IMPORTANCE OF RISK-BASED PROCESS SAFETY MANAGEMENT FRAMEWORKS

By Erik Vandenberg

Risk-based process safety (RBPS) is a framework that is used to manage and control risks associated with the operation of complex physical assets which could cause significant negative consequences if they were to fail.

RBPS is a systematic approach that identifies and prioritises risks and implements measures to manage these risks in a cost-effective manner. RBPS considers all aspects of the facility's design, construction, operation, and maintenance and helps to ensure the safety of personnel, the environment, and the surrounding community.

Implementing good RBPS management frameworks involves several steps. First, a company should conduct a thorough risk assessment to identify and evaluate all potential hazards and risks associated with the facility. This risk assessment should be comprehensive, considering all aspects of the facility, including equipment, processes, human factors, and external factors. Once the risks have been identified, the company should prioritize them and develop risk management strategies to mitigate them.

Some elements of a good RBPS management framework include:

- Leadership and commitment from senior management
- A systematic approach to risk management
- Clear and effective communication of risk information
- A culture of continuous improvement and learning
- Appropriate training and competence of personnel
- Ongoing monitoring and review of risk management processes
- Operating Procedures including clear and accurate work instructions
- Asset Integrity and Reliability strategies and procedures
- Contractor Management including control and assurance
- Management of Change including deference to expertise
- Operational Readiness including criticality-based strategies

One important part of a robust RBPS management framework, is a rational approach to determination and classification of Safety Critical Element's (SCE), which are any component, system, or process that is essential to the safe operation of the asset. Examples of SCEs may include emergency shutdown systems, pressure vessels, or fire protection systems. SCEs are critical because their failure could lead to multiple fatalities, or other serious harm to multiple people, the environment, or the surrounding community.

The selection of the appropriate Safety Critical Assurance Tasks is paramount to ensure continued safe operation and should be designed to provide assurance that an SCE is operating as intended. These tasks are important because they help to ensure that SCEs are functioning properly and can perform their intended safety functions on demand. Examples may include regular inspections, function testing, and maintenance of SCEs.

Classifying less critical elements as Safety Critical Elements could have negative effects on the ability to accurately prioritize important maintenance and inspection tasks, particularly in resource constrained environments. If less critical elements are classified as SCEs, resources may be unknowingly diverted away from more critical elements, resulting in a failure to properly maintain and inspect the items of genuine high criticality.

Additionally, classifying less critical elements as SCEs may undermine the culture of the organization, as personnel may lose confidence in the classification process and the overall RBPS management framework. It is important for operators of large complex physical assets, that good RBPS starts at the policy level and permeates throughout all levels of the organisation, to maximise safe operations and provide assurance against catastrophic events.

Resources used for this research include:

- Center for Chemical Process Safety, "Guidelines for Risk Based Process Safety"
- American Petroleum Institute, "Recommended Practice 754 - Process Safety Performance Indicators for the Refining and Petrochemical Industries"
- Health and Safety Executive, "Safety Critical Elements and Performance Standards"
- Institution of Chemical Engineers, "Process Safety Management - Leading and Lagging Metrics"

ABOUT VERBREC ASSET MANAGEMENT

Verbrec Asset Management specialises in working with owners and operators across Australia, New Zealand and PNG to provide asset management solutions that increase effiiciencies, reduce cost and improve productivity, unlocking higher value from client's assets.