

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

## Part 2

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](http://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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Understanding and continuously improving an organization’s culture is more effective than any other strategy at improving results. A quote from one of the most important business leaders of the last century gets to this point as directly as any other we have seen. Per Peter F. Drucker “Culture Eats Strategy for Breakfast.” We would add, “Especially when it comes to Safety!”

***Culture Eats Strategy for Breakfast.*** Thank you, Mr. Drucker, for saying it so clearly.

An example of why culture wins over strategy is provided by the following.

During a production run at a small manufacturing site the procedure for approving a batch as complete and ready for transfer was as follows; Send a sample to the lab and test for the percentage of solvent that remains and repeat until enough solvent is driven off to an established the quality standard level.

Following the procedures operations sent samples to the lab several times but they were having a hard time reaching the required percent solvent level. Before they could reach the prescribed solvent level, the batch started an uncontrolled exothermic reaction. The reaction vessel was over pressurized and most of the product was released to the atmosphere and surrounding area.

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The last sample returned from the lab results still suggested they had a way to go to get to the solvent level they were shooting for.

On investigation it was found that the procedure for running the sample was correct and that the lab had followed it exactly, almost. The lab followed the procedure to the bottom of the single page procedure. There was, however, one line on the back of the page that had one final step that the lab missed. They thought they were at the end of the procedure and didn't turn the page over. That last step on the back of the page was "Multiply the result by 0.5." The operations team was trying to drive the solvent level to one half of the level needed. They had surpassed the specification limit and were well into unsafe conditions hours before the incident finally occurred.

How does this prove Culture Eats Strategy for Breakfast? What strategy would have prevented this incident? None that we can think of. What was necessary was a culture that supported the operations guys saying to the lab, hey wait a minute, something is wrong. The two departments working together to understand the anomaly before proceeding to the

reaction that occurred is a culture issue, not a strategy or even process issue. Remember the basic idea learned that influence accidents and errors; "People trying to do the right thing will fail at predictable rates. System safeguards need to be built in and guided by the frequency and potential severity of the outcome of those natural failure rates." In a strong open safety culture, the operations team would have felt comfortable saying "stop" and find out why this batch was so different than

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others they had run many times. Should the lab employee have turned the page for the last step, sure. Are both not predictable errors of human behavior? Certainly. But you can not expect a strategy to find circumstances such as the printer settings had been changed to double side printing as the default in a money saving idea submitted in a recent "help improve our cost" program at the site. Before that improvement occurred, Lab Procedures were only printed on one side of the page. There will always be unforeseen actions or circumstances that promote or allow errors and accidents to happen. Many more can be seen and avoided with an active open safety culture that tomes of procedures and best intended strategies can ever cover.

It is a sure bet that the strategy of the site was not to have this major release that ultimately resulted in the closure of the site, the loss of over 100 jobs, and the loss of steady income for the community.

A culture that people felt they could communicate openly and question when something seemed wrong, or just different, would have had a better chance of preventing this incident than any strategy or procedure by itself. A culture that makes sure people are fit and fully trained to do a job might have made the difference necessary to have prevented this accident. The lab technician had been trained in

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the procedure, several months ago when she started in the job. She had also lost a lot of sleep tending an ill child the day before this graveyard shift. A culture in which the lab technician felt comfortable to say it has been a while since I was taught this procedure, I would like to review it again with the lab lead before I am left to run the samples in the middle of the night, might have helped. A culture that employees felt obliged to inform management of personal conditions that might affect one's ability to work; a culture that would praise not punish employees for being up front about personal limitations; might also have helped avoid this incident. A culture that promoted any change, no matter how small, needs to be considered for possible unintended consequences. Have you ever missed something printed on the back of a page? Do you check every time to see if the printer was left on single or double sided print settings?

***Culture Eats Strategy for Breakfast.*** Thank you, Mr. Drucker, for saying it so clearly.

Hopefully by now you can accept that culture is at least one of the critical aspects that needs to be understood, measured, and monitored to achieve excellent sustainable safety performance. But, how can it be measured to provide meaningful information to help an organization learn and use that data to improve its actions, to improve its results? You cannot just stick a gauge in the culture and watch the needle. Or can you?

Our search for better ways to measure and improve safety results led us to well constructed culture surveys as the tool we found most efficient and effective. We took lessons from the quality arena and applied them to safety. Here is what we found;

- Surveys are the best tool we found because they are the most efficient and effective way to understand if the people of an organization are aligned with the organization's expectations.
- Done properly, surveys are the most statically driven, unbiased tool we found.
- The purpose of a survey should be to measure the culture at a point in time, not to identify people with bad attitudes.
- Surveys must be confidential and be believed to be confidential. The only way to maintain that credibility of confidentiality is to set up a process that is confidential.
- A question might be well written, but if it does not differentiate strong cultures from weak cultures it has no value in gaining understanding of where and how to act to improve a culture.
- We found the question we asked that most differentiates cultures that are improving and those in decline is one that asks if "the results of the last survey have been used to change things at the organization".
- If an organization is not going to study and act on the results of a survey they should not do the survey. The impact will be negative.
- It is important to share organization summary results and unit level results of the survey with the organization and the demographic groups that took the survey.

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- Good demographics is a force multiplier in helping understand what the survey has to tell the organization.

The survey we use consist of 70 to 80 questions. Most are core questions, but some customization is important to consider. The reader can see ten of the core questions and take a sample survey at our New Generation Safety webpage (<http://newgenerationsafety.com/index.html>). Access is located at the bottom of the home page.

The 10 Sample questions are:

- |   |        |
|---|--------|
| 1. Do employees participate in the development of safe work practices?                                  | Yes No |
| 2. Is off the job safety a part of the company's safety program?  | Yes No |
| 3. Does the company seek prompt correction of problems found during inspections?                        | Yes No |
| 4. Supervisors treat subordinates with respect.   | Yes No |
| 5. Employees trust the information that management provides about our company.                          | Yes No |
| 6. Are safety rules effectively enforced?   | Yes No |
| 7. Do employees caution other employees about unsafe practices?   | Yes No |
| 8. When you are asked to do a new job do you receive proper training?                                   | Yes No |
| 9. Do you believe the equipment and facilities you work with are maintained to ensure a safe operation? | Yes No |
| 10. Do employees understand the hazards of the jobs they perform?                                       | Yes No |

All the core questions we use have been tested and validated multiple times at multiple sites and with different company cultures. No rats or pigeons were injured in the confirmation of this process because none were used. We don't subscribe to the idea that human and animal cultures are comparable. You can find similarities, but the alignment is mostly in the mind of the study team.

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The survey process works as follows;

1. A site/organizations decides they want a better safety culture.
2. They set up and administer the survey.
3. They receive and analyze the survey.

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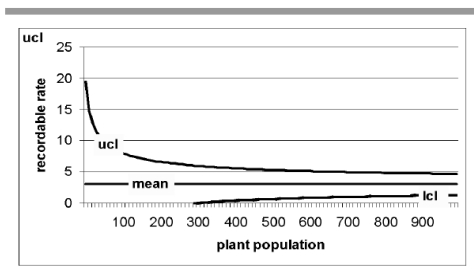
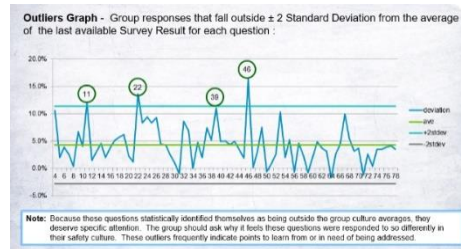
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4. They define needed actions and just do it.
1. Repeat

There are many tools to help get the most out of each step of this process. They include

- Statistical tools to confirm question/process validity for each organization.
  - Statistical Process Control charts
  - Poisson distributions
  - Histograms
  - Question paired comparisons



**FIGURE 2.** Control limits for accident rates as a function of plant size for a mean accident rate of 3

Factor / Category	2016 Group Surveys	2016 All Company Surveys	2012 All Group Surveys
1. Employee Engagement	92%	89%	89%
2. Living HSE	75%	66%	71%
3. Management Commitment	94%	90%	85%
3b (Mgmt. Commitment – Provisional)	96%	95%	NA (new)
4. Environmental Protection	96%	93%	93%
5. Rules and Accountability	93%	87%	89%
6. Process Safety	96%	90%	89%
6b (Training – Provisional)	84%	77%	NA (new)
Average question score	93%	88%	88%

- Logical cause analysis
  - Causal Tree
  - Fishbone diagrams
  - 5 whys
  
- Tools to help consolidate data for better understanding of what the organization is saying and what might have the highest influence when worked on
  - Facilitated Group Dialogue sessions

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- Affinity diagram grouping of team thoughts
- Influence diagrams



### Conclusion

While it is not possible to stick a gauge in your culture to monitor its status, it is very possible to get information from the people that make up that culture to tell you where it is, the direction it is headed, and how to get the changes you want; to reduce unwanted actions and increase the likelihood of wanted actions.

We have found that well constructed employee surveys are the best and most reliable way to get this information. Good surveys are not easy to do but are well worth the effort.

A good survey process:

- Gives honest and open feedback on what employees believe they are being told is important by the company and their managers.
- Uses Team effort to understand the specifics of the survey as it is the most efficient and effective way to make these improvements in a positive way.
- Allows proactive actions to impact before the incident, not just react to incident trends.
- Improves the Safety Culture to promote a strong, safe, risk adverse, willing to stop and take the time to evaluate changes, culture that not only prevents injuries and incidents, but guides actions that will help prevent Low Frequency / High Consequence events that are hard to affect any other way.

Year	Average Question Score	Total # of Surveys Returned
2004	72%	930
2009	80%	2133
2012	89%	1313
2016	89%	2644

For questions, comments or an example of a survey output 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>)