LEVEL CROSSING ACCIDENT FATALITIES

The purpose of this publication is to provide an overview of level crossing accident fatalities in Australia. The information provided is based on unpublished data obtained from the Australian Bureau of Statistics but responsibility for the analyses presented here rests solely with the ATSB.

TOTAL NUMBER OF DEATHS DUE TO LEVEL CROSSING ACCIDENTS

The total number of deaths in Australia due to level crossing accidents each year in the period 1997-2002, the period for which data are currently available, ranged from 19 to 44 (**Table 1**).

Table 1
Level crossing accident fatalities, Australia: year of death by State / Territory of registration of death, 1997-2002

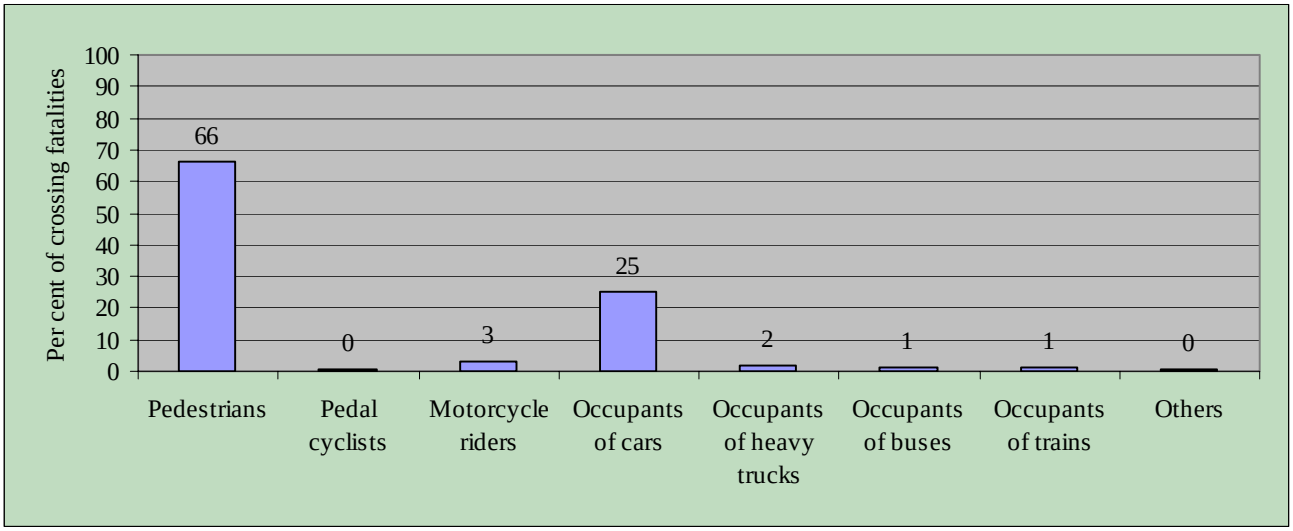
	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Australia
1997	19	15	5	1	4	0	0	0	44
1998	22	11	5	0	0	0	0	0	38
1999	5	9	1	0	4	0	0	0	19
2000	10	11	4	3	8	0	0	1	37
2001	20	13	6	1	2	0	0	0	42
2002	14	11	6	4	3	0	2	1	41

Note: These are fatalities due to collisions between trains and road vehicles or persons on *public* streets. Deaths due to collisions between trains and road vehicles or persons on *private* roadways are excluded. Note also that suicides are excluded. A suicide is defined here as a death that a *coroner* has found to be a suicide.

Each jurisdiction has a different number of level crossings. It is not possible to compare level crossing safety in each of the jurisdictions without first standardising the data by relating the number of fatalities to the number of level crossings in each jurisdiction. The ATSB has asked the rail safety authorities in each State and Territory for data on the number of level crossings.

From 1997 to 2002, pedestrians and car occupants accounted for the bulk of fatalities arising from level crossing accidents (**Figure 1**).

Figure 1
Level crossing accident fatalities by their mode of transport, Australia, 1997-2002



Note: Percentages rounded. One pedal cyclist and one other person (mode of transport unknown) were fatally injured in level crossing accidents in the period.

Level crossing accident fatalities can be divided into two groups: deaths due to collisions between trains and pedestrians, pedal cyclists or trams at level crossings and deaths due to collisions between trains and motor vehicles at level crossings. The ATSB counts the first group as part of the rail toll and the second group as part of the road toll (please see the explanatory notes below).

DEATHS DUE TO COLLISIONS BETWEEN TRAINS AND PEDESTRIANS, PEDAL CYCLISTS OR TRAMS AT LEVEL CROSSINGS

From 1997 to 2002, there was one pedal cyclist killed due to being hit by a train at a level crossing. There were no occupants of trams killed due to a collision between a tram and a train either at a level crossing or elsewhere.

From 1997 to 2002, a total of 146 pedestrians were killed due to being hit by a train at a level crossing (**Table 2**). These 146 deaths represented around 60 per cent of the national rail toll in the same period.

Table 2
Pedestrians on public streets killed due to being hit by a train at a level crossing, Australia: year of death by State / Territory of registration of death, 1997-2002

	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Australia
1997	13	6	0	0	2	0	0	0	21
1998	17	7	1	0	0	0	0	0	25
1999	3	6	1	0	4	0	0	0	14
2000	9	9	2	3	5	0	0	1	29
2001	14	10	5	1	0	0	0	0	30
2002	11	7	5	0	2	0	1	1	27

Note: Suicides are excluded. A suicide is defined here as a death that a *coroner* has found to be a suicide.

In the six years 1997-2002, over 84 per cent of the pedestrians who died as a result of being hit by a train at a level crossing were males, with over 60 per cent being males between 15 and 49 years of age. Males in this age range constituted less than 30 per cent of the Australian population in the period and it is clear that they are disproportionately represented among pedestrians killed due to being hit by a train at a level crossing.

The ATSB has sought to use the National Coronial Information System (NCIS) to examine cases of pedestrians fatally injured as a result of being struck by a train at a level crossing (those cases that coroners did not find to be suicides). The NCIS is a system being developed by the Monash University National Centre for Coronial Information (see www.vifp.monash.edu.au/ncis) and information from the system is made available to selected organisations, such as the ATSB, under strict confidentiality arrangements. A search for cases in the years 2000 to 2002 was undertaken (2000 is the earliest year covered by the NCIS). As the system is still in its infancy, not all of the cases were on the system and for many cases the relevant information was still to be loaded on to the system. However, some 18 cases were examined and it was possible to make a few observations that provide some preliminary insights into the nature of the problem.

In none of the 18 cases did the police or coroners find the train crew or rail safety equipment to be at fault. Police often breath tested the train crew and in all cases where this was done the results were negative (0.00 blood alcohol level). In all cases the level crossing warning systems (for example, lights, bells, boom gates, warning signs) were found to be working properly or undamaged. The major factors in evidence were the use of alcohol or drugs by the pedestrian prior to the accident (6 cases), a history of mental illness of the pedestrian (4 cases), or the tragic misjudgment of the pedestrian involved (8 cases). It needs to be stressed again that these are merely preliminary observations rather than findings that can lead to any definitive conclusions about pedestrian deaths at level crossings. Hopefully, more details on this issue will become available as the National Coronial Information System develops further.

DEATHS DUE TO COLLISIONS BETWEEN TRAINS AND MOTOR VEHICLES AT LEVEL CROSSINGS

From 1997 to 2002, there were 74 deaths in Australia due to collisions between trains and motor vehicles at level crossings (**Table 3**). These 74 deaths represented less than 1 per cent of the national road toll in the same period.

Table 3
Deaths due to collisions between trains and motor vehicles on public roadways at level crossings, Australia: year of death by State / Territory of registration of death, 1997-2002

	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Australia
1997	6	9	5	1	2	0	0	0	23
1998	5	4	4	0	0	0	0	0	13
1999	2	3	0	0	0	0	0	0	5
2000	1	2	2	0	3	0	0	0	8
2001	6	2	1	0	2	0	0	0	11
2002	3	4	1	4	1	0	1	0	14

From 1997 to 2002, there were 7 motorcycle riders, 4 occupants of heavy trucks, 3 bus occupants, 3 occupants of trains and 1 other person (mode of transport unknown) killed in collisions between trains and motor vehicles at level crossings. On the other hand, there were 56 car occupants killed in collisions with trains at level crossings (**Table 4**).

Table 4
Occupants of cars on public roadways killed due to being hit by a train at a level crossing, Australia: year of death by State / Territory of registration of death, 1997-2002

	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Australia
1997	4	8	2	1	1	0	0	0	16
1998	5	3	4	0	0	0	0	0	12
1999	2	2	0	0	0	0	0	0	4
2000	1	1	2	0	3	0	0	0	7
2001	5	2	1	0	2	0	0	0	10
2002	3	1	1	1	1	0	0	0	7

Note: Occupants of pick-up trucks or vans are included. To date in this time series, there have been only three such fatalities.

Nearly 70 per cent of the car occupants who died as a result of level crossing accidents were males, but no particular age group stands out.

In another study conducted by the ATSB, using a different data source and a larger sample, one of the findings was that older drivers, drivers in the 60+ age group, both male and female, were particularly at risk of being involved in a fatal level crossing accident. For more detail on this and other aspects of fatal level crossing accidents involving trains and motor vehicles, see the publication *Level crossing accidents* on the ATSB web site.

EXPLANATORY NOTES

The figures on level crossing accident fatalities presented here are based on an analysis of unpublished data obtained from the Australian Bureau of Statistics (ABS). Importantly, the ABS data exclude suicides on a nationally consistent basis, ie only on the basis of a coroner's finding of suicide. Since 1997, the ABS has classified deaths due to transport accidents in accordance with the *International Statistical Classification of Diseases and Related Health Problems*, Tenth Revision (ICD-10), published by the World Health Organization. The key ICD definitions relevant to level crossing accidents can be summarised as follows:

transport accident	Any accident involving a device designed primarily for, or being used at the time primarily for, conveying persons or goods from one place to another. Excludes accidents occurring during transportation but unrelated to the hazards associated with the means of transportation. Excludes accidents involving persons engaged in the maintenance or repair of transport equipment or a vehicle not in motion, unless injured by another vehicle in motion.
railway or railroad	A right-of-way designed for traffic on rails, which is used by carriages or wagons transporting passengers or freight, and by other rolling stock, and which is not open to other public vehicular traffic.
public highway or street	The entire width between property lines (or other boundary lines) of land open to the public as a matter or right or custom for purposes of moving persons or property from one place to another. A roadway is that part of the public highway designed, improved and customarily used for vehicular traffic.
railway train or railway vehicle	Any device with or without cars coupled to it, designed for traffic on a railway. Includes funicular railway train, monorail or other vehicle designed to run on a railway track and operated chiefly on its own right-of-way, not open to other traffic. Excludes electric cars, streetcars, trams or light rail operating on a right-of-way that forms part of the public street or highway.
road vehicle	Any device in, on, or by which any person or property may be transported on a roadway.
motor vehicle	Any mechanically or electrically powered device, not operated on rails, upon which any person or property may be transported or drawn upon a roadway.

pedestrian	Any person involved in an accident who was not at the time of the accident riding in or on a motor vehicle, railway train, streetcar or animal-drawn or other vehicle, or on a pedal cycle or animal.
traffic accident	Any vehicle accident occurring on the public highway.

A person is counted as a transport accident fatality if the death occurs up to 12 months after the accident. In classifying accidents which involve more than one kind of transport vehicle, the following order of precedence is used in ICD: aircraft or spacecraft, watercraft, motor vehicle, railway vehicle, other road vehicle. In other words, if an aircraft hits a boat, for example, the accident is classified as an air transport accident; if a train and a motor vehicle collide, the accident is classified as a motor vehicle accident; if a train hits a pedestrian, the accident is classified as a railway accident. By adopting this rule, fatalities can be counted in one or other of the types of transport accident and not counted more than once in the overall transport accident death toll.

ICD-10 does not specifically identify level crossing accidents. However, fatalities due to collisions at level crossings between trains and road vehicles or persons on public highways can be identified using ICD-10. The ATSB uses the following ICD-10 codes to identify persons who died following such level crossing accidents:

Categories	Description	Sub-categories
V05	pedestrian injured in collision with railway train or railway vehicle	.1 traffic accident
V15	pedal cyclist injured in collision with railway train or railway vehicle	.3 person injured while boarding or alighting .4 driver injured in traffic accident .5 passenger injured in traffic accident .9 unspecified pedal cyclist injured in traffic accident
V25	motorcycle rider injured in collision with railway train or railway vehicle	.3 person injured while boarding or alighting .4 driver injured in traffic accident .5 passenger injured in traffic accident .9 unspecified motorcycle rider injured in traffic accident

Categories	Description	Sub-categories
V35	occupant of three-wheeled motor vehicle injured in collision with railway train or railway vehicle	.4 person injured while boarding or alighting .5 driver injured in traffic accident .6 passenger injured in traffic accident .7 person on outside of vehicle injured in traffic accident .9 unspecified occupant of three-wheeled motor vehicle injured in traffic accident
V45	car occupant injured in collision with railway train or railway vehicle	.4 person injured while boarding or alighting .5 driver injured in traffic accident .6 passenger injured in traffic accident .7 person on outside of vehicle injured in traffic accident .9 unspecified car occupant injured in traffic accident
V55	occupant of pick-up truck or van injured in collision with railway train or railway vehicle	.4 person injured while boarding or alighting .5 driver injured in traffic accident .6 passenger injured in traffic accident .7 person on outside of vehicle injured in traffic accident .9 unspecified occupant of pick-up truck or van injured in traffic accident
V65	occupant of heavy transport vehicle injured in collision with railway train or railway vehicle	.4 person injured while boarding or alighting .5 driver injured in traffic accident .6 passenger injured in traffic accident .7 person on outside of vehicle injured in traffic accident .9 unspecified occupant of heavy transport vehicle injured in traffic accident

Categories	Description	Sub-categories
V75	bus occupant injured in collision with railway train or railway vehicle	.4 person injured while boarding or alighting .5 driver injured in traffic accident .6 passenger injured in traffic accident .7 person on outside of vehicle injured in traffic accident .9 unspecified bus occupant injured in traffic accident
V81.1	occupant of railway train or railway vehicle injured in collision with motor vehicle in traffic accident	N/A
V87.6	person injured in collision between railway train or railway vehicle and car (traffic)	N/A

Use of these codes is based on the assumption that a collision between a train and a person / mode of transport type in a traffic accident is a collision at a level crossing. State Rail Safety Authorities in Australia define a 'level crossing' as 'a location where a public or private roadway, footpath, or both, crosses one or more railway tracks at grade'. ICD-10 can provide data on:

- accidents involving collisions at level crossings between trains and motor vehicles or other road vehicles (except trams) on the public highway.
- accidents where a pedestrian on the public highway (ie on a public road or on a public footpath alongside a public road) is struck by a train at a level crossing.

but not on:

- accidents involving collisions at level crossings between trains and pedestrians on a footpath or pedestrian crossing that is not alongside a public road.

Hence the term 'level crossing accident' is restricted in this publication to accidents involving a collision between a railway train or other railway vehicle and a road vehicle (other than a tram) or pedestrian on a public street.

However, we know that:

- the number of deaths due to collisions between trains and motor vehicles on private roadways at level crossings is small (fewer than five in the six years from 1997 to 2002), as the total number of deaths each year from 1997 to 2002 due to a collision between a train and a motor vehicle (all circumstances) was either equal to or only a few above the total each year for deaths due to collisions between trains and motor vehicles on public roadways at level crossings.

- there were no deaths from 1997 to 2002 due to collisions between trains and trams at level crossings, as there were no deaths recorded against code V82.8 ('occupant of streetcar injured in other specified transport accident - collision with train or other nonmotor vehicle').

- there were no deaths from 1997 to 2002 due to collisions between trains and animal-riders at level crossings, as there were no deaths recorded against code V80.6 (‘animal-rider or occupant of animal-drawn vehicle injured in collision with railway train or railway vehicle’).

- there was only one death from 1997 to 2002 due to collisions between trains and pedal cyclists off the public highway, as there was only one death recorded against codes V150, V151 and V152 (‘pedal cyclist injured in collision with railway train or railway vehicle in nontraffic accident’).

In this publication, ‘year of death’ is the year that the death occurred, not the year the death was registered. All figures presented are preliminary only. It is possible that they will be revised upwards as delayed death registrations are received by the ABS. A certain percentage of deaths occurring in any given year are not registered by coroners until the following year or later.

In Australia, deaths are registered in accordance with the State or Territory in which the death occurred. It is sometimes the case that a transport accident casualty is admitted to hospital, and subsequently dies, in a State or Territory other than that in which the accident occurred.

For reasons of confidentiality, the ABS releases age data in the data source used here in 5-year groupings: 0-4, 5-9 and so on. The ATSB is consequently unable to provide age data here in any groupings other than these groupings or aggregates of these groupings.