

AssetCare Counts #19

March 2013

► Pressure Equipment Integrity Management



Fig 1. Damage caused by rupture of a pipe elbow at the Humber Refinery, UK 2001.

In our scope of providing Asset Care services to industry, pressure equipment rates as one of the more important items of plant that requires strict management control. Pressure equipment is high risk due to the potential damaging consequences of failure.

Consider the negative impacts to a business and to people lives if a piece of critical pressure plant containing a hazardous substance in close proximity to people unexpectedly ruptured (ref Fig 1). The consequences are likely to include, serious injury or loss of life, prosecution and fines, damage to plant and structures with loss of production, damage to the environment and negative media exposure.

For these reasons pressure equipment requires extra attention and has specific statutory requirements. For most States in Australia these requirements are defined in the Work Health and Safety Act 2011 and Regulation 2011, with practical guidance given in the Code of Practice for Managing Risks of Plant in the Workplace 2012.

Persons with management or control of a workplace have a duty to comply with the statutory requirements and standards in order to manage the risks to health and safety and to ensure that maintenance, inspection and testing of plant is carried out by competent persons.

The relevant standard relating to the in-service inspection and integrity assessment of pressure equipment is AS/NZS 3788. This standard emphasises the importance of using a competent team of people to develop an effective management plan.

Asset Care services utilized by our clients include management, inspection, testing, assessment and review of pressure equipment. Integrity Management at ALS is about having a team of competent persons, each with niche areas of expertise. This enables us to contribute, communicate and consult with our clients and each other in order to deliver valuable outcomes.

In simple terms, we can define a pressure equipment integrity management methodology in the way that is commonly used for a risk assessment process, i.e. Identify, Assess, Control and Review. The process is known as Risk Based Inspection (RBI) and is a structured process of Integrity Management which enables effective management of the risk. ALS RBI teams provide this methodology to a number of clients across multiple industries and is supported by the following activities:

- Advanced Inspection and testing,
- Assessment of flaws and remaining life,
- Investigation of failures,
- Engineered repair/refurbishment strategies.

An ALS client in the chemical manufacturing industry has integrated the RBI process with their business operations. ALS uses the client's risk management software to consider the likelihood and consequence of failure by a qualitative risk assessment for new and existing pressure vessels and tanks and to prepare the inspection and test plans based on the likely damage mechanisms that may occur for the particular material in a particular operating environment. An effective risk assessment requires an understanding of the design drawings, material properties and manufacturing methods, inspection methods, site competencies, plant operation and maintenance plans. To complete the loop, the role includes a review of inspection findings, repairs or modifications, and re-consideration of the damage mechanisms. The plant is then risk ranked according to the risk assessment score. This ranking is used by plant management to:

- optimise inspection intervals,
- allocate resources and
- prioritise maintenance activities targeted towards the higher risk items (ref Fig 2, 3).

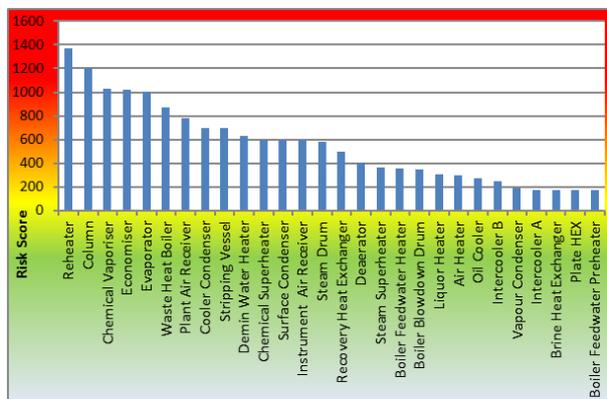


Fig 2. Representation of risk ranking

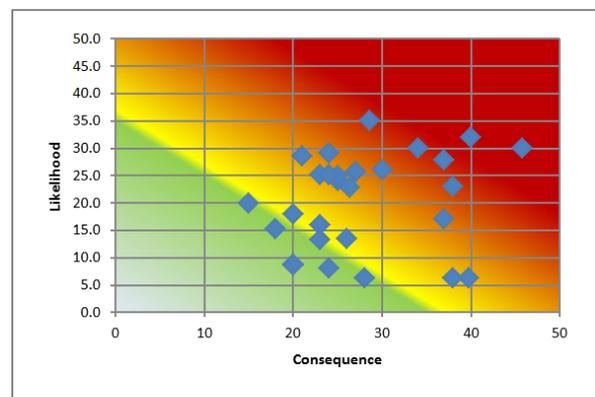


Fig 3. Representation of risk ranking

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