



# How Safe is Safe Enough?

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# Background

- The Safety Decisions Programme was set up, in response to requests from within the industry, in order to:
  - establish a common understanding amongst internal and external stakeholders as to what the railway is expected to deliver with regard to safety.
  - develop a trusted framework of processes and criteria for safety decision makers to apply.
  - achieve clarity and stability in the safety governance of the railway.
- The programme seeks to achieve these objectives by bringing together research, consultation and deliberation to find a way forward on all aspects of proper decision-taking as it affects safety.

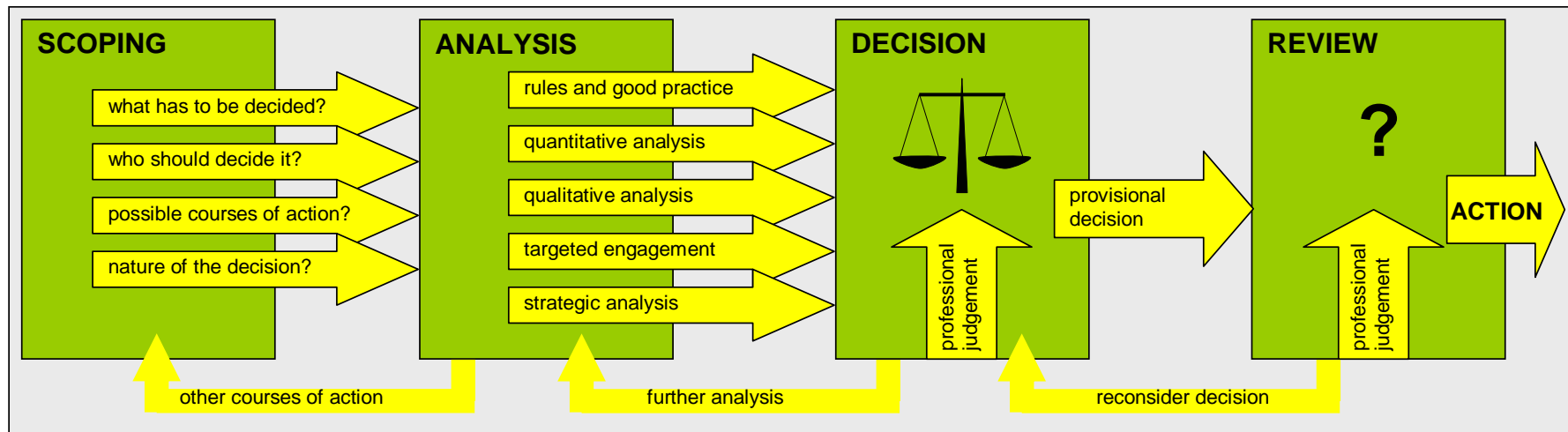


# Decision Taking Framework

- **'How safe is safe enough'** was published in February 2005.
- The document summarised the legal background, and industry approach to decision making. However further work was needed to clarify long standing difficulties and ambiguities.
- Various work streams were begun:
  - **Decision Taking Framework:** Development of a framework providing a structured process for taking decisions that formalise and build on existing good practice.
  - **Legal Certainty:** to review the legal position emerging from state and case law, identifying uncertainties that exist and seeking clarification of them.
  - **Valuing Safety:** Research into how to better understand how society values safety, and to propose a framework for building this understanding into decisions.

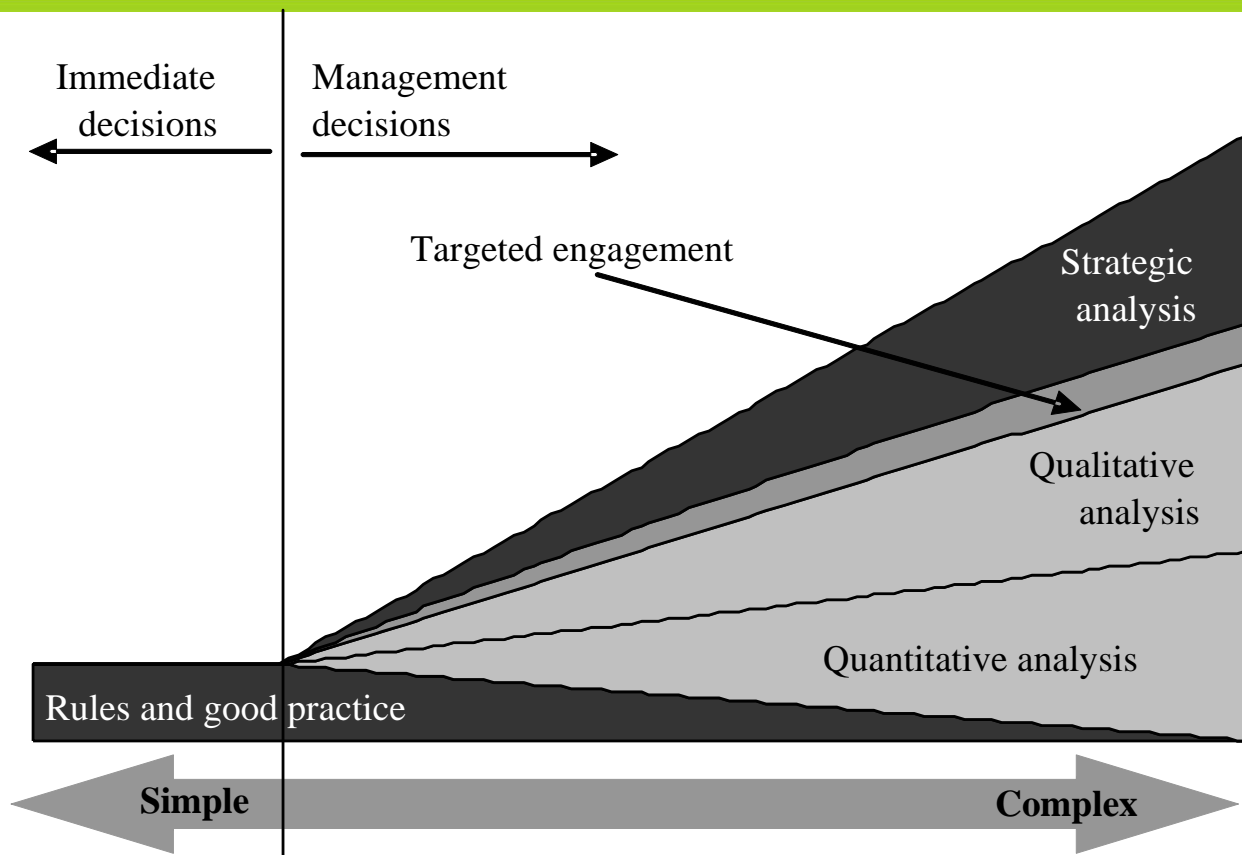


# Decision Taking Framework



- Framework proposed has four stages:
  - Scoping the decision
  - Analysis
  - Taking the decision
  - Review

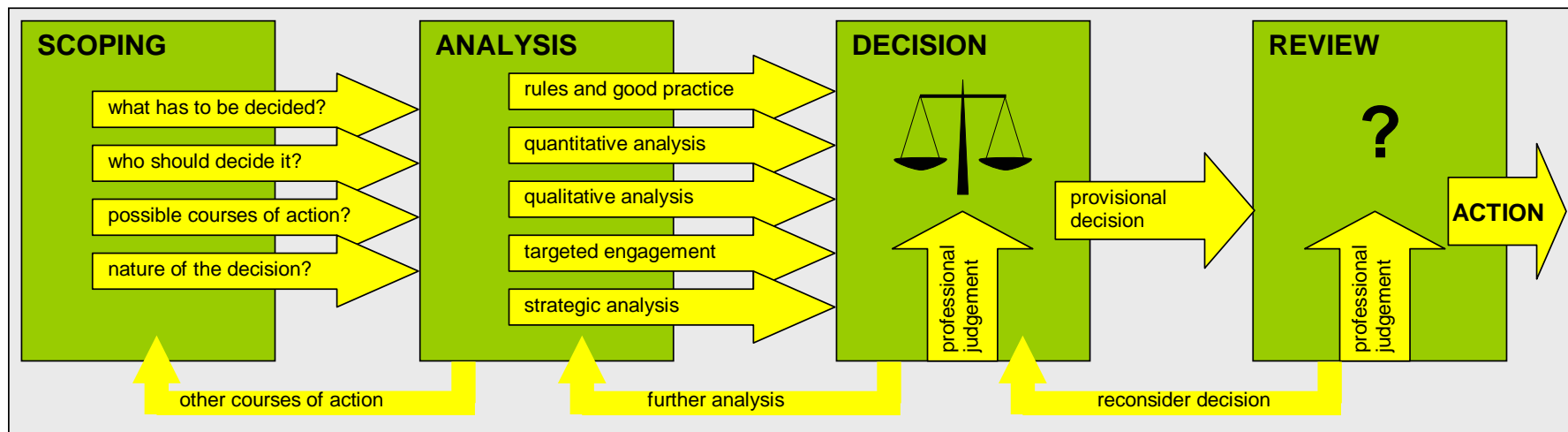
# Decision Taking Framework



- A framework has been proposed to support the analysis stage.
- The methods to apply and the degree of resource invested in each depends on the complexity of the problem.



# Decision Taking Framework



- Framework proposed has four stages:
  - Scoping the decision
  - Analysis
  - Taking the decision
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# Valuing Safety/Legal Certainty

- **Decision Taking Framework:** Development of a framework providing a structured process for taking decisions that formalise and build on existing good practice.
- **Legal Certainty:** to review the legal position emerging from state and case law, identifying uncertainties that exist and seeking clarification of them.
- **Valuing Safety:** Research into how to better understand how society values safety, and to propose a framework for building this understanding into decisions.
- Two key issues that we are trying to resolve:
  - the correct application of the test of gross disproportion
  - clarifying the duty on railway companies to manage risk when it is wilfully taken.



# Gross Disproportion vs Proportion

quantum of risk =  
avoidance of harm

- fatalities
- injuries
- trauma



sacrifice = net cost of  
avoiding the harm

costs offset by  
benefits

“... the quantum of risk is placed in one scale and the sacrifice necessary for averting the risk (whether in money, time or trouble) is placed on the other, and that, if it be shown that there is a **gross disproportion** between them – the risk being insignificant in relation to the sacrifice – the defendants discharge the onus on them.”

We must do all that is **reasonably practicable** to reduce risk.



# Gross Disproportion vs Proportion

- Value of Preventing a Fatality
  - To weight net costs against safety risks we use the Value of Preventing a fatality figure (currently £1.5 million per statistical fatality)
- The VPF is aggregate willingness to pay for typically very small reductions in individual probability of death.
- the VPF is not a “value (or price) of life” in the sense of a sum that any given individual would accept in compensation for the certainty of his or her own death.
- It is derived from studies of what the public would be willing to pay for reduction in already low levels of residual risk.
- They are a measure of society’s values.



# Gross Disproportion vs Proportion

- The test of 'gross disproportion' now appears antiquated and inappropriate. The use of an ill-defined factor of disproportion to apply in various undefined circumstances is entirely inappropriate for the industry as it is today. It introduces confusion and detracts from clear decision making. Our industry consultation strongly supported this view.
- There are three reasons which have been cited for introducing an imbalance between net costs and risks:
  - Societal Concern/Societal Risk
  - Magnitude of Individual Risk
  - Uncertainty
- We need to know precisely which are relevant, and how they influence the degree of disproportion, for companies to be able to take decisions confidently in the full range of different circumstances they face.



# Gross Disproportion vs Proportion

- **Societal Concern**

- We have developed a definition of societal concern:

*“The level of concern and anxiety that the public feels in relation to different types of risk. This concern might not reflect the true level of risk but is influenced by dread and other subjective or emotive feelings. It might change considerably as a result of events such as a particular type of accident. Societal concerns fluctuate because the public is exposed to information about risk in an uncontrolled and often retrospective way.”*

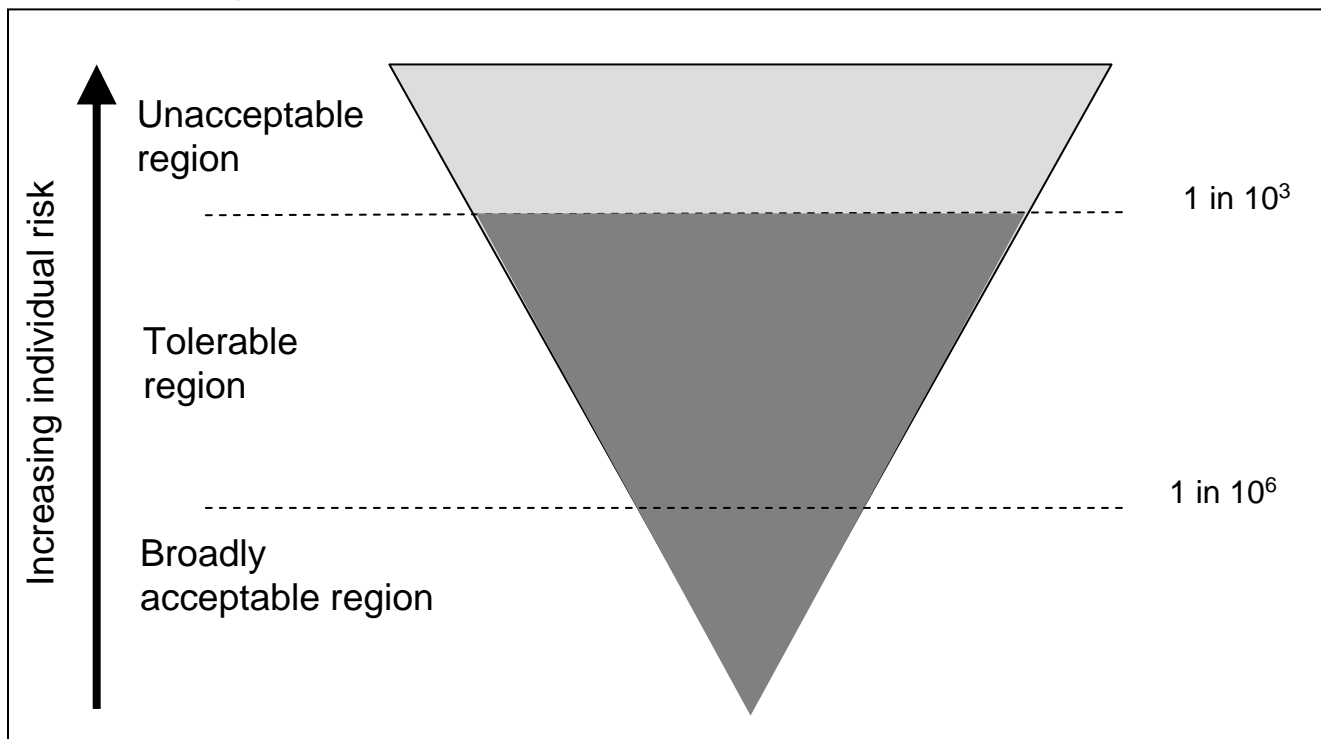
- **‘Societal concerns’ are not an objective measure of risk and duty holders cannot be expected to try to second guess them in their decision making process. Instead:**
- Society’s values are taken into account in the VPF figure.



# Gross Disproportion vs Proportion

- **Tolerability of Risk Framework**

- Introduced in 'The Tolerability of Risk from Nuclear Power Stations'.
- Subsequently described in safety regulator document 'Reducing Risks, Protecting People.'
- It describes absolute limits to the total risk to various types of exposed group within the railway.





# Gross Disproportion vs Proportion

- **Magnitude of Individual Risk**
- It is only in rare circumstances that the individual risk to exposed groups approaches the intolerable region.
- It is not practical or workable to use the level of individual risk in a particular circumstance to determine a degree of imbalance between net costs and risks.
- Proposal:
  - Railway companies should only take the magnitude of individual risk into account in decisions when it is 'close to intolerable' despite all ALARP measures having been implemented (Further guidance would be needed about determining when individual risks to particular groups were considered to be 'close to intolerable').
  - In these circumstances the railway companies would speak to the regulator about how best to proceed, what levels of resource and expenditure would be suitable, and how this funding could be found.



# Gross Disproportion vs Proportion

- **Uncertainty**
- There were no quantitative or qualitative models to assess risk and value safety at the time of the Edwards judgement. It is likely that the test of gross disproportion was intended to err on the side of caution to account for the uncertainty inherent in decisions about risk.
- We now have much more sophisticated techniques that provide greater certainty of the actual level of risk – such as risk modelling techniques, and a financial figure for the value of preventing a fatality. We are now able to act proportionately, taking account specifically of the uncertainty in our knowledge.
- As an example, uncertainty is at its greatest where risk relates to high severity, low frequency accidents, such as risk relating to train accidents. The uncertainty in such assessments could easily be a factor of 3 or more. This provides a logical argument for HMRI guidance suggesting the imposition of such factors.



# Gross Disproportion vs Proportion

- In summary:
  - ‘Societal concerns’ are not relevant to determining a degree of disproportion between net costs and risks. The VPF figure takes account of society’s values.
  - When individual risk to an exposed group is ‘close to intolerable’ (despite all ALARP measures having been implemented) railway companies should speak to the regulator about how best to proceed – this does not effect the degree of disproportion in an ALARP assessment.
  - The only logically valid reason for introducing an imbalance between net costs and estimated risks is to err on the side of caution to account for uncertainty in this analysis.
- This should be clarified. The approach would be best described as a proportionate one: to ensure that the net costs of a decision are not disproportionate to the risks.
- Railway companies may choose to err on the side of caution to an extent determined by the uncertainty in these estimates.



## Wilful Risk and Reasonable Practicability

- **Wilful Risk and Reasonably Practicability : Different views**
- There are different interpretations within the railway industry of how/if the HSWA applies to those who wilfully expose themselves to risk (such as adult trespassers or those committing suicide).
- Some argue that, in these cases, the risk is not created by the railway industry, and therefore they have no legal duty to manage it (although they may choose to for a variety of other reasons).
- Others believe that they have a responsibility to manage such risk, but that it is reasonably practicable for them to do less when people wilfully expose themselves to risk.
- Another interpretation is that a 'life is a life' and that exactly the same duty exists regardless of the circumstances in which it occurs.



## Wilful Risk and Reasonable Practicability

- **Focus group research**
- RSSB commissioned research to test some of these ideas.
- This project used opinion survey techniques to make quantitative comparisons of the relative value attributed to each of a set of scenarios. The work was led by Oxford Risk Research Associates (ORRA) and NOP conducted the surveys (the sample size was 1033 people).
- The quantitative results were analysed to calculate the relative societal value attached by the general public to avoiding each scenario.
- The baseline case is an adult rail passenger behaving responsibly and killed in a single-fatality rail accident. This is considered to be the typical accident that is the basis of the average VPF derived from WTP studies. The societal values relative to this baseline were estimated.



- **Focus group research**
- Conclusions were:
  - The societal value attributed to a multi-fatality accident is no higher than that attributed to the equivalent number of single fatality accidents, and the societal value attributed to an accident that is thought to inspire dread is not higher than any other.
  - There is a group of scenarios for which the societal value is equal to the baseline (within + 25%). This group includes all of the scenarios in the list down to and including “Child trespasser killed while taking a shortcut”.
  - Other scenarios, which describe injury to those wilfully exposing themselves to risk are represented by a societal value which is 0.4 x the baseline (within + 25%).
- This research supports the argument that it is reasonably practicable for companies to do less where the injured party has wilfully exposed themselves to risk.



## The Way Forward

- A number of issues remain to be resolved.
- We are currently working with the joint safety and economic regulator in the UK, the Office of the Rail Regulator (ORR) to communicate all of our findings and recommendations to them.
- They are to publish a document that clarifies any existing ambiguity in legislation.
- Our current intention is to publish 'How Safe is Safe Enough 2' as a document that describes a clear decision taking framework that is consistent with the clarified position.