

What Does it take to Create a Reliability Culture?

Abstract

What does it take to create a reliability culture? Many managers think that high equipment reliability needs a reliability mindset. They think you need the right beliefs and values to get reliability. Reliability requires both correct thinking and correct behaviour, but behaviour is by far the most important. Your plant and machinery will deliver outstanding reliability only if their parts are not heavily stressed. Reliability is the result of properly doing the right actions to the parts in your machines—the right belief comes later, once the evidence is in. You make your machines and equipment reliable; you do not think them into being reliable with a good attitude. You do not need to have the right mindset to get highly reliable machines; you only need to deliver to your machinery parts the right environment for high reliability. If reliability is mostly the result of the behaviours that you do, it means that great reliability can be created everywhere.

Keywords: reliability culture, reliability improvement, reliability creation, operational readiness

At a renown industrial reliability seminar the assembled group of senior managers and engineers were asked, “Is safety an attitude or a behaviour? Is reliability an attitude or a behaviour?”

Occupational safety improvement since the mid 1980’s has been extraordinary. From the attitude common in 1970’s industrial workplaces that ‘accidents happen’, to the realisation in the 1980’s that ‘accidents are caused’, there has been great life-saving steps made in occupational safety reforms. Once governments legislated for occupational safety, and insurance companies increased premiums on companies with poor safety performance, firms began adopting and using better work safety systems and practises. Figure 1 confirms that drastic improvements were achieved in a relatively short time¹. Now corporate managers are asking why the same cannot be done for plant and equipment reliability?

That managers ask such questions shows their misunderstanding of the enormous difference between improving occupational safety and improving operating plant reliability. Unlike safety, which mostly depends on you doing safe acts now and next, your future reliability depends mostly on what wrong acts you and others have already done. What was done in the past is not vital for improving safety, but for reliability it is life and death. It is why improving workplace safety has been comparatively easy, but improving plant reliability has been so very hard!

Reliability success is totally unlike occupational safety success—improved workplace safety is got by removing the job task dangers ahead, but improved reliability depends on preventing the introduction of equipment failure causes during all past and current life cycle stages. The vital differences between workplace safety and operational reliability is time and focus. For high occupational safety you need to use the right safety creation practices from now on, but for high reliability you must have done the right reliability creation practices long before now.

Why Reliability Success is So Vastly Harder to Get than Work Safety Success

Figure 1 shows occupational safety trends for some industrial companies during 1995-2005. The rapidly improving trend is satisfying to see. Industrial workplaces have become safer. Were the swiftly improving results due to the people in those companies being ‘evangelised’ and their

¹ Harstad., Elisabeth, Pitblado., Robin, *Converting major hazards into minor risks – a 21st century approach*, 19th World Petroleum Conference, Spain 2008

attitudes improved? Or were the trends the result of those companies adopting the right safety behaviours, and because the right actions were done the right results were produced?

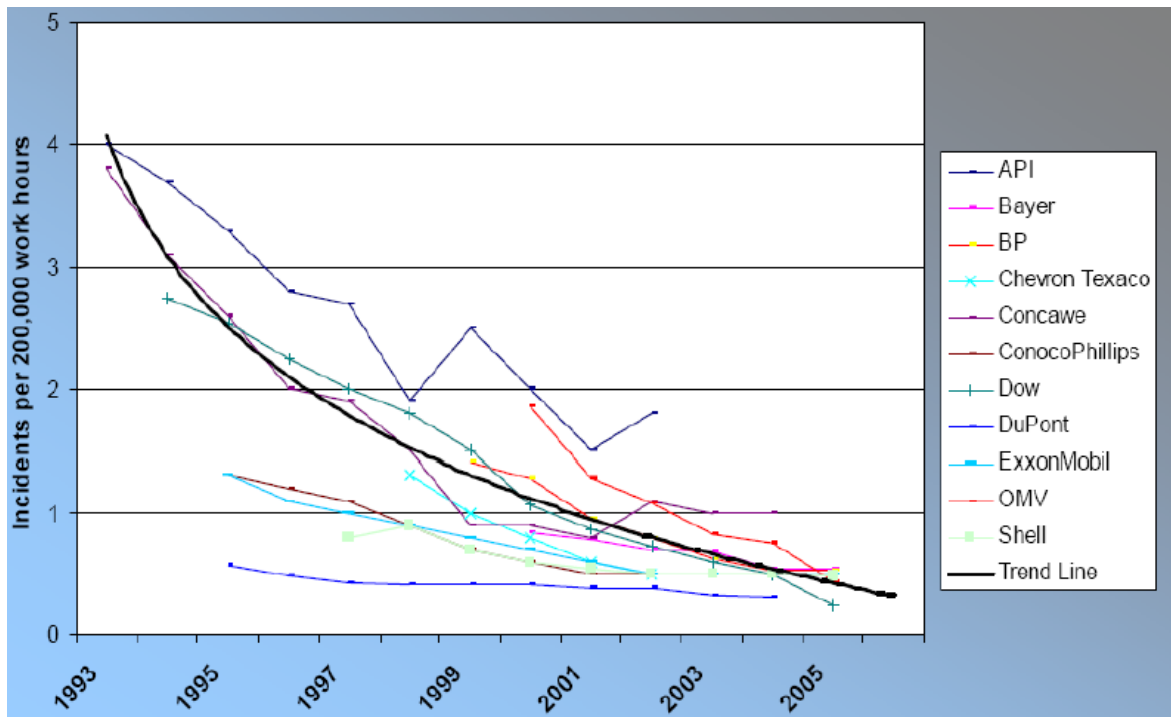


Figure 1 Trends in Occupational Health and Safety 1995-2005

The DuPont trend at the bottom of Figure 1 indicates that it is an outstanding workplace safety operator. It has been a world leader in occupational safety for decades. In fact, it sells its work safety system to other companies. When companies adopt DuPont methods they too become good occupational safety performers. From having poor safety results the companies adopting the DuPont safety system change and become better. Does the DuPont safety system require people to first be ‘evangelised’? Or does it require people to first start doing safe practices?

During the First Gulf War (1990-91) death rate of injured American soldiers was 25%. By the end of the Second Gulf War (2003-11) the death rate of US troops had dropped to 10%. Army doctors had started tracking weekly injury and survival rates and asking why injuries were occurring. Instead of just treating wounds they began looking for their causes and how to proactively prevent the harm. An example was troop eye injuries. Why were so many eye injuries occurring, the doctors asked? The investigation turned up an interesting fact—troops were not wearing their protective goggles. The cause was found to be that the goggles were too ugly; it was not ‘cool’ to be seen wearing them! So the military switched to ‘cooler’ looking ballistic eyewear. The soldiers wore the new glasses more often and the injury rate immediately dropped². The story confirms what has long been known: do the right safety behaviours and safety improves. It also provides evidence of an insight whose importance we are only starting to fully appreciate: the values people internalise make them behave in certain ways. Some people will not wear ‘uncool’ glasses because of their internal image of themselves; even if their lives depend on it.

The DuPont safety system asks companies to institute correct behaviour. You use proper safety practices reinforced with training in the right use of the practices. DuPont requires people to act

² Hallinan., Joseph T., *Why we make mistakes*, Broadway Books, 2009, Pg 214.

and behave safely. You do particular safety practices in certain ways. How you personally feel about safety or value safety is not key to the successful use of the DuPont work safety system.

You could say a reliability creation system for physical asset health is an ‘equipment safety system’. An occupational safety system protects people from injury by reducing risk of harm. An equipment safety system protects physical assets from breakdown by removing risk of failure. Because the two systems have a common aim—risk reduction—do the same improvement principles apply to both? Is reliability the result of doing a set of right behaviours, or do you need to first be ‘evangelised’ into a reliability culture before you get great reliability performance? The answer is the same for equipment reliability as it was for occupational safety—to prevent injury (breakdowns) you must reduce risk of harm (failure). You are not safe just because you think positively about safety; you are safe because you DO safe practices. Your machines are not reliable because you take-on a reliability mindset; your machinery is reliable because the parts in them are not overstressed. First you DO the right reliability behaviours properly ON your machinery, and then your plant and equipment become reliable. Eventually you will come to understand and believe in quality and the reliability it brings. But it is always the right behaviour that matters first.

These days the occupational safety solution is known—you can buy it off the shelf. Safety needs you to use personal protective equipment: wear safety boots, put on a high visibility vest, slip on appropriate gloves, don a hard hat and your safety statistics improve: just like the doctors discovered during the Gulf Wars. They further improve by adopting safe work methods and they improve again by spotting risks and removing them from the workplace. Good safety stats tomorrow result from good safety practices done today. The past matters little to safety because you act on what is in front of you from now on. Equipment reliability is vastly different. Physical asset reliability totally depends on what happened during the past years—your operating asset reliability today is the result of the prior practices used, and the company-wide decisions made, over your operating assets’ whole lifetime. You cannot change your future reliability by putting on a hard hat, walking around in safety boots, marking direction lines on the ground, and doing a flip pad job risk assessment prior to starting work.

For occupational safety success you do not need to do what you must do for reliability success. Safety success does not need sound engineering design knowledge that reduces the probability of failure. You do not need to ensure that your machinery manufacturer gives you properly made components accurately assembled in the machine. You do not need precision skills and tools to install internal machine parts to a tolerance of 10 micron. You do not need to ensure the machine is always operated as designed and its parts maintained to design conditions. Safety creation is easy to achieve compared to producing plant and equipment reliability because you can bring safety into a company, but reliability creation is a foundational keystone of a company—it is how a company lives; it is in its DNA—reliability is inbuilt; never tacked-on.

Interestingly, whereas occupational safety does not affect reliability, reliability success always improves work safety results—world class reliability also delivers workplace safety for free³.

What to do to get Reliability into Your Company

Because reliability cannot be ‘tacked-on’ you have to approach reliability improvement totally different to safety improvement. Outstanding reliability is not easy to have because you must be great at doing every phase of the life cycle well. From Boardroom choices, to drawing board

³ Moore., Ron, *Making Common Sense Common Practice*, Elsevier Butterworth-Heinemann, 2002, OEE-Pg 224

choices, to operating and maintenance choices: get any one of them wrong and you lose operational reliability. You may have a ‘right here and now’ need to get higher reliability, but reliability responds to life cycle practises—good practises throughout the whole life cycle give good operating results; bad practices anywhere in the life cycle get you bad operational results. Truly, reliability success starts on the drawing board, but if it is not possible to change your company’s past, then what can you do from today forward?

If you want stunning reliability success in future you need to put someone onto the job of replacing bad life cycle practices with the right ones. If you have ‘right here and now’ needs start by separating equipment reliability success in two—what to do during the life cycle before handover, and what to do from handover onwards. Set up two cross-functional teams. In each team at least have a manager from finance, a manager from operations, a manager from capital projects and a manager from maintenance (Everyone’s actions throughout the company are important if you want world class reliability). One team concentrates on what needs to happen in your company from today forward to have high reliability. Their job is to find out how to improve operating phase reliability. The other team concentrates on what must be done from the first phase of the life cycle to create high reliability operating assets.

Be careful here—you cannot ‘bolt’ reliability onto a company, you must build reliability into the company. The team that works on the life cycle phase before handover will be the team that permanently changes your organisation’s DNA. The team that works on the operating phase of the life cycle is only ‘patching problems’ in your company. If you only concentrate on removing your ‘here and now’ problems, and do not stop new problems entering into the operating phase, you will in a few months start to return to bad reliability once the improvement teams disband.

Luckily reliability improvement, like safety improvement, is a set of activities and practices to adopt. First you need to know what are the right activities to do throughout the life cycle which guarantee high operational reliability. But knowing what to do does not cause improvement. Once you know what to do, you also need to know how to do those right things rightly.

There is telling advice from the famous Antarctic explore Ernest Shackleton which may help you understand and appreciate why—if you want world class reliability results—it is important to do the right things rightly at every phase of the life cycle. The extract below comes from the book ‘Shackleton’s Way’ and relates to an incident which occurred during the Antarctic Quest expedition⁴ that sailed soon after World War I.

“Marr had unlashd a drum stored on the ship’s deck and was opening it when Shackleton gave ‘a needed lesson on common sense sailorising’.

“Don’t try to do too many things on your own until you’ve got the hang of them,” Shackleton told him. “If any accident happened and that drum fetched away, the boatswain would be blamed, because safe storage is his job. When you mix it with another man’s job, always remember that he might have to take the blame that’s rightly due to you.” Marr watched the Boss (Shackleton) lash up the drum while explaining: “You’ve put on a slippery hitch. Here’s the right way, it is the right way that counts at sea.”

The comment, “You’ve put on a slippery hitch. Here’s the right way, it is the right way that counts at sea.” is what is important in the context of this article. On board an ocean going sail ship it is life and death to tie the wrong knot. It is not sufficient to know that you must make a

⁴ Morrell, Margot., Capparell, Stephanie., *Shackleton’s Way*, Nicholas Brealy Publishing, 2001, Pg 116

knot; you must know exactly which knot to use, and you must make that knot right every time. Outstanding plant and equipment reliability needs the same understanding of what causes great reliability as Shackleton had of sailing the world's roughest oceans trouble-free. Shackleton knew that if today you tie the wrong knot in port; next year you die in the Antarctic. 'Doing the right thing rightly' as a vital principle for outstanding machinery reliability and Shackleton understood that the principle applied to surviving dangerous explorations as well.

Knowing the right skills to apply at every phase of the life cycle is critical for great reliability. Equally vital is to properly use those skills. Working on your peoples' attitude first will never bring reliability. You cannot 'evangelise' reliability into your company. Reliability involves doing the right life cycle behaviours. Great reliability comes from the act of doing great quality craftsmanship in all phases of the life cycle. You can talk as much as you want about how to become highly reliable, but world class reliability, like world class safety, is founded on doing the correct practices all the time. You have to change to the right practices everywhere in your company and use them rightly always—from the start of its business life; for its entire life—if your organisation wants to guarantee world class reliability.

The Reason that You get Poor Reliability in a Company

The truth is that it may be impossible to change some companies reliability performance. The reason is that once people are trained wrongly it is impossible to change what they learnt. This applies equally to corporate managers at MBA classes, as it does to shopfloor workers in training courses. I first came across this fact in the books 'Out of the Crisis' and 'The New Economics' by the late quality guru W. Edwards Deming. Deming was one of the key people credited for the Japanese quality dominance of the latter half of the 20th century. In both books Deming laments the misfortune of being taught by 'hacks' who do not fully understand what they are teaching. In his industrial career and consulting engagements he continually saw the lasting foolishness and incompetence taught to other by teachers who did not know their subject well enough.

Since reading Deming's books I have come across many references explaining how our brain works and why Deming was right. Fundamentally, learning occurs when the neurons firing in our brains take-on a pattern that correspond to what we learnt. Once the neurons are set into the pattern relating to a learned action the pattern is there for life. But immediately the memory starts degrading⁵. If you learn to do something wrongly you will always do it wrong because your brain has been 'hooked' into a defined neuron arrangement that automatically triggers whenever the same situation occurs in future. What is worse is that the memory will be incomplete and your brain 'kindly' makes up the missing information on the spot. Once you are taught wrong you are ruined for life—you never get the incorrect pattern out of your head. Compounding your risk is the longer that you do not use a neuron pattern, the more mistakes you will make in future when you do need to use it. The once-fixed neuron patterning within a human brain cannot be changed, nor can it be overwritten, it can only be dominated by more recent learning. This means that if you and your people do not want to deeply learn the new skills and the new ways that will produce reliability, then no matter how much 'reliability evangelising' you do, it will not change your company's reliability results—people will continue to act and behave as they now do because that is the pattern imbedded in their minds.

Picking up bad habits is not just a learned behaviour problem, it is also a human brain design problem. If people do not learn the right skills; do not use them the right way; do not reinforce the right skills regularly so the correct patterning dominates their brain, they never get competent

⁵ Medina., John, *Brain Rules – 12 principles for surviving and thriving at work, home and school*, Pear Press, 2008

with the new ways, so when situations arise that they are not ready for their brain makes them fall back into the old patterns it knows well. If you want to create reliability you may need to get new people and move the old employees to new jobs (Yes, you included). Give the old employees jobs that they have never done before and be sure to correctly skill and properly train them first-off—you only have one chance to imprint their brains right!

You Can Create a Reliability Culture in Your Company

If you want to build a corporate culture where reliability creation is habitual, then use the great explorer Ernest Shackleton's advice, "Here's the right way, it is the right way that counts..."

First specify the right practises to use in your company throughout the life cycle. "What is the right way?" Shackleton would ask you. These practices need to be built into your corporate DNA. Start with the facts—exactly what must be done in every step of every phase in the life cycle, and how well must they each be done, to guarantee a machine's operational reliability for its entire working life. Include specifying and defining the right skills and actions people must use.

Once you know what exactly must be done, and how well it needs to be done, you next need to develop the right skills and the correct practices that produce that performance. You are going to have to help your people 'dominate' their brains with the right behaviours so they 'bury' any past bad practices. Finally you will need to create work processes where right practise is followed and which prevent past wrong actions returning. Once you and your people are in the habit of properly doing those actions that bring outstanding reliability, the right 'mindset' is imprinted in your company DNA.

If you need help to become a world class operation ring me, or send me an email—Lifetime Reliability Solutions is here to help you to become a world leader in your industry. It is why we created the Plant Wellness Way system to world class reliability.

My best regards to you,

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March 2012