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Culture Change Framework Dramatically Improves Safety Performance

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Abstract

The importance of having a 'good safety culture' has long been recognized for achieving great HSE performance and yet, perhaps due to the complexity of analyzing culture, it's often a struggle to positively impact it. This paper explains the use of a simple framework to plan, implement and achieve a dramatic improvement in safety culture. Real culture change and associated improvement in safety statistics occurred at a major chemical manufacturing location. The model is described, implementation is discussed, with challenges, and the impacts of its use are presented. The result is a practical guide to managers and leaders seeking to improve safety performance.

The practical advice given in this paper is useful to any oil and gas manager, regardless of level and scope of business. This advice is particularly relevant to dealing with remote locations and high-risk operations where chemicals and machinery are in use. This approach fits well into the current environment, where budgets and costs are significantly reduced, and careful planning is required to minimize cost and ensure any investments for safety deliver returns.

A site where recordable incidents and spills were expected became a model facility with over 1,000 perfect HSE days, resulting in two Chairman's and two President's HSE awards bestowed in subsequent years. The managers and leaders in these businesses had their own beliefs and standards on safety leadership permanently changed for the better. To our knowledge, this is the first time such a culture framework has been adapted and used for this purpose.

Introduction

Since 2008 some concerning trends on HSE performance were observed in a chemical business unit. These trends were observed through incidents leading to injuries, and via repeated chemical spills. In addition, internal audits of the main chemical blend plant showed that it was potentially hazardous and needed to be brought up to modern standards. It was also realized that a dramatic change in overall safety culture was needed to stabilize this important piece of the chemical supply chain.

Culture can be described as the shared values and attitudes of people in an organization "the way we do things around here"[1]. Culture is complex, so it can be difficult to analyze and to change. However, the importance of having a "good" Total Safety Culture for potentially hazardous chemical plants has been recognized as a way of achieving great safety performance[2]. It is the role of the leader to complete a range of activities such as searching and structuring available information and then problem solving, managing personal resources and material[3]. The McKinsey 7S model[4] enables a leader to do just that, and to conceptualize organizational effectiveness. Zacarro 2001b[5] identified that multiple leadership activities are utilized to engage the team and business unit's mission, and the resources required to complete the vision and translate the strategic intent into collective action.

This paper explains the use of a simple framework to plan, implement and get collective action to achieve a dramatic improvement in safety performance. Here McKinsey's 7S model was adapted as a way to structure and measure how to impact culture change (Fig. 1). This model describes seven internal aspects of an organization that must be aligned correctly if it is to be successful. The model suggests that achieving change requires progress in all parts of the organization, not just a focus any one factor.
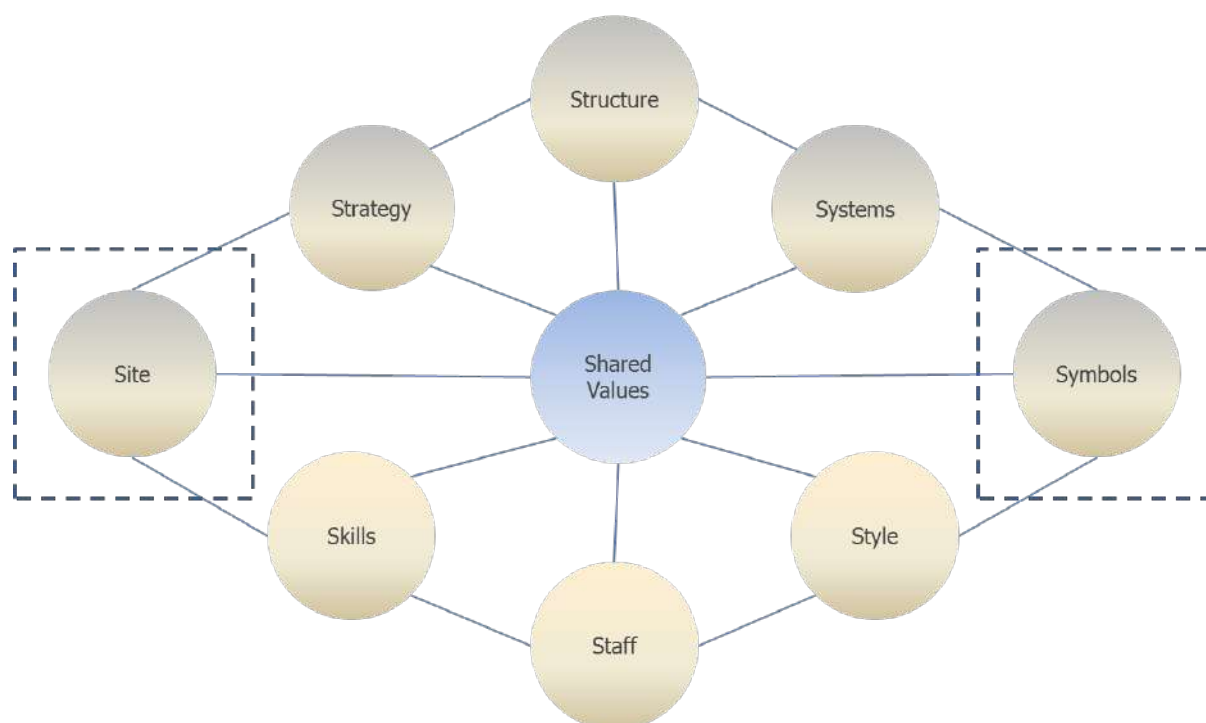

Fig. 1. Adapted McKinsey 7S model[4]

Each item in the 7S model is categorized into 'hard' and 'soft' elements. 'Hard' elements are those that are easier to define; management can often make direct changes to them. 'Soft' elements can be more difficult to describe. They are less tangible and more influenced by 'soft' skills, such as the emotional intelligence of leaders and how they relate to the culture of the organization. However, these soft elements are just as important as the hard elements if the organization is going to be successful.

Macdonald, Burke and Stewart (2009)[5] commented that creating a culture builds on clarity of purpose and is achieved through three main leadership tools: Behaviours, Systems and Symbols. Leadership of any organisation is to influence employee's behaviors such that they contribute to the purpose of the organisation and at the same time work within the framework of the law and organisations policies. Systems are the equivalent of non-verbal behavior in human interaction and, as they become embedded, they are like habits in "the way that we do things around here".[5] Symbols are a key cultural component,[5] so an 'S' for symbols was added, which would allow quick, visible changes to be made. Finally, the integrity of the plant and equipment being operated is also key, so the 7S model was further adapted to include the 'S' for Site in place of 'Plant'.

We hope the practical advice given in this paper is useful to any oil and gas manager seeking to analyze and improve the safety culture and performance of their business. In this paper we used our adapted framework to significantly improve an under-performing business unit and reduce risk to the people and the business. These lasting improvements have been recognized by a series of internal company and world-wide awards.

Methods, Procedures, Process

This business was firmly in a dependent state in 2008 and 2009[7], characterized by discipline from senior management after incidents such spills and injuries. In addition, most plans came from management, and it was felt that regular visits to the blend plant were required for supervision and audits to help 'fix' the problem. Clearly, the business and the employees wanted to be in the interdependent state, but the challenge was how to get there.

The adapted McKinsey 7S model was used to plan a series of actions for each 'S' of the business, and in that way to bring about meaningful change.

Strategy

First, a proper strategy was needed that could be clearly communicated and help the business compete and be financially successful. After some thought the new manager realized that for financial success the main chemical blending plant would need to operate well and with zero incidents, or 100% perfect days (days with no injuries or spills), to provide a solid foundation for supplying to its customers. A vison was formed that the plant could be the very best site in the business area and an example to others. This strategy was shared with employees and customers. The importance of the blend plant as the foundation on which the rest of the business was to be built was particularly stressed.

Style

A deliberate attempt was made by the senior manager to be visible on site at least once per quarter, and to take / encourage other leaders (sales, technical, etc.) in the business to attend also. These visits were to include wearing overalls, getting out in the shop, and talking to people. Communication and celebration were also deliberately enhanced.

Skills

It was recognised that the people within the business, both managers ("Leaders") and employees (also needed as "leaders") had not been educated in practical safety leadership skills, despite having much technical development and training. A series of safety leadership training and behavior-based-safety workshops were planned and communicated. The major aim of these workshops was to develop the people and to get alignment (Fig. 2).
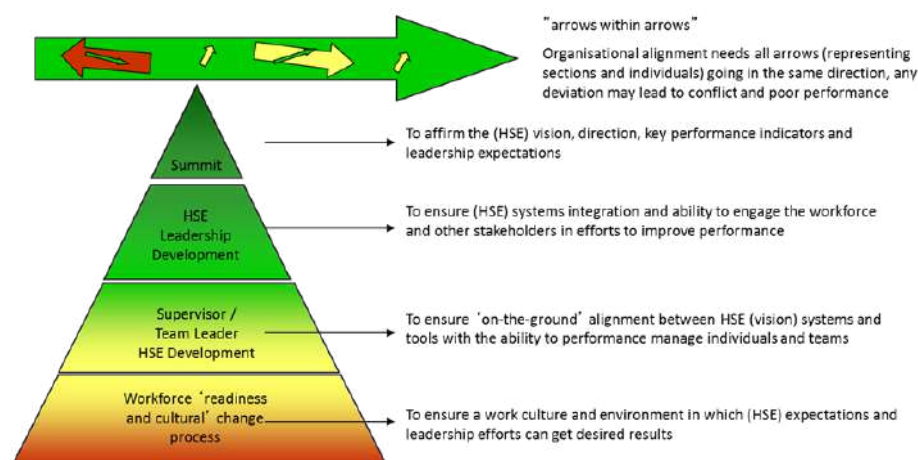

Fig. 2

Shared Values
As part of the safety leadership workshops, a session to jointly develop the Vision was held at the plant. The session addressed the importance of the plant to the business and "how we work" to develop the people, the culture, and a set of values. These topics were communicated often and underpinned by "stretch targets" to influence the decision making at the plant.

Structure
A few structural changes were required to address long-held grudges, issues and clear mental barriers. For instance, the site manager was promoted to Operations Manager, but this promotion came with a much bigger set of goals and deliverables to help drive the vision. This new role came with a clear, written job description, the new responsibilities of which were accepted by the manager. In addition, an HSE resource was dedicated onsite at the plant (by re-tasking existing personnel). This HSE person reported to operations and was within the business, not a watchdog from the separate HSE group.

Symbols
A number of symbols were used to help quickly and visually drive change. New safety observation cards were made (each carrying the vision). Visual information boards were set up in the plant to aid in the communication of key business metrics, starting with safety performance. Risk and impact assessments were also placed on the shop wall to ensure regular use and to highlight their importance.

Staff
Until 2011 the blend plant was operated by a third-party toll blender, with chemical office personnel based onsite. There were a number of temporary staff present at the site as blenders and all were brought on to full-time staff.

Site
The existing, leased equipment used at the blend plant was in a poor state of repair with an outdated design, so there was an ongoing safety risk associated with its operation. Approval for the replacement of the leased equipment was received in early 2011, and by October 2011, the old equipment had been removed. It was replaced with new equipment, incorporating numerous safety improvements and innovations, such as an automated sampling system with built-in safety mechanisms, mesh across the open tops of the blend tanks to prevent foreign matter falling in (such as glasses and helmets), guards preventing entry to confined spaces, extraction venting for solvent tanks, automated valves to minimize manual handling, improved signage and walkways and an overall design tailored to meet Baker Hughes' needs.

Presentation of Data and Results

Table 1 shows the overall safety statistics for the greater business area, and the chemical unit. Total incidents tracked include first aids and more serious injuries. There have also been a number of recordable incidents each year, between 4 and 13. After a recordable injury in 2008, related to a chemical spill at the blend plant, there have been zero recordable injuries through this business unit over this period, as well as a very limited number of first aid incidents, relative to the rest of the business. In addition motor vehicle accidents were zero for chemicals.

Table 1. Overall Safety Statistics for Area

	2009	2010	2011	2012	2013	2014
Total Incidents - Business area	35	23	33	36	54	53
Total Recordable Incidents - Business area	8	5	4	13	8	9
Recordable Incidents - Chemicals business unit	0	0	0	0	0	0
First Aid - Chemicals business unit	2	1	0	1	1	1
Motor Vehicle accidents - Chemicals business unit	0	0	0	0	0	0

In 2009 and 2010 chemical spills were significant problems for this business unit, with 9 and 10 spills per year, respectively (Fig. 3). A significant focus on preventing spills resulted in zero spills in each of the following years, from 2011 to 2014. Although the data is not shown, the chemical volumes handled by the blend plant increased over this time period.
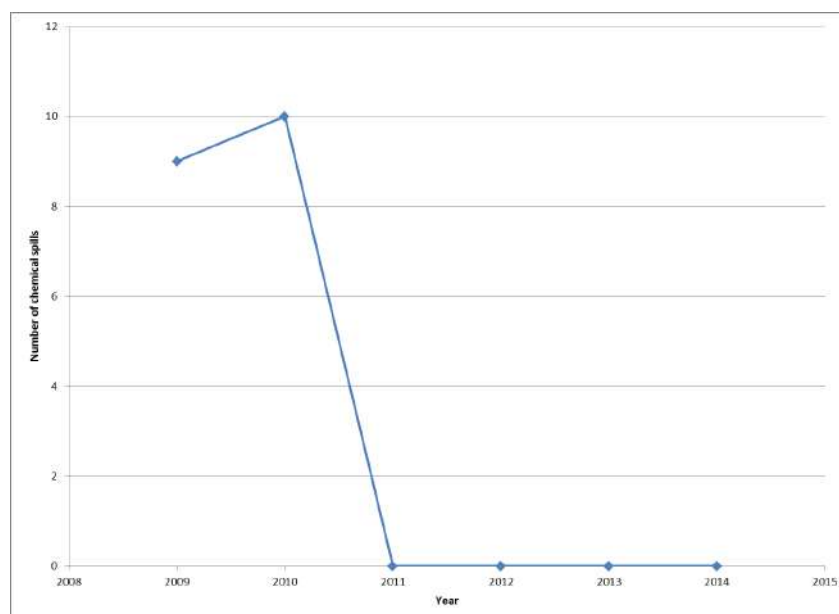

Fig. 3. Number of chemical spills per year – Chemical business unit

In addition to reviewing the ultimate results in terms of statistics it is important to review progress made in each of the adapted 'McKinsey 7S' factors of the business.

Strategy

The strategy adopted for this business unit was to become a top-three contributor to the business, in terms of profit dollars. The plan was to achieve this by securing our supply chain, taking full control of our local chemical blending, and ensuring this was a safer, more reliable part of the supply chain that would enable us to better deliver to our clients. It was also declared to the whole business by the Operations Manager as part of that strategy that *"we will improve our safety culture and include everyone in that –This is the most important value for me"*.

Style

Multiple leadership visits were made and regular video casts were used to address business performance, always focusing strongly on safety first. The important content that was communicated was how the business and the main blend plant were progressing, and how these improvements supported the strategy.

Skills

Leaders were developed in 'safe environment with peers' with practical safety leadership knowledge and skills and provided with coaching, and counselling if requested, and 'real-time' feedback in their workplace with their work mates. This approach was enabled through a program of a safety leadership summit, safety leadership training for all plant employees, and a behavior-based-safety workshop with practical, on-site coaching. The HSE Leadership Summit inclusive of BH Corporate Staff HR Feedback Surveys, Corporate Performance traffic lights process cascaded to the business unit performance set the commercial context for business and individual performance. This process was crucial because contextual influences that enhance leadership behaviors and responses are critical for changing team siutations[8].

HSE Leadership Development identified the contextual environment for the business vision and how this cascaded to the team and individual visions for safety leadership. Underpinning this discovery was the development of leadership knowledge, skills, and experiences that included the correct application of a variety of personal and process risk-management tools. This knowledge was further underpinned by on-site coaching to ensure efficacy of risk tool application and efficiency of tool application to deliver safe and productive outcomes.

HSE training was later followed up by 'LEAN' management training, with a strong focus on tracking safety improvements and metrics, as well as other business drivers that are discussed further below.

Shared values

While strongly reinforcing our company's core values of Integrity, Teamwork, Performance, Learning and Courage, as a team we borrowed shamelessly from Lean and adopted the five guiding principles: Go and See, Continuous improvement, Respect the operator (person doing the work), Teamwork and Challenge (the status quo). These values were prominently displayed and discussed (Fig. 4), and the team accepted them to improve their business and make their jobs easier and better.

Workplace performance readiness and cultural change included a "LEAN" site visit to another business to see the future vision of how we wanted to work. This helped develop a shared mental model and concepts of how we wished to work in delivering future safe and productive work environments.

Recent cognitive theories and models have commented that effective team coordination and performance depends upon the emergence of accurate shared mental models of team strategies and interaction tactics among members[9]. The models help team members anticipate each other's actions and reduce the amount of processing and communication and produce more efficient collective responses to immediate and anticipated task requirements[9].

Symbols
New safety observation cards were made (each carrying the vision). Visual information boards were set up in the plant to aid communication of key business metrics, starting with safety performance. Risk and Impact assessments were also placed on the shop wall to ensure regular use and highlight their importance.

Fig. 4. Lean board at the main chemical blend plant, showing shared values, as well as key safety and business metrics.

Staff
A commitment was made early on to take all temporary staff on full time. This was not easy to do immediately due to headcount restrictions. However, with careful planning and the correct business justifications, we finally achieved a fully staffed team. In a team environment, excellent relationships were essential for a safety culture where people look out for themselves, the people in their teams, and those around them. It was therefore important to make these people feel equal partners in the business.

Site
During the installation of new equipment (Photos 1-5), 122 work permits were raised (Safe, Height and Hot) and there were 347 visits from subcontractors over a 12-month period (averaging 29 per month). The removal and refit of the new equipment was carried out without any incident or disruption to clients. This outstanding feat could not have been completed without the dedicated team at the blend plant and a renewed, positive safety culture.

Photo 1: Removal of the old tanks

Photo 2: New tanks with extraction vents to protect workers from solvent fumes

Photo 3: New automated sampling system with built-in safety mechanisms

Photo 4: Mesh over tank openings to prevent foreign matter from falling in as well as confined space entry guards

Photo 5: The refurbished, freshly painted site, with new safety signage

Finally, the team at the blend plant was awarded the 2011 Chairman's HSE Excellence Award in acknowledgement of its commitment and dedication to HSE. The review committee was particularly impressed that over a 6-month period the team completed the total refit of the blending equipment without injury or disruption to clients. This site is now a model facility for the company with over 1,000 consecutive perfect HSE days, which resulted in a further Chairman's and two President's HSE awards bestowed in subsequent years.

Conclusions

The adapted framework presented here proved to be an excellent model for planning and then changing a safety culture and improving organizational effectiveness with respect to safety performance.

While significant thought and effort was spent in each area of the model, many areas required zero or little cost to make improvements. Indeed, many of the softer S's directly impacted the way people thought and behaved and developed a clear team vision. This vision, supported by the necessary leadership skills, was critical to getting buy-in and real change. Through this process the managers and leaders in these businesses had their own beliefs and standards on safety leadership permanently changed for the better. Several have gone on to promote such improvement in other areas.

Finally, it was necessary to address more costly areas such as plant equipment; however, the payback on these investments was extremely quick, relative to the previous leasing costs. Therefore, we believe this model does have merit even when difficult market conditions exist.

To our knowledge, this is the first time that such a culture framework has been adapted and used for this purpose, and once we have developed a culture of interdependence and engagement it's a matter of where we wish to focus. After the safety improvements this business went on to create increased financial value because the methodology of getting there remains the same.

Acknowledgements

References

1. Cooper M.D, 2000. Towards a Model of Safety Culture. E. Yorks. An abridged version published in *Safety Science*: Vol 36. Pp 111-136
2. Geller E.S., 2001. Working Safe. Second edition. Lewis Publishers, NY.
3. Fleishman E.A., Mumford M.D., Zaccaro S.J., Levin K.Y., Korotkin A.L. and Hein M.B., 1991. Taxonomic efforts in the description of leader behavior. *Leadership Quarterly*, 2(4) Pp 245-287.
4. McKinsey 2006. In Search of Excellence: Lessons from America's Best-Run Companies Paperback – February 7, 2006 by Thomas J. Peters (Author), Robert H., Jr. Waterman (Author) Harper.
5. MacDonald, 1., Burke, C., and Stewart, K.; (2009) System Leadership- creating Positive Organisations (pp, 104-109), Gower Publishing Company
6. Zacarro S.J., 2001b. The nature of executive leadership. APA books, Washington DC.
7. Bradley, 1995. http://www.dupont.com/products-and-services/consulting-services-process-technologies/brands/sustainable-solutions/sub-brands/operational-risk-management/uses-and-applications/bradley-curve.html
8. Zaccaro S.J., 2002. The interface of leadership and team processes. *Group and organization management.* Special issue.
9. Cannon-Bowers J.A., Salas E. and Converse S. 1993. Shared mental models in expert team decision making. *Current issues in individual and group decision making.* Pp 221-246. Hillsdale,

NJ.