WHITE PAPER

The Future of Behaviour-Based Safety

For 30 years, employee-driven safety systems – sometimes known as behaviour-based safety (BBS) – have been widely implemented. But how effective have these approaches been really? Research on DEKRA's Behavioural 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 Behavioural Accident Prevention Process (or BAPP) technology, was built over a decade ago in the 1990s. The method focused on safety, but it was built on general business performance improvement principles. The behavioural 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 modernise 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 summarises 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

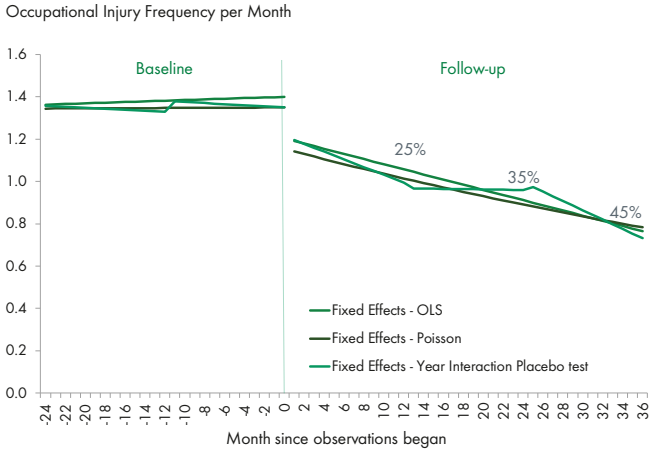
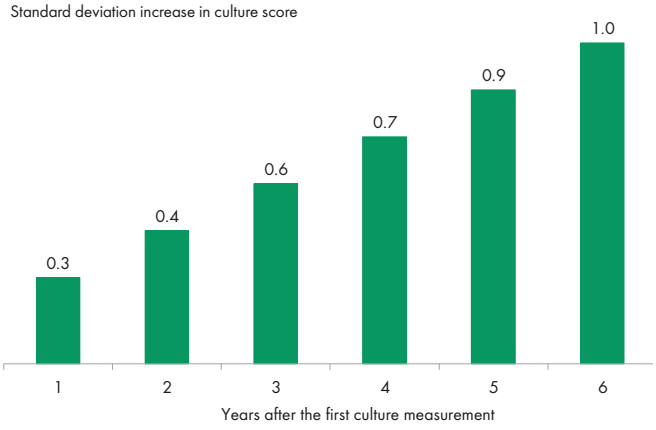


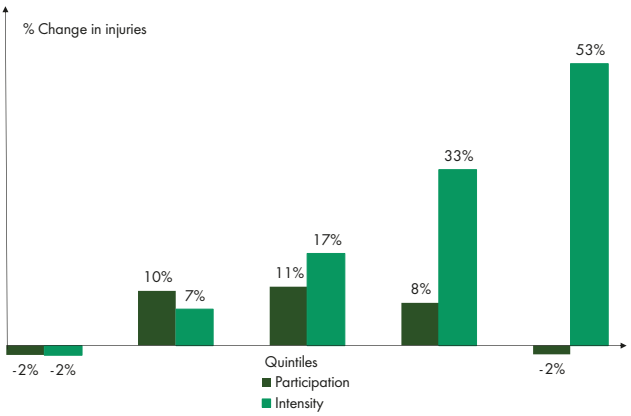
Figure 2



The implementation of BAPP technology coincided with improved safety climate measures (Organisational Safety **Culture Diagnostic** measures of employee perceptions of organisational 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.

Figure 3

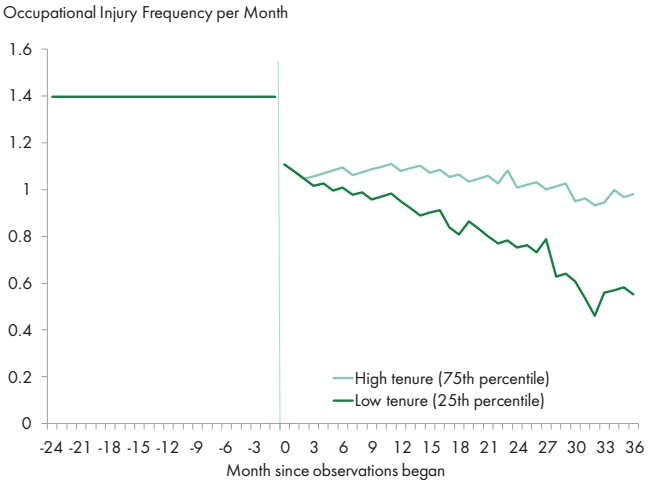


What Influenced BAPP Technology Effectiveness?

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).

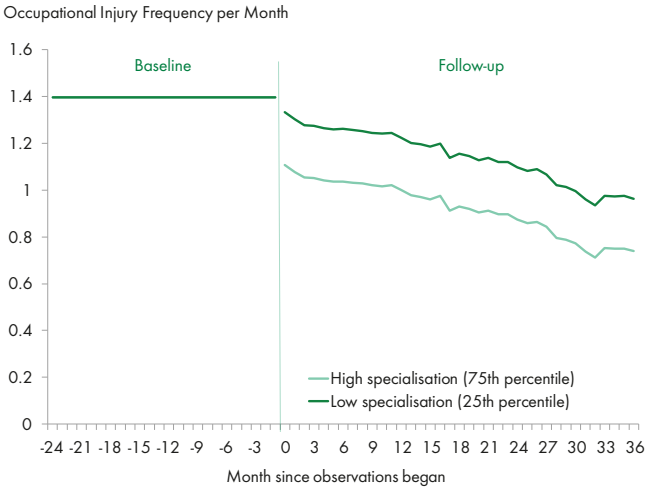
Observer development strategies: rotation vs. tenure
One of two strategies can be employed to staff observers: One strategy tenures observers, keeping them longer and potentially develops seasoned observers. The other strategy rotates new observers in and retires observers early. We learned that having 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).

Figure 4



Observer deployment strategy: localise or generalise
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).

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!

DEKRA Organisational & Process Safety

DEKRA Organisational and Process Safety are a behavioural change and process safety consultancy company. Working in collaboration with our clients, our approach is to assess the process safety and influence the safety culture with the aim of 'making a difference´.

In terms of behavioural change, we deliver the skills, methods, and motivation to change leadership attitudes, behaviours and decision-making among employees; supporting our clients in creating a culture of care and measurable sustainable improvement of safety outcomes is our goal.

The breadth and depth of expertise in process safety makes us globally recognised specialists and trusted advisors. We help our clients to understand and evaluate their risks, and work together to develop pragmatic solutions. Our value-adding and practical approach integrates specialist process safety management, engineering and testing. We seek to educate and grow client competence to vide sustainable performance improvement; partnering with our clients we combine technical expertise with a passion for life preservation, harm reduction and asset protection.

We are a service unit of DEKRA SE, a global leader in safety since 1925 with over 45,000 employees in 60 countries and 5 continent. As a part of the world's leading expert organisation DEKRA, we are the global partner for a safe world.

We have offices throughout North America, Europe, and Asia.
For more information, visit www.dekra-uk.co.uk/en/dekra-organisational-and-process-safety/
To contact us: dekra-ops.uk@dekra.com
To contact us: +44 (0) 23 8076 0722

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