



Report 01-201

commercial jet boat

Huka Jet 3

rock strike and uncontrolled departure from river

Lake Aratiatia, Waikato River, Taupo

25 January 2001

Abstract

On Thursday 25 January 2001 at about 0945, the commercial jet boat *Huka Jet 3*, with a driver and 10 passengers on board, was proceeding at about 60 km/h into the area known as the “Second Tunnel” on Lake Aratiatia on the Waikato River near Taupo, when the extreme right rear of the boat struck a rock on the riverbank. The impact slewed the boat to the right and despite the driver’s efforts to regain control, the boat climbed the riverbank and came to rest among the trees within the tunnel area. Four of the passengers were severely injured and 4 others received minor injuries.

Safety issues identified included the suitability of the Second Tunnel as an area of operation for commercial jet boats.



Huka Jet 3 after the accident

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Abbreviations

km/h	kilometres per hour
LPG	liquefied petroleum gas
m	metre(s)
mm	millimetre(s)
MSA	Maritime Safety Authority
UTC	universal time (co-ordinated)

Glossary

aft	rear of a vessel
class	category in classification register

Data Summary

Boat Particulars:

Name:	<i>Huka Jet 3</i>
Type:	commercial jet boat
Class:	passenger (under 6 m)
Limits:	Lake Aratiatia, Waikato River between Huka Falls and Aratiatia Dam
Allowable occupants:	driver plus 12 passengers (at driver's discretion)
Length:	5.2 m
Construction:	aluminium monohull with aluminium topsides
Built:	by Shotover Jet Limited at Queenstown in 1989
Propulsion:	a single Chevrolet 496 LPG engine driving a series 212 Hamilton jet unit
Normal operating speed:	up to 80 km/h
Operator:	Huka Jet Limited
Parent company:	Shotover Jet Limited

Location: Lake Aratiatia, Waikato River, Taupo

Date and time: Thursday 25 January 2001 at about 0945¹

Persons on board:
crew: 1
passengers: 10

Injuries:
crew: nil
passengers: 4 serious
4 minor

Nature of damage: substantial to hull at left front and right rear
driver's seat displaced and first passenger seat distorted

Investigator-in-charge: Captain John Mockett

¹ All times in this report are New Zealand Daylight Time (UTC + 13 hours) and are expressed in the 24-hour mode.

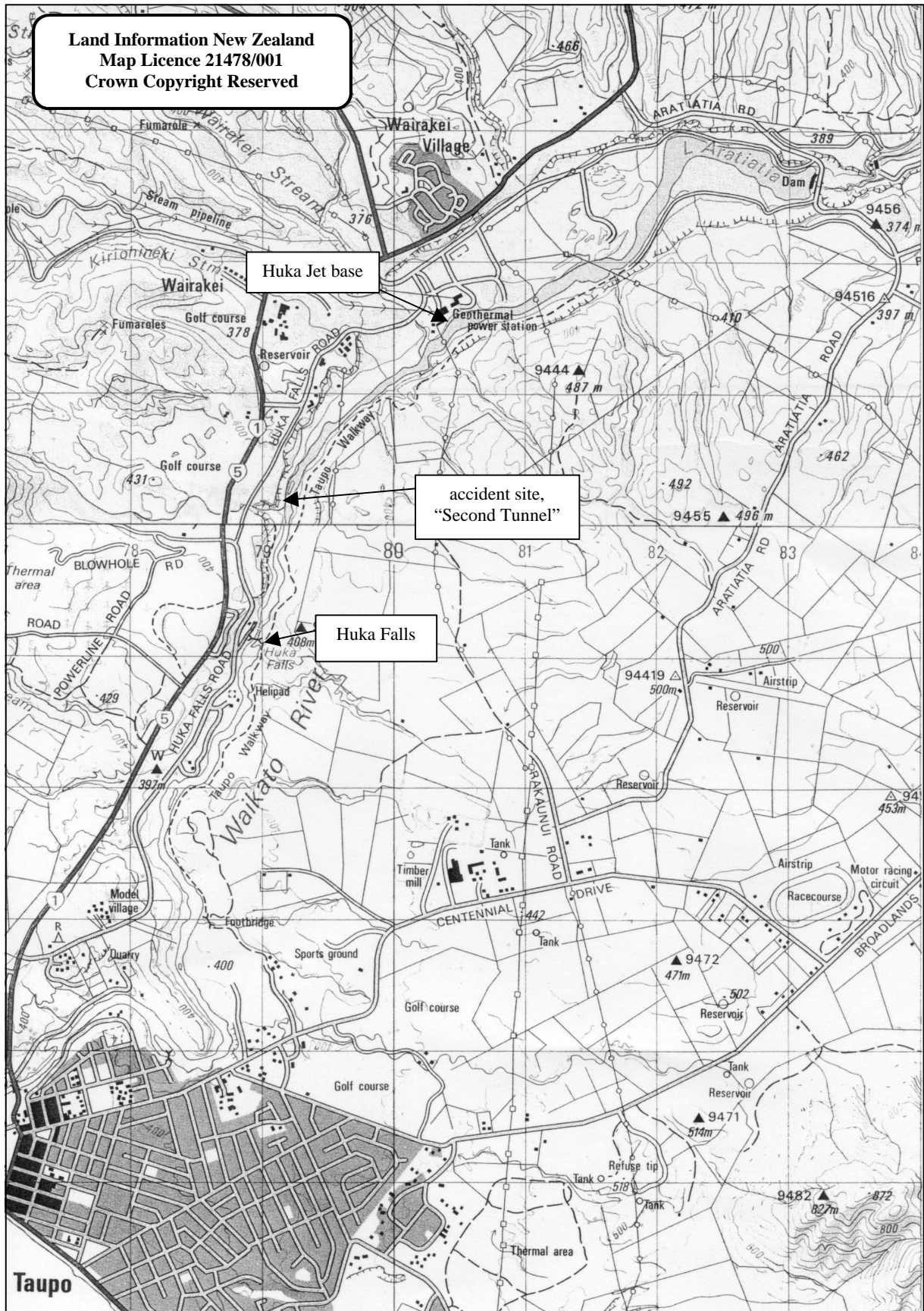


Figure 1
Location map showing key points

1. Factual Information

1.1 History of the trip

- 1.1.1 On Thursday 25 January 2001 at about 0800 the boat drivers and mechanic commenced the daily checks on the jet boats at the Huka Jet Limited (Huka Jet) base on the Waikato River near Taupo. Once the workshop checks were completed *Huka Jet 3* and *Huka Jet 4* were launched and run on the river. One driver took *Huka Jet 4* up river and another took *Huka Jet 3* down river to do the daily river check, looking at water levels and making sure there were no obstructions in the river.
- 1.1.2 By about 0900 both boats had returned to the jetty and were refuelled ready for the day's operation. At this time a tour party had arrived at the base to make the first trip of the day. The party was split into groups of suitable size for the boats.
- 1.1.3 The first group of 10 passengers was allocated to *Huka Jet 3* and fitted with life-jackets and spray jackets. The driver of *Huka Jet 3* settled his passengers into the boat and pulled away from the jetty and gave a safety briefing. Most of the passengers were Korean and did not speak English, but one who could was asked by the driver to interpret for the others.
- 1.1.4 The driver explained the nature of the trip and the safety features of the boat. He told the passengers that they must remain seated, hold on to the handrails, keep themselves wholly inside the boat and watch for his hand signal to indicate that he was about to perform a spin². He was satisfied that all the passengers had understood the briefing.
- 1.1.5 The driver took *Huka Jet 3* a short distance upstream from the jetty and performed a spin. He checked that his passengers were comfortable before proceeding downstream and performing another spin off the jetty where a souvenir photograph was taken before the driver continued on the trip.
- 1.1.6 The trip, which normally took about 30 minutes, consisted of a run downstream to Aratiatia Dam then back upstream to Huka Falls before returning to the base (see Figure 1). The drivers performed spins at various locations and also stopped at points of interest to give the passengers a commentary.
- 1.1.7 The trip in *Huka Jet 3* down to the dam, back past the jetty and up as far as Huka Falls was made normally and without incident.
- 1.1.8 *Huka Jet 3* arrived at Huka Falls at about 0930. The driver stopped his boat at the edge of the white water and gave his passengers the usual commentary for that area. He spent some time taking photographs of the group with their cameras.
- 1.1.9 Before setting off downstream at about 0940, the driver called on his radio to let the base staff and the driver of the other boat know that *Huka Jet 3* was leaving the Huka Falls area.
- 1.1.10 The driver took *Huka Jet 3* downstream, accelerating up to about 80 km/h. As he approached the area known as the "Second Tunnel", a passage between the riverbank and a wooded island, he checked markers on the riverbank that he used to gauge the water level. Judging that the water level was adequate to transit the Second Tunnel, he slowed down to about 60 km/h and lined *Huka Jet 3* up for the entrance.
- 1.1.11 Before committing himself to making the transit through the tunnel he looked ahead for a large rock, known as Flat Rock, that was within the turn of the tunnel area. The rock was submerged, indicating to him that there was adequate water for the transit.

² A spectacular manoeuvre, unique to jet boats, where the boat is turned at high speed, almost within its own length. Commercial jet boat drivers use the manoeuvre to enhance the degree of excitement of a trip.

- 1.1.12 When approaching the entrance of the tunnel, the boat was travelling across the river flow and being set downstream with the current. The driver had initially headed towards the right-hand side of the entrance to counter the set.
- 1.1.13 The driver committed himself to transiting the tunnel and approached the entrance, increasing speed to make the relatively tight turn through the area (see Figure 2).

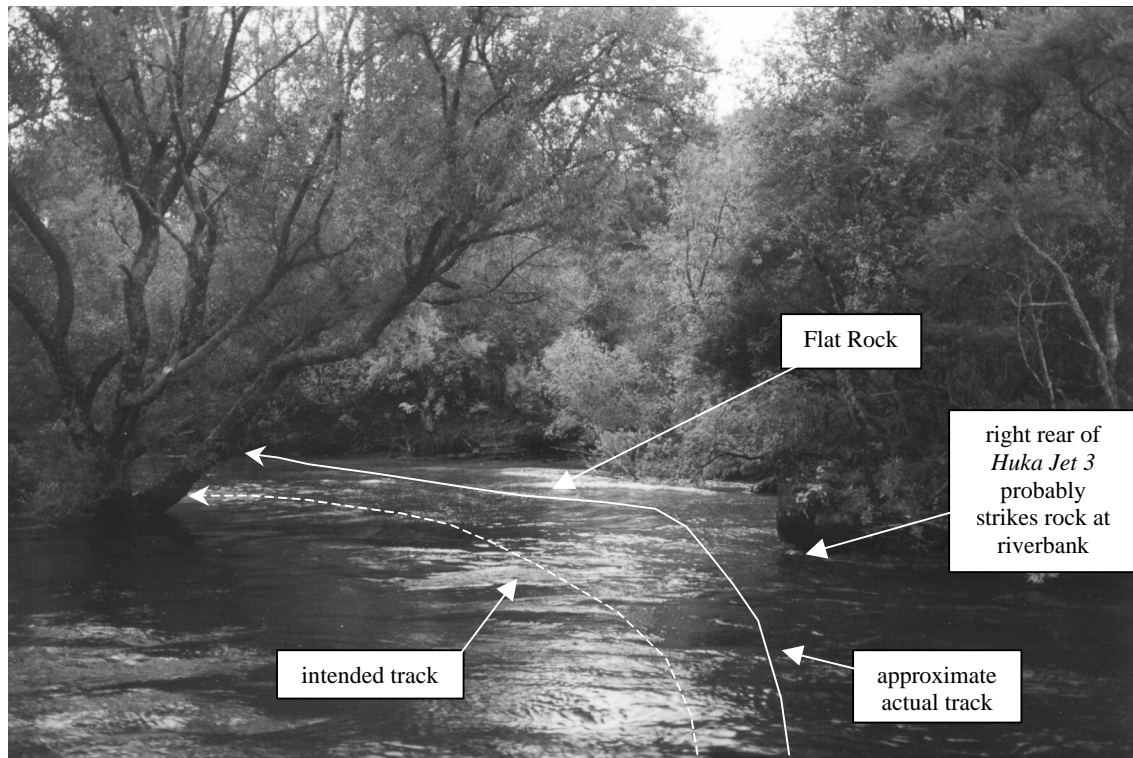


Figure 2
View of entrance to Second Tunnel

- 1.1.14 As *Huka Jet 3* entered the tunnel, the driver heard a bang, which he later described as being at the back of the boat and sounding like “steel hitting rock”.
- 1.1.15 The boat slewed out of control and tracked further than normal to the right-hand side of the tunnel. The driver tried to steer the boat out of the tunnel but he was unable to regain control before the boat hit the riverbank. The boat climbed the bank and came to rest among the trees about 2 m in from the water’s edge (see Figure 3). The driver later recalled that he had tried to close the reverse bucket before the boat hit the bank.
- 1.1.16 The driver immediately tried to assess the condition of the passengers and initially thought that only 5 were injured. He called the base on his radio and reported that he had a Code 2³ incident and was in the Second Tunnel.
- 1.1.17 Having made his call for assistance the driver, who was not injured himself, turned his attention back to his passengers and using the first aid kit gave what assistance he could.
- 1.1.18 At the base the Code 2 call was recorded as being received at 0945. The person receiving the call immediately informed the manager, who called the driver of *Huka Jet 3* to confirm the location of the boat and that passengers were injured.

³ Minor injury accident, requiring ambulance only.

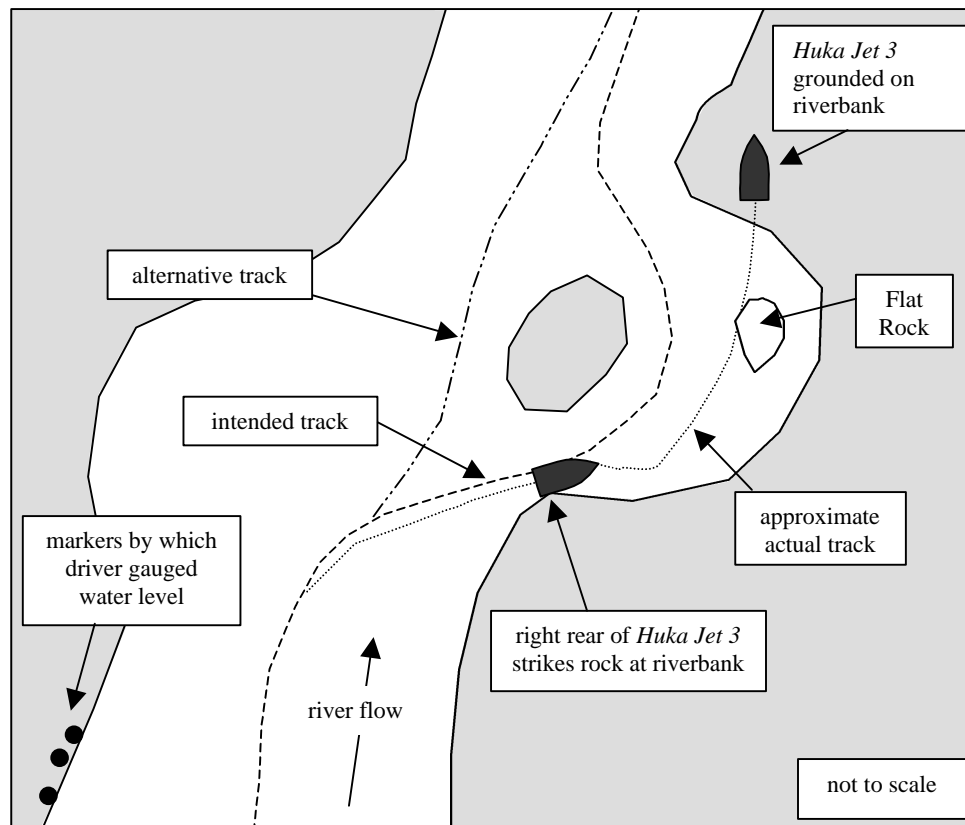


Figure 3
Second Tunnel showing intended and actual tracks

- 1.1.19 The manager instructed the staff at the base to call an ambulance, inform the management at Shotover Jet Limited, get out the emergency crisis box and start an incident running sheet. While those tasks were being done, the manager called the driver of *Huka Jet 4*, informed him of the emergency and instructed him to return immediately to the base and unload his passengers. He also called the base workshop and told the staff there to launch *Huka Jet 1* and take it to the jetty.
- 1.1.20 The manager and one of the base staff donned lifejackets and took the crisis box to the jetty. By the time they arrived, the driver of *Huka Jet 4* had returned to the jetty, unloaded his passengers and refuelled the boat. The crisis box was loaded on board and they all went upstream to the Second Tunnel.
- 1.1.21 When they arrived at the Second Tunnel they could not see the *Huka Jet 3* until its driver whistled to them. The boat was out of sight among the trees and totally on the riverbank. The driver of *Huka Jet 4* took his boat as close as possible and the manager jumped out and waded to the stricken boat.
- 1.1.22 The manager assessed the situation and found some of the passengers were standing around the side of the boat, 3 were still in the boat: 2 lying down and one sitting on the seats. The driver had already begun tending the injured and the manager got him to relay the extent and nature of the injuries to the staff at the base. Realising that the situation was more serious than first thought, the manager told the driver to upgrade the incident to a Code 1⁴. The Code 1 upgrade was recorded at the base at 0952.

⁴ Major injury accident.

- 1.1.23 Under the manager's direction, the uninjured passengers and those with minor injuries were moved off to one side to sit quietly while the more seriously injured were tended to. The manager realised that the injured would have to be taken to Rotorua for treatment and so contacted the base and told staff to call for a rescue helicopter.
- 1.1.24 Meanwhile the workshop staff had launched *Huka Jet 1*, taken it to the jetty and fuelled it. Two ambulances arrived at this time and one crew was transported to the accident site while the other crew remained at the jetty to receive the injured passengers.
- 1.1.25 The paramedics at the site took over the passenger assessment and ordered a second helicopter and another ambulance to attend. *Huka Jet 1* and *Huka Jet 4* were used to take the uninjured passengers and those with minor injuries back to the jetty while those with serious injuries were stabilised.
- 1.1.26 When each of the seriously injured passengers was prepared for evacuation they were taken to the jetty in one of the jet boats. At the jetty the passengers were received by the ambulance crews there and evacuated either by helicopter to Rotorua or by ambulance to the Taupo medical centre.
- 1.1.27 Of the passengers, 4 received serious injuries and 4 received minor injuries. Most of the injuries were caused by trees intruding into the passenger compartment after the boat climbed the riverbank. The driver and the remaining 2 passengers were not injured.
- 1.1.28 Once all the passengers had been removed from the accident site, *Huka Jet 3* was covered and left on the riverbank to be retrieved later.

1.2 Post-accident inspection

- 1.2.1 *Huka Jet 3* was substantially damaged in the accident. On the left front, the hull was set in about 140 mm over a length of 1700 mm and a height of 600 mm. At the extreme right rear there was a tear on the chine about 300 mm long, 55 mm high and 30 mm deep (see Figure 4).



Figure 4
Damage to chine at right rear

- 1.2.2 The driver's seat was dislodged from its mountings and the passenger seat backs were distorted.
- 1.2.3 The steering system was thoroughly checked and nothing untoward was found. The pulley system from the steering wheel was all intact and operated the steering nozzle smoothly to each side as far as the nozzle stops.
- 1.2.4 The maintenance records and daily checksheets for *Huka Jet 3* were inspected and there were no entries which might have indicated a potential mechanical problem with the boat.
- 1.2.5 The accident site was inspected but no definitive telltale marks or scratches were found on the rocks and trees at the entrance that would positively confirm where the rear of *Huka Jet 3* had struck.

1.3 Site information

- 1.3.1 Lake Aratiatia was a man-made lake in the Waikato River formed as a result of the construction of the Aratiatia hydro-electric dam, 12 km downstream from Huka Falls, the outlet of Lake Taupo. The water level of the lake varied considerably and was affected by different factors.
- 1.3.2 The quantity of water flowing out of Lake Taupo over Huka Falls varied dependent on water levels of the higher lake, and thus affected the water level and rate of flow in Lake Aratiatia.
- 1.3.3 The amount of water passing through the turbines in Aratiatia dam varied during the day and was dependent on electricity demands.
- 1.3.4 The Aratiatia Rapids were situated below the dam and were a natural scenic attraction. The hydro-electric power scheme was designed in such a way to preserve the rapids. The spillway gates were opened daily to allow large volumes of water to flow over the rapids, which were a popular attraction of the area.
- 1.3.5 The drivers of the Huka Jet boats had to be able to read the river and its levels as there were areas into which they were unable to venture if the levels were too low. The changes in water level and flow rate could be sudden and dramatic, even to the extent that changes could occur during a half-hour jet boat trip.
- 1.3.6 The Second Tunnel was one such area that was affected by the water levels. The tunnel was a route between a small wooded island and the riverbank. The trees overhanging from both sides gave the impression of a tunnel. There was a large rock within the tunnel known as Flat Rock. There was sufficient space for a jet boat to pass through the tunnel without passing over the rock, but established practice was that the transit was not made if it was exposed.
- 1.3.7 Drivers had to assess the water level in the tunnel and make their decision whether or not to transit through it. Their decision was based on what they could see as the trip went upstream past the tunnel, looking at their gauge marks on the riverbank as the trip proceeded downstream towards the tunnel, and finally whether or not Flat Rock was exposed as they lined the boat up for the entrance.
- 1.3.8 If the drivers had any concerns about the water level in the tunnel or the speed of the water flow past the entrance, then they would not transit the tunnel but instead pass outside the island that formed the tunnel.
- 1.3.9 From the entrance to the tunnel to the point on the riverbank where *Huka Jet 3* left the river was a distance of about 30 m.

- 1.3.10 The weather conditions on the day of the accident were later described as being clear, hot and calm. The River Conditions Check records showed that on the morning of the accident the river level was high and river flow was high. The column for the Second Tunnel was ticked to indicate that it was usable. In the comments column was the notation “all OK”.

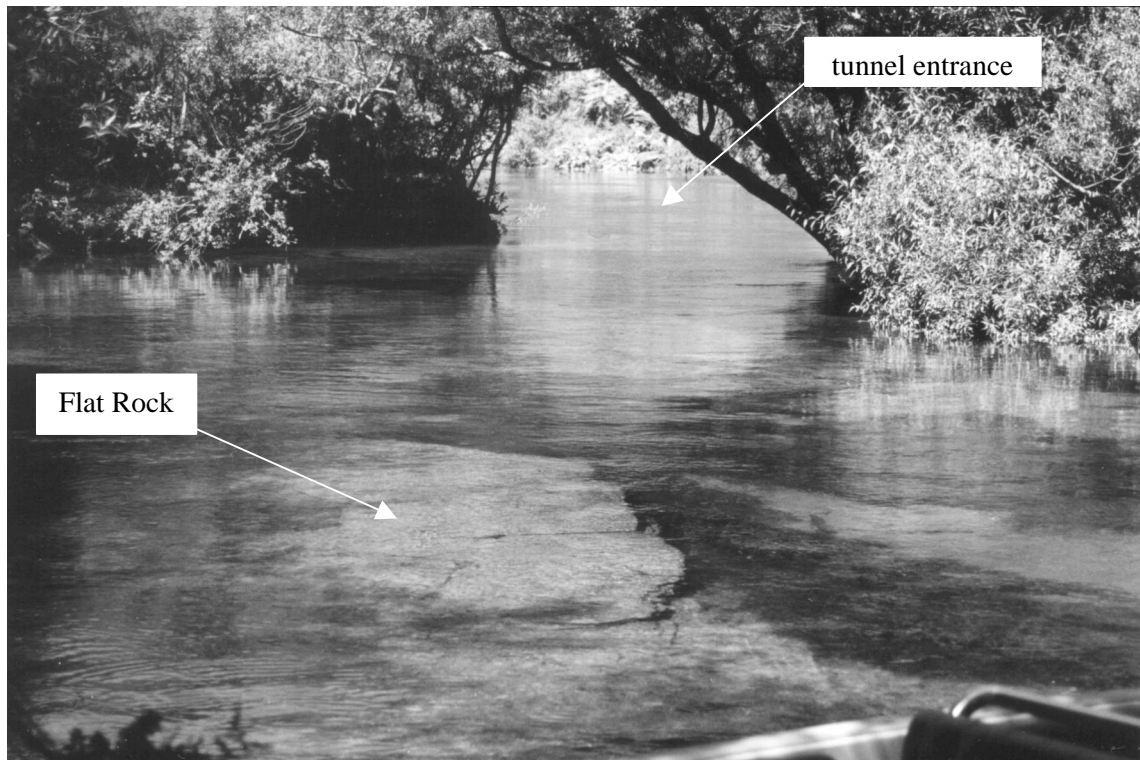


Figure 5
Second Tunnel entrance viewed from within tunnel

- 1.3.11 During the site inspection subsequent to the accident, the river conditions were reported as being similar to those on the day of the accident (see Figure 5). Flat Rock was submerged to an extent that a planing jet boat would have been able to pass over it, as a depth of only about 100 mm is required.

1.4 Boat information

- 1.4.1 *Huka Jet 3* was of aluminium construction and had been built in Queenstown by Shotover Jet Limited in 1989. The boat was capable of seating up to 12 passengers. The driving position was at the front left with a short seat for 2 passengers to its right. Behind the driver were 2 bench seats across the full width of the boat. The engine compartment was at the stern.
- 1.4.2 Propulsion was achieved using a water jet unit driven by an inboard liquid petroleum gas (LPG) engine. The jet unit drew a high volume of water through an intake grille on the flat bottom of the hull and ejected it at high pressure through a restricting nozzle at the aft end near the surface of the water.
- 1.4.3 Steering was achieved by deflecting the nozzle to either side to direct the flow of the water jet. Steering was thus integrally linked to the propulsion. If propulsion was lost for whatever reason then steering capability was also lost.
- 1.4.4 Speed and reverse thrust were achieved through a combination of throttle setting and a cable-operated reverse bucket. When the reverse bucket was fully open the water efflux was rearwards, thrusting the boat forward. As the bucket was closed, an increasing amount of the water jet was deflected forward, progressively changing the resultant thrust from forward to reverse. The engine throttle was operated independently of the bucket.

- 1.4.5 Safety lap seat belts were fitted in the front 2 passenger seats. They had been fitted, as part of a Shotover Jet Group policy, to minimise the movement of passengers during spins. Shotover Jet found that there was a tendency for those passengers seated in the front seat to be thrown around during spins and some had received minor injuries as a result.
- 1.4.6 The use of the front seat lap belts was not compulsory but drivers advised passengers that the operator recommended their use. The driver could not recall whether or not the passengers in those seats on the day of the accident had used the belts.
- 1.4.7 Together with the other boats in the fleet, *Huka Jet 3* underwent a refit late in 2000. New stainless steel seats were fitted and re-padded. Additional padding was fixed to the dashboard. Inclined footrests were fitted in front of all seats to allow passengers to brace themselves with their feet as well as holding on to the handrails. The safety belts in the front seats were fitted during the refit. These improvements were designed to reduce injury to passengers in the event of a mishap.

1.5 Driver training requirements

- 1.5.1 At the time when the driver of *Huka Jet 3* underwent his training, Maritime Rules Part 80 stipulated that a driver must have not less than 50 hours experience as a jet boat driver under the supervision of an experienced driver before driving solo with passengers. The operator followed the parent company's training policy, the provisions of which were in excess of the legislative requirements.
- 1.5.2 Prospective new drivers were preferred to have no previous marine experience and therefore no preconceived ideas of boat handling which might be significantly different from those required in the specialist area of jet boating.
- 1.5.3 New entrants were trained by the company training driver and had to amass a total of 120 hours on the water before driving commercial trips solo. The training involved simulated loads to change the handling characteristics of the boats. The first 25 hours of commercial driving were probationary and with light loads only. The next 25 hours of commercial driving were also probationary but with full loads. During the probationary periods, the new driver was occasionally accompanied by an observing senior driver.

1.6 Driver information

- 1.6.1 The driver of *Huka Jet 3* commenced employment with the operator in September 2000. He had no previous commercial maritime experience but had some recreational boating experience. He had spent 9 years in the Army Corps of Engineers and had some boating experience during that time.
- 1.6.2 He started his on-water training on 14 September 2000 and had completed 126 hours by 30 October 2000. He started driving commercial trips on 2 November 2000 but was limited to light loads for a 25-hour probationary period, which he completed on 17 November 2000. He then progressed to full loads for a further 25-hour probationary period, which he completed on 4 December 2000.
- 1.6.3 The driver's log showed that in the nearly 8 weeks since completing his probationary periods, he had driven a total of 227 commercial trips equating to about 113.5 hours on the water up to the time of the accident.
- 1.6.4 There was no requirement for the driver to hold a licence but both the training driver and the manager assessed his driving ability during and on completion of initial training and both probationary periods. The driver held a valid first aid certificate as required.

1.6.5 The drivers worked a staggered roster to maintain the required number on duty each day. The driver of *Huka Jet 3* was rostered to work from Thursday to Monday with each Tuesday and Wednesday being his “weekend”. The day of the accident was his first day at work after 2 days off.

1.7 Operator information

1.7.1 Huka Jet Limited (the operator) was a wholly owned and operated subsidiary of Shotover Jet Limited. The operation started in November 1990 and was the first of several subsequent subsidiaries of Shotover Jet.

1.7.2 At the time of the accident, the operator ran 3 boats, *Huka Jets 1, 3 and 4*.

1.7.3 The operator had a Safe Operational Plan that had been in place since 31 May 1999 and had last been updated on 19 January 2001. The plan had been made in consultation with Shotover Jet and a Maritime Safety Authority (MSA) authorised person⁵. The plan was essentially the same as those used by all operators in the Shotover Jet Group but adapted specifically for the local operation.

1.7.4 The Safe Operational Plan included a section on boat driver’s procedures regarding boat checks, river checks, features of the trip, training and safety equipment, a section on boat maintenance and a section on the crisis management plan.

2. Analysis

2.1 The driver of *Huka Jet 3* had completed his training during September and October 2000 before starting solo commercial trips in November 2000. By 4 December 2000 he had completed two 25-hour probationary periods with increasing passenger loads.

2.2 The training given to the driver exceeded the requirements of the then current Maritime Rules and would have provided a solid base on which to build his driving experience.

2.3 The driver would have driven in varying river conditions during his training, probationary periods and the following weeks. He had likely often driven on the river in conditions the same as or similar to those on the day of the accident.

2.4 The river conditions of the day, with high water level and flow, meant that all areas of the river were driveable although the drivers would have had to continuously monitor the conditions which were subject to rapid change.

2.5 As *Huka Jet 3* entered the Second Tunnel, the driver heard a bang from somewhere at the back of the boat and he lost control. The engine, jet unit and some steering components were at the rear of the boat. Had there been a mechanical failure in that area it might have resulted in the bang and the loss of control. However, inspection of the boat after the accident revealed no indication of any mechanical failure.

2.6 The damage to the hull of the boat, particularly that on the left front, could mostly be explained by the grounding on the riverbank and passing through the trees. The damage at the right rear of the boat was on the chine and was a tear in the aluminium rather than the depression damage at the front of the hull. It could not be determined with certainty whether the tear resulted from contact with the rock at the entrance to the tunnel or had happened at some other point in the accident sequence.

⁵ An authorised person is any person who holds a valid certificate of recognition issued under section 41 of the Maritime Transport Act 1994.

- 2.7 Given the driver's description of the bang sounding like "steel hitting rock", it was probable that the right rear of the boat contacted the rock at the right-hand side of the entrance. At that time the driver would have been accelerating to make the turn within the tunnel, and the contact would have slewed the boat to the right.
- 2.8 The initial contact was unlikely to have been with Flat Rock in the tunnel. Had *Huka Jet 3* entered the tunnel normally, the driver would have been making a hard turn to the left through the tunnel and the chine at the right rear would have been clear of the water and could not have hit Flat Rock, which was submerged at the time of the accident.
- 2.9 After the boat slewed to the right, the driver tried to regain his line out of the tunnel but had by then gone deeper into the tunnel than usual and probably passed directly over Flat Rock before hitting the riverbank.
- 2.10 The driver remembered trying to steer to regain his line, and the fact that the boat travelled around the left-hand curve of the tunnel before hitting the riverbank showed that he had been partly successful, and for that to happen the steering mechanism must have been functioning.
- 2.11 The distance from the entrance to the point of impact was about 30 m. At a speed of 60 km/h, *Huka Jet 3* would have covered that distance in under 2 seconds. The driver instinctively tried to steer out of trouble and his partial success showed that he had reacted with commendable speed.
- 2.12 The driver also remembered trying to put down the reverse bucket. This action was probably an automatic reaction just before impact, and whether or not he achieved any reverse thrust it would have had little effect at that late stage.
- 2.13 The line onto which *Huka Jet 3* was thrown was one from which the driver was unlikely to have been able to recover.
- 2.14 To have struck the rock at the entrance, the driver's line of approach or the entry line to the tunnel must have been incorrect. The reason why the boat was not on the correct line was not clear.
- 2.15 The driver had thought that his approach to the tunnel was normal. His line could have been slightly to the right and still looked normal but he then might have overestimated the effect of the boat being set downstream by the river flow and thus entered the tunnel even further to the right of his usual line. Alternatively the driver may have turned to the left fractionally earlier than normal, thus pushing the right rear of the boat to the right and into contact with the rock at the entrance.
- 2.16 The driver in this accident had less than 2 months' experience driving solo. A more experienced driver might have identified that the approach line was not quite right and been able to adjust accordingly.
- 2.17 In previous investigations into commercial jet boat accidents, the Commission has identified that a large proportion of the drivers involved have had less than one year's experience and that there was a tendency for their confidence to grow ahead of their capabilities as they gained experience.
- 2.18 In June 2000, the Commission made several safety recommendations concerning commercial jet boat operations to the Director of Maritime Safety. Recommendation 102/99 related to the development of a Commercial Jet Boat Driver Licence and addressed the Commission's concerns regarding initial and on-going training. The recommendation and response from the Director of Maritime Safety have been included as Appendix A to this report.

- 2.19 Jet boat operations like this are adventure tourism. The trips are made at high speed and close to objects along the route. By the nature of the operation there will always be an element of risk involved. It is the combination of speed, closeness to objects and the element of risk that operators perceive make a jet boat ride a thrilling experience and such a popular attraction.
- 2.20 The Commission acknowledges that to attract custom, a commercial jet boat operation probably should be portrayed to potential customers as a thrilling experience, but the risks involved must be minimised. In assessing the safety of a trip, among other things, the route to be followed should be a major consideration.
- 2.21 The Second Tunnel was a confined area, involving a tight turn at speed with little option for escape should something go wrong. The drivers had to assess the viability of transiting the tunnel based on river conditions and then confirm each trip by observation when passing upstream and again on approach to the tunnel.
- 2.22 To successfully negotiate the tunnel, a driver needed to slow down on approach, turn towards the entrance, gauge the effect of the downstream flow on the line and make any adjustments in order to pass centrally through the tunnel entrance before accelerating to turn within the tunnel.
- 2.23 There is little doubt that the passage through the Second Tunnel was a thrilling part of a trip for passengers but it is questionable whether the additional risk involved was warranted when a less complicated alternative route was available.
- 2.24 Whether the front seat passengers on the day of the accident had been wearing the seat belts was not clear, but even if they had been it cannot be said with certainty that the seat belts would have prevented or reduced the severity of the injuries sustained.
- 2.25 The jet boat industry questions the compulsory fitting of seat belts, citing, among other things, safety concerns over passengers being unable to release themselves in a deep water sinking situation. However, belts had been fitted in the front seats of Shotover Jet Group boats to minimise an identified risk to passengers during spins. Drivers normally execute several spins during a trip, whereas the sinking situation is rare.
- 2.26 Where a particular risk is identified and a protection against it put into place, that protection should always be used. Although passengers were not injured in this accident as a result of an executed spin, the use of the seat belts against such an event should be mandatory. To allow front seat passengers the choice could result in their being unrestrained at a time of identified risk several times during a trip.
- 2.27 Among the safety recommendations made to the Director of Maritime Safety in June 2000, were recommendations 098/99 and 099/99 relating to risk analysis and identification. Those recommendations have been included in Appendix A to this report.
- 2.28 In response to the safety recommendations made to the Director of Maritime Safety, he advised that the MSA was to commission a review of the commercial jet boat industry. In March 2001, the draft results of that review were circulated to the industry for comment. Taking account of submissions received, the MSA then formed a list of recommendations which has been included as Appendix B to this report.

3. Findings

Findings and safety recommendations are listed in order of development and not in order of priority.

- 3.1 The driver of *Huka Jet 3* had received adequate initial training to enable him to drive solo with passengers on board. The amount of his training had exceeded legislative requirements.
- 3.2 The weather and river conditions at the time of the accident were such that all features of the trip could be completed within the operator's Safe Operational Plan.
- 3.3 When the driver of *Huka Jet 3* approached the Second Tunnel, the river level and flow in the area were suitable by the operator's standards for transit through the tunnel.
- 3.4 The driver likely lost control of *Huka Jet 3* just as it entered the feature known as the Second Tunnel, when the right rear of the boat struck the rock on the right bank of the entrance to the tunnel.
- 3.5 There was no evidence of any mechanical failure having contributed to the loss of control of *Huka Jet 3*.
- 3.6 Once the driver had lost his intended line through the tunnel, he was unlikely to have been able to prevent the boat striking the riverbank, regardless of what actions he took.
- 3.7 The Second Tunnel was a feature that required precise driving in order to be negotiated safely. Its inclusion in the trip probably placed the passengers at a higher level of risk than was necessary to provide an appropriate level of thrill.
- 3.8 The operator's Crisis Management Plan was effective. The reactions of the driver and base staff were decisive, in accordance with the plan and resulted in the timely rescue of the passengers.
- 3.9 It was not established whether the front seat passengers were wearing seat belts, or if their injuries would have been lessened had they been. However, the non-mandatory use of the fitted belts potentially exposed the front seat passengers to an identified risk.

4. Safety Actions

- 4.1 Immediately after the accident, Huka Jet Limited suspended operations through the Second Tunnel pending its own and other investigations.
- 4.2 Huka Jet Limited removed the top 300 to 400 mm of Flat Rock to give a greater depth of water over the rock.
- 4.3 Huka Jet Limited cut back the boughs of the overhanging and protruding trees to significantly widen the entrance and to create an easier driving line through the tunnel.
- 4.4 In June 2001, an MSA authorised person carried out the annual audit of Huka Jet Limited. The authorised person gave clearance for the modified Second Tunnel to be included in the trip but noted the need for enhanced training specific to the area.
- 4.5 On 20 March 2001, Huka Jet Limited introduced into its Safe Operational Plan an "advanced jetboat driver training programme: 1st tunnel and 2nd tunnel". At that time operations through the Second Tunnel were still suspended and no drivers were under training.

- 4.6 One new driver has since been employed and the enhanced training was first put into practice in August 2001, although operations were still suspended awaiting the finalisation of all reports into the accident. Before resumption of operations, all drivers will undergo refresher training for the area.
- 4.7 The enhanced driver training programme was to take place after the completion of the basic 120-hour driver training and the two 25-hour probationary periods. The additional training specific to the tunnels included:
- 5 hours tuition with the training driver
 - 5 hours solo driving with no passengers
 - 10 commercial trips with light passenger loads
 - 10 commercial trips with heavy commercial loads
 - demonstration of driver skills regarding river level, driving lines, obstruction clearance, safe entry and exit lines combined with appropriate speed
 - a practical test with Huka Jet manager.

5. Safety Recommendations

5.1 On 31 October 2001 the Commission recommended to the General Manager Jetboating of Shotover Jet Limited that he:

- 5.1.1 adopt a policy whereby the use of the safety lap seat belts, already fitted in the front passenger seats, is mandatory. (060/01)

5.2 On 12 November 2001 the General Manager Jetboating of Shotover Jet Limited replied:

- 5.2.1 At this stage we are not sure we agree with your recommendation that Shotover Jet adopt a policy whereby the use of the safety lap seat belts, already fitted in the front passenger seats, is mandatory.

The reason for this is that when MSA carried out the review of Rule Part 80 their conclusion with respect to the fitting of seat belts was that they disagreed with the recommendation made by TAIC. As the time they did note that they would continue to review this decision. MSA staff again confirmed this to me during a discussion last week. I 'm sure you would agree that this puts us in a difficult situation, as we have conflicting views from two different authorities.

For this reason we therefore believe that MSA and TAIC should collectively advise us on what we should do.

Approved for publication 31 October 2001

Hon. W P Jeffries
Chief Commissioner

Appendix A

A.1 On 10 June 2000 it was recommended to the Director of the Maritime Safety that he:

- A.1.1 Conduct a risk analysis on the various jet boat activities of commercial operators in the New Zealand jet boat industry and set a benchmark of identified risk against which a risk assessment for each operator can be measured. (098/99)
- A.1.2 Conduct an independent review of the jet boat activity each commercial jet boat operator in New Zealand is offering, to measure the type of activity and the manner in which it is conducted against the benchmark of identified risk. For any operations carrying more than the identified level of risk, either take the necessary action to reduce the risk level, or allow the operation to continue but require the operator to give passengers an appropriate warning of the high risk factor, before they commit to embarking on the trip. The content of any such warning and the method used to convey it should be approved by the MSA. (099/99)
- A.1.3 Develop an MSA Commercial Jet Boat Driver Licence, which every commercial jet boat driver must hold. The licensing system should be structured with:
- a detailed training syllabus and a driving test, for the basic licence
 - several levels of endorsement, each dependent on specified numbers of driver hours and a further driving test
 - restrictions on all-up weight (boat and passengers) for each endorsement
 - endorsements for each river on which the holder intends to operate, following a specified number of hours on each river
 - experience requirements, and a training syllabus and test for jet boat driver instructors
 - a requirement for subsequent periodic check trips
 - a requirement for drivers who do not accumulate a specified number of driving hours within a specified period, to undergo revalidation training. (102/99)

A.2 On 14 September 2000 the Director of the Maritime Safety replied:

- A.2.1 We do not propose at this time to respond to [the safety recommendations] individually or in detail. Some of these have been proposed to and commented on by MSA in relation to previous reports.

We would however, consider it helpful at this time to outline the course of action initiated by MSA on 28 July 2000, where a formal safety review of the Commercial Jet Boat Industry was commissioned by the Director of Maritime Safety.

This review is an MSA initiative response to the recent accidents experienced by the industry and a desire to evaluate the performance of Rule Part 80. Terms of reference for the review are listed hereunder:

Purpose: Review the commercial jet boat industry to identify actual and potential current safety issues, assess any adverse safety trends and propose recommendations and any new initiatives to ameliorate adverse safety trends.

- 1 Document the safety performance of the commercial jet boat industry and identify its relative performance in the maritime industry (other adventure tourism activities, other passenger vessels, and commercial maritime operations), taking into account relevant technical, environmental and social considerations.

- 2 Develop benchmarks for the commercial jet boat industry by reviewing the performance of the industry overseas.
- 3 Identify and assess possible areas of concern within the commercial jet boat industry, in terms of safety performance and perceived future trends.
- 4 Contextualise the safety performance of the commercial jet boat industry by identifying past, present and future trends within the industry.
- 5 Review the current operation and effectiveness of legislation (Rule Part 80 and Maritime Transport Act/local bylaws) where appropriate.
- 6 Provide recommendations on any new safety initiatives based on lessons learned from the review.

The review will involve evaluation of all incident and accident data held on file, active surveying of operators in the industry and undertaking passenger expectation surveys. It will also involve data collection from international operators in an attempt to benchmark the local industry.

The review will be detailed, it has been given a high priority by MSA and it will involve an in depth examination of the effectiveness of Rule Part 80. The review will also involve careful evaluation, including costs and benefits, of all safety recommendations made by TAIC in this and previous reports.

Appendix B

List of the recommendations made by the MSA after consideration of public submissions following the review of the safety performance of commercial jet boat operations in New Zealand

- B.1 That clause 80.3(2) of Maritime Rule 80 be removed as it may place conflicts of interest on the designated Authorised Person when they are also acting for the Queenstown Lakes District Council.
- B.2 That the New Zealand Commercial Jet Boat Association amends their current policy of requiring their members to use only selective Authorised Persons as approved by the Association.
- B.3 That a standard checklist be used by Authorised Persons when auditing companies, SOP's and boats. This checklist should be issued as an advisory circular to the rule, so that it may be amended from time to time, dependent on industry practice and requirements.
- B.4 That Maritime Rule Part 80 be amended regarding driver training with considerations to the activity being undertaken.
- B.5 That Maritime Rule Part 80 be amended regarding driver licensing.
- B.6 That Maritime Rule Part 80 be amended regarding the requirement for drivers to maintain a log.
- B.7 That Maritime Rule Part 80 be amended to require new and existing jet boats used for adventure tourism and operating on braided rivers, to be fitted with a structure, approved by the Authorised Person, to permit an escape route with the boat in an upturned condition.
- This structure would not be required on boats used for fishing or hunting guides.
- B.8 That Maritime Rule Part 80 be amended to require operators to advise passengers of the risks that they may experience during the ride
- B.9 To rename Maritime Rule Part 80 from “Marine Craft used for Adventure Tourism” to “Commercial Jet Boats and White Water Rafting” (or similar) and that Appendix 1 be separated into adventure and non-adventure activities with appropriate standards for the physical requirements of the boat, driver training and Safe Operational Plan applying to each activity.
- B.10 In addition, the Rule should contain a procedure to determine which activity the operation belongs to (i.e. adventure or non-adventure). The procedure should consider, at least:
- primary activity and services provided
 - number of seats contained in the boat
 - area of application
 - frequency of operation
 - marketing of application.
- B.11 In restructuring Maritime Rule Part 80, the Manager, Safety and Environmental Services of the Maritime safety Authority should attempt to align the Rule to follow the audit checklist contained in the Consultation Document so operators can reference the Rule and requirements easily.