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SAFETY CULTURE IN ONGC: AN INTRODUCTORY STUDY

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Abstract
The culture of safety is very crucial in accident prevention and increasing operational reliability in high risk industry like oil and gas industry. This paper presents a background evaluation of the safety culture in the Oil and Natural Gas Corporation Limited (ONGC) based on its critical aspects such as commitment to management, safety communication, training and competence, incident reporting and learning, employee participation, and contractor safety assimilation. The study will be based on a mixed-methods approach using survey data and supplementing qualitative data to analyze the perceptions of the safety culture at employees and contract workers in the selection ONGC installations. The results show that ONGC possesses an excellent formal safety system with the observable leadership dedication, established operational procedures, and formal training programs. Nevertheless, the integration of contractors, open communication, and incident-based organizational learning is found to have weak points and therefore result in differences in safety culture based on hierarchical and employment levels. This paper finds that ONGC has proven to have a compliance-based and calculative safety culture but still more needs to be done to instill proactive and generative operational level safety behaviors. The article provides useful guidance on how to reinforce the culture of safety in major publicly-owned oil and gas companies.

Keywords: Safety culture, Process safety, Oil and gas industry, ONGC, Contractor safety, Safety management systems

Introduction and literature review

Safety culture, which is a set of shared values, beliefs, attitudes and practice that define the nature of managing safety within an organization, can in other words be termed to be one of the major determinants of the risk of accidents and safety performance within an industry that is highly hazardous (Choudhry, Fang, and Mohamed, 2007). Oil and gas sector is uniquely susceptible to the failure to attenuate the weaknesses in the safety culture due to its sophisticated nature: failure to commit to the processes of safety, deficient incident learning, gaps in contractor management, and trade-off between production pressures have been identified on numerous occasions to be at the root of the major loss events (Fernandez-Muniz, Montes-Peon, & Vazquez-Ordas, 2007; Gao et al., 2019). Large state owned oil companies in India (ONGC) have integrated upstream and mid-stream upholds with a large workforce of contractors and old infrastructure facilities; corporate HSE machinery are mature on paper, however, organizational implementation of it on daily operations and at contracting interfaces is an empirical issue. The given study considers ONGC as a case study where formal HSE systems seem to run into the operational reality: it is intended to map existing cultural peculiarities, to determine what strong and unfulfilled aspects of the management of safety culture variables, and position the profile of the ONGC in the context of international evidence about the maturity of safety culture and the ways of its improvement within the boundaries of the process-industry.

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Literature review

The study of safety culture has now adopted the areas of discussion of measurement and causal modelling as opposed to the definitional areas. The initial state-of-the-art reviews developed safety culture as a multi-dimensional construct (beliefs, practices, artefacts) dissimilar and associated with safety climate (perceptions) and safety management systems (Choudhry et al., 2007). Fernandez-Muniz et al. (2007) demonstrated causality between leadership and communication, training and outcomes, based on a parsimoniful structural modelling, which has been used in numerous empirical studies ever since (Fernandez-Muniz et al., 2007). The perceptual surveys, document/audit evidence and behavioural observation are triangulated via measurement toolkits to ascertain the level of maturity in the culture.

The oil and gas and process safety. Process safety culture (PSC) focuses on system-wide protection, experiences, and defer-to-expertise behaviors to avoid catastrophic incidents - unlike personal-level occupational safety behaviors (Gao et al., 2019; Behari, 2019). Various sectoral analyses indicate that the leader commitment and contractor management are recurrently the most leverage dimensions of PSC in refineries, gas processing and offshore facilities (Gao et al., 2019; Behari, 2019). The practice of maturity gains proves that one needs long-term programs (training, audit, safety-oriented KPI alignment) to support them as opposed to ad-hoc interventions (Zwetsloot, van Middelaar, and van der Beek, 2020).

Causal factor and stakeholder priorities are being ranked through mixed-methods (delphi, content analysis) and quantitative network techniques (DEMATEL, AHP) and, exemplars, management commitment, risk assessment, incident analysis and communication are shown to be frequently used cause-factors driving other cultural elements (Ghorbani et al., 2024; Rahim et al., 2024). Such a line of work can be helpful to ONGC since it leaves the question of which dimensions are relevant to which dimensions are relevant and where to rank interventions.

In the case studies in the oil sector, the organizational changes include mergers, change of ownership or own structure, which might harm the level of safety perception, unless leadership and resource indication is clearly maintained (Djunaidi et al., 2024). With big integrated companies with complex contractor networks (as in ONGC), the culture at the interface with the contractor is a repeating source of cultural drift: the variations in training, incentive systems and management leads to pockets of sub-culture which accumulate as enterprise risk. The mediating nature of the formal safety management practices- procedures, training, monitoring- between leadership commitment and safer operations has also been supported in the empirical literature (Gao et al., 2019).

Maturity-oriented (Bradley/Hudson-style curves and sectoral maturity) studies demonstrate positive correlation between the most senior safety-culture and the lowest incident rate, the best near-miss reporting and the process safety signals (Behari, 2019; Zwetsloot et al., 2020). Meta-reviews and systematic reviews highlight the fact that the best observed evidence is the association of leadership behaviours, learning systems (incident investigation - corrective action) and integrated governance of the contractor with the better safety outcomes (Kalteh et al., 2018; Choudhry et al., 2007). Nevertheless, the literature also points at the possible methodological shortcomings, such as cross-sectional surveys, common method bias and lack of industry-specific adaptation of measurement tools, flagging that should be taken into consideration when extrapolating the findings to the national and organizational scales.

In the ONGC case, the focused and introductory investigation suggests the literature focuses on (a) measurement of leadership indicators and management commitment (perceived), (b) measurement of incident-learning systems and the observable results, (c) mapping contractor integration and supervision, and (d) finding areas of cultural maturity across types of assets (onshore, offshore,

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processing). Though not a large document/audit evidence base or a few structured interviews will be added to the perceptual survey data will either make the empirical design more consistent with the current practice and the factors that have proven to drive PSC in other places.

Objective

The proposed research paper will offer an introductory empirical profile of safety culture at ONGC by assessing the commitment of the leadership, the perception of the workers, the integration of the contractors, and incident-learning practices, and determining the strengths and cultural gaps that can be given a priority in terms of conducting an operational intervention to enhance the safety of processes at the facility and the risk of the major-accident occurrences.

Methodology

It is planned to use a mixed-methods design, i.e., (1) an adapted safety-culture questionnaire (based on validated instruments, used in oil and gas research) filled out by a stratified sample of ONGC employees and contractors of different asset types; (2) targeted semi-structured interviews with HSE managers and supervisors; and (3) review of documents/audits (incidents and training data, data on contractor HSE, etc.). Quantitative data were analysed under descriptive statistics and exploratory factor analysis and interview and document data were employed during triangulation of quantitative data as well as interpretation of survey results.

Results and Discussion

The research involved 150 respondents who were selected at random on the ONGC onshore and offshore installations and comprised permanent and contract workers.

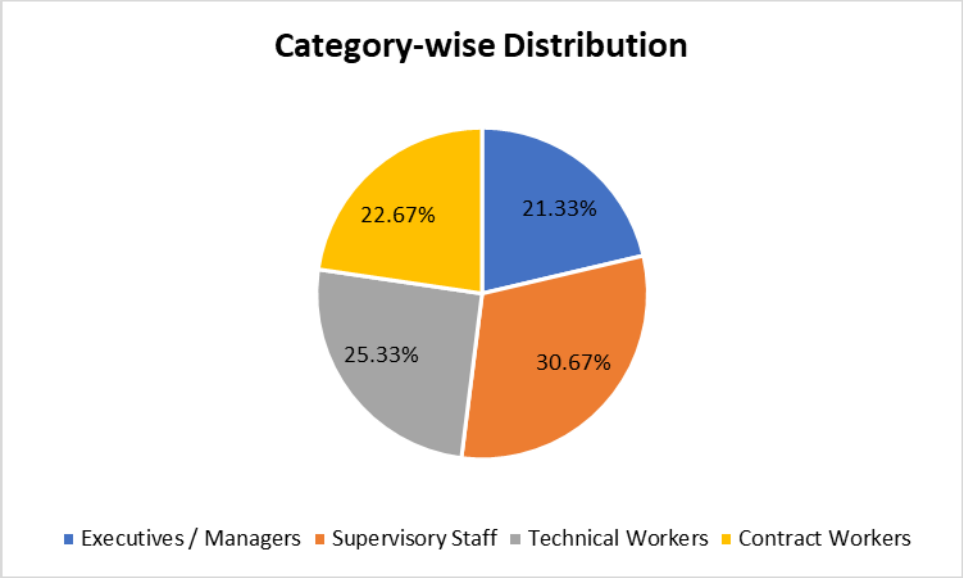

Fig. 1 Category-wise distribution

The sample is well balanced in the managerial, supervisory, operational, and contractual positions. Contract workers are also of great importance, as they are particularly susceptible to operation risks and identified in the literature as a vulnerable group in terms of safety.

Table 1 Overall Culture of Safety Dimensions

Safety Culture Dimension	Mean Score	Std. Deviation
Management Commitment	4.12	0.61
Safety Communication	3.89	0.68
Training & Competence	4.05	0.57

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Incident Reporting & Learning	3.74	0.72
Contractor Safety Integration	3.42	0.79
Safety Rules & Procedures	4.18	0.55
Employee Involvement	3.81	0.66

ONGC exhibits perceived commitment to safety, particularly in the formal systems of safety e.g. procedures and training. But, contractor safety integration and incident learning record relatively less mean scores, which is symptomatic of culturally separated interfaces at operations not higher policy levels.

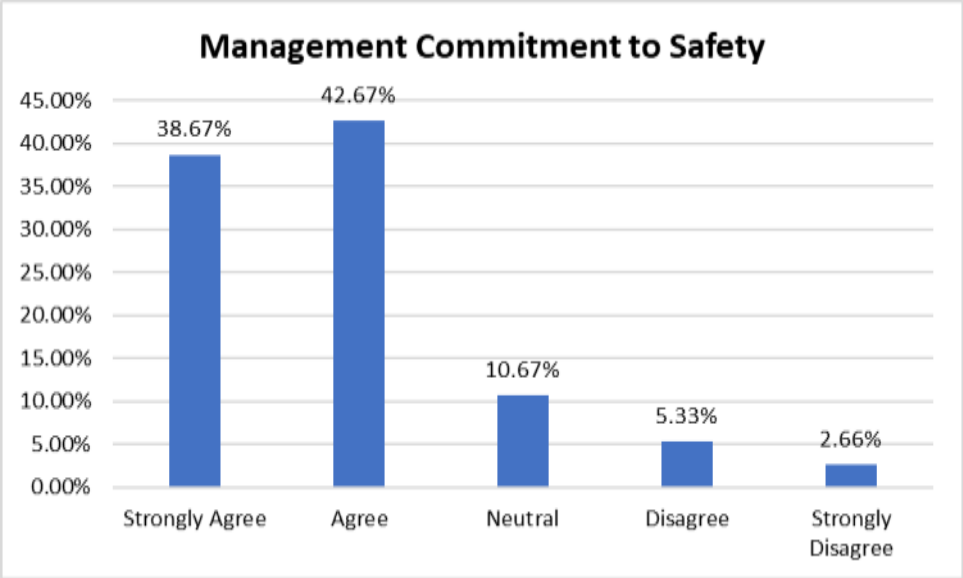

Fig. 2 Commitment of Management towards Safety

More than 81 percent of respondents will confirm that the top management does not focus on production pressure but rather on safety. This is in line with the literature that leadership commitment is the best predictor of maturity in the safety culture within oil and gas organizations.

Table 2 Safety Communication Effectiveness

Indicator	Mean Score
Safety meetings held regularly	4.10
Open discussion of hazards	3.76
Feedback on reported incidents	3.62
No fear of blame while reporting	3.48

Even though the evaluation of structured communication (meetings, briefings) is favorable, psychological safety in reporting and feedback loops are not as good. This implies a biased learning culture where reporting is established however learning is not institutionalized.

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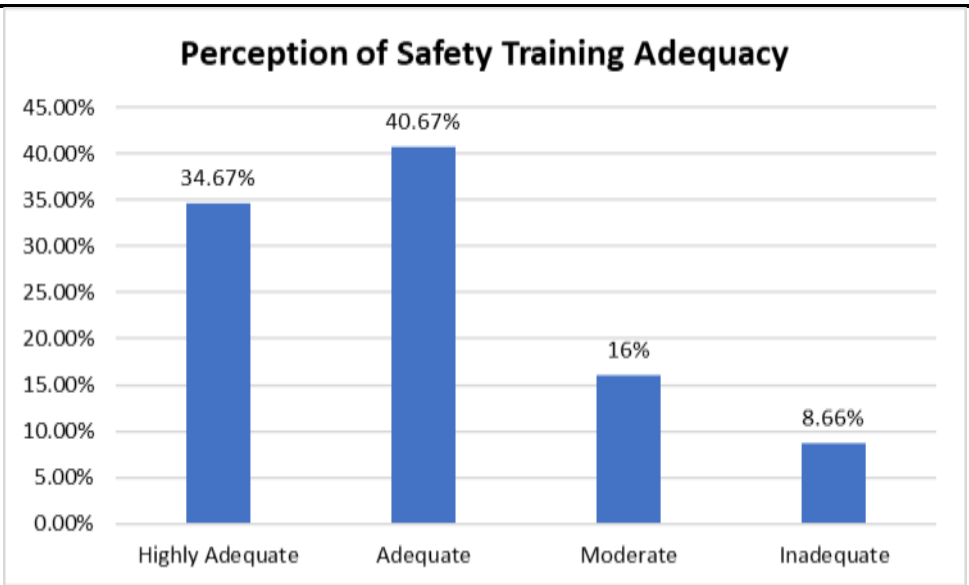

Fig. 3 Training and Competency Development

Almost three quarters of respondents feel that safety training is sufficient, which is provided by ONGC with well-organized induction and refresher courses. Nonetheless, qualitative statistics show inconsistency in the quality of training between contractors, which agrees with the results of process-safety literature.

Table 3 Comparison of Safety Perception (Employees vs Contractors)

Dimension	Employees (Mean)	Contractors (Mean)
Safety Training	4.21	3.56
Supervision	4.05	3.41
Incident Reporting	3.92	3.22
Management Support	4.18	3.48

All score points on safety culture show that contract workers have lower scores in all dimensions. This loophole demonstrates a phenomenon in dual safety culture, in which formal systems are active in salaried employees but less functional in the outsourcing operation- which has been numerous reports in the study of oil and gas safety.

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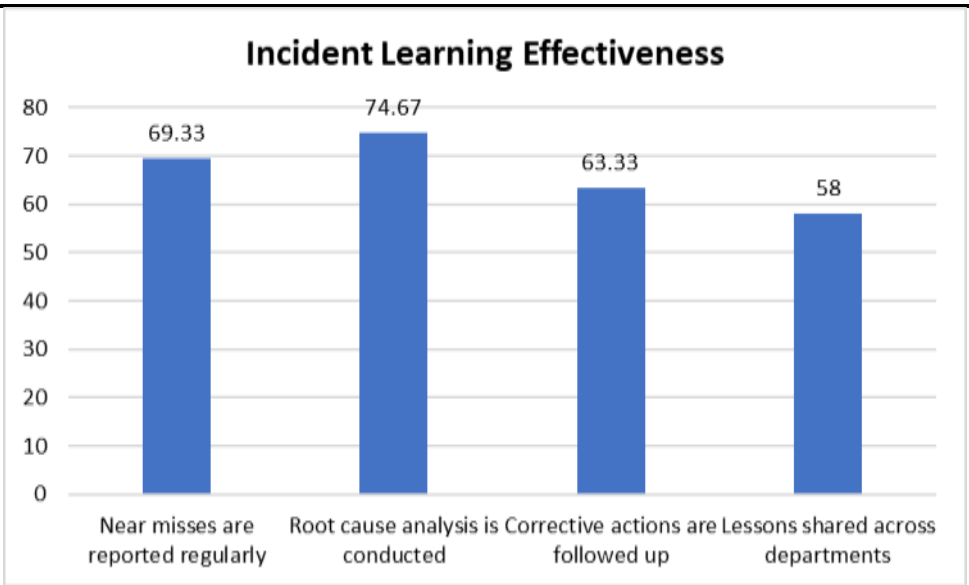

Fig. 4 Incident Learning and Continuous Improvement

Even though the mechanisms of incident investigation are present, cross-unit learning and feedback dissemination are rather weak. This implies that this is a stage of reactive-to-calculative safety culture, and not a completely proactive or generative one.

The analysis suggests that ONGC has a formal safety structure that is well established, that the company has a good leadership dedication, standard procedures and training systems are in place. But the depth of culture differs between organizational levels especially in contractor management, incident learning and empowering the employees. The results are ridded with the literature of major oil and gas accidents around the world which has stressed how cultural differences are the key initial factor that leads to major accidents as opposed to the lack of systems.

Discussion

The current study aimed to give an introductory evaluation of the safety culture in ONGC by looking at the main areas, which included the management commitment, management communication, management training, crisis learning, employee participation, and contractor safety incorporation. The results indicate that ONGC has a relatively elevated formal and managerial orientation to safety, which is to be expected in a large, publicly traded oil and gas company operating in a risky company.

One of the main trends that have arisen in the analysis is a great feeling of management commitment to safety. The high levels of agreement on the priorities of leadership in terms of safety demonstrate that safety is part of the organizational policy and rhetoric. This is in line with previous oil and gas studies that single out visible leadership commitment as a foundation of a healthy safety culture and a requirement towards a higher quality of safety performance. Formal safety rules, procedures and training systems in the case of ONGC are seemingly being institutionalized, which supports the presence of a calculative safety culture with compliance and control mechanisms being the salient force.

Nevertheless, the research also shows that the existence of strong systems does not necessarily result in the presence of a strong safety culture throughout the organizational levels. Although there are sufficient training infrastructure, the impact of learning processes, especially incident feedback and cross-departmental knowledge exchange, are still very low. The comparatively low scores of incident reporting without the fear of being blamed and lessons learned dissemination indicate that the organization can be characterized by the elements of reactive approach towards safety. This is in line

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with process safety literature that recommends against excessive dependence on procedural conformity that does not enhance open learning and reflexive practices.

The other big point of debate is the contractor safety culture which was always ranked lower than the permanent employees. This gap depicts two-layered safety culture in the ONGC which has permanent employees enjoying a superior supervision, more precise communication and training accessibility. Since the contract labor is widely used in the oil and gas sector, such gaps are significant, as most of the major accidents start at the interfaces of the contractors. These results resonate with the global evidence that one of the most consistent vulnerabilities in safety culture implementation in the energy industry is the contractor management.

Patterns of communication at ONGC are another way of demonstrating this complexity. Although formal communication channels that include safety meetings and briefings are rated positively, there seems to be a limitation in informal and upward communication. Reports of hazards and perceived fear of blame may result in limited feedback that discourages proactive reporting thus weakening organizational learning. This implies that, although its safety culture is mature in structure, ONGC has room to develop to a proactive and generative safety culture where the culture of trust and shared responsibility and continuous improvement exists.

Altogether, the discussion highlights the fact that the safety culture of ONGC is structurally good and inconsistent in behavior. The organization possesses a lot of characteristics of mature safety management systems, although, the homogeneity of culture along the hierarchical lines and types of employment is still a difficulty. It would be essential to address these gaps, especially integrating contractors, psychological safety and learning mechanisms which would be necessary to shift toward a resilient, high-reliability model of organizational culture as a transition away of compliance-based safety culture.

Conclusions

The research concludes that ONGC has an established and formalized safety culture model which is typified by good management commitment, well-developed safety procedures, and well-organized training systems. These strong points are indicative of compliance-oriented and calculative attitude to safety of ONGC that is suitable to a high-risk type of operating environment in oil and gas industry. Nevertheless, the results also provide the understanding that safety culture is not being consistently embedded in all the layers of the organizations. Lack of integration on contractor safety, learning on incidents and communication see gaps and shows that although systems exist, the cultural integration of them at the operations level is yet to be fully established. This imbalance implies that the safety culture in ONGC still does not evolve fully into a generative and proactive culture of safety, but rather the rule-based compliance model remains to be used.

Recommendations

Moving the safety culture further upstream, ONGC must embark on further contractor integration in the form of uniform training, increased oversight and harmonization of safety rewards between permanent and contract employees. More attention should be focused on the creation of a blame-free reporting culture and the empowerment of the feedback mechanisms to improve the organizational learning based on the incidents and near misses. At the operational level, leadership must consider visible safety leadership, which will involve the participation of employees and empowerment in management of hazards and risk management. Regular safety culture evaluations, together with the use of effective behavioral focused safety measures, would assist ONGC in maintaining the ongoing improvement and advancement towards the resilient, high-reliability safety culture.

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