



**Office of Transport Safety Investigations**

## **BUS SAFETY INVESTIGATION REPORT**

**FATAL BUS ACCIDENT - JUBO TRAVEL  
JAMBEROO MOUNTAIN ROAD**

**5 SEPTEMBER 2005**



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JAMBEROO MOUNTAIN ROAD

5 SEPTEMBER 2005

**OTSI File Ref: 04190**

**25 August 2006**

**Office of Transport Safety Investigations**

**Level 17, 201 Elizabeth Street**

**Sydney NSW 2000**

The Office of Transport Safety Investigations (OTSI) is an independent NSW agency whose purpose is to improve transport safety through the investigation of accidents and incidents in the rail, bus and ferry industries.

Established on 1 January 2004 by the *Transport Administration Act 1988*, the Office is responsible for determining the causes and contributing factors of accidents and to make recommendations for the implementation of remedial safety action to prevent recurrence.

OTSI investigations are conducted under powers conferred by the *Rail Safety Act 2002* and the *Passenger Transport Act 1990*. OTSI investigators normally seek to obtain information cooperatively when conducting an accident investigation. However, where it is necessary to do so, OTSI investigators may exercise statutory powers to interview persons, enter premises and examine and retain physical and documentary evidence. Where OTSI investigators exercise their powers of compulsion, information so obtained cannot be used by other agencies in any subsequent civil or criminal action against those persons providing information.

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OTSI's investigative responsibilities do not extend to overseeing the implementation of recommendations it makes in its investigation reports. OTSI monitors the extent to which its recommendations have been accepted and acted upon through consultation with the relevant Transport Safety Regulator.

Information about OTSI is available on its website or from its offices at:

Level 17, 201 Elizabeth Street  
Sydney NSW 2000  
Tel: (02) 9322 9200

PO Box A2616  
Sydney South NSW 1235

The Office of Transport Safety Investigations also provides a Confidential Safety Information Reporting facility for rail, bus and ferry industry employees. The CSIRS reporting telephone number is 1800 180 828.

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## Glossary of Terms and Abbreviations

<b>ABS</b>	Anti-Lock Braking System
<b>ADRs</b>	Australian Design Rules
<b>Bus Operator</b>	A bus company accredited by the NSW Ministry of Transport
<b>CCTV</b>	Closed Circuit Television
<b>CIU</b>	NSW Police Crash Investigation Unit
<b>DOTARS</b>	Australian Commonwealth Department of Transport and Regional Services
<b>ICAM</b>	Incident Cause Analysis Method
<b>MoT</b>	NSW Ministry of Transport
<b>OTSI</b>	The Office of Transport Safety Investigations
<b>RTA</b>	NSW Roads and Traffic Authority

## EXECUTIVE SUMMARY

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### The Accident

At approximately 2:10pm on 5 September 2005, the Driver of a 24 seat mini-bus, operated by Jubo Travel, lost control of his vehicle when its brakes overheated while descending a steep and winding section of the Jamberoo Mountain Road in the Illawarra Region of NSW. The bus, which was towing a trailer, hit a section of Armco guard railing and scraped along it for approximately 20 metres before toppling onto its left side and then travelled a further 20 metres before hitting a second section of Armco. It subsequently crushed the second portion of railing, slid over it and rolled onto its roof, finally coming to rest against a small tree. In the process, two passengers were fatally injured and 15 persons sustained injuries that subsequently required them to be hospitalised. One of these persons died two days later.

### Findings

In relation to those matters prescribed by the Terms of Reference as the principal lines of inquiry, OTSI finds as follows:

- a. **Causation.** The accident occurred when the bus's brakes failed, preventing the Driver from safely negotiating a corner on a steeply descending road. The brakes overheated as a result of the Driver's inappropriate selection of gears and poor braking technique for the section of road he was travelling.
- b. **Contributory Factors**
  - i. Although the Driver had held a Chinese driving license for 19 years and had operated heavy vehicles before moving to Australia, he had only resided in Australia since April 2005 and had only obtained his NSW bus license on 29 July 2005, i.e., his bus driving experience in Australia was limited to five weeks.

- ii. The Driver was required by Jubo Travel to operate over a route which was sign-posted as being unsuitable for coaches, and with which he was largely unfamiliar.

c. ***Emergency Response***

- i. Response agencies handled a situation involving fatalities, multiple serious injuries and difficult terrain exceptionally well and were well supported by the Kiama Council and local community.

d. ***Other Safety Matters***

- i. The bus was being driven with a defective air brake pressure alarm system.
- ii. The bus was registered by the RTA but did not meet its pre-registration requirements.
- iii. Prior to registration, the RTA received certification from a consulting Engineer which stated that the bus conformed to the requisite Australian Design Rules. The Engineer subsequently became concerned that he may have misinterpreted some of the rules and sought clarification from the RTA in relation to a number of matters. In the light of that clarification, the Engineer determined that the bus did not comply with *Australian Design Rules 59 and 68*. These rules required that the bus be shown to have met rollover strength parameters, and it had not, and that all occupants be provided with a three point or 'lap-sash' seat belt, and they were not.
- iv. The consulting Engineer produced documentation indicating that he subsequently wrote to Jubo Travel on two occasions advising that the bus, and a like one owned by Jubo Travel also certified on the same day, did not fully comply with the pre-registration standards and should not be operated. The Engineer also advised that, in the absence of a response, he later telephoned



Jubo Travel's Sydney office and conveyed the same advice. Jubo Travel insists it has no knowledge of such communication.

- v. Several months later, the Engineer observed one of the two Jubo buses he had incorrectly certified in operation. This prompted him to write to two different managers in the RTA, on 4 March 2005 and 11 April 2005 respectively, expressing his concerns over the continued operation of these buses. The Engineer included copies of the letters he had forwarded to Jubo Travel in this correspondence, but the RTA did not act on his advice.
- vi. Jubo Travel is one of four companies operating under the name of Jubo. The extent of interdependency between these companies is such that it is probable that any limitations in the operation of Jubo Travel will also be apparent in the other companies.
- vii. There are allegations within the tour bus industry in NSW that the arrangements under which second-hand buses are imported into Australia and subsequently certified, licensed and operated for commercial purposes are being circumvented by some operators.

## Recommendations

To prevent recurrence of this type of bus accident, it is recommended that the specified responsible entity undertake the remedial safety action described below:

### a. **Kiama Council**

- i. Undertake a safety audit of the Jamberoo Mountain Road to determine whether the road should be prohibited for use by passenger buses and other heavy vehicles; to ensure the adequacy of the signage in place and to examine the feasibility

of establishing one or more emergency 'run-offs' along the steeply descending and winding sections of the road.

**b. NSW Ministry of Transport (MoT)**

- i. As a matter of urgency, subject the four companies trading under the name of Jubo to a full compliance audit to determine their suitability to remain accredited operators.
- ii. Review whether the driver has the necessary competency to hold a bus driver's Public Passenger Vehicle Driver's Authority.

**c. NSW Roads and Traffic Authority (RTA)**

- i. Review its handling of the advice provided by the consulting Engineer.
- ii. Review its registration inspection procedures and the application of those procedures.
- iii. Assist Kiama Council, if requested, to conduct a safety audit of Jamberoo Mountain Road.

**d. Jubo Travel**

- i. Modify this model of bus and resubmit it/them to the RTA for inspection, or formally advise the RTA that it is no longer operating buses of this model.
- ii. Thoroughly review its approach to the identification and management of safety risk, with particular emphasis on its approach to route selection; route and vehicle familiarisation for drivers; competency testing and the identification and rectification of defects.

## PART 1 INTRODUCTION

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### Notification and Response

- 1.1 At 3:00pm on 5 September 2005, the Office of Transport Safety Investigations' (OTSI) Duty Officer was notified by telephone from the RTA's Traffic Management Centre (TMC) of a bus accident on Jamberoo Mountain Road in the Illawarra Region of NSW. The accident had occurred at approximately 2:10pm but there was little information available about the consequences of the accident at the time of the report to OTSI.
- 1.2 Based on the information provided by the TMC and media reports, the Chief Investigator directed the initiation of a preliminary investigation.
- 1.3 As a result of the primary evidence collected by OTSI's Investigating Officers at the incident site, the Chief Investigator initiated a Bus Safety Investigation in accordance with s46BA of the *Passenger Transport Act 1990*.
- 1.4 On 12 September 2005, the Chief Investigator notified all Directly Involved Parties (DIPs) that OTSI was investigating the accident and requested that an officer be nominated in each organisation to act as the point of contact for all inquiries made by the appointed OTSI Investigator in Charge. The Terms of Reference for the Investigation were provided to the DIPs with this notification.

### Terms of Reference

- 1.5 The Chief Investigator established the following Terms of Reference to determine why the accident had occurred and what to do to prevent recurrence:
  - a. Identify the factors, both primary and contributory, which caused the accident.

- b. Make safety recommendations, the implementation of which by the responsible parties would minimise the potential for a recurrence of this type of accident.
- c. Assess the adequacy of the emergency response and management and the level of safety and protection offered to all involved.
- d. Advise on any matters arising from the investigation that would enhance the safety of bus and coach operations.

### **Interim Factual Statement**

- 1.6 An Interim Factual Statement notifying OTSI's investigation and describing the incident in terms of what had happened was published on the OTSI website on 29 September 2005.

### **Methodology**

- 1.7 OTSI utilises the ICAM (Incident Cause Analysis Method) approach in the conduct of its investigations and applies the Reason Model of Active Failures and Latent Conditions to its analysis of causative and contributory factors.
- 1.8 The underlying feature of the methodology is the Just Culture principle with its focus on safety outcomes rather than the attribution of blame or liability.

### **Consultation**

- 1.9 On 3 August 2006, a copy of the investigation Draft Report was forwarded to NSW MoT, NSW RTA, Jubo Travel and the Independent Transport Safety and Reliability Regulator (ITSRR). The purpose was to provide all DIPs with the opportunity to contribute to the compilation of this Final Report by verifying the factual information, scrutinising the analysis, findings and recommendations, and providing any commentary that would enhance the structure, substance, integrity and

resilience of the Investigation Report. DIPs were requested to submit their comments by 18 August 2006. Submissions were received from NSW MoT, NSW RTA and ITSRR.

- 1.10 The Chief Investigator considered all representations made by DIPs and where appropriate, reflected their advice in this Final Report. On 24 August 2006, the Chief Investigator informed DIPs which matters from their submissions had been incorporated in this Final Report and where any proposal was excluded, the reasons for doing so.

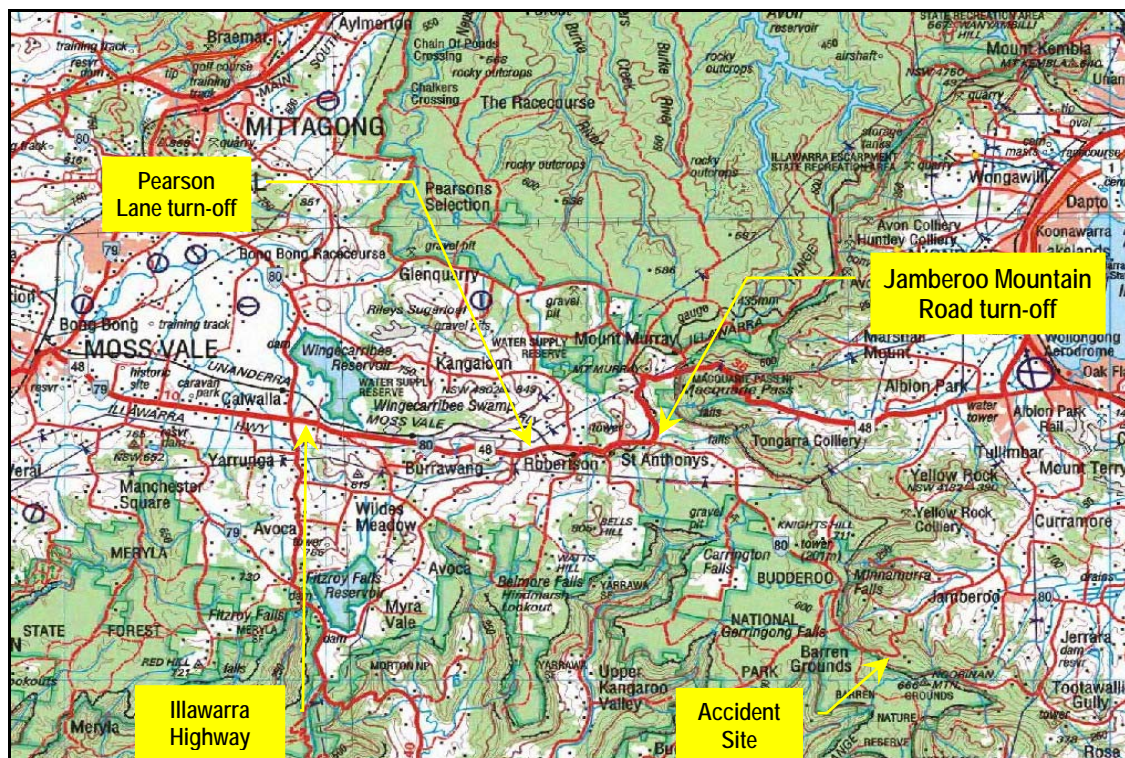
### **Investigation Report**

- 1.11 This report describes the circumstances of the accident on Jamberoo Mountain Road on 5 September 2005 and explains why it occurred. The recommendations that are made are designed to contribute to the maintenance of safe bus operations and to minimise the potential for a recurrence of this type of accident.

## PART 2 FACTUAL INFORMATION

### Before the Accident

2.1 At approximately 8:00am on 5 September 2005, a group of 21 Taiwanese tourists and a tour guide departed Canberra, where they had stayed over-night, enroute to the Nan Tien Buddhist Temple near Wollongong. The group was travelling in a 24 seat bus, towing a trailer, operated by Jubo Travel. The bus was crewed by a Driver and Co-driver. Having passed through Goulburn and Moss Vale, the bus turned off the Hume Highway onto the Illawarra Highway, as shown in *Figure 1*. Approximately 3kms from Robertson, the bus turned in an Easterly direction and travelled along Pearson Lane before stopping at the 'Farmgate Lavender Farm' for lunch, at approximately 11:30am. At approximately 1:30pm, the bus resumed its journey and passed through Robertson before turning onto Jamberoo Mountain Road.

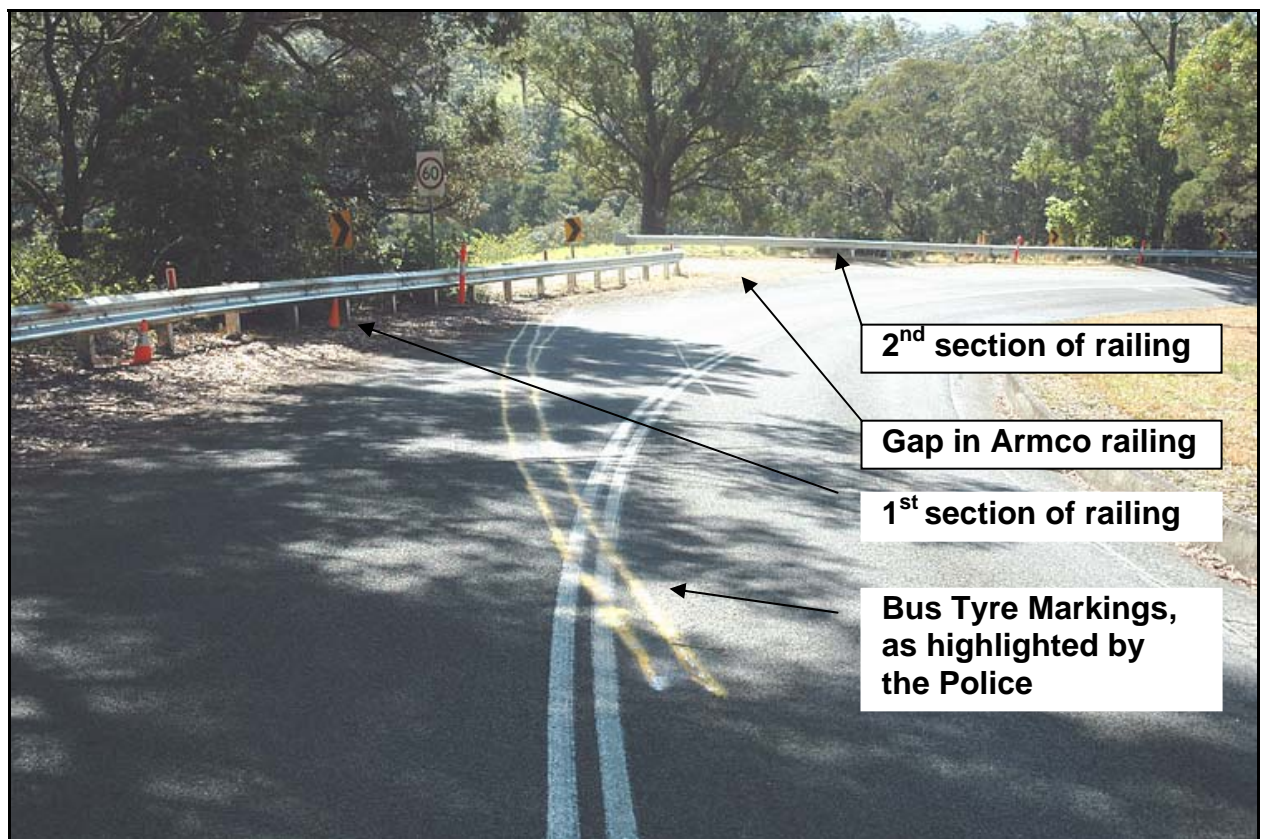


**Figure 1: Map section depicting the route taken by the bus on the day of the accident**



## The Accident

- 2.2 The Driver lost control of the bus as he approached a sharp right-hand bend at the end of a 7km section of steeply descending and winding road. The bus collided with a section of Armco guard railing and remained in contact with the railing for approximately 20m before rolling onto its left side and impacting with a second section of railing. It subsequently crushed the second portion of railing, slid over it and rolled onto its roof, coming to rest against a small tree. The immediate area of the accident is depicted in *Photograph 1*.



**Photograph 1: Immediate area of the accident**

- 2.3 Local residents heard the accident and phoned 000 to alert the local country fire brigade and emergency services. The first emergency response vehicle, an ambulance, arrived at the scene 15 minutes later. Over a short period of time, representatives from the Ambulance, Police, Fire and State Emergency Services also arrived, along with a

fleet of five rescue helicopters and 14 ambulances. Two passengers were found to be deceased at the scene and 15 persons were evacuated to hospitals, with seven of these being airlifted to Sydney. One of the 15 died as a result of her injuries two days later. Rescue and recovery operations continued throughout the night with the bus eventually being lifted by crane onto a low-loader before being transported to an RTA holding compound at Unanderra.

## **The Operator**

2.4 Jubo Travel is one of four Sydney-based travel companies trading under the name Jubo. The four companies, Jubo Buses, Jubo Coaches, Jubo Tours and Jubo Travel are individually accredited with the NSW Ministry of Transport, with Jubo Travel being accredited in August 2001 and being due for reaccreditation in April 2006. The four companies, which share vehicles, staff and premises, are collectively permitted to operate up to 35 buses on long distance charter tours. The companies are currently operating 22 buses and employ four administrative staff and 25 drivers, some of whom are employed part-time.

## **The Driver and Co-driver**

2.5 The Driver of the bus was a 44 year old Chinese national who has resided in Australia since April 2005. He had been issued with his NSW MR Class<sup>1</sup> driver's licence, with a condition B<sup>2</sup>, by the RTA, on 21 June 2005. He had previously held a Chinese driving license for 19 years and that license had entitled him to operate heavy vehicles. The driver had been employed by Jubo Coaches since 1 April 2005. He was transferred to Jubo Travel after securing his Public Vehicle Authority number from the MoT on 29 July 2005 and commenced his bus driving duties on 1 August 2005. The Driver had driven on

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<sup>1</sup> Medium Rigid, small, non-articulated vehicles over 4 tonnes. Includes rigid vehicles with two axles and a gross vehicle mass of more than 8 tonnes. Any towed trailer must not weigh more than 9 tonnes GVM. Also includes vehicles in class 'LR'.

<sup>2</sup> Condition 'B' restricts a driver to the operation of vehicles having an automatic or a synchromesh gearbox.



Jamberoo Mountain Road on only one previous occasion, and that was in a motor car.

- 2.6 The Co-driver, who is the brother of the Driver, arrived in Australia in June 2000 and was employed by Jubo Coaches as a depot manager and accompanied drivers periodically to observe their performance. He had held a NSW MR Class driver's licence since 21 August 2000.
- 2.7 The driver of the bus was charged by NSW Police with a number of driving offences. These matters are the subject of continuing court action and are outside the scope of OTSI's Just Culture jurisdiction.

### **Bus and Trailer Information**

- 2.8 The bus was a 1988 model Hino Rainbow and had been imported into Australia in 2004. The bus was fitted with seating for 24 passengers, a six cylinder diesel engine and a six (forward) speed manual gear box. The four wheel drum brakes were hydraulic air-assisted and were supplemented by an exhaust brake. This brake, operated by a small lever on the driver's left-hand side of the steering column, is intended to slow rather than stop the bus and is typical of such systems on medium-sized vehicles. A floor-mounted ratchet type handbrake was also fitted to the bus, which acted on a driveshaft mounted drum.
- 2.9 The box trailer had a tare and gross weight of 280kg and 750kg respectively. The trailer did not require, and was not fitted with, brakes.

### **Road Conditions**

- 2.10 Jamberoo Mountain Road is classified as a 'regional' road which means that the control and maintenance of the road is vested in a Council, in this case Kiama Council, rather than the RTA. The driver of the bus passed signs, approximately 100m before the intersection of the Illawarra Highway and Jamberoo Mountain Road, on both the Highway and the Road, warning that Jamberoo Mountain Road was not

suitable for caravans, trucks and coaches, as shown in *Photographs 2* and 3. Although the signage on Jamberoo Mountain Road was partially obscured by foliage, the signage on the Highway was not.

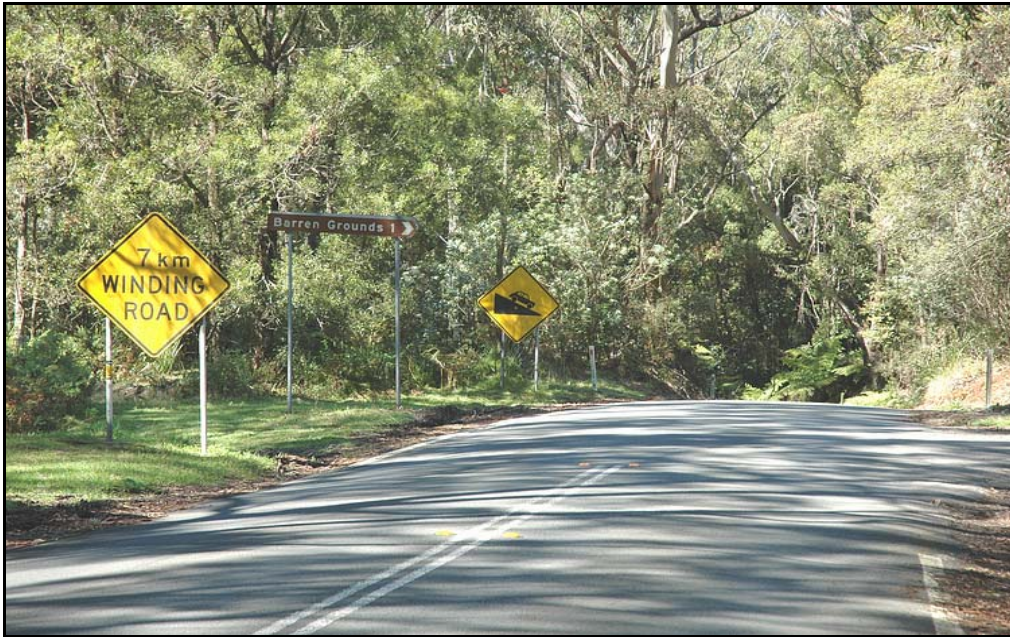


**Photograph 2: Signage on the Illawarra Highway, approximately 100m before its intersection with Jamberoo Mountain Road**



**Photograph 3: Signage on Jamberoo Mountain Road, approximately 100m after having turned onto the road from the Illawarra Highway.**

*Photograph 4* depicts road signage further along Jamberoo Mountain Road, approximately 8.5km from the accident site.



**Photograph 4: The “7km Winding Road” sign, including the sign depicting the steep grade ahead.**

Further down the grade, there are other signs indicating difficult driving conditions and speed restrictions, as depicted in *Photograph 5*.



**Photograph 5: Jamberoo Mountain Road location approximately 800m before the accident site.**

## **Environmental Conditions**

- 2.11 The road was wet at the time of the accident, with 10mm of rain having fallen the previous day and a further 1mm falling earlier on the day of the accident. The sun was at an elevation of approximately 37° and was setting in the North-West at the time of the accident.



## PART 3 ANALYSIS

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### Causation

#### *Speed*

- 3.1 OTSI was unable to interview either the Driver of the bus or any of the passengers at the scene of the accident. Subsequently, the Driver refused to be interviewed by OTSI and those passengers who were not hospitalised had left Australia within a matter of days after the collision. Access to those hospitalised was restricted because of the severity of their injuries. However, NSW Police subsequently provided OTSI with an overview of the statements made to the Police, both by passengers and by a number of drivers who had followed or passed the bus while it travelled down Jamberoo Mountain Road. OTSI was also provided with a download of the bus's tachograph and was present when key mechanical functions were tested.
- 3.2 The passengers had varying recollections of the accident. Some of them were sleeping and were only awoken when the bus hit the Armco railing. The common elements in the statements of the passengers were that the vehicle appeared to be travelling too fast; that there was the smell of overheated brakes and/or tyres and that the Driver appeared to be wrestling with the steering wheel and grinding the gears. A number of passengers reported that they heard the Driver shouting to the Co-driver that the brakes had failed and that they saw the Co-driver apply the hand brake. Following drivers reported smelling the bus's brakes and/or tyres and seeing indications from the bus rear brake lights that were consistent with rapid and frequent brake applications.
- 3.3 The data obtained from the tachograph allowed a Chart Analysis to be conducted by an independent expert and the Police Crash Investigation Unit. The analysis showed that:

- 930m prior to the accident, the vehicle reduced speed from 37km/h to 18 km/h over a distance of approximately 60m, which based on a relatively constant descent, indicates a brake application.
- 870m prior to the accident, the vehicle further decelerated for a distance of 70m, before increasing speed.
- 800m prior to the accident, the bus reached a speed of 34km/h.
- 720m prior to the point of first impact, the vehicle decelerated, consistent with a further application of the brakes.
- 630m prior to the point of impact, the bus's speed was 25km/h.
- 430m from the point of impact, the bus had reached a speed of 45km/h but then there was a slight deceleration. This is consistent with witness accounts of the hand brake being applied and the Driver shouting to the Co-driver advising him that the brakes had failed.
- 320m from the point of impact the bus was travelling at 43km/h and subsequently built up to 55km/h.
- At the point of impact, the tachograph 'spiked' at 95km/h which might be explained by the force of the impact and a loss of wheel contact with the road.

3.4 Approximately 800m before the point of impact, there was a road sign advising "Trucks Use Low Gear", as previously indicated in *Photograph 5*. There were a number of other signs between this point and that of the accident indicating speed restrictions of 20km/h. Several days after the accident, OTSI observed buses and trucks travelling on this section and it was apparent from their engine noise that they were being driven in a low gear and with the benefit of exhaust brakes. However, as revealed by the tachograph, the bus was operated at speeds well in excess of 20km/h without the benefit of the exhaust brake and was found to be in 4<sup>th</sup> gear when examined immediately after the accident.

### ***Load***

- 3.5 The bus had a tare weight of 6420kg and a maximum permitted gross weight of 8700 kg. The bus had 16 female and eight male occupants whose average weight was estimated to be 47kg and 60kg respectively.<sup>3</sup> On this basis, the gross weight of the bus would have been in the order of 7700kg which, even allowing for stowed and hand luggage, was below the permitted maximum weight.

### ***Mechanical Function***

- 3.6 The Police Vehicle Examination Unit and OTSI examined the bus. Notwithstanding the damage from the accident, it was apparent that the bus had been in generally sound mechanical condition. Having established that the condition of the tyres had not contributed to the cause of the accident, considerable attention was paid to the braking system. OTSI noted that the handbrake had been applied but that the exhaust brake had not.
- 3.7 The primary braking system was dependent on a regulated flow of air to act on the hydraulic master cylinder, which distributes hydraulic pressure to each wheel cylinder. The air is stored under pressure in a reservoir which is supplied by an engine-driven compressor. A single gauge on the dash panel indicates the air available at the reservoir and the air pressure being applied to the system. The air gauge scale indicates a range of zero to 15, with each increment representing 100Kg/cm<sup>2</sup> of air pressure.
- 3.8 OTSI and Police investigators utilised a standard procedure to test the efficiency and integrity of the air supply the bus's brakes. It took approximately three minutes and twenty seconds to fully pressurise the reservoir to approximately 700kPa<sup>4</sup>. It subsequently took 37 depressions of the brake pedal to deplete the reservoir to the point at

<sup>3</sup> Body weights based on data in "Bodyspace: Anthropometry, Ergonomics and the Design of the Work", 2nd Edition by Stephen Pheasant

<sup>4</sup> 1kg/cm<sup>2</sup> = 1kPa

which the needle on the pressure gauge on the dashboard entered into the red zone. Even then, there was approximately 450kPa of pressure left in the reservoir. OTSI also noted that Police investigators at the incident site tested the brake pedal whilst the bus was in situ. They depressed the pedal a significant number of times before the needle reached the red zone. On this basis, OTSI was satisfied that the air supply to the braking system was functioning on the day of the accident.

- 3.9 The operation of automotive brakes is dependent upon friction and the conversion of kinetic energy into heat energy in the process. Disc brakes, which are commonly fitted to modern passenger cars, dissipate generated heat efficiently; however, they require a high degree of force to operate. Drum brakes dissipate heat less efficiently but their stopping power and compact design make them more suitable for heavy vehicle applications. An examination of other elements of the bus's brake components established that the brake linings were within the required specifications. However, there was evidence of discolouration of the outer brake drum and brake dust residue at the bottom of the drum as shown in *Photographs 6 and 7*.



**Photograph 6: Glazed brake shoe**



**Photograph 7: Discoloured outer brake drum**



- 3.10 The discolouration is consistent with the brake operating at higher than normal temperatures, induced by frequent and rapid applications of the brake at speed. Furthermore, there was evidence of severe glazing on the transmission park brake hub, indicating that it had been used as a dynamic, rather than a static or 'park', brake.
- 3.11 This evidence of overheating, in concert with the information provided by the passengers and other witnesses, and the information obtained from the chart analysis, led OTSI to conclude that bus's brakes 'faded'. Brake fade occurs when the co-efficient of friction between the brake linings and friction surfaces, in this case the brake shoes and drums, becomes greatly reduced due to overheating. As the bus's brakes overheated, due to their frequent and rapid application, the Driver may not have felt any significant loss of brake pedal pressure. Typically, drivers 'pump' the brakes under such circumstances which exacerbates the overheating.

## **Contributory Factors**

### ***Fatigue and Impairment***

- 3.12 There was nothing to suggest from an examination of the Driver's rosters that fatigue was an issue and the driver returned a negative result when breath tested for the presence of alcohol by the Police.
- 3.13 In the absence of fatigue, impairment, mechanical defects and, considering the manner in which the bus was operated, OTSI had cause to question the competence of the driver and his suitability to hold a bus driver's Public Passenger Vehicle Driver's Authority.

### ***Operator's Management of Risk***

- 3.14 Jubo Travel provided documentary evidence which indicated that its acquisition of the bus was conditional upon the bus passing the registration process and that it had delayed payment for the bus until

that process had been completed. OTSI noted that following the accident, Jubo Travel suspended the operation of its like bus.

- 3.15 Since 1 July 2005, Jubo, like all accredited bus operators in NSW, has been required by the MoT to have a Safety Management System (SMS). However, the MoT did not release specific guidance as to what should be contained in an SMS until November 2005. An SMS should provide an integrated framework for the identification and management of safety-related risk. Given the recency of MoT's requirement for bus operators to have an SMS, OTSI did not examine Jubo Travel's SMS. However, well before this requirement, bus operators had, and continue to have, a duty of care to their employees and their passengers. OTSI had cause to question the extent to which Jubo Travel discharged this duty, given the Company's decision to operate over a route that was identified as being unsuitable for medium and heavy vehicles and, especially so, with a driver who had only had his NSW commercial bus license for five weeks and whose single exposure to the route had been in a motor car.



Photograph 8: Pieces of the broken light bulb.



Photograph 9: Back of circuit board

- 3.16 During its examination of the bus, OTSI noted that the warning light and audible alarm on the dashboard, intended to alert a driver to low brake air pressure, was not functioning. *Photographs 8 and 9* depict what was revealed on closer inspection, that the light bulb for the

warning light was found to be inoperable and the circuit board within which it was located showed signs of discolouration and burnt circuitry.

3.17 Documentation revealed that this defect had been identified in Victoria by a coach repairer in 2004. Given that there was no record of the defect being rectified, OTSI could only conclude that this matter was not revealed during the certification and inspection processes that were required before the bus was first registered in NSW. This defect was not significant in the context of this accident as there was no indication that low brake pressure was at issue. However, the fact that Jubo Travel failed to detect this fault, or allowed the bus to operate with such an important safety device disabled, is indicative of poor defect identification.

3.18 Jubo Travel advised OTSI that following the accident, it suspended its use of the like bus and that when this bus's registration expired, it did not seek to re-register the bus.

## **Emergency Response**

3.19 An ambulance arrived from Kiama at the scene approximately 15 minutes after the accident. The ambulance officers immediately commenced to attend to those who were seriously injured. The Ambulance radio room located in Wollongong was responding to a number of emergency calls in relation to this matter and omitted to notify the Police of the emergency until 14 minutes later. Fortuitously, there were a number of rescue helicopters available in the area, including Rescue 25<sup>5</sup> that had only been introduced into service in the region in the preceding week. These helicopters were redirected from an exercise to the scene and a fixed-wing aircraft and medical crew were also deployed from Sydney and placed on standby at Albion Park aerodrome.

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<sup>5</sup> Rescue 25 was a response helicopter operating on behalf of the Ambulance Service.

- 3.20 Quite apart from the numbers injured, the location of the accident presented the response agencies with communication difficulties. These were largely overcome by the deployment of a radio repeater vehicle by the Ambulance Manager Southern Operations Centre, Southern Division to higher ground between the accident site and Albion Park. This allowed communications from the accident scene, via the repeater vehicle, to a base station at Shell Harbour.
- 3.21 The bus came to rest upside down and was prevented from rolling down steep sloping terrain by a small tree. There was concern at the scene that some occupants might have been trapped beneath the bus. Consequently, the requirement to right the bus had to be balanced by this possibility, together with the prospect that others, who might have been thrown clear of the bus, might be endangered if the bus toppled during the recovery operation. This prospect was eliminated by a search of the area before the bus was righted. Traffic control in the area was assisted greatly by Kiama Council who quickly arranged to have traffic blocked-off in both directions to prevent congestion in the area of the rescue operation. A local business, Jamberoo Mountain Lodge, made its premises available to the response agencies and was utilised as a command post.
- 3.22 OTSI reviewed post-activity reports/briefs compiled by the Police, Ambulance Service and the State Emergency Services and talked with a number of experienced response personnel, who attended the accident, from these agencies. With the benefit of hindsight, it is generally not difficult to identify many matters that might have gone more smoothly, particularly when a large number of agencies are involved and there are mass casualties. In this instance however, the weight of reflection was overwhelmingly positive. Given the seriousness of the injuries, OTSI concluded that the number of fatalities might have been considerably higher had it not been for the level of resources made available; the professionalism of, and high level of

cooperation between, all of the agencies involved and the valuable support rendered by the local community and Council.

## Other Matters

### ***Importation of Second-Hand Buses***

3.23 The importation of buses is governed by Commonwealth legislation. Within NSW, the RTA requires that buses that are being registered for the purpose of commercial operation meet Australian Design Rules (ADR). The bus involved in the accident, a Hino Rainbow, was imported into Western Australia from Japan in 2004. At the time of importation, it was fitted with lap-only seat belts which were attached to the seats. The bus was subsequently relocated to Victoria, where it could be registered according to standards that were applicable at its time of manufacture, 1988. As such, the bus was not required to meet *Australian Design Rule 68*.<sup>6</sup> When it failed to meet Victoria's registration requirements due to a number of non-compliances, including mechanical defects and having Japanese-fitted seat belts that didn't meet 1988 Australian requirements, the seat belts were removed. The removal of the seat belts was a requirement specified by VicRoads.<sup>7</sup> Having removed the seatbelts, and being aware of the purchaser's intention to operate the bus for commercial purposes, the importer decided to register the bus in NSW rather than re-submitting it for registration in Victoria. However, in NSW, to register the bus for commercial operations, its date of manufacture was considered to be the date of its importation, 2004, which meant that the bus was subject to *ADR 68* requirements. *ADR 68, section 5.4.2*, required, and still requires, that front-facing seats must be fitted with 'Lap-Sash'-design seat belts with emergency locking retractors. The existing seats and their anchorages would have been incapable of meeting the strength

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<sup>6</sup> *ADR 68* specifies a range of requirements, including the design of vehicle bodies, seats and seatbelts, intended to protect drivers and passengers. Buses manufactured prior to 1989 may be imported into Australia without the need to be comply with *ADR 68*.

<sup>7</sup> Although Victoria did not require the bus to be fitted with seatbelts, it did require the any seatbelt that was fitted be of a type approved for use in Australia.

requirements specified in *ADR 68* once an approved seat belt had been fitted. To have met the requirements of *ADR 68* would have therefore necessitated not only the fitment of new seat belts, but also replacement seats and reinforced anchorages. Nevertheless, the bus was presented for commercial registration in NSW without seat belts and with its original seats.

### ***NSW Bus Certification Processes***

- 3.24 The RTA relies on consulting engineers that it has accredited to confirm that an imported bus meets the related ADRs. Once that confirmation has been provided, the bus must then pass inspection at an authorised vehicle inspection station. In this instance, the bus was certified by an engineer, recognised by the RTA, in 2004. The Engineer certified the bus involved in this accident as meeting the RTA's requirements, including ADRs, on 24 October 2004. He subsequently became concerned that he erred in his interpretation of the ADRs and wrote to the RTA on 23 November 2004 to seek clarification on a number of matters. The RTA responded on 26 November 2004.
- 3.25 In light of the clarification provided by the RTA, the Engineer states that he wrote to Jubo Travel, on 6 December 2004, advising of his error and indicating that this bus, and a like one owned by Jubo and inspected at the same time, did not fully meet the required standards and should not be operated. The Engineer also advised OTSI that in the absence of a response he wrote to Jubo again, on 22 December 2004, reiterating his advice. A copy of both pieces of correspondence was provided to OTSI. Again, there was no response. He further advised that he then telephoned Jubo Travel's Sydney office and verbally communicated the same advice. Jubo Travel insists that it has no knowledge of such communication.

- 3.26 In early 2005, the Engineer observed one of the two Jubo buses he had incorrectly certified in operation. This prompted him to write to two different managers in the RTA, on 4 March 2005 and 11 April 2005 respectively, expressing his concerns over the continued operation of these buses. The Engineer included copies of the letters he had forwarded to Jubo in this correspondence and also advised the RTA that he was no longer interested in continuing to certify imported vehicles. OTSI could find no record of the RTA acting on the concerns expressed by the Engineer.
- 3.27 Throughout the process of reviewing the rules and processes governing the importation and licensing of imported second-hand buses, OTSI was provided with a considerable amount of anecdotal evidence to suggest that buses may have been imported into Australia prior to 2000 and deliberately represented as older than they were in order to avoid the need for them to conform to particular ADR requirements.
- 3.28 OTSI was also advised that some operators have deliberately re-registered their buses in another State and notionally shifted their trading address to that same State, while continuing to function within NSW, in order to avoid meeting RTA requirements. Further, it is alleged that some operators have effectively entered into a short term rental arrangement for only as long as it has taken the MoT to satisfy itself that they had proper garaging arrangements, as required for accreditation, but had then reverted to parking their buses in other operators' garages or on the streets. OTSI was unable to establish the veracity of these claims but considers them sufficiently serious as to warrant a separate investigation. Accordingly, these matters have been incorporated as lines of inquiry in OTSI's ongoing systemic investigation into the importation of foreign buses.

## Remedial Actions

3.29 *Kiama Council.* OTSI noted that Kiama Council had upgraded road-markings, signposting and installed guard-rails at a variety of locations along Jamberoo Mountain Road in 1998. Following the accident, there was further improvement to signage. Representatives of the Council and the RTA met on 6 June 2006 and discussed the possible imposition of load and length limits on sections of the Road. Kiama Council has advised OTSI that it is awaiting advice from the RTA as to whether Council has the authority to impose such limits.

3.30 *RTA.* The RTA had advised OTSI that:

- a. On 6 October 2005, it inspected all Jubo buses and identified one bus, the like bus referred to in paragraph 3.25, as not fully conforming to the RTA's requirements in respect of imported buses being operated for commercial purposes. It issued Jubo with a major defect notice which prohibited the use of the bus. It also issued a similar notice on three other like buses operated by another Sydney-based company.
- b. In October 2005, it issued *Compliance and Enforcement Notice 44 – Inspection Requirements for Buses – Australian Design Rule (ADR) Compliance* to all of its vehicle inspectors to clarify its requirements in respect of bus inspections.
- c. In November 2005, it wrote to all engineering signatories to remind them of the requirements for certifying imported buses and requested copies of all certificates they had issued in respect of imported buses in the period 2000-2005, and subsequently reviewed those certificates.<sup>8</sup>

3.31 *MoT.* MoT conducted a full compliance audit of Jubo Travel on 13 September 2005. As a result of deficiencies identified during the audit, primarily related to record-keeping, Jubo Travel was issued with a

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<sup>8</sup> The RTA assured OTSI on 21 August 2006 that all "in all cases the certificates had been correctly issued".



warning notice on 29 September 2005 which required it to rectify these deficiencies. MoT has advised OTSI that it intends to follow up this audit “within the next few months” and that the other companies trading under the name of Jubo will also be audited within the same time period.

## PART 4 FINDINGS

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- 4.1 In relation to those matters prescribed by the Terms of Reference as the principal lines of inquiry, OTSI finds as follows:
- a. **Causation.** The accident occurred when the bus's brakes failed, preventing the driver from safely negotiating a corner on a steeply descending road. The brakes overheated as a result of the Driver's inappropriate selection of gears and poor braking technique for the section of road he was travelling.
  - b. **Contributory Factors**
    - i. Although the Driver had held a Chinese driving license for 19 years and had operated heavy vehicles before moving to Australia, he had only resided in Australia since April 2005 and had only obtained his NSW bus license on 29 July 2005, i.e., his bus driving experience in Australia was limited to five weeks.
    - ii. The Driver was required by Jubo Travel to operate over a route which was sign-posted as being unsuitable for coaches, and with which he was largely unfamiliar.
  - c. **Emergency Response.** Response agencies handled a situation involving fatalities, multiple serious injuries and difficult terrain exceptionally well and were well supported by Kiama Council and the local community.
  - d. **Other Safety Matters**
    - i. The bus was being driven with a defective air brake pressure alarm system.
    - ii. The bus was registered by the RTA but did not meet its pre-registration requirements.

- iii. Prior to registration, the RTA received certification from a consulting Engineer which stated that the bus conformed to the requisite Australian Design Rules. The Engineer subsequently became concerned that he may have misinterpreted some of the rules and sought clarification from the RTA in relation to a number of matters. In the light of that clarification, the Engineer determined that the bus did not comply with *Australian Design Rules 59 and 68*. These rules required that the bus be shown to have met rollover strength parameters, and it had not, and that all occupants be provided with a three point or 'lap-sash' seat belt, and they were not.
- iv. The consulting Engineer produced documentation indicating that he subsequently wrote to Jubo Travel on two occasions advising that the bus, and a like one owned by Jubo Travel which was also certified on the same day, did not fully comply with the pre-registration standards and should not be operated. The Engineer also advised that, in the absence of a response, he later telephoned Jubo Travel's Sydney office and conveyed the same advice. Jubo Travel insists it has no knowledge of such communication.
- v. Several months later, the Engineer observed one of the two Jubo buses he had incorrectly certified in operation. This prompted him to write to two different managers in the RTA, on 4 March 2005 and 11 April 2005 respectively, expressing his concerns over the continued operation of these buses. The Engineer included copies of the letters he had forwarded to Jubo Travel in this correspondence, but the RTA did not act on his advice.
- vi. Jubo Travel is one of four companies operating under the name of Jubo. The extent of interdependency between these companies is such that it is probable that any limitations in the operation of Jubo Travel will also be apparent in the other companies.

- vii. There are allegations within the tour bus industry in NSW that the arrangements under which second-hand buses are imported into Australia and subsequently certified, licensed and operated for commercial purposes are being circumvented by some operators.

## PART 5 RECOMMENDATIONS

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5.1 To prevent recurrence of this type of bus accident, it is recommended that the specified responsible entity undertake the remedial safety action described below:

a. **Kiama Council**

- i. Undertake a safety audit of the Jamberoo Mountain Road to determine whether the road should be prohibited for use by passenger buses and other heavy vehicles; to ensure the adequacy of the signage in place and to examine the feasibility of establishing one or more emergency 'run-offs' along the steeply descending and winding sections of the road.

b. **NSW Ministry of Transport (MoT)**

- i. As a matter of urgency, subject the four companies trading under the name of Jubo to a full compliance audit to determine their suitability to remain accredited operators.
- ii. Review whether the driver has the necessary competency to hold a bus driver's Public Passenger Vehicle Driver's Authority.

c. **NSW Roads and Traffic Authority (RTA)**

- i. Review its handling of the advice provided by the consulting Engineer.
- ii. Review its registration inspection procedures and the application of those procedures.
- iii. Assist Kiama Council, if requested, to conduct a safety audit of Jamberoo Mountain Road.

d. **Jubo Travel**

- i. Modify this model of bus and resubmit it/them to the RTA for inspection, or formally advise the RTA that it is no longer operating buses of this model.
- ii. Thoroughly review its approach to the identification and management of safety risk, with particular emphasis on its approach to route selection; route and vehicle familiarisation for drivers; competency testing and the identification and rectification of defects.