**INTERACTIONS BETWEEN RAIL AND ROAD SAFETY**
**MAJOR FINDINGS FROM EPSRC RESEARCH PROJECT GR/R98488/01**

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From an analysis of National Travel Survey (NTS) data for 1999-2001, journeys on the main line rail system include an average of 1.8 journey access stages in addition to the rail stage itself. Of these additional stages, 1.1 are on foot, and the remaining 0.7 are by other modes, mainly car, bus and the London Underground.

The average distance walked in connection with main line rail journeys is 0.9 kilometres (excluding walk stages of less than 50 yards). This implies that just under 5% of all walking nationally is in connection with main line rail journeys.

The risk of being killed per kilometre travelled is about 150 times greater as a pedestrian than it is on the rail system. In consequence, the majority of the risk for rail passengers arises in the walk to or from the station. For the average rail journey, 21% of the risk of being killed is on the rail system itself, 65% is as a pedestrian, and the remaining 14% is on other access modes.

Rail, bus and car travel imposes risks on other people as well as passengers, but travel on foot does not. When the risk of death to other people is included, the proportion of total risk of rail journeys attributed to the walk stages is lower but still substantial: 40% of the risk is on the rail system, 46% in the walk stages, and 14% is on other access modes.

The proportions of risk change somewhat when the risk of serious injury as well as death is included in the analysis, but the pattern remains similar.

The risk of travelling on the rail system is about 10% of the risk of travelling by car per kilometre travelled. However, travelling by car requires little or no walking, so travelling by car avoids the relatively high-risk walk stages of rail journeys. In consequence, changing mode from rail to car increases the overall journey risk not by a factor of 10, but by a factor of rather more than 2. Similar increases in risk arise when third-party risk and/or serious injuries are taken into account.

Increasing rail fares can be expected to cause passengers to change mode from rail to car, and thus increase overall risk for diverted passengers. Therefore if rail safety measures are funded by increases in rail fares, it is possible in principle for the safety measures to lead to an increase rather than a decrease in overall risk, as the increase in risk caused by diversions to car may outweigh the reductions in risk on the rail system itself.

However, applying a rail/car modal split model developed from NTS data suggests that such counterproductive outcomes are unlikely in practice. For any sensible rail safety measure, i.e. one for which the safety benefits are reasonably related to the costs, the additional risk from diversions to car are negligible compared with the intended rail safety benefits.

Even for very expensive rail safety measures funded by passengers, the additional risks from diversions to car would be about the same as the intended rail safety benefits, so the net safety change would be close to zero. Of course, this does not imply that such very expensive safety measures are sensible, but it does remove one argument against them.

There are two contributory reasons for these results. First, as noted above, the safety disbenefits of diversions from rail to car are not as great as a simple comparison of modal casualty rates would suggest. Secondly, a substantial minority of rail passengers – 39% in the NTS data – are not holders of driving licences or come from households without cars, so they could not easily divert from rail to car.

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