

# Knowledge Exchange Note: #001

Date: 12<sup>th</sup> August 2019

## Bow Tie Diagrams

*This knowledge exchange note is shared in order to promote learning and improve safety. You should seek appropriate guidance regarding the relevance, accuracy, and completeness of this alert to your circumstances prior to implementation.*

### Theme

Hazard & Risk assessment

### Summary of Query

High Level Description of the Process of Hazard and Risk Assessment using the Bow Tie Analysis Technique.

### Response

What is Bow Tie risk analysis?

Bow Tie Assessment (BTA) is widely used in all types of industries such as aviation, railways, downstream oil and gas, chemicals, construction, defence, energy, healthcare, marine, manufacturing, mining and upstream oil and gas.

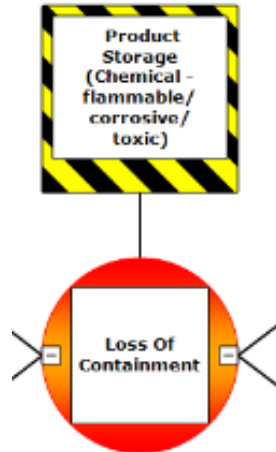
A Bow Tie is a diagram that visualises the risk you are dealing with in one easy-to-understand picture (refer to page three). The diagram is shaped like a Bow Tie, creating a clear differentiation between proactive (protection measures) and reactive (mitigatory measures) risk management.

The power of a Bow-Tie diagram is that it gives an overview of multiple plausible scenarios, in a single picture. It provides a simple visual explanation of a risk that would be much more difficult to explain otherwise. Commercial software is available to assist in conducting and recording BTA, however they can also be completed manually.

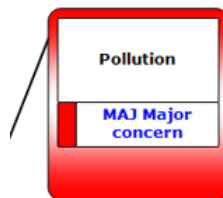
Common terms used in a BTA



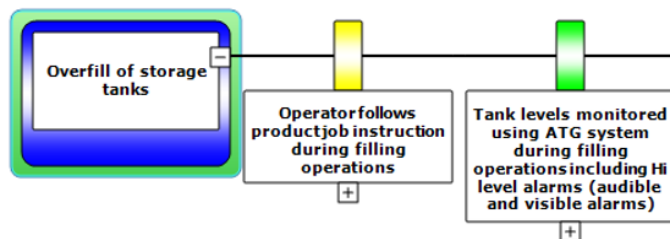
**Hazard** – examples chemicals, energy, flight,



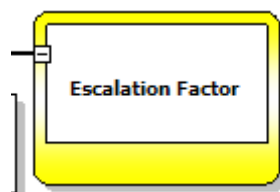
**Top Event** – usually loss of control, containment



**Consequence**- result of loss of control example pollution, fire, explosion

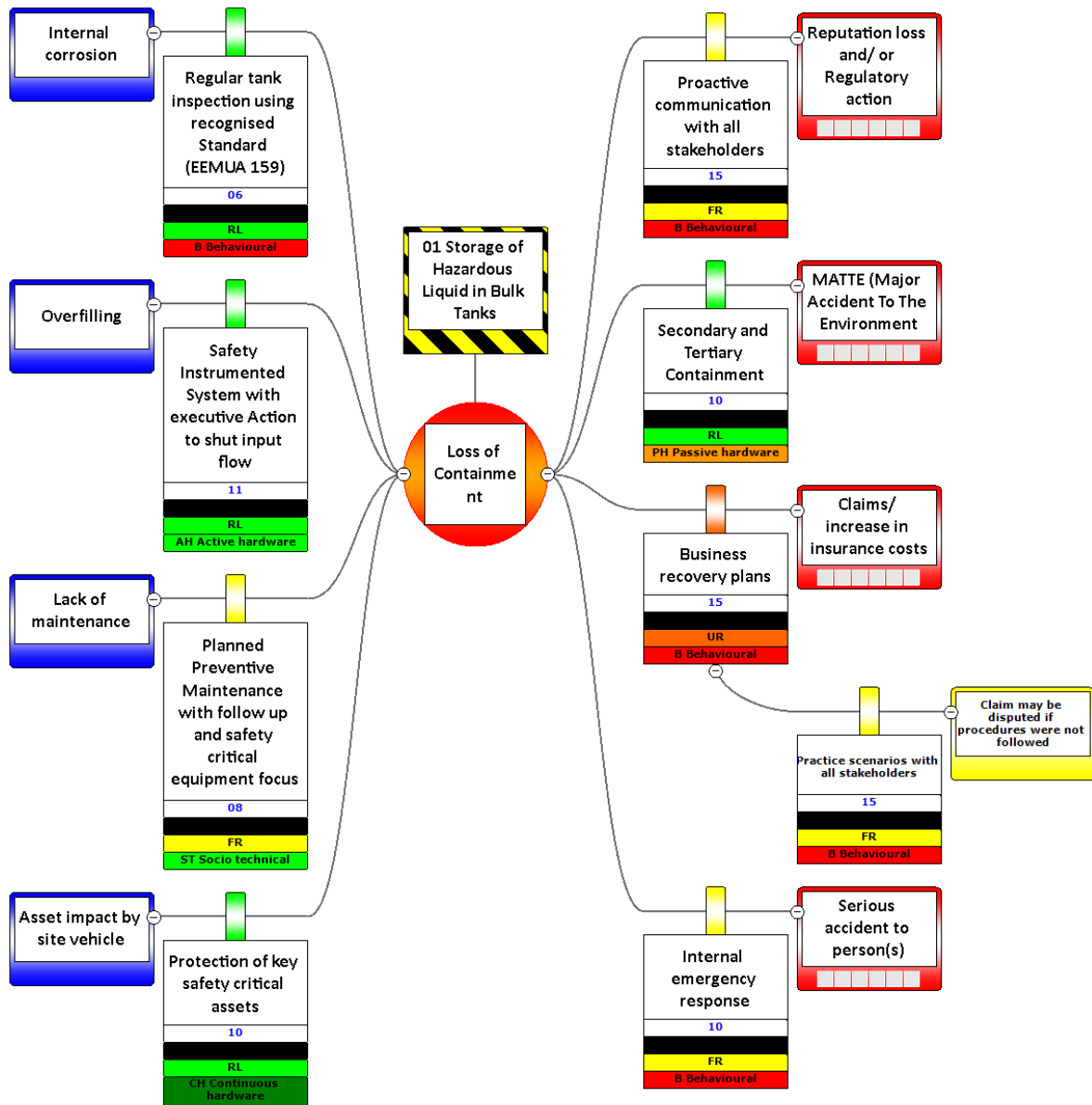


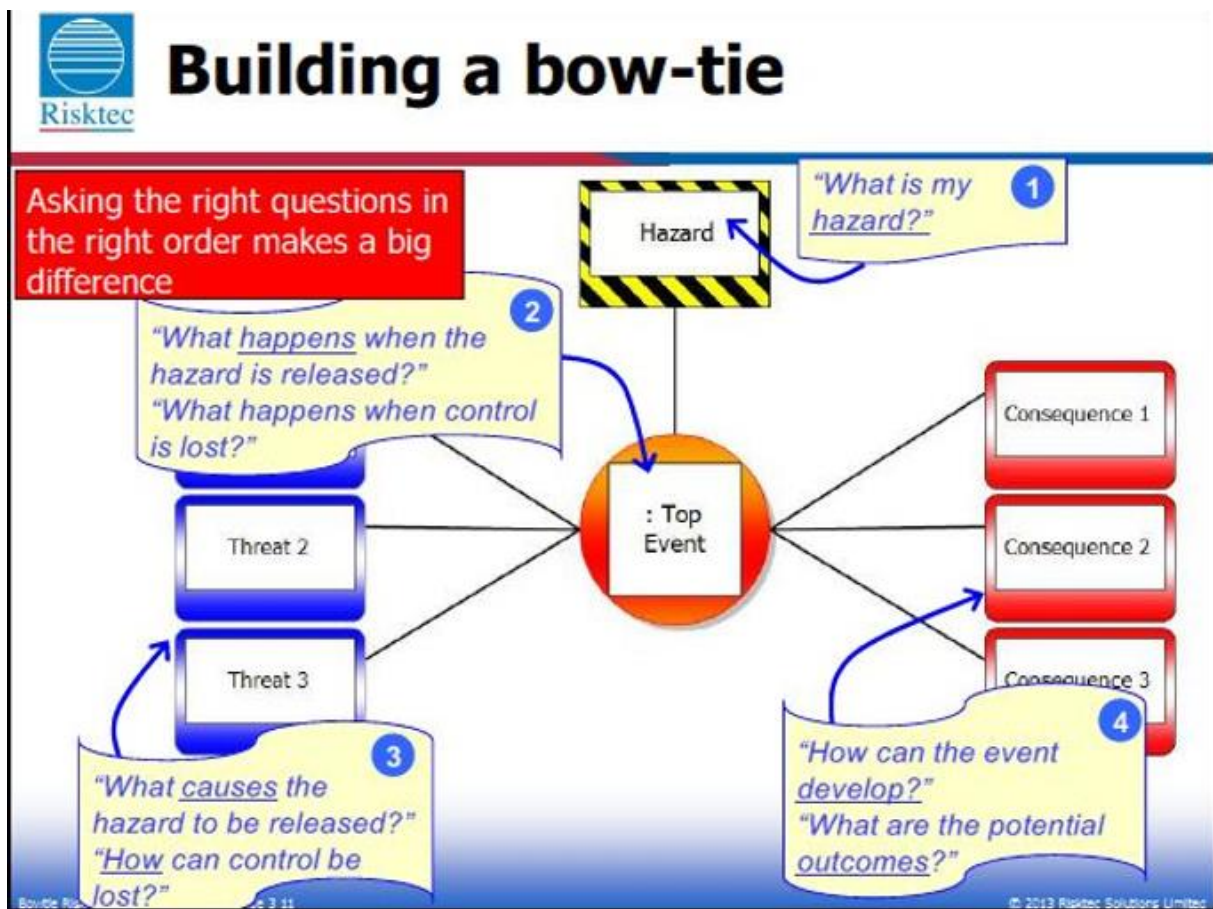
**Barriers:** Mitigatory or Preventive Controls



**Escalation Factor:** Required when Barriers require additional support

# Typical Process Industry Bow Tie





Building a Bow Tie (Courtesy Risktec Training Slide)

### Further reading

[https://www.cgerisk.com/knowledgebase/The\\_bowtie\\_method](https://www.cgerisk.com/knowledgebase/The_bowtie_method)

<https://www.risktec.tuv.com/our-services/consulting/consulting-services/bowtie-risk-management/>

The Process Safety Forum has been set up to provide an industry association platform whereby initiatives, best practice, lessons from incidents and process safety strategy can be distilled and shared across sectors, to influence our stakeholders (including the Regulators), and to drive the process safety management agenda. The Process Safety Forum consists of representatives from across industry, refer to the website for details

The website is [www.p-s-f.org.uk](http://www.p-s-f.org.uk).