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DISTRUST IN ACCIDENT ANALYSIS: THE CASE OF A BRAZILIAN DRILLING DRILLING SHIP

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Summary

Trust is considered one of the main defining elements of security culture. A low level of trust is associated with several harms, such as reduced cooperation and omission of problems, which can lead to accidents. When analyzing accidents, trust is a crucial element to avoid fear of punishment and obtain a reliable report of what happened, promoting a learning environment and, thus, improving safety in organizations. Among the various aspects involved in the study of trust, this article specifically aims to identify how trust relationships impact and are impacted by accident analysis processes. To this end, a case study is conducted with the workforce of a offshore well construction drillship in Brazil. Reports collected in focus groups were the main source of data, in addition to interviews and direct observations. Analysis of the material reveals the existence of distrust and withholding of information, which create psychological and communicational barriers between the workforce and the contractors and contractors. These issues are related to factors such as investigations that tend to blame and the attempt to curb defensive silence by linking safety indicators to the drillship's performance assessment. It appears that the organizational learning capacity is impacted by distrust in leadership and the accident investigation process, and that this distrust is linked to a culture of blame. Finally, future research proposes a contrast between the results of incident investigation methodologies that tend to blame and methodologies that foster trust as the basis of the collective learning process.

Keywords: Trust; Safety Culture; Accident Analysis; Offshore operations; Oil and Gas Sector.

1. Introduction

Building trust plays a fundamental role in analyzing accidents and promoting Safety Culture (SC) in organizations. According to the definition proposed by the Institute for an Industrial Safety Culture (2023), CS is a set of ways of doing and thinking shared by the actors of an organization in relation to controlling the most serious risks related to their activities. Various approaches aim to promote the evolution of this culture, whether through interventions that transform ways of thinking or directing actions towards security practices. Reason (1997, 1998) highlights the importance of practices in the transformation of SC, emphasizing the direct relationship between a low level of SC and the occurrence of organizational accidents. And trust is identified as one of the bases for effective CS (REASON, 1997). Studies have shown that trust plays a crucial role in influencing CS in organizations. In organizations with high CS, characterized by strong trust between teams and in Safety, Environment and Health (SMS) tools, in addition to a high flow of pertinent information, trust between the different actors is an important predictor of this culture (GONÇALVES FILHO et al., 2011).

The definition of trust is complex and multifaceted, involving positive expectations about the interactions and actions of others, in addition to presupposing vulnerability, risk and interdependence between different types of actors (LEWICKI et al., 1998, 2006; LUHMANN, 1979; ROUSSEAU et al ., 1998, apud THARALDSEN et al., 2010). Trust is essential in situations where there is uncertainty about the future and involves assuming a certain level of risk (ROUSSEAU et al., 1998). It can manifest itself in two distinct states: assured confidence and determined confidence. Assured confidence occurs when there is no reason to believe that future results will be different from what was expected. Decided trust, on the other hand, involves identified risks, where there are options and choices, and the decision to trust is made based on reducing these risks through dependency relationships (KARSENTY, 2013).

Trust is fragile and can be easily broken (SKARHOLT et al., 2016). In the context of security in organizations, trust plays an essential role in the development of cooperative, collaborative and interdependent relationships between actors (CONCHIE et al., 2006). Trust positively influences CS, improving organizational performance, cooperation between team members, open communication and knowledge sharing (REASON, 1997; and CONCHIE et al., 2006). However, trust can also be undermined by actions that violate established expectations and commitments, resulting in distrust and difficulties in rebuilding affected trust relationships (KARSENTY, 2013; LEWICKI et al., 1998).

Therefore, this work seeks to identify how trust relationships impact and are impacted by accident analysis processes. To this end, studies were carried out with the workforce of a drill ship in Brazil. These actions were developed in the context of a larger project called: Human and Organizational Factors in Industrial Safety (FHOSI) which aims to develop a methodology for evaluating and developing CS in the oil and gas industry.

1.1. Confidence in the accident analysis process

Trust in the accident analysis process is a crucial element in promoting a learning environment and improving safety in organizations. Petroski (2018) highlights that punitive approaches, focused on identifying culprits, result in an environment where workers accuse each other, negatively affecting trust relationships and generating fear. This stance compromises the learning process, as individuals avoid sharing information about accidents, fearing liability. Furthermore, investigations tend to be conducted by specialists with little practical knowledge of the work, providing an analysis focused on the errors of individuals close to the accident.

Distrust and fear play a fundamental role in the manifestation of a culture of blame within an organization (COX, 2006). Fear reflects the fragility of trust relationships between employees and contributes to the worsening of daily problems and disagreements. Employees adopt a defensive posture, avoiding exposing themselves and hiding accident and incident data for fear of the consequences. The silence of the workforce is also a manifestation of this punitive culture, in which workers choose not to speak, fearing being blamed for future problems (PETROSKI, 2018).

Van der Schaaf and Kanse (2004) highlight that the main barrier to preparing accident and incident reports is not technical in nature, but psychological. The fear of being blamed or punished compromises the quality of reports and, when there is no trust in organizational processes, such as investigations and leadership, the potential of these reports to improve safety conditions is compromised. Therefore, overcoming distrust and fear is essential to enable true learning after accidents and incidents occur.

To evolve in this scenario, it is necessary to look ahead and look for organizations that have overcome the blame culture. These organizations value learning rather than responding to behavioral failures with blame (BITAR, 2018). Leaders are encouraged to find learning opportunities from events rather than assigning blame. This approach promotes higher CS, where trust is strengthened and the focus is on continuous improvement.

1.2. The Case of Drilling Rigs in the Offshore Oil Industry

Confidence in accident analysis processes plays a fundamental role in the petroleum industry, especially in relation to drilling rigs and offshore operations, as part of the process of permanent improvement of personal and operational safety. The complexity and risks involved in these operations require a high level of interdependence and trust between interested parties. The evolution of the oil industry, with exploration in increasingly challenging areas, has resulted in an increase in costs and complexity of operations (MORAES, 2013). Rovina and Borin (2005) observe that the construction of wells presents the largest cost and schedule deviations, often due to geological risks and the complexity of operations.

Trust is a key factor in improving safety and performance in high-risk organizations in the petroleum industry. Conchie et al. (2006) and Reason (1997) highlight the positive effects of trust, such as reducing accidents, safe behavior, improving cooperation and increasing organizational citizenship behavior. Trust is also associated with environments of open communication and knowledge sharing, which facilitates organizational learning and reduces transaction costs (BIJLSMA and KOOPMAN, 2003; DIRKS and FERRIN, 2001).

Accident and incident investigation processes are fundamental to organizational learning in the oil and gas industry. The Macondo accident exemplifies the importance of these processes, as it resulted in profound transformations in organizations and boosted the increase in scientific production on safety (REPORT TO THE PRESIDENT, 2011). Levenson (2020) emphasizes the need to invest resources and efforts in generating knowledge through these processes, as they generate learning that contributes to industrial safety.

1.3. The research method

This work follows the steps of the Case Study proposed by Yin (2015), which seeks to investigate a contemporary phenomenon in its real context. This single, exploratory and descriptive case study aims to fill the gap in previous studies on offshore well construction units in Brazil and present the interpersonal events and their key phenomena. To do this, it takes the following steps: planning, design, preparation, evidence collection, evidence analysis and reporting. In this case, the study is qualitative and focuses on a specific social community, the offshore well construction unit.

In the design stage, a literature survey was carried out to delve deeper into the topic and study questions. The offshore well construction drillship was selected as the research object due to the complexity of the scenario, the level of process outsourcing and the scarcity of related studies. The contractor's teams and the drill ship's fixed team were considered for the study, excluding outsourced teams due to their seasonality and high turnover.

In the preparation stage, relating to the research protocol, it was defined that qualitative information would be collected through interviews, direct observations of activities on the drill ship and focus groups. These create environments where participants' sharing and memory are stimulated, favoring access to the group's experiences (KRUEGER and CASEY, 2014).

Thus, evidence collection was carried out through four shipments that took place on the following dates: October 30th and November 5th, 2021; April 16 to 21, 2022; June 7th to 11th, 2022; and June 24 to 28, 2022. For the focus groups, which took place on the fourth shipment, participants were separated, considering hierarchy and company. At the meetings, they were invited to narrate and discuss their experiences relating to incidents, accidents, investigation processes and other safety issues on board the drill ship. The basis for the discussions were the results of the questionnaires applied in the FHOSI project. The participants were divided into five main homogeneous groups, according to Table 1. This considers the total workforce of the drill ship and presents the number of meetings and participants, without considering the other outsourced teams, as they suffer great variation depending on the phase or intervention to be carried out in the well.

Table 1 – Meetings for discussion in focus groups.

Grups	Meetings	Participants	Residents
Contractor's Representatives	1	3	17
Hired Managers	1	3	7
Hired Supervisors	1	8	36
Contracted Operations	7	39	143
Contracted SMS	1	3	8
Total	11	56	211

Source: The authors, 2023

The clustering technique (GIL, 2022) was used to analyze the evidence. This approach consists of categorizing elements, such as events, actors, situations, processes and scenarios, in order to identify groups that share a set of similar attributes. This tactic was applied to understand how security is impacted by trust dynamics and the factors that influence these elements.

2. Development and Results

2.1. The organization of subsea well construction operations

A drillship is a vessel designed to drill in deep and ultra-deep waters, with a capacity of up to 12,000 meters deep, aiming to build offshore wells. The vessel being studied may be divided into two distinct areas: one under the hull, which includes the engine room and tanks, and another on the hull, with areas such as helideck, houses, mud module, platform/tower, cargo areas and generators. The work team is made up of 196 people, including workers who cover vacations and days off. The distribution of personnel includes professionals from the drillship operator (50%), outsourced workers from the operator (18%), representatives from the contracting company (3%) and outsourced professionals requested by the contractor (29%). The composition of outsourced workers varies depending on the phases and interventions in the well, with the exception of the outsourced team responsible for the hotel sector. The construction of offshore wells comprises different stages, with drilling, completion and evaluation being the main ones. When drilling, the objective is to access the reservoir in a safe and controlled manner, ensuring the mechanical integrity of the well. At completion, equipment and the production or injection column are installed to prepare the well for connection to the production system on an offshore platform. There may still be an evaluation stage, to collect information about the structure of the reservoir and its contents. Occasionally, maintenance interventions, called workovers, may be necessary to repair or stimulate production.

To carry out such operations, the drillship has several specialized teams. Marine, Drilling and Maintenance are the main teams, in addition to the Tax Team (Contractor Representatives) and other contractors. The Offshore Installation Manager (OIM) is responsible for managing onboard operations. There are also teams of ground or base staff, who provide support and guidance to onboard staff.

2.2. Investigation processes that tend to blame

Regarding the processes of investigating anomalies (accidents or incidents) that occur on the drillship, focus group participants highlight the strong tendency to search for culprits. They feel as if they were "in the dock": "the investigator keeps asking the same questions, as if the operator was hiding something" (Contracted operational). Furthermore, they highlight the lack of knowledge and lack of interest in the reality of work in operations: "they [investigators] don't know our work, as happens on a daily basis". They highlight that the elements that led to or resulted in the anomaly are not usually investigated in depth: generally when a person is found guilty, the investigation stops (Contracted Operational). For the workforce, blame can be seen whether in the belief that it is human errors that generate accidents, or even in the methods and procedures that guide investigations. assess that investigations are guided by a culture of blame. A member of the drill ship's management tries to counter this statement that the priority is to find someone to blame, but ends up reinforcing that this is indeed the objective of the investigation:

> "Blaming the worker is not the first thing we do. When an accident occurs, the first thing we do is see if anyone is injured. If there is, we provide the necessary care. Only then will we investigate to find out who was at fault" (Contractor manager).

Based on their experiences, several groups highlight that "accidents never come from a single failure". In addition to worker behavior, there are organizational, process, environmental issues and even involving work groups. They note that there are pressures for performance or production, closely related to parameters of the contracting, evaluation and remuneration system of outsourced companies, which affect the context of activities on board. However, the results of investigations often end up being limited to behavioral issues (the errors of actors close to the occurrence), presenting, in effect, superficial resolutions, which compromises the ability of companies to generate relevant learning at the organizational level and undermines their credibility in the face of to workers. The following highlight brings

statements from representatives of the contractor, the highest management level on board, about blame in the investigation processes:

> "We know that there is a tendency [in accident investigation] to find someone to blame. They end up focusing on the person involved who made the last wrong decision. They find the last flaw and stop there. Often, it is a design flaw, or a process flaw, at the beginning" (Contractor representatives).

The following episode (Table 1), rescued by the participants, illustrates how investigation processes focused on blaming workers can end up leaving important lessons learned regarding errors in processes and projects in the background.

Table 1 – Episode of blaming a worker for incorrect installation of equipment.

In one operation, it was necessary to open a bottom valve to perform a pressure cycle in the well. This valve was installed in equipment at the wellhead on the seabed, more than 2 km deep. During the activity, they realized that remotely activating the valve did not open it. During a meeting to identify the cause of the problem, based on a photo taken by a remote underwater vehicle, a worker decided to look up the serial number of the device that opened the valve. Through the consultation, they identified that the installed device did not in fact have the function of opening the valve, but rather of disarming it. In other words, a wrong device had been installed. The error caused a delay in the schedule and great financial loss, especially to the contractor. As a result of the investigation, the worker who installed the wrong device was held accountable and fired.

Source: The authors, 2023

In the focus groups, representatives of the contractor commented on the design flaw involved in the episode. When developing two very similar devices to serve different purposes, the mistake was made: "How do you make identical devices for different purposes? Why don't you make one red and one green, or with a different shape?" (Representatives of the Contracting Party). They also commented on the flaws in the logistics chain, involving the processes of separation, checking and shipping of materials: "From the deposit until arriving on board, there were many chances to avoid the problem". When the wrong device was made available, this contributed to the error of the worker, who was unable to prevent a series of errors upstream of the installation. According to the participants, the investigation was conducted in such a way that it was impossible to convert the episode into improvements in the areas of design and logistics. It is worth mentioning a methodological limitation of this study: we did not check with the contracted and contracting companies whether or not there were improvements in design and logistics following the episode. It is common for the analysis to stop at blaming those involved and, at the same time, several suggestions for material improvements are formulated, but without having delved into them in depth in the analysis. A phrase used by onboard staff in team meetings reinforces the role of the front line: "we are the last barrier".

However, when it comes to investigation processes, they comment: “We are not the last barrier, we are the only one. The only one that is punished, at least” (Contracted Operational). Another worker reports that, during his shift, equipment failed and as a result a section of pipe fell onto the drilling floor, configuring a high potential incident. Although the equipment was defective, the first questions asked by the person responsible for the investigation report already assumed he was to blame for what had happened.

Among the participants, there is a general perception that the contractor also works on a logic of blaming and this is the main reason that leads contractors to carry out investigations focused on holding workers accountable: “The contractor asks for this. She wants there to be someone responsible to punish and use as an example for everyone to fit in” (Contracted Supervisors). On the other hand, it is clear that the contractor has learned to “take advantage” of this culture, so that blaming the front-line worker is an easy, quick and well-accepted response, being a way for the company to protect itself, avoiding exposing its failures in processes and organizational.

When a serious incident occurs, it is clear that those responsible for the investigation process begin with questions and actions based on a logic of blame. They check checklists, Work Permits and other documentation associated with the occurrence. A filling error can serve as a basis for blaming the responsible professional, making the documentation a way for the company to protect itself, claim that it fulfilled its obligations and blame the workers closest to the incident. Also according to the participants, the contracted company, aware that blame is well accepted by the contractor, can hold a worker responsible, even when it knows that the root cause of a certain anomaly was the failure of equipment. Pointing it out as the root cause may lead to a request for replacement or repair, which may require the purchase of parts, shipping on board or even the need to bring in a specialized team. This could result in a considerable period of non-productive time, resulting in a penalty due to the parameters of the hiring system. Thus, a strategy used by the contractor is to attribute the anomaly to human error, determining light punishments for the workers closest to the incident. In this way, blaming is associated with the concealment of information that, if reported, could pave the way for exhausting process restructuring and monetary losses, also resulting in damage to the evaluation and reputation of the vessel or its contracted company. It is worth noting that, in the final accident investigation reports, the contractual parameters that induce the continuity of the

operation to the detriment of maintenance are not usually identified as a risk factor upstream of the occurrences, even if actors on board and ashore are aware of this factor. of risk. It is not just the company's management that resorts to blaming, as some front-line workers report that in milder cases, a strategy is to anticipate and take the blame, even if they believe they are not responsible for the incident, thus avoiding a lawsuit. exhausting investigation. They also highlight that in these cases, by taking the blame instead of highlighting an equipment failure, they feel that they are helping the company.

From the reports it is possible to observe evidence of a culture of blaming, which is directly linked to low levels of trust in relationships. Workers do not trust the impartiality of investigation processes or the ability of companies to promote a fair culture. When they become involved in any undesirable event, they feel like a likely target, even before the investigation begins.

2.3. Work environment marked by distrust and fear

Another issue highlighted during discussions with workers was the existence of an atmosphere of fear regarding accidents and incidents. This fear is not limited to the possibility of fatalities, as the offshore work environment involves multiple and serious risks. It is also the fear of being punished or having one's reputation affected for a long time. This feeling is even captured by the contractor's representatives, when they declare that there is a “fear of punishment, of being frowned upon, of impacting the probe's indices. The indices are very important” (Contracted Operations). The following report is from a focus group participant and refers to the experience of being involved in an incident:

> “You have an X on your back. People no longer trust your professionalism as much as they used to. They want to check out the simple things you do. They ask in a suspicious tone: ‘are you sure?’. Sometimes it becomes so unsustainable that it is better to change probes, to start over.” (Contracted operational).

The fear in question refers to the shame of losing the reputation and identity of a competent and trustworthy professional, which has been built over the years, but can be called into question if the worker becomes directly involved in a serious occurrence or one with high potential for harm. gravity. When this occurs, workers identify a distrust that comes from management levels, which direct constant recommendations to supervisors for attention towards the worker involved in the incident. In more critical cases, the worker may be sent to

another unit, which they interpret as a form of punishment. Distrust also occurs within teams, in the form of assignment to simpler work or a need to check and recheck common activities. In a study conducted on oil platforms in the North Sea, Collinson (1999) also notes the occurrence of these phenomena, designated as vertical blame (from management to workers) and lateral blame (among members of a group).

A hired Operator comments that "when an accident happens, there has to be an offering for everything to return to normal". An analogy is made with a human being (the contractor) who seeks to appease the fury of a superior being (the contractor) through a sacrifice. The offering, in this case, would be the worker directly involved in a serious incident, which drew the contractor's attention to the need for strong action. In this analogy, the contractor only understands that the problem has been resolved when a worker is held responsible and punished by the contractor. The latter, in order to improve her relationship with the contractor, is afraid of contradicting her and offers what satisfies her, punishing a worker.

According to workers, punishments can have different levels: warnings, replacement of the worker involved with a new professional, as if it were replacing a defective part, or dismissal of the worker. There is also another fear, which is the biggest fear of workers: having their individual registration canceled in the contractor's system. In the national context, this in practice means no longer being able to work in the oil and gas industry. It's like being "exiled", as the workers say. The fear is accentuated by the perception of disproportionality in the punishments applied. A Hired Supervisor highlights: "It's like this here: if the dog has fleas, it kills the dog." Often the solution given is disproportionate, unpredictable and even meaningless, especially if the contractor is involved in the conduct investigation and treatment processes, which is the case in the most serious accidents, but this can also occur in less serious occurrences or gravity potential. Among the effects of this fear of exposure and association with accidents and incidents is the resistance of workers to using medical services on board. According to workers, accessing the infirmary is taking a big risk, which can result in friction with their teams, a feeling of exposure and even disembarking without real need. Table 2 presents an experience reported in the discussions.

Chart 2 – Fear of calling the infirmary.

A worker, after suffering a scratch, went to the infirmary to sterilize the small wound. When requesting the application of antiseptic to the wound, the nurse was informed that the procedures determine that what happened should be passed on to the medical department on shore. Figuring that no serious complications could result from this, the worker did not object. However, due to the scratch, the worker was disembarked and was unnecessarily subjected to X-ray procedures twice. According to the account, the following day his case was the subject of discussion at the company's management levels, resulting in his exposure to the entire fleet through an SMS alert.

Source: The authors, 2023.

Just as relevant as the fear of an injury getting worse is the fear of exposure and wear and tear that could be generated if they seek medical care on board. “It was the biggest embarrassment. An exhaustion with supervision and the shame of being the topic of the day. Do you think I or anyone from the department will look for the infirmary after this?” (Contracted Operator). Other Contracted Operators confirmed: “it is not possible to use the infirmary”. If necessary, they take medication or take medication from their colleagues. Therefore, in case of injury, they try to endure the pain until disembarkation. The onboard infirmary is, in practice, a type of last resort, used only in unavoidable cases such as serious injuries.

3. Discussion

The literature highlights the importance of trust for achieving safety in jobs that involve high levels of risk, interdependence, collaboration and information exchange (COLLINSON, 1999; STAPLES and WEBSTER, 2008). In the present study, we observed high levels of risk and interdependence; however, collaboration and information exchange — and consequently, security — are compromised due to low levels of trust contextualized in a culture of blame. In line with the study by Cox (2006), we noticed a culture of blame (employees' belief that they will be blamed) manifesting itself through fear. This signals degraded trust and is reflected in the defensive posture of workers, who avoid exposure as much as possible. Eventually, they hide information not because of a lack of professionalism, but to protect themselves against punishment, as discussed by Petroski (2018). We found that evidence concealment also occurs when avoiding calling the infirmary to treat pain and injuries, which become under-reported. Van der Schaaf and Kanse (2004) note that the main barrier to the quality of data collected and incident reports is psychological in nature. In the present study, we noticed that psychological

barriers are being built in the interaction between the workforce and companies, as they signal superficial investigations that tend to blame.

Combating blame is a characteristic of organizations with high levels of Safety Culture (SC). In these, leaders are encouraged to learn from each failure (BITAR, 2018). Only by overcoming distrust and fear can an organizational learning culture be developed (CONCHIE, 2006), as it is not possible to force someone to report what they know. Reports of sensitive issues only occur voluntarily when it is perceived that the actors involved are capable of fair interpretations and decisions and, therefore, appear worthy of trust.

As in the study by Cox, Jones and Collinson (2006), we observed that top management has tried to overcome silence and promote safety by linking safety indices to the drillship performance assessment. This, however, has resulted in more distrust and withholding of information that can have negative repercussions, distorting the indices. According to Skarholt (2018), authoritarian management raises distrust and blocks communication, ultimately harming the security of the production system. To promote the circulation of information on a voluntary basis, it would be crucial to increase trust in managers and processes (BITAR, 2018; REASON, 1997). This is the confidence that the information provided will be treated fairly, something that was not verified in the verbalizations of the participants in the present study. According to them, after the occurrence of serious events, investigators usually arrive with closed hypotheses, which they seek to endorse regardless of what the interviewees say. As is known in the ergonomics of the activity, misrepresentations about real work are common (GUÉRIN et al., 2001). Such representations, in turn, can affect the quality of companies' diagnoses and actions regarding safety. Thus, greater investment in understanding frontline activities could contribute to fairer and more constructive anomaly analyzes and to the maturation of CS in general.

Regarding the limitations of this study, it is worth pointing out that the reports of the onboard personnel were not compared with analysis of the documents of the mentioned occurrences nor with comments from the teams on the ground, which could present a different and possibly opposite view of the existence of blame and low capacity. to generate organizational improvements based on occurrences. In any case, we observed that the interaction between ground and on-board staff is such that it generates a clear perception of

blame, especially at lower hierarchical levels. At this point, it is not a question of knowing who is right, but rather of highlighting that there are strongly divergent perceptions. This is enough to compromise trust relationships and the safety of the drillship, and represents an opportunity for improvement for companies.

4. Conclusions

This work discussed the importance of trust for an effective accident analysis process from the perspective of organizational learning. Based on the workers' experiences, it was possible to observe how a culture of blaming generates fear, negatively affecting horizontal, vertical and transversal relationships (between companies). This fear, be it of being labeled as a bad professional, fired or even "exiled" from the oil and gas sector, is expressed in distrust of leadership and the investigation process, and directly impacts the organizational learning capacity. Focusing on learning and not blaming workers is a fundamental point in developing trusting relationships. Due to restricted access to the field, one of the limitations of this research involves the number of shipments and teams that participated in the discussions, restricting this to a partial diagnosis of the unit. Work aimed at raising the awareness of the professionals involved (managers, leaders and members of investigation committees), as well as the restructuring of processes, with methodologies centered on learning, are ways to advance trust. We also suggest carrying out studies that present a contrast between the results of blameworthy accident and incident investigation methodologies and methodologies that support trust in the search for organizational learning.

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