

Railway industry guidance on managing risks

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1 INTRODUCTION

1.1 Lack of legal certainty and the interpretation of reasonable practicability

The primary legal duty relating to safety for rail companies in Great Britain arises under the Health and Safety at Work Act 1974 (HSWA), in part clarified by earlier cases that led to HSWA and cases since 1974 that help to show how it should be interpreted. There are few court rulings that help to clarify how the railways can determine what measures are reasonably practicable so there is the potential for conflicting views to exist about how to interpret the law. Ultimately determination of whether an action is reasonably practicable involves balancing its risks, costs and benefits. The principle was set out in a Court of Appeal judgment in the case of Edwards (Asquith 1949):

‘...a computation must be made...in which the quantum of risk is placed on one scale and the sacrifice involved in the measures necessary for averting the risk (whether in money, time or trouble) is placed in the other, and that, if it be shown that there is a gross disproportion between them – the risk being insignificant to the sacrifice - the defendants discharge the onus on them.’

Comparison of the risk associated with an action and its cost, as implied by the Edwards judgement, is not simple as risk and cost are not measured in the same units. In the GB railway industry risk is generally estimated in Fatalities and Weighted Injuries (FWI) per year. In order to make a comparison of risks with costs, the risk needs to be translated into a financial value. This is done using the industry ‘Value of Preventing a Fatality’ (VPF), a figure endorsed for use by the Department for Transport (DfT, 2004), which is currently approximately £1.6 million per statistical fatality averted. Having made the risk and the sacrifice comparable how do we weight one against the other? This has historically been a key question for the industry and uncertainty around it has led to risk aversion.

1.2 Railway interpretation of the principles

In response to this uncertainty the railway industry undertook a programme of research and consultation, facilitated by RSSB to develop a clear consensus

position on the practical interpretation of 'reasonable practicability'. The programme resulted in the publication of Taking Safe Decisions (TSD) (RSSB, 2008).

1.3 Taking Safe Decisions – the industry consensus

TSD acknowledges that different types of decision are taken in the railway industry. For example:

- Duty holders may decide to take a decision because they judge that it is necessary in order for the company to meet its legal duty.
- Duty holders may decide to take a decision that is not legally required because they believe that it makes commercial sense for their business
- Policy makers may choose to undertake policy decisions.

The diagram of Figure 1 shows how these different types of decision relate to each other.

Figure 1 Different types of decision in the GB railway industry and their interrelationship

1.3.1 Reasonable practicability

In TSD the GB railway industry has set out a clear process for it to determine whether measures are reasonably practicable. There are three approaches which a duty-holder might apply, individually or in combination, to determine whether a measure is legally required: good practice, judgement and Cost Benefit Analysis (CBA). The GB railway has many conventions of good practice which can be important in determining whether a particular decision meets the legal duty with respect to safety. In some simple circumstances decisions might be made on the basis of judgment and experience. However, in many cases where risks and options are complex it is necessary to undertake analysis from first principles. In such cases a CBA might be undertaken, supported by quantitative risk assessment. This process follows an explicit application of the test of reasonable practicability as outlined previously in the Edwards judgement. TSD describes how this test is applied

“where the cost [of the measure] is above the monetary value of the safety benefit [of the measure], we apply professional judgement in determining whether the cost is grossly disproportionate to the safety benefit and it is reasonably practicable to implement the improvement. In making this judgement, we pay particular attention to:

- The degree of uncertainty in the assessment of costs and safety benefits
- The range of potential safety consequences.”

The document confirms that the safety benefit is calculated using the VPF, not a multiple of it. Edwards use of the term 'gross' is taken as an acknowledgement that, as accidents and their consequences are difficult to predict, the estimation of risk is an inherently uncertain process, and in some circumstances wide confidence limits may need to be applied to risk estimates and hence judgements. Uncertainty is particularly likely when trying

to estimate the risk associated with high-consequence, low-frequency events such as train collisions. There are two reasons for this:

- These incidents are rare so there is by definition little past data to use to develop estimates of future risk.
- These type of incidents can result in a wide range of consequences the severity of which can vary greatly. For example the Ladbroke Grove accident resulted in 31 fatalities (Cullen, 2000). The accident at Southall was similar in many ways, and resulted in the occurrence of 7 fatalities.

Conversely, the risk associated with high-frequency, low-severity incidents can be much more easily ascertained, as there should be more historic data available to support risk estimation.

1.3.2 Societal concerns

To determine how 'societal concerns' might impact upon decisions a definition of the term is needed. TSD considers the term 'societal concern' to refer to the concerns and anxiety that the public feels about different types of risk. These concerns: might not reflect the true level of risk; are influenced by dread and other subjective or emotive feelings and might change considerably as a result of accidents. They fluctuate because the public is exposed to information about risk in an uncontrolled and often retrospective way. Societal concern is not Societal risk. Societal risk is the collective risk associated with catastrophic accidents, like nuclear power station accidents, where large sections of the neighbouring population (a section of society) may be physically harmed by the accident. It is therefore not a helpful term for the railway industry where injury to large numbers of people in the area surrounding an accident would not be expected to occur. The term collective risk or just 'risk' is preferred, making the assumption that, when considering safety measures and applying the ALARP test we are concerned with the change in collective risk (or risk) associated with that measure.

In the diagram of figure 1 we highlight that railway companies and the regulator have different places in the hierarchy of the industry, different roles, and different responsibilities. Understanding this context is key to understanding how each entity must react to different pressures, including 'societal concerns'

Decisions taken by duty holders because they are considered to be necessary to reduce risk ALARP

The Value of Preventing a Fatality (VPF) figure was developed using studies to measure the public's views when they are informed about the risk and the circumstances of its occurrence. The research showed that these values do not change suddenly as a reaction to events although they may evolve gradually over time. Societal values represent the public's ethics – their underlying sense of what is right and what is wrong. The programme consultation document 'Valuing Safety'(RSSB 2006), and associated research (Covey et al. 2006), explored whether people's underlying values, and their preferences for safety investment, varied with the circumstances of an accident and whether this variability could be measured. The research found that:

- the value attributed to a multi-fatality accident was no higher than that attributed to the equivalent number of single fatality accidents
- the value attributed to accidents thought to inspire dread (for example death in a fire) is not higher than any other.

Therefore the research found no logical reasons for increasing the VPF to take account of 'societal concern' or for any other reason. The research supports the industry consensus view that the VPF should be used to factor societal preferences into an ALARP judgement and that societal concerns are not relevant to these types of judgments.

Decisions taken by duty holders for commercial reasons

Often in the railway industry decisions are taken which impact upon safety that are not legally mandated. A company might choose to implement measures that go beyond what is reasonably practicable. They may perceive there to be a commercial advantage to doing so, or they may be particularly averse to certain types of risk. They may also do this to take account of 'societal concern' because of the real affects that such subjective concerns might have on their business. TSD stresses that these decisions are voluntary and have no ALARP implications.

Decisions taken by government

The decision taking principles applied by duty holders are not the same as those applied by the Government. The government can, and do, react to 'societal concerns': as elected bodies they have a mandate to do so. For example the Railway Safety Regulations 1999, mandated the fitment of a form of train protection to rolling stock on the GB mainline rail network. A CBA undertaken to look at this measure did not support the judgement that it was necessary in order to reduce risk ALARP (RSSB, 2003).

This position is reflected in railway regulatory guidance, which makes reference to TSD, and also states:

"Duty holders do not need to consider any potential socio-political response to a multi-fatality incident; this is a matter for the government and regulators"
ORR (2009).

This is a hugely important clarification. Without clarity on this issue a greater potential for risk aversion would have remained within the industry. This aversion would be driven by fear that unfair regulatory enforcement of legal sanctions might be encouraged when there is political pressure on the government and regulator, as might exist in the aftermath of a major accident. The potential from such an approach has historically given rise to examples of risk aversion with the potential to increase the costs of the industry to the taxpayer .

1.4 Individual risk

TSD clarifies that the judgement about what is reasonably practicable does not vary as a function of the total level of risk to which particular groups of people are exposed. Instead individual risk is a useful notion when organisations are seeking to understand their risk profile and to prioritise and target safety effort. If particular exposed groups can be identified as having a

high level of individual risk then this might indicate a high priority for investigating whether there are any possible measures for reducing risk to these groups. However each possible measure identified would be assessed by applying the agreed and standard ALARP criteria, as set out in the Edwards judgement described earlier – a comparison of the safety benefits of each measure (calculated using the VPF) with the costs of that measure. 'Individual risk' is not a consideration in this judgment as it does not relate to the measure, but instead to the totality of risk to which different categories of individual are exposed.

Figure 2 Tolerability of risk framework

2 Acknowledgements

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Figure 1 Different types of decision in the GB railway industry and their interrelationship

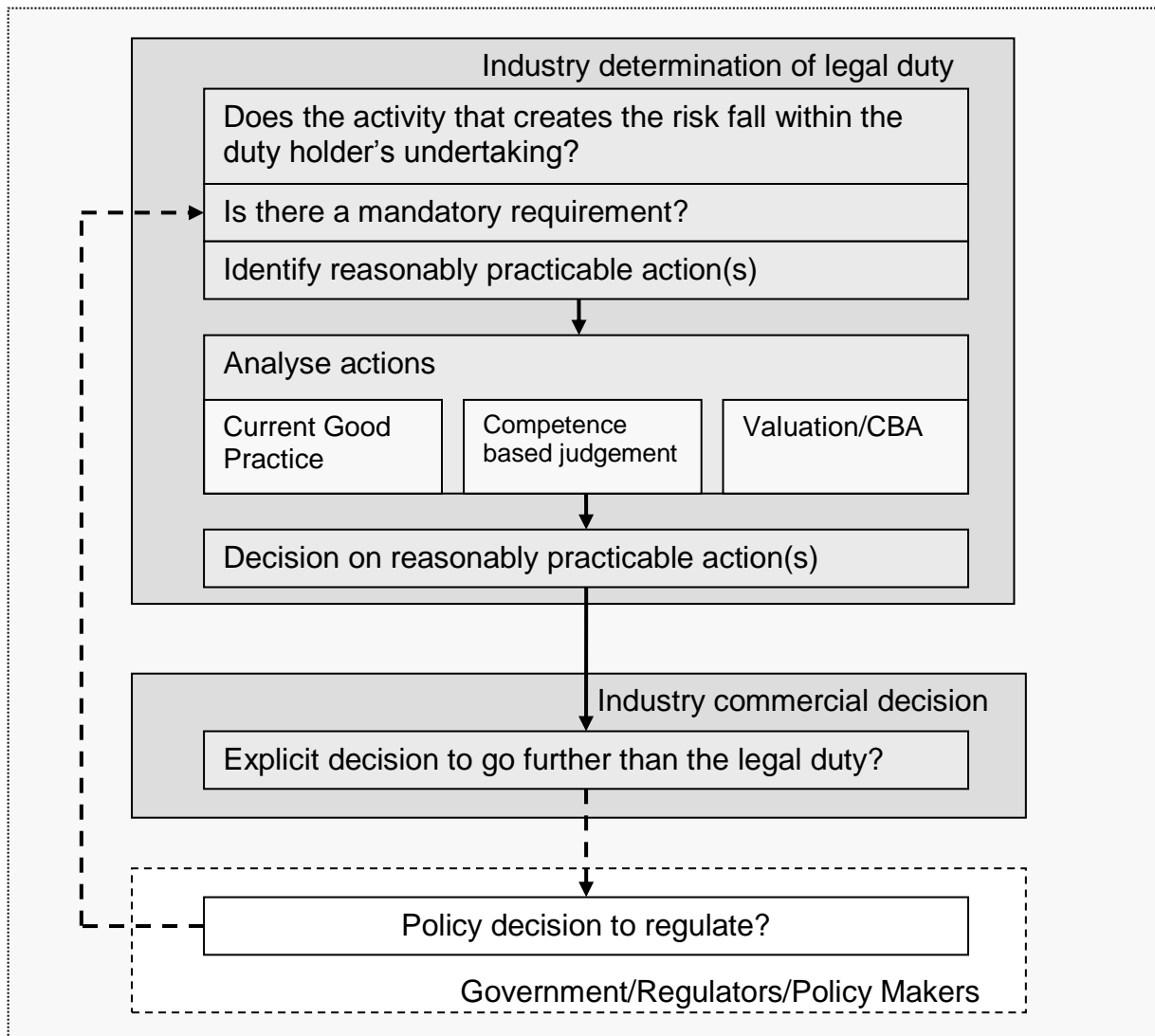


Figure 2 Tolerability of risk framework

