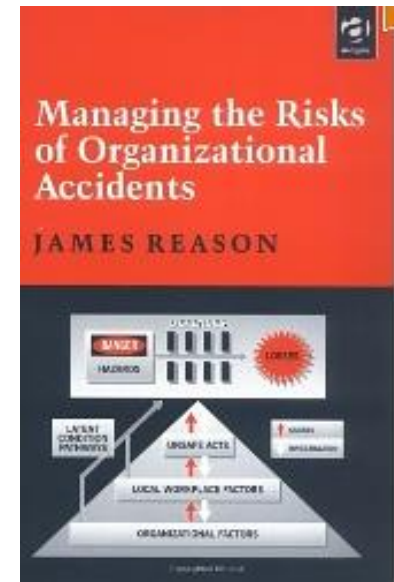
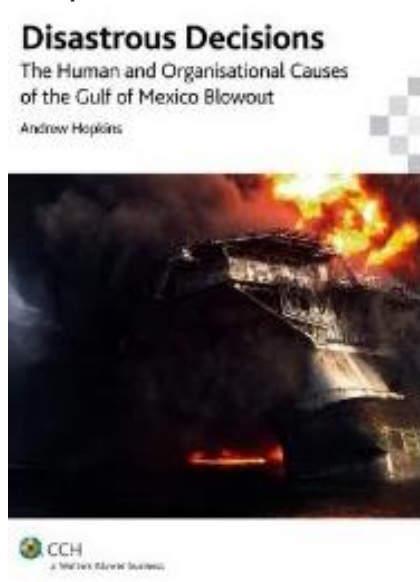


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Current Industry Climate

- Major incidents continue to occur in the industry: upstream, midstream, and offshore
 - NTSB reports: recommend Safety Management Systems (SMS)
- Industry experts continue to identify three critical causes of events:
 - Insufficient hazard identification
 - Weak process safety (operational safety) culture – still focus on occupational safety
 - Focus of SMS is operational safety
 - Inadequate/ineffective learning from events



The Element that ties it all Together – Incident Investigation

Common Challenges

- Hesitancy to report minor incidents and near misses
 - Fear of the process and of discipline
- Inadequate definitions of incident and near miss
- Tendency to find human error as the root cause of incidents
 - This is improving in many companies, but there is still improvement to be made
- Incidents are not analyzed by both actual and potential impact(s)
- Barriers are not formally evaluated during investigations



Incident Investigation – Regulatory Requirements

Maintain a procedure

- Incidents & near misses with HSE consequences

Investigate promptly

- Most do not have timeframes

Follow-up and communicate findings

- Some discuss applying lessons learned but most say communicate

Track actions to completion

- Consistently applied

Maintain records

- Report, database, etc.

Effective Implementation and Best Practices

- Effective implementation has a strong focus on learning from events to minimize the chances of repeat and similar occurrence in the future.
- Newer regulations and industry practices focus on learning:
 - Share lessons externally
 - Re-evaluate past events and learn from them
- Best Practices
 1. Utilize managers from other regions, geographical areas, and include cross-functional teams
 2. Apply risk assessment through processes to events, and investigate appropriately
 - Classify events into levels of severity
 - Determine worst credible consequence that could have occurred and use for team makeup and level of rigor required
 - Use risk matrix or other risk criteria to assign risk level to actual & potential incident



Incident Investigation Best Practices

3. Assess the both the actual consequence(s) and the potential consequence(s)
 - WHY?
 - How do we assess potential?
 - Ask the 6 what-ifs

Process/Pipeline Safety Incident	Occupational Incident
What if the last line of defense (e.g., relief valve) had failed?	What if appropriate PPE or harness/tie-off had not been used?
What if the spill/leak had ignited?	What if the person had landed differently (e.g., landed on his/her back instead of feet)?
What if the spill/leak had gone un-detected for a longer period of time?	What if the person had been working alone or had not been found until later?
What if people/more people had been present?	What if more people had been present?
What if weather conditions (e.g., wind direction) had been different?	What if weather conditions had been different (e.g., extreme heat or cold)?
What if operating conditions had been different?	What if first aid had not been administered in a timely manner?

Incident Investigation Best Practices

4. Use timelines to begin to understand the event
 - Go back further than the time span of the event
 - Link events on the timeline to barrier effectiveness
5. Implement a formal approach for identifying both immediate and basic (root) causes
6. Identify the prevention & mitigation barriers in place at the time of the event
7. Transform undesired events into improvement opportunities
 - Include suitable knowledge sharing methods to ensure that the organization actually institutionalizes learnings
 - Often, too much emphasis is placed on email

Implement LFE system

Ensure management participates

Look for systemic issues

Document rationale

Update risk information

Monitor action effectiveness

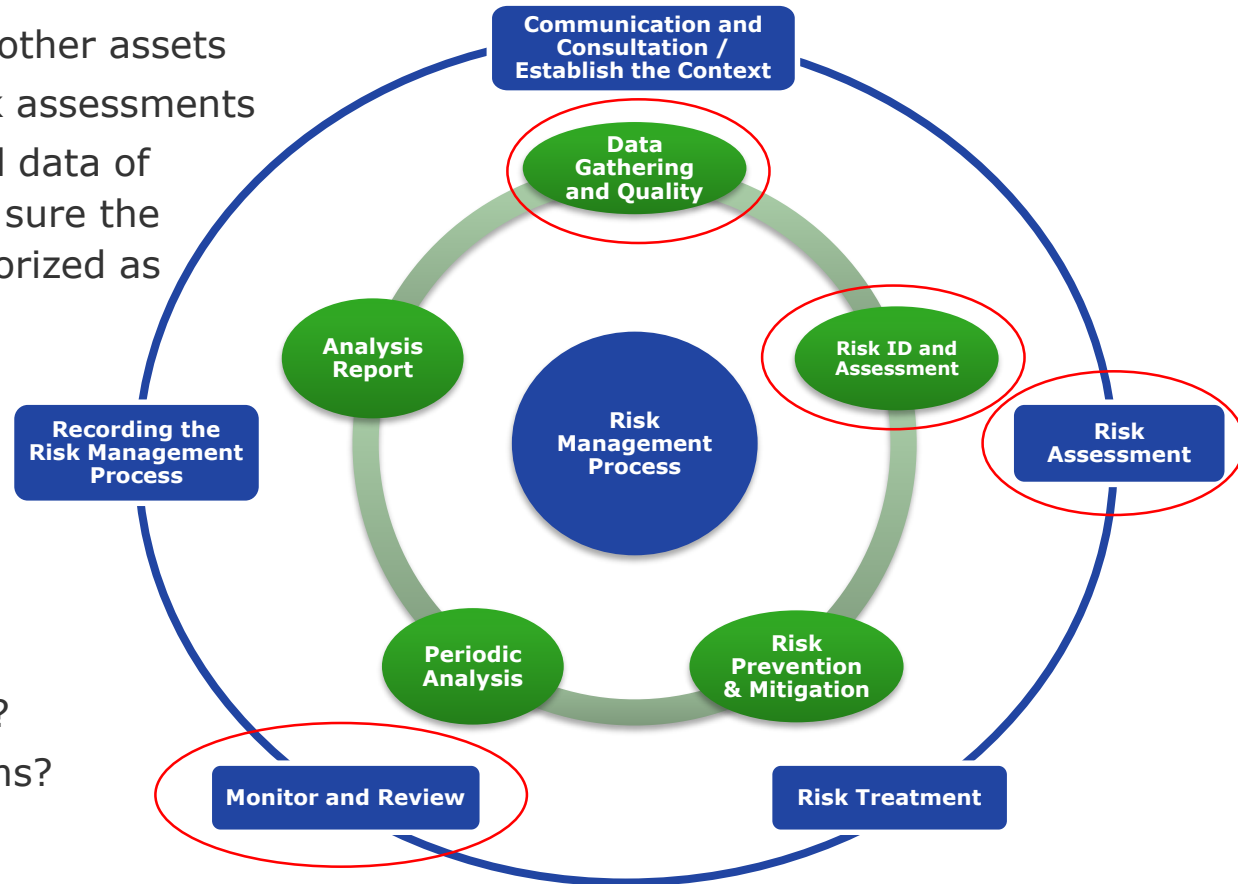
Best Practices for Follow-up and Lessons Learned

8. Incident investigation is a risk assessment in reverse

- Add/modify risk register(s)
- Determine susceptibility of other assets
- Use results as inputs to risk assessments
 - E.g., if you want historical data of failures of valve seals, be sure the immediate cause is categorized as “valve seal failure”

9. Monitor effectiveness of implemented actions

- Gain feedback from local
Was it the right thing to do?
- Has it caused other problems?



Learning from Past Events and External Events

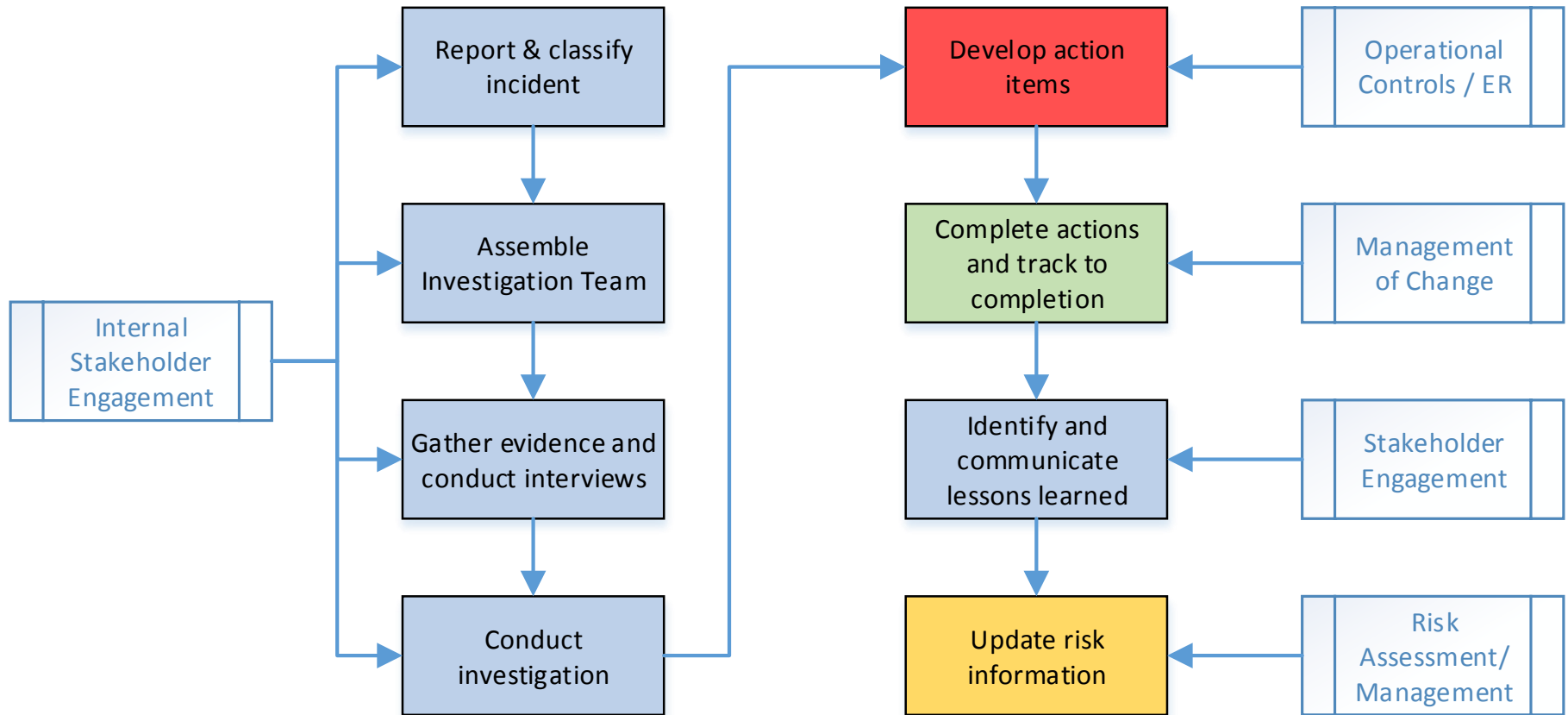
Past Events

- Go back to previous events and near misses, especially those that could have had more severe consequences
 - Identify new learnings and opportunities for further improvement
 - Determine if the changes have been effective or if other actions are required
 - Determine how effective the communication and lessons have been

External Events

- *"Learn from others' mistakes. You can't live long enough to make them all yourself." (Eleanor Roosevelt)*
- Ensure a process is in place to learn from industry events and from relevant incidents in other industries

Links to Other Elements



Benefits of Effective Investigations

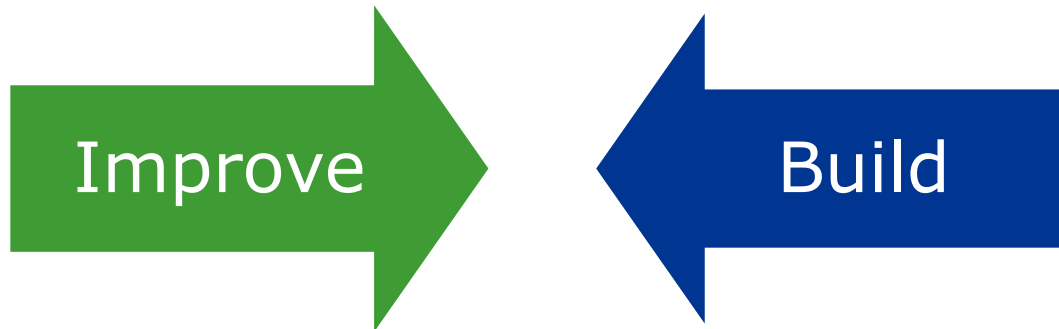
- A systematic process will yield many benefits:
 - Risk reduction
 - Lower likelihood of repeat incidents
 - Ability to measure what could have happened
 - An “Informed” Culture
 - Proactive near miss action
 - Root cause recognition and actions to address them
 - Greater return on investment capital
 - Fewer environmental issues, worker injuries, & illnesses
 - Reduced costs, increased production, improved product quality
 - Enhanced image in the eyes of employees, industry and the public

Ensure Success of Incident Investigation & Learning from Events

- Managers strive to create a “no blame” culture to foster high levels of event reporting
- Personnel is particularly encouraged to report near misses, which offer the greatest number of learning opportunities
- Investigations uncover the basic causes of events before determining the necessary corrective and preventive actions
- Actions are tracked to completion and the results communicated to all necessary stakeholders
- If a new methodology or process is implemented, go back to a selection of events that had high potential to be more severe, and evaluate with the new method

Where do we go from here?

- Evaluate the current state
 - Review existing documentation
 - Visit the field
 - What is being done that is not documented?
 - Make it a conversation: Ask *Why...? Why not...? and How do we...?*
- Set goals
 - Build on strengths
 - Benchmark
 - Engage employees early – create buzz
- Find your focus
 - Set the strategy and policy
 - Promote field-level ownership to promote culture
 - Determine what software/tools will be needed
- Prioritize what to build and improve first
 - Use incident investigations to prioritize
 - Pick some low-hanging fruit





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