



tractors



Rollover backwards

A middle-aged man was using a tractor on his land to pull a large dead shrub out of the ground. He placed a chain around the base of the shrub and attached the other end to a high point on the back of the tractor. He then tried to pull out the shrub, but it was too strong for the tractor, causing the tractor to flip back over on top of him, trapping him across the chest with the steering wheel. The tractor was not fitted with a ROPS or drawbar attachment.

One hundred and forty four persons (one every ten days) died in work-related incidents involving tractors between 1989 and 1992 in Australia.

One hundred and two of the fatally injured persons were employed. This was six percent (one in every 16) of all work-related deaths of workers during this period and represents a rate of 0.32 deaths per 100,000 persons per year. This rate was 42% lower than the rate found for the period from 1982 to 1984.

Of the forty-two remaining fatalities, 23 were of bystanders to someone else's work, 17 were of persons doing home duties and two were of volunteers.

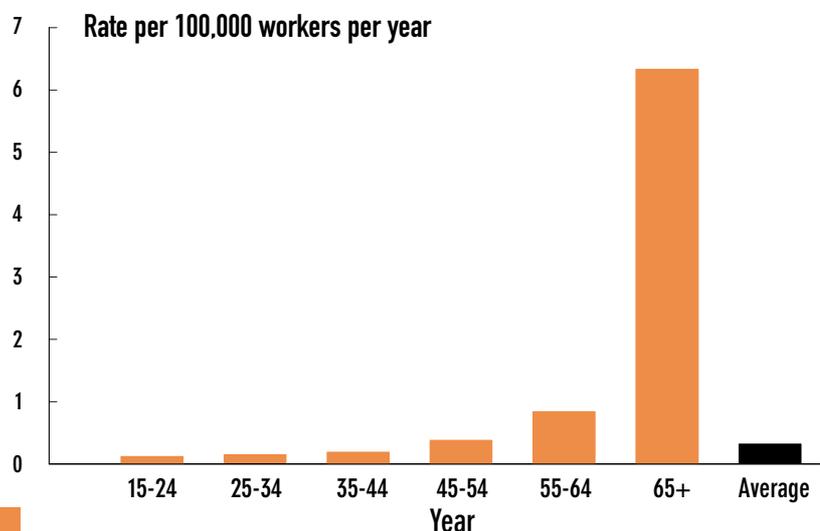
Age

People of all ages were killed in tractor-related incidents:

■ under 15 years	13%
■ 15-24	6%
■ 25-34	10%
■ 35-44	15%
■ 45-54	18%
■ 55-64	17%
■ 65 years or older	20%

However, for the 102 workers, the rate of death increased with age and was twenty times the national average for those over 64 years (Figure 1).

Figure 1 Age specific rates of tractor-related fatalities of working persons, Australia 1989 to 1992



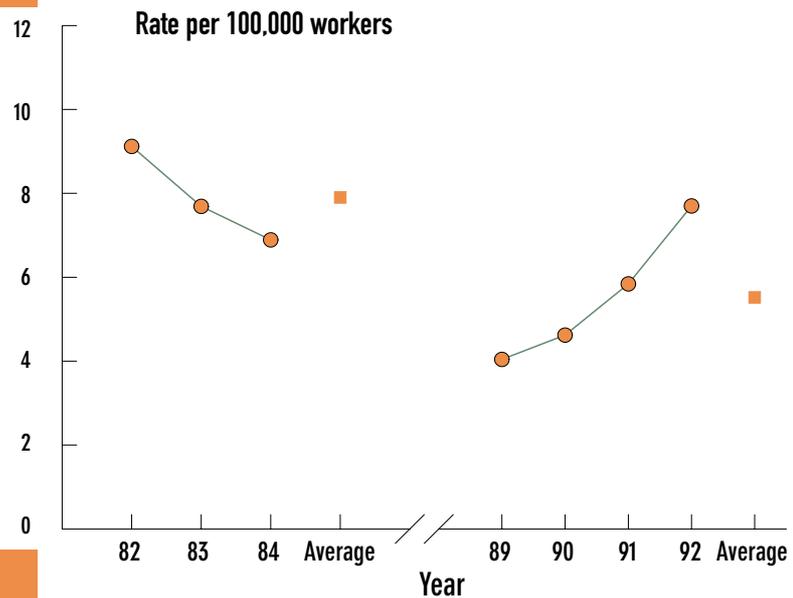
Fall from tractor

An elderly farmer, on his way to feed cattle, drove an old tractor with a carry-all attached to it out of the shed where it was housed. It appears that he stood on the side of the tractor to operate it, because he suffered from arthritis, which made it difficult for him to turn around and see behind if he was seated in the driver's seat. The farmer fell from the tractor and was run over by its rear wheels.

The farming industry

The tractor-related death rate in the farming industry was 5.5 deaths per 100,000 persons per year. This was a 30% fall compared to the period from 1982 to 1984. However, there was a steady yearly increase in the rate of tractor fatalities from 1989 to 1992. By 1992, it was approaching the rate it had been in 1982 (Figure 2).

Figure 2 Rate of tractor-related fatalities in the farming industry, Australia 1982 to 1984, 1989 to 1992



Occupation

The 102 workers were mainly:

■ farmers and farm managers	68%
■ farmhands	20%
■ mobile plant operators	5%
■ truck drivers	2%

Industry

The 102 workers were working mainly in:

■ agriculture	87%
■ construction	3%
■ recreation, personal and other services	3%
■ forestry and logging	2%
■ community services	2%

Type of incident

The most common types of incidents were:

■ rollover	41%
■ run over while on the ground	21%
■ fall (all but one fall were followed by a run over)	17%
■ hit by object	12%
■ caught in machinery	4%
■ vehicle collision	3%

Boarding moving tractor

An elderly farmer was using a tractor in a paddock. He got off the tractor to repair a wire fence, leaving the tractor on an incline. The tractor started to roll down the hill and the farmer tried to jump on, grabbing the steering wheel. He fell and was run over. It was not clear whether the farmer left the handbrake off or whether it failed.

Starting tractor from the ground

A farmhand put a solution to stop a leak into the radiator of his tractor. The tractor was fitted with an anti-start safety switch that required the clutch to be pressed before the motor would start. The farmhand needed to run the engine, so he started the tractor whilst standing on the ground, pushing the clutch with his hand to bypass the safety switch. The tractor was in gear and ran over the farmhand.

The main changes in incident type between the periods 1982 to 1984 and 1989 to 1992 for farm-related deaths involving tractors were that:

- the proportion of rollover, hit by an object and caught in machinery deaths decreased
- the proportion of fall and run over deaths increased

Location

The main locations of the incidents were:

- farm 79%
- public road 8%
- rural property (not a farm) 6%
- remote or undeveloped area 4%
- trade, industrial, commercial area 3%

The main locations of farm-related incidents were:

- paddock or field 63%
- in a shed 6%
- yard 5%
- roadway 5%
- near a shed 4%

General activity

The most common activities involving the tractors were:

- treating land or crops 25%
- transportation 24%
- pulling or towing objects 13%
- maintenance 12%
- hauling goods, rubbish or equipment 8%

Activity of the injured person

The activities of the injured persons were:

- operating the tractor 78%
- passengers on the tractor or attached equipment 9%
- bystanders other than passengers 7%
- co-workers of the tractor operators 6%

Agency

The most common agencies of injury were:

- tractor 77%
- tractor attachment 10%
- powered mechanism 4%
- tree branch 2%
- hay bale 2%

Pathophysiological cause of death

The most common causes of death were:

- head injury 28%
- multiple injuries 20%
- internal injury of chest, abdomen and pelvis 20%
- crush asphyxia 19%

Hit by "parked" tractor

A boy was operating a tractor with a hay baler attached. He apparently noticed that the stand on the baler was down and stopped, got off, lifted the stand, and then engaged the baler. The tractor was required to be in reverse gear to do this. It is suspected that he was standing between the front and rear wheels when he engaged reverse. It appears that the tractor jumped back suddenly, and the boy was run over by the front wheel. Because the throttle was open, the tractor did not stall. Although young, the boy was considered very experienced with machinery.

Child run over

A farmer was operating a tractor that was towing a spray vat. The farmer moved the tractor intermittently while a co-worker walked up and down rows of strawberries, spraying with a hand held gun. A one-year old girl came over to the tractor unobserved and stood beside it, between the front and rear wheels, and was run over by the rear wheel.

Contributing factors

The main factors that contributed to incidents, and the percentage of incidents with the factors, were:

■ work practices and procedures	70%
■ lack of safety equipment	65%
■ terrain	47%
■ equipment problems	21%
■ personal factors	15%
■ inexperience	13%
■ human error	8%

Features of the incidents

Common features of the fatal incidents involving tractors were:

Rollovers – 59 incidents

- the tractor rolled over sideways – often when travelling across steep and rough terrain
- the tractor rolled over rearwards – often when using the tractor to strain against some resisting object (such as a vehicle or tree stump) and attaching the rope or chain too high on the tractor
- a rollover protective structure was not used in 51 incidents
- there was no evidence of seatbelt use in any of the incidents

Run overs – 30 incidents

- trying to get on moving tractors or attached equipment
- starting a tractor while standing on the ground
- leaving the tractor "parked", usually with the motor running and the tractor either in gear or with the handbrake inadequately applied
- children run over while standing or playing near work activities

Falls – 25 incidents

- riding without proper seating on the tractor or attached equipment
- in all but one of the 25 incidents the person was subsequently run over
- there was no evidence of seatbelt use in any of the 25 incidents involving falls

Hit by a falling object – 11 incidents

- handling attachments or doing maintenance on a tractor or machinery
- working with hay bales
- hit by tree branches

Caught in machinery – 6 incidents

- trapped by poorly guarded machinery being powered by a tractor
- caught in posthole diggers when loose-fitting clothing got tangled in moving parts

Falling hay bale

A farmhand was using a tractor, fitted with bent tines, to unload large round bales of hay from a truck. The bales weighed about 500 kg and were being stacked inside a hay shed. It appears that, after placing a bale on top of a stack measuring about three metres high, he got off the tractor and stood at the base of the stack. A round bale of hay fell from the top row, striking him, after the bent tines had pulled the hay bale forwards when they were withdrawn. The coroner warned against the procedure of stacking round hay bales on top of each other, as well as the dangers involved in the use of improvised lifting equipment, as occurred in this case.

Children

19 children under 15 years were killed over the four years of the study:

- seventeen were not adequately supervised while work was being done by other persons, usually family members
- ten were run over after falling from a tractor or machinery that did not have adequate seating or restraints
- seven were allowed to be too near tractors or machinery associated with tractors
- two were relatively experienced farm workers

Elderly workers

29 workers 65 years or older were killed over the four years of the study. Most incidents could not be definitively linked to age. Probable age-related problems that were identified included:

- difficulty in applying the handbrake
- having to stand whilst operating the tractor due to arthritis
- difficulty managing the tractor and implements

Recommendations by Coroners

Coroners made recommendations regarding 10% of the incidents. The main areas covered by the recommendations were:

- equipment safety and design
- maintenance of machinery and equipment
- work practices and procedures
- training and development
- information and awareness



Caught in auger

A farmer was operating a tractor with a post hole digger, to dig post holes on a property. It appears that she bored a hole, struck some rock, and then attempted to bore a second hole. She dropped her glasses in the hole, raised the auger out of the hole and inserted her arm into the hole whilst the device was still rotating, in order to retrieve her glasses. Her clothes were then caught up in the auger.

Further information and inquiries:

Work-related deaths as a result of incidents involving tractors in Australia were studied as part of a larger study of all work-related traumatic deaths from 1989 to 1992. For further information regarding work-related deaths, refer to: NOHSC. *Work-related traumatic fatalities in Australia, 1989 to 1992*. NOHSC: Sydney, 1998.

Further information from this study regarding work-related fatalities involving tractors in Australia is also available. Refer to:

NOHSC. *Work-related fatalities involving tractors in Australia, 1989 to 1992*. NOHSC: Sydney, 2000.

Franklin R, Mitchell R, Driscoll T, Fragar L. *Farm-related fatalities in Australia, 1989-1992*. ACAHS, NOHSC & RIRDC: Moree, 2000.

Information is also available via the NOHSC web site:

<http://www.nohsc.gov.au>

or you can contact:

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