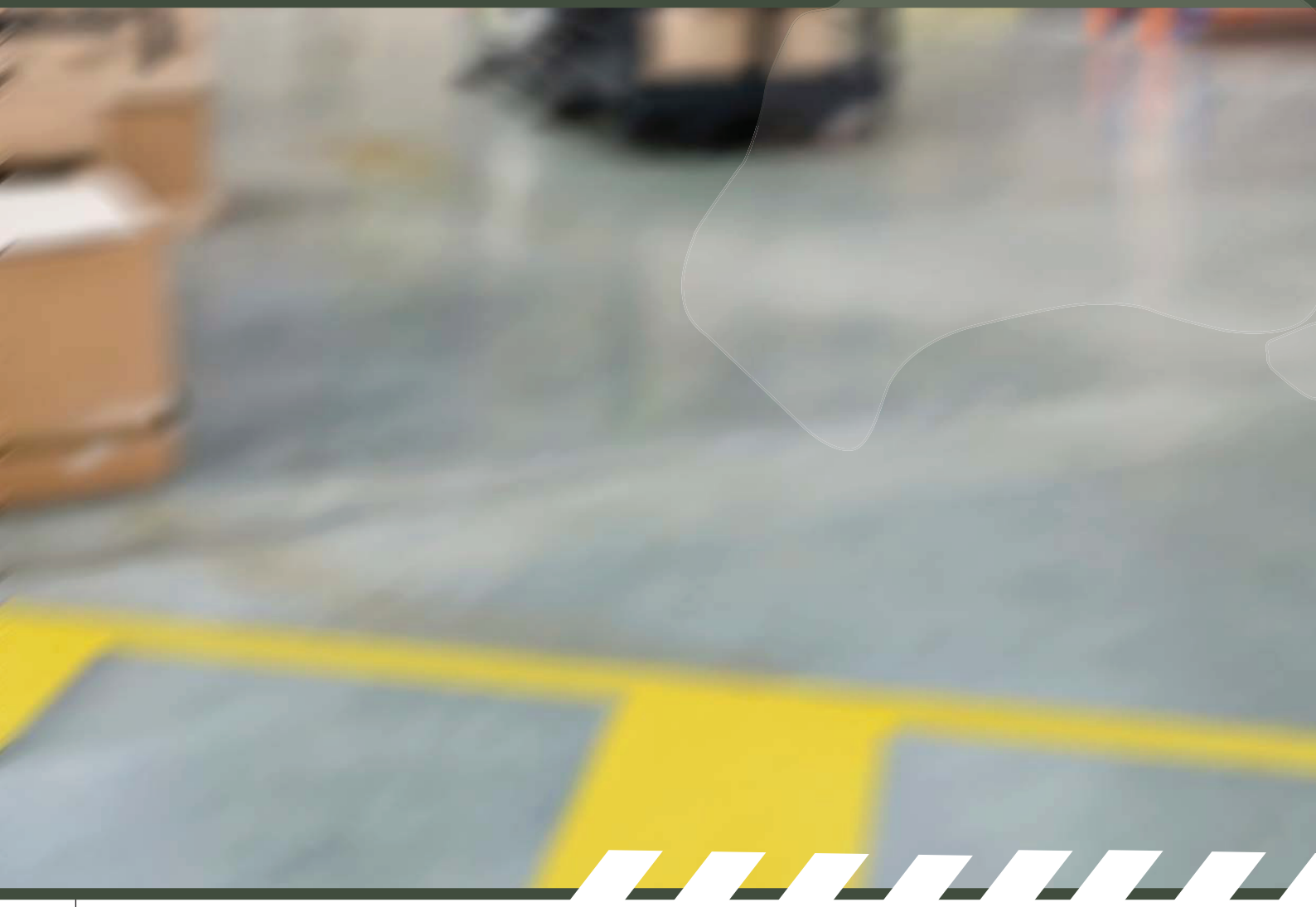
WORK-RELATED TRAUMATIC INJURY FATALITIES, AUSTRALIA 2007-08



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safe work australia

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Acknowledgement

Information on work-related deaths in this report was compiled from three datasets, two collected by Safe Work Australia and the other, the National Coroners Information System (NCIS), maintained by the Victorian Institute of Forensic Medicine (VIFM). The authors would like to thank VIFM for allowing access to the data presented in this report. The authors, and not VIFM, are responsible for the use of the data in this report.

Disclaimer

Foreword

This report is the fifth in a series that estimates the number of workers and Bystanders killed each year due to work-related injury. Because there is no single national data collection system that identifies all work-related injury fatalities, the exact number of people who die in any year as a result of work-related injuries in Australia is difficult to establish. To achieve the best estimate, Safe Work Australia examines three datasets that contain information on work-related fatalities.

A key source of information in Australia is the *National Data Set for Compensation-based Statistics* (NDS). The NDS includes work-related deaths of employees (that is, excluding self-employed workers) for which liability for compensation has been accepted. The NDS includes compensated commuting-related fatalities, but these fatalities are not compensable in all jurisdictions. Bystanders, who die as a result of another person's work activity, are not included in the NDS.

A second source is the Notified Fatalities Collection (NFC) compiled by Safe Work Australia from notifications of fatalities in accordance with the work health and safety legislation in each jurisdiction. Jurisdictions do not generally notify commuting fatalities and notification of Bystander deaths is not comprehensive.

The third dataset is the National Coroners Information System (NCIS), which contains information on all deaths notified to any Australian coroner. Although all fatalities from work-related injuries are likely to be notifiable, they are not uniformly coded as work-related, particularly before the coroner closes the case.

In addition to these three datasets, media reports sometimes alert the project to deaths not identified elsewhere. These deaths tended to result from incidents, including air, rail and maritime incidents, not generally investigated by work health and safety agencies. All such cases were matched with information in the NCIS to determine work-relatedness.

For further details on these data sources, please see the Explanatory notes.

Definition of work-related injury

This report covers fatalities resulting from an injury sustained in the course of work activity, commuting to and from work, and as a result of someone else's work activity. Injury is defined as a condition coded to 'External Causes of morbidity and mortality' and 'Injury, poisoning and certain other consequences of external causes' in the International Statistical Classification of Diseases and Related Health Problems, Tenth Revision, Australian Modification (ICD-10-AM).

Within scope of this collection are all persons:

- who were fatally injured
- whose injuries resulted from work activity or exposures
- whose injuries occurred in an incident that took place in Australia, Australian territories or territorial waters.

They include all persons killed:

- while working (including unpaid volunteers and family workers, persons undertaking work experience and defence forces personnel killed within Australia, Australian territories or territorial waters) or travelling for work (Working fatalities)
- travelling to or from work (Commuting fatalities)
- as a result of someone else's work activity (Bystander fatalities).

The collection specifically excludes those who die:

- of iatrogenic injuries — those where the worker died due to medical intervention
- due to natural causes such as heart attacks and strokes, except where a work-related injury was the direct cause of the heart attack or stroke
- as a result of diseases, such as cancers
- while working overseas (defence personnel and civilians)
- by self-inflicted injuries (suicide).

Methodology

All cases within scope as described were extracted from each dataset and compared to identify and remove duplicate and triplicate records.

On the basis of information in the datasets, occasionally amplified by media reports, each individual case was classified as a:

- Working fatality
- Commuting fatality (travelling to or from work)
- Bystander fatality.

People who die of injuries resulting from someone else's work activity while themselves at work or commuting are classified as Working or Commuting, respectively, rather than as Bystanders.

This publication covers fatalities that occurred over the period from 1 July 2003 to 30 June 2008. Changes may be evident from previous years' reports due to the inclusion of additional work-related deaths identified through a major review of the time series data.

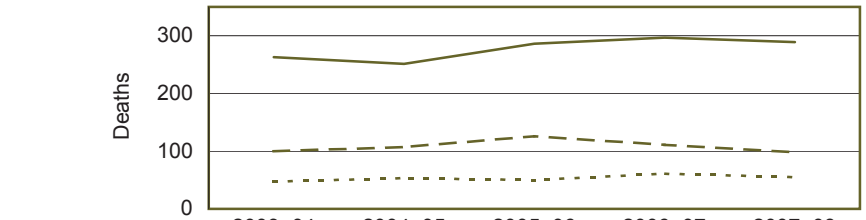
Contents

Summary of findings

This study identified a total of 442 work-related traumatic injury fatalities in Australia during 2007–08, a decrease of 6% from the 2006–07 total of 469 but above the five year average of 439. Just under half (219) of all work-related injury fatalities resulted from traffic incidents.

Of the 442 people who died of work-related injuries, 289 (65%) were injured at work (Working fatalities); 98 (22%) while travelling to or from work (Commuting fatalities) and 55 (12%) as a Bystander to someone else's work activity (Bystander fatalities). As Figure 1 shows, deaths in all three categories were lower than in 2006–07, with Commuting fatalities reaching a five year low.

Figure 1 Work-related injury fatalities, Australia, 2003–04 to 2007–08



	2003–04	2004–05	2005–06	2006–07	2007–08
Working	263	251	286	297	289
Commuting	100	107	126	111	98
Bystander	47	53	50	61	55

Working fatalities

In the context of employment growth over the period from 2003–04 to 2007–08, the overall incidence rate of Working fatalities varied from 2.6 deaths per 100 000 workers in 2004–05 to 2.9 deaths per 100 000 workers in 2006–07. The fatality rate for 2007–08 was 2.7 deaths per 100 000 workers.

Occupation

Nearly one-quarter of those fatally injured while working in 2007–08 worked as Truck drivers (69 deaths). Another 16% were Labourers & related workers (46); 11% were Farmers & farm managers (31); and 12% were Tradespersons & related workers (35). The fatality rate for Truck drivers was 16 times the rate for all occupations with the rate for Farmers & farm managers nearly six times the rate for all occupations.

Industry of employer

Half of those fatally injured while working in 2007–08 were employed in three industries: Road freight transport (54 deaths); Agriculture (51); and Construction (40).

In the Road freight transport industry, there were 34.0 deaths per 100 000 workers, lower than the 2006–07 peak of 38.2, but still above the five year average of 30.2. In Agriculture, the rate was 16.8 deaths per 100 000 workers, the highest rate in the industry since 2003–04, when it reached 18.5. Also above the all industries average were fatality rates in the Mining and Construction industries: 5.5 and 4.2 deaths per 100 000 workers, respectively.

Mechanism of injury

Traffic incidents resulted in 94 Working fatalities in 2007–08, 33% of the total. *Vehicle incidents*, including non-traffic incidents, killed 134 workers (46% of all Working fatalities), while 28 (10%) died from *Falls from a height*, 34 (12%) from *Being hit by moving objects* (including vehicles), and 24 (8%) from *Being hit by falling objects*.

Sex and age

Of the 289 Working fatalities in 2007–08, 23 (8%) were of women, who experienced a fatality rate of 0.5 deaths per 100 000 workers, barely one-tenth the rate of 4.5 deaths per 100 000 workers among men.

Workers aged 65 years and over experienced a fatality rate of 14.1 deaths per 100 000 workers, more than five times the rate for all workers in 2007–08, while workers aged under 25 years experienced a rate of 1.6 deaths per 100 000 workers.

Commuting fatalities

There were 98 Commuting fatalities identified in 2007–08: 23 women and 75 men died of injuries sustained on the journey to or from work. Limitations of the available data mean commuting deaths identified in this report are a known undercount.

In 98% of cases, the fatal injury occurred in a traffic incident, including two pedestrians struck by vehicles.

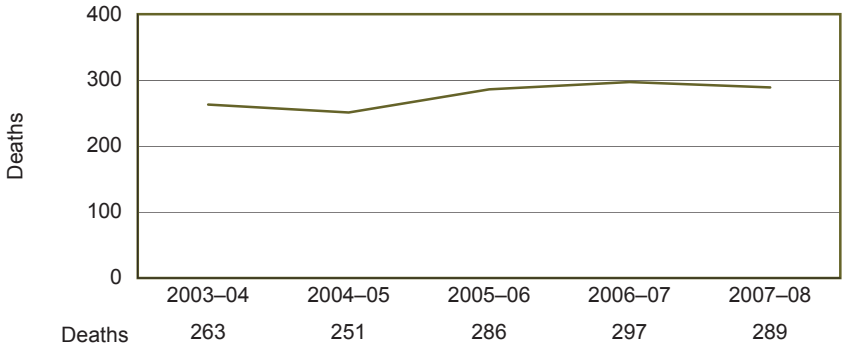
Bystander fatalities

In 2007–08, 17 of the 55 identified Bystander deaths were of women and girls and 38 were of men and boys. Three-quarters (41) of the Bystanders were fatally injured in incidents involving working vehicles or mobile plant and machinery. Nearly one-third (16) of the Bystanders were children under the age of 10, six of whom drowned.

1 Working fatalities

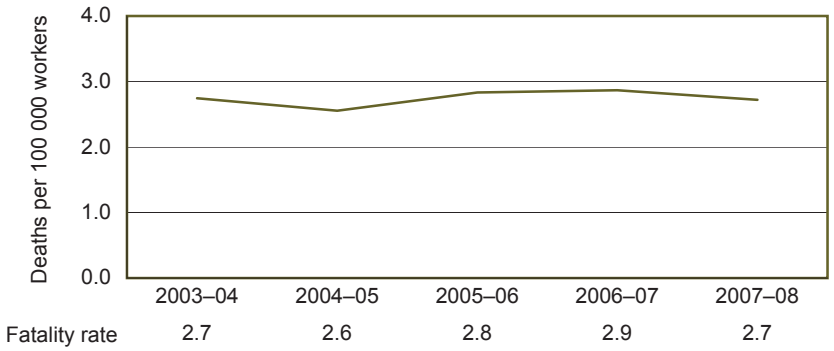
Analysis of the data derived from workers' compensation claims, fatality notifications and coronial records identified 289 fatalities in 2007–08 due to injuries sustained while working. As Figure 2 shows, the number of Working fatalities has remained fairly consistent over the five years of this data series, varying by no more than 9% from the average of 274 and ranging from a low of 251 in 2004–05 to a high of 297 in 2006–07. Notably, the decrease in Working fatalities between 2006–07 and 2007–08 is due to a decrease in the number deaths as a result of traffic incidents.

Figure 2 Working fatalities, Australia, 2003–04 to 2007–08



In the context of employment growth over the period from 2003–04 to 2007–08, the overall incidence rate of Working fatalities varied between 2.6 and 2.9 deaths per 100 000 workers. The fatality rate for 2007–08 was 2.7 deaths per 100 000 workers, the average over the five year period.

Figure 3 Working fatality rate, Australia, 2003–04 to 2007–08



1.1 Occupation

The Australian Standard Classification of Occupations, second edition (ASCO), which forms the basis of occupation coding in this study, divides workers into nine major occupation groups. Figure 4 shows that in 2007–08, 41% of the Working fatalities (118 deaths) were among persons employed as Intermediate production & transport workers. This is the highest proportion recorded for this occupation group in the five years of this series. The fatality rate among workers employed in this occupation group, 12.8 deaths per 100 000 workers, was nearly five times the overall rate, and the highest rate for any major group over the five years.

Figure 4 Proportion of Working fatalities by major occupation group, Australia, 2007–08

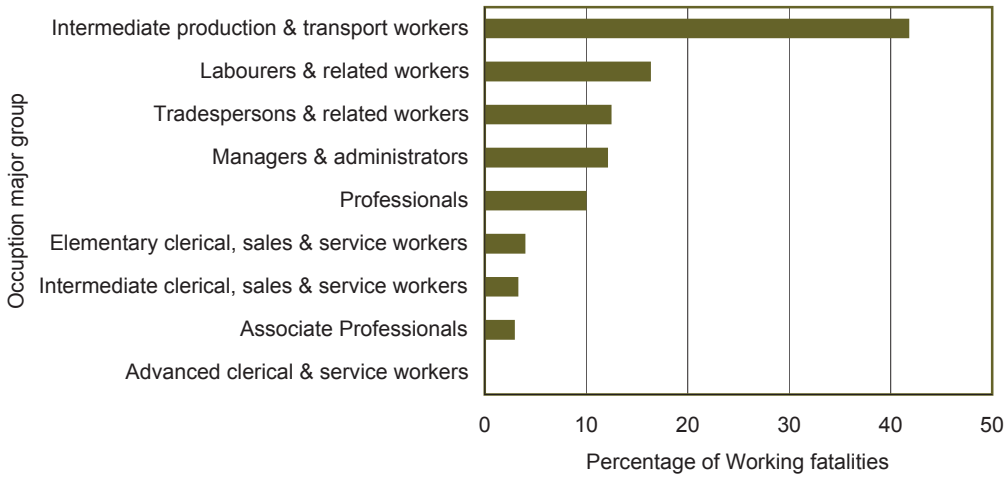


Table 1 shows the pattern in 2007–08 is similar to previous years although the number of Working fatalities among Tradespersons & related workers and Associate professionals was lower in 2007–08 than in previous years.

The second highest number of fatalities (46 deaths) and the second highest fatality rate (5.2 deaths per 100 000 workers) in 2007–08 occurred among workers employed as Labourers & related workers. Managers & administrators, principally Farmers & farm managers, ranked third with 34 deaths and a fatality rate of 3.8.

Table 1 Working fatalities and fatality rates by occupation, Australia, 2003–04 to 2007–08

Occupation	2003–04	2004–05	2005–06	2006–07	2007–08	Average
			Deaths			
Managers & administrators	39	41	39	38	34	38
Farmers & farm managers	*34*	*33*	*29*	*29*	*31*	*31*
Professionals	19	19	27	25	28	24
Associate professionals	13	15	21	18	8	15
Tradespersons & related workers	38	40	51	57	35	44
Intermediate production & transport workers	89	87	89	113	118	99
Truck drivers	*54*	*49*	*46*	*67*	*69*	*57*
Labourers & related workers	53	36	48	30	46	43
Clerical, sales & service workers [a]	12	12	11	15	20	14
Total	**263**	**251**	**286**	**297**	**289**	**277**
			Fatality rate (Deaths per 100 000 workers)			
Managers & administrators	5.5	5.0	4.6	4.5	3.8	4.7
Professionals	1.1	1.0	1.4	1.3	1.3	1.2
Associate professionals	1.1	1.2	1.7	1.4	0.6	1.2
Tradespersons & related workers	3.1	3.2	4.0	4.4	2.6	3.5
Intermediate production & transport workers	11.2	10.5	10.8	12.7	12.8	11.7
Labourers & related workers	6.0	4.1	5.6	3.4	5.2	4.8
Clerical, sales & service workers [a]	0.4	0.4	0.4	0.5	0.6	0.5
All occupations	**2.7**	**2.6**	**2.8**	**2.9**	**2.7**	**2.7**

[a] This category comprises three ASCO major groups: Elementary clerical, sales & service workers; Intermediate clerical, sales & service workers; and Advanced clerical & service workers.

The following sections provide a more detailed analysis of occupations that had high numbers of fatalities.

Truck drivers

Within the Intermediate production & transport workers major group, one occupation stands out — Truck drivers. In 2007–08, 69 Truck drivers died of work injuries, 24% of all Working fatalities identified in that year. Over the five years of this series, 285 Truck driver fatalities have been identified — 21% of all workers dying of injuries sustained while at work.

Of the Truck drivers who died in 2007–08, 80% died from injuries received in traffic incidents, comprising 59% of all workers killed in traffic incidents that year. All but two were injured in vehicle incidents; the other two were struck by passing traffic while undertaking maintainence on their vehicles.

There were also 14 Truck drivers who died in non-traffic incidents. Three of these died in a bushfire and another in a fuel explosion. Three others were involved in vehicle collisions off public roads on farms and mine sites.

All the Truck drivers who died of work injuries during 2007–08 were men. Most of them were aged between 35 and 54 years: 21 were aged 35–44 years and 20 were aged 45–54 years.

About 42 out every 100 000 Truck drivers died of work injuries in 2007–08, more than three times the rate for Intermediate production & transport workers generally and nearly 16 times the overall rate for all occupations.

Farm workers

In 2007–08, 31 of the 34 Managers & administrators who died of injuries received while working were Farmers & farm managers, 11% of all Working fatalities. The inclusion of Farmers & farm managers within the Managers & administrators occupation group inflates the fatality rate for the major group. While the fatality rate for Managers & administrators was 3.8 deaths per 100 000 workers in 2007–08, the fatality rate for the group excluding Farmers & farm managers was 0.4 deaths per 100 000 workers. Farmers & farm managers on their own had a fatality rate of 15.4 deaths per 100 000 workers in 2007–08, nearly six times the rate for all occupations.

Five of the 31 Farmers & farm managers killed were women, the largest number in the five years of the series.

More than 60% (19) were aged 65 years and over. This is also more than half of all workers in this age group who died of work injuries.

Although 29 of the 31 Working fatalities among Farmers & farm managers were due to events other than traffic incidents, one-third (10) of those arose from a *Vehicle incident*. Of these, seven involved rollovers: six of all-terrain vehicles (ATVs) and one of a tractor. Tractors were involved in five other deaths among this group.

In addition to the 31 Farmers & farm managers who died of injuries received while working in 2007–08, there were 11 Farm hands who died in this period. All were men, eight of them aged under 45 years. Three died in motorcycle incidents on rural proprties and another two were trapped by moving machinery attached to tractors.

Pilots

In 2007–08, 13 of the 26 Professionals killed were involved in aircraft crashes, four involving helicopters. These workers were employed as Air transport professionals, specifically, pilots and flying instructors, one of whom was a woman. Over the five years of the series, an average of nine Air transport professionals have died each year, 38% of all Working fatalities among Professionals.

1.2 Industry

The Australian and New Zealand Standard Industrial Classification (1993 edition—ANZSIC) on which this industry analysis is based classifies employed persons into 17 broad industry Divisions. Figure 5 shows that the highest number of fatalities in 2007–08 was among workers in the Transport & storage and Agriculture, forestry & fishing industry divisions, together accounting for nearly half of all Working fatalities in that year.

Figure 5 Working fatalities by industry of employer, Australia, 2007–08

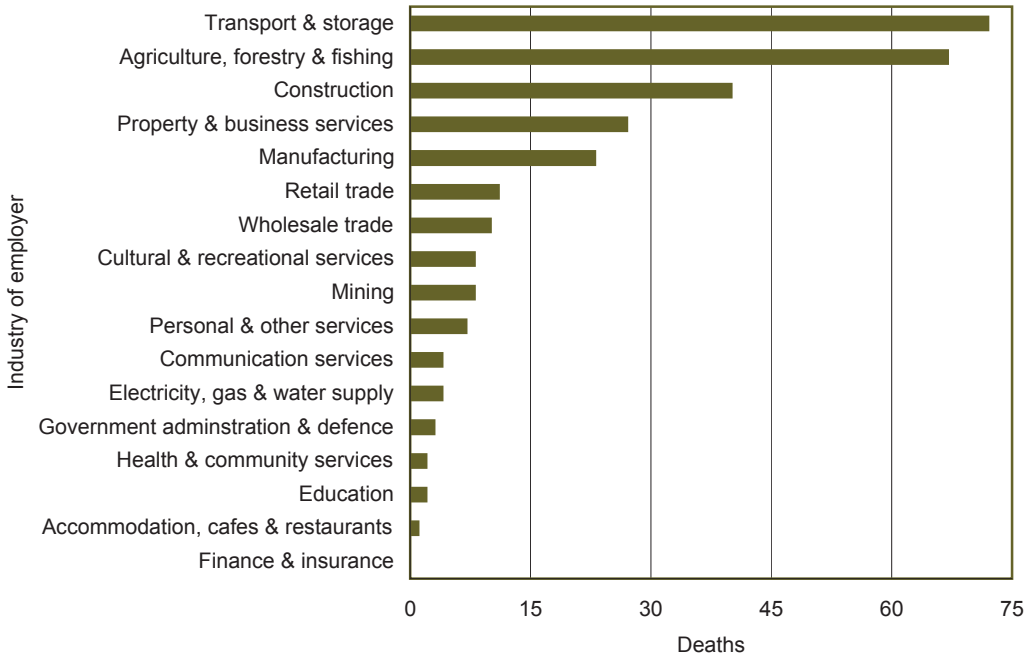


Table 2 shows that the highest fatality rates in 2007–08 were also in these industry divisions. The fatality rate in the Agriculture, forestry & fishing industries of 18.6 deaths per 100 000 workers is nearly seven times the overall fatality rate of 2.7 deaths per 100 000 workers across all industries. The rate in the Transport & storage industry division of 14.4 was five and a half times the all industries rate.

Within these two broad industry divisions were groups with higher fatality rates. Of the 72 workers employed in the Transport & storage industry who died of injuries sustained while at work, 54 worked in the Road freight transport industry, where the fatality rate was 34.0 deaths per 100 000 workers.

Within the Agriculture, forestry & fishing industry division, four of the 66 fatalities occurred among workers employed in Forestry & logging. In the Marine fishing industry group, another five workers died of work injuries, three of them in drowning incidents. Because of the small numbers employed in these industry groups, the fatality rates were 30.3 and 100.8 deaths per 100 000 workers, respectively.

Similarly, even though with eight Working fatalities the Mining industry ranked eighth among ANZSIC industry divisions in number of deaths, the fatality rate of 5.5 deaths per 100 000 workers was third highest of all industries, as it was in each year of the series.

Table 2 Working fatalities and fatality rate by industry of employer, Australia, 2003–04 to 2007–08

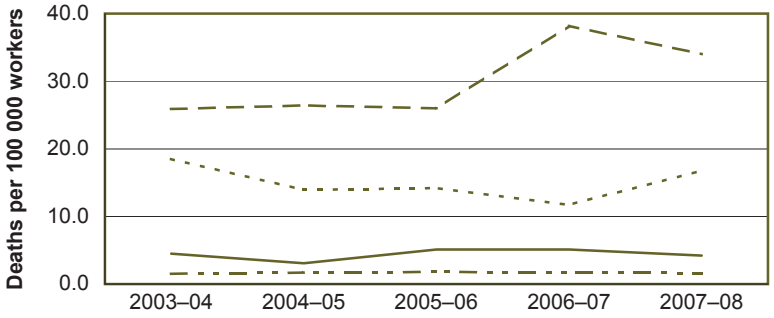
Industry of employer	2003–04	2004–05	2005-06	2006-07	2007–08
			Deaths		
Agriculture, forestry & fishing	75	67	56	50	67
Agriculture	*59*	*43*	*43*	*36*	*51*
Mining	5	7	14	10	8
Manufacturing	17	23	23	29	23
Electricity, gas & water supply	1	3	7	2	4
Construction	35	26	45	48	40
Wholesale trade	12	10	6	7	10
Retail trade	8	9	15	16	11
Accommodation, cafes & restaurants	2	4	5	4	1
Transport & storage	59	51	56	77	72
Road freight transport	*41*	*36*	*37*	*57*	*54*
Communication services	6	0	3	1	4
Finance & insurance	0	0	1	0	0
Property & business services	13	13	21	17	27
Government administration & defence	2	9	6	7	3
Education	2	1	5	2	2
Health & community services	5	1	3	1	2
Cultural & recreational services	3	8	5	8	8
Personal & other services	18	19	15	18	7
All industries	**263**	**251**	**286**	**297**	**289**
			Fatality rate (deaths per 100 000 workers)		
Agriculture, forestry & fishing	20.1	18.4	15.8	14.0	18.6
Agriculture	*18.5*	*13.9*	*14.2*	*11.7*	*16.8*
Mining	5.2	6.6	10.8	7.4	5.5
Manufacturing	1.6	2.1	2.2	2.7	2.1
Electricity, gas & water supply[a]	1.3	3.9	8.0	2.3	4.4
Construction	4.5	3.1	5.1	5.1	4.2
Wholesale trade	2.7	2.3	1.4	1.5	2.2
Retail trade	0.6	0.6	1.0	1.1	0.7
Accommodation, cafes & restaurants[a]	0.4	0.8	1.0	0.8	0.2
Transport & storage	13.7	11.2	12.1	16.3	14.4
Road freight transport	*25.9*	*26.4*	*26.0*	*38.2*	*34.0*
Communication services[a]	3.4	0.0	1.6	0.5	2.2
Finance & insurance[a]	0.0	0.0	0.3	0.0	0.0
Property & business services	1.2	1.2	1.8	1.4	2.1
Government administration & defence	0.4	1.8	1.2	1.3	0.6
Education[a]	0.3	0.1	0.7	0.3	0.3
Health & community services[a]	0.5	0.1	0.3	0.1	0.2
Cultural & recreational services	1.3	3.1	1.8	2.9	2.8
Personal & other services	4.9	4.9	3.8	4.5	1.7
All industries	**2.7**	**2.6**	**2.8**	**2.9**	**2.7**

a Fatality rates in industries where 5 or fewer deaths occurred in most years should be viewed with caution.

Because fatality rates are sensitive to the number employed in each industry, they are liable to show volatility in those industries that employ the fewest workers. In the Electricity, gas & water supply industry division, for example, which employed less than 90 000 workers in 2007–08, an increase or decrease of a single death will be reflected in a change in the fatality rate of more than one death per 100 000 workers. This is important to consider when examining the data in Table 2, which presents fatality rates for all 17 industry divisions over the five year period.

In 2007–08, more than half of all Working fatalities occurred among workers employed in three industries. There were 54 deaths in the Road freight transport industry (19%); 51 in the Agriculture industry (18%); and 40 in the Construction industry (14%). Over the five years of the time series, 47% of all those who died of work injuries worked in these three industries (651 deaths). Figure 6 shows the number of Working fatalities in these three industries and all other industries over the 2003–04 to 2007–08 period.

Figure 6 Working fatality rate, selected industries, Australia, 2003–04 to 2007–08



	2003–04	2004–05	2005–06	2006–07	2007–08
Road Freight Transport	25.9	26.4	26.0	38.2	34.0
Agriculture	18.5	13.9	14.2	11.7	16.8
Construction	4.5	3.1	5.1	5.1	4.2
All other industries	1.5	1.7	1.8	1.7	1.6

Although the number of Working fatalities in the Construction industry consistently ranked third highest, because the industry employs a much larger workforce than the Agriculture or Road freight transport industries, fatality rates are lower and less volatile than those observed in the other industries.

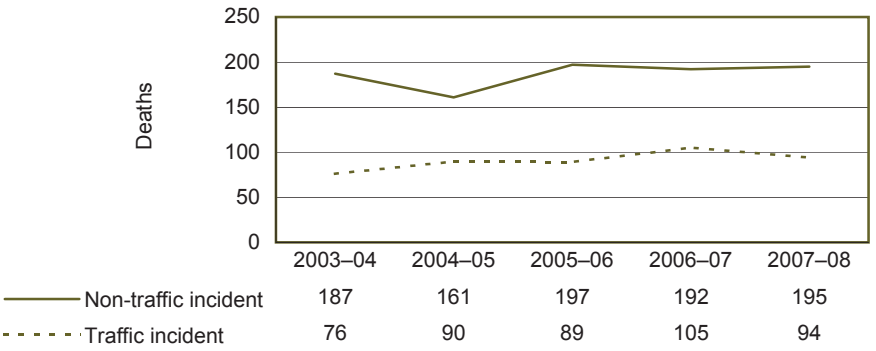
The most notable observation is the spike in the Road freight transport industry in 2006–07. The number of Working fatalities increased by 54% over the 37 in the previous year, resulting in a 47% increase in the fatality rate from 26.0 to 38.2 deaths per 100 000 workers. According to the Australian Bureau of Statistics Survey of motor vehicle use, the number of kilometres driven by trucks increased by 10% in the year ending 31 October 2007, yet in 2006–07, the number employed in the Road freight transport industry increased by only 5%. This may account for some of the sharp rise in Working fatalities in the industry that year. The number of deaths and the fatality rate decreased in 2007–08, but remained higher than in the first three years of the series.

In the Agriculture industry in 2007–08, both the number of Working fatalities (51) and the fatality rate (16.8 deaths per 100 000 workers) reached their highest level since 2003–04, when there were 59 deaths, 18.5 deaths per 100 000 workers.

1.3 Traffic incidents

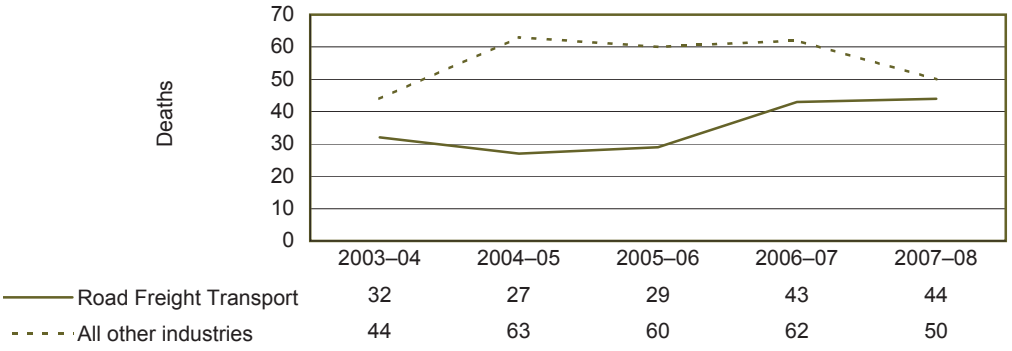
Over the five years of this series, one-third of Working fatalities arose from injuries sustained in traffic incidents. The number of traffic incident Working fatalities averaged 90 per year over the series, but reached 105 in 2006–07. Figure 7 shows the number of Working fatalities due to injuries sustained in traffic and non-traffic incidents over the five year period.

Figure 7 Working fatalities by traffic incident status, Australia, 2003–04 to 2007–08



The largest proportion of traffic incident Working fatalities was in the Road freight transport industry. This proportion has grown in recent years due to an increase in the number of deaths in this industry since 2006–07. In 2007–08, 47% of all traffic incident Working fatalities occurred in the Road freight transport industry.

Figure 8 Traffic incident Working fatalities, Road Freight transport industry, Australia, 2003–04 to 2007–08



Over the period 2003–04 to 2007–08, 78% of Working fatalities in the Road freight transport industry were due to traffic incidents, compared to 24% in all other industries. Similarly, 75% of the Truck drivers were fatally injured in traffic incidents,compared to 24% in all other occupations.

Vehicle incidents were responsible for 89 (95%) of the 94 traffic incident deaths in 2007–08, while the other five were persons struck by vehicles, classified as *Being hit by moving objects*.

Of the 94 traffic incident Working fatalities, 65 (69%) involved a truck, including 42 of the 44 traffic incident deaths in the Road freight transport industry. Three workers, including one truck driver, died in two incidents at railway level crossings; two died in incidents involving buses; and two others in motorcycle crashes. Most of the other traffic incidents involved cars, vans or utilities.

1.4 State/territory of death

The largest number of Working fatalities in 2007–08 occurred in the most populous states, New South Wales (84), Victoria (52) and Queensland (76). Workers in these three states comprise 77% of Australia's working population. In 2007–08, 73% of working deaths occurred in the three states, slightly lower than the five year average of 76%.

Table 3 shows the number of working fatalities due to injuries in traffic incidents and non-traffic incidents for each jurisdiction over the five year period.

Table 3 Working fatalities by traffic incident status and state/territory of death, Australia, 2003–04 to 2007–08

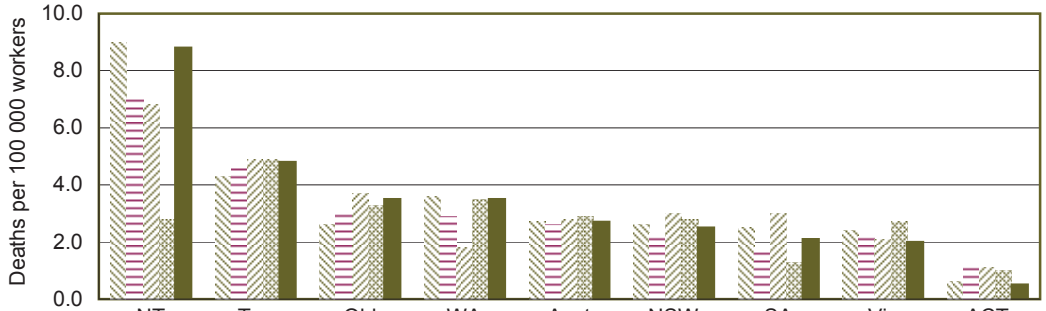
State/territory of death	2003–04	2004–05	2005–06	2006–07	2007–08
			Not a traffic incident		
New South Wales	54	42	66	64	57
Victoria	33	35	31	39	36
Queensland	42	42	51	43	47
Western Australia	28	19	15	26	31
South Australia	16	9	18	9	10
Tasmania	7	8	8	9	8
Northern Territory	6	4	6	1	6
Australian Capital Territory	1	2	2	1	0
Australia	**187**	**161**	**197**	**192**	**195**
			Traffic incident		
New South Wales	31	33	32	30	27
Victoria	25	20	22	31	16
Queensland	6	18	23	26	29
Western Australia	7	10	4	12	8
South Australia	2	4	4	1	6
Tasmania	2	2	3	2	3
Northern Territory	3	3	1	2	4
Australian Capital Territory	0	0	0	1	1
Australia	**76**	**90**	**89**	**105**	**94**
			All Working fatalities		
New South Wales	85	75	98	94	84
Victoria	58	55	53	70	52
Queensland	48	60	74	69	76
Western Australia	35	29	19	38	39
South Australia	18	13	22	10	16
Tasmania	9	10	11	11	11
Northern Territory	9	7	7	3	10
Australian Capital Territory	1	2	2	2	1
Australia	**263**	**251**	**286**	**297**	**289**

In New South Wales, there were 10 fewer working fatalities in 2007–08 than in the previous year and 16% fewer than the 2005–06 high of 98. Working fatalities in Victoria decreased by 26% to 52 from the 2006–07 peak of 70, the lowest number in the five years of the series. This decrease was largely due to the reduction in the number of traffic incident fatalities in Victoria in 2007–08. In contrast, Working fatalities in Queensland increased by 7% in 2007–08 to 76, the highest number recorded there to date. The increase in the number of Working

fatalities in South Australia was mostly attributable to traffic incident deaths. Despite a decline in traffic incident deaths, Working fatalities also increased by one in Western Australia to reach the highest level in the five years of the series. Working fatalities in the Northern Territory also peaked in 2007–08 after a low number of non traffic incident deaths the preceding year.

As Figure 9 shows, fatality rates among the six states in 2007–08 ranged from 2.0 deaths per 100 000 workers in Victoria, the lowest rate there so far, to 4.8 in Tasmania. Fatality rates in the Northern Territory throughout the five years of the series have characteristically been much higher than in the other jurisdictions. Although there was a decrease to 2.8 deaths per 100 000 workers in 2006–07 (3 deaths), in 2007–08, the rate rose to 8.8 (10 deaths). The Australian Capital Territory, in contrast, with one or two Working deaths in each year of the series, has had the lowest rate of any jurisdiction in every year of the series and with one working fatality in 2007–08, recorded a fatality rate of 0.5, a five year low.

Figure 9 Working fatality rate by state/territory of death, Australia, 2003–04 to 2007–08



	NT	Tas	Qld	WA	Aust	NSW	SA	Vic	ACT
2003–04	9.0	4.3	2.6	3.6	2.7	2.6	2.5	2.4	0.6
2004–05	7.0	4.6	3.1	2.9	2.6	2.3	1.8	2.2	1.1
2005–06	6.8	4.9	3.7	1.8	2.8	3.0	3.0	2.1	1.1
2006–07	2.8	4.9	3.3	3.5	2.9	2.8	1.3	2.7	1.0
2007–08	8.8	4.8	3.5	3.5	2.7	2.5	2.1	2.0	0.5

1.5 Age and sex

Of the 289 who died of injuries sustained at work in 2007–08, 23 (8%) were women, the largest number in the five years of this series, but barely one-twelfth the number of men (262).

Nine of the 23 women (39%) were aged 55 years and over. Nearly one-quarter of the women (5) were employed as Farmers & farm managers in the Agriculture industry, three of whom were aged 65 years or older. Of the 11 Working fatalities among Elementary clerical, sales & service workers, six were of women, four of whom were employed in the Retail trade industry and died in the same traffic incident. Of the women who died of workplace injuries, six were in New South Wales and eight in Victoria, where women comprised 15% of those who died of injuries sustained while working. Almost half of the women died in traffic incidents, compared to 32% of the men.

Because over 90% of those who died of injuries incurred while working in 2007–08 were men, their distribution by occupation and industry more closely resembles the overall pattern. All the workers employed as Truck drivers, plant operators and tradespersons who died of injuries received at work were men, as were all those killed in the Mining industry.

As Figure 10 shows, over the five years of the series the fatality rate among women has remained stable with little variation from the average of 0.4 deaths per 100 000 workers, rising to 0.5 in 2007–08, while men have consistently experienced rates more than ten times as high, peaking at 4.8 in 2005–06 and 2006–07 before decreasing to 4.5 in 2007–08.

Figure 10 Working fatality rate by sex, Australia, 2003–04 to 2007–08

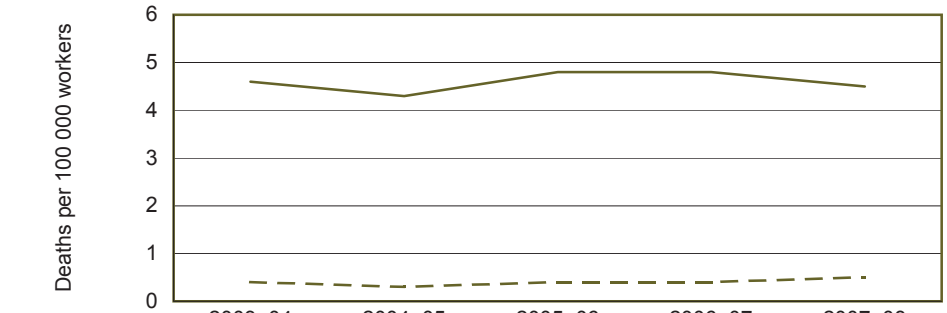


Table 4 shows the distribution of Working fatalities by age group and sex. These data show that workers aged 65 years & over experienced the highest fatality rate, five times the rate for all workers in 2007–08.

Table 4 Working fatalities and fatality rates[a] by age group and sex, Australia, 2007–08

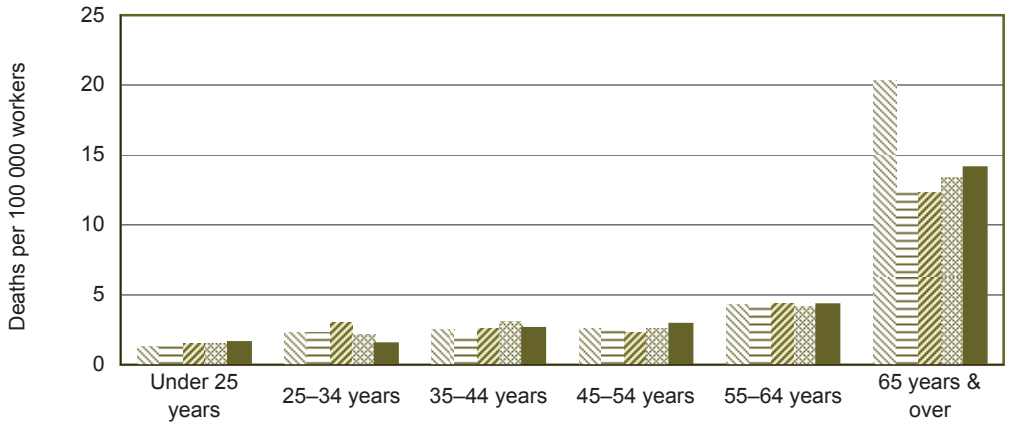
Age group	Women	Men	Total	Proportion	Fatality Rate[a]
15–25 years	2	28	30	10%	1.6
25–34 years	4	31	35	12%	1.5
35–44 years	4	59	63	22%	2.6
45–54 years	4	63	67	23%	2.9
55–64 years	5	53	58	20%	4.3
65 years & over	4	32	36	12%	14.1
Total	**23**	**266**	**289**	**100%**	**2.7**

[a] deaths per 100 000 workers

Figure 11 shows that Working fatality rates tend to increase with age. While the largest proportion of deaths in 2007–08 was among workers aged 45–54 years, the fatality rate of 2.9 deaths per 100 000 workers for that age group was lower than the rates for the two older groups. Because of the relatively small number of workers aged 65 years & over, their fatality rate was more than three times that of those aged 55–64 years and nine times the rate of the two youngest age groups. Of the 36 Working fatalities among workers aged 65 years & over, 20 (57%) were in the Agriculture industry.

In 2007–08, the fatality rate among workers aged 25-34 years reached its lowest level in the five years of the series — 1.5 deaths per 100 000 workers. Nearly one-fifth (6) of those aged 25–34 years who died of work injuries were employed in the Manufacturing industry and an equal number in the Construction industry.

Figure 11 Working fatality rate by age group, Australia, 2003–04 to 2007–08



	Under 25 years	25–34 years	35–44 years	45–54 years	55–64 years	65 years & over
2003–04	1.3	2.3	2.5	2.6	4.3	20.3
2004–05	1.5	2.3	2.1	2.5	4.2	12.3
2005–06	1.5	3.0	2.6	2.3	4.4	12.3
2006–07	1.5	2.2	3.1	2.6	4.2	13.4
2007–08	1.6	1.5	2.6	2.9	4.3	14.1

1.6 Mechanism of injury

Figure 12 shows that in 2007–08, 134 Working fatalities were due to a *Vehicle incident,* 46% of all Working fatalities and the largest number in the five years of the series. Among these, 89 workers were killed in crashes on public roads; 16 in rollovers of farm, mining & construction vehicles and equipment; and 15 in aircraft crashes.

Of the 16 rollovers, six were of All-terrain vehicles (ATVs); six of graders and other self-propelled plant; three of tractors; and one of a forklift truck. This number of rollover deaths is the highest in the five years of the series, with six more deaths in 2007–08 than in any previous year.

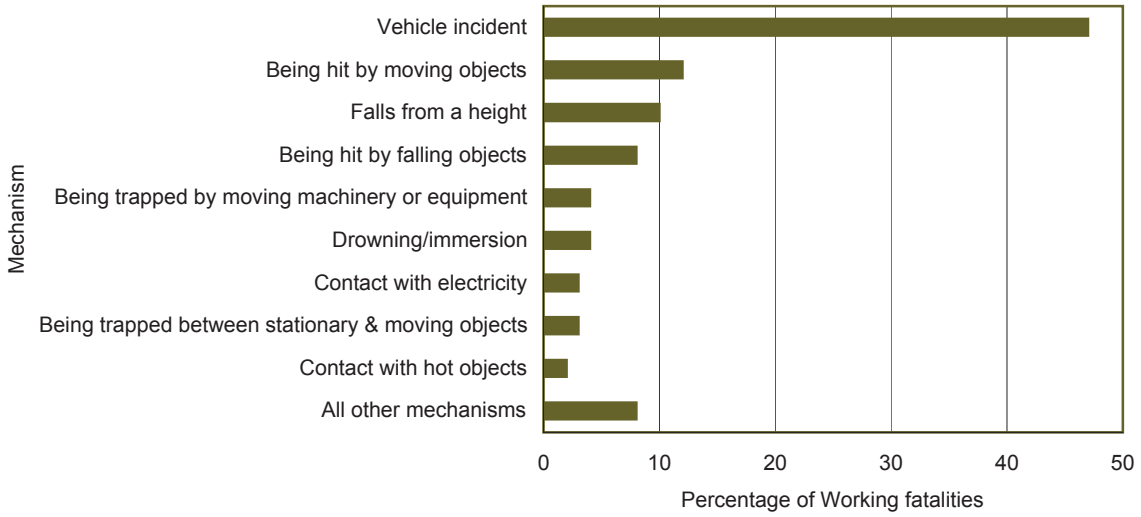
Half of those killed in a *Vehicle incident* not on a public road in 2007–08 worked in the Agriculture or Services to agriculture industries, including all those involved in ATV and tractor rollovers and five of those killed in aircraft crashes.

The second most common Mechanism of injury, *Being hit by moving objects,* resulted in 34 deaths or 12% of all Working fatalities. In two cases, the moving object was pressurised cleaning equipment, but the majority involved a pedestrian hit by a vehicle or mobile plant, including five traffic incidents. In seven cases, the moving object was a truck; four were hit by trains; three by tractors; five by cars and other light vehicles; and two by trailers.

Falls from a height caused the injuries in 28 Working fatality cases, including nine who fell from *Ladders*; four from *Buildings & other structures;* and three from *Power hoists*. Most of those killed in falling incidents were either Tradespersons & related workers (11) or Labourers & related workers (9). The Construction industry employed 43% (12) of the workers who died from injuries sustained in falls.

Another 24 Working fatalities (8%) resulted from *Being hit by falling objects*. In seven cases, the falling objects were metallic, including pipes or beams, while three workers were killed by falling trees.

Figure 12 Proportion of Working fatalities by Mechanism of injury, Australia, 2007–08



Being trapped by moving machinery or equipment killed 11 workers in 2007–08, five of whom were employed in the Manufacturing industry. This is the same number as in the previous year, but substantially more than the six or seven fatalities in each of the first three years of the series. At the same time, the number *Trapped between stationary and moving objects* decreased from the peak of 15 in 2006–07 to 8 in 2007–08, the lowest number in any year of the series.

While the number dying in drowning incidents peaked at 11 in 2007–08, those electrocuted declined from 15 to 9, a five-year low, as shown in Table 5.

Table 5 Working fatalities by Mechanism of injury, Australia, 2003–04 to 2007–08

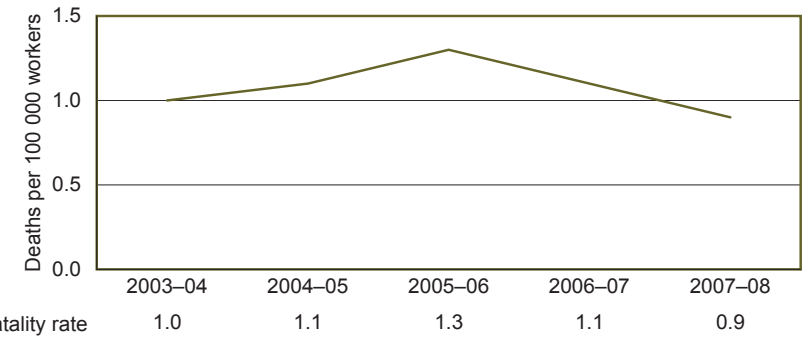
Mechanism of injury	2003–04	2004–05	2005–06	2006–07	2007–08
Vehicle incident	118	120	118	124	134
Traffic incident	*71*	*86*	*78*	*97*	*89*
Rollover	*10*	*10*	*6*	*7*	*16*
Aircraft crash	*17*	*15*	*21*	*7*	*15*
Being hit by moving objects	41	22	40	40	34
Traffic incident	*5*	*4*	*9*	*8*	*5*
Falls from a height	27	24	33	33	28
Being hit by falling objects	16	25	22	24	24
Being trapped by moving machinery or equipment	6	6	7	11	11
Drowning	9	4	8	9	11
Contact with electricity (electrocution)	11	18	18	15	9
Being trapped between stationary & moving objects	12	11	11	15	8
All other mechanisms	23	21	29	26	30
Total	**263**	**251**	**286**	**297**	**289**

2 Commuting fatalities

Analysis of the datasets identified 98 workers, 23 female and 75 male, who died travelling to or from work, a decrease of 12% from the 111 commuting deaths identified in 2006–07 and the lowest number in the five years of this series. This represents 0.9 commuting deaths per 100 000 workers in 2007–08, below the five-year average of 1.1. It is worth reiterating that only some jurisdictions compensate workers for injuries sustained on the journey to and from work. Without a compensation claim it is difficult to determine whether a fatal injury occurred during such a journey, particularly since NCIS records do not consistently code Commuting fatalities as such. So the number identified as commuting fatalities from the available sources is necessarily an undercount of unknown scale.

Figure 13 shows the trend in commuting fatality rates over the five years of the series. The peak in 2005–06 is attributable to a higher number of commuters on foot who sustained fatal injuries when hit by vehicles (15 deaths in 2005–06 compared with 2 in 2007–08). There was also a larger number of deaths due to a *Vehicle incident*: 109 in 2005–06 compared with 94 in 2007–08. It is difficult to determine whether year to year movements in this series reflect real changes in the number of workers dying of injuries sustained while commuting.

Figure 13 Commuting fatality rate, Australia, 2003–04 to 2007–08



Unsurprisingly, all but two of the 98 commuting fatalities in 2007–08 resulted from injuries sustained in a traffic incident. One of the two who died in non traffic related incidents was murdered on the way to work. In two of the traffic incidents, pedestrians were struck by vehicles and in one, the mechanism was unstated. Fourteen of the commuters were killed riding motorcycles and six were riding bicycles, while the rest were driving or passengers in cars, utilities or other light vehicles.

2.1 Occupation

Table 6 shows that the largest number of commuting fatalities in 2007–08 occurred among Tradespersons & related workers with 24 deaths, followed by Labourers & related workers with 21.

Table 6 Commuting fatalities and fatality rates by occupation, Australia, 2003–04 to 2007–08

Occupation	2003–04	2004–05	2005–06	2006–07	2007–08
			Deaths		
Managers & administrators	6	5	6	10	1
Professionals	14	11	11	6	12
Associate professionals	7	18	6	9	5
Tradespersons & related workers	16	18	27	23	24
Advanced clerical & service workers	1	1	1	3	1
Intermediate clerical, sales & service workers	13	10	14	7	16
Intermediate production & transport workers	14	15	21	20	14
Elementary clerical, sales & service workers	2	6	8	11	4
Labourers & related workers	25	22	31	22	21
Unstated	2	1	1	0	0
Total	**100**	**107**	**126**	**111**	**98**
	Fatality rate (deaths per 100 000 workers)				
Managers & administrators	0.9	0.6	0.7	1.2	0.1
Professionals	0.8	0.6	0.6	0.3	0.6
Associate professionals	0.6	1.5	0.5	0.7	0.4
Tradespersons & related workers	1.3	1.5	2.1	1.8	1.8
Advanced clerical & service workers	0.3	0.3	0.2	0.8	0.3
Intermediate clerical, sales & service workers	0.8	0.6	0.8	0.4	0.9
Intermediate production & transport workers	1.8	1.8	2.5	2.2	1.5
Elementary clerical, sales & service workers	0.2	0.6	0.8	1.2	0.4
Labourers & related workers	2.8	2.5	3.6	2.5	2.4
All occupations	**1.0**	**1.1**	**1.2**	**1.1**	**0.9**

Although commuting fatalities were widely distributed among workers across a range of occupations, at a lower level of the ASCO classification, the largest number of Commuting deaths was among Farm hands, six of whom died while commuting. There were four Electricians; four Carpentry & joinery tradespersons and four Storepersons who were killed on the journey to or from work, and another four among Other professionals, a group that includes Lobbyists, Curators and Wine tasters.

Table 6 also shows that Labourers & related workers have experienced the highest Commuting fatality rates in every year of the series. The next highest rates were among Tradespersons & related workers and Intermediate production & transport workers.

2.2 Industry of employer

In 2007–08, the highest number of Commuting deaths occurred among workers employed in the Manufacturing industry (16), in the Property & business services industry division (13) and the Construction industry (11). While the highest number of Commuting deaths in four out of the five years was in the Manufacturing industry, the pattern in the other industry divisions has varied each year as seen in Table 7. Due to the small number of Commuting fatalities identified in them, Table 7 aggregates seven of the 17 industry divisions: Communication services, Cultural & recreational services, Electricity, gas & water supply, Finance & insurance, Government adminstration & defence, Mining and Personal & other services.

The highest Commuting fatality rate in 2007–08 was 1.7 deaths per 100 000 workers employed in the Cultural & recreational services industry division. Fatality rates by industry have fluctuated considerably due to the small number of fatalities identified in some industries.

Table 7 Commuting deaths and fatality rate by selected industry of employer, Australia, 2003–04 to 2007–08

Industry of employer	2003–04	2004–05	2005–06	2006–07	2007–08
			Deaths		
Manufacturing	14	12	26	20	16
Property & business services	14	13	13	11	13
Construction	11	9	18	10	11
Retail trade	8	12	14	12	8
Accommodation, cafes & restaurants	7	8	6	7	6
Agriculture, forestry & fishing	7	6	9	6	5
Transport & storage	6	4	7	12	4
Health & community services	13	6	1	6	3
Wholesale trade	5	7	7	2	5
Education	5	3	5	3	6
Other and unstated	10	27	20	22	21
Total	**100**	**107**	**126**	**111**	**98**
			Fatality rate (deaths per 100 000 workers)		
Manufacturing	1.3	1.1	2.4	1.9	1.5
Property & business services	1.3	1.2	1.1	0.9	1.0
Construction	1.4	1.1	2.1	1.1	1.1
Retail trade	0.6	0.8	0.9	0.8	0.5
Accommodation, cafes & restaurants	1.5	1.6	1.3	1.4	1.2
Agriculture, forestry & fishing	1.9	1.6	2.5	1.7	1.4
Transport & storage	1.4	0.9	1.5	2.5	0.8
Health & community services	1.4	0.6	0.1	0.6	0.3
Wholesale trade	1.1	1.6	1.6	0.4	1.1
Education	0.7	0.4	0.7	0.4	0.8
All industries	**1.0**	**1.1**	**1.2**	**1.1**	**0.9**

[a] deaths per 100 000 workers

2.3 Age and sex

In 2007–08, 23 (23%) of the Commuting fatalities occurred among female workers, just below the five year average of 25. Figure 14 shows that workers aged 15–24 years experienced the largest number of Commuting fatalities (34). There were seven women and 27 men in this age group who died while commuting. This youngest age group also sustained the highest fatality rate — 1.8 deaths per 100 000 workers, up from 1.6 the previous year.

Figure 14 Commuting fatalities by age group, Australia, 2007–08

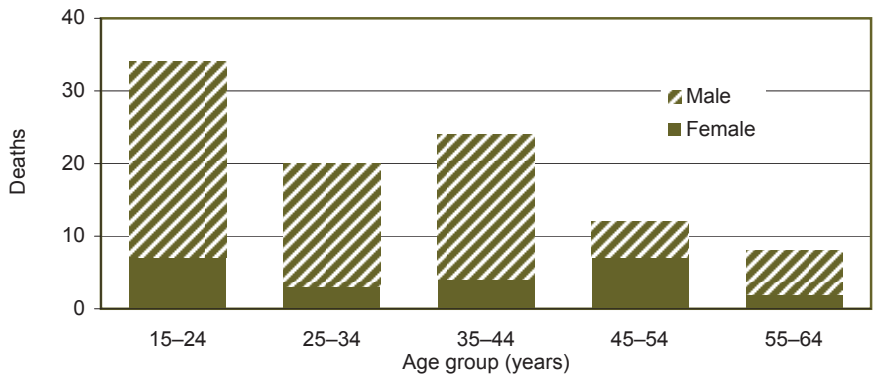


Table 8 Commuting fatalities: fatality rate[a] by age group, Australia, 2003–04 to 2007–08

Age group	2003–04	2004–05	2005–06	2006–07	2007–08
15–24 years	1.3	1.3	2.7	1.6	1.8
25–34 years	0.9	1.3	1.2	1.2	0.9
35–44 years	1.0	0.8	1.0	0.9	1.0
45–54 years	1.0	1.0	0.6	0.9	0.5
55 years & over	1.2	1.2	1.0	0.7	0.5
All ages	**1.0**	**1.1**	**1.3**	**1.1**	**0.9**

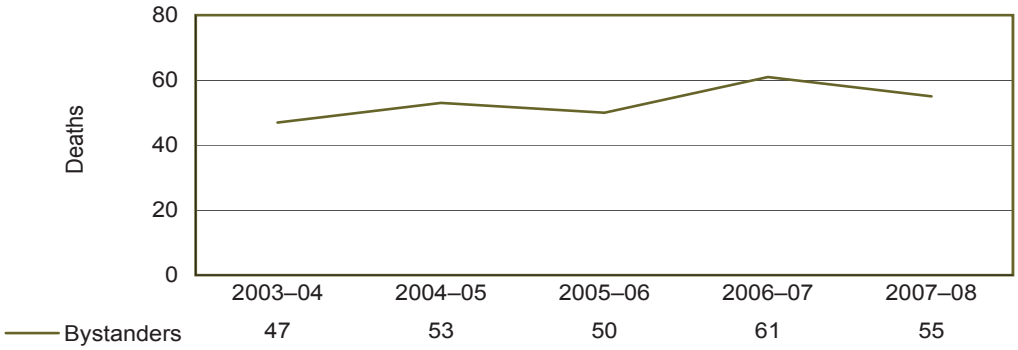
[a] deaths per 100 000 workers

As Table 8 shows, workers aged 15–24 years have consistently suffered the highest Commuting fatality rate. The largest number of Commuting fatalities was also among the youngest workers in all years except 2004–05 when more workers aged 25-34 years were killed. The Commuting fatality rate among workers aged under 25 years peaked in 2005–06, when 48 deaths due to injuries sustained in collisions involving cars or other light vehicles were identified as Commuting fatalities. In comparison there were 34 Commuting fatalities among this age group in 2007–08.

3 Bystander fatalities

This study identified 55 people who died from injuries due to another person's work activity in 2007–08. As Figure 15 shows, this number is consistent with the trend over the first three years of the series although an uncharacterisitcally high number of Bystander fatalities was identified in 2006–07 (61), 10 of whom died in the Kerang train disaster that year.

Figure 15 Bystander fatalities, Australia, 2003–04 to 2007–08



The number of Bystander deaths identified in any year is almost certainly an undercount. Bystander deaths are not compensable through the workers' compensation system and are therefore absent from the NDS; work health and safety legislation in each jurisdiction requires notification under different circumstances; and coronial records seldom provide sufficient information to determine the connection between work activity and a fatality conclusively. Deaths in vehicle collisions only count as Bystander fatalities where available documentation shows the driver of the work vehicle to be at fault. Year on year fluctuations in Bystander fatalities may be an artefact of variations in notification procedures or the treatment of records of heavy vehicle collisions and may not provide an accurate guide to real changes in the risk of work activity to Bystanders.

3.1 Age and sex

The most striking observation about Bystander fatalities in 2007–08 is that 18 of those killed (33%) were children under the age of 15 years and 16 (29%) were aged under 10 years. Although children under the age of 10 years comprise about 13% of Australia's population, they are disproportionately represented among those who die as a result of others' work activity, accounting for 24% of all Bystander fatalities identified in the five years.

Of the 16 children under 10 years old, six drowned. While this is an improvement on the eight drowning fatalities among children aged under 10 years in 2006–07, it is still double the number of children who drowned in each of the first three years of the series.

Table 9 shows that the second highest number of Bystander fatalities in 2007–08 was among those aged 65 years & over. The 12 deaths in this age group is above the average of 10 for the five years of this study. Over the five years of this

series, 19% of the Bystander fatalities were among the oldest age group, higher than their proportion of the Australian population (13%). Among the Bystanders aged 65 years & over in 2007–08, seven died in traffic incidents and one in a gyrocopter collision. In two cases, they were travelling in vehicles struck from behind by trucks and in two others, pedestrians were struck by reversing trucks.

Table 9 Bystander fatalities by age group, Australia, 2003–04 to 2007–08

Age group	2003–04	2004–05	2005–06	2006–07	2007–08
Under 15 years	15	12	12	25	18
15–24 years	3	4	7	1	6
25–34 years	5	7	6	3	4
35–44 years	6	10	2	5	4
45–54 years	4	4	2	13	9
55–64 years	7	6	8	5	2
65 years and over	7	10	13	9	12
Total	**47**	**53**	**50**	**61**	**55**

As Table 9 shows, there was a spike in Bystander fatalities among those aged 35–44 years in 2004–05. Of the 10 deaths that year, three were killed in the same traffic incident, and another two in the same plane crash. Similarly, in 2006–07 there was a large increase among those aged 45–54 years. Of the 13 Bystanders in this age group killed that year, two died in the Kerang train crash and another two in a ferry crash. Again in 2007–08, there was an uncharacteristically large number of Bystander fatalities among this age group, principally due to traffic incidents. In each of the last two years of the series, one of the Bystanders in the 45–54 years age group was a cyclist struck from the rear by a truck.

Over the five year period between 2003–04 and 2007–08, 41% of the Bystanders killed were female. In 2007–08, 31% (17) of those who died of injuries due to someone else's work activity were female, including seven of the 18 children aged under 15 years.

3.2 Location of incident

Because of the methods used to identify Bystander fatalities, crash events on public roads are the dominant cause of injuries. In 2007–08, 53% of Bystander fatalities (29 deaths) involved collisions on public roads, including seven pedestrians struck by vehicles, two of whom were hit by trucks while attending stationary vehicles.

In 2007–08, six of the seven Bystanders who died of injuries sustained on farms were children, the eldest of whom was aged eight. Apart from the three who drowned, two were crushed by tractors and one by a forklift truck. Over the five year period, 11% of Bystander fatalities took place on agricultural properties. Of the 22 Bystander fatalities due to drowning among children aged under 10 years identified between 2003–04 and 2007–08, 10 occurred on farms.

Apart from roads and farms, the principal hazard to Bystanders is swimming pools, where six drowned over the five years, five in public pools and one in a school pool. There were two cases in 2007–08 where inattention by a carer contributed to a drowning fatality. In one case, a disabled adult drowned at the beach; in the other, a child drowned in an unfenced lake at a park.

3.3 Mechanism of injury

Table 10 shows that in 2007–08, 42% of the Bystander fatalities (23) were due to a *Vehicle incident.* Of these, 15 involved trucks: eight crashing with cars or other light vehicles; three with bicycles; and two with motorbikes. Five of these incidents involved the truck driving into the rear of the vehicle in front: two were cars or other light vehicles, three were bicycles and one was a motorcycle. Over the five years there were 135 Bystander fatalities (51%) which resulted from a *Vehicle incident* and another 56 where Bystanders were struck by vehicles or mobile machinery (21%).

There were 15 deaths in 2007–08 that involved *Being hit by moving objects*, all of which involved vehicles or mobile machinery, with eight involving a truck.

Drowning incidents killed 8 Bystanders in 2007–08 and a total of 31 over the five year period. As mentioned, 10 of the 31 drownings occurred on farms and all of those killed were children ranging in age from one to eight years.

Injuries from *Being hit by falling objects* caused four of the Bystander fatalities in 2007–08 and 14 over the five year series. In three cases, unsecured gates fell on children aged between five and eight years.

Falls killed 14 Bystanders between 2003–04 and 2006–07, but none were identified in 2007–08. In three cases, passengers fell from moving trains and in three others, patients fell from patient lifting devices.

Table 10 Bystander fatalities by Mechanism of injury, Australia, 2003–04 to 2007–08

Mechanism	2003–04	2004–05	2005–06	2006–07	2007–08	Total
Vehicle incident	23	29	23	37	23	**135**
Being hit by moving objects	11	13	10	7	15	**56**
Drowning/immersion	4	5	5	9	8	**31**
Being hit by falling objects	2	2	3	3	4	**14**
Falls	3	4	5	2	0	**14**
All other mechanisms	4	0	4	3	5	**16**
Total	**47**	**53**	**50**	**61**	**55**	**266**

Explanatory Notes

1 Inclusions

This report covers fatalities due to work-related injuries and explicitly excludes deaths attributable to disease and other natural causes. Injury is defined as a condition coded to 'External Causes of morbidity and mortality' and 'Injury, poisoning and certain other consequences of external causes' in the International Statistical Classification of Diseases and Related Health Problems, Tenth Revision, Australian Modification (ICD-10-AM) .

Among conditions specifically included as injuries are those arising from poisonous plants and animals, environmental conditions (e.g. frostbite), allergic reactions, and embolisms. Heart attacks and strokes are regarded as natural causes, but where available information shows that a work-related injury directly triggers a fatal heart attack or stroke, the fatality is included.

Working fatalities

All cases identified of persons who die of injuries sustained while they are working are included in this report. For this purpose, 'working' includes travelling from one workplace to another. So a tradesperson or professional killed driving from one job or client to the next counts as a Working fatality rather than a Commuting fatality. Similarly, a worker killed in an air crash on their way to a conference would be a Working fatality.

People killed while travelling for work purposes in a light vehicle are difficult to identify unless compensated, and self-employed workers are not covered by workers' compensation. Few work-related road traffic fatalities are notified by the work health and safety jurisdictions to the Notified Fatalities Collection (NFC) because they are generally investigated by the police. Unless the accident involves a heavy vehicle, it is unlikely to be identifiable as a Working fatality among coronial records. These factors may contribute to an undercount of Working fatalities from traffic incidents.

Commuting fatalities

Work-related injury fatalities also include deaths from injuries sustained while commuting to or from work. Fatal commuting incidents are only included in this publication where sufficient information is available to identify them with confidence. While the National Coroners Information System (NCIS) would have records for all deaths involving vehicles, specific details of the reasons for travel are seldom available, making it difficult to identify a fatality decisively as a Commuting fatality from coronial records alone.

The only jurisdictions that offer workers' compensation for commuting injuries are

- New South Wales (with some restrictions)
- Queensland (with some restrictions)
- the Northern Territory (unless it involved a motor vehicle which would be covered by the Motor Accident Compensation Act)
- the Australian Capital Territory (if the employer provided transport for the purpose of transporting employees and was driven by or at the direction of the employer, or travelling between a workplace and a place of treatment for a work-related injury)

- Comcare (up to March 2007), and
- Seacare.

Jurisdictions that do not cover commuting claims are Victoria, South Australia (unless there was a real and substantial connection between the employment and the accident), Western Australia and Tasmania. Furthermore, fatalities are only compensable where there is a dependant to lodge a claim, regardless of jurisdiction.

Commuting deaths, moreover, are not generally notifiable under work health and safety legislation.

These factors contribute to an unquantifiable undercount of Commuting deaths in this publication.

Bystander fatalities

In this collection, work-related injury fatalities are defined to include deaths resulting from the work activity of another person. These deaths are classified as Bystander fatalities. Bystanders are persons such as visitors to a workplace, or persons, including children, who suffer fatal injuries as a result of someone else's work activity or work factors (including work factors that persist outside working hours).

Included are bystanders who received fatal injuries connected with the travel of a 'working' vehicle (for example, a truck, commuting vehicle or police vehicle). But if the driver of the working vehicle did not contribute to the fatal accident then the other party does not count as a Bystander in this publication. Where a car veers into the path of a truck and the car driver is killed, for instance, the car driver would not be considered a Bystander.

There are many difficulties in identifying these deaths as they are not compensable under workers' compensation legislation in any jurisdiction and therefore out of scope of the National Data Set for Compensation-based Statistics (NDS). Notifications depend on the work health and safety legislation of the jurisdiction, and they are only identified in the coronial database when sufficiently detailed information on the circumstances of all parties to the death is available. Most of the Bystander deaths in this report were identified by examining NCIS records involving heavy vehicles, so Bystander deaths resulting from collisions involving cars and four wheel drives engaged in work activity that NCIS does not code as work-related are unlikely to have been identified.

Estimates of Bystander fatalities in this collection should therefore be regarded as underenumerated by an unknown amount.

Deaths resulting from criminal activity

Persons sustaining fatal injuries at work or while commuting as a result of someone else's criminal activity are included in this collection, but those dying of injuries received while carrying out criminal activity are out of scope. Otherwise uninvolved persons fatally injured in an incident involving both criminals and law enforcement officers, security officers, etc. are included as Bystanders.

Classification of fatalities

Persons who die of injuries sustained at work are included among Working fatalities even when the cause of the injury is another person's work activity. Similarly, deaths due to injuries sustained while commuting are classified as Commuting fatalities regardless of fault or cause.

2 Exclusions

Deaths due to natural causes

Natural causes include heart attacks, strokes and diseases.

Deaths due to complications of surgical and medical care

Although deaths of patients who die as a result of medical negligence or malpractice are in principle Bystander fatalities, deaths arising from such iatrogenic injuries are specifically excluded from this collection.

Suicide

The scope of this project excludes deaths resulting from self-harm because it is difficult to assess the extent of any connection between work and a decision to take one's own life, even when detailed information is available.

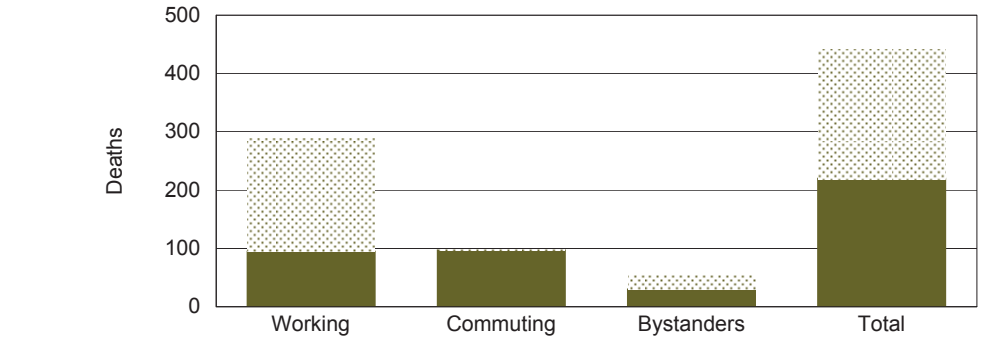
Deaths of persons undertaking criminal activity

As mentioned, work-related injury fatalities exclude deaths of persons fatally injured while undertaking criminal activities. For these purposes, 'undertaking criminal activities' applies where the principal activity was criminal, committing a burglary or robbery, for instance. Where the criminal activity is incidental to legitimate work activity, for example, where a worker dies of an injury sustained while under the influence of illegal substances, the fatality is included.

3 Traffic incidents

As Figure 16 shows, traffic incidents are a major cause of work-related fatality in all three categories of activity, accounting for just under half of all fatalities reported in this study — 219 out of the total of 442.

Figure 16 Work-related injury fatalities by activity and traffic incident status, Australia, 2007–08



Nevertheless, work-related traffic incident fatalities in all three categories are likely to be underenumerated for the reasons discussed.

4 Data sources

This study has used information from three datasets: the NDS, the NFC and the NCIS. Each of these datasets has limitations, so all three datasets are needed to estimate the number of work-related deaths occurring each year.

The National Data Set for Compensation-based Statistics (NDS)

The NDS is currently the most comprehensive source of compensation-related work health and safety data in Australia. The scope of the NDS is all accepted workers' compensation claims made by or for an employee (other than an employee of the defence forces).

The NDS is compiled annually by Safe Work Australia from data supplied by the state, territory and Australian Government workers' compensation authorities.

The strengths of the NDS are that it:

- is Australia's most comprehensive source of compensation-based work health and safety data
- usually codes Industry of employer accurately
- is supported by several classification systems, including the Australian and New Zealand Standard Industrial Classification (ANZSIC), the Australian Standard Classification of Occupations (ASCO) and the Safe Work Australia Type of Occurrence Classification System (TOOCS), and
- independently assesses work-relatedness.

The weaknesses of the NDS are that:

- workers' compensation is only available to employees (see Glossary for definition of employee), so the NDS does not provide good coverage of deaths in the Agriculture, forestry & fishing and Construction industries where a significant proportion of workers is self-employed. Table 11 shows the percentage of workers in each industry classified as Employees
- many work-related injury fatalities are not compensable because there are no dependants to lodge a claim
- only Comcare, Queensland and New South Wales NDS records provide the date of death in the 2007–08 dataset, although jurisdictions are progressively introducing this data item
- only jurisdictions where commuting injuries are compensable (Australian Capital Territory, Comcare, New South Wales and Queensland) provide data on Commuting fatalities
- Bystander deaths are not compensable in any jurisdiction and are therefore out of scope of the NDS collection
- narratives are not provided
- coding of Mechanism, Agency, Breakdown agency, Nature of injury, Bodily location, Occupation and Industry of workplace may not be complete or accurate
- date of birth may not be accurate, and
- names are not provided.

As NDS data comprise workers' compensation claims of employees, industries with low proportions of employees are not well covered. It is unsurprising, therefore, that the NDS captured only 29% of the Working fatalities in the

Agriculture, forestry & fishing industry, since only 51% of workers in that industry are employees, as shown in Table 11. While the available information does not include Status in employment data for each deceased worker, 24 of the 45 Working fatalities in this industry were coded to the Occupation Farmers & farm managers and were probably self-employed.

Table 11 Proportion of Employees by industry of employer, Australia, 2007–08

Industry of employer	Percentage of employees
Agriculture, Forestry and Fishing	51%
Agriculture	*48%*
Forestry and Logging	*92%*
Mining	98%
Manufacturing	94%
Electricity, Gas and Water Supply	98%
Construction	71%
Wholesale Trade	93%
Retail Trade	90%
Accommodation, Cafes and Restaurants	93%
Transport and Storage	87%
Road Transport	*77%*
Road Freight Transport	*82%*
Communication Services	91%
Finance and Insurance	95%
Property and Business Services	84%
Government Administration and Defence	100%
Education	96%
Health and Community Services	95%
Cultural and Recreational Services	83%
Personal and Other Services	80%

Notified Fatalities Collection (NFC)

Since 1 July 2003, Safe Work Australia has maintained a database of work-related injury fatalities notified to work health and safety authorities in each jurisdiction under their work health and safety legislation. There are thirteen work health and safety jurisdictions in Australia that report to Safe Work Australia:

- each of the eight states and territories
- the Commonwealth (Comcare)
- the mining sector in New South Wales, Queensland and Western Australia, and
- the National Offshore Petroleum Safety Authority (NOPSA).

The strengths of the NFC are that:

- it captures fatalities not covered by the NDS such as self-employed contract workers and bystanders
- names are supplied by some jurisdictions, and
- it provides a brief narrative account of the circumstances of the fatality.

The weaknesses of the NFC are that:

- data are only available from 2003-04 onwards
- limited information is available at the time of notification, and
- there is limited coverage of transport-related deaths because these deaths are notified to and investigated by the police, road traffic authority or, in the case of plane crashes and marine deaths, by Commonwealth agencies

- it tends to capture work-related deaths only when they occur shortly after the injury.

National Coroners Information System (NCIS)

The NCIS was officially launched in July 2000 and is a national internet-based data storage and retrieval system of coronial cases in Australia. The NCIS holds information on all fatalities referred to a coroner in Australia. The coroners' findings, police reports, autopsy reports and toxicology reports may also be available. The NCIS contains a work-relatedness data item coded by the staff of the individual state and territory coroners' offices.

Each state and territory in Australia has a licence agreement with the Victorian Institute of Forensic Medicine (VIFM) permitting the transfer of coronial information for storage and dissemination via the NCIS. Coronial clerks enter the data into local case management systems, which are regularly uploaded to the NCIS.

The strengths of the NCIS are that:

- the scope of the collection includes all deaths reported to an Australian coroner regardless of compensation status or work arrangement
- when available, attachments to records, including police narratives and coronial findings, may shed light on the causes and circumstances surrounding a fatal incident
- there is a work-relatedness assessment against standard criteria, although not all work-related fatalities are correctly coded, and
- relevant data items are coded to International Classification of Diseases version 10 (ICD-10-AM).

The weaknesses of the NCIS include:

- access to records for open cases is restricted in Western Australia
- crucial data items, including name, date of birth and date of death, as well as documentation, may be missing in records for open cases and even some closed cases, and
- identification of Bystander deaths may not be possible where accompanying documentation is absent or uninformative, especially for road-related fatalities.

The coding of work-relatedness in the NCIS

NCIS records are not always correctly coded for work-relatedness. Certain types of incidents, including some traffic incidents, may not be coded as work-related. Another factor is that the work-related flag may not be finalised until the case is closed. To overcome some of these issues, fatalities that meet certain criteria are extracted for closer examination. These include:

- fatalities marked as work-related
- fatalities that involved a heavy vehicle or light commercial vehicle
- fatalities that occurred at a workplace
- fatalities where cause is not known yet, and
- fatalities where some working activity is noted.

Summary of dataset characteristics

Table 12 summarises the main characteristics of the selected datasets (NDS, NFC and NCIS) pertinent to their use for estimating the number of persons fatally injured in work-related incidents in Australia.

Table 12 Selected characteristics of the NDS, NFC and NCIS datasets

Characteristic	NDS	NFC	NCIS
Type of dataset	Administrative	Administrative	Administrative
Work-relatedness	Yes	Yes	Yes
State/territory	workers' compensation jurisdiction	work health and safety jurisdiction	state/territory of coronial inquiry – (usually state/territory of death)
Industry coding	ANZSIC 1993 (coded by jurisdictions)	ANZSIC 1993 (coded by jurisdictions or Safe Work Australia)	ANZSIC 1993 (coded by Safe Work Australia)
Occupation coding	ASCO 2nd edition (coded by jurisdictions)	ASCO 2nd edition (coded by jurisdictions or Safe Work Australia)	ASCO 2nd edition (coded by Safe Work Australia)
TOOCS coding	Yes (coded by jurisdictions)	Yes (coded by jurisdictions or Safe Work Australia)	Yes (coded by Safe Work Australia)
Scope	Compensated work-related injury fatalities only, i.e. excludes self-employed persons	All notified fatalities	All deaths reported to an Australian coroner
Availability of data	1997–98 to current	2003–04 to current	July 2000 to current (January 2001 for Queensland)
Inclusion of bystanders	No	Yes but limited	Yes but not always identifiable
Inclusion of commuting deaths	NSW, Qld, ACT and limited in NT	Occasionally	Yes but not always identifiable
Timeliness	Data available 18 months after period	Data available 6 months after period	Data extracted 18 months after end of period; limited information available immediately
Narrative	No text description of the incident circumstances	Brief description of the incident circumstances may be included	Police narrative, autopsy report, toxicology report and coroner's finding may be available once the case is closed. Some information may be available for open cases.

While nearly all deaths were eventually found in the NCIS, the initial extraction of cases found only around 50–60% of the cases eventually included in the study as shown in Table 13. These data only go back to 2004–05 as the extraction from the NCIS in 2003–04 was done on a different basis and is not comparable.

Table 13 shows that the proportion of fatalities found in the NDS and NFC have remained fairly constant, however, the proportion found in the NCIS has been falling, particularly for Working fatalities where only 52% were identified in the latest extract compared to 70% in 2004–05. Some of this may be due to earlier extraction of the NCIS records.

Table 13 Work-related injury fatalities and proportion by activity and dataset before matching, Australia, 2004–05 to 2007–08

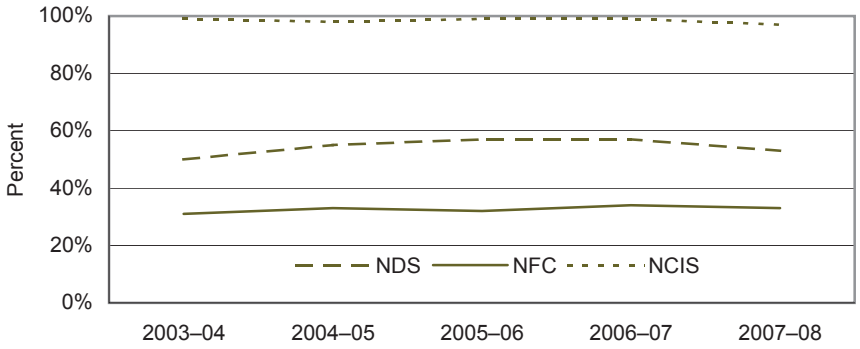
	Number of fatalities				Proportions			
	2004–05	2005–06	2006–07	2007–08	2004–05	2005–06	2006–07	2007–08
Working fatalities								
NDS	148	182	190	174	59%	64%	64%	60%
NFC	121	138	146	135	49%	48%	50%	48%
NCIS	243	283	287	272	70%	62%	56%	57%
Total	**249**	**286**	**294**	**289**	**100%**	**100%**	**100%**	**100%**
Commuting fatalities								
NDS	77	83	75	61	72%	66%	68%	62%
NFC	0	0	0	1	0%	0%	0%	1%
NCIS	48	86	45	53	45%	68%	41%	55%
Total	**107**	**126**	**111**	**96**	**100%**	**100%**	**100%**	**100%**
Bystander fatalities								
NDS	0	0	0	0	0%	0%	0%	0%
NFC	13	12	12	11	23%	23%	23%	21%
NCIS	33	21	23	27	62%	40%	43%	50%
Total	**53**	**50**	**63**	**53**	**100%**	**100%**	**100%**	**100%**
All work-related injury fatalities								
NDS	225	265	265	235	55%	57%	57%	53%
NFC	134	150	158	147	33%	32%	34%	34%
NCIS	255	285	234	243	62%	62%	50%	56%
Total	**411**	**462**	**469**	**442**	**100%**	**100%**	**100%**	**100%**

Apart from the three basic sources, some additional work-related deaths are identified through media coverage and via accident investigation reports from the Australian Transport Safety Bureau. Some of these related to plane crashes, train crashes and maritime incidents investigated by Commonwealth authorities and therefore not notified. Such cases are included in the collection where details can be verified with NCIS information.

Following the matching process and verification of details using the NCIS, many additional NCIS records were identified. Figure 17 shows that 98% of records were found in the NCIS after the matching process. Despite the increase in the number of identified work-related deaths over the four years of this series, the proportion of cases each dataset contributed remained relatively stable over the period. Specifically, the NCIS has consistently held identifiable records for about 95% of all work-related injury fatalities, while just over half were identified in the NDS and about one-third in the NFC.

Of the 442 work-related injury fatalities enumerated in this report for 2007–08, just 92 (21%) were identified in all three datasets. Another 152 (34%) were found only in NCIS records, 14 only in the NDS, and one only in the NFC. When considering only Working fatalities, 31% were found in all three datasets.

Figure 17 Dataset contribution after matching, 2003–04 to 2007–08



Coverage of Working fatalities

Table 14 shows the proportion of working deaths in each industry captured by each dataset in 2007–08. The NCIS (after the matching process was completed) captured all deaths in 10 of the 15 ANZSIC industry divisions where deaths were identified, as well as all three cases where the industry of employer was unstated. The deaths that couldn't be identified in NCIS may involve police investigations, which must be completed before the coroner investigates the death. Only 55% of the cases identified in NCIS in 2007–08 were marked as work-related, in part due to the high proportion of open cases (49%). Among records for 2003–04, only 15% of which remain open, 75% of Working fatalities are now coded as work-related.

Table 14 Proportion of Working fatalities by dataset by Industry of employer, Australia, 2007–08

Industry of employer	NCIS	NDS	NFC	Deaths
Agriculture, forestry & fishing	96%	31%	48%	67
Mining	100%	88%	75%	8
Manufacturing	100%	74%	65%	23
Electricity, gas & water supply	100%	50%	50%	4
Construction	93%	68%	75%	40
Wholesale trade	70%	90%	10%	10
Retail trade	100%	36%	9%	11
Accommodation, cafes & restaurants	100%	100%	0%	1
Transport & storage	99%	72%	31%	72
Communication services	100%	50%	50%	4
Finance & insurance	n/a	n/a	n/a	0
Property & business services	93%	85%	67%	27
Government administration & defence	100%	67%	67%	3
Education	100%	0%	50%	2
Health & community services	100%	50%	50%	2
Cultural & recreational services	100%	38%	25%	8
Personal & other services	100%	43%	0%	7
Total	**96%**	**60%**	**47%**	**289**

5 Calculation of fatality rates

Employment figures from ABS quarterly Labour force data are used in calculating fatality rates in this publication. The denominator is the average of all persons employed over the four quarters of the financial year for each sex, age group, industry, occupation, or state or territory.

Although denominators are not available from the Labour Force Survey for occupations at the unit group level, denominators for Truckdrivers, Farmhands and Air transport professionals were estimated by multiplying the denominator for a higher level ASCO category by the proportion of Truckdrivers, Farmhands, and Air transport professionals within that category identified in the 2006 Census.

Because work-related injury fatalities of Australian Defence Force (ADF) personnel within Australia are in scope of this report and therefore nominally included in the numerator of certain fatality rates, denominators for the Government administration & defence industry division and the total of all industries, as well as each sex and state or territory are supplemented with the average of levels of ADF permanent members' reported in the Department of Defence Annual Report reported at 30 June 2007 and 30 June 2008. In 2007–08, there were no ADF fatalities in scope of this collection.

Although included in the numerators for fatality rates, the Working fatalities include one of a volunteer who would not be accounted for in the denominators. In 2003–04 and again in 2005–06, there was one working fatality of a child under the age of 15 years. Children under 15 are out of scope of the Labour Force Survey, so are also excluded from the denominators.

6 Identification of matching cases

Details of the deaths in each of the three datasets were compared in order to identify duplicate records. In general, matching was achieved by sorting the death records by date variables and reviewing groups of records that had the same or similar values. Pairs or triplets that looked plausible on the basis of date of death were scrutinised carefully, using other data items to confirm or refute the match. The other data items used most often were age, sex, jurisdiction, text descriptions (for NFC and NCIS cases), date of birth (for NCIS and NDS cases), Mechanism of injury, industry, occupation, and Agency (in roughly that order of priority).

A number of cases were found where the death occurred in one jurisdiction but the NDS record came from the jurisdiction of the employer. Extra care was taken with these records to confirm a match. This is particularly an issue for NDS records for the Comcare jurisdiction, which covers Commonwealth employees and the employees of certain self-insuring organisations and does not specify the geographical location where the fatal injury occurred.

The NCIS database was interrogated to find records corresponding to NDS and NFC records that were not matched to a record in the original NCIS extract. Where a match was found, it often provided invaluable details missing in the NDS and NFC records. Cases identified only through media and Australian Transport Safety Bureau reports were also confirmed through the NCIS.

Since virtually all injury deaths in Australia are reported to the coroner, it is reasonable to expect that the NCIS would include records for all work-related traumatic injury fatalities. The reason not all NDS and NFC records have been matched to an NCIS record is that some jurisdictions restrict the information available on open cases. In addition, the coroner will not commence an inquest until all criminal proceedings have been completed. So while NCIS may have assigned a record to the case, not all information will be accessible. Records of open cases from Western Australia, for example, suppress the decedent's name. Open cases from Queensland do not include a date of death and names are also sometimes suppressed.

This impacts on the NCIS's utility in closing gaps in the other data sources, such as self-employed workers out of scope of the NDS and persons killed in traffic incidents seldom captured in the NFC. The NCIS is the only one of the three datasets likely to record, for example, the traffic incident death of a self-employed truckdriver. If the NCIS record for such a case is uncoded or incorrectly coded for work-relatedness, it would not be included in the initial extract. For this reason, all cases involving a heavy vehicle, whether flagged as work-related or not, were extracted and scrutinised to determine whether they were in scope of this collection. Where the incident involves a working light vehicle, like a tradesperson in a car, or a bicycle courier, however, it is unlikely to be identifiable as work-related.

The availability of dates for the data matching process

Dates were very important in the matching process. Dates of incident, death and birth were usually consistent across the data sources, suggesting that the date information was often of good quality. While the NDS provides the date of the injury incident, not all jurisdictions consistently include date of death, although this is generally unproblematical because in traumatic fatality cases, death often occurs on the same day as the incident. Date of death is being progressively supplied by the jurisdictions with the introduction of the third edition of the NDS (NDS3).

Of the three data sources, the NCIS has the best array of dates, although date of birth and date of death are not available for all open cases and the NCIS web interface only permits searching on month and year of birth. Because date of death is not always available for open cases, date of notification is used as an initial extraction tool.

Industry information

Industry analysis for Working and Commuting fatalities is based on Industry of employer because relevant denominators are available, permitting calculation of fatality rates by industry. As the employer of a bystander is irrelevant to analysis and usually unknown, Bystander fatalities are classified by Location of incident, which may be a specific workplace that can be coded by industry.

Where different data sources coded the same case to different Industries of employer and further details were not available from narrative sources, this report has generally accepted NDS coding as the most reliable, as the claim is directly linked to the policy of the employer of the deceased worker.

The timing of data extraction

The NDS dataset for a given year pertains to claims that were submitted during that year regardless of when the death occurred. The data are usually extracted by the jurisdictions in the November following the reference financial year. There are instances where the insurer has yet to determine liability by the time the data are extracted. Therefore additional deaths may be found using this source in future years. As more jurisdictions supply data in NDS3 format, date of death will become increasingly available for extraction purposes.

The timing of NCIS data extraction also bears on the number of work-related deaths captured for this project. Because date of death is not available for all NCIS records, NCIS data are currently extracted on the basis of date of notification to the coroner on the assumption that notification occurs shortly

after a death. For this study, the NCIS was interrogated until 1 August 2010 for coronial records matching records in the other datasets.

There are no issues with the timing of extraction from the NFC as updates to the dataset are rarely received more than six months after the fatality.

Glossary

Activity

This report classifies fatalities from work-related injuries according to the decedent's level of participation in the work causing the injury. See separate entries for:

- Working fatality
- Commuting fatality
- Bystander fatality

Bystander fatality

The death of a person who dies as a result of injuries sustained as a result of another person's work activity and who was not engaged in work activity of their own or travelling to or from their own workplace at the time of the injury. Those killed by others' work activity while at work themselves are classified as Working fatalities, and those killed by others' work activity while commuting are classified as Commuting deaths.

A traffic incident death is only classified as a Bystander fatality when attributable to someone else's work activity. Typically, this means the driver of a work vehicle is at fault. Cases where fault could not be determined with sufficient confidence were excluded.

Commuting fatality

The death of a person who dies as a result of injuries sustained while travelling to or from work, including those whose injury results from another's work activity.

Employed

The denominators used in calculating fatality rates in this report are based on ABS estimates of Employed persons, as defined in *Labour force, Australia* (ABS cat no 6202.0) http://www.abs.gov.au/AUSSTATS/abs@.nsf/Latestproducts/6202.0Glossary1Oct%202009?opendocument&tabname=Notes&prodno=6202.0&issue=Oct%202009&num=&view=. This population includes Employees, who work for an employer; self employed persons, whether they employ others or not; and those who work without pay for a family business or farm. It excludes persons whose only work is voluntary.

Employee

A person who works for a public or private employer and receives remuneration in wages, salary, a retainer fee from their employer while working on a commission basis, tips, piece-rates, or payment in kind; or a person who operates his or her own incorporated enterprise with or without hiring employees. (Source: ABS 2007)

Fatality rate

The number killed as a result of work-related injury expressed as a per-capita rate against the population at risk of work-related injury. In this report the rate is expressed as the number of deaths per 100 000 Employed persons: for brevity this is usually expressed as 'deaths per 100 000 workers'.

See Paragraph 5 of the Explanatory notes for further details.

Industry

A grouping of businesses which carry out similar economic activities. (Based on ANZSIC 1993, p. 2.)

Fatalities data provided to Safe Work Australia for 2007–08 was coded to the 1993 edition of ANZSIC, so all discussion of industry in this publication is based on that classification rather than the 2006 version.

Injury

A condition coded to 'External Causes of morbidity and mortality' and 'Injury, poisoning and certain other consequences of external causes' in the International Statistical Classification of Diseases and Related Health Problems, Tenth Revision, Australian Modification (ICD-10-AM).

Job

A 'job' is a set of tasks designed to be performed by one individual in return for a wage or salary. Of course, some people may work for themselves but are still regarded as having a job and belonging to the labour force (Source: ASCO, p. 5).

Location of incident

The location at which the fatal injury occurred. Where this is an identifiable workplace, the location is coded to the appropriate category of ANZSIC 1993. In many cases, however, injuries occur in public places and are coded as such. In previous issues of this series, this variable was known as 'Industry of workplace'.

Mechanism of injury

The action, exposure or event which was the direct cause of the most serious injury.

Occupation

A set of jobs with similar sets of tasks. An occupation in ASCO is a collection of jobs which are sufficiently similar in their main tasks to be grouped together for the purposes of the classification.

Because fatalities data provided to Safe Work Australia for 2007–08 was coded to the second edition of ASCO, all discussion of industry in this publication is based on that classification rather than on the more recent ANZSCO .

Road crash

See Traffic incident.

Traffic incident

A collision on a public road between any vehicle or self-propelled plant and anything else, including a pedestrian. In previous reports, traffic incidents were called 'public road crashes'.

Type of occurrence classification system (TOOCS)

A suite of four classifications developed by the National Occupational Health and Safety Commission, a predecessor of Safe Work Australia, comprising:

- the Nature of injury/disease classification
- the Bodily location of injury/disease classification
- the Mechanism of injury/disease classification
- the Agency of injury/disease classification.

Although the most current version is version 3.1, 2007–08 data was coded principally to version 2.1, with a few additional codes from later versions.

Working fatality

The death of a person who dies as a result of injuries sustained while at work, including those whose injury results from another's work activity.

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