitudes towards safety upon employee's behavior.

Edwin Sawacha et al. [8] the literature on bonus schemes suggests that financial incentives to improve productivity or to compensate for working in hazardous conditions can lead to safety being compromised. Employees who were eligible for hazard pay were found to be at greater risk of having an accident, and it may be seen as an inducement to take risks. Productivity bonus schemes have been found to act as an incentive to work faster and thus to commit unsafe acts.

David L Collision et al. [9] the article examines the politics of accident reporting on North Sea oil installations. In the context of an all-pervasive safety culture and performance assessment system, offshore workers restricted the reporting of accidents. Other studies suggest that workers often respond to increased monitoring by engaging in defensive practices that manipulate performance information. Accordingly, a central contention of this article is that performance assessment frequently creates employee performances. In turn, the paper highlights the value of linking the work of Goff man to that of Foucault for the critical analysis of culture, performance assessment and safety.

1) Noise
2) Illumination
3) Vibration
4) Radiation (ionizing and non-ionizing)
5) Microclimatic conditions in the case of extreme heat and cold.

Fig. 1: Basic Hazards

A. *Mechanical & Ergonomics Hazards*

Unshielded machinery, unsafe structures in the workplace and dangerous tools are some of the most prevalent workplace hazards in developed and developing countries. In Europe, about 10 million occupational accidents happen every year (some of them commuting accidents). Adoption of safer working practices, improvement of safety systems and changes in behavioral and management practices could reduce accident rates, even in high-risk industries, by 50% or more within a relatively short time.

Fig. 2: Mechanical & Ergonomics Hazards

B. *Biological Hazards*

Exposure to some 200 biological agents, viruses, bacteria, parasites, fungi, moulds and organic dusts occurs in selected

occupational environments. The hepatitis B and hepatitis C viruses and tuberculosis infections (particularly among healthcare workers), asthma (among persons exposed to organic dust) and chronic parasitic diseases (particularly among agricultural and forestry workers) are the most common occupational diseases resulting from such exposures. Blood-borne diseases such as HIV/AIDS and hepatitis B are now major occupational hazards for healthcare workers. This can be classified into:

1) Human tissue and body fluids
2) Microbial pathogens (in laboratory settings)
3) Genetically modified organisms
4) Animals and animal products
5) Organic dusts and mists

Fig. 3: Biological Hazards

C. Chemical Hazards

About 100 000 different chemical products are in use in modern work environments and the number is growing. High exposures to chemical hazards are most prevalent in industries that process chemicals and metals, in the manufacture of certain consumer goods, in the production of textiles and artificial fibres, and in the construction industry. Chemical hazards could be classified into:

1) Particles, fibers, fumes and mist: Carbon Black, Welding Fume, Oil Mist.
2) Metals and metalloids: Arsenic, Cadmium, Chromium, Mercury, Zinc.
3) Organic, solvents and compounds: Acetone, hydrocarbons, Benzene.
4) Inorganic gases: Carbon monoxide, Hydrogen sulphide, Sulphur dioxide.

Fig. 4: Chemical Hazard

D. Psychosocial Hazards

Psychosocial hazards comprises of the psychological and social hazards. Psychological hazards are caused when time and a work pressure has become more prevalent during the past decade. Monotonous work, work that requires constant concentration, irregular working hours, shift-work, and work carried out at risk of violence (for example, police or prison work), isolated work or excessive responsibility for human or economic concerns, can also have adverse psychological effects. Psychological stress and overload have been associated with sleep disturbances, burn-out syndromes and depression. Epidemiological evidence exists of an elevated risk of cardiovascular disorders, particularly coronary heart disease and hypertension in association with work stress. Severe psychological conditions (psycho traumas) have been observed among workers involved in serious catastrophes or major accidents during which human lives have been threatened or lost.

Fig. 5: Psychosocial Hazards

III. IMPLEMENTED SAFETY INFORMATION SYSTEM

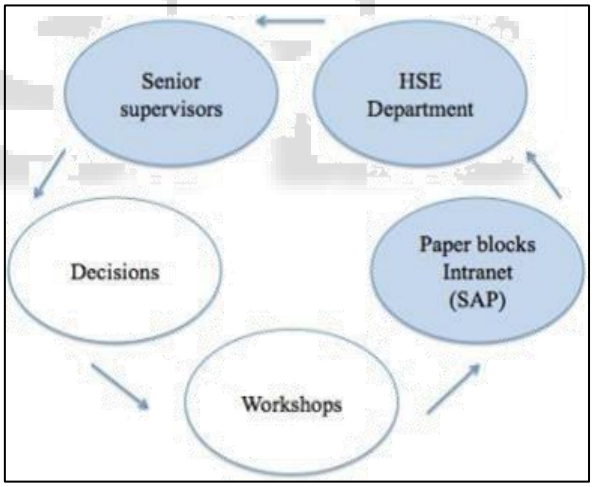

Fig. 6: Implementation of SIS

In this chapter I will present my empirical findings. The findings have been schematized and divided according to the research questions. First I will present how the facility has implemented its SIS. Thereafter, organizational measures that contribute to the development of safety culture are presented. Here I only provide an overview of measures directed at safety.

A. Data Collection

In the workshops they have paper-blocks/sheets containing a standard template. After reports are down-written, they deliver them in mailboxes located around the workshops, and the HSE-engineers from the HSE department walk regularly rounds during weekdays and collect the reports.

B. Data Processing

After the reports have been collected, dedicated HSE-engineers at the HSE department sort out the reported information and create a "Quality Notification" (QN) in the SAP-system under a specific code. These processes include multiple steps which all shall not be included here due to the scope of investigation. The essential part is to analyze the report (risk analysis), look at where the information comes from, and add the responsible senior supervisor within the relevant workshop unit who can take further actions based upon the analyzed report.

C. Distribution of Information

While registering the report in SAP, the HSE department creates tasks in the same system and disseminates this information primarily to senior supervisors within his/her workshop unit to implement corrective measures. When assigning tasks in SAP, the relevant person will receive a notification in their SAP inbox and regular email inbox. Under the condition that the reporters voluntarily provide their names in the report, the HSE department can add the reporter's name when processing it.

IV. RESEARCH OBJECTIVES

The purpose of this study is to:

1) Identify the Occupational Health Hazards among Refinery Workers.
2) Determine the awareness of the workers on Occupational Health hazards.
3) Assess the risk associated with the Health Hazards.
4) Evaluate the Occupational Health Practice in the Refinery.
5) Recommends control to prevent and mitigate the effects of the Health Hazards on the health and well-being of the workers.

V. SIGNIFICANCE OF STUDY

This study will help to create awareness of the Occupational Health Hazards prevalent among Refinery workers and improve the Occupational Health and Safety Management System of the Organization. Occupational safety and health is good for business as well as being a legal and social obligation (OSH, October, 2013). Enterprises appreciate that OSH prevents people from being harmed or made ill through work, but it is also an essential part of a successful business. Occupational safety and health helps demonstrate that a business is socially responsible, protects and enhances brand image and brand value, helps maximize the productivity of workers, enhances employees" commitment to the business, builds a more competent, healthier workforce, reduces business costs and disruption, enables enterprises to meet customers"" OSH expectations, and encourages the workforce to stay longer in active life (EU-OSHA, 2013).

The worth of this study cannot be underestimated and over-emphasized owing to the fact that it will propose a value-added Occupational Health and Safety Management System (OHS-MS) approach in the Oil and Gas Refinery. The proposed approach wherein the OHS-MS elements as shown below will be duly exploited;

1) Leadership and Commitment.
2) Policy and Strategic Objectives.
3) Organization and Resources.
4) Evaluation and Risk Management.
5) Planning.
6) Implementation and Monitoring.
7) Audit.
8) Management Review.

VI. SCOPE OF STUDY

The Research Study identifies health hazards and delineates the awareness of Occupational Health Hazards of the workers of Refinery. In addition, it includes the health risks assessment of the hazards to the workers, evaluation of the risk on the health of the workers and possible control to prevent and mitigate the impact of the hazards on the health and well-being of the workers.

VII. LIMITATIONS

Occupational Health Practices in Nigeria is not very popular which made the study very challenging as some of the workers found it hard to respond for fear of losing their jobs. Also, as structured Organization, getting approval to carry out the study was a huge task. In addition letting out some useful information alongside using their equipments did not just come by. Occupational Health Practices need to be properly promoted and projected by the necessary government and corporate bodies, who in turn should partner with Organizations in the encouragement of such studies.

VIII. CONCLUSION

Identification of Occupational Health Hazards, the awareness of the workers on the health hazards, the risk associated with them and the effectiveness of the Occupational Health Practices is crucial in the promotion, protection and rehabilitation of the health and well-being of people working in the Refinery. From this study, it could be deduced that these were achieved as the Occupational Health Hazard among Refinery workers were identified, it was seen that most of the workers were aware of the health hazards that is prevalent in their workplace. The Occupational Health Practice was seen to be effective as there is a Plant Clinic in the Industrial Layout of the Refinery which has two (2) full-time Occupational Health Doctors, an Industrial Hygienist (nonprofessional), six (6) nurses that run shift, a Pharmacist and an Assistance, Radiographer and an Assistance, a Medical Laboratory Technologist and Hospital Administrator for records keeping.

REFERENCES

[1] Mearns K, Bertheles. Assessing the state of organisational safety - culture or climate? Current Psychology 2014; 18: 5–13.
[2] Stock, Mc Fadden, Gowen, Grove rail inquiry part 2 report. London: HMSO, 2007.
[3] MD Copper, Towards a model of safety culture, Safety Science, Volume 36, Issue 02, 2000
[4] HSE, Reducing error and influencing behavior, Health services, Volume 2, 2009

[5] Kathryn Mearns, Rhona Flin, Pawl o Connor, Sharing "worlds of Risk" improving communication with crew resource management, Journal of Risk research, Volume 04, Issue 04, 2001
[6] T- Rundmo, Safety climate, altitudes and Risk perceptions in Norse Hydro, Safety Science, Volume 34, Issue 1, 2000
[7] David L Collision, Surviving the Rigs: - Safety and surveillance on North Sea oil installations, SAGE Journal, Volume 20, Issue 04, 1999.

