Applying Human Factors in Whisky Manufacture – A project of Firsts

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SUMMARY

This paper outlines a case study of the Human Factors (HF) work that was undertaken for a whisky manufacturer, Whyte and Mackay (W&M), at an Upper Tier Control of Major Accident Hazards (COMAH) site in Scotland. The work was delivered by HF specialists at Risktec Solutions (Risktec) and involved: the incorporation of HF into the company investigation process; the development of a process for identifying and assessing safety critical tasks, including demonstration of the process (whisky loading to a tanker) and the development of a process for producing safety critical procedures and demonstration of application of this process. The project featured a number of firsts – the first whisky project for the HF consultant and the first HF project for the client.

KEYWORDS

Whisky, COMAH, safety critical tasks

Introduction

The Health and Safety Manager of W&M contacted Risktec to request HF support following a Health and Safety Executive (HSE) visit. A need for improvement had been identified by the HSE in relation to: the incorporation of HF into the company investigation process; a means of identifying and assessing safety critical activities which may have major accident hazard (MAH) consequences if carried out incorrectly, or impact the recovery of an MAH event, and a process for developing safety critical procedures. The requirement of Risktec was to support W&M to develop these processes and to provide evidence back to the HSE of their existence and application.

Method

The project was split into three main workstreams:

1. The incorporation of HF into the company investigation process.
2. The development of a process for identifying and assessing safety critical activities. This included a screening exercise for the entire distilling site and the demonstration of human failure assessment (HFA) on one activity (tanker loading of whisky).
3. The development of a process for producing safety critical procedures and demonstration of application of the process to the tanker loading procedure.

The work was carried out using a combined approach of remote workshop sessions to undertake the activity screening, desktop work to develop the investigation and safety critical procedure processes and a site visit to the distillery to observe the tanker loading task and start the HFA process. Remote activities were carried out following the site visit to complete the HFA for tanker loading and to input to the final procedure for tanker loading.

Outcomes and impact

The project resulted in the delivery of an investigation process which incorporated HF. This involved the inclusion of simple investigation techniques, such as timeline, the 5 Whys and the Fishbone technique. The guidance and process was targeted for line managers and therefore needed to incorporate intuitive and relatively basic techniques and models. The 5 Whys and Fishbone techniques were supported by HF models to prompt the investigator to think beyond the immediate causes of the event related to human performance, and towards more systemic causes. The HF models included the human failure types (slips, lapses, mistakes and violations) and Performance Influencing Factors, structured around the major categories of Job, Individual and Organisation Factors. Distinguishing between human failure types was important to enable the most effective mitigations to be identified e.g., to avoid slips in misreading a display, improve the interface.

The process for identifying and assessing safety critical activities was based on industry good practice by the Energy Institute and a process that had been refined by Risktec. Screening of activities took place in workshops with operators and was based on an assessment of the 'consequence of failure' and 'level of human involvement' (e.g., fully manual to fully automated). The screening activity resulted in the identification of 10 'high priority' activities in the 'Production' and 12 activities in the 'Maturation' parts of the distillery which required further human failure assessment. Examples of tasks which were rated as 'high priority' for further assessment were: transfer of large quantities of grain which could create static charge with the potential for dust explosion; bulk transfer of caustic and nitric acid which if spilled could have a major environmental impact; unloading spirit tankers; filling of butts and sampling of spirit.

The HFA of tanker loading identified 13 safety critical steps in which a potential MAH consequence existed. An example of a safety critical step was connection of a 'scully' system to the tanker which provides: earth bonding, ensuring tank vents are open; provision of high level probes preventing overfill and application of brakes to stop the vehicle driving away whilst loading. Mitigations to the safety critical steps were identified during the HFA process. Examples of new mitigations to be explored included: liaising with tanker hauliers to minimise tanker queuing which puts time pressure on the operator; provide photos in training/ signage of what hosing in 'bad' and 'good' condition look like (hose leaks are a potential source of spirit loss of containment) and checking that night heaters used in tankers to keep the driver warm are EX-rated.

The process for developing safety critical procedures was also based on industry good practice and included examples of how to apply the guidance. Risktec provided input to the development of the revised procedure for tanker loading which took into account the new procedure guidance. The HFA process enabled some rationalisation of the procedure e.g., removal of a step which described the use of earthing straps which was now routinely not used due to the use of modern 'scully' systems and the removal of a superfluous step to check spirit volume on a historical meter.

The outcome of the project was positive in that the deliverables provided back to the HSE were satisfactory to address and close out the actions that had been raised to W&M.

The HF consultant who delivered the work benefitted from learning about a new sector and applying HF methods in this novel context. Another key learning point for the HF consultant was in the usefulness of having a process safety expert in the human failure assessment workshop. The client benefitted from the support provided from the HF consultant, as whilst they had completed HFA training, they were lacking in experience in applying HFA. The collaboration between HF specialists, process safety experts, health and safety and operations worked very well, and the

outcome was a robust system for assessing and managing the impact of human performance on the site. W&M is currently working through the remaining Safety Critical Activities and undertaking further HFAs in-house.