

Managing risk; an integrated approach for water companies



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Development of a good practice integrated risk management framework provides the basis by which risks to water companies as a whole can be assessed and managed efficiently and effectively.

Water companies are asset intensive; they require significant investment in fixed assets and rely on the performance of those assets to meet required levels of service. As such, the assessment of operational risk presents a central element of any risk based approach. Key to this is a formal development of the linkage between a water company's assets and its customers.

Through its 'Portfolio' collaborative research programme, WRc has developed comprehensive fault trees and event trees for distribution management systems that capture all key failure mechanisms and reactive measures encountered and enacted by companies. This approach, which can be applied to both water and wastewater operations, provides an effective mechanism for identifying the linkage between a water company's assets and its customers and allows water companies to utilise a standard, effective, and transparent approach that can be populated by individual company data.

Why use fault and event trees?

Fault trees and event trees provide a widely accepted, effective and transparent means of identifying and analysing these links. Fault trees describe the causes of failure for a range of failure types. They can also illustrate the link between events, activities and policies, the failure process and the type of asset failure.

A fault tree can be defined as a clear and logical graphical representation of the relationship between events that cause or contribute to a defined failure (undesired event). In terms of assessing the risk of customer service failure in water supply systems, fault trees can be used to set out the links between how the supply assets fail (failure mode) and the process by which the assets enter that mode of failure (the failure process). The failure process will be initiated by deliberate, accidental or random events and activities linked to those assets.

Event trees provide an ideal means to represent a hierarchical series of actions that are taken following asset failure to prevent (or mitigate) customer service failure. The event tree enables the success or failure of these event mitigation options to be charted.

Event trees are logic tree diagrams that start from a basic initiating event (undesired event) and provide a description of all possible outcomes. Event trees are ideal for representing a hierarchical series of actions which are taken that have a variable number of outcomes.

WRc's collaborative approach to developing fault and event trees

Fault trees and event trees can be complex and time consuming to develop. However, the similarity of assets across water companies and the common mechanisms by which these assets fail, provide an opportunity for water companies to collaborate to develop generic fault trees and event trees. It is this collaborative approach that WRc has promoted in its two recent Portfolio projects entitled 'Integrated Distribution Management: A Common Approach to Risk' and 'Towards Integrated Distribution Management – Risk Fault Trees and Event Trees'. Having developed the generic fault and event trees, it is a relatively straightforward process for individual water companies to tailor their use for their specific assets and operational activities.

What are the benefits of using this methodology?

WRc believes that the use of fault trees and event trees in this context provides water companies with a valuable approach to risk and asset management for the next business planning cycle that integrates with the Capital Maintenance Planning Common Framework and PAS55, and is compliant with the Ofwat approach to risk. The methodology provides a transparent and justifiable approach to understanding the links between asset management and serviceability, with the potential to support better justified business cases. The methodology also provides an additional means to improve targeting of investment within AMP5 and a robust and auditable approach to support the development of AMP6 business plans.

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