



NSW STATE CORONER'S COURT

**JORDAN BRIDGE FILE NUMBER 3730/09
MAKEELY BRIDGE FILE NUMBER 3729/09
DAVID BRIDGE FILE NUMBER 0028/10
DAVID CAROLAN FILE NUMBER 3731/09**

Hearing dates: 15-17 NOVEMBER 2011
Date of findings: 17 NOVEMBER 2011
Location of Inquest: BATEMANS BAY LOCAL COURT
**Coroner: MAGISTRATE C. FORBES
DEPUTY STATE CORONER**

**Representation: MR S KELLY Advocate Assisting the Coroner.
MR C BARRY QC instructed by Slater and Gordon
Lawyers on behalf of Mrs Debbie Bridge.
MR C HEAZLEWOOD instructed by Carney's
Solicitors on behalf of Mr and Mrs Montgomery.
MS K SIM solicitor, Philip Sim & Associates on
behalf of the estate of Mr David Carolan.
MR A McINERNEY instructed by Sparke Helmore
Lawyers on behalf of Roads and Maritime Services.
MR A WOODS instructed by Aitken Partners Pty
Ltd on behalf of Cootes Transport Group.**

REASONS FOR FINDINGS

This is an Inquest into the very sad and tragic deaths of Jordan Bridge aged 13, Makeely Bridge aged 11, their father Mr David Bridge and Mr David Carolan. They all died in a collision on the Princes Highway at East Lynne, NSW on 28 December 2009 when the fuel tanker Mr Carolan was driving rolled over and collided with the vehicle the Bridge family was travelling in.

The purpose of an inquest is for a Coroner to establish for any deceased person their identity and the date, place, cause and manner of their death. The cause of death is the immediate physical cause and the manner refers to the surrounding circumstances of the death. If the evidence justifies it a Coroner may then go on to make recommendations about matters of public health and safety that arise out of the deaths in question.

In this case there is no issue as to the identity, date, place or cause of the deaths. The only issue is how the collision occurred and whether there are any recommendations that could be made that would prevent a similar incident in the future.

THE COLLISION

Shortly before 4.50pm on Monday 28th December 2009 Mr Carolan was driving a fuel tanker in a southerly direction along the Princes Highway at East Lynne approximately 25 kilometres north of Bateman's Bay. The tanker had a Prime Mover registration ION-000 and a tri-axle trailer that was laden with 38,000 litres of fuel for delivery to a service station at Cobargo only 20 minutes further along the highway.

Approximately 80 m south of the bridge at Middle Creek and approximately 200 m north of the intersection of Pebbly Beach Road the tanker rolled over sliding onto the northbound side of the road and colliding with 3 vehicles travelling in the opposite direction.

The first vehicle was a Toyota RAV 4 driven by Mr N.Fricke with his wife Beverley.

The next vehicle was a Honda sedan driven by Mr Robert Baillie and his wife Annette.

The third vehicle was a Subaru Forester driven by the Mr David Bridge. He was travelling with his wife, Deborah and their two daughters Jordan and Makeely Bridge.

Senior Constable Hamilton of the NSW Police Crash Investigation Unit based at the Southern Region Crash Unit undertook the police investigation. He has been a crash investigator for 5 years and in that capacity has done specialist training in collision principles and dynamics. Prior to joining the NSW Police Force, Senior Constable Hamilton had lengthy experience and training as a licenced motor vehicle technician. In that capacity gained detailed knowledge of vehicle components and technology.

He attended the scene at around 8.00pm on the evening of the collision and remained at the site until 10 or 11 am the next day recording all the available relevant forensic evidence. He subsequently undertook extensive investigations that included interviewing all relevant witnesses in order to prepare a reconstruction of the sequence of events of the collision based on the results of his investigations and his expertise and experience.

There has been some evidence given at this inquest that the tanker may have taken evasive action to avoid a car on the wrong side of the road causing it to roll or that the tanker fishtailed and jack-knifed before rolling. The forensic evidence that was obtained by Senior Constable Hamilton does not support this evidence nor do the witness who were in the best position to carefully observe the incident. In fact, Senior Constable Hamilton said that the markings on the road are "significant" indicators that the prime mover did not jack knife before rolling on to its side. He further states that the tyre marks show that the tyres were not locked and were still rotating and had traction on the road up unto the point of rolling. I am satisfied that the reconstruction of the collision Senior Constable Hamilton has proposed is the most likely way the collision occurred.

He informs this court that prior to the collision site there is a slight downhill gradient and right bend in the roadway then a straight section that approaches the bridge at Middle Creek. Upon crossing the Bridge the roadway commences an immediate left curve.

He says there were three eyewitnesses traveling behind the tanker that observed it entering the left curve and were in a good position to describe the speed the tanker was traveling and what happened as it began to rollover.

Mr Patterson was driving the first vehicle behind the tanker. He said he first saw the tanker near an overtaking lane 4-5 kms before the collision site. He thought he might overtake the tanker. He said he went into the overtaking lane but that the tanker was traveling at the same speed as he was, which was the speed limit of 100kph, so he pulled back in behind the tanker. He said he carried on behind the tanker for about 5-10 minutes and that he was about 4 or 5 car lengths behind the tanker traveling at about 100kph when he saw all of the passenger side wheels of the tanker lifting off the ground as they were on a sweeping bend curved to the left and that the tanker kept rolling and was not able to go with the bend of the road.

Ms Willard was also driving behind the tanker. She has given evidence that shortly after she left the town of Berry she noticed the tanker about 8-10 vehicles ahead of her. She thought that she would probably overtake the tanker but noticed that half an hour later the tanker was still ahead of her. She said that at one point her partner, Mr Campbell who was sitting next to her said "Oh my gosh, look how close the tanker is to the van in front of it". She said that she thought the tanker was tailgating the van. This was about 8-10 k before the collision. She said that further along the road her partner yelled, "stop the tankers rolling" and that she stopped and then heard bangs and then explosions.

Her partner, Mr Campbell, gave evidence that the first time he saw the tanker he saw that it was almost on the tail of a black van. He said to his Ms Willard "Look at that idiot". He said that later as the tanker commenced to negotiate a left hand bend he noticed the left rear wheels on the trailer start to lift off the roadway.

Senior Constable Hamilton says that once the trailer wheels lifted that the trailer then completely rolled onto its side while the prime mover remained in an upright position. The trailer impacted with the rear offside (drivers side) of the first vehicle driven in the opposite direction by Mr Fricke resulting in his Toyota rotating in a clockwise direction approximately 180 degrees where it was forced approximately 50 metres in a rearwards direction before coming to rest within the tree line upon the western side of the roadway.

The tanker then continued to travel in a southerly direction into the northbound lane with the trailer sliding on its offside.

The trailer then impacted with the second vehicle driven by Mr Baillie resulting in his vehicle rolling onto it's roof before coming to rest on the western side of the highway amongst the roadside vegetation. The estimated distance traveled by the Honda from the impact with the Tanker was approximately 11m.

The trailer continued to slide on it's side for approximately 18.6 m at which point the weight of the trailer pulled the prime mover over onto its drivers side.

The third vehicle, a Subaru, in which the Bridge family was travelling was then hit by the tanker resulting in it being forced off the roadway in a sideways direction forcing their car to roll a number of times before coming to rest with the nearside of the vehicle facing upwards. The estimated distance of travel of the Subaru after impacting with the fuel tanker trailer was approximately 35.3metres. During the impact with Mr Bridge's vehicle an amount of fuel sprayed from the tanker resulting in both the internal and external components of the Subaru and the surrounding area being contaminated. Tragically, the fuel ignited starting a massive explosion that resulted in a large fire that could not be contained for several hours. Mr Montgomery, Mrs Bridges brother in law was able to release David Bridge and Deborah Bridge from their vehicle that had caught alight. Tragically, Jordan and Makeely sustained critical injuries and died at the scene.

The Prime mover and trailer separated causing the Prime Mover to continue to roll over an unknown number of times ultimately coming to rest on it's wheels some 59.7 metres from the initial impact. The trailer continued to travel a further distance south coming to rest approximately 82.3 metres from the area of initial impact. Both the Prime Mover and trailer were engulfed in fire from the ignition of the fuel and Mr Carolan died at the scene.

Mr Bridge was airlifted to Royal North Shore Hospital and and Mrs Bridge was airlifted to Concord Hospital. Mr David Bridge died on the 3rd January 2010. Deborah Bridge miraculously survived and I am informed still requires daily medical assistance and treatment.

I should also indicate there was some evidence given by Mr and Mrs Cusick about a fuel tanker traveling towards them some point north of the collision site causing them to take evasive action. This observation may or may not have been of the tanker Mr Carolan was driving and I am of the view that it is not necessary for me to make a finding in relation to their evidence in order to determine the manner and cause of this collision.

WHY DID THE TANKER ROLL OVER?

The tanker had a Kenworth Prime Mover T404SAR Model manufactured by Kenworth Australia with a compliance plate of 05/2004. It had a tare weight of 8100kg and was fitted with a 6-cylinder diesel powered engine with a 15200cc capacity manual transmission and rear wheel drive capability. The trailer was designed by Marshall Lethlean which is based in Victoria. It had a compliance plate of 07/05 and was classed as a flammable goods vehicle with a tare weight of 6900 kg and was fitted with tri axles, Hendrickson intraax airbag suspension, and an anti lock braking system.

There were 5 separate compartments in which the tanker was carrying a total of 38,000 litres of fuel. Each compartment was separated by bulkheads and had baffles fitted to reduce liquid load surging. The total gross weight of the vehicle was 43,446 tonnes which was under the maximum allowable weight.

The Prime Mover had last been serviced on 13.11.09 at 927,220 km with the tyres and pressure maintenance completed on 12.12.09 all recording no outstanding defects.

The trailer was similarly serviced and checked recently prior to the collision with no outstanding defects.

Senior Constable Hamilton says that he could find no evidence of any defect with the tanker that caused it to roll.

Mr Carolan had left the Clyde Refinery at about 12.41pm that day for the United Service Station in Cobargo. He had been the holder of a drivers licence for 19 years. He had no significant entries on his traffic history and in fact had no traffic offences at all for the last 13 years. He was issued with a Heavy Vehicle drivers licence in 1997. He had no traffic or log book offences at all in his twelve years of truck driving. He was also the holder of a Dangerous Goods Drivers Licence.

He was employed by Cootes Transport and had completed the instruction course for Petroleum Bulk Haulage.

Senior Constable Hamilton says that there is nothing in Mr Carolan's history that would suggest he was not qualified and experienced to drive the tanker.

Senior Constable Hamilton noted that the conditions at the collision scene were warm and dry, it was dusk, the visibility was good and the wind was light. He observed that the road surface in both north and southbound lanes was sealed bitumen in a generally good condition being smooth and even. He found no evidence of any debris, fluids,

subsidence or surface deterioration that may have contributed to the collision. He says that an analysis of the history of collisions occurring within a 2 km radius of the site in the 10 years prior does not indicate that this is a stereotypical incident. He concludes there was nothing about the road or on the road that caused the truck to roll over.

His opinion is that the reason the truck rolled over was that the speed it was traveling was not compatible with the radius of the left curve it was negotiating. He estimated the minimum speed of the tanker at the time it commenced to roll was 98km per hour.

An independent report relating to the circumstances of the collision was obtained from a consultant engineer, Mr Grant Johnston. Mr Johnston has extensive engineering experience background and is often called upon to give his expertise in fatal collisions. He agrees with Senior Constable Hamilton that the primary factor in the rollover was the speed of the tanker for this stretch of road. His opinion is that the likely speed of the tanker was about 100km per hour for it to have rolled over on this curve.

The speed of about 100km per hour that has been determined by both of the experts as the speed the tanker would have rolled over on this curve, is consistent with the speed the eyewitness traveling behind the tanker prior to the collision observed. Their observations are reliable as they were traveling behind the tanker for a period of time at the same speed so in a good position to measure the tankers speed.

On the basis of the two experts evidence, the eye witness accounts of the speed I am satisfied that the tanker was traveling at about 100kph as it negotiated the left curve and that this caused it to roll.

WHAT CAN BE DONE TO PREVENT A SIMILIAR "ROLLOVER" IN THE FUTURE?

While the tanker was traveling well in excess of the advisory speed for the curve of 85kph it was not in excess of the posted maximum speed limit of 100kph. This scenario creates a difficult situation in that another tanker could drive through that curve at the posted speed limit and repeat this tragedy. Vehicles carrying dangerous goods are particularly lethal and as we have seen the outcome of a rollover can be catastrophic. It is therefore imperative that measures are put in place for the transport of Dangerous Goods that minimizes the risk of a repeat of this incident.

Three proposals have been suggested as measures that would minimize the risk of this incident occurring again either at the same site or in similar conditions elsewhere around Australia.

1. The appropriate posted speed on this particular curve be re-considered and analysed in light of this incident
2. Any available technology that would prevent such a rollover be made compulsory, and
3. Truck drivers carrying dangerous goods should be carefully educated about rollover propensities of their vehicles

In relation to the first proposal I note that the Roads and Maritime Services welcome a recommendation that the Princes Highway from Termeil to Batemans Bay be reviewed

in light of this collision. I note that the review would include considerations of appropriate speed limits and appropriate signage and whether advisory speed limits should be mandatory for heavy vehicles.

In relation to the second proposal I accept the evidence that electronic stability control equipment can significantly reduce rollovers. The technology measures wheel speed, lateral forces that act on a vehicle whilst cornering and the stability of the load to detect and automatically apply the brakes once the roll stability threshold is reached.

I note that electronic stability control is not a mandatory requirement in Australia. While it appears the heavy vehicle industry is rapidly embracing this technology and most new vehicles are being designed and fitted with it the average tanker trailer stays on the road for about twenty years so measures need to be taken in relation vehicles carrying dangerous goods that are currently on the road.

I note that the evidence that the estimated cost of retro fitting a vehicle with these systems would be approx \$ 5000.00. I am satisfied that this would be an economically viable proposition taking into account the average value of a prime mover is \$200,000 and the average value of a fuel tanker trailer is \$180,000. I note that the general manager of Cootes Transport has given evidence that all of their fleet will be retro fitted.

In relation to the final proposition I note that the stability systems cannot defy physics and prevent every rollover. It is important that the technology is used in conjunction with education and training of the drivers of Dangerous Goods. I am pleased that Mr Rannard the Senior Operations Officer of the Office of Environment and Heritage has informed this court that the appropriate education about rollovers and this particular incident could be included in the course drivers are required to pass before they are issued with Dangerous Goods Drivers Licences. I understand this is not currently the case.

CONCLUSION

Pursuant to S.81 Coroner's Act I find that:

- 1. Makeely Bridge died on 28 December 2009 on the Princes Highway at East Lynne, NSW the cause being consistent with burning she sustained in a motor vehicle collision**
- 2. Jordan Bridge died on 28 December 2009 on the Princes Highway at East Lynne, NSW the cause being consistent with burning she sustained in a motor vehicle collision**
- 3. David Bridge died on 3 January 2010 at the Royal North Shore Hospital, St Leonards, Sydney, NSW as a result of multi-organ failure with multiple injuries he sustained in a motor vehicle collision**
- 4. David Carolan died on 28 December 2009 on the Princes Highway at East Lynne, NSW from the consequences of heat exposure he sustained in a motor vehicle collision**

RECOMMENDATIONS

Pursuant to S.82 Coroner's Act I make the following recommendations arising out of the deaths and subsequent inquest;

1. To the Minister of Roads and Ports, NSW

I recommend that the Roads and Maritime Services undertake a review of the signage and speed limits for heavy vehicles for the Princes Highway between Termeil and Batemans Bay having regard to the circumstances of this collision. I recommend that the review include an investigation as to the feasibility of making advisory speed limits mandatory for heavy vehicles.

2. To the Federal Minister for Infrastructure and Transport

I recommend that an amendment be made to the Australian Dangerous Goods Code to make it mandatory that any vehicle used for the transportation of Dangerous Goods be fitted with a stability control system.

3. To the Minister of Transport & Environment, NSW

I recommend that an amendment be made to the Dangerous Goods (Road & Rail Transport) Regulation NSW 2009 to make it mandatory that all vehicles used in the transport of dangerous goods be fitted with a stability control system.

4. To the Minister of Environment & Heritage, NSW

I recommend that the 'relevant authority' responsible for the certification of persons who are authorised to transport dangerous goods include in the certification process a training component on the causes of rollover incidents.

5. To the Chairman of the Australian Trucking Association

I recommend that a training and education package be developed for the benefit of members of your association incorporating the facts and findings from this Inquest and addressing the causes and prevention of heavy vehicle rollovers.


Magistrate C Forbes,

Deputy State Coroner

21 October 2011