Mind the gap – Improving process safety with an integrated approach using risk assessments, incident analyses & audits

Many high hazard organizations use the bowtie method to analyze and assess risks. In the bowtie risk analysis model, barriers are identified which aim to prevent, control or mitigate unwanted scenarios and process safety incidents.

However, process safety incidents and near misses still occur, despite the identification barriers.

This shows that there can be a mismatch between what is identified during risk assessments and how effective the barriers are functioning in reality. So, how can we create a stronger link between risk assessment and operational reality? We may find one such answer in the ability to aggregate incident and audit data onto bowtie diagrams in a meaningful way.

An integrated approach is presented in which the barriers on bowties are used to monitor process safety performance using incidents & audits. This barrier-centric approach highlights weak spots within the safety management system on a concrete level.

Incident data

A bowtie model can be perceived as collection of potential incident scenarios. With Scenario-based Incident Registration (SIR) the investigator is guided through an incident path, prompting questions on the performance of the barriers during the incident. This information is automatically linked back to the bowtie to visualise how often barriers have failed during incidents and why. This information can in turn be used to update the bowtie risk analysis or share lessons learned. SIR aims to support organisations in gathering incident information in a uniform and insightful manner, to increase learning and prevent future process safety incidents.
Audit data

Organizations cannot afford to wait for incidents to happen in order to learn and to improve. A proactive approach is critical to further fuel the improvement of the process safety management system. Barrier-based audits can be used to link proactive process safety signals onto the bowtie model. This provides insight into the weaknesses of the process safety management system before incidents occur and to make specific recommendations to prevent incidents.

Targeted improvement on the process safety management system

Since the audit and incident data is linked back to barriers in bowties, we are able to make targeted decisions on where and how to improve the process safety management system. This facilitates learning from these risk critical signals to prevent process safety incidents.

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