The value of preventing a fatality

Overview

The 'value of preventing a fatality' (VPF) is a generally accepted metric by which the safety benefits from proposed improvements are assessed, as an aid to effective decision-making.

Following careful consideration of the economic and ethical issues involved, as well as the available empirical evidence, the rail industry, taking account of the views of Health and Safety Executive, Office of Rail Regulation and Government, decided in 2004 to set the rail VPF at the same level as that used by the DfT in road project appraisal (£1.36 million in 2004 prices).\(^1\)\(^2\)

The VPF is calculated by the Department for Transport using 'willingness to pay' (WTP) methodologies. However it is important to be clear that it is in no sense intended to be a 'price (or value) of life' in the sense of a sum that a typical individual would accept as compensation for the certainty of his or her own premature death. For most people no sum, however large, would suffice for this purpose. Rather, the VPF is the aggregate amount that a large group of individuals would be willing to pay for (typically very small) individual safety improvements that can be expected to prevent one fatality. NB With this in mind, the term VPF has been replaced, throughout the report, by VPSF - the value of preventing a statistical fatality.

As part of this research Oxford Risk (ORRA) was commissioned to find out how members of the public would prioritise the prevention of several types of rail fatality. Some of the examples used were: the death of a responsible adult in a multiple-fatality rail accident; a child who has wandered in error into the path of an oncoming train; a track worker struck by a train; an adult trespasser or suicide. Each of these was assessed relative to a "baseline case" of a single fatality of a responsibly behaved, adult passenger.

Aims

For a period of time beginning in the early 1990s, the railway industry employed two levels of VPF, a single value for risk situations where only single fatalities can occur (eg slips, trips and falls) and a multiple of the VPF to appraise measures designed to control risk in situations where multiple fatalities can occur. The use of two VPFs was challenged both by the industry and the regulatory community. The challenge focused the spotlight on the industry's justification for having two VPFs and for the values employed. In this project RSSB tested the figures by exploring and comparing stakeholder and public views of the VPF in a number of different scenarios such as...

\(^1\) How Safe is Safe Enough (2005, p.14)
\(^2\) Valuing Safety (2006, p.9)
as: suicides, trespass, and multiple-fatality accidents. The aims of the project were: to identify whether all loss of life on the railway is viewed in the same way (regardless of circumstances); identify and quantify any perceived differences; and highlight implications for the current methods for calculating VPF.

Findings

The results of the project can be summarised as follows:

- There is no case for saying that the prevention of a fatality in a multiple-fatality rail accident is different to the prevention of a fatality in a single-fatality rail accident. This applied both to the case of a multiple-fatality accident resulting from signal failure and to a multiple-fatality accident involving a fire in a tunnel.
- Comparison of the responses relating to the prevention of a fatality in a multiple-fatality accident caused by signal failure, and the multiple-fatality accident involving a fire in a tunnel, suggests that in multi-fatality accidents with and without a 'dread factor', dread is not a major factor in people's thinking.
- For all rail fatalities in which the victim is behaving responsibly, as well as child trespassers who have simply taken a shortcut, the view of the people sampled was that the VPF does not differ greatly from baseline case. For such cases the report recommends that the VPF is set equal to the baseline figure. Victims behaving responsibly include: rail passengers, car drivers killed at level crossings, track workers, and adult passengers tripping or falling from a platform.
- For cases in which adult victims are behaving irresponsibly as well as child trespassers engaged in acts of vandalism, and suicides, the view of the people sampled was that the VPF is about 0.4 of the value for the baseline case.
- No further differentiation in the value of preventing rail fatalities was recommended.

Method

The research was originally commissioned in February 2004. However, shortly afterwards an intermediate piece of work (T430) was started to clarify: exactly what the VPF is; what its principles are; what it is used for; which costs are included/excluded in it; and to combine all this together into a robust definition of the VPF.

Once T430 was complete this research (T616) was started with the aim of establishing how members of the public would prioritise the prevention of several types of rail fatality relative to the baseline case. More specifically, the aim of the project was to estimate if ‘multipliers’ or ‘discount factors’ could be applied to the baseline VPF to derive corresponding values for the other cases, such as multiple-fatality accidents, trespassers, suicides, and so on.

To provide a comparison, the estimation of the public’s relative valuation of the prevention of different types of statistical rail fatality, was based on so-called ‘matching’ or ‘equivalence’ questions. These aimed to establish the number of rail fatalities of a given type that would need to be prevented by a safety improvement in order for the respondent to regard that safety improvement as being ‘equally as socially desirable’ as the prevention of a given number of baseline case fatalities. If for example, all other things being equal, a respondent regarded the prevention of ten adult passenger deaths in a multiple-fatality rail accident as being equally as good as the prevention of ten adult passenger deaths in separate single-fatality rail accidents, the VPF

3. The Value of Preventing a Fatality (2006)
the value would be treated as being equal to the baseline case value. By contrast, if a respondent regarded the prevention of ten adult trespasser fatalities as being equally desirable to the prevention of two adult fatalities in single-fatality rail accidents, the implied value for the prevention of an adult trespasser fatality would be one fifth of the value for the "baseline case".

Matching questions of this type is likely to elicit individual preferences viewed principally from a 'citizen's' rather than purely 'self-interested' perspective. This can be considered appropriate as it is highly unlikely that many of the respondents would expect to end up in the role of, say, a rail trespasser or suicide victim. Nor would many of the respondents be railway workers; and none would be children.

**Next Steps**

The RSSB 'safety decisions programme' achieved a consensus within the industry on a whole series of issues such as the appropriate treatment of 'societal concerns', 'gross disproportion', and the ALARP principle, as well as the VPF and how it should be approached. This research informed the programme and its conclusions. The results of this research and others are reflected in Taking Safe Decisions which was published in June 2008. The Board of RSSB confirmed the approach to the VPF for the railway when it met in December 2007 that there should be a single VPF.

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