Deep dive risk management review for offshore assets

Using deep dive audits as an input to safety case reviews.

Scope of work
ABB were asked to carry out a risk management review of Major Accident Hazards (MAHs) for a number of the customer’s offshore facilities in South East Asia.

This audit was intended as a precursor to the 5-yearly offshore safety case thorough review for the assets. The aim was to perform an efficient assessment of the effectiveness of the MAH risk management arrangements on the facilities, to identify any weaknesses in the risk management processes and provide recommendations to address the risks identified in the reviews. The findings from the deep dive audit would feed into the 5-yearly review, making the safety case review less time-consuming.

ABB’s risk management review was in two parts:

- Initial desktop review of relevant process safety information. This review was designed to identify the ‘Top 10’ issues at each facility for more detailed assessment at the offshore facilities through the deep dive process
- Offshore facilities assessments: The 10 issues identified for each of the offshore facilities formed the basis for more detailed reviews (deep dive audits) on each of the assets

Reviewing several assets successively allowed general recommendations for suggested improvements to company risk management standards and procedures to be made which applied to all the assets, as well as assessing whether there was a consistent approach in the implementation of the selected company’s Process Safety Management (PSM) arrangements. These were in addition to recommendations which were raised specific to a particular asset.

Solution
The desktop review used ABB’s proven and well-established methodology of design verification for process safety and used the client’s own procedures, international standards and recognised good practice to assess the existing design and operations against a consistent set of criteria.

The safety critical activities assessed included:

- Hazard identification / assessment
- Target and achieved SIL (Safety Integrity Level) assessment for SIFs (Safety Instrumented Functions)
- Management of Change (MOC) procedures and records
The reviews of the hazard study documentation gave a clear understanding of the breadth and depth of the studies and whether the analysis had been performed to an appropriate level of rigour to support an operating facility. The review of the target and achieved SIL assessments established if there was a clear link from the preceding hazard analysis, and whether appropriate layers of protection had been provided throughout the process and if these were sufficiently reliable to reduce the risks to ALARP (As Low As Reasonably Practicable). The review of the MOC arrangements assessed the procedural requirements and whether these addressed an appropriate range of changes, e.g. people and organisational changes, programmable systems, temporary changes. Sample MOC records were reviewed to assess the competence of the change review teams, that risk assessments were proportionate to the scale of hazard associated with the change, and how actions were completed.

The desktop review raised a number of recommendations relating to PSM procedures at the facilities. The findings from the review were discussed with the client, and the scenarios to be carried forward to the deep dive audit agreed.

Deep dive assessments were carried out on the ‘Top 10 scenarios’ for 3 separate assets, reviewing approximately 3 scenarios per day and involved a process safety consultant and an integrity management specialist. The assessments followed ABB’s proven methodology: for each scenario the layers of protection were identified and tested to assess whether these were in place and were being maintained. This was achieved through interviews with personnel on the asset, and scrutinising records for testing, inspection and maintenance for each protection measure.

The deep dive audits raised a number of general recommendations which applied across all of the assets, for example ensuring that hazard assessment documentation is regularly reviewed and updated. Additionally, the audits identified recommendations which were specific to particular assets. These included improvements to vibration monitoring of equipment, process alarm prioritisation, and for improvements to existing procedural checklists to reduce the risk of a loss of containment during transfer operations.

Benefits
The initial desktop review identified potential areas of concern regarding the risk management arrangements and directed the deep dive audit to focus on specific hazardous event scenarios where there was the potential to improve process safety.

The deep dive assessment on these areas ensures the client:
- Has control of the key process safety aspects of the business
- Spends money on safety management and improvement in the most effective way
- Achieves the process safety performance improvements needed
- Has a consistent commitment to process safety throughout the business
- Has access to the skills, resources and expertise required

Why ABB?
ABB is able to combine process safety delivery and assessment of PSM capability with expertise in training. This has been developed through a background in chemical manufacturing, and as a provider of professional PSM consulting and training.

We have extensive experience of introducing improvements and technical solutions in organisations. The ABB approach to process safety involves working with customer teams to ensure we maximise the use of local operational experience and to share our skills and experience. This approach provides optimum solutions by combining best practice knowledge with a true understanding of operational needs.