



## The Future of Behavior-Based Safety

By Gennifer Lyon

For 30 years, employee-driven safety systems – sometimes known as behavior-based safety (BBS) – have been widely implemented. But how effective have these approaches been really? New research on DEKRA’s Behavioral Accident Prevention Process® (BAPP®) approach from the University of Cambridge Judge Business School provides some surprising answers, with implications for the future of safety practice globally.

### Where are we and how did we get here?

DEKRA’s BBS methodology, or Behavioral Accident Prevention Process (or BAPP) technology, was built by BST over a decade in the 1990s. The method focused on safety, but it was built on general business performance improvement principles. The behavioral science was employed for the design. As a result, BAPP technology layers on additional value, social interaction skill development,

data use, and social norming. The business performance improvement for clients using BAPP technology were and still are compelling. For most of our clients, the effort has been sustained for years, if not decades. What is not to like?

Looking at BAPP technology today, one might wonder if the robust methods are truly worth the extra effort over a typical “plug-and-play” BBS effort. Justifying the intensive amount of internal resources needed to keep observations going

has detracted from BBS efforts generally. On the other had, the value adds for BAPP safety do not come without additional resources. Over time, many companies moved on to safety improvement approaches that appeared to be more expedient: standards, technology, process-focused improvements, and leadership development.

Given DEKRA's value for continuous improvement and scientific rigor, we decided it was time for us to revisit BAPP safety and initiate a project to research and modernize it. In 2014, we assembled all our client data into a data-warehouse and mined it for information. We wanted to know what mechanisms make the BAPP intervention work best, identify what factors added value and what did not, and develop a better understanding of the factors that improved its ability to focus on risks with potentially serious outcomes.

Shortly after this project began, we were approached by an independent academic researcher with an interest in business interventions for performance improvement. This researcher ran across our work in the field with a few of our clients and wanted to study our methodology and approach – his perception was that we were doing something uniquely sustainable and impactful and he wanted to know how it worked and if there were general lessons for business process interventions that could be adapted to other problems.

Not knowing how this would turn out, the prospect of working with a researcher at the Cambridge University, Judge School of Business, was too interesting to pass. He is a trained econometrician with experience in financial analysis, program assessment, and consulting. We agreed to help him with his peer-reviewed study. He agreed to help us know if BAPP technology was worth the reinvestment and to learn more about the mechanisms that work. The following summarizes the preliminary results of the first planned research by this Cambridge researcher.

We made our data available to this researcher (anonymously). These data assimilate over three million observations, monthly incident frequencies, and exposure hours from nearly 360 client sites, and include every matching summary employee survey result. The resulting study sample included all client sites having at least one year of baseline injury and hours data, at least one full year of injury and hours results, and a complete series of observations for the first year without any interruption in the series (identifying data that were complete and uncorrupted). In the end, 88 client sites and 1.3 million observations were included in the study. No other criteria for selection were imposed.

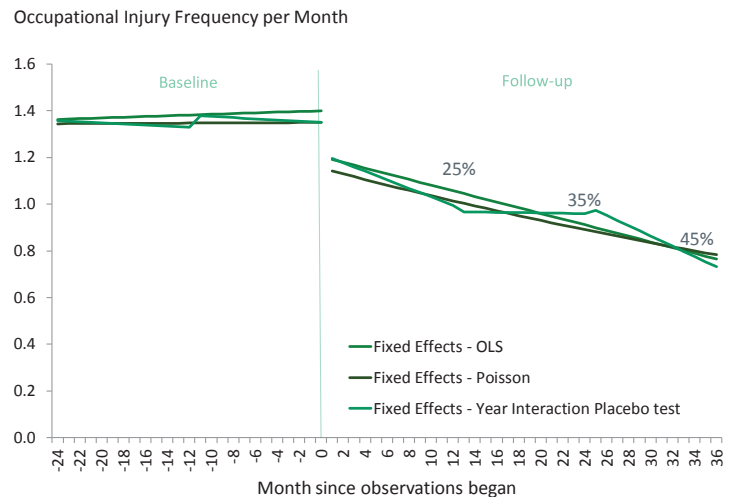
## What did we learn?

This work confirmed that BAPP technology works, this time using more sophisticated analytical tools. Two findings illustrate safety performance improvement:

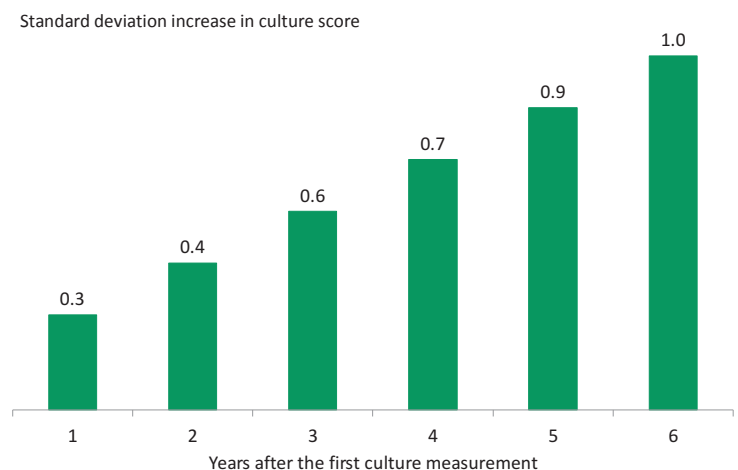
1. BAPP technology worked to reduce incidents by 25% in year one, 35% in year two, and 45% by year three, after controlling for baseline average and trends (Figure 1).
2. Our analysis is highly suggestive that BAPP methodology had a causal impact, although it is difficult to definitively claim causality.

From a technical point-of-view, it is important to know that the results remain unchanged after controlling for a large array of controls, as well as doing a placebo test – a standard test for our research design. Negative binomial tests also confirmed these results.

**Figure 1**



**Figure 2**



The implementation of BAPP technology coincided with improved safety climate measures (Organizational Safety Culture Diagnostic measures of employee perceptions of organizational support) year over year (Figure 2).

There were variations in the results. While some were logical and unsurprising, (i.e., larger client sites got better results, they also had more incidents to start with), other results were helpful to understanding the way BAPP technology works. This is where things get interesting.

## What influenced BAPP technology effectiveness?

### Activity strategies: participation vs. intensity

One of two strategies can be used to get observations done: One strategy increases participation by expanding the pool of observers. The other keeps only a few observers, but they each do more observations. We learned that having fewer observers doing more observations is more effective (Figure 3).

### Observer development strategies: rotation vs. tenure

One of two strategies can be employed to staff observers: One strategy tenures observers, keeping them longer and potentially develops seasoned observers. The other strategy rotates new observers in and retires observers early. We learned that having longer tenure as an observer decreased impact and that low tenure is good. Tenure is not the same as experience (how many observations an observer did) (Figure 4).

### Observer deployment strategy: localize or generalize

One of two strategies can be employed to view risk: Cold eye or familiar eye. One strategy sends observers where they are most familiar with the work, the other takes them to look at risks in locations where they are unfamiliar. We learned that having observers provide feedback on fewer areas was better (Figure 5).

### Other clues of better performance:

Several other findings related to the quality of the effort. The researcher identified capture and use of data indicated by completeness of the observation record and use of follow-up mechanisms. He found that clients who focused on fewer critical issues, who adapted to changing risks, and who coached observers also did better than those who did fewer of these activities.

We have a better recipe for BAPP technology. We have known adaptations that produce twice the results, with half the effort. And, there is more to come. Welcome to the 21st Century!

Figure 3

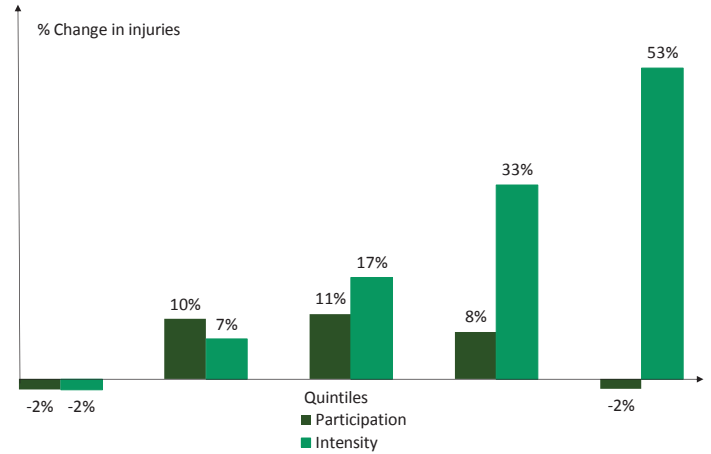


Figure 4

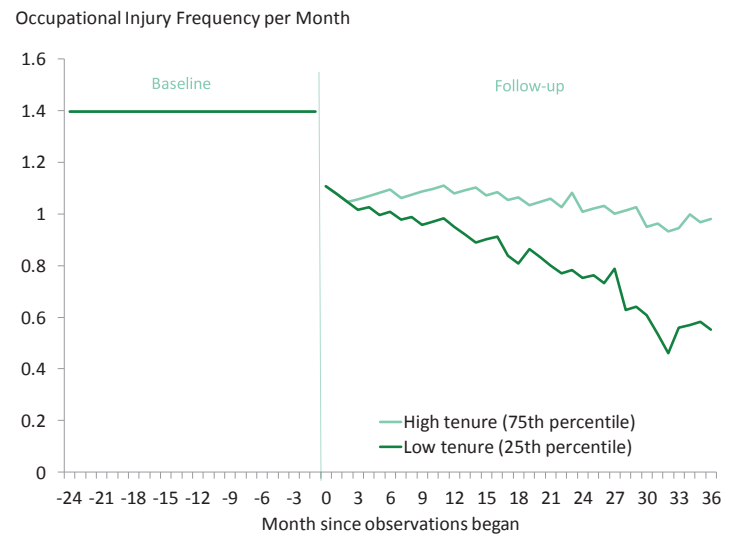


Figure 5

