

Chapter 5

The Safety Culture Construct: Theory and Practice



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Abstract Safety culture means different things to different people which subsequently guides their improvement efforts. Providing clarity, the essence of the safety culture construct is that it reflects a proactive stance to improving occupational safety and reflects the way people think and/or behave in relation to safety. The extant evidence shows the best proactive stance is to target the significant safety issues found nested within the common safety characteristics (management/supervision, safety systems, risk, work pressure, competence, procedures and rules) identified from public enquiries into process safety disasters. This is best achieved by focusing on the entity’s safety management system and their people’s safety related behaviours, not by trying to change people’s values, beliefs and attitudes. A revised model of safety culture is offered to help guide readers in their quest to improve their safety cultures, along with an adapted model of safety culture maturity. In addition, based on academic evidence and practical experience gained over the past 25 years in numerous industries and countries, the author provides insights into specific issues regarding the influence of senior executives, the impact of national cultures when working on international projects, whether policies and tools should be the same or differ when addressing potential minor, serious and catastrophic events, and who should be involved to drive an organisations safety culture to achieve excellence.

Keywords Safety culture • Safety culture models • Safety culture product
Behavioural factors • Psychological factors • Situational factors
Safety culture maturity

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C. Gilbert et al. (eds.), *Safety Cultures, Safety Models*,
SpringerBriefs in Safety Management,
https://doi.org/10.1007/978-3-319-95129-4_5

1 Safety Culture Theory

The ‘safety culture’ construct refers to, and is used to, encapsulate and explain organisational safety failings (IAEA, 1991). Its *purpose* is to improve occupational safety in organisations, by preventing low frequency, high severity events such as Chernobyl, Bhopal, Piper Alpha, Texas City, Deepwater Horizon, etc. as well as high frequency, lower impact events (i.e. personal injuries, etc.).

1.1 The Safety Culture Construct

The evolution of any construct proceeds through three overlapping stages (Reichers & Schneider, 1990):

1. *introduction and elaboration* is characterised by attempts to sell the ideas and legitimise the new construct;
2. *evaluation and augmentation* is where critical reviews and early literature on the construct first appear identifying the constructs parameters; and
3. *consolidation and accommodation* is where controversies wane and what is known is stated as a matter of fact.

First introduced in 1984 after the Bhopal disaster, the International Atomic Energy Agency (IAEA, 1991) elaborated on the safety culture construct when defining it as

that assembly of characteristics and attitudes in organisations and individuals which establishes that, as an overriding priority, [nuclear power] safety issues receive attention warranted by their significance.

This clarity led directly to the *evaluation and augmentation* stage. Unfortunately, many influential scholars ignored the IAEA’s definition as it did not reflect their ‘academic’ positions. Under the guise of theoretical purity, academe lost sight of the construct’s main purpose—‘to stop process safety disasters and serious injuries and fatalities’. There are now more than 50 definitions of the safety culture construct (Vu & De Cieri, 2014) which cause considerable confusion (Hale, 2000) in both industry and academe.

At the heart of these definitional disagreements over the past 30 years or so, is the conflict between interpretive and functionalist approaches. Favoured by social scientists, interpretative approaches state *the organisation is the culture*, where ‘cultural’ realities are socially constructed solely by the organisations membership. The interpretive emphasis is on gaining an in-depth understanding of the prevailing cultural influences (i.e. assumptions and attitudes) affecting people’s behaviour. Conversely, the functionalist approach is favoured by managers and practitioners (the owners of safety culture) who view culture as a variable to be engineered to suit the prevailing circumstances to affect performance by addressing

management system faults, people's safety related behaviour, risk-assessments and decision-making.

Almost all of those attempting to define the safety culture construct agree it reflects a proactive stance to improving occupational safety (Lee & Harrison, 2000), and the way people think and/or behave in relation to safety (Cooper, 2000). In reality therefore, most safety culture definitions are functionalist, albeit the interpretive view emphasises shared values, beliefs, attitudes, and norms.

1.2 Influential Safety Culture Models

During the period 1986–2000 three influential models of safety culture were developed to guide theory, research and practice:

1. Guldenmund's (2000) adoption of Schein's (1992) interpretive three-layered organisational culture framework reflecting anthropology and organisational theories;
2. Cooper's (2000) reciprocal safety culture model, based on a functional approach leveraging Social Learning Theory (Bandura, 1977); and
3. Reason's (1998) five inter-dependent sub-cultures (informed, learning, reporting, just, and flexible cultures) based on incident analyses.

Each attempted to provide an actionable framework, and each has been influential in the sense that researchers, regulators and industry have made use of them in some empirical and/or practical capacity.

Guldenmund's (2000) interpretive model contains three layers:

1. *unconscious and unspecified (invisible) core basic assumptions*: the assumptions or suppositions about safety are not articulated, but are taken for granted as the basis for argument or action;
2. *espoused beliefs and values*: operationalised as relatively explicit and conscious 'attitudes' whose targets are hardware (safety controls), software (effectiveness of safety arrangements), people (functional groups) and people's safety-related behaviours; and
3. *artefacts*: visible safety objects (e.g. inspection reports, safety posters, etc.).

In this model, 'culture' is viewed as a pattern of core basic assumptions, invented, discovered, or developed by a group as it learns to cope with external adaptation and internal integration. Explicitly recognising sub-cultures of the overall culture, these differ for executives, engineers and operators. Reducing any significant negative discrepancies between these sub-cultures requires meaningful dialogue between all parties, so they can be explored and minimised by agreeing standardised solutions to practical safety issues (Cooper & Finley, 2013).

Cooper's (2000) functionalist reciprocal model treats safety culture as a sub-culture of an organisations overall culture, while highlighting that it is the

product of multiple goal-directed interactions between people (psychological), jobs (behavioural), and the organisation (situational). The psychological, behavioural, and situational aspects are the inputs to the safety culture construct, with the key transformation process being the organisations goals, expectations and managerial practices to create the prevailing safety culture *product* (Cooper & Finley, 2013). Formally adopted by the American Petroleum Institute (2015) and the American National Standards Institute (ANSI), the prevailing safety culture is reflected in the dynamic reciprocal relationships between members' perceptions about, and attitudes toward, the operationalisation of organisational safety goals; members' day-to-day goal-directed safety behaviour; and the presence and quality of the organisation's safety systems and sub-systems to support the goal-directed behaviour.

Reason (1998) categorically states safety culture is not a unitary construct as it is made of a number of interacting elements. He equates safety culture with an 'informed culture', which is dependent in turn upon an effective 'reporting culture' underpinned by a 'just culture'. Simultaneously, a 'flexible culture' is required if the organisation is to reconfigure itself in the light of certain kinds of dangers, which in turn will require a 'learning culture'. To some degree these are both objects of, and processes that create, the safety culture *product*: an informed culture.

1.3 *Reviewing the Evidence*

Cooper's (2016a) recent major review of the safety culture research literature published over the past 30 years showed Guldenmund's interpretive model is clearly *not* linked to actual safety performance. A major conceptual difficulty is that invisible core basic assumptions and/or attitudes are the central core of the safety culture construct, but the evidence shows the link between attitudes and actual safety performance is non-existent to weak. *Thus, in the absence of goals and action, changes in core basic assumptions and attitudes will not stop process safety disasters or serious injuries and fatalities.* Conversely, both Cooper's and Reason's models were clearly linked to actual safety performance. Evidence reveals companies should focus at least 80% of their culture change efforts on situational (e.g. safety management systems) and behavioural factors to prevent process safety disasters and Serious Injury and Fatality (SIF) incidents. For example, top management can positively influence an organisations safety culture by paying attention to the *effectiveness* of the development, execution, and performance of the safety management system, frequently questioning managers about safety matters during routine meetings, and frequently visiting various business units to discuss safety issues.

Attempting to *consolidate and accommodate (stage 3)* to make clear what is known, making use of the IAEA's (1991) definition of safety culture as a framework, Cooper's (2016a) explored its constituent parts. What are the assembly of

safety culture characteristics? The assembly of attitudes? The significant safety issues?

Consensus was found on six major safety culture characteristics when examining academic research and the results of public enquiries into process safety disasters:

1. management/supervision;
2. safety systems;
3. risk;
4. work pressure;
5. competence; and
6. procedures and rules.

Typically, each of these characteristics are contained in modern safety management systems (e.g. OSHA (S) 18001:2007; ANSI-Z10: 2012) implemented in many countries. Already aligned with existing practical and proven Health, Safety and Environment (HSE) strategies and processes, companies should prioritise these safety culture characteristics to effect change.

Respectively reflecting the interpretive and functional perspectives of safety culture, academe tends to emphasise the associated psychological factors of these six characteristics, whereas the results of public enquiries focus almost entirely on improving tangible situational and behavioural factors within company operations. Although there were at least twelve psychological factors to target to influence safety culture change, none were found to be consistently and reliably linked to actual safety behaviour or actual safety incident rates. Instead, results revealed a sole focus on psychological factors when changing and/or assessing safety culture (a common approach in industry) is fatally flawed. Conversely, both situational and behavioural factors were clearly linked to actual safety performance. As such, companies are urged to stop focusing on psychological factors and concentrate their improvement efforts on tangible situational and behavioural factors.

Common significant safety issues within each of the six safety culture characteristics were also explored by examining a series of independent studies into the causal factors across numerous process safety incidents (e.g. Collins & Keely, 2003). This showed 80% of Loss of Primary Containment incidents (LOPC's) are commonly caused by managerial behaviours, or lack of, and that 80% of process safety disasters occur during normal routine everyday operations (64%) and maintenance (16%). Depressingly, similar managerial behaviours were also found to be related to the occurrence of SIFs. Such dramatically clear findings show safety leadership has to become a fundamental managerial competency.

Figure 1 presents the universally applicable targets of safety culture (i.e. its characteristics and the significant safety issues associated with each) identified by Cooper incorporated into a revised reciprocal safety culture model (Cooper, 2016a). It shows companies should focus on the common root causes of Process Safety and SIF incidents to drive desired behaviour. *The principle is to optimise the situation to optimise the behaviour.* In turn, as the desired behaviours become habitual, the various psychological factors will become more positive.



Fig. 1 Cooper’s (2016a) revised reciprocal model of safety culture

Summarised below, a focus on the salient issues and the evidence-based solutions to address them that would change company’s safety cultures for the better (see Cooper, 2016a for details) are:

The ‘*Management and Supervision*’ characteristic is primarily concerned with people’s visible safety leadership: ineffective safety leadership often stems from confusion about (a) the company safety management systems and associated policies; (b) a leader’s individual safety responsibilities and obligations; (c) the leader’s and others’ authority over safety; and (d) what leaders are being held accountable for (Cooper & Finley, 2013). This confusion has often led to managers and supervisors failing to adequately plan activities, not managing the safety of operations, and not being adequately prepared for an incident (e.g. IAEA, 2014). It would help if companies developed Leadership Behavioural Competency and Accountability Matrices defining its managerial and supervisory roles and responsibilities, clarifying what people are expected to do and when, with associated performance measures being used to ensure leaders are doing the right things at the right time, for the right reasons.

The ‘*Safety Systems*’ characteristic refers to any formalised *strategic* system to control HSE. Based on the LOPC research, however, it is argued the primary areas of opportunity consist of optimising: (a) two-way safety communications processes; (b) incident analyses and lessons learned processes; (c) the design of plant, equipment, and processes so that safety is an integral element; (d) asset integrity to ensure material conditions meet the expected standards; and (e) management of change processes to ensure they are related to risk assessment and analysis. Each of these require clear policies and procedures.

The ‘*Risk*’ characteristic refers to (a) risk appraisal; (b) risk assessment; and (c) risk controls. The LOPC research points to a significant number of failures in each of these areas, indicating that the ‘*Risk*’ characteristic represents a fundamental weakness in the majority of companies.

The ‘*Work Pressure*’ characteristic primarily refers to the safety-production conflict that stems from competing priorities, lack of resources or of a willingness to treat *safe production as the number one priority*. The costs of incidents tend to outweigh any perceived advantages of placing productivity before safety (HSE, 2016), but this is often overlooked by managers trying to satisfy their immediate job-related needs. This is one area where a company’s top management team can unequivocally stamp its authority on its managers and operators, by setting the right expectations and reinforcing them through an alignment of their Key Performance Indicators (KPIs) and productivity bonus systems.

The ‘*Competence*’ characteristic refers to the knowledge, skills, and abilities people possess to do their job efficiently and effectively. From a process safety perspective, poor competence is often revealed in control rooms when operators fail to recognise and react to early warning signals and/or adequately respond to incidents. Similarly, plant personnel often misuse or incorrectly operate equipment and/or fail to complete isolations properly. It is imperative that people are sufficiently trained in the safety aspects of their jobs to the point that they cannot get things wrong. Currently, people often receive training only until they get something right. In essence, rehearsal is the key to developing people’s competence.

The ‘*Procedures/Rules*’ characteristic refers to all those codified behavioural guidelines developed by companies to form their safety management system. In too many cases, process safety catastrophes and SIFs stem from (a) an absence of procedures (e.g. a lack of procedures altogether, or those developed are not freely available to the workforce); (b) the presence of poor quality procedures; and (c) a lack of procedural reviews. These situations lead to non-compliance, where managers tend to circumvent the administrative aspects of safety, or put productivity before safety, while employees tend to circumvent them to make their task easier in some way. Clearly, the way forward is to (a) identify any gaps in written procedures; (b) allow the workforce to review the existing procedures to ensure they are safe, they make sense and are easily understood; (c) monitor procedural compliance, and (d) regularly audit those procedures involved in near-miss incidents or accidents.

Incorporated into the model presented in Fig. 1, the safety culture product,

that observable degree of effort with which all organisational members direct their attention and actions towards improving safety on a daily basis (Cooper, 2000)

provides a universal measure of safety culture with which to assess the impact of change (i.e. are people putting in more effort to improve safety as a result of an intervention?). Evidence (e.g. Vogus & Sutcliffe, 2007) shows this *product* is a viable and practical means of measuring safety culture. The results can be graded

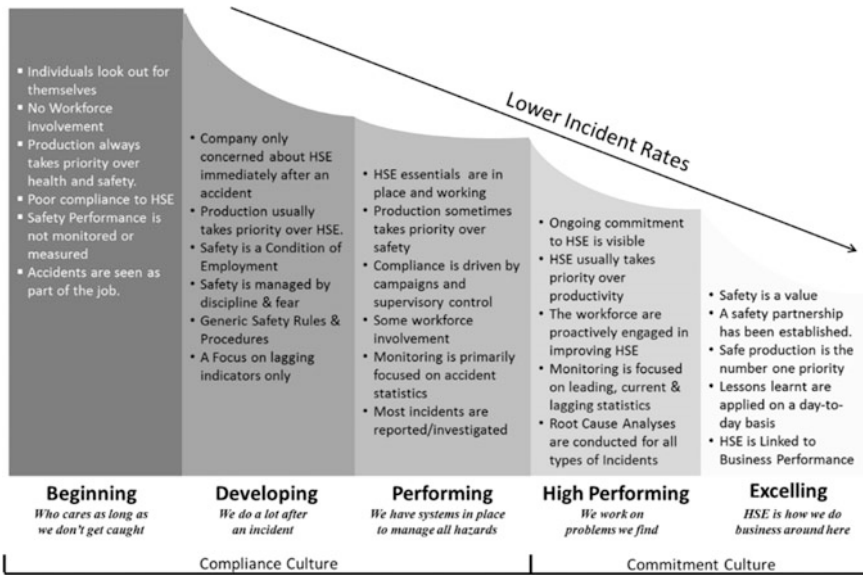


Fig. 2 Adaptation of the British health and safety executive’s (2011) safety culture maturity model

against safety culture maturity models (e.g. HSE, 2011) which facilitate benchmark assessments within a company or against others in industry. Typically, these are divided into five safety culture maturity levels (see Fig. 2) specifying an organisations level of effort (e.g. Beginning, Developing, Performing, High Performing, and Excelling) as it progresses on its safety culture improvement journey, and are, therefore, *de facto* measures of the safety culture product, “*that observable degree of effort...*”.

Safety culture assessments are typically conducted on an annual or bi-annual basis. In the interim, it makes good commercial sense to develop leading KPIs that focus on the safety characteristics outlined above, but *with an emphasis on what people do*, so that the level of effort put into safety (i.e. the safety culture product) can be easily monitored. For example, KPIs for the ‘Management and Supervision’ characteristic could include (a) the number of corrective actions completed with 30 days; (b) the number of safety observations and conversations a manager/supervisor had with the workforce each week. Such measures facilitate and enable transparency. In turn, this allows companies to monitor the integrity, and maintenance of its improvement initiatives, while also revealing the status of their safety culture *product*.

2 Safety Culture Practice

Given the *purpose* of the safety culture construct is preventing process safety and personal injury incidents, what should industry do to help ensure this? Typical questions are:

To what extent can changes in safety culture be achieved as a result of decisions by top management?

Executive level managers and board members have to prioritise and balance safety against production, stock-market concerns and other commercial/operational/political pressures. The expectations they set, the management practices they reinforce, and the performance outcomes they reward (i.e. shaping the situational aspects) will all influence the safety culture. ExxonMobil provides a true example of ensuring safety is an integral part of their operating culture, where they strongly believe protecting the safety and health of their workforce is fundamental to its business. In 2007, ExxonMobil drillers in the Gulf of Mexico asked if they could stop drilling the Blackbeard West at 30,000 ft (the goal was 32,000) as they felt it was too dangerous to drill deeper, having experienced a ‘kick’ that made the platform tremble. The prize was over a billion barrels of oil and the geologists wanted to continue because of the rewards on offer. The decision was pushed right up to the CEO, who erred on the side of safety, saying the ‘Well’ had only cost \$180 million dollars to date. He received strong criticism from Wall Street but no lives were lost. In contrast, the Deepwater Horizon drillers were ignored when they expressed similar concerns about the Macondo Well. This ultimately cost 11 lives, the loss of a platform, an environmental disaster, with BP’s costs and fines reaching \$42 Billion to date. Clearly, executive level managers who consider the safety element in all their decisions can guide and impact others decision-making and actions to prevent disasters and personal injuries. This again points to the fundamental importance of safety leadership in everyday operations: ensuring safety before profit, cultivating a trusting and fair culture, making decisions that err on the side of safety, developing safety competencies for all, applying lessons learned, ensuring compliance to well-written rules and procedures, and constantly communicating meaningful safety messages. If senior managers do not manage and reinforce these issues, their company’s safety culture will never achieve excellence.

What are the relative influences of the national/local culture, corporate culture, and professional cultures, on the safety culture of a given entity?

A study in the global Oil and Gas industry showed western countries tend to have higher risk tolerance and higher incident rates than Asian countries, who have much higher respect for authority (Brown, 2012). Total Recordable Incident Rates were much lower on projects where the site safety culture embodied a combined ‘high perception of risk’ and ‘low tolerance of risk’, compared to those with a high/low perception of risk and high tolerance for risk. Other work (e.g. Perez-Floriano & Gonzalez, 2007) shows there has to be respect for national culture traits by working with them if risk management programs are to be successful. National cultural differences reside mostly in values, while at the organisational level,

cultural differences reside mostly in practices (Hofstede, 1983) suggesting that national cultures can be over-ridden by the company's practices and their prevailing safety culture. This is reinforced by Mearns and Yule (2009) who found that proximal influences such as perceived management commitment to safety and the efficacy of safety measures exert more impact on workforce behaviour and subsequent accident rates than fundamental national values. Another example showed exemplary safety leadership practices in conjunction with genuine employee engagement on a middle-east construction project with 47,000 third-party nationals from 64 countries led to 121 million man-hours worked without a single lost-time accident (Cooper, 2010). Thus, the key ingredient for success is the quality of safety leadership at the local level to ensure risk management initiatives are implemented effectively. However, expats who provide local site leadership must be provided with the tools and skills needed to address a broad spectrum of local cultural needs.

Should the safety culture be the same in the whole corporate organisation, or should it be implemented diversely according to local activities/cultural features?

There have always been sub-safety cultures (even in the same facility) which is likely due to each group's differing 'frame of reference' for viewing the risks presented by tasks (Cooper, 1997). The real issue is whether this should be catered for in some specific way. In the author's experience, the role of the corporate executive team is to provide a clear framework for action that sets the parameters, but allows for some degree of local variation: the main point being that people are doing things to improve safety within the parameters set. This approach, commonly known as '*pull and push*', is where a global framework (i.e. policy, template tools, roles and accountabilities, resources, time frames, etc..) is provided by the corporate offices, but these are tailored and implemented to suit local conditions. The underlying principle, therefore, is to do safety *with* people, not *at* them. This is also where the participation of engaged employees comes into its own, as they are intimately familiar with all aspects of their work and can provide insights often overlooked by corporate safety departments and managers.

Should occupational safety regarding minor risks, the prevention of fatalities and the prevention of major industrial risks be managed with the same policy and the same tools?

In principle, the policies that govern occupational safety to prevent and protect people from workplace hazards and risks are broadly similar: they attempt to define a problem area, assess its scope, and give direction on the control of the issues. However, the tools and strategies required to control the various aspects of Safety and Health will differ. Recent work on SIFs shows that the causes of life-threatening and life-altering events tend to be different than those for minor personal injuries (Cooper, 2014; Wachter & Ferguson, 2013). Thus, a specific SIF program targeting *potential* SIFs is required. The same can be said for process safety with its emphasis on the blending of engineering and management approaches, as event outcomes are very different from personal injuries, albeit the underlying managerial causes tend to be the same for both. A good/poor safety culture affects all managerial aspects of Occupational Safety and Health.

Who should drive an organisation's safety culture to help it evolve?

Two key initiatives (i.e. situational changes) are known to drive an organisation's safety culture to achieve safety excellence: safety leadership and employee engagement, within a formal ethos of developing a 'safety partnership'. Both are contained within the 'Management/Supervision' characteristic in the model shown in Fig. 1, and lend themselves to monitoring the safety culture product, "that observable degree of effort...".

2.1 Safety Leadership

Defined as

The process of defining the desired state, setting up the team to succeed, and engaging in the discretionary efforts that drive the safety value (Cooper, 2015),

safety leadership is widely recognised to be extremely important, especially when the prevailing safety culture is weak (Martínez-Córcoles, Gracia, Tomas, & Peiro, 2011). A company's safety culture is driven by the executive leadership team who creates, cultivates, and sustains its journey to excellence. They set the vision and the strategic direction (i.e. *the desired state*), provide resources (i.e. *set up the team to succeed*), and constantly emphasise and reinforce the importance of safety to people and the business (i.e. *engage in the discretionary efforts to drive the safety value*). For a variety of reasons, ineffective safety leadership is a major blockage to achieving success in many companies (Cooper & Finley, 2013).

Recent research, summarising 328 safety leadership studies, examined the impact of transformational, transactional and servant leadership styles on actual safety performance (Cooper, 2015). All three styles directly influence people's safety behaviour, which in turn reduce incident rates. However, the positive effects were stronger for servant leadership. The major difference is a servant leadership style naturally creates a supportive environment that exerts strong direct influences on employee engagement, safety behaviour, and incident reduction, which the transformational and transactional safety leadership styles do not. In practice, leaders who engage in meaningful two-way dialogues with the workforce induce a collaborative learning environment and facilitate other people's safety needs, helping to create the supportive environment that appears so important for improving safety performance.

Unfortunately, there are always two sides to a coin: the more hazards and risks that are present in the working environment, the lower the impact of any safety leadership style and the bigger the barriers to creating a supportive environment. If a company's safety leadership efforts are to flourish, it is imperative that a supportive environment is also developed for managers, and sufficient resources provided so they can eliminate or reduce known hazards/risks to as low as reasonably practicable (ALARP).

2.2 *Employee Engagement*

The business benefits to be obtained from employee engagement are huge. Studies have shown that (a) where employee engagement was low, companies had 62% more safety incidents (Harter, Schmidt, Killham, & Asplund, 2006); and (b) where employee engagement was high, engaged employees were five times less likely to experience a safety incident, and seven times less likely to have a lost-time safety incident (Lockwood, 2007) than non-engaged employees. Employee engagement is an approach designed to help ensure employees are committed to an entity's goals and values, while motivating people to contribute to that entity's success. Such entities tend to possess a strong and genuine value for workforce involvement, with clear evidence of a 'just and fair' culture (Reason, 1997) based on mutual respect between the entire management structure and the workforce. The key aspect is ensuring an understanding by all concerned that engagement means two-way dialogues that lead to joint decision-making about the best way forward, while also acting together to make things happen: managers deliberately reach out to engage with employees to focus on issues of importance (e.g. safety), who in turn proactively and positively engage with management. In sum this means creating a genuine *safety partnership* between management and the workforce to improve safety performance.

2.3 *A Safety Partnership*

A safety partnership is defined as:

Leadership, managers and front-line associates jointly focusing on safety and proactively working together in a business entity to minimise the possibility of harm and maximise safety performance. (Cooper, 2016b)

Creating a genuine safety partnership, therefore, means management and the workforce jointly working towards achieving common and understood safety goals, with clear and consistent communication, efficient monitoring, reporting, and decisive action to investigate blockages and take the appropriate corrective action as needed.

The key drivers for developing and maintaining a safety partnership are straightforward and involve (a) effective safety leaders who develop a supportive environment; and (b) reducing the degree of risk presented by the nature of the work. High levels of managerial support lead to higher levels of engagement, which in turn lead to much higher compliance with safety rules and procedures. Moreover, reducing levels of risk presented by hazards and high job-pressures also leads to much higher compliance with safety.

Specific areas of safety that joint management and workforce teams can use to develop a proactive safety partnership include: (a) safety leadership skills

development; (b) hazard identification exercises; (c) risk assessments; (d) reporting, investigating and reviewing incidents; (e) reviews of rules and procedures; (f) employee development of toolbox talks; (g) mentoring new hires; (h) pro-active involvement in behaviour-based safety processes; and (i) seeking people's views on improving safety.

3 Summary

'Safety culture' is a social construct used by industry and academe to describe the way that safety is being managed in organisations to avoid catastrophes and personal injuries. As well as being used to save lives and prevent process safety disasters, it is known that operational and safety excellence go hand-in-hand; companies that are good at managing safety also manage operations well (Fernández-Muñiz, Montes-Peón, & Vázquez-Ordás, 2009; Veltri, Pagel, Behm, & Das, 2007).

In terms of safety culture theory, almost all of those attempting to define the safety culture construct agree that it reflects a proactive stance to improving occupational safety, and the way people think and/or behave in relation to safety. As such, these should be treated by industry as the key underlying factors that guide their improvement efforts.

A major review of the evidence (Cooper, 2016a) showed: (a) there is consensus between academe and the results of public enquiries about the main safety culture characteristics a company should target to improve its organisational safety culture; (b) the sole use of psychological safety surveys to assess a company's safety culture is fatally flawed as they are not reliably linked to actual safety performance; (c) common significant safety issues to avoid process safety disasters and SIFs are well known, and provide a tangible and robust focus for assessing the safety culture construct; (d) organisations should concentrate 80% or more of their safety culture improvement efforts on situational and behavioural (e.g. managerial safety related leadership behaviours) factors to prevent process safety and SIF incidents; and (e) the safety culture product should be used to assess safety cultures, the results of which can be used to determine a company's safety culture maturity. Companies should develop leading KPIs that focus on what people do, to facilitate the monitoring of "*that observable degree of effort...*".

In terms of safety culture practice, evidence shows that: (a) senior executives have to consider the safety element in all their decisions to guide and impact other's decision-making and actions to prevent disasters and personal injuries; (b) the quality of safety leadership at the local level to ensure risk management initiatives are implemented effectively tends to override national culture considerations; (c) every organisation *will* have sub-safety cultures, and adopting a '*pull and push*' approach where a corporate framework is provided that can be tailored and implemented to suit local conditions, is the best way forward; (d) different policies and tools are needed to address minor, major, and catastrophic events; and

(e) creating a safety partnership that fully involves both management and employees in the safety improvement effort is the best way for an organisation's safety culture to evolve and achieve excellence.

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