

Bowtie: A Revolutionary Tool to Manage Risk and Boost Food Safety Culture



Almost every large industry in the world - including energy, chemical, medical and cybersecurity - is currently using a tool, called Bowtie, to manage risk. Despite this widespread use, it has yet to be adopted by most food and drink businesses, yet many could use it to tackle challenges that have been a focus in recent years.

By Andrew Collins, Food Safety Management Systems Lead at Campden BRI

Allergen management and food safety culture are at the top of the agenda for many food business operators (FBOs). Yet the ordinary charts and tables of HACCP plans are seen by some as currently lacking the adaptability and holistic view that is key for good communication. This is where Bowtie comes in. As seen in Figure 1, this simple tool can help FBOs visualize risks while providing a much more comprehensive review of their food safety systems. In a nutshell, this can allow food manufacturers to boost food safety culture (by highlighting why barriers are in place) and aid allergen management (by identifying new barriers). It's important to highlight that this simple tool does not replace HACCP, but instead can enhance FBO's food safety management and HACCP plans by providing an extra level of robustness and visual clarity. The tool makes it easier for FBOs to identify factors that could


compromise barriers, helping them put in place additional barriers to prevent a hazard, such as allergens, from occurring and escalating.

Put simply, FBOs can use Bowtie to improve their current food safety system by proactively identifying risks and easily adapting their system to incidences and occurrences.

Here I'll focus on how Bowtie can help improve food safety culture and allergen management.

Why these two?

Not only have



they been an area of attention in recent years, but they also put great emphasis on communicating risks, which is what Bowtie can help with. Before we delve deeper, I'll cover the basics behind Bowtie.

WHAT IS BOWTIE?

Bowtie is an approach that was originally developed in the petrochemical sector and has now spread to many of the largest industries including aviation, energy, chemical, mining, medical, health & safety and even financial. The simple visual tool for risk management and communication simplifies the need to look at the management of hazards at every process step, thereby increasing efficiency by reducing repetition. Critically it highlights that risk management requires many barriers to be identified and establishes the need for ownership of these barriers to give a holistic approach to food safety management. Bowtie is effectively a picture that says a thousand words.

EXPLAINING THE BOWTIE MODEL: WHAT DOES IT MEAN?

Putting into words the components of the Bowtie and how this allows us to manage risk isn't easy due to the multiple, interconnected elements. The best way to understand it is by looking at an image that names each of these elements (Figure 1). Explained briefly, there are eight elements in Bowtie methodology. The hazard is the 'desired state'. In food safety we have a legal definition that defines a hazard as a biological, chemical or physical agent. The Top Event is the point at which we lose control of the 'hazard'. These two elements form the knot of the bow tie. Threats that lead directly to the Top Event, and consequences that are a direct result of the Top Event occurring, need to be identified. Beyond what forms the bow tie's knot, another key point to understand is that the left of the bow tie covers threats and prevention, while the right side covers consequences and recovery controls.

Barriers also need to be identified. Proactive barriers, sometimes called preventative controls, prevent the Top Event, while reactive barriers, sometimes referred to as mitigation controls, reduce the impact of potential consequences. There are factors that may reduce the effectiveness of the barriers; these are called degradation factors. Degradation barriers that reduce the effect of these factors would also need to be identified.

FOOD SAFETY CULTURE

The importance of food safety culture has become increasingly recognized in the past few years, as has the role of psychology and the importance of behavior-based approaches to food safety management. Within the food industry, food safety culture can be described as the "Shared values, beliefs and norms that affect mind-set and behaviour toward food safety in, across and throughout an organization" GFSI, 2018. Some of these are easy to observe, such as the facilities and equipment, posters and paperwork, and the visible behaviors of staff. However, some are harder to see, such as underlying values and priorities, unspoken rules, and the way things are done when no one is looking. This makes the clear identification and evaluation of food safety culture very challenging. In the recent 2020 revision to the Codex General Principles of Food Hygiene it states that FBOs should, "build a positive food safety culture by demonstrating their commitment to providing safe and suitable food and encouraging appropriate food safety practices". It later goes on to state the elements that are important in cultivating a positive food safety culture. In practice, however, changing and sustaining a strong culture can be a challenge. Food safety culture has also been incorporated in the regulatory framework within the EU. The food industry has seen an increased emphasis on food safety culture recently with a number of certification bodies incorporating it into their standards.

HOW CAN APPLYING BOWTIE HELP IMPROVE FOOD SAFETY CULTURE?

A strong and positive culture is about ensuring all employees do what they should when they should, and this can't be achieved without good communication. By making this communication visual, Bowtie helps staff understand the hazards and risks in their business and appreciate the impact of their actions on the consumer, company and themselves.

The level of detail in the Bowtie can be filtered to ensure the right information is communicated to the intended user. It can be presented at a business level, which may be generic, or at an operational level that contains more detail. It can also show the link in the management of a hazard either from farm to fork and all the links in the supply chain as well as tracking a hazard through a process.

For example, senior managers can see their procedure without all the detail an auditor would need. More importantly, floor staff can easily see the whole process so they understand not just what they need to do but why they need to do it. We're finding that this visual adaptability avoids confusion and helps improve safety culture.

This ability to paint a map of the risk managing process really comes into its own when you consider its use in-situ. For example, operators could have the Bowtie as a print-out pinned up around the factory which would allow them to understand why they need to implement preventative barriers and what the potential consequences of their actions could be. You can't have good culture without effective communication and you can't have effective communication without good culture.

ALLERGEN MANAGEMENT

With the recent publication of Codex's first-ever code of practice on food allergen management and Natasha's Law coming into force in October 2021, it's clear to see that allergen management is not only a current hot topic, but also one that the sector will continue to deal with long term. The important part of allergen management is understanding that there are lots of factors that can contribute to managing this risk. For example, there is not just the product itself that must be considered but also the process, equipment, packaging, environment and people. Considering each of these factors is one thing but being able to visualize them for each specific allergen hazard to identify the most appropriate barriers is another.

HOW CAN APPLYING BOWTIE AID ALLERGEN MANAGEMENT?

Bowtie allows FBOs to map out these factors and barriers, making it easier to identify any that wouldn't otherwise have been considered. Once these factors have been identified, the tool can then allow FBOs to focus on one particular area, 'people' for example, or expand it to include all identified factors.

Overall, seeing how the use of Bowtie has expanded so rapidly throughout similar industries, it's likely that the increased emphasis on safety culture and allergens in the food and drink sector will see a similar expansion in this industry too. It's possible that enhancing HACCP plans with Bowtie becomes the norm in the near future. At Campden BRI, we're at the forefront of implementing this tool in the food industry and are keen to encourage more food businesses to find out how it can help with their risk management needs. •

Bowtie diagram

