

DEMYSTIFYING ASSET RISK MANAGEMENT

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Industry leaders are 25% more likely than their competitors to have a standardised risk assessment process across all of their operations.

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1 Executive summary

Risk management is topical in the physical asset management arena. AM experts and industry practitioners advocate the integration of relevant and purposeful risk management practices for the optimal utilisation of physical assets.

This paper shares how risk management works synergistically with physical asset management. Risk management is defined as the coordinated activities in support of directing and controlling an organisation with regard to its risks. Reasons are presented why risk management is a high priority in today's business environment and the challenges which asset managers are facing in managing asset-related risks. Asset risk management is explained against the background of the risk management standard, ISO 31000. The asset risk management value proposition according to The Pragma Way concludes the paper.



Risk management is defined as the coordinated activities in support of directing and controlling an organisation with regard to its risks.

2 What is risk management?

Risk management is the identification, assessment and prioritisation of risks and the associated plans and actions to minimise the probability of occurrence and the negative impact that these risks might have on an organisation. This leads to the question: what is considered a risk? The International Organisation for Standardisation (ISO), in ISO 310001, defines a risk as “the effect of uncertainty on objectives”, which means a risk arises from uncertainty related to: financial markets, project failures, legal actions, accidents, natural disasters, business discontinuity, etc.

Risk management is the identification, assessment and prioritisation of risks and the associated plans and actions to minimise the probability of occurrence and the negative impact that these risks might have on an organisation.

The effective management of an organisation’s risks is an essential part of business continuity. All risks can never be fully avoided and some level of residual risk needs to be accepted. It is however important that all risks should be isolated, defined and managed within financial and practical constraints.

3 Why is risk management important?

A benchmark report on risk management² reports that 47% of companies indicate the improvement and reduction of their risk profile as one of the top pressures on their organisations. While the less mature often see risk in isolation, and perceive it as a departmental function, industry leaders are 25% more likely than their competitors to have a standardised risk assessment process across all of their operations. A risk management framework which not only considers safety of employees but also equipment and the environment, commonly forms part of these best-in-class risk management processes.

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4 ISO 31000 – Standard for risk management

ISO 31000 is an international standard on risk management. It consists of a set of risk principles, a risk framework and a risk process. For risk management to be effective the following principles should form part of an organisation's risk culture.

- Risk management should:
- Create value
- Be integrated into business processes
- Be included in decision-making
- Address uncertainty

- Be systematic, structured and timely
- Be based on the best available information
- Be tailored
- Consider human and cultural factors
- Be transparent
- Be dynamic and responsive
- Facilitate continual improvement

Figure 1 illustrates the generic risk framework and process according to ISO 31000.

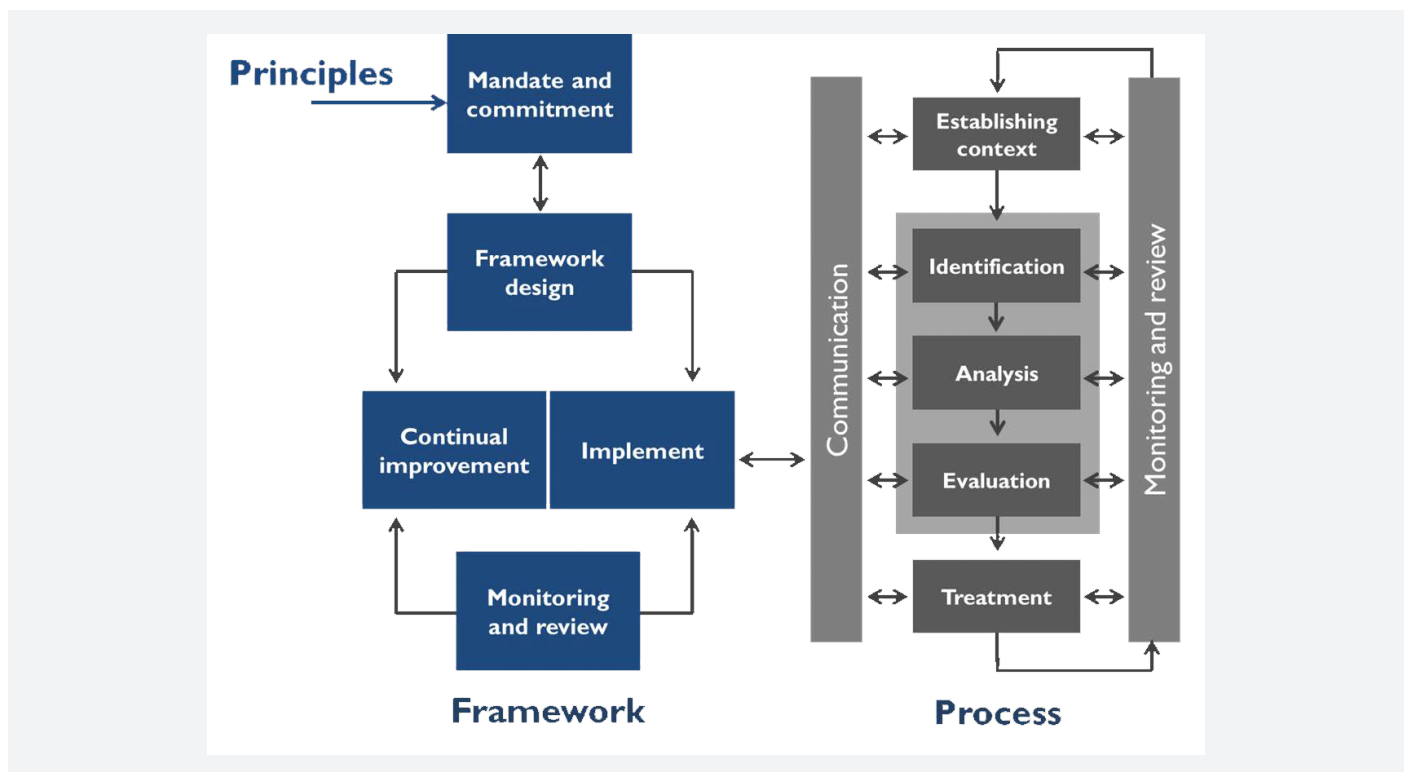


Fig. 1. The risk management framework and process of ISO 31000

5 Where does risk management fit into Asset Management?

Physical assets have inherent risks and the potential of failures, but the link between risk and asset reliability is not always obvious. In general, risk is calculated as the probability of **an adverse event occurring** multiplied by the consequence of occurrence. If the probability of a failure occurring is zero, you have a perfectly reliable asset with zero risk. Asset reliability or operational uptime is therefore inversely linked to the number of risks you allow to occur on your assets - the higher your risk, the lower your asset reliability. **Recognising potential risks and their consequences and preventing them from occurring is fundamental to asset management.**

Asset risk management is central to the effective management of an organisation's physical assets. Figure 2 depicts the importance of balancing asset related risk with performance and cost, as defined by the asset management standard, ISO 550003 as:

The coordinated activities of an organisation to realise value from its assets, where the realisation of value involves a balancing of costs, risks and performance, while considering opportunities.

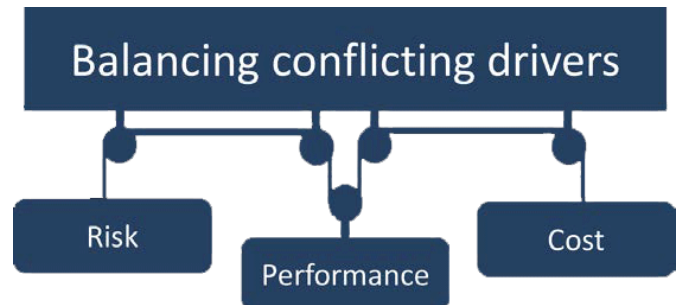


Fig. 2. Asset management is about the balance between performance, cost and risk drivers

ISO 55000 states that an organisation should take the necessary action to address risks when planning for its asset management system. This implies that an organisation shall establish, implement and maintain documented processes for the ongoing identification and assessment of asset related and asset management-related risks, and the identification and implementation of the necessary control measures throughout the life cycle of the assets.

The overall purpose of asset risk assessment is to understand the cause, effect and likelihood of adverse events occurring, to optimally manage such risks to an acceptable level, and to provide an audit trail for the management of risks.

6 The problem with asset risk management

In today's business environment, an asset manager is faced with **three** challenges in managing asset related risks: the confidence that the asset risk management framework which is in place is effective, the scope of what business aspects to manage as part of asset risk management activities, **and the isolation of risk management from daily asset management.**

The book, *The Failure of Risk Management*⁵ states three questions which should be asked in relation to your risk management practices:

- Do any of the risk management techniques that you use work?
- Would anyone in your organisation know if your risk management techniques didn't work?
- And if your risk management techniques didn't work, what would the consequences be?

The purpose of these questions is to obtain an introspective view of how an organisation approaches risk management and if risk management practices are proving to make a difference.

As an asset manager, consider recent disasters such as the Fukushima nuclear plant meltdown, Hurricane Katrina and Deepwater Horizon oil spill. Think about the devastating effects which resulted from these events – socially, economically and environmentally. Consider that flawed risk assessment methods could have been one of the causes for insufficient planning for the effects of these disasters.

Now apply this logic to your business. What are your organisation's biggest asset related risks? If these risks occur, what will the effects be? Are you confident that your current asset risk management methods ensure sufficient planning for the adverse effects in the case of a risk event?

The ultimate failure mode would be the failure of risk management itself. A weak risk management approach is effectively the biggest risk in the organisation. - Douglas Hubbard

The challenge facing asset managers is the scope of what type of risks should be included and managed under asset risk management. Often the focus is too narrow, focusing only on one aspect of risk, such as asset criticality analysis - and failing to identify other asset related risks. In contrast, too broad a scope could lead to a lack of focus and dilute the asset risk management effort – which is equally ineffective.

The isolation of risk management from daily asset management is also problematic. The challenge is to create wider awareness of risk management and make it an integral part of all asset management decisions, as proposed by ISO 55000.

7 The role of asset risk management in the organisation

Asset managers not only play an important role in asset risk management, but also act as facilitators to reduce organisation-wide risk. In 63% of organisations, risk management is already performed as part of the asset management function – the highest percentage of all other organisational departments³. In some cases a third of non-asset management practitioners are neutral about considering risk in decision-making, while 7% consider risk as not important (figure 3). This is in comparison to 84% of asset managers who regard risk management as integral to asset decision making⁶.

Asset managers are taking the lead in the organisational risk management initiatives and have a responsibility to ensure that the risk management methods which they develop and employ are effective and make a difference.

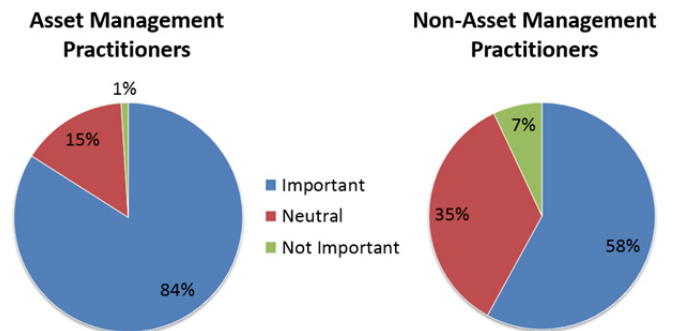


Fig. 3. Different perspectives on asset risk management

To the contrary, a benchmarking study by Pragma shows the current effectiveness of asset risk management practices are below average compared to industry best practices. These ineffective methods will lead to ultimately harming the business and potentially put business continuity at risk. It is therefore important for asset managers to play the part of ensuring effective asset risk management practices to benefit the whole business.

8 The Pragma Way and asset risk management

At Pragma we believe the effectiveness of your asset risk management framework determines the success of your risk management efforts. Your framework should serve as the basis for ensuring risk is successfully managed by all asset risk stakeholders. Your framework should facilitate the management of risks through the application of a tailored risk process which is specific to the various stakeholders in your organisation and relevant to each of their contexts.

Through The Pragma Way, we assist our clients in developing an asset risk management framework and process. This overcomes the challenges of effectiveness, uncertainty and asset risk scoping difficulty. We narrow the scope of asset risk management down to business risk and asset risk. Figure 4 shows how we create an integrated asset risk management framework

between business goals, the AM management system and asset-related risk considerations. Figure 3: Different perspectives on asset risk management

Pragma's approach to asset risk management is based on the ISO 31000 risk standard. With our industry knowledge, library of supporting tools and templates we assist and work with our clients to establish an effective asset risk management system.

Asset risk management affects everyone in the organisation and should form part of its culture. As part of The Pragma Way we take senior and tactical management on a two day training course and technical personnel on a one day training course in asset risk management to sensitise everyone affected by asset-related risks.

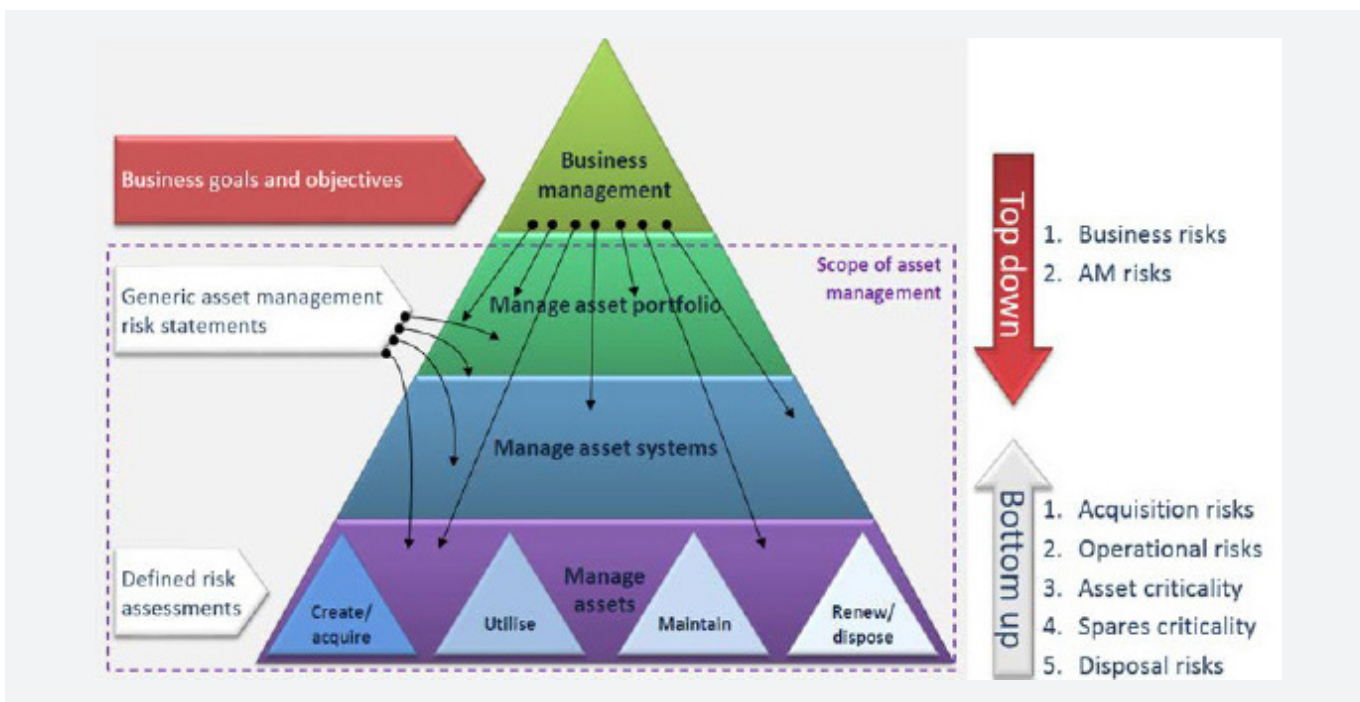


Fig. 4. The scope of asset risk management according to The Pragma Way

8 The Pragma Way and asset risk management

Following the training, we will work with you to develop a risk management framework which supports your business, AM management system and asset-related risks. As part of the framework development, the following is addressed and co-developed with you:

- A risk process: A systematic process with supporting templates and tools, which aligns **ISO 31000** requirements for establishing the risk context, assessing risks, risk treatment and the related communication, monitoring and review related to risk management. **The process provides for the consideration of risk during all major asset management decisions (ie capital investments, maintenance strategies and tactics, maintenance planning and scheduling, outsourcing and plant modifications).**
- Risk registers: Registers for identifying, analysing and evaluating risks with likelihoods, consequences and mitigation plans. Risk registers for business risk and asset-related risk, ie criticality analysis, are established.
- Risk treatment cycle: Decision logic to evaluate and select risk treatment options and the tolerance of risk levels.
- Risk monitoring and review process: A process for monitoring and reviewing the risk registers, which is integrated in the risk management framework and process.

9 Case study

In a recent project, Pragma assisted a client in the manufacturing industry to:

- Analyse a vast amount of asset risk data that was obtained during a risk Identification survey conducted by the client to use in strategic decision making, and
- Develop a strategy to revise their risk management framework and processes within the organisation to give more emphasis to asset related risks.

Having access to large volumes of risk assessment data often has little value if this data cannot be translated into meaningful information that can be used during strategic decision making. Simply lumping a huge amount of asset risk data together through averaging often masks important risks and Pragma assisted the client to analyse the risk data to identify areas with high asset related risks through other aggregation methods. The outputs of this project were:

- risk heat maps for the different plant areas that indicating asset groups/systems with high maximum risk levels in each of the selected risk categories, as well as
- risk profiles for different plant areas in terms of the number of assets falling into specific consequence and likelihood of failure groups.

Figure 6 assists in understand the make-up of a risk in a specific plant area, i.e. are there a few high consequence-high probability risk items that should be addressed, or is the risk for that plant area made up of many smaller risk items.

Maximum Individual Asset Weaknesses With High Risk

Report description:
This report highlights individual blind spots in the overall asset health of parent systems where systems with high risk do not have good mitigation coverage.

Equipment Number	L1 Description	L2 Description	Entry consequence	Entry likelihood	Condition monitoring	Equipment stress level	Current equipment health	Historic maintenance quality	Failure management	Maintainability	Overall consequence	Overall likelihood	Overall risk
25HRU010101	SCALPER ENTRY		High	High	Low	Low	Low	Low	Low	Low	High	High	High
25HRU010101-01	SCALPER ENTRY	ENTRY WEIGHING POSITION	Low	Low	High	High	High	High	High	High	Low	Low	Low
25HRU010101-05	SCALPER ENTRY	ENTRY FEED TABLE	Low	Low	High	High	High	High	High	High	Low	Low	Low
25HRU010101-10	SCALPER ENTRY	TURN OVER DEVICE	High	High	Low	Low	Low	Low	Low	Low	High	High	High

Fig. 5. Risk composition for selected plant areas as a function of consequence and likelihood.

This project only covered the Analysis aspect of risk management and the outputs were used in a strategic risk review for the organisation managed by the risk review board of the client.

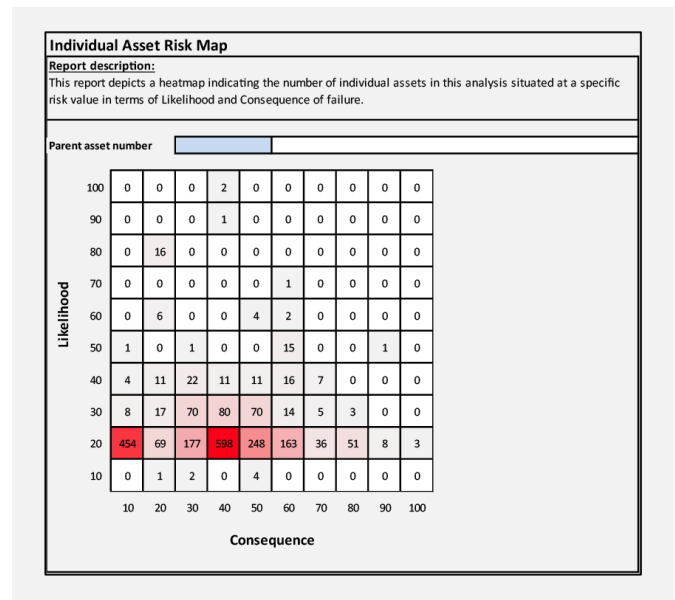


Fig. 6. Risk composition for selected plant areas as a function of consequence and likelihood.

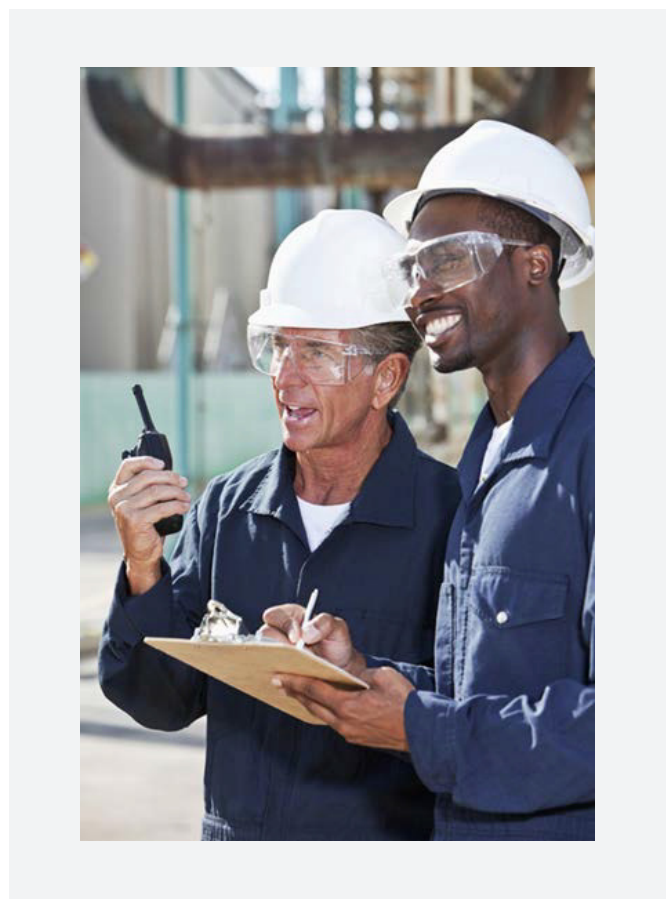
10 Concluding summary

Asset risk management forms a fundamental part of asset management and needs to be balanced with asset performance and expenditure for optimal performance of your physical assets. One of the biggest risks for your organisation is your asset risk management practices are ineffective.

The Pragma Way's approach to asset risk management is based on ISO 31000 and supplemented with our supporting tools and templates and asset risk expertise. We work with our clients to establish customised asset risk management, consisting of:

- Asset risk management framework and process
- Risk registers for business and asset risk
- Risk treatment action plans
- Risk monitoring and review process

The ISO 31000 based risk management approach integrates with other standards. It specifically supports the AM management system, as required by ISO 55000, but also aligns with ISO 9001, ISO 14001 and OHSAS 180007.



11 More information

Visit Pragma at www.pragmaworld.net or contact us on +27 21943 3900 for more information on how Pragma can assist you with your risk management.

¹ ISO, 2009. ISO 31000:2009 Risk management – Principles and guidelines. Geneva, Switzerland: ISO.

² Mobley, Keith, 2011. What is risk management? Uptime Magazine, Reliabilityweb.com, pp. 40-41

³ Aberdeen Group, 2011. Operational Risk Management. Boston, USA: Aberdeen Group

⁴ BS ISO, 2014. BS ISO 55000:2014 Asset management – Overview, principles and terminology. Geneva, Switzerland: BS ISO.

⁵ Hubbard, QW, 2009. The failure of risk management – why it's broken and how to fix it. New Jersey, USA: John Wiley & Sons

⁶ McGraw-Hill Construction, 2012. Water infrastructure asset management report. Bedford, USA: McGraw-Hill

⁷ <http://www.assetmanagementstandards.com/ISO55000.html>