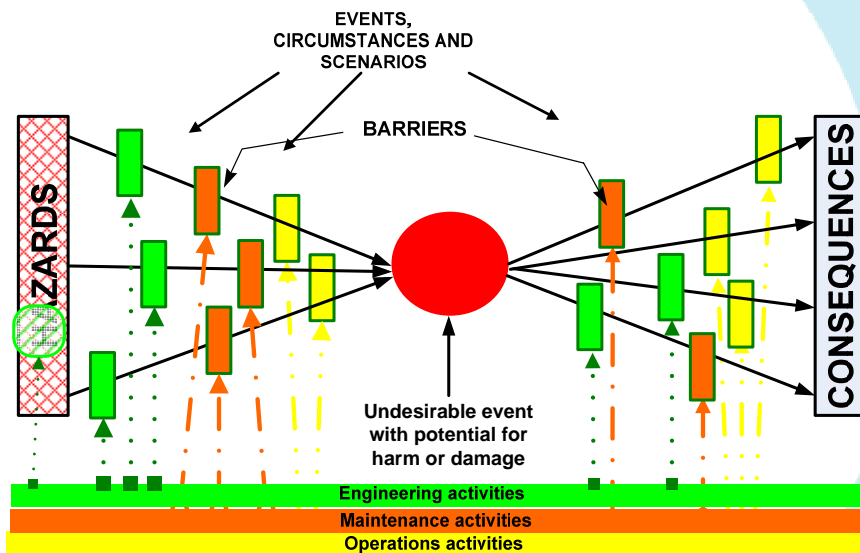


Justification of risk-taking

reasoning,
reasonableness
practicability



Des Hartford: Scientific Advisor; Safety & Risk Assessment

Catastrophic loss societal risk - dams

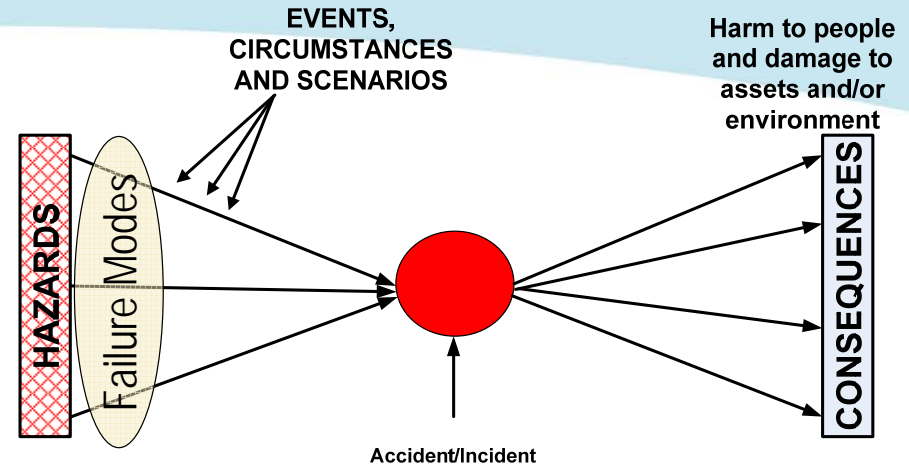
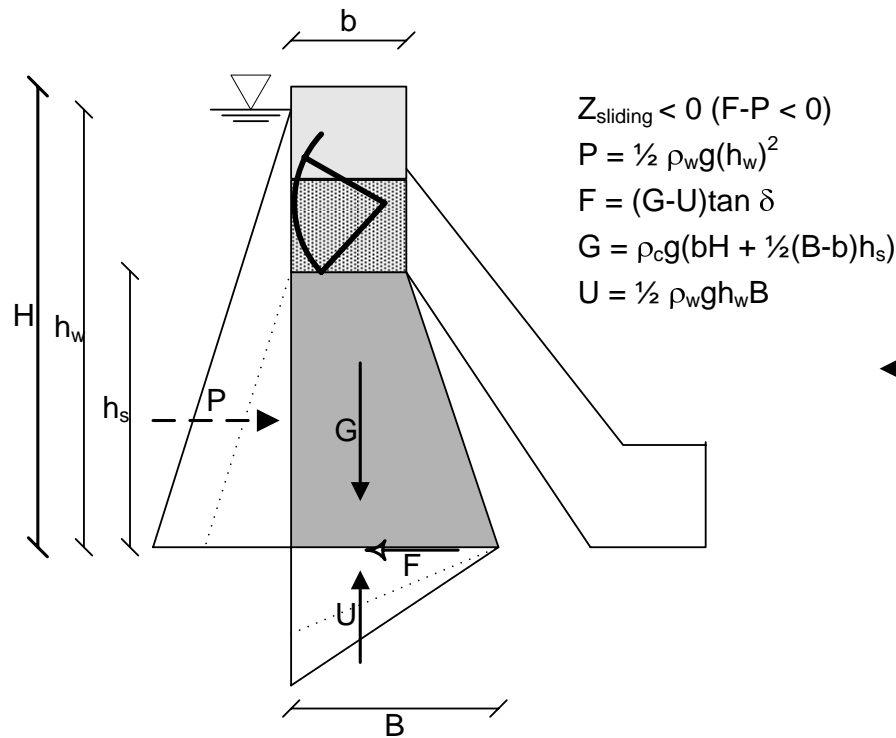


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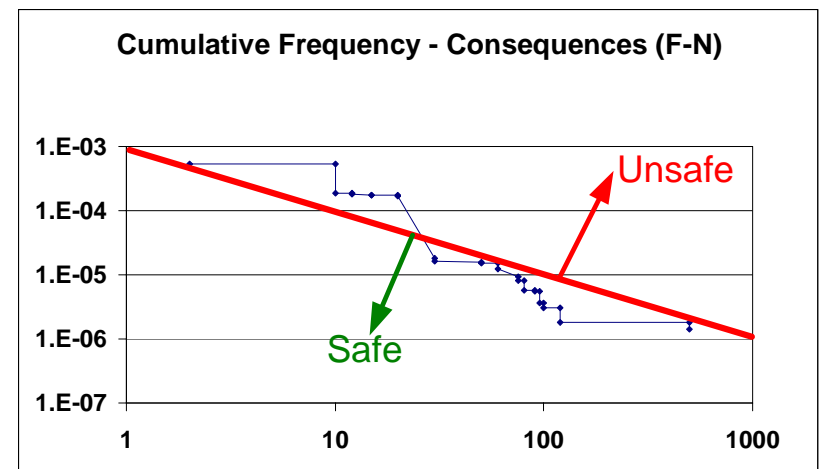
Safety, Health and Environment

Protecting People, Property and the Environment for Generations

Technocratic view of “safe”

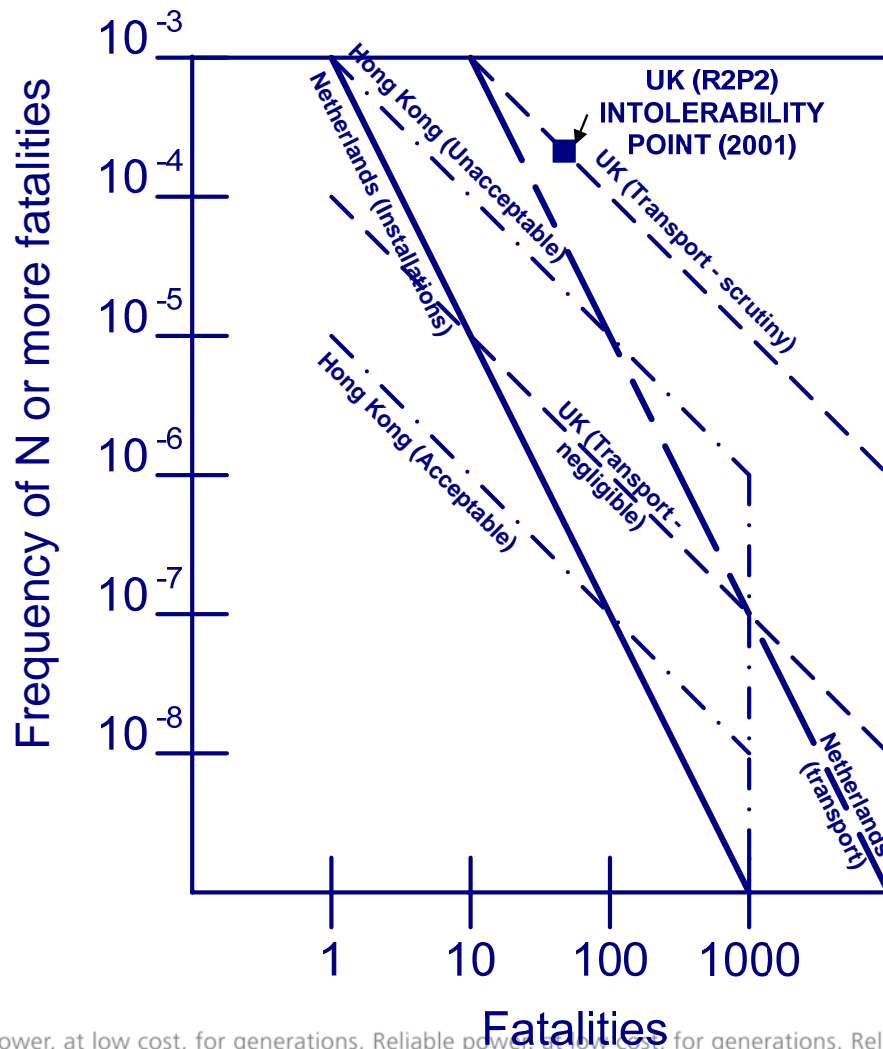


← Fault tree analysis Event tree analysis →



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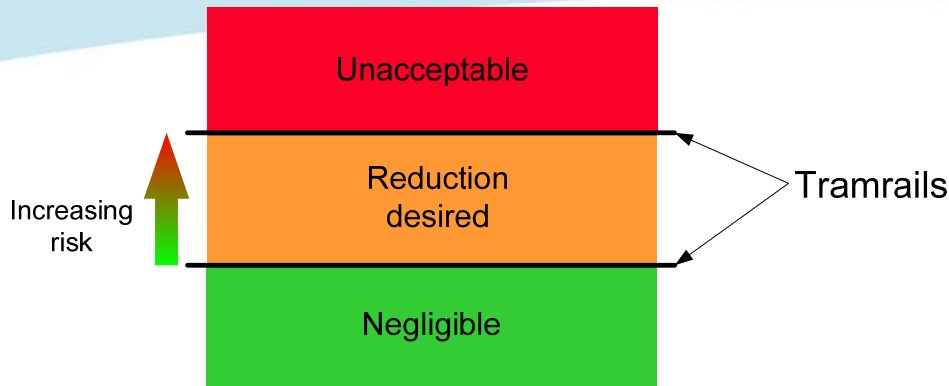
Some government's view of safety



Apparently very similar
Actually very different

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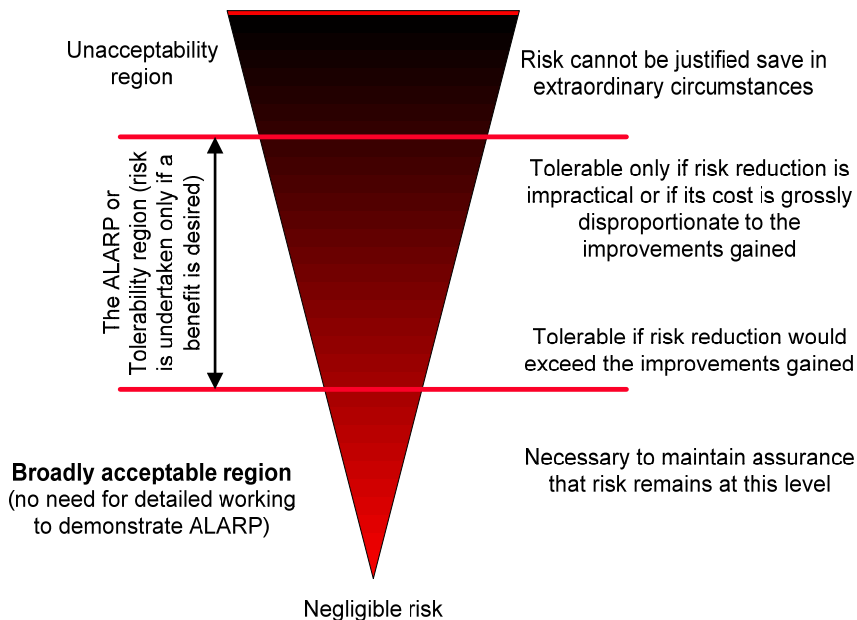
Similar but starkly different frameworks



Netherlands

The (marginal) costs of safety improvements should balance the benefits in terms of lives and property saved

“ALARA” is a token statement



United Kingdom

The (marginal) costs of safety improvements should grossly outweigh the benefits in terms of lives and property saved

“ALARP” is a requirement

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Implications... (Ale, 2005)

- Common law system,
 - > *what is not explicitly allowed is forbidden, unless it can be justified, where necessary in court,*
- Roman/Napoleonic system,
 - > *everything that is not explicitly forbidden is allowed.*
- Leads to completely different interpretations of the meaning of "As Low As Reasonably Practicable" under the different legal systems.
 - > These differences of legal definition mean that "seemingly different" or "seemingly similar" measures or metrics can lead to completely different conclusions

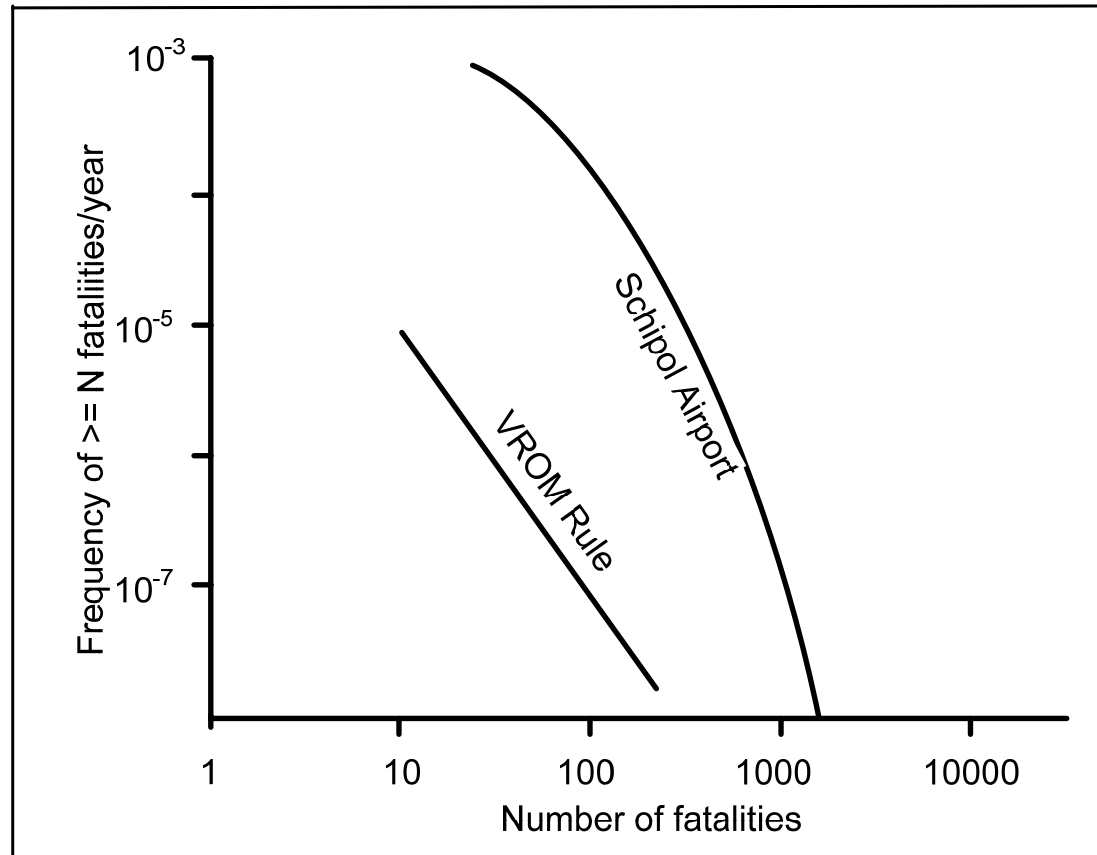
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Acceptable or tolerable

- Roman/Napoleonic system,
 - > notion of tolerability of risk does not really apply
 - the legally enshrined “decision rule” constitutes the political acceptability of the risk.
 - *Courts invariably state that, should the government want more safety, it should put stricter levels in the law”*
 - » except when politics overrides the rule”
- Common law system
 - > risks are only tolerable if there are no reasonable opportunities to implement further risk reduction measures.
 - in the United Kingdom there is no way of being sure in advance if the ALARP demonstration is sustainable in court

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Politics of risk acceptance criteria



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Societal risk regulation – common law

- *“Risk-regulation is about making trade-offs.*
 - > *Trade-offs between different risks;*
 - *between risks to some individuals or groups, and risks to others;*
 - *between costs and benefits.*
 - > *It is the nature of risk that, frequently, those who create the risk do not bear its consequences nor its wider costs.*
 - *So the market does not function properly as a distributive mechanism. The State must intervene to regulate risk.”*
 - UK Health and Safety Executive (Bacon, 1997)

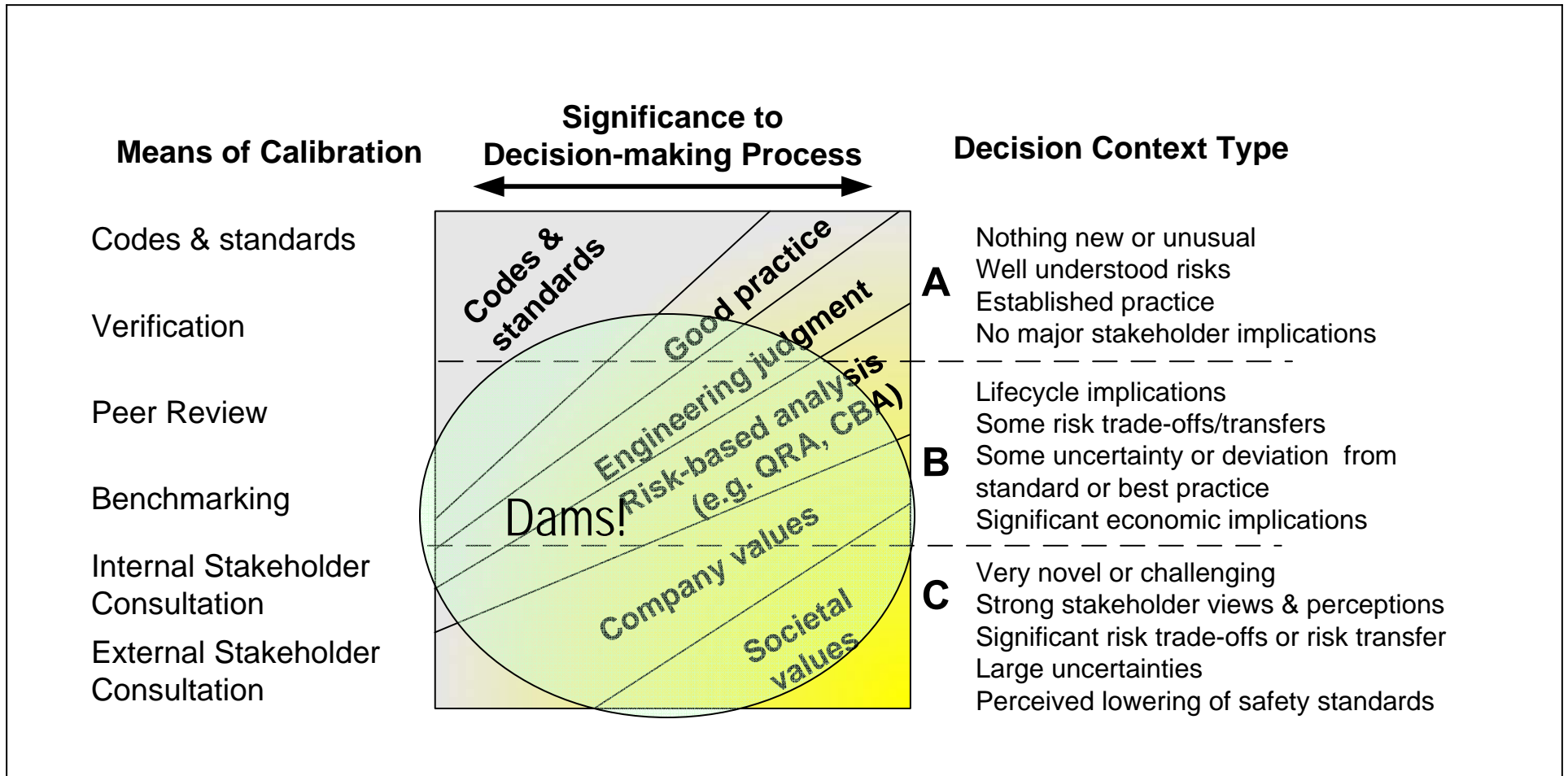
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The State's regulator has to

- *confront some basic issues:*
 - > *the need for economic, social and technological progress compared with "zero risk" or "guaranteed safety".*
- *assert the propositions that*
 - > *risk is a necessary part of the human condition;*
 - > *progress often depends both on incurring risk and on learning from failures (that is, accidents);*
 - > *risks must be controlled but cannot in most circumstances be eliminated;*
 - > *control of risks must move public opinion from focussing on what is acceptable to what is tolerable;*
 - *that 'safe enough' is the goal to be striven for in design, engineering and risk management"*

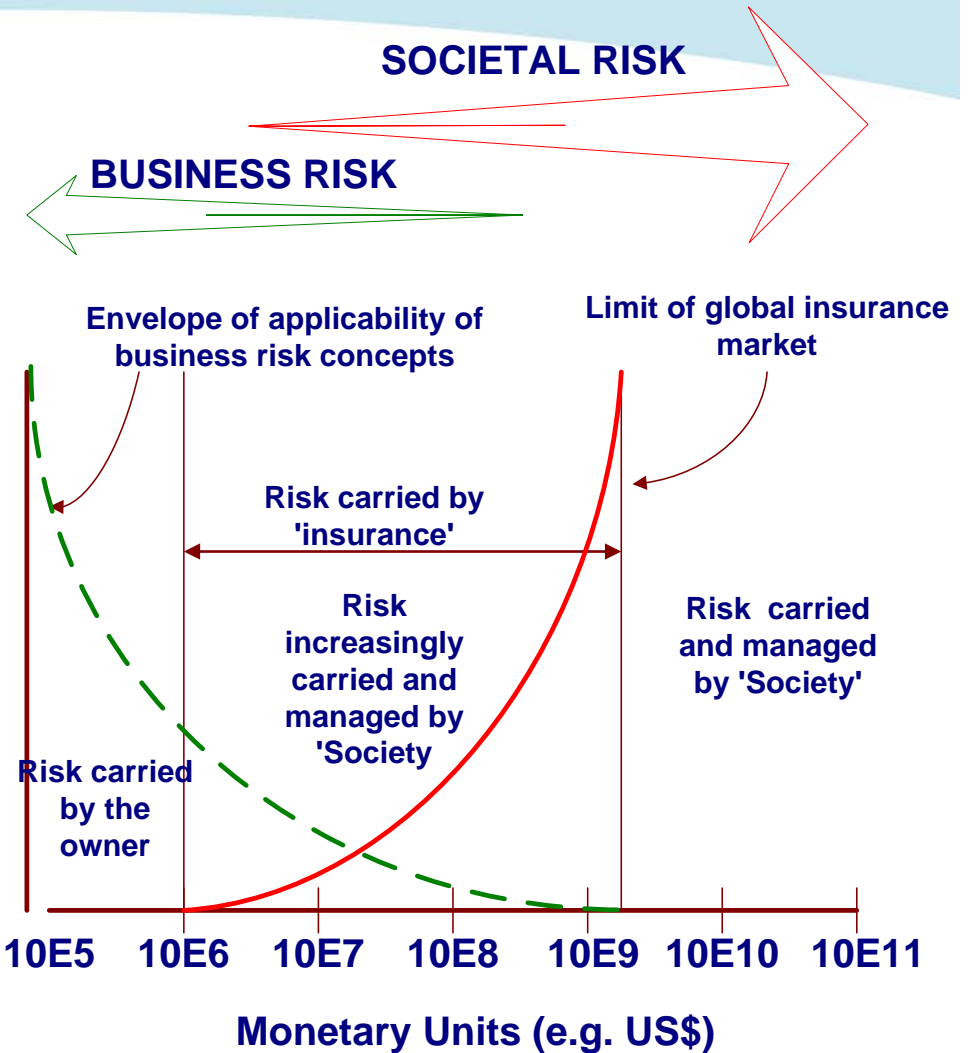
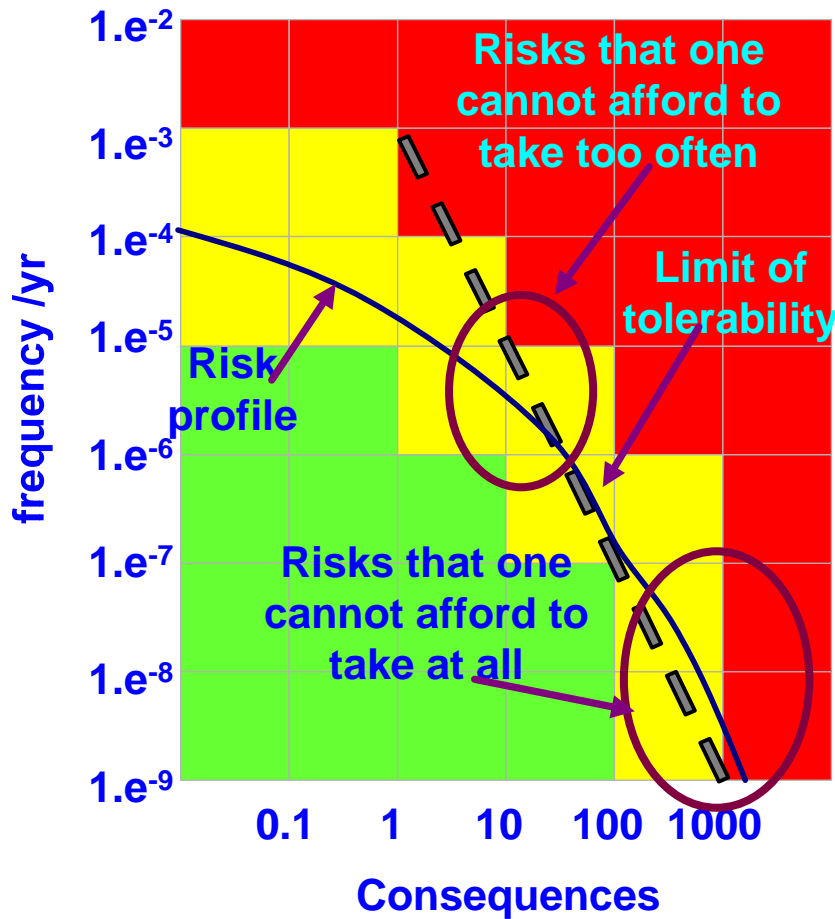
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Setting the decision context (UKOOA)



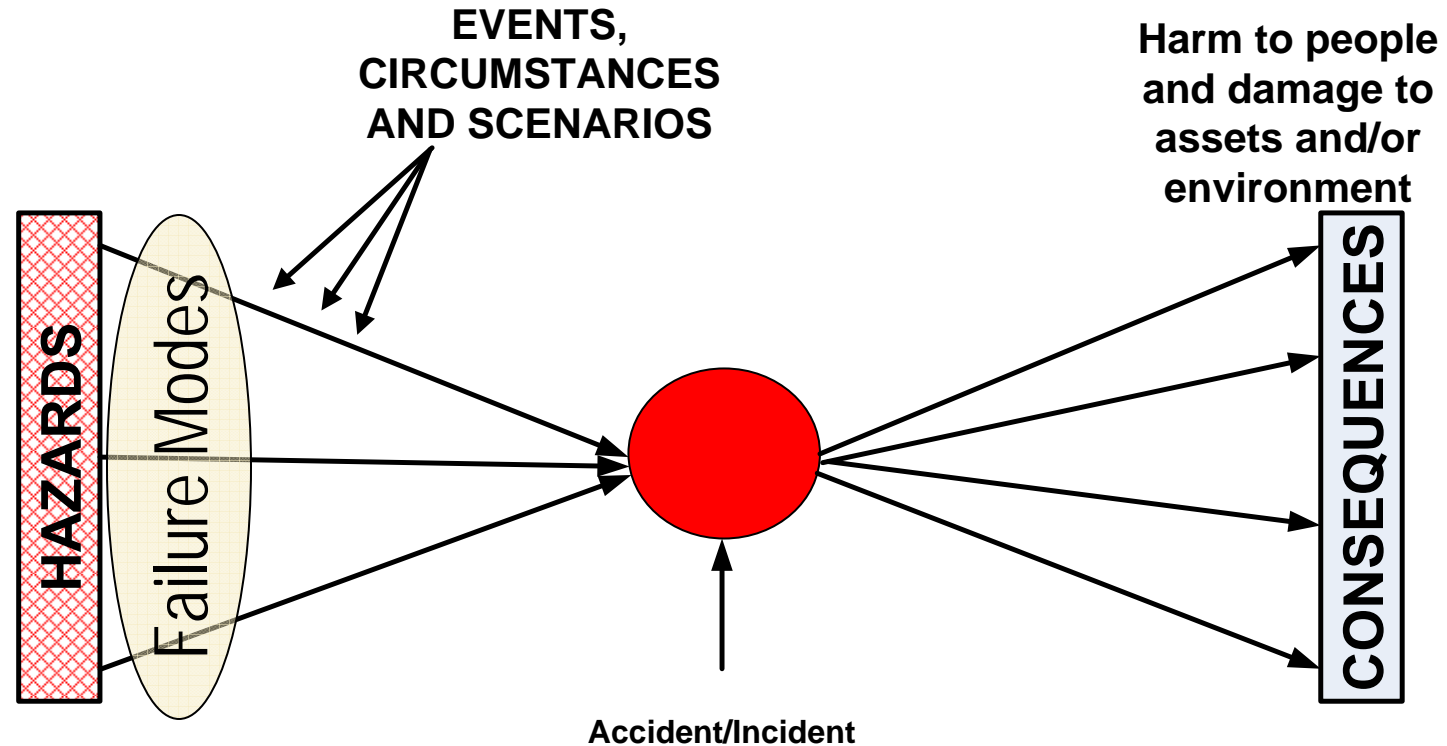
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Quantified risk context



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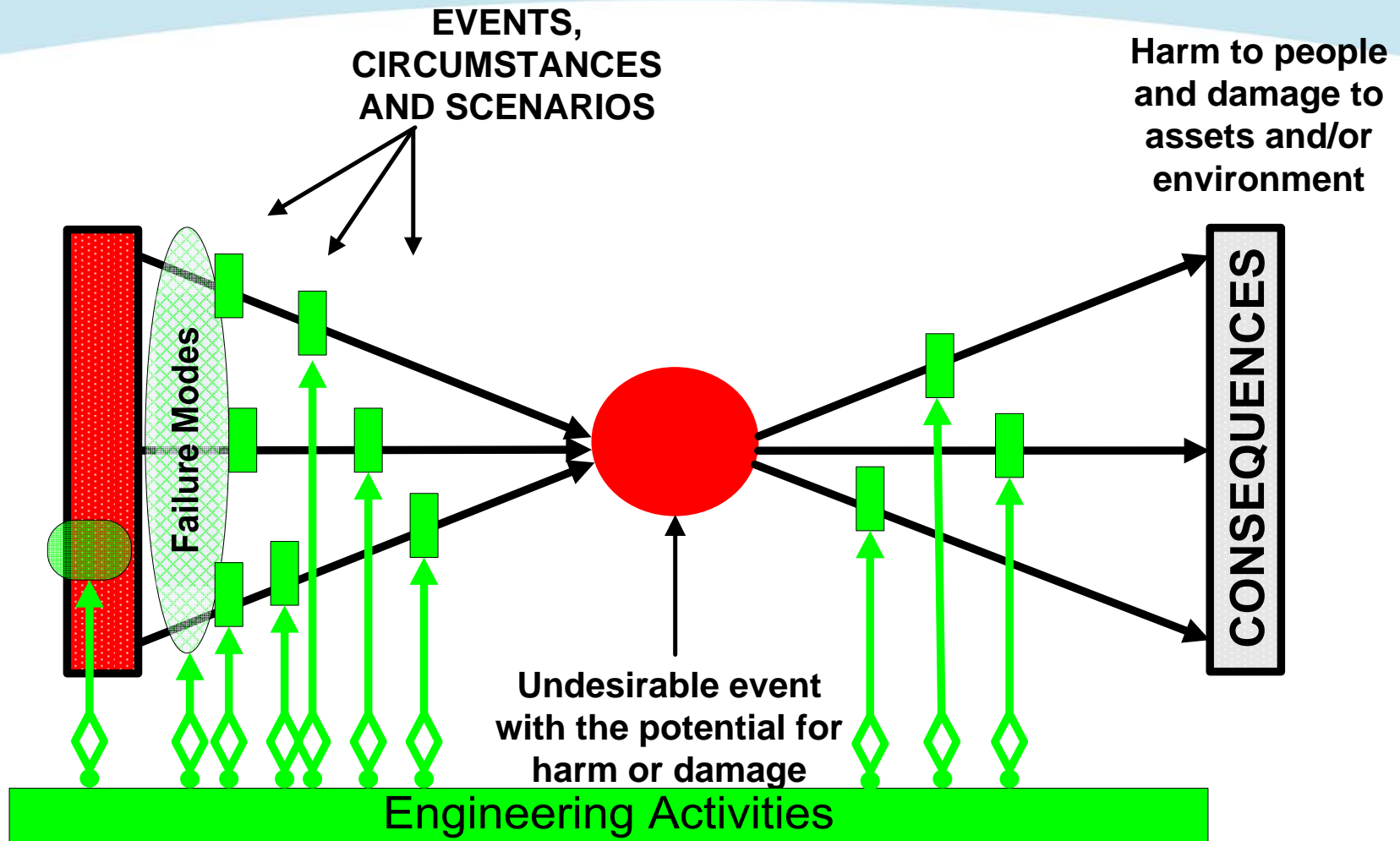
Risk analysis the unifying link



← Fault tree analysis Event tree analysis →

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Engineered safeguards

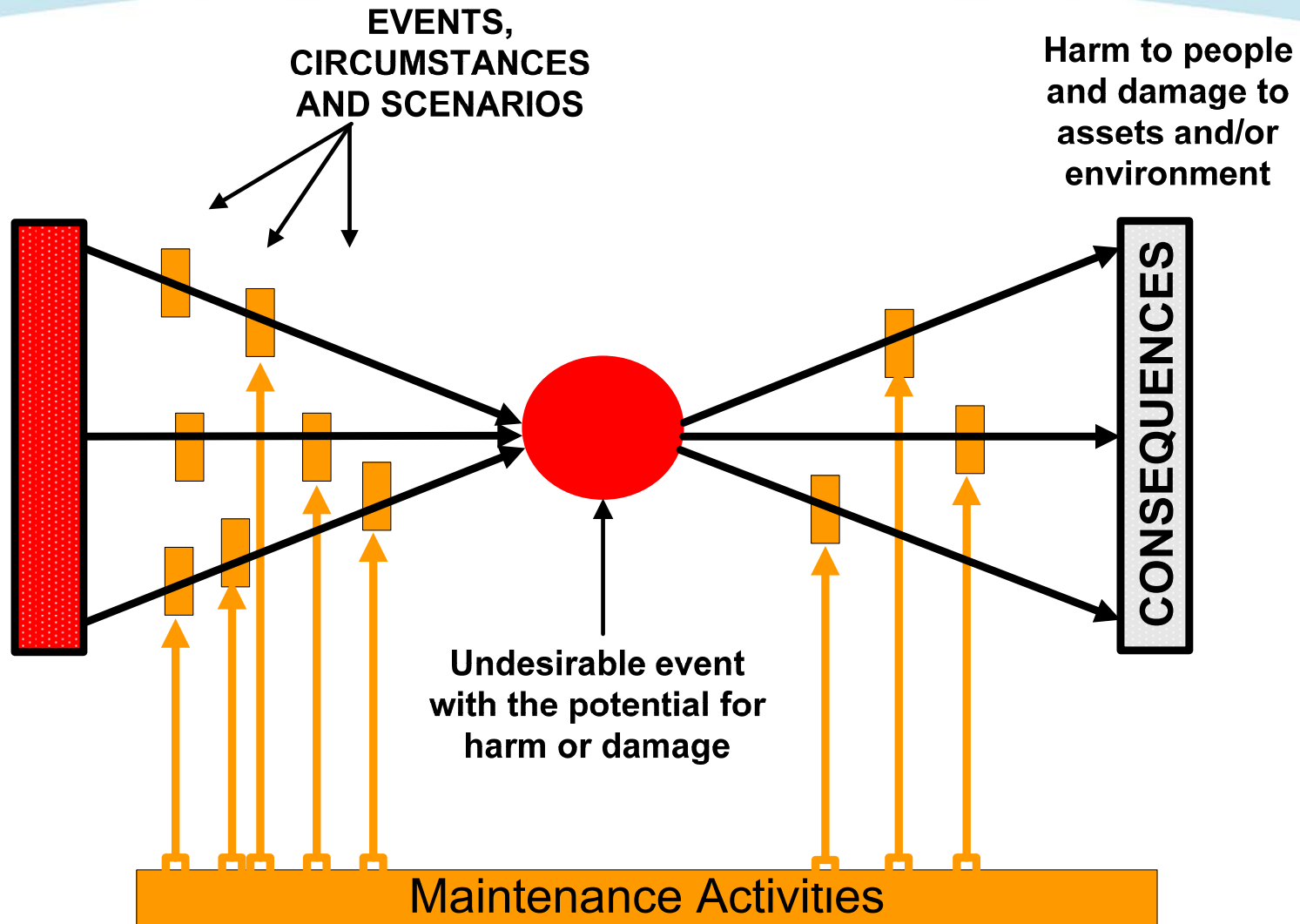


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Safety, Health and Environment

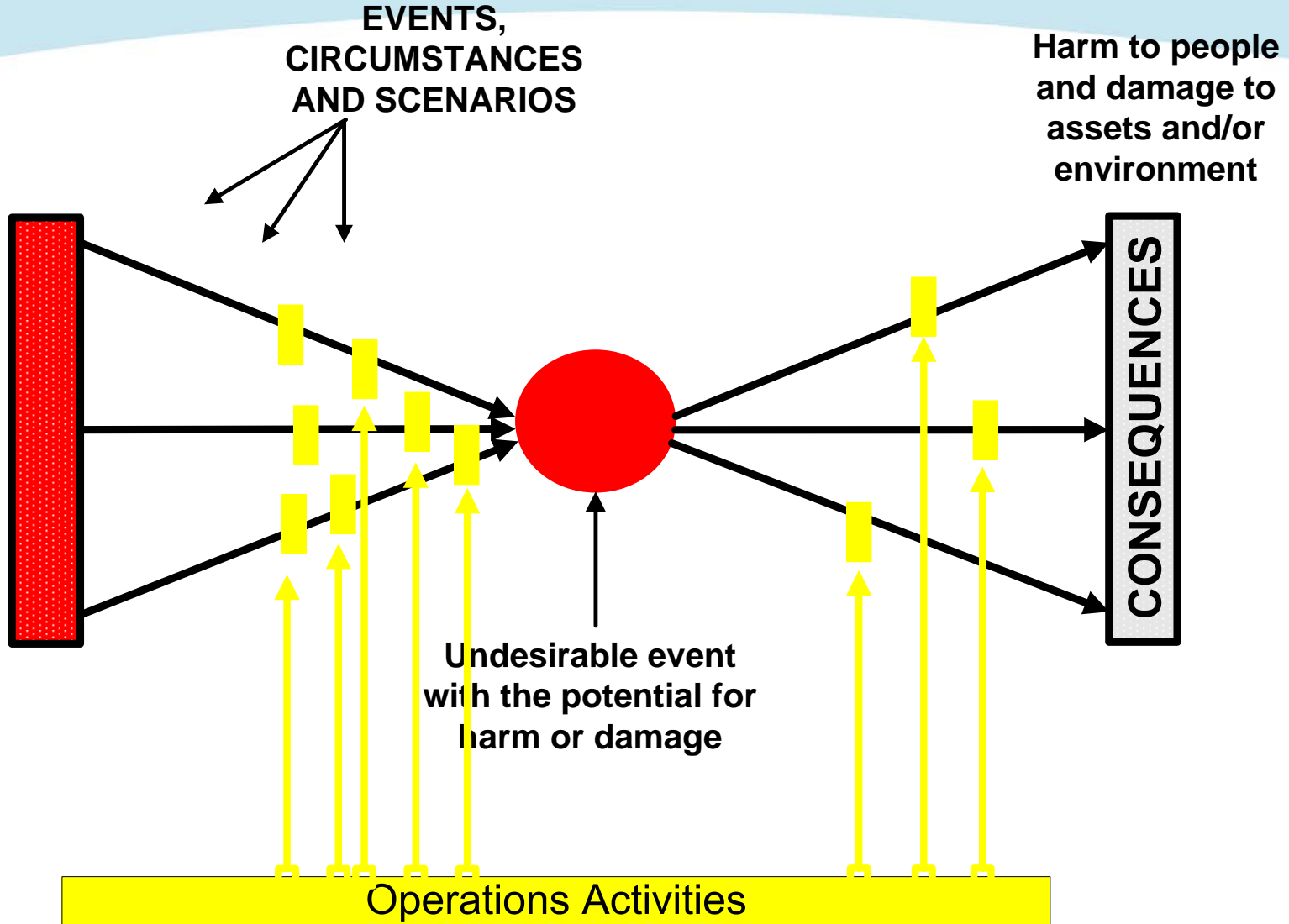
Protecting People, Property and the Environment for Generations

Maintenance safeguards



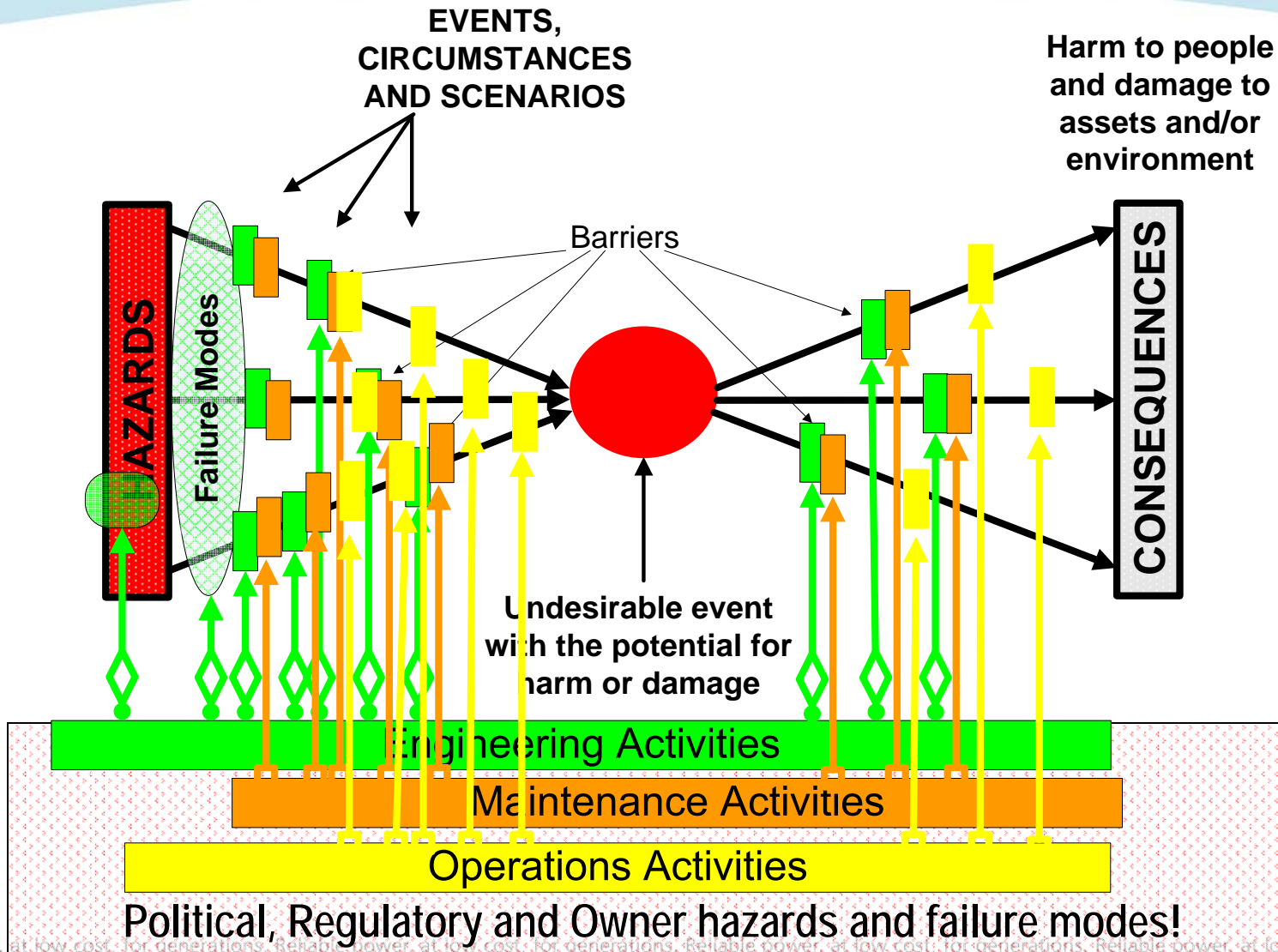
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Operational safeguards



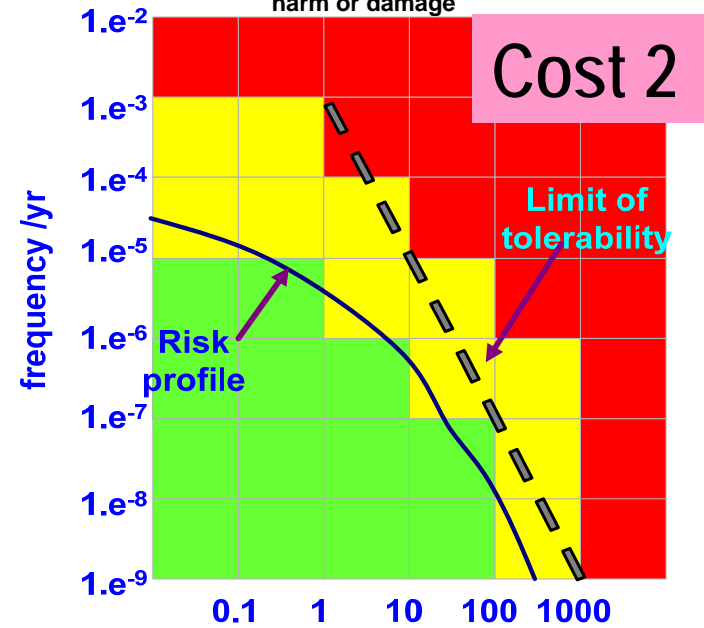
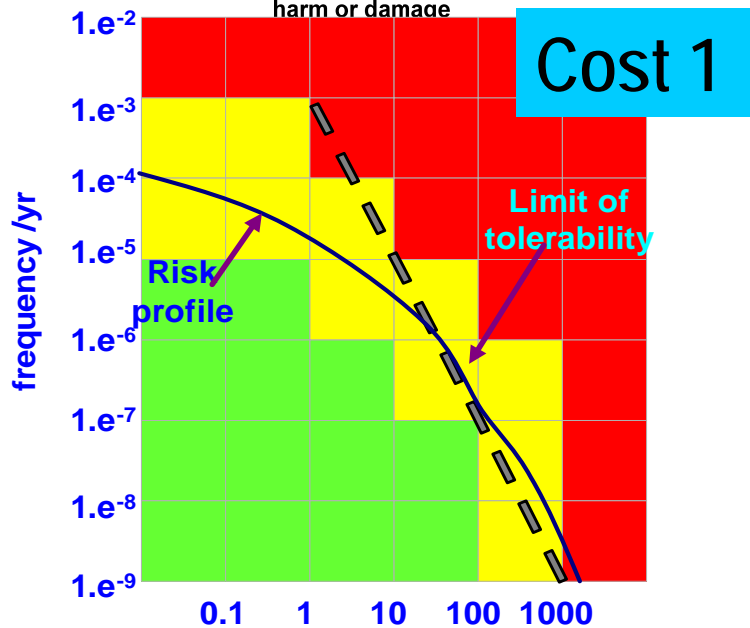
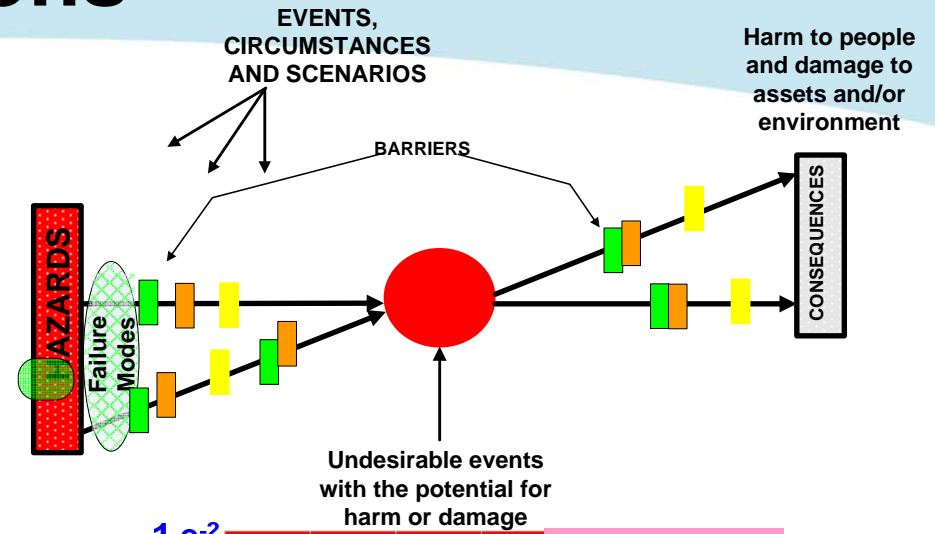
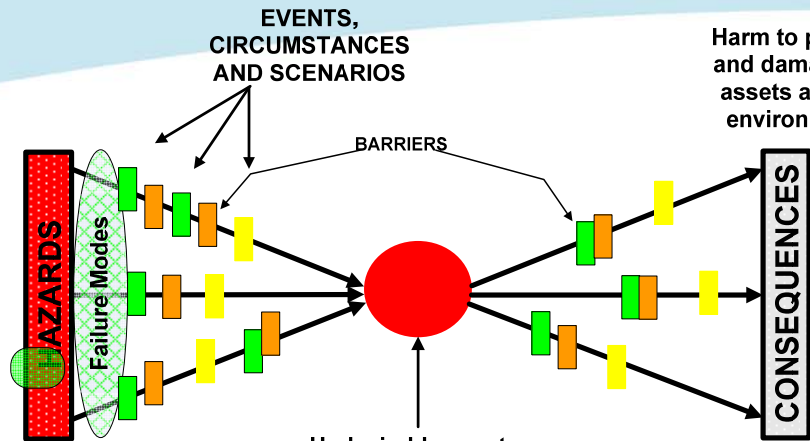
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Defence in depth & strategic risk



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Risk informed decisions



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