

Wrapping it up with a Bow(tie)

Packaging Process Safety Success



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ProSafe 2022
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R4Risk

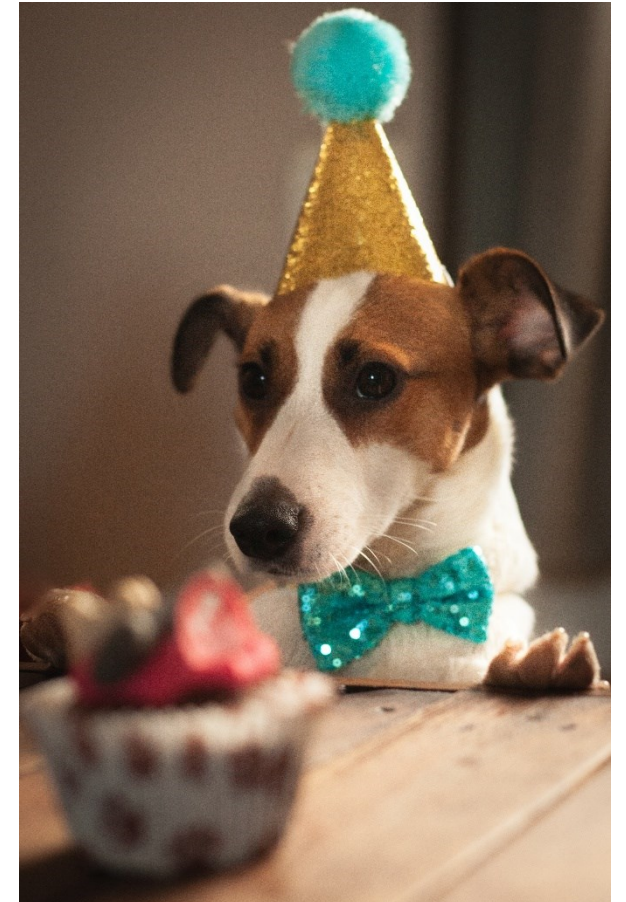
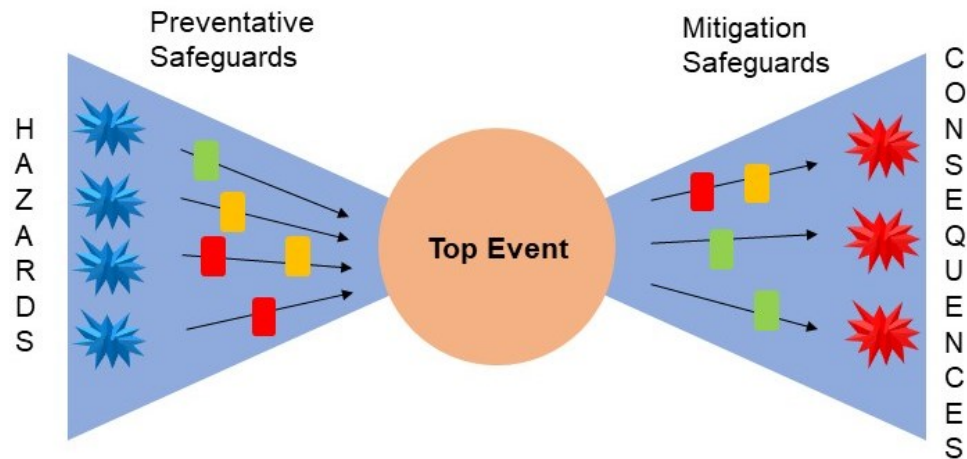
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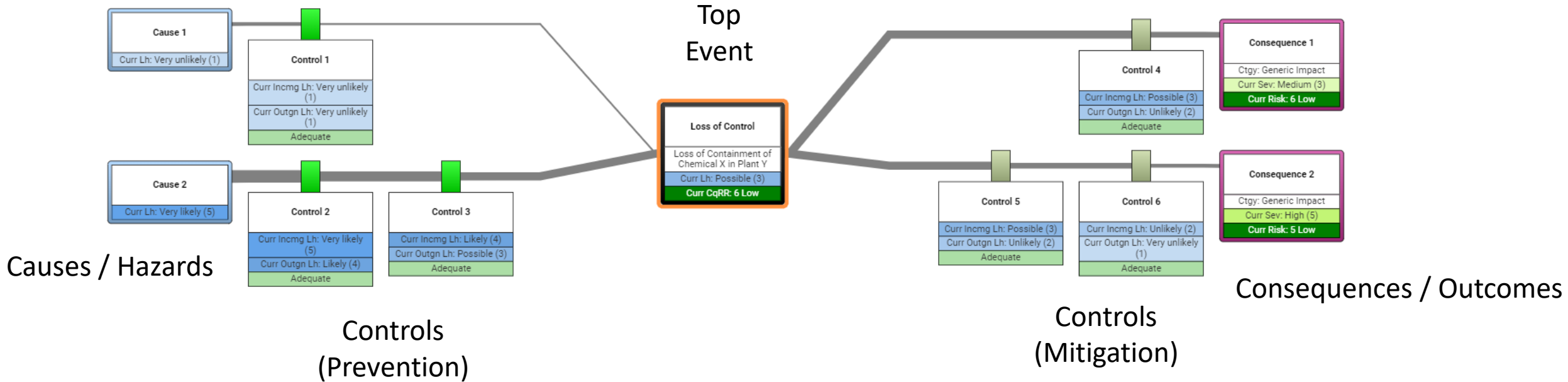
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- Overview
 - Bowtie Recap
 - Why not Bowties
 - Why Bowties
 - Making things work
 - Keeping Process Safety going

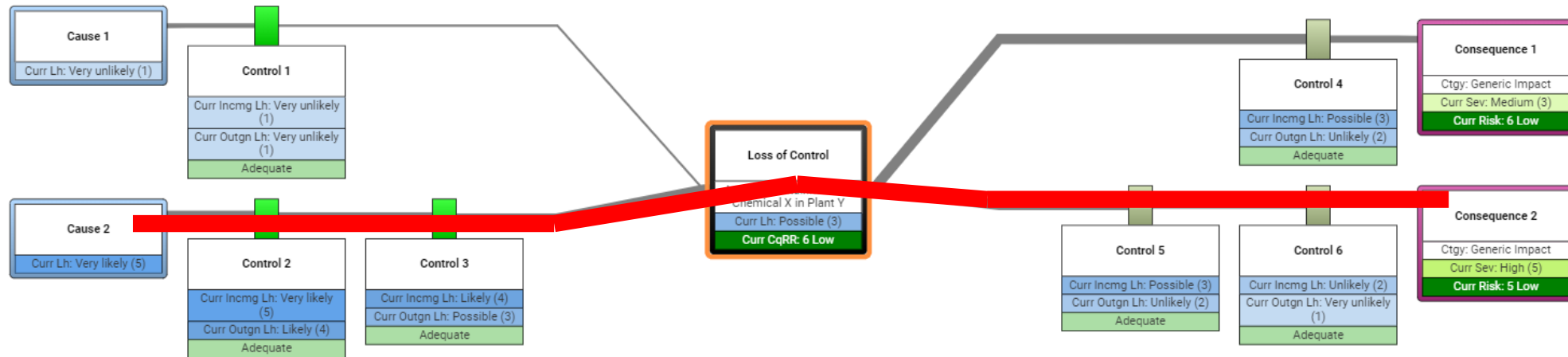


- Bowtie / Bowtie Analysis
 - Cause-consequence analysis
 - Identifies potential causes
 - Identifies potential consequences
 - Identifies applicable controls
 - Brings this all together in a pretty diagram!

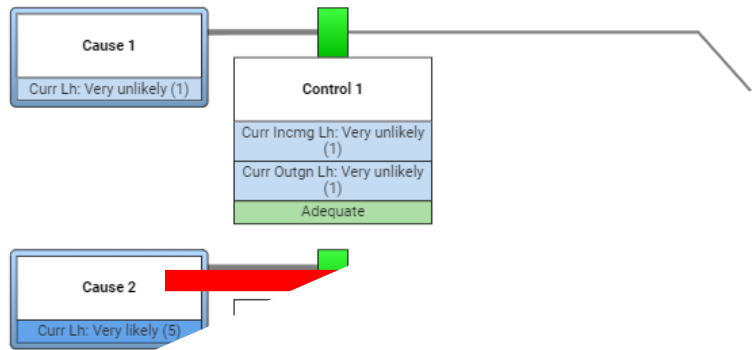




- Linear model of the event
 - Unable to cater for complex interactions of systems

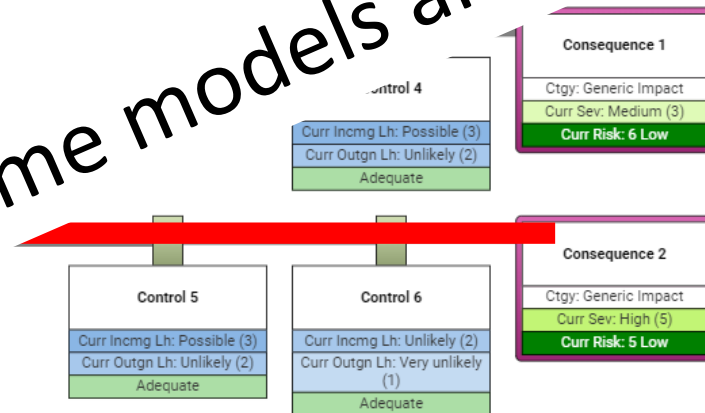


- Linear model of the event
 - Unable to cater for complex interactions of systems



Don't Panic!

All models are wrong.... Some models are useful!



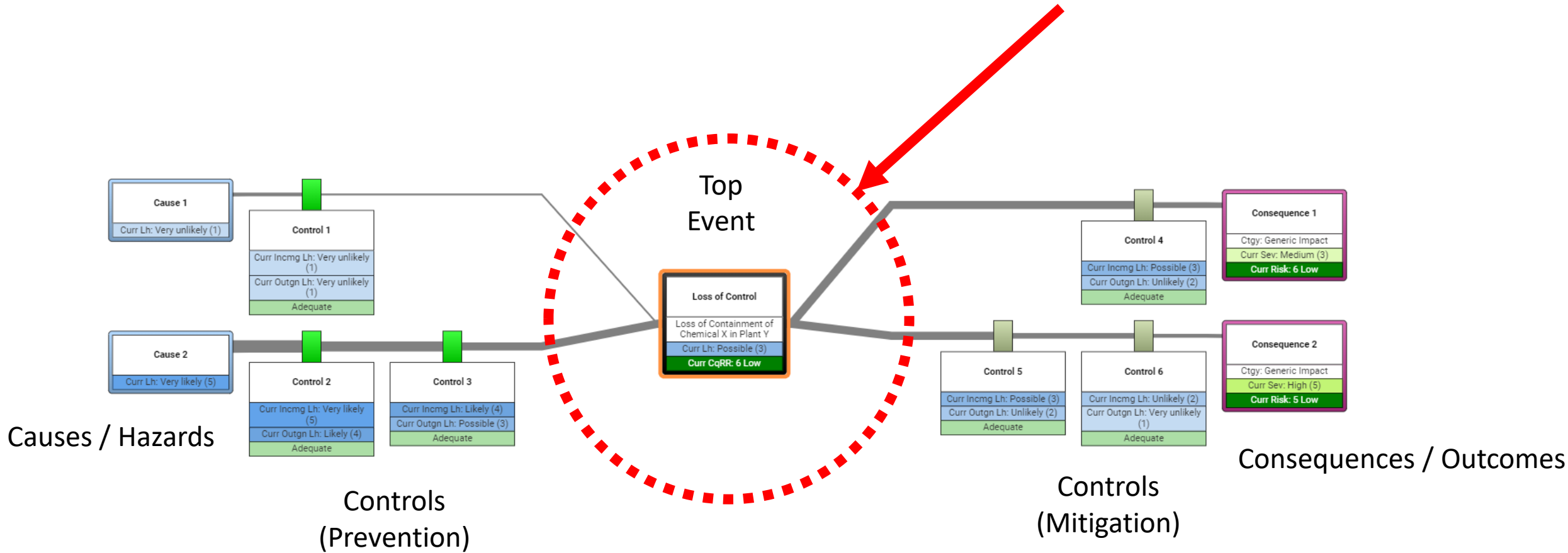
Comments from various contributors....

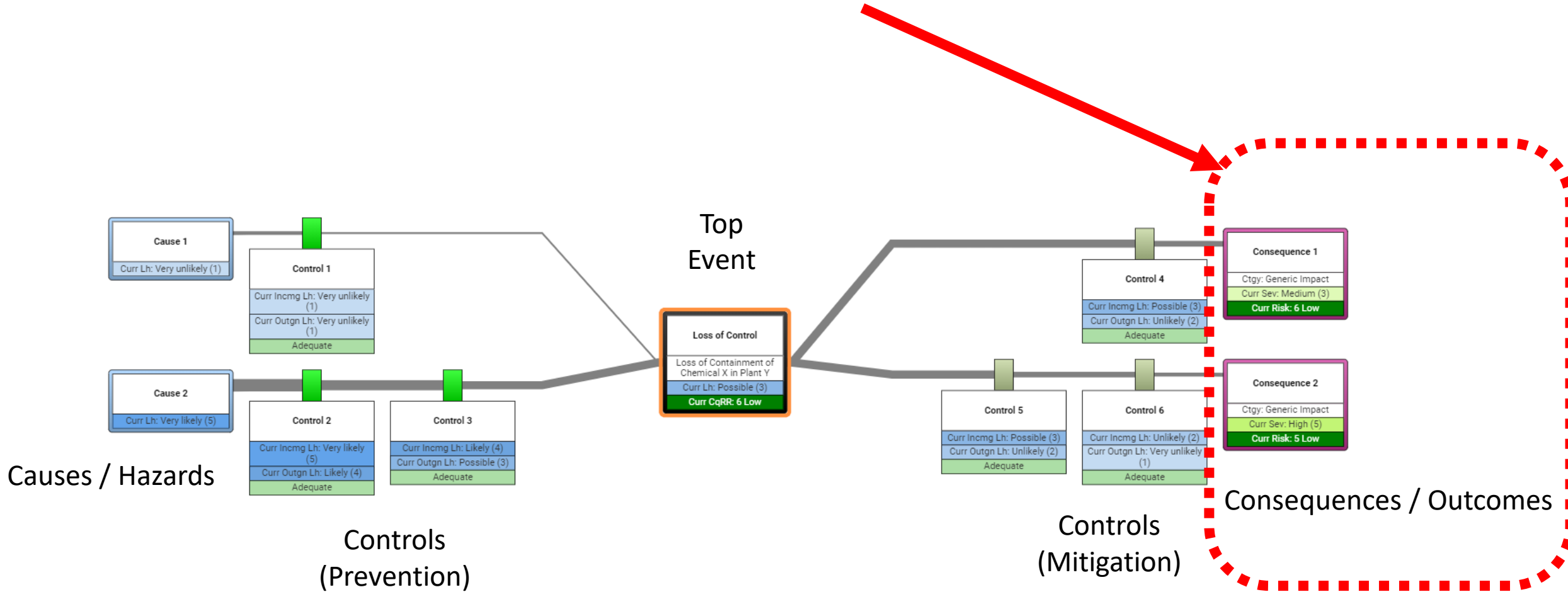
- Does not replace detailed hazard analysis techniques such as HAZOP
- Depends on the experience and participation of the workshop team
- Not obvious which controls are more important
- Assumes that the original design / software is correct
- Accounting for common-mode failures
- Accounting for changes over time
- Difficulty in representing combinations of causes

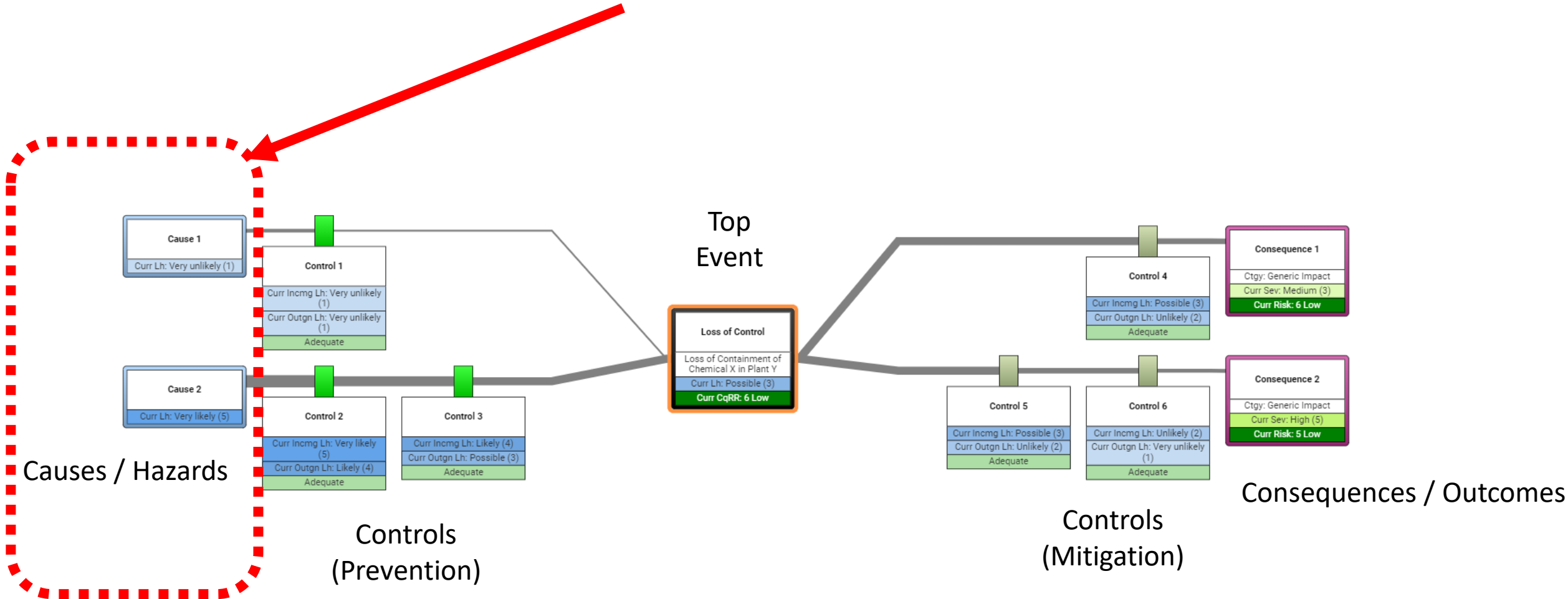


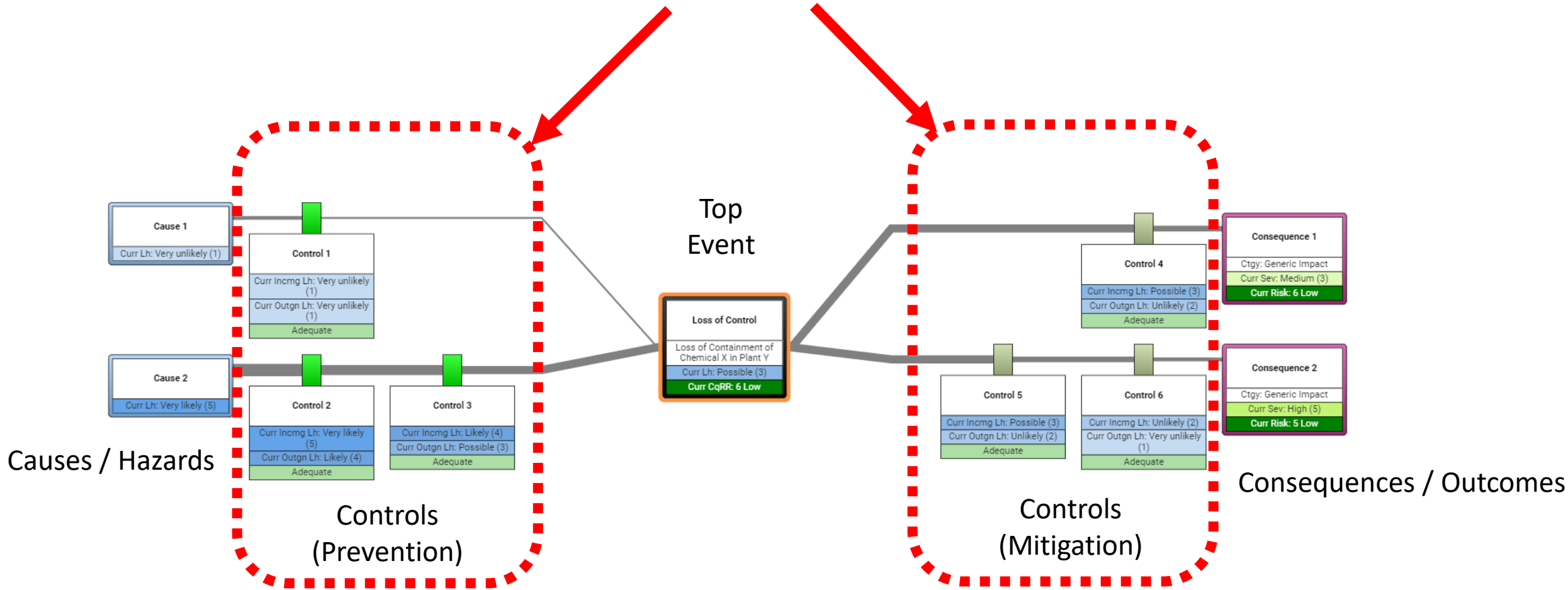
- Simple, clear and easy to understand
- Good communication tool
- Can be used to analyse a wide range of scenarios
- Clear linkages between controls and the causes / consequences











- **Implemented** The control must be fully implemented, i.e. the control must be in place.
- **Effective** The control must be effective – if the control functions as intended, it should prevent the Top Event or significantly mitigate its consequences.
- **Reliability** The control should be sufficiently reliable, i.e. it should have a low probability of failure on demand.
- **Auditable** It should be practical to audit the control so that its performance may be established.
- **Monitored** Systems should be in place to monitor the performance of the control, to ensure that it remains functional.

- We have a good set of bowties!
- Our Process Safety is all sorted!



- We have a good set of bowties!
- Our Process Safety is all sorted!
- NO!.... but it's a good start



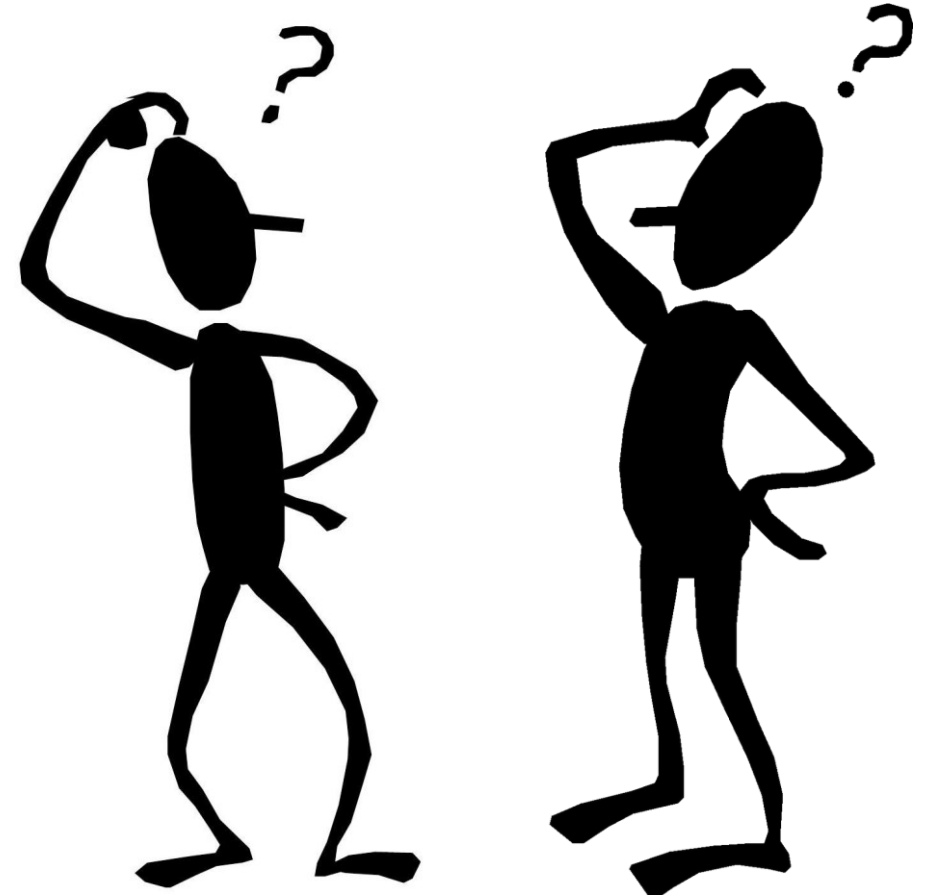
- What next?
- What came out of the Bowtie process?
 - A set of “Good” Bowtie diagrams
 - A list of Major Incidents
 - A list of controls
 - A list of Risk Reduction Actions



Risk Reduction Actions....

What to do....

1. Compile the list
2. Categorise the actions
3. Assign responsibility
4. Implement action tracking and reporting
5. Update the bowties.



- Management of Controls
 - Performance Indicators
 - The parameter that provides an objective measurement of performance of the control
 - Performance Standards
 - The target or required level of performance for a particular control
- Must be embedded into the Safety Management System!



Major Incidents and “Good” Bowties

- Use for Risk Communication
 - Store in an accessible format
 - Train relevant personnel on how to read bowties
 - Integrate the use of bowties into existing systems
 - Ensure that the Bowties are kept updated



- Bowties – not perfect, but an excellent tool
- Make the Bowties work
 - Consistency!
 - Top Events / Causes / Controls
- After the Bowties
 - Risk Reduction Actions
 - Management of Controls



Wrapping it up with a Bow(tie)

