

# Offshore Safety Culture Assessment

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**Abstract**— Safety culture is not easy to define since it consists of beliefs and assumptions of every worker shared at the organization. What is the safety culture implied at the drilling and work over offshore operation? Using the Westrum model for safety culture (pathological, reactive, calculative, proactive, and generative), at what stage of safety culture does the drilling and work over offshore operation work? This paper studies the level of safety culture using the survey was based on the Loughborough University Safety Climate Survey (LSCAT) which identified four areas: organizational context, social environment, individual appreciation, and work environment. Method: the assessment will measure the prevailing safety culture from these data: employee attitude surveys also referred to as the safety climate questionnaire; face to face interviews; focus discussion groups; structured observations in the form of behavioral observations and situational audits to explore the effectiveness of the safety management systems. The assessment was conducted to 167 respondents from office personnel and field personnel. Results: on average, drilling and work over operation safety culture profile standard at 8.3 points (excellence level) or at generative level, with seven of the nine dimensions are rated as excellence and two dimensions are rated as strong. Discussion: seven of the nine dimensions which are rated excellence are: management commitment, communication, priority for safety, supportive environment, involvement, personal priorities and need for safety, personal appreciation of risk. Two dimensions which rated strong are: work environment and safety rules and procedures. Impact on Industry: drilling and work over is considered as high-risk industry, the understanding of it safety culture and how to achieve high safety level can be shared across the industry for learning experience.

**Keywords**— Safety culture, Organization culture, Offshore, Drilling, Work over.

## I. INTRODUCTION

Occupational Health and Safety (OHS) is integral part of the business now days. Business objectives typically state and define underlying organizational “values” and quality factors such as safety, rework, environmental soundness, and customer satisfaction [1]. Business side of the objectives may be stated in terms of productivity, costs, or profits, while safety objectives can be stated in terms of losses, accidents, safe behaviors, or increased costs [1].

To achieve it safety objectives, a structured OHS Management System (OHS-MS) which consist several elements is implemented. However, the implementation of OHS-MS has tended to be mechanical, setting and meeting minimal requirements, but not going further [2].

Implementation in the form of ticking-off that the activities have been done is by no means necessarily equivalent to proving the existence of a Health Safety and Environment (HSE) culture and is certainly not a guarantee for good HSE performance [4].

In highly hazard industry such as oil and gas industry, that level of practice is unacceptable. [5] mentioned several offshore work characteristics causing it to be considered as high-risk industry: isolated work area, major hazard potential (fire and explosion), 12 hours per day shift pattern, multiple exposure (e.g. hazardous material, noise, vibration, heat, manual handling), and environmental condition.

The implementation of HSE MS needs to support by a good safety culture at the organization. The health and safety culture can be defined as an aggregation of beliefs, attitudes, and values that contribute and facilitate hygiene behavior and environment in a business setting [6].

An organization displaying a positive safety culture would be characterized by communication based on mutual trust, shared perceptions of the importance of safety, and confidence in the effectiveness of their safety barriers.

Currently, there are plenty of tool that can be used to assess safety culture. To name few, there are: Loughborough Safety Climate Assessment Toolkit (LSCAT), Safety Health of Maintenance Engineering (ShoMe) Tool, Safety Culture Toolbox,

HRMI Safety Culture Inspection Toolkit, RSSB Safety Culture Improvement Toolkit, Multilevel Safety Climate (MSC) Scale (Organizational and Group-level Safety Climate), Offshore Safety Questionnaire (OSQ) Offshore Safety Climate Questionnaire (OSQ99), Commercial Aviation Safety Survey (CASS), Norwegian Offshore Risk and Safety Climate Inventory (NORSCI), Nordic Occupational Safety Climate Questionnaire (NOSACQ), HSL Safety Climate Tool (SCT), Safety Awareness Questionnaire (SAQ) (Arbeitsfähigkeit und Umgang mit Sicherheit), and Organizational and Safety Climate Inventory (OSCI).

There are also 3 pragmatic normative approach to assess safety culture: Hearts & Minds Program/Toolkit, Safety Culture Maturity Model (SCMM), and Safety Culture Indicator Scale Measurement System (SCISMS) [7].

The Hearts and Minds toolkit was developed by Shell E&P, based upon 20 years of university research, and are being successfully applied in both Shell and non-Shell companies around the world. Hearts and Minds use a range of tools and techniques to help the organization involve all staff in managing HSE as an integral part of their business. Collectively, these tools and techniques are known as the Hearts and Minds Toolkit [9].

LSCAT (Loughborough Safety Climate Assessment Tool) as developed by Loughborough University. Compared to the Hearts and Minds toolkit it is somewhat “old school” but remains an effective approach. The LSCAT was initially designed for use in the offshore oil industry.

This tool is based on a systems approach to organizational culture and is a multi-method package that provides a range of individual tools to help investigate culture from a holistic perspective incorporating elements of organizational structure, organization and behavior.

The LSCAT measures the responses across nine dimensions which are organized under three headings: organization system and environment; organization system and work groups; and organization system and Individual and work groups. The nine dimensions measured by the tool are: management commitment, work environment, safety rules and procedures; supportive

environment, involvement, communication, personal priority and need for safety, personal appreciation of risk, and priority for safety. These may be loosely grouped into the following four areas: [10]

#### *A. Organizational Context*

- Management Commitment - Perceptions of management’s visible commitment to safety issues
- Communication - The nature and efficiency of safety communications within the organization
- Priority for Safety - The relative status of safety issues within the organization
- Safety Rules and Procedures - Views on the effectiveness and necessity of rules and procedures

#### *B. Social Environment*

- Supportive Environment - The nature of the social environment at work, and the support derived from it
- Involvement - The extent to which safety is a focus for everyone and all are involved.

#### *C. Individual Appreciation*

- Personal Priorities and Need for Safety - The individual’s view of their own safety management and need to feel safe
- Personal Appreciation of Risk - How individuals view the risk associated with the work they do and finally.

#### *D. Work Environment*

- Physical Work Environment - Perceptions of the nature of the physical environment.

Measuring safety culture using a standard tool offers a pragmatic approach to provide information on existing safety culture as it focuses on the workforce’s current perceptions of safety in relation to management support, supervision, risk-taking, safety policies, safety practices, trust and openness.

## II. METHOD

This research uses cross sectional approach where data are collected in specific single point time.

The safety culture survey was based on the Loughborough University Safety Climate Survey (LSCAT) which identified four areas:

organizational context, social environment, individual appreciation, and work environment.

The assessment will measure the prevailing safety culture from these data: employee attitude surveys also referred to as the safety climate questionnaire; face to face interviews, focus discussion groups; structured observations in the form of behavioral observations and situational audits to explore the effectiveness of the safety management systems.

The use of focus groups, behavioral observations and audits are appropriate techniques to seek additional information related to culture following the application of the questionnaire.

The assessment was conducted to 167 respondents from field personnel on offshore drilling & work over operations and office personnel located at East Kalimantan, Indonesia.

The questionnaire itself contains 43 items that ask the workforce to rate their agreement or disagreement with a range of statements about OHS within their work area.

### III. RESULT

On average, drilling and work over safety culture profile stands at 8.3 points (excellence level) – Green Flag.



Fig. 1 Drilling and work over safety culture profile

Seven of the nine dimensions are rated as excellence. Work environment (7.9 of 10.0) and safety rules and procedures (7.6 of 10) are rated as strong.

Work Environment questions in scored as follows:

- I always have enough time to get the job done safely: 167 of 167 agree or strongly agree
- This is a safer place to work than other places I have worked: 8 of 167 disagree or strongly disagree
- Operational targets rarely conflict with safety: 71 of 167 disagree or strongly disagree
- Sometimes conditions here prevent me from working safely: 34 of 167 agree or strongly agree
- There are always enough people available to get the job done safely: 3 of 167 disagree or strongly disagree
- I can always get the equipment I need to do the job safely: 0 of 167 disagree or strongly disagree.

Summary of the drilling and work over on work environment:

- All believe they have adequate time to get the job done safely. There are no time pressures.
- 5% believe that KLO is a more dangerous place to work than other places they have worked
- 43% believe that Operational targets conflict with Safety
- 20% believe that at times conditions in the workplace prevent them from working safely
- 2% believe that there are at times insufficient people to do the job safely
- All have a positive or neutral view about being able to obtain the right equipment to do the job safely.

Safety rules and procedures questions scored as follows:

- Some safety rules and procedures do not need to be followed to get the job done safely: 25 of 167 agree or strongly agree
- Some safety rules and procedures are not really practical: 25 of 167 agree or strongly agree

- Sometimes it is necessary to do things in an unsafe way to continue production: 17 of 167 agree or strongly agree.

Summary of the drilling and work over on safety rules and procedures:

- 15% believe that some safety rules and procedures do not need to be followed to get the job done safely
- 15% believe that some safety rules and procedures are not really practical and
- 8% believe that at times it is necessary to do things in an unsafe way to continue production.

**IV. DISCUSSION**

International Association of Oil and Gas Producer (OGP) use model developed by Westrum that define safety culture maturity model into 5 level: [12] [11]

- Pathological organization believes that individuals, typically at lower levels, cause accidents. They implement only what is mandatory
- Reactive organization consider HSE important but believe that most problems lie within the lower levels of the workforce
- Calculative organization believe in the value of systems in managing HSE performance and the use of a large number of tools and training
- Proactive organization consider HSE a fundamental (“core”) value and leaders at all levels genuinely care for the health and wellbeing of the staff and contractor
- Generative organization has a high degree of self-sufficiency and strives to understand their entire operating environment.

A simple system rating developed for this research

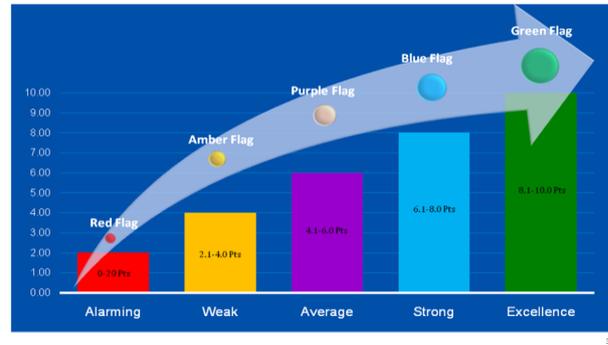


Fig. 2 System Rating

TABLE I

**System Rating**

Flag	Score	Description
Red (alarming)	0 – 2.0	Safety value is not internalized within the individual, group or in the wider organization. Workforce is disengaged with the safety effort. Need serious effort to internalize safety value to all employee
Amber (weak)	2.1 – 4.0	Safety value is reactive. Management or individual acts decisively in safety matters only after incident have occurred
Purple (average)	4.1 – 6.0	Worker involvement toward safety is increasing and a clear safety culture is appearing in area of organization. The worker involvement in seen both by worker and management as an important thing to achieved good safety performance
Blue (strong)	6.1 – 8.0	Safety value are strong. Organization wide there is active attention, care and action, in preventing workplace incidents. Workforce and management are found to be working in partnership to improve safety
Green (excellence)	8.1 – 10	Safety value is internalized in every individual, group, and wider organization. Organization continues to invest in safety not only in the workplace but at home as well. Workforce is found to be leading the safety improvement effort.

As surveyed, overall drilling and work over is at the top of safety culture level as it received 8.3 points or green flag (excellence level).

Seven of the nine elements are rated as excellence. They are: commitment management; communication; priority for safety; supportive environment; involvement; personal priorities and need for safety; and personal appreciation of risk.

Management at office and on site are considered committed to HSE. Management commitment can be form as visible leadership to worker and provide example of safety practice, provide adequate resource allocation (time, money) to implement safety, participate at safety meeting, and make safety priorities. [13]

Two elements are rated strong. They are: work environment and safety rules and procedures. Even though, the result is considered still favourable.

Understanding which element where improvement opportunity occurred is a good starting point to allocate focused resources to create effective and efficient steps to improve company's HSE performance, and can be source of reference to develop further targeted HSE program.

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