

Accident Report

CYS

Capsize

Waimakariri River on 13 May 2004

KEEPING YOUR SEA SAFE FOR LIFE



Maritime Safety

MARITIME SAFETY AUTHORITY OF NEW ZEALAND
Kia Maanu Kia Ora



REPORT NO: 04 3476

VESSEL NAME: CYS

CASUALTY DETAILS:

Date of Casualty: 13 May 2004

Time of Casualty: 1705 hours New Zealand Standard Time (NZST)

Casualty Type: Capsize

Casualty Location: Waimakariri River, under Twin Highways Motorway

Weather Forecast Area: River

Date MSA Notified: 15 May 2004

Date Investigation Started: 15 May 2004

Date Investigation Completed: 6 October 2004

Investigator: Zoe Brangwin



REPORT NO: 04 3476

VESSEL NAME: CYS

VESSEL DETAILS:

Ship Name: CYS

Ship Category: Commercial Passenger Jetboat

Overall Length (m): 5.24

Owner: Jet Stream Tours



SUMMARY

At 1705 hours New Zealand Standard Time (NZST) on 13 May 2004, the Jet boat *CYS* capsized after it became stuck in reverse and then struck the Waimakariri River State Highway One Bridge. The Driver and eight passengers were thrown into the river. One passenger was trapped under the vessel for 2-3 minutes before freeing himself. The Driver and occupants of the second Jet boat, *CBNC*, quickly rescued them. There were no serious injuries.

1. KEY EVENTS

- 1.1 At approximately 1350 hours New Zealand Standard Time (NZST), on 13 May 2004, the drivers for Jet Stream tours picked up *CYS (White Boat)* and *CBNC (Black Boat)* from the service station by the Old Waimakariri Bridge. They transported them to the launch ramp on the north bank of the Waimakariri River, close to the motorway bridge.
- 1.2 The drivers commenced their pre-run safety checks and warmed the engines up whilst on the trailer. The checks included ensuring the grill, steering and reverse bucket were all in working order. They then pulled the boats back up the ramps and readied the lifejackets and other equipment while waiting for the clients to arrive.
- 1.3 At approximately 1640 hours, the clients (a corporate group) arrived. They were kitted out with lifejackets and offered extra warm clothing to wear, including beanies and gloves. The 18 clients were split into two groups, 10 to the *Black Boat* and eight to the *White Boat*. The clients climbed in to the respective boats, were seated and then given a safety brief by the drivers.
- 1.4 By approximately 1655 hours, the drivers had completed their safety briefing and commenced the trip upstream.
- 1.5 The *Black Boat* led with the *White Boat* following behind at a safe distance. The driver of the *Black Boat* elected to cut the trip short slightly due to the cold weather and poor river conditions. The trip downstream was bumpy but passed without incident.
- 1.6 The boats continued past the ramp for a short distance before turning. The driver of the *White Boat* executed a “Hamilton turn” before heading into the ramp. The two boats arrived back at the ramp between 1715 and 1720 hours.
- 1.7 The *Black Boat* was on the trailer as the *White Boat* was manoeuvring towards the trailer. The driver of the *White Boat* pulled down on the reverse lever to line up with the trailer but was not able to pull it back up.
- 1.8 He yelled to the driver of the *Black Boat* that his reverse bucket was jammed down. The driver of the *Black Boat* jumped out of the boat and ran down the bank shouting at the driver to throw the bow rope. Before he could attempt to throw a line the boat was swept out into the river flow.
- 1.9 The driver of the *White Boat* attempted to drive the vessel towards the bank using throttle while stuck in reverse, however this was unsuccessful. The driver of the *Black Boat*, seeing that the vessel was in difficulty ran back to his boat. He ordered the passengers out with the exception of two of the largest males. He reversed the vessel back into the flow.

- 1.10** The *White Boat* was being swiftly carried downstream towards the pylons of the motorway bridge. The boat missed the first pylon but the driver was unable to manoeuvre out of the way of the second.
- 1.11** The *White Boat* hit the second pile with its starboard side, about half way down. As the vessel hit the pile it rode up it causing water to pour over the port side aft. As the vessel continued to fill with water she rolled over to port. The passengers and driver jumped and/or fell out of the boat into the water.
- 1.12** One passenger remained under the vessel, trapped in an air pocket in the bow. The boat continued to float downstream, upturned with the bow up.
- 1.13** The passengers attempted to swim to the riverbank. The *Black Boat* assisted the driver and a passenger to the shore. Once ashore they carried out a head count and quickly realised that they were missing one person.
- 1.14** The *Black Boat* returned to the upturned vessel. By this time the vessel had sunk further and only the stem section was just visible at water level. As they approached the vessel the missing person appeared from under the boat and floated downstream. He had been under the boat for between 2-4 minutes. They pulled him onboard and took him back to shore. He was conscious and appeared to be uninjured.
- 1.15** The passengers were instructed to return to their vehicles to keep warm. The Police and Owner of the company arrived shortly after.
- 1.16** The passengers then returned to their accommodation.
- 1.17** The *White Boat* was salvaged the following day. It was found on the bottom of the riverbed under the Old Waimakariri Bridge.

2. KEY CONDITIONS

2.1 Vessel Details

- 2.1.1 The *Jet Stream Tours* vessel involved in the accident was a 5.2 metre Hamilton 171A HS MK 11 CYS, the *White Boat*. The vessel was of aluminium construction with a glass reinforced plastic (GRP) deck. It had a Hamilton 212 jet unit and a Chevrolet 350 cubic inch engine. The vessel seated 10 adult passengers.
- 2.1.2 The vessel had a valid Safe Operating Plan (SOP) and Certificate of Compliance.
- 2.1.3 Jet Stream Tours NZ began in 1999 and purchased its opposition company “Jet Thrills” in March 2003. The smaller Jet Stream boats were sold and the Jet Thrills Cobra 6.2 and Hamilton 171 were retained. The 6.2 metre Cobra 6200C jet boat, the *Black Boat* and a 5.2 metre Hamilton 171A HS MK 11 CYS, the *White Boat*.
- 2.1.4 The Director has over 20 years of experience with various types of boats and has been a member of the New Zealand Jet Boating association (NZJBA) for 24 years. He is an active member of the association and assists with Search and Rescue, Civil Defence and the coast to coast organisation.

2.2 Driver Details

- 2.2.1 The driver of the *White Boat* was a contract driver for Jet Stream Tours. He has over 20 years experience driving and building jet boats. He has also owned and run his own jet boating company on the Waimakariri River. He drove for Jet Stream Tours on a casual basis and was also contracted at times to drive his own jet boat, which has a valid Certificate of Compliance. He has also owned and run a commercial jet boating company.
- 2.2.2 The driver of the *Black Boat* has been driving jet boats since 1977. He has owned and/or built around 20 boats during that time. He has an estimated 2 000 hours driving in a variety of conditions and jet boats in New Zealand and overseas. He has been a relief driver for various commercial operations on the Waimakariri River since 1985. He is also involved in a number of other jet boating activities including racing, white water boating, safety co-ordination and water rescue.
- 2.2.3 Both drivers held valid medical and first aid certificates.

2.3 Safety Equipment and Briefing Card

2.3.1 The vessel was equipped with the following safety equipment:

- Life Jackets
- Cell phone
- Bow rope
- First Aid Kit
- Fire extinguisher
- Bailer
- Flares x 3

2.3.2 The passengers were offered additional warm clothing due to the weather conditions - ponchos, beanies and gloves.

2.3.3 All vessel checks were carried out and ticked off on the daily checklist sheet prior to the trip commencing.

2.3.4 The passengers were briefed by the drivers and shown the briefing plaque. They were briefed to:

- Keep seated
- Do not stand up
- Keep their hands and arms inside the vessel
- Hold the handles during a 360 degree spin
- No smoking

2.3.5 Six of the passengers stated that they did not feel that they were given an adequate safety briefing. They all commented that they were not told what to do in the event the vessel capsized.

In commenting on the draft report the Director of Jet Stream Tours NZ stated, “ *The safety briefing is designed to reduce the risk of the passengers causing an accident i.e. waving arms out of the boat and standing up. It is not designed to cover every eventuality. We do add at the end of the briefing, “Although the jet boat is only a little ship, I am still the Captain. And should a situation arise please follow the instructions given.” The briefing card used is almost identical to that which is recommended for use in the Draft Rule 80b document.* ”

2.3.6 The drivers did not physically check the fit of the lifejackets.

In commenting on the draft report the Director of Jet Stream Tours NZ stated, “We have three lifejacket sizes XXL, large and medium for adult usage. We ensure that all the right size jackets are issued to the correct size person. It is true that we do not ask someone’s weight as this would embarrass some people. We ensure all jackets are zipped first and then

buckled and then that the straps are firm. To my knowledge the lifejackets performed adequately.”

- 2.3.7 A number of the passengers commented that they felt the driver of the **White Boat** was not in complete control of the situation, that he did not try to account for the passengers after the capsize and that at no time did they hear him tell the passengers to jump from the boat or to lean into the side that they were going to hit.

In commenting on the draft report the Director of Jet Stream Tours NZ stated, *“This is a very stressful moment in time immediately before during and after the point of the capsize. From the report’s comment it suggests that this happens to jet boats every day! And that the driver, although human must react to every situation automatically. The driver was the 2nd to last person hauled out of the river and was suffering from shock just as much as the other passengers.”*

2.4 River and Weather Conditions

- 2.4.1 Jet Stream Tours operates on the Lower Waimakariri River between the State Highway One Bridge and the pylons area Dixons Bay.

- 2.4.2 The weather was described as follows:

- By the owner of Jet Stream Tours as being “overcast but clear with visibility of about 1km.”

- 2.4.3 The Police Officer who attended the scene described the scene (20 minutes after the accident) as, “the river was dirty and high, light was poor due to weather, light drizzle and coming darkness”.

- 2.4.4 The river was described by:

- The owner of Jet Stream Tours, as “discoloured and higher than normal flow (115 cumecs) at the time of the tour 220 to 230 but dropping”.
- The driver of the **Black Boat** as, “the river was rising slightly, was discoloured and there was some floating debris being brought downstream.”

- 2.4.5 The passengers used the following words to describe the river that day, swollen, running very fast, debris and silt, strong current, rough.

- 2.4.6 The air temperature was about 11°C (Celsius).

- 2.4.7 The operational limits for the Waimakariri River as stated in the company Safe Operating Plan were as follows:

Jet boat rides will not be undertaken in conditions that compromise safety. Factors assessed include visibility, high winds, floating debris and river flow.

- a. Maximum Flow – If the river exceeds 300 cumecs from the Environment Canterbury (Ecan) river flow site situated at the Old Waimakariri Bridge the trip will be cancelled.*
- b. In the case of a static or falling river 350 cumecs is allowable.*
- c. Floods, Trips will be cancelled in event of flood warnings, which are available from Environment Canterbury.*
- d. Minimum Flow. Trips will be cancelled if flow falls below 27 cumecs at as per (a).*

2.4.8 The river flow was recorded at the Old Waimakariri Bridge on the 13 May as 270 cubic metres per second (cumecs) at 1300 hours. The flow rose to 300 cumecs as recorded at 0001 hours, on 14 May.

2.4.9 The river level was close to cut off levels at the time of the accident, there was also floating debris in the river.

2.4.10 The owner stated that on the day of the accident the “*river was up but it was fine and dropping.*” The river was in fact still rising at the time of the trip.

In commenting on the draft report the Director of Jet Stream Tours NZ stated, “The section of river described is the narrowest part of the Lower Waimak for approx 100km’s. 1km upstream it spreads to about 1km wide and becomes very shallow. It should be noted both boats completed the trip and it was in retrieval that the accident happened. We were operating within the parameters of the SOP, the 270 cumecs mentioned is the smoothed and altered figures by ECAN (Environment Canterbury) at the time of the trip the river was dropping off a tidal push back. The ECAN cumec reading is not very accurate (their words, and to be used only as a guide.) The drivers have the authority to cancel the trips for any reason they choose. They assessed the river to be okay for the trip to continue. The two boats in question had previously been approved to boat in 400 cumecs but we chose to reduce this to 300.”

2.5 Reverse Mechanism

2.5.1 The *White Boat* was fitted with D series controls. The reverse system was cable operated.

- 2.5.2 On salvaging the vessel the variable detent shaft was found to have broken in two.
- 2.5.3 The broken shaft indicated that it had bent before breaking.
- 2.5.4 The SOP identified a “reverse jam” as a hazard. The SOP stated, “*reverse jam: Reverse away from fast water try and shift manual at rear of boat.*”
- 2.5.5 The driver tried to reverse towards the riverbank however the river flow was too fast to enable it to be effective.
- 2.5.6 At the time of the accident the vessel had done 461 engine hours.
- 2.5.7 The steering cables were due to be serviced at 1000 engine hours.
- 2.5.8 The MSA Jet boat Safety Auditor examined the **White Boat** and consulted with a number of operators and manufacturers. The following are pertinent extracts from his report;

“Note: It was very difficult to make an accurate comment on parts that have been pulled apart and tested prior to inspecting them.”

Possible causes and outcomes

- *“The brass dog was out of adjustment and kept the reverse bucket down, due to the severe amount of pressure applied to the hand control, combined with the high mounting system, the detent shaft bent and broke.*

I would suggest that with the tests I did that the shaft would have been bent if only slightly for some time.

- *External impact bent the shaft and then the above happened, i.e. the boat backed into a wall while parking.*
- *I am confident that the reverse was not jammed by an external influence such as a stick or a stone. When the vessel was recovered they tried to move the reverse bucket up and down from the outside. It moved about 30-50mm freely and then the locking dogs held it as they are supposed to do.”*

I would question the mounting system as with the heavy-duty cable and high mounting of it on the reverse control. You can apply severe pressure from the hand control in comparison to the two other mounting systems.

It should be noted that most larger operators, (those that do about 100-200 times the amount of river hours than this operator) use a mechanical rod or electric system over a hydraulic reverse.”

In commenting on the draft report the Director of Jet Stream Tours NZ stated, “At no point had the Safety Auditor examined the white boat prior to strip down and refit. The pulling apart and testing was done by TAIC. The Safety Auditors last comment is interesting as it raises the question as to why do other larger operators change from the factory supplied equipment. Is he suggesting they have had problems with the variable detent in the past? And so have replaced it with a more suitable mechanism. The TAIC report said that the dogs were actually adjusted so that it would have less grab rather than more. The TAIC report also made mention that the mounting system in CYS put added pressure on the detent rod.”

3. CONTRIBUTING FACTORS

N.B. These are not listed in order of importance.

3.1 The weather conditions.

In commenting on the draft report the Director of Jet Stream Tours NZ stated, *“The weather did not contribute to this incident in any shape or form.”*

3.2 The higher than normal river flow at close to cut off levels.

3.3 Mechanical failure of the reverse bucket.

3.4 The decision to proceed with the trip regardless of the time of day, visibility, weather and river conditions.

In commenting on the draft report the Director of Jet Stream Tours NZ stated, *“The time of day did not contribute to this incident as the outcome would have been the same had it been 0900 hours.”*

3.5 The detent shaft may have been bent prior to the accident.

3.6 The brass dog was out of adjustment.

In commenting on the draft report the Director of Jet Stream Tours NZ stated, *“The dog was out of adjustment to make it looser not tighter. And had been working faultlessly prior to the accident.”*

3.7 The severe amount of pressure applied to the hand control.

In commenting on the draft report the Director of Jet Stream Tours NZ stated, *“The Driver should have reacted sooner to try and steer away from the bridge pile. Rather than try and force the lever forward. Once past the bridge there was plenty of time and space to sort out a plan. This is seen in hindsight and can understand that that the driver was trying his best at the time.”*

4. CAUSE

Human Factor

- | | | |
|---|---|--|
| <input type="checkbox"/> Failure to comply with regulations | <input type="checkbox"/> Drugs & Alcohol | <input type="checkbox"/> Overloading |
| <input type="checkbox"/> Failure to obtain ships position or course | <input type="checkbox"/> Fatigue | <input type="checkbox"/> Physiological |
| <input type="checkbox"/> Improper watchkeeping or lookout | <input type="checkbox"/> Lack of knowledge | <input type="checkbox"/> Ship Handling |
| <input type="checkbox"/> Misconduct/Negligence | <input type="checkbox"/> Error of judgement | <input type="checkbox"/> Other . . . |

Environmental Factor

- | | | | |
|---|---|------------------------------------|--|
| <input type="checkbox"/> Adverse weather | <input type="checkbox"/> Debris | <input type="checkbox"/> Ice | <input type="checkbox"/> Navigation hazard |
| <input checked="" type="checkbox"/> Adverse current | <input type="checkbox"/> Submerged object | <input type="checkbox"/> Lightning | <input type="checkbox"/> Other . . . |

Technical Factor

- | | | |
|--|---|---|
| <input type="checkbox"/> Structural failure | <input type="checkbox"/> Wear & tear | <input type="checkbox"/> Steering failure |
| <input checked="" type="checkbox"/> Mechanical failure | <input type="checkbox"/> Improper welding | <input type="checkbox"/> Inadequate firefighting/lifesaving |
| <input type="checkbox"/> Electrical failure | <input type="checkbox"/> Inadequate maintenance | <input type="checkbox"/> Insufficient fuel |
| <input type="checkbox"/> Corrosion | <input type="checkbox"/> Inadequate stability | <input type="checkbox"/> Other . . . |

- 4.1** While manoeuvring onto the jet boat ramp the *White Boat* became stuck in reverse. The vessel then capsized and sunk when it struck a pylon on the Waimakariri Bridge.

5. OPINIONS & RECOMMENDATIONS

5.1 It is the opinion of the Maritime Safety Authority that the drivers physically check the fit of all lifejackets prior to passengers getting onboard the jet boat.

5.2 It is recommended that the Maritime Safety Authority include hours of operation into Maritime Rule Part 80. The hours of operation to read, “Jet Boats are only to operate between sunrise and half an hour before sunset except where "night operating" is the specific purpose of the trip and is provided for in the approved safe operational plan.”

5.3 Action taken by Jet Stream Tours

5.3.1 The owner of Jet Stream Tours held a debrief with his staff on the 15 May to go over the accident and the companies Safe Operating Plan. Outcomes of this meeting included:

- The *White Boat* has been fitted with a roll bar at the rear of the vessel.
- The Owner has purchased handheld GPS units for the boats.
- It was decided that no trips are to depart after 1600 hours, in the winter months. This is due to the small window for search and rescue if something was to go wrong.
- As the majority of their foreign tourists are Japanese the Owner is getting the briefing card made in Japanese, (on the reverse side) to explain what to do if they fall in the water.
- The owner has changed the reverse control and mounting system.

The Maritime Safety Authority concurs with the above outcomes.