Managing and Understanding Risk within an Asset Management environment

Dean Griffin
Partner
Pragma Acuity

Understanding • Improving • Sustaining
• Who in the room manages Risk?
• Who in the room manages safety related risk?
• Who in the room work with zero harm?
• Who have skills shortages?
• Who have resource shortages?
2 RISK EXAMPLES
House of Representatives letter to Tony Hayward regarding the BP Gulf of Mexico Oil Spill

The Committee’s investigation is raising serious questions about the decisions made by BP in the days and hours before the explosion on the Deepwater Horizon. On April 15, five days before the explosion, BP’s drilling engineer called Macondo a “nightmare well.” In spite of the well’s difficulties, BP appears to have made multiple decisions for economic reasons that increased the danger of a catastrophic well failure. In several instances, these decisions appear to violate industry guidelines and were made despite warnings from BP’s own personnel and its contractors. In effect, it appears that BP repeatedly chose risky procedures in order to reduce costs and save time and made minimal efforts to contain the added risk.

Conclusion

The Committee’s investigation into the causes of the blowout and explosion on the Deepwater Horizon rig is continuing. As our investigation proceeds, our understanding of what happened and the mistakes that were made will undoubtedly evolve and change. At this point in the investigation, however, the evidence before the Committee calls into question multiple decisions made by BP. Time after time, it appears that BP made decisions that increased the risk of a blowout to save the company time or expense. If this is what happened, BP’s carelessness and complacency have inflicted a heavy toll on the Gulf, its inhabitants, and the workers on the rig.
2½ months - £3/share (50%)
Do you think that Tiger played the first ‘round’ with the same risk tolerance as he did on the later rounds??
RISK DEFINITIONS
Leading Questions

What is risk and risk management all about?

Why does an organisation need a formal risk policy which looks at all level risks?

“Things that matter most should never be at the mercy of things that matter least“

Goethe
What is PAS 55?

PAS 55 is the British Standards Institution's "Publicly Available Specification" for the optimized management of physical assets and infrastructure - it provides clear definitions and a 21-point requirements specification for joined-up, optimized and whole-life asset management systems.
Risk Definition

*Risk* is defined in ISO 31000 as the effect of uncertainty on objectives (whether positive or negative).

*Risk management* can therefore be considered the identification, assessment, and prioritization of risks followed by *coordinated* and *economical* application of resources to minimize, monitor, and control the probability and/or impact of unfortunate events.

*Douglas Hubbard: The Failure of Risk Management:*
Risk Definition

Likelihood x Consequence

Risk is then expressed as a number or value. I would like to see it as a monetary value.
LEVELS OF RISK
Various risk assessments at different levels of asset management

- **Business risk assessment** to identify potential risks to achieving the overall business objectives
- **Asset portfolio risk assessment** to identify potential asset related risks at all asset levels
- **Asset criticality analysis** to determine the most significant assets and associated approach for the development of maintenance tasks
- **Spares criticality analysis** to determine the inventory category and associated approach for a specific spare or material
- **Disposal risk assessment** to identify assets that should be disposed of and any issues that should be considered during the disposal process
- **Asset acquisition risk assessment** to determine issues that should be included in the specification of the asset such as training, integration of systems, energy considerations, critical spares etc
Portfolio & System level consideration of condition

Remaining useful life

Numbers of
Various risk assessments at different levels of asset management

- All assets of the business, including: physical, human, information, financial and intangible assets
- Complete range of physical assets and asset systems owned by an organisation
- Set of physical assets that interact and/or are interrelated
- Individual physical assets

Levels:
1. Business management
2. Manage asset portfolio
3. Manage asset systems
4. Create/acquire, Utilise, Manage assets, Maintain
PEOPLE & TECHNOLOGY
The ABC’s of failure...

Biggest Failure mode is People related
Technology Adoption Profile

Adoption

- Early adopters
  - Reliable
  - Lower cost
  - Wider availability
  - High skill requirements

- Tried & Tested
  - Reliable
  - Lower cost
  - Wider availability

- Late adopters
  - Older technology
  - Higher cost
  - Obsolescence
  - Lower availability

Time
Technology Adoption Profile

- Early adopters
- Tried & Tested
- Late adopters

- Old Fashioned
- Repeatable fair cost
- Competitive Edge
RISK PROFILES
Risk Profile

- **Unacceptable Risk**
- **Desired Risk**
- **Acceptable Risk**
- **Retained Risk**

Risk Intervention / mitigating action
Risk profiles

• Risks change on a daily basis, do your systems accommodate this?
• BP proved that the risk changed with each decision. It can go up or down!
• Our tolerance to risk changes
• We need to quantify risk in financial terms
  – For every R spent on mitigation we removed x amount of risk
  – How do you quantify risk removed?
  – How do you quantify residual or retained risk?
RISK MANAGEMENT REQUIREMENTS
Risk Policy (PAS55-2008)

- Covers all asset life cycle activities
- Integrated with the AM Strategy
- Meets the requirements of insurers
- Understood and consistently applied across the organisation
- Focuses on the long term sustainability of the organisation
- Asset risk management is an integral part of the overall risk management
1. Set the framework
   Objectives
   Stakeholders
   Criteria
   Key issues

2. Identify the risks
   What risks might be encountered?
   How will these risks occur?

3. Evaluate the risks
   Probability
   Consequences
   Risk ranking
   Existing controls

4. Mitigate the risks
   Identify risk treatment options and select the best one
   Develop an implementation plan

5. Monitor and review

Risk register
1. Set the Framework

Various risk assessments at different levels of asset management

- **Asset acquisition risk assessment** to determine issues that should be included in the specification of the asset such as training, integration of systems, energy considerations, critical spares etc.

- **Asset criticality analysis** to determine the most significant assets and associated approach for the development of maintenance tasks.

- **Asset portfolio risk assessment** to identify potential asset related risks at all asset levels.

- **Spares criticality analysis** to determine the inventory category and associated approach for a specific spare or material.

- **Disposal risk assessment** to identify assets that should be disposed of and any issues that should be considered during the disposal process.

- **Business risk assessment** to identify potential risks to achieving the overall business objectives.
2. Identify the Risks

Alignment of risk assessments within the business

- Primary framework: business goals and objectives
- Supplementary framework: generic asset management risk statements
- Supportive: defined risk assessments

Business management
- Manage asset portfolio
- Manage asset systems
- Create/acquire
- Utilise
- Maintain
- Renew/dispose

Scope of asset management

Top down:
1. Business risks
2. AM risks

Bottom up:
1. Acquisition risks
2. Operational risks
3. Asset criticality
4. Spares criticality
5. Disposal risks
3. Evaluate the Risks

<table>
<thead>
<tr>
<th>Risk Matrix</th>
<th>Hazard Effect / Consequence (Where an event has more than one ‘Loss Type’, choose the ‘Consequence’ with the highest rating)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk Type</td>
<td>Insignificant</td>
</tr>
<tr>
<td>Harm to People (Safety / Health)</td>
<td>First aid case / Exposure to minor health risk</td>
</tr>
<tr>
<td>Environmental Impact</td>
<td>Minimal environmental harm – L1 incident</td>
</tr>
<tr>
<td>Business Interruption / Material Damage &amp; Other Consequential Losses</td>
<td>No disruption to operation / US$0 to US$10k</td>
</tr>
<tr>
<td>Legal &amp; Regulatory</td>
<td>Low level legal issue</td>
</tr>
<tr>
<td>Impact on Reputation / Social / Community</td>
<td>Slight impact - public awareness risk exist but no public concern</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Likelihood</th>
<th>Examples</th>
<th>Risk Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 (Almost Certain)</td>
<td>The unwanted event has occurred frequently, occurs in order of one or more times per year &amp; is likely to occur within 1 year</td>
<td>11 (M) 16 (H) 20 (H) 23 (Ex) 25 (Ex)</td>
</tr>
<tr>
<td>4 (Likely)</td>
<td>The unwanted event has occurred infrequently, occurs in order of less than once per year &amp; is likely to occur within 5 years</td>
<td>7 (M) 12 (M) 17 (H) 21 (Ex) 24 (Ex)</td>
</tr>
<tr>
<td>3 (Possible)</td>
<td>The unwanted event has happened in the business at some time, or could happen within 10 years</td>
<td>4 (L) 8 (M) 13 (H) 18 (H) 22 (Ex)</td>
</tr>
<tr>
<td>2 (Unlikely)</td>
<td>The unwanted event has happened in the business at some time, or could happen within 20 years</td>
<td>2 (L) 5 (L) 9 (M) 14 (H) 19 (H)</td>
</tr>
<tr>
<td>1 (Rare)</td>
<td>The unwanted event has never been known to occur in the business, or it is highly unlikely that it will occur within 20 years</td>
<td>1 (L) 3 (L) 6 (M) 10 (M) 15 (H)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Risk Rating</th>
<th>Risk Level</th>
<th>Guidelines for Risk Matrix</th>
</tr>
</thead>
<tbody>
<tr>
<td>21 to 25</td>
<td>Extreme</td>
<td>Eliminate, avoid, implement specific action plans/procedures to manage &amp; monitor</td>
</tr>
<tr>
<td>13 to 20</td>
<td>High</td>
<td>Actively manage</td>
</tr>
<tr>
<td>6 to 12</td>
<td>Medium</td>
<td>Monitor &amp; manage as appropriate</td>
</tr>
<tr>
<td>1 to 5</td>
<td>Low</td>
<td>Monitor &amp; manage as appropriate</td>
</tr>
</tbody>
</table>
4. Mitigate the Risks

- Understand the total risk exposure from all sources, not just assets
- Adopt a cost-effective business approach to manage risk
- Several approaches to manage the inherent risks:
  - reduce risk by capital or maintenance expenditure
  - reduce the impact of a failure
  - accept some risks and carry the consequential costs
  - insure against the consequential costs
  - a combination of above
- After mitigation, the residual risk should be evaluated as before
5. Monitor and Review

- Risk registers are a common and effective mechanism for recording and managing risk
- The monitoring and management of this risk register includes senior management reviews, together with clear processes and accountability for planned mitigation
- The process of maintaining, updating and auditing the risk register is a key AM process, and should be referenced in the AM Strategy (PAS 55)
- Any change introduces new risks
  - It is important to identify and assess these risks on a continual basis
5. Monitor and Review

- Changes to business objectives and goals
- Changes to legal and regulatory requirements
- Changes to the business

1. Set the framework
   - Objectives
   - Stakeholders
   - Criteria
   - Key issues

2. Identify the risks
   - What risks might be encountered?
   - How will these risks occur?

3. Evaluate the risks
   - Probability
   - Consequences
   - Risk ranking
   - Existing controls

4. Mitigate the risks
   - Identify risk treatment options and select the best
   - Development of an implementation plan

5. Monitor and review

Risk register
Change Control

- Any change creates risk in the business
- Change control process must ensure that appropriate risk management activities are conducted

AM changes:
- Assets
- Processes
- Procedures
- Organisational structures
- Out- or insourcing
- CMMS or EAMS
- Other software tools

Increase risk

Formal change control process:
- Risk assessment
- Mitigation and control activities

Decrease risk
In Summary

• Risk is the common language for Asset Management

• As Engineers we need to be able to
  – Understand Risk
  – Quantify Risk at Business, Portfolio, System and Asset level
  – Prioritise Risk & Risk mitigating activities
  – Attach Risk to business objectives and assets alike
  – Mitigate Risk

– Speak Risk it's a boardroom language
Questions?

Dean Griffin

+27 82 550 5373
Dean.Griffin@pragmaworld.net