



CORONERS COURT OF QUEENSLAND

FINDINGS OF INVESTIGATION

CITATION: **Non-inquest findings into the death of DB**

TITLE OF COURT: Coroners Court

JURISDICTION: BRISBANE

DATE: 28 February 2023

FILE NO(s): 2022/5704

FINDINGS OF: Ainslie Kirkegaard, A/Coroner

CATCHWORDS: CORONERS: rural property death; tractor roll-over; crush injuries; early model/vintage tractors; roll over protective structure (ROPS); sloping terrain; excessive weight with inadequate ballast

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Background

DB was a 76 year old retired man who was found deceased at a rural property in Queensland on 14 November 2022. DB lived alone in a small cabin on a rural property. An elderly woman lived separately in a caravan on the property. The property is a collection of sheds, small bungalows and a few cultivated citrus trees which DB grew for his own consumption.

DB's death was reported to the coroner because he died from traumatic injuries.

Events leading to the discovery of the overturned tractor

At around 10:45am on Monday 14 November 2022, a birdwatcher phoned 000 to report an overturned tractor up a track off a well known bird watching corridor. A brown dog was sitting beside the tractor. Police attended the property soon afterwards and located a male person pinned face down underneath the tractor with the tractor pressing deeply into his back. His right leg was also pinned under the tractor. He was obviously deceased. The tractor was upended on a fairly steep dirt track leading up to a cabin and sheds.

Officers from the QPS Forensic Crash Unit attended the scene and commenced a forensic crash examination. It was thought the tractor, which had no roll cage, had lost traction, struck a large tree and tilted over.

The elderly woman who lived on the property told police she had last seen DB alive at around 2:00pm the previous day, Sunday 13 November 2022. He was driving the tractor at that time. She thought he might have been using it to clear a fallen tree which he had told her about.

Post mortem findings

Post mortem examination including CT scan revealed multiple injuries consistent with tractor rollover which the pathologist considered caused the death. Toxicological analysis detected no alcohol or other drugs in the blood and some alcohol in the urine (16mg/100mL).

Forensic crash investigation outcomes

The forensic crash investigator observed the tractor to be a post-WWII British-made machine, probably manufactured in the 1950s to 1960s and weighing about 2.5 tonne. The tractor appeared to be in good working order for a machine of that vintage, many of which despite their age and lack of modern engineering are still very effective and reliable machines. It was a two-wheel-drive tractor. The tractor had no roll over protective structure. The tractor had a bucket scoop attached to the rear three-point linkage, this being implement used to scoop a large load of soil from the ground about the quantity of two or three standard wheelbarrows.

All four tyres were found to be an acceptable operating pressure for a tractor and were in good condition. The rear tyres contained water as ballast which is correct for maximising traction and lowering centre of gravity. The front tyres contained only air and had no water ballast. The forensic crash investigator considered the front tyres should have contained 75% water as ballast to weigh down the front of the tractor and reduce the likelihood of the front tyres lifting off the ground. It was noted that some operators do not like to have front ballast because it makes older tractors without power steering difficult to turn. Turning input from the operator on older tractors generally requires a greater than usual physical effort and in certain applications is achieved through the use of split brakes (if they work) which can stop either the right rear or left rear tyre to turn the tractor. There was a storage box on the front of the tractor that had contained chains. The forensic crash investigator considered the front of the tractor should have had at least 100 to 200 kilograms of steel weights attached to increase the ballast at the front of the tractor.

The sheds on the property contained a large quantity of machinery and tools. There were service manuals and servicing notes which indicated DB conducted his own servicing and repairs of his equipment, including his tractors. Three tractors on the property, including the overturned tractor, all appeared to be in good operational condition. All indications were that DB was an accomplished handyman who was capable of performing a wide range of practical trade and agricultural activities.

The property where the death occurred is a 16.4-hectare bush block in hilly terrain. The front gate sits at 916 metres above sea level. The overturned tractor was about thirty metres along the driveway inside the property boundary, by which point the terrain rises to about 920 metres above sea level. A further 50 metres along the driveway there are water tanks and a shed, at which point the terrain rises to 925 metres above sea level. There were several sheds and dwellings located further up the driveway at 930 and 940 metres above sea level. The forensic crash investigator's assessment of the slope on the driveway was that the risk of rolling a tractor was high and that the property was generally not suitable for tractor usage.

Examination of the scene noted markings on the ground that clearly explained what had occurred. A long, dredged line of soil on the low side of the driveway indicated DB had used the tractor and bucket scoop to collect a load of soil. The tractor had then driven forward and commenced a left turn onto the driveway. The tractor failed to turn left at the required time. This was the result of the front being insufficiently weighted with ballast to keep the front wheels in contact with the ground meaning the front wheels levitated enough to reduce the effectiveness of steering input and the rear wheels pushed the tractor in a straight line. The tractor overshot the driveway. DB probably persevered with steering input, which on an older tractor can become the sole focus because of the physical effort required. By the time the tractor began to turn it had driven forward onto a slight embankment on the other side of the driveway. The tractor began to make a delayed turn to the left, by which time its roll-axis was across the slope of the embankment. The slope of the embankment measured approximately 18 degrees. The rear right tyre glanced a large stringy bark tree, leaving visible pieces of bark in the tyre tread which had rubbed against the tree trunk. This halted forward movement and further pushed the tractor into a precarious position directly side-on to the slope. From this position the tractor was unbalanced and rolled first onto its left side then upside down in one motion. DB rolled with the tractor and was crushed underneath it, having not left his seating position. He was pinned to the ground by the metal seat pushing into his lower back and a short solid steel projection from the rear working parts of the tractor pushing into his upper back. There was no evidence on the ground of any further movement by DB after the roll-over, as he was pinned to the ground by the full weight of the tractor. A pile of dirt on the driveway appeared to be the ejected contents of the bucket scoop and appeared consistent with ejection while rolling left. The tractor was still in gear because the rear wheels could not be turned. The forensic crash investigator considered the tractor was probably in a forward gear because bark from the stringy bark tree in the leading edge of the tyre tread indicated forward rotation on the embankment.

There was no evidence of mechanical failure.

Input from a local tractor mechanic who has operated and restored vintage tractors for at least fifty years, identified the tractor to be a Nuffield DM-4 manufactured in the early 1950s and confirmed that the front tyres should have contained water as ballast, that the tractor was not suitable for use on hilly terrain and that the absence of a roll over protective structure significantly increased the risk of death or serious injury to an operator.

The forensic crash investigation concluded that the tractor was not suitable for operation on unlevel terrain, the tractor was not correctly weighted with ballast and DB made an error in his operation of the tractor by attempting a turn that could not be executed safely on sloping

terrain with excessive weight at the rear. The forensic crash investigator believed DB would have survived the roll-over if the tractor had been fitted with an Australian Standard rollover protective structure which would have arrested the roll of the tractor on its left side.

Roll over protective structures for early model “vintage” tractors

A recent safety alert [Worker sustained fatal injuries from tractor rollover | WorkSafe.qld.gov.au](https://www.worksafe.qld.gov.au) highlights the roll over dangers associated with operating tractors on uneven ground, slight and steep slopes, edges of depressions, contour banks or water courses and identifies tractor operators are most at risk of injury in circumstances including when the tractor does not have roll over protective structures, the operator does not wear a fitted seatbelt, the operator is working on uneven terrain and the tractor is towing or pulling objects or loads.

The *Work Health and Safety Regulation 2011* requires that a roll over protective structure be fitted to a tractor. The [Safe Design and Operation of Tractors Code of Practice 2005 \(worksafe.qld.gov.au\)](https://www.worksafe.qld.gov.au) requires roll over protective structures to comply with specified standards and notes that approved roll over protective structures may be available for early model tractors, even as far back as 1945. If these are unavailable from a manufacturer, a roll over protective structure testing centre can supply an approved frame, or at least test a home designed frame.

Findings required by s.45

Identity of the deceased – [de-identified for publication purposes]

How he died –

DB died from multiple traumatic injuries sustained when he was crushed by the tractor he was operating to move a load of soil on his private property. The accident occurred because the early model tractor was not suitable for operation on unlevel terrain, the tractor was not correctly weighted with ballast and DB made an error by attempting a turn that could not be executed safely on sloping terrain with excessive weight at the rear. In making the turn, the tractor overshot the driveway onto an embankment, become unbalanced and rolled onto its side, pinning DB with its full weight. The early model tractor did not have a roll over protective structure which, had it been fitted, would have significantly reduced the risk of death or injury by arresting the tractor’s roll to the side. The circumstances in which DB died highlight the roll over dangers associated with operating tractors on sloping terrain when pulling loads while not correctly weighted with ballast and demonstrates the crucial importance of roll over protective structures in reducing the risk of death and serious injury in these situations. Approved roll over protective structures may be available for early model tractors like the one involved in this accident or alternatively a home designed frame can be tested at a roll over protective structure testing centre.

Place of death – [de-identified for publication purposes]

Date of death – 13/11/2022 - 14/11/2022

Cause of death -
1(a) Multiple injuries due to
1(b) Tractor rollover (driver)

I close the investigations.

Ainslie Kirkegaard
A/Coroner
CORONERS COURT OF QUEENSLAND

28 February 2023