

The development of a reliable scientific approach to measuring, understanding and changing safety cultures.

Part 1

By; *Patrick Ragan, CSP, MBA and Brooks Carder, PhD*

Over a 25+ year span we worked to develop a way of measuring safety in a way that would take out bias and provide reliable information to assist organizations in continuously and permanently improving the process that keep accidents from happening. The following text describes out lessons learned, the process we developed and a tool that has worked well for companies we worked with.

Other publications on this effort and process can be found at our webpage - newgenerationsafety.com .

The paper is provided in 2 parts

Part 1: Why pick Culture as the most important thing to measure and improve to get better safety results.

Part 2: Examples of how culture impacts safety results and a tool to help understand causes and guide actions to improve any organizations culture.

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Part 1: Why pick Culture as the most important thing to measure to improve to get better safety results.

Let's begin with a few questions on culture to get an idea of what your current feelings are about it.

1. Does your organization have a good culture?
2. Does your organization have a bad culture?
3. Does an organizations culture have a big influence on individuals' decisions and risk tolerance?
4. Can a culture be measured?
5. Can culture be influenced?
6. Can culture changes happen almost overnight?
7. Do culture changes take at least 18 months to see?
8. Does management create the culture?
9. Does the environment create the culture?
10. Do peer groups create the culture?
11. Does the individual worker create the culture?

We could respond to the specifics of each of these questions but let's take a little more of a system level view of the questions.

Is Culture a noun or an adjective? Does it designate or describe? Absent this clarification it can be difficult to know what to measure.

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A culture is not a subjective thing. It is not good or bad, it just is. It influences individuals, but individuals also are the biggest influencers of the culture. The community creates the culture, but the culture is the construct of the community.

Culture is constantly changing making it resistant to static measures. Culture can also be a stabilizing influence against change, both good and bad. However, there can be fundamental changes even in huge immovable cultures overnight. Was America's, even the world's, culture not shaken and changed by the September 11th, 2001 terrorist attacks? Overnight?

Culture is so difficult to describe, so fluid and so multi-faceted, it is difficult to know how or what to measure. Yet culture is so influential it cannot be ignored.

Recent research in psychology has yielded some fascinating insights into the nature of culture and revealed a confounding aspect of improving cultures. This work has strongly influenced our thinking about culture.

Based on a large body of work which led to the award of a Nobel Prize, Daniel Kahneman and Amos Tversky, described two systems which guide behavior. System 1 is unconscious, fast, jumps to conclusions, tends to ignore evidence that conflicts with its original conclusion, and makes many/or most of our decisions without us even noticing. System 2 is conscious, slow and rational. It can overrule system 1 decisions, but spends most of its time rationalizing them instead.

Much of culture appears to be in system 1. Reacting to culture is usually not a conscious and deliberate process. You intuitively know what the culture is. Once established, culture is difficult to change because of the properties of system 1. In surveys we have used to measure culture we have questions about both the management system and the culture. The former can be changed rapidly while the latter generally is slow to change. A management system question would be, "Do supervisors discuss accidents and injuries with employees involved?" If your organization is not discussing accidents and injuries with employees it could start tomorrow. A culture question would be, "Do employees trust the information that management provides about the company?" If they don't trust management's information, it is going to take a long time to change. The distrust lies in System 1, which is resistant to new information.

In fact, our research shows that the questions we label as culture do change, but change more slowly than management system questions. Culture change requires persistence, patience, and a good measurement system. The organization must know if their actions are getting the desired results. Without this ability to measure results it is easy to do the exact wrong thing with very right intentions.

What do we do to better measure safety to get these desired better results? This was the question a task team we put together struggled with some twenty plus years ago. We started by seeking a new meaningful measure for safety performance and ended up with a process that monitored cultures. This unexpected approach gave us and the companies we worked with even better results than we or they could have hoped for.

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Essentially, we decided we could not define, but we could observe. We could not measure, but we could monitor. We could not force, but we could influence. We could observe, monitor, and influence the aspects of culture that were foundational elements of processes generating accidents. Over time we found improving the culture affected much more than the safety results. The work on improving the safety culture was improving the culture overall. How could improving employees' perception on a question such as "Do employees trust the information that management provides about the company?" not have an overall culture impact.

Because we had the luck to be in the middle of a wave of applying science to process improvement, also known as the quality movement, we had a number of tools we had not considered in the past. These newly found quality tools gave us new monitoring and learning leverage to understand and influence incident producing processes.

With our idea to focus on culture and new, to safety, quality tools in hand we asked ourselves; How are other social non-static systems measured and monitored? We saw epidemiology and politics as two areas that were close to our needs.

In epidemiology you use process outputs to back track the causes of usually biologic systems. With enough data you can use what you find to be more proactive in prevention. A good example of this is how they predict and select each year's flu vaccine. In safety, good incident investigations yield not only proximate causes, but also paths to prevent other incidents often unrelated to the incident being investigated.

In Politics they need to monitor the changes in their constituencies to determine if what they are doing is getting the desired result. Epidemiology uses reflective logic as the foundation for determining the causes of trends in the systems they look at. Political parties use polls, a form of survey, to see if the people agree with where they are and where they believe they are headed. Polls/surveys have a bad reputation not because polls/surveys are unreliable, but because often the people employing polls/surveys are not reliably adhering to proper scientific techniques. ⁱ

The next step was to develop the information now held on processes. That would give insights into how to improve the process.

We did a lot of work testing and evaluating our various theories of why people had accidents. We tried to find what level of influence the culture people worked in had on the actions they took and the decisions they made that resulted in their having accidents.

Some basic ideas we learned about culture and its influence on accidents and errors in general include:

- Most people want to do what they believe their company wants them to do. The same applies, to a slightly lesser extent, to how they want them to do it.

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- People interpret what the company wants them to do more from the culture they see in actions and hear from their peers than the words they hear or read from their leadership.
- A culture can be monitored and improved if the processes used to do so are unbiased. Testing for reliability and validity requires the application of what Dr. W.E. Deming's described as a "system of profound knowledge".
- Surveys only work when they are anonymous and those taking the survey believe them to be so.
- People will almost always know when these principles are not being followed and when statistics are being manipulated
- Even people trying to do the right thing will fail at predictable rates. System safeguards need to be built in such a way as to account for the frequency and potential severity of the outcomes of these natural failure rates.
- Cultures or systems tend to be made up of three general components:
 - Human
 - Organization
 - Material/Environmental
- When considering how to change a culture one needs to consider the impact of all three of these general components to have a full understanding of what happened and what to do to get the desired results in the future. We believe that all three are present in 100% of incidents, errors and success that occur.

In his recent book, Edward Martin Bakerⁱⁱ noted the following:

- The practical value of knowledge is as foresight.
- Knowledge makes predictions possible.
- Knowledge empowers management to bring about the future it wants for the organization. It can help each of us to produce the future that we want and to avoid the future we don't want.

Mr. Baker also noted that he had heard Dr. Deming say, "Information is not sufficient for making predictions. Knowledge enables prediction and it requires theory."

We agree, and believe strongly that improvement is based on good information about where a process is, where it is headed and understanding the normal process limits. This information can then be used to develop knowledge that allows an organization to more efficiently and effectively cause positive change to happen and prevent a slide into decline.

Improving an organization's safety culture not only results in fewer "normal" incidents, but is the only way we know of to influence Low Frequency High Consequence events. By definition, the frequency of these events is too low to allow trends to be tracked for any but the largest organizations. But, the

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consequences are too serious not to try to prevent even one from occurring. Improving culture reduces the frequency and severity of culture driven individual decisions that lead to Low Frequency High Consequence events.

Conclusion

You can have an aggressive change culture. Monitoring such a culture will help provide foresight to prevent changes that generate too high a level of risk and avoid actions that individuals or processes are not capable or qualified to do.

We believe, and ultimately demonstrated, that we could measure culture in a way that offered information that would yield culture improvement, reduce accidents and injuries, and, we believe, result in fewer Low Probability High Consequence events.

In our follow-up paper we will provide examples of why we think culture is essential to moving Safety into a new generation approach, and how we helped the companies we worked with use this to improve their results.

For questions and comments please contact either of the authors.

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Other related publications can be found under the “Our Work” tab at the New Generation Safety webpage (<http://newgenerationsafety.com/index.html>)

ⁱ Many political polls are constructed to provide a wanted outcome not learn the attitude of those polled. A very dangerous and misleading approach.

ⁱⁱ The Symphony of Profound Knowledge: W. Edwards Deming’s Score for leading, Performing and Living in Concert by Edward Martin Baker, Copyright 2017.