



Fatal crashes at level crossings

This publication presents the findings of a study of 87 fatal crashes at level crossings that were among those that occurred in the period 1988–1998 and involved a train and a road vehicle (a ‘road vehicle’ can be either a motor vehicle or a non-motor road vehicle, such as a bicycle). The study focussed on crash details recorded in ATSB’s ‘Fatality Crash Database’, a national database holding records of crashes on public roads resulting in at least one fatality. The database currently covers the years 1988, 1990, 1992, 1994, 1996, 1997 and 1998 (only part year to date, as some of the relevant coroners’ reports have not yet been received). The 87 cases in the study sample are the fatal crashes at level crossings that occurred in these years.



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Key findings

- ▶ In any given year covered by the ATSB database, level crossing crashes constituted no more than one per cent of fatal road crashes. The actual annual figures range from half a percentage point to one per cent, averaging out to 0.7 of a percentage point.
- ▶ The number of fatalities per 100 fatal level crossing crashes was slightly higher than the number of fatalities per 100 other fatal road crashes. There were 120 fatalities per 100 fatal level crossing crashes compared with 113 fatalities per 100 other fatal road crashes.

Of the 87 level crossing crashes involving fatalities examined:

- ▶ The point of impact was more often the front of the train rather than the side of the train. In 66 per cent of the 87 cases the point of impact was the front of the train. In 16 per cent the point of impact was the side of the train. In the remaining 18 per cent the point of impact was unknown.
 - ▶ Eighty three per cent occurred in daylight (excluding dawn and dusk) and 63 per cent on a weekday (as opposed to a weekend) during the day. Fourteen per cent occurred at night, two per cent at dawn and one per cent at dusk. Fifteen per cent occurred on a weekend day, 13 per cent on a weeknight, and nine per cent on a weekend night.
 - ▶ Eighty five per cent occurred in fine weather, 84 per cent on a dry road, and the road was straight in 89 per cent of cases and level in 77 per cent of cases.
 - ▶ Sixty seven per cent occurred in a rural area or urban centre away from a capital city. Sixty seven per cent occurred in locations other than a capital city, 18 per cent in a capital city, and the location of 15 per cent of cases was unknown.
- ▶ Ten per cent occurred at crossings with boom gates, 41 per cent occurred where the warning system in place was some other type of 'active' warning system (other than boom gates) and 44 per cent occurred where the warning system was 'passive'. 'Active' warning systems employ devices such as flashing light signals, gates or barriers, or a combination of these. 'Passive' systems employ signs, road humps or other non-electric devices.
 - ▶ Unintended road user error was more common in level crossing crashes than in other fatal road crashes (Table 1). Forty six per cent of level crossing crashes appeared to be due to unintended road user error compared with 22 per cent of other fatal road crashes. That is, in these level crossing crashes the road user did not see the train, or did not observe or was unable to heed the warning system, or for some other reason was unable to avoid the train. It is not the intention here to say that in these cases the road user was 'at fault'. ATSB recognises the importance of the 'human factors' approach to transport safety. In some cases the safety defences in place at the level crossing might not have adequately protected the road user from a collision with the train.
 - ▶ The influence of alcohol or drugs was less common in level crossing crashes than in other fatal road crashes (Table 1).
 - ▶ The influence of excessive speed was less common in level crossing crashes than in other fatal road crashes (Table 1).

Table 1:
Fatal road crashes by major factors, Australia, 1988–1998

	<i>Fatal level crossing crashes</i>		<i>Other fatal road crashes</i>		<i>Total fatal road crashes</i>	
	No.	%	No.	%	No.	%
<i>Adverse weather or road conditions</i>						
No	73	84%	10617	87%	10690	87%
Yes	11	13%	1043	9%	1054	9%
Unknown	3	3%	592	5%	595	5%
<i>Alcohol / drugs</i>						
No	76	87%	7914	65%	7990	65%
Yes	8	9%	3746	31%	3754	30%
Unknown	3	3%	592	5%	595	5%
<i>Fatigue</i>						
No	81	93%	10735	88%	10816	88%
Yes	3	3%	925	8%	928	8%
Unknown	3	3%	592	5%	595	5%
<i>Driver error (unintended)</i>						
No	31	36%	6603	54%	6634	54%
Yes	40	46%	2708	22%	2748	22%
Unknown	3	3%	454	4%	457	4%
Not available 1988	13	15%	2487	20%	2500	20%
<i>Excessive speed</i>						
No	78	90%	8866	72%	8944	72%
Yes	6	7%	2794	23%	2800	23%
Unknown	3	3%	592	5%	595	5%
<i>Other risk taking</i>						
No	68	78%	8751	71%	8819	71%
Yes	3	3%	560	5%	563	5%
Unknown	3	3%	454	4%	457	4%
Not available 1988	13	15%	2487	20%	2500	20%
TOTAL	87	100%	12252	100%	12339	100 %

Source: ATSB Fatality Crash Database, 1988, 1990, 1992, 1994, 1996, 1997, 1998 (part year).

Key findings (cont)

Of the 89 road vehicles involved in level crossing crashes (in two of the 87 cases, two road vehicles were involved in each crash):

- ▶ Sixty nine per cent were either a car, 4WD, van or utility, 15 per cent were heavy trucks, and nine per cent were motorcycles, a pattern similar to that for other fatal road crashes. Three per cent were bicycles, two per cent buses and another two per cent were some other type of road vehicle. 'Heavy truck' means a truck with a gross vehicle mass of over 4.5 tonnes and one that was either a rigid or an articulated truck.
- ▶ Seventy six per cent of the drivers were male. Males represent 80 per cent of drivers in other fatal road crashes.
- ▶ Twenty six per cent of the drivers were in the 60+ age group while only ten per cent of drivers in other fatal road crashes were in this age group. The over-representation of older drivers was observed for both male and female drivers. Twenty four per cent of the male drivers were in the 60+ age group compared with 10 per cent of the male drivers in other fatal road crashes. Thirty three per cent of the female drivers were in the 60+ age group compared with 12 per cent of the female drivers in other fatal road crashes.

Notes:

The study has provided a description of some of the circumstances that appear to be prevalent in fatal crashes at level crossings but in no way claims to be a definitive study of the nature and causes of level crossing crashes. The sample size was too small to enable in-depth analysis. This was especially so once cross-classifications were undertaken and also given the incidence of 'unknown' and 'not applicable' codes for some data items. Moreover, the data elements in ATSB's Fatality Crash Database are used to describe fatal road crashes in general and not level crossing crashes in particular. Hence, variables of particular relevance to level crossing crashes are not necessarily included (for example, volume of road vehicle traffic and volume of train traffic are not included).

The ATSB has also conducted an initial literature survey of material on level crossing crashes which researchers might find useful for further study. The literature survey can be obtained by sending an email to stats@atsb.gov.au.