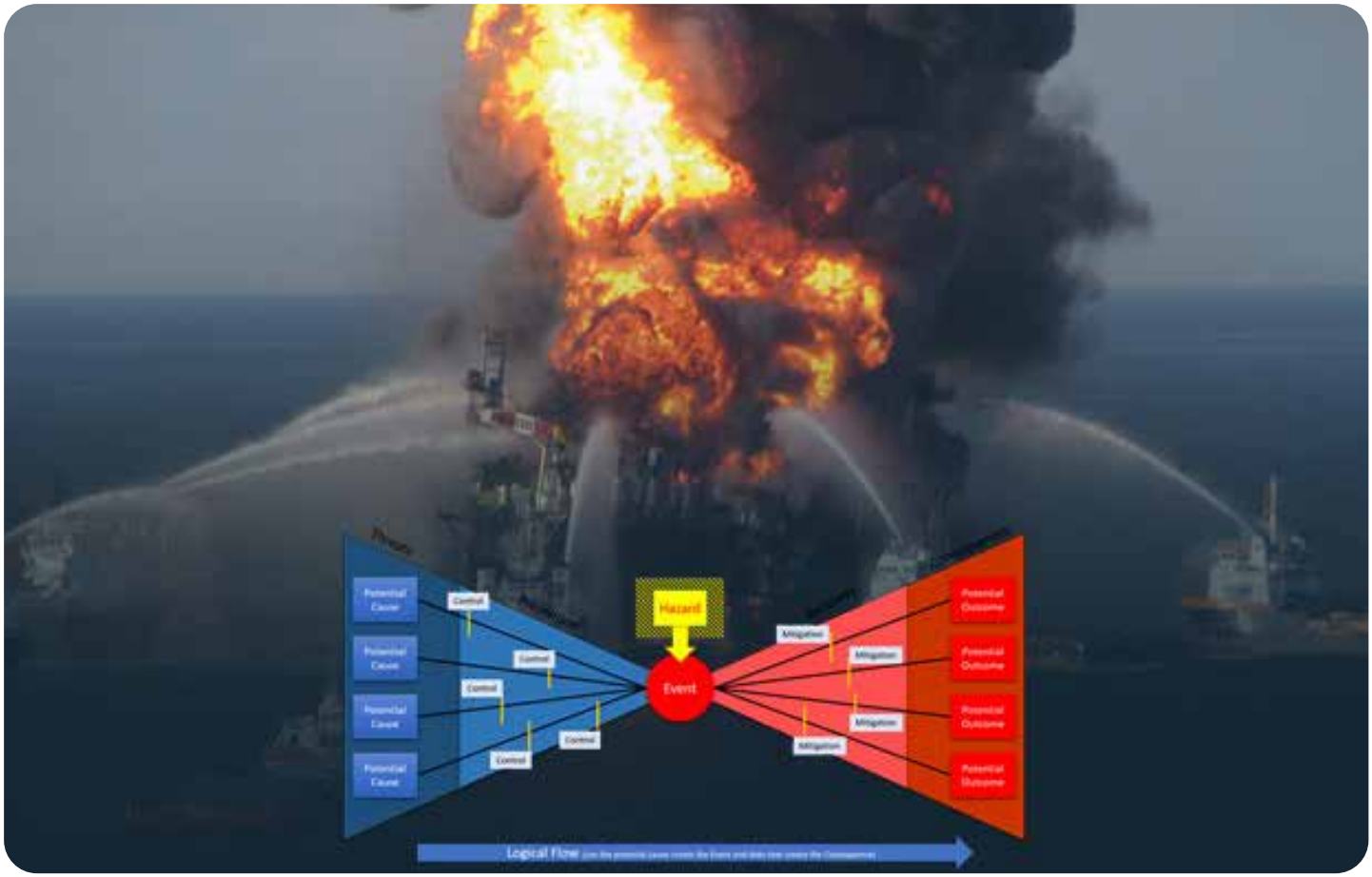
Bow Tie Analysis

Bow Tie Analysis is a simple method to identify where new or enhanced controls may be worthwhile. It is a vital part of risk treatment planning, especially where there is a high level of risk or where control effectiveness is evaluated as low.

A bow tie diagram provides a visual representation of all credible accident scenarios that could exist around a certain hazard. It links threats and consequences to an event that are controlled by various prevention as well as recovery measures (barriers).

A bow tie is a graphical description of pathways from the causes of a risk or an event to its consequences in a simple qualitative cause-consequence diagram. It is a simplified mixture of a fault tree that evaluates the cause of a risk or an event, the left-hand side of the diagram, and an event tree that evaluates the consequences, the right-hand side.

The focal point of bow tie analysis is on the barriers or controls described to the left-hand side of the knot that can change the likelihood of the circumstance or event, or on those on the right-hand side that can change its consequences.



Benefits of Bow Tie Analysis

- Highly productive for initial Process Hazard Analysis.
- Assures identification of high probability-high conse quence events.
- Amalgamated application of a high-level fault/event trees.
- Representation of the causes of a hazardous scenario event, likely outcomes, and the measures in place to avoid, reduce, or control hazards.
- Existing safeguards (barriers) are identified and assessed.
- Usual cause scenarios are recognized and described on the pre-event side (left side) of the bow-tie diagram.
- Credible consequences and scenario outcomes are described on the post-event side (right side) of the diagram.
- Associated barrier safeguards are involved.