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Cultivating a 'just' culture in construction industry to improve Health and Safety management systems

ABSTRACT

Within the last decades, safety statistics in the UK construction industry have reached a plateau and cultural changes are required for further improvement of occupational health and safety (H&S) management systems. The aim of this research is to understand how the UK construction industry can improve H&S reporting to learn from failures and near misses based on experience of aviation and aerospace industries that made a successful shift from a 'blame' to a 'just' culture. The reason is that H&S culture remains undeveloped within the industry. Cultivation of a culture that can facilitate bottom-up reporting and learning from failures and near misses is difficult due to fragmented nature and the complexity of construction programme and project operations. The industry that is criticised for being inward looking and slow in learning could benefit from safety practices of other safety-critical industries, rather than take a position of its uniqueness. An interpretative methodology is applied in this research. Thematic analysis is supported by cognitive mapping technique. The findings revealed that H&S practices in the construction industry are affected by the lack of consistency across construction sites due to fragmented supply chain, 'silo' project culture and a tendency to blame individuals for human error. The levels of engagement with bottom-up reporting are quite low and the most frequently mentioned reasons are transactional approach to H&S by the management, figure-pointing behaviours, lack of robust follow-up processes and lack of trust. H&S regulations, norms and guidelines do not include all possible safety issues specific to unique project environments. Cultivation of a 'just' culture could help the industry to go beyond H&S legal compliance and change attitude to safety reporting. Despite the differences, construction organisations can learn from aviation and aerospace industries' accountability for the systems they design and from their proactive approaches to dealing with human error and encouraging and facilitating self-reporting.

Keywords: Health and Safety, Construction, Culture, Management System, Organisational Learning.

INTRODUCTION

The UK construction is a complex safety-critical industry that involves a wide range of enterprises that form long supply chains (Office for National Statistics, 2018) and operates under the pressure to deliver short-term results, which affects the management of occupational H&S. Moreover, the industry is known for having an orthodox approach to H&S on sites and for 'finger-pointing' behaviours that discourage employees to report near misses and failure or raise concerns regarding fatigue, stress, and other H&S issues.

Given that safety statistics have reached a plateau (HSE, 2018), the limitations of transactional approach to H&S are starting to be acknowledged by the industry. Identification of root causes and quantification of risks with the following reduction of accidents via technological and administrative interventions is not sufficient anymore and a deeper analysis of the causes of injuries and fatalities that mainly lie in the behavioural or cultural domains is required (e.g. Goh, et al., 2018).

There is no one-size-fits all model for H&S systems. Given that most incidents are combinations of organisational, cultural and human factors, construction organisations need to move away from buck-

passing and fear of blame to facilitation of bottom-up reporting and learning from failures and near misses, followed by analysis of contributing factors along the causal chain (Carrillo et al., 2013; Dekker, 2009; HSC, 1993; HSE, 2005).

The focus of this paper is improvement of safety reporting systems to learn from failures and near misses based on experience of aviation and aerospace industries that made a successful shift from a 'blame' to a 'just' culture. Empirical data are gathered through semi-structured interviews with H&S policy makers, H&S specialists from aviation, aerospace (aircraft maintenance) and construction industries, academics, and programme managers from large infrastructure organisations. The findings demonstrate inconsistency in H&S culture and the lack of a systematic approach to learning from incidents, failures and near misses in the UK construction industry. The industry needs transformational change in a legal framework and in policies and procedures that will support non-punitive reporting of incidents. Based on the perceptions of the respondents, the industry needs to improve upon arbitrarily punitive policies and create an environment in which individuals are encouraged to report near misses and failures.

LITERATURE REVIEW

Safety culture

International Nuclear Safety Advisory Group's summary report that reflected on lessons learnt from the Chernobyl accident, initiated debates on safety culture (Guldenmund, 2010). The concept 'safety culture' is used to illustrate how organisational culture, among several other factors, influences H&S behaviours (Antonsen, 2009). Safety culture reflects beliefs about what is 'right' or 'wrong' within the organisation (HSE, 2005). Depending on an established culture, organisations whether blame individuals for human error and discourage people from reporting incidents and near misses (HSE, 2005) or create an environment where employees share perceptions of the importance of safety and build their confidence in the efficacy of preventive measures they can contribute to (HSC, 1993). Schein (2004) clinically analysed and prescribed safety culture in organisations of extreme high risk to address the H&S.

Safety culture "evolves gradually in response to local conditions, past events, the character of the leadership and the mood of the workforce" (Reason, 1998). It depends on a number of interacting elements in organisations, including ways of doing, thinking and managing. According to HSE report (n.d.) on safety culture, there are key factors that define its efficiency and effectiveness: management commitment, visible management, good communication between all functional levels, and active employee participation in safety reporting. 'Safety reporting culture' and a 'just culture' are two of the most important aspects of safety culture (Reason, 1998).

The 'just' and 'safety reporting' approach

According to Reason (1997), a 'just' culture is about safety thinking that is based on a questioning attitude. It promotes double-loop learning, learning that comes from people questioning their assumptions and beliefs. A 'just' culture acknowledges that human error is inevitable and human adaptability is needed to deal with local circumstances. Even experienced professionals can violate routines, use shortcuts and workarounds. At the same time, a 'just' culture does not accept reckless behaviour and lack of responsibility and accountability and posits that better communication and more transparency on punitive matrix increase staff awareness and promote free reporting (Dekker and Breakey, 2016).

Some studies on the relationship between safety culture and safety performance demonstrate that employees' involvement in unsafe acts and accidents is linked to their perceptions of safety policies (e.g. Clarke, 2006). To encourage people to provide information on failures and near misses, organisations need to be open on the boundaries between culpable (or acceptable) and non-culpable unsafe acts (GAIN, 2004; Reason, 1997). It is quite challenging though for organisations to distinguish between the two; a case-by-case review of an incident is required. Organisations need to evaluate their safety processes and procedures to ensure that there is a system in place to learn from incidents that are reported openly and communicated back to employees (GAIN, 2004). The leadership needs to be ready to reconfigure the organisational

structure to adjust to the changing task environments (Parker et al., 2006). According to Dekker (2009), organisations should see near misses and incidents as opportunities for collective learning. They need to promote a questioning attitude and foster personal accountability and corporate self-regulation in safety-related issues (GAIN, 2004). Employees should be rewarded for H&S reporting at early stages (GAIN, 2004; Parker et al., 2006).

Modern aviation safety management systems SMS serve as decision-making tools that aim at eliminating known and unknown risks. Aviation SMS, that were developed on the basis of quality management systems, put emphasis on designing a quality system with repeatable processes along with measuring performance and are supported by the organisational culture of error reporting (Dekker, 2009; Stolzer and Goglia, 2016). Aviation SMS are based on four structural elements: safety policy, safety risk management, safety assurance, and safety promotion (Stolzer and Goglia, 2016). Safety policy refers to the dedication by senior management to cultivate a 'just' culture in which reporting on failures and near misses is considered as a normal behaviour, and in which organisations are accountable for systems they design, rather than individuals.

There is a strong belief in the industry that punishing employees for making mistakes will not stop them repeating those mistakes. The benefits of a 'just' culture include (GAIN, 2004):

- Increased reporting - to address latent safety problems (among other things).
- Building trust - one of preconditions of a 'just' culture.
- Effective safety and operational management.

Aviation industry puts significant efforts at eradicating blame and positively encouraging reporting. The industry acknowledges that people at the frontline are not usually the instigators of accidents and incidents, they normally inherit challenges that have been already in place or were developing over a long period (e.g. Reason, 1997).

Health and safety culture on construction sites

The UK construction industry is a complex industry with over 314,590 organisations (Office for National Statistics, 2018) that operate in high-risk operational environments, which calls for more attention to occupational H&S. However, due to the pressure to deliver on time and within the budget, any changes in the project performance goals may affect the priority of safety. Lately, closer attention has been paid to the concept of H&S culture in the industry (e.g. Sherratt et al., 2013) leading to a significant decline in injuries and fatalities on construction sites. However, the rates of decline have slowed within the last decade (HSE, 2018), suggesting there is a need for a deeper analysis of the causes of injuries and fatalities that mainly lie in the behavioural or cultural domains (e.g. Goh, et al., 2018).

Cultural change is especially necessary for construction organisations because they are multi-level systems with variations in safety perception and quality of implementation (e.g. Zhang et al., 2018). Construction projects are complex technologically and culturally as they are shaped by the groups of professionals from other organisations across the long and complex supply chain (Duryan et al., 2020; Walker, 2015), which complicates building relationships of trust and cultivating a culture that encourages safe behaviours. Cultural silos are created even when "all contributors are in-house to the client organisation" (Walker, 2015, p. 161). This implies that safety on construction sites may depend on the management team working on that specific site, rather than on the company itself, and line managers' commitment to safety may have a strong influence on employees' safety behaviours (Duryan et al., 2020; Schein, 2004). However, top-down approach to managing H&S in construction is focused on regulating employees' behaviour through the enforcement of prescriptive rules and procedures without consideration of the role that different cultures in a single organisation play on safety behaviours.

Among other factors, 'blame' and 'macho' cultures are seen as a major obstacle to safety behaviours (Duryan et al., 2020; Goh et al., 2018). Some work environments in the industry involve 'macho' role models, which inhibits raising concerns regarding fatigue, stress, and other H&S issues (Goh et al., 2018).

This is especially dangerous on the labour-intensive construction sites, given that fatigued and stressed workers are more likely to have accidents and injuries (Sherratt et al., 2013; Smyth et al., 2019). To promote greater introspection and analysis of failures and near misses a cultural shift from buck-passing and fear of blame to learning from success and failure is required (Carrillo et al., 2013; HSE, 2018). This highlights the importance of cultivating a 'just' culture to encourage bottom-up reporting, learning from incidents, near misses and failures internally and across the long and complex supply chains. Not only management strategies and actions are needed to consider the traits of organisational culture that can affect efficiency of formal and informal H&S practices (e.g. Roberts et al., 2012), but also collective H&S norms should be established to guide people in their daily decision making. The industry needs to benchmark its safety practices against other safety-critical industries, rather than take a position of its uniqueness (Duryan et al., 2020). Significant changes are also required in a legal framework and in policies and procedures that will support non-punitive reporting of incidents.

METHODOLOGY AND METHODS

This paper is drawn from wider research on the impact of Digitisation and Digitalisation on Occupational Health and Safety and Wellbeing in construction industry in the UK. The focus of this paper is improvement of bottom-up safety reporting to learn from failures and near misses based on experience of aviation and aerospace industries that made a successful shift from a 'blame' to a 'just' culture. An interpretative methodology was used in this research (e.g. Miles and Huberman, 1994). A total of 49 interviews with representatives of construction clients, main contractors, subcontractors, sector investors and consultants (programme managers, H&S managers, engineering directors, operations managers), aerospace and aviation organisations (crew members, technicians, production and H&S managers), representatives of policy implementation bodies and academics, were conducted across two research phases: pilot interviews and main interviews. There were differences in the questions asked based on the types of organisation, however, all themes included questions on the key leverage points required to break through the statistical plateau in occupational H&S, H&S reporting, lessons that can be learnt from aviation and aerospace industries, particularly on safety culture and safety behaviours.

Thematic analysis of the data from the interviews was enhanced by a cognitive mapping technique that allowed understanding of interrelationships among the concepts expressed by the respondents. The cognitive mapping technique helped to demonstrate both the complexity of the findings and rigor in the analytical process. A cognitive map, a two-dimensional directed graph that represents the issue from the perspectives of an interviewee, is a visual representation of the mental models within the human mind. It is grounded on cognitive psychology and facilitates understanding why a situation is problematic and what can be done about it (Eden, 2004). The concepts in the nodes are expressed in the interviewees' own language and the meaning of every concept is contextual. In this paper, the head, domain and centrality analyses of the merged cognitive map were conducted to identify the goals and key strategic directions as perceived by the respondents.

RESULTS AND ANALYSIS

The cognitive mapping technique enabled structuring of shared beliefs of all interviewees regarding the importance of a 'just' culture for H&S in construction industry. Given the complexity of the map (226 nodes), a more simplified schematic map is presented (Figure 1) to demonstrate how the analysis and relevance of the findings were derived. The heads of the map, the goal-type statements, are the concepts represented by the nodes that have only arrows going inside.

The analysis of the cognitive map revealed the key strategic directions (as perceived by the respondents) that contribute to the head of the map (the goal), which is "improve health and safety and wellbeing in construction industry" (Figure 1). The key strategic directions (the concepts with the highest domain and centrality scores) are the heads of clusters, groups of concepts that are linked together and cover a specific area of the issue (the underlined nodes, Figure 1). The links among the clusters indicate their interrelatedness (dotted arrows, Figure 1).

Cultivating a 'just' culture

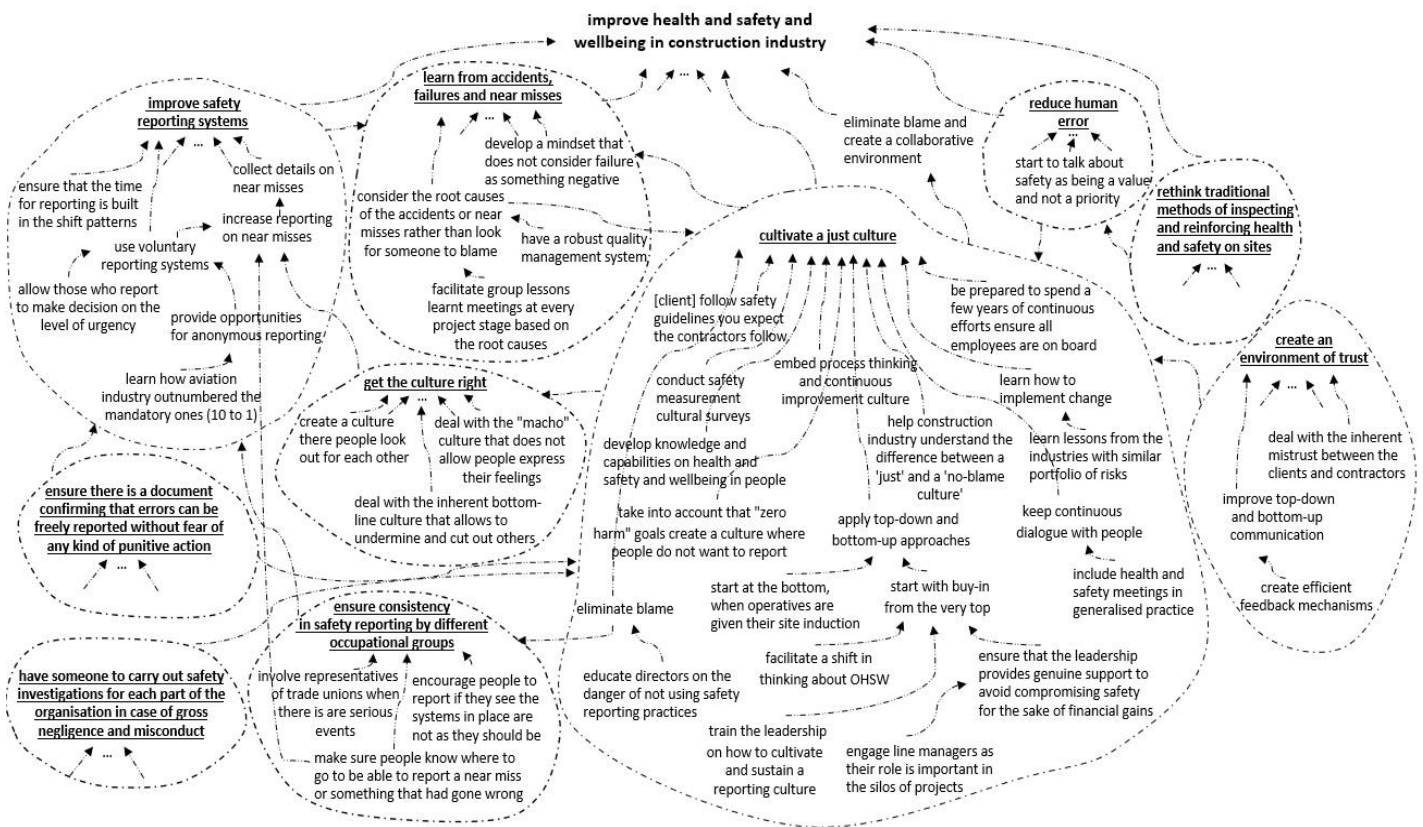
Overall, the interviewees from construction industry see 'blame' as one of the major obstacles to safety reporting. The H&S director of a real estate company mentioned that:

...the construction world is still very masculine; it is still quite macho. And however hard we work, we are still battling...

Based on the analysis of cognitive map, the cluster 'get the culture right' (Figure 1) has an immediate impact on the rates of reporting on near misses. 'Macho' culture inhibits also reporting on health-related issues, which eventually affects employees' wellbeing. This is especially evident in smaller organisations:

[construction industry] is very gung-ho get the job done. It is very macho... if somebody is not feeling well one day they will get ridiculed...

Figure 1: Schematic merged map



Organisational culture needs to encourage people to report not only on near misses or failures, but also on health-related issues knowing that they will be handled "discreetly, sensitively and for the greater good of all those concerned". According to a construction safety manager, one of the reasons for finger-pointing behaviours can be the lack of the mechanisms to consider all factors that contribute to incidents and near misses:

... we take in on a face value and we look into the factors bringing the event, fine. How about the surrounding factors because they influence the outcome? That is where information is omitted, so immediately they find someone to blame, because it's easy.

The respondents from policy makers highlighted the need for a major cultural shift in the industry to ensure that safety policies work. The interviews revealed also that there are some pockets of good practice in the industry. There is a “real appetite in the bigger companies to learn from their mistakes”. Unfortunately, this does not relate to the smaller companies that largely do not have enough resources to invest in H&S:

... it's all about making money [in small companies]. Unfortunately, these smaller companies are the ones where somebody will fall off a scaffold or fall off a roof... [they] are probably going to be the biggest risk of not improving.

Another respondent from the industry mentioned that senior managers and site supervisors need to display safety behaviour. Only in that case, “slowly but surely” organisational culture will change.

Learning from accidents, failures and near misses

According to the respondents from aviation, the industry regularly conducts “human factors and continuation” trainings where they also learn from incidents. As the air maintenance manager mentioned, there is a “a hunger, almost a morbid interest in some ways, to understand what went wrong” in the industry. Based on the priority given to organisational learning among the key emergent issues (the concepts with high centrality and domain scores), the respondents agree that more proactive approach to lessons learnt should be taken. According to a construction H&S manager:

Lessons learnt is a reactive thing. We are waiting for something to happen and then we will learn the lesson. We actually need to look ahead and say... “What else can we do to drive improvement?”

From the perspectives of the respondents, some of the main differences between the construction and aviation industries are lack of consistency across construction sites and uniqueness and complexity of project operations, which means that H&S related solutions must allow for customisation. Thus, organisational learning on H&S in construction industry cannot be complete if it is based on generic safety guidelines and regulations (e.g. Duryan et al., 2020). According to an H&S manager:

... there's nothing worse than somebody saying, “Follow this process,” and actually half of it doesn't relate to you.

Safety practices are context specific and to be successful they need to be grounded on knowledge-based reasoning (e.g. Duryan et al., 2020). Employees at the sharp end need to develop experience and cognitive skills to act appropriately when dangers arise. This requires organisational support from the knowledge management systems at project and firm levels.

It emerged during the interviews with the representatives of construction industry that not only ‘blame’ but also ‘silo’ mentality is a major constraint to organisational learning on H&S. The industry needs to develop mechanisms to transfer H&S knowledge across functional silos and boost collaboration and learning (e.g. Duryan et al., 2020). Based on the interviews with the representatives of aviation and aerospace industries, one of the reasons for their success in cultivation of a ‘just’ culture was breaking down functional silos.

Safety reporting

The levels of engagement with reporting are quite low in the construction industry and the most frequently mentioned reasons fall into two related categories: blame and a lack of trust. From the perspectives of the respondents, cultivation of a ‘just’ culture has a direct link to changing attitudes towards failure and near misses (Figure 1). Construction projects are pressured to get the job done on time and within the budget to move onto the next contract and so, the concept of failure is not seen as a way to learn and improve SMS. The H&S manager from aerospace industry highlighted the importance of going beyond H&S legal compliance to change the attitudes to safety reporting:

... it is important not to get tied down with showing that you're complying and ticking boxes, to make sure everything is green... if they're reporting something that is red, then it shouldn't be

seen as a bad thing. It should be, "Yes, it's red. Why is it red? How can we help you return to green? What do we need to do to make sure that it's safe?"

The management of construction organisations, and this is especially relevant to the client organisations, need to shift their mindset from seeing 'red' on a safety scorecard as a negative thing to seeing it as a product of open and honest reporting.

H&S managers from aerospace industry mentioned that people are encouraged to report not only incidents and near misses, but also inefficiencies and things that cause unnecessary work and workarounds. There is also a structured system that feeds all captured reports onto an intelligent information management system for further analysis. When somebody in the industry reports a near miss or mistake:

...rather than the organisation looking to punish them, it would take that learning, and say, "Actually, if that person did that wrong, could it happen to somebody else? What factors were involved? Were there limitations because the person was tired?..."

The industry has a team of people that are trained to undertake these investigations. They analyse the factors that caused a near miss or incident. If necessary, they conduct interviews with the people involved and with the witnesses, so all the causal factors will be considered.

The voluntary reporting in aviation feeds into leading indicators and predictive capacity. The philosophy behind encouraging voluntary reporting, that is correcting small failures to help the industry stop more serious incidents, proved to be efficient. According to the manager of the centre for safety and accident investigation, the voluntary reports outnumbered the mandatory ones ten to one. One of the cabin crew members emphasized the importance of a 'no blame' in the corporate culture for cultivating a voluntary reporting culture:

I've never thought that reporting will result in blaming me. It never happens... For us, the reporting only results in benefits, that is everybody's safety.

H&S experts from aviation and aerospace industries highlighted the importance of involving trade unions, who should be seen as partners. Every change in monitoring and reporting, like using drones, is discussed with the trade unions.

Reducing human error

It is normal for all people, including experts, to make mistakes every day. It is noticing the difference between the behaviour we want and the behaviour we get that helps us learn and refine our decisions and actions. The real problem in safety-critical industries is that some mistakes have such serious consequences that they need to be caught before they have a chance to develop into disasters. One of the construction H&S inspectors mentioned that the real challenge is that:

...the methods of inspecting and enforcing health and safety on sites still do focus far too much on the immediate risk of somebody getting hurt ... they don't necessarily follow through with enough effort to transform the employer. We hope that employers learn from that experience, but whether they do or not is a bit hit and miss in practice.

This affects how organisations deal with human error (see also Figure 1) and cultivating a culture of self-reporting is necessary for people to be encouraged to report as soon as they either have made an error or feel that they have been put in a position where they could make an error. They should be encouraged also to report if they recognise that the systems that are in place are not robust as they should be.

Aerospace industry has an error management system within the H&S management system. As the head of maintenance mentioned, there are several causes that come together to manifest in a potentially catastrophic accident, and knowledge about those causes is of a high importance for the industry. Thus, it is necessary to assure employees that they are "absolutely authorised to hit the stop button and break the

links in the chain to prevent that accident happening". The industry brings human factors into the aircraft maintenance environment to prevent errors. For instance, there are certain things that people are not allowed to do at 2:00 am or 3:00 am because of estimated poor physical performance of human body affected by circadian rhythms. As the same manager mentioned:

... we are very mindful of the time and the impact on the human body and performance, and that gets taken into consideration.

He also acknowledged that there is never one single thing that is gone wrong, normally, it is a chain of events that leads to an accident or incident. Thus, the industry considers all possible contributing factors and puts in as many safety gates as they can with the aim to minimise occurrence of incidents.

Safety leadership

Establishing a safety culture at the organisational level requires commitment from the senior leadership, who are responsible for establishing a fair and just environment and empowering people to report all critical H&S related issues. They have a significant role to play in shaping organisational culture through the messages they convey (Schein, 2004). To sustain a 'just' culture and encourage reporting, employees need to have confidence in the leadership. People need to see that there is an effective safety culture and that they will not face punitive actions for self-reporting. As the manager of the centre for safety and accident investigation in aviation company said:

...if leadership are coming in with that hire and fire attitude, "He made a mistake, I want him out," you are going to destroy your 'just' culture...

He mentioned also that senior managers need to communicate the message:

We want to learn about your errors, but you will not face punitive action for reporting your own errors.

The leadership needs to provide "genuine support to avoid compromising safety for the sake of financial gains" (cluster 'cultivate a just culture', Figure 1). H&S can sometimes be seen by the leadership of construction industry as an add-on. Some senior managers buy into it with the following investment and support, but not all of them commit. There was a consensus among the majority of the interviewees on the necessity of training the leadership on how to cultivate and sustain a reporting culture. They need to understand the danger of not using safety reporting practices (cluster 'cultivate a just culture', Figure 1).

Aviation industry systematically conducts surveys (of about 20 questions) to understand how employees feel about SMS and if they get enough support from the leadership. As it can be seen from the map (cluster 'create an environment of trust', Figure 1), the interviewees agree on the impact of top-down communication on trust.

An environment of trust

There was agreement among the respondents from the construction industry on the transactional mode of H&S management. One of the safety managers mentioned that there are instances where people were:

...pushed to do things at speed, rather than always 'safety-first'. You hear a lot of 'safety-first'... 'home safely', but it has to be more than lip service, it has to be demonstrated from the top.

Based on the responses from the construction industry, there is little trust from the site workers that the employer is really interested in their health and wellbeing, which affects bottom-up reporting. Employees at the sharp end need to know that they will not be unfairly blamed when they report near misses or failures and that they can escalate H&S issues at any time. The approach to H&S reporting in aviation industry demonstrates that a culture of transparency, communication and honest reporting removes a major set of

employees' concerns related to unjust proceedings against them in the event of an accident. A 'just' culture helps them see that organisations are concerned with their legitimate interests.

There is a need to build trust not only internally but also across the long and complex supply chain. The interviews revealed that there is a major concern among construction clients for H&S compliance among contractors and subcontractors. There is a bottom-line culture in the industry that is deeply rooted in all the disciplines and all the tiers (cluster 'get the culture right', Figure 1). The approach of main contractors to H&S is mainly procedural and prescriptive. However, the interviews revealed that some of the contractors started investing in their H&S teams because they came to realise that "if they can get them performing well in H&S, they will perform well in other areas of managing risk".

The primary difference in aviation industry is that the supply chains are integrated in general and for H&S. One of the respondents from the aerospace industry mentioned that:

We have to treat the same safety methodology and the same safety culture in my supply chain. Because if a part that my team buys and procures for the aircraft maintainers to fit to the aeroplane, if we don't make sure it's safe at source and that we're buying from an approved supplier, and that that part or that component or that asset meets all the right requirements, then we deliver a hazard to the maintenance organisation, that is going to install that part.

CONCLUSIONS AND RECOMMENDATIONS

This study contributes to the current understanding of key enablers and inhibitors to cultivation of a 'just' culture in construction industry to improve H&S reporting. The interviews revealed that the reporting culture in the industry contrasts with the 'just' culture in aviation, that is free of finger-pointing behaviours and buck-passing. The industry needs changes in a legal framework and in policies and procedures that will support non-punitive reporting of incidents. The methods of reporting need a revision to avoid ambiguity or safety data, improve accessibility or the means of reporting, support professional handling of accident investigation and ensure robust processes for the transfer of lessons learnt. The processes for determining follow-up action need to be revisited as well, because people will not be encouraged to report if they receive no adequate feedback from the management. There is a need to establish agencies or departments that will analyse the industry reports with the authority to initiate disciplinary measures and impose sanctions (GAIN, 2004).

The findings demonstrate that there are pockets of good practice in managing H&S in some larger industry players. However, the lack of supply chain integration remains a major issue for improvement of H&S management in construction. Of course, aviation and aerospace industries are a lot less fragmented, however there is still a considerable opportunity for construction to learn lessons from these two sectors to cultivate a 'just' culture in which bottom-up reporting on failures and near misses is considered as a normal behaviour. The management of construction organisations, and this is especially relevant to the client organisations, need to understand the danger of seeing H&S as an add-on and compromising safety for the sake of financial gains. Addressing this shortcoming could provide a basis for improvement, especially where H&S statistics have plateaued.

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