



Accident Report

Lynne Cee

Canoe Flipped & Wrapped
around a Rock resulting in 2
Fatalities on the Clarence River
on 26 October 2001



KEY EVENTS

- 1.1 Shortly before 0850 hours NZDT (*New Zealand Daylight Saving Time*) on 26 October 2001, a staff member, a parent aide and seven students met at the Hanmer Springs Primary School in preparation for a canoeing trip on the Clarence River, South Island.
- 1.2 The Owner and Operator of the outdoor adventure company that had been contracted to carry out the activity met the group at the school at approximately 0850 hours. He was the Instructor for the trip and was driving a Landrover, which was towing a trailer with five Canadian canoes.
- 1.3 The parent aide and one student travelled to the "put in" position in the parent's car. The remainder of the group, travelled in the Landrover. They arrived at the "put in" position at about 0920 hours.
- 1.4 On their arrival, the Instructor unloaded the safety clothing and equipment. He explained the sizing of the safety clothing and the order that it should be put on the wearer. At about this time he asked the group if everyone could swim; to which they all responded in the affirmative. Before getting dressed, the group removed the canoes from the trailer. While doing this, one of the students trapped her fingers between a canoe and the supports on the trailer. She was attended to by the parent aide and the Instructor. The canoes were then taken to the water's edge.
- 1.5 When the group was dressed the Instructor checked that their lifejackets and helmets were securely fastened.
- 1.6 Once everyone was fully clothed, the spare gear along with the group's personal belongings was stowed in the Landrover. The Instructor and parent aide drove in their respective vehicles to the "get out" position where the Landrover was left parked in readiness for the end of the trip. They then returned to the "put in" site in the parent aide's car.
- 1.7 On their return, the Instructor gave the group a thorough briefing, which also dealt with 'on-water' matters. This included safety precautions and how to operate the canoe. The group was then divided into teams for each of the three canoes that were being used on the trip. The first canoe, **Il Bossy** contained the Instructor and two students (one male and one female); **Lisa Marie** contained the teacher and two students (one male and one female) and **Lynne Cee** contained the parent and three students (two males and one female).
- 1.8 At about 0950 hours, (*the Instructor believed the canoes were launched earlier than this time*), the canoes were launched. The crew of each canoe was told by the Instructor how to board the canoes and the respective jobs they were each to undertake once underway. The Instructor then paddled **Il Bossy** towards the shore on the other side of the river, where he stopped and told his "navigator" (*the person who was in the front of the canoe*) to get out and hold onto the canoe. Afterwards, the crews boarded the other two canoes and went across the river to join the Instructor.
- 1.9 The crew of **Lisa Marie** and **Lynne Cee** were instructed to practice paddling in the smooth water, situated upstream of the "put in" position. He instructed them not to go outside a specific "safe" area. This practice lasted between 10 and 15 minutes. *On receipt of the draft report, the Instructor disputed these figures, stating that the first practice lasted about 15 to 20 minutes.* During the first practice, it was noted that those on board **Lisa Marie** were struggling to maintain a steady course. The Instructor suggested that to overcome this problem, one of the students from his canoe, **Il Bossy**, should take over the steering of **Lisa Marie** and that the



teacher of that canoe should move to the front of the boat. Also, that one of the students from **Lisa Marie** should move to **Il Bossy**. Afterwards, they continued to practice for a further 5 minutes; *the Instructor believed this second period of practice lasted for about 10 minutes.*

- 1.10 After the practice sessions, the crews were told to follow the Instructor's canoe down the 'left arm' of the river. After they had travelled approximately 400 metres, they stopped in an eddy situated on the true river left, at a point about 10 metres above the downstream extremity of an island. *The Instructor believed the actual distance travelled was "probably in excess of 600 metres," which he believed would have taken about 10 to 15 minutes to complete.* The Instructor stated they were all practising for this period of time; that there were no problems and that he judged the standard of paddling to be good.
- 1.11 After stopping in the eddy, the crews disembarked from their respective canoes while the Instructor told them how they were going to negotiate the next rapid. He pointed out a partly submerged rock that was located immediately upstream of the large mid stream rock (Rock "A") and abreast of the willow tree. One of the students expressed concern about the forthcoming part of the trip and insisted on going in the canoe with her mother (*the parent aide on the trip*). This was acted upon by one of the male students moving to **Lisa Marie** whilst the female student who was concerned about the next leg of the trip, joined her mother in **Lynne Cee**.
- 1.12 After a short rest, the Instructor told the others to remain where they were until he gave them the signal to set off. He then set off down the rapid to show them the line they should take through the rapid.
- 1.13 After he had completed the rapid without incident, the Instructor eddied out on the true river right, about 20 metres downstream of Rock "A". He then walked back upstream and stood adjacent to the willow tree and the partly submerged rock.
- 1.14 The Instructor signalled that **Lisa Marie** should start its descent of the rapid. Initially, the crew of **Lisa Marie** experienced difficulty in getting across a shingle bank that was located adjacent to the eddy but eventually, after some assistance, they managed to clear the left side of the stream and head towards the true river right, in an attempt to follow the Instructor's line. However, their canoe struck the partly submerged rock, which caused it to turn through an arc of 180°. Initially, the crew on **Lisa Marie** was unable to turn the canoe around to face the rapid and it passed through backwards. After passing the rock, however, the canoe circled around completely, and travelled in the correct direction before eddying out on the true river right next to the Instructor's canoe. The crew then started to walk along the bank of the river to where the Instructor was standing.
- 1.15 As soon as **Lisa Marie** had cleared the rapid, the Instructor signalled the crew of **Lynne Cee** to commence their descent of the rapid. They also experienced some difficulty in clearing the shingle bank. As they approached the "V" of the island and the confluence of the two arms of the river, the canoe was swept sideways. The front of the canoe turned downstream, heading directly for the rock "A". The crew managed to turn the canoe to the right, in an attempt to clear the rock, but the canoe was caught by the current and was swept broadside onto rock "A". Initially, as the canoe rode up the pillow of water in front of the rock the upstream facing 'gunwale' (*top of the side of the canoe*) 'leant' over towards the surface of the water. At this juncture, the crew acted as they had been taught and "hugged the rock" by leaning towards it so that the downstream side of the canoe leant in the opposite direction namely, towards the rock. As that happened, the downstream amidships gunwale dipped, and water from the pillow of water flowed into the boat, causing it to swamp quickly. This, combined with the action of the crew, who were already leaning towards the rock, caused the downstream side of the canoe to sink underwater.



- 1.16 When **Lynne Cee** started to sink, the parent aide managed to grab hold of one of the two students (*who were positioned in the middle of the canoe*), by their helmet but was unable to free the student before the parent aide was swept downstream by the force of the water. The parent aide was subsequently washed ashore at the eddy where the other two canoes had come ashore. The male student, who had been in the front of the canoe, was also swept downstream. Meanwhile, the two students in the centre of the canoe were left trapped between the canoe and the rock, after the hydraulic force of the water held the submerged canoe firmly against the rock. This was known as a 'wrap'.
- 1.17 The Instructor and the parent aide made several attempts to swim to Rock "A" but were unable to gain sufficient grip to hold onto the rock and were swept away on each occasion.
- 1.18 After trying and failing numerous times to reach the rock, it was decided to seek assistance. The parent aide, the teacher and the remaining female student ran back to the car at the "put in" point and drove to the Landrover at the 'get out' position, to collect the Instructor's cellphone. However, there was no cellphone coverage in the valley and they had to travel back towards Hanmer Springs until they could get good reception on the cellphone. At 1115 hours, they called "111" to alert the Police. The Police Southern Communications Centre, which received the call, immediately activated an ambulance, helicopter rescue, local police constables, Occupational Safety and Health and the Maritime Safety Authority.
- 1.19 After they had made the emergency call, the parent aide and the teacher called the school where the mother of the other missing student was working.
- 1.20 On their return to the accident site, they found that the Instructor had driven his Landrover into the stream until it started to be pushed downstream by the river flow. He then tried to run a line across to the rock where the two female students were trapped but was unsuccessful and had to abandon the attempt. At about this time a police constable and a nurse from Hanmer Springs arrived. They were followed shortly afterwards by the volunteer fire brigade and police back up. Two of the volunteer firemen were trained qualified raft guides with river rescue training. One was the previous owner of the company and was very familiar with the river. Continuous but unsuccessful attempts were made by the police and firemen to reach the two trapped students. Eventually, one of the firemen, was able to gain access to the rock. However, he was unable to move the canoe which was still firmly wrapped across the face of the rock at a depth of between 0.5 and 1.0 metre beneath the surface.
- 1.21 At approximately 1200 hours, the Westpac rescue helicopter, with a water rescue team on board, arrived at the accident site. That team also tried to gain access the canoe but was thwarted by the fast flowing current in the river.
- 1.22 At 1225 hours, a mechanical digger was requested and was transported to the accident site.
- 1.23 The mechanical digger arrived at approximately 1320 hours. It was driven to the water's edge and, using its hydraulic arm, the driver of the digger was able to dislodge the canoe from the rock.
- 1.24 At approximately 1343 hours, when the canoe was swept downstream by the river flow, the bodies of the two students floated to the surface. They were brought ashore by members of the rescue teams.



KEY CONDITIONS

The Company and Personnel

- 2.1 In 1997, the owners, consisting of the Instructor and his Partner purchased the company, which owned the canoes. The Instructor had worked as a manager for the previous owners between September 1994 and June 1995. In addition to operating the Canadian canoes, the company conducted many other outdoor activities. These included rock climbing, mountain biking, tramping, bush walking, bushcraft, orienteering and initiative (team building) exercises.
- 2.2 The company had a 'Staff Handbook', which contained general company instructions and procedures; specific procedures and a risk management plan for each activity. When activities and client numbers required, the company employed other established instructors on a casual basis. No additional instructors were used on this occasion.
- 2.3 The company maintained an incident book, which detailed accidents and incidents that had taken place in all their activities. Since 1997, only one other river accident had been reported, when a canoe capsized at the bottom of a rock garden. This did not result in any injuries.
- 2.4 The Instructor had extensive outdoor activities experience. He had been a Physical Education teacher in England between 1975 and 1984. He was then promoted to Head of Recreational Studies until 1993. During 1993 and 1994, he travelled the world, eventually settling in New Zealand. Between 1994 and 1995 he was the manager of the company, which was based in Hanmer Springs. He returned briefly to teaching between November 1995 and January 1996, before resuming employment with the company in the same year. This situation continued until he purchased the company in January 1997.
- 2.5 The Instructor had undertaken white water rescue courses in December 1997 and October 1998. He was also involved in search and rescue and had taken part in annual exercises since 1998. He had not taken part in a dedicated canoeing course and held no specific canoeing credentials.
- 2.6 The previous owners of the company, had been running similar canoeing trips over the same stretch of water for about seven years. The new owner had not significantly changed the content of the trips. The only major change in the way the trip was run by the previous owners was the time spent on paddling practice. Before this accident, each crew was given about 15 minutes practice time. One of the previous owners, however, stated that his clients remained on the water for approximately two hours. The first part of this period was used to practice near the "put in" point, and lasted between 30 and 60 minutes. The balance of the time was for the run down the river. The Instructor stated that he had spoken to three instructors who had worked in this type of business and none of them had ever experienced a practice time as long as one hour. The Instructor stated that when he was employed by the previous owners of the company, the maximum total practice time he had seen on the water was no more than 20-30 minutes.
- 2.7 The Instructor and new owner of the company had amended the procedures and risk management policy for each of the activities and had prepared detailed documentation. Nonetheless, he had not identified Rock "A", a known risk, as a significant hazard and identified ways to eliminate, isolate or minimise that hazard.



The Canoes

- 2.8 Two of the Canadian canoes that were used on the trip, one of which was **Lynne Cee**, were already owned by the company when it was purchased by the new owner in 1997. They were about 9 years old. Since taking over the business, the new owner had replaced two other canoes with new ones. He was in one of the new canoes at the time of the accident. All the canoes owned by the company, including the new ones had been purchased from 'Perception', a New Zealand owned and operated company, were supplied as "hulls to which gunwales were fitted." Other internal parts that were fitted to each canoe, included a central buoyancy chamber; two seats that were fitted onto wooden cross members and a further two cross thwarts situated on either side of the canoe's mid-point, which strengthened the hull and provided a fixture for the central buoyancy chamber. These parts were usually recycled from the canoe being replaced. There was also a rope handle at each end to assist in carrying the canoe. The hull of each canoe was constructed of polyethylene and fitted with plastic and aluminium gunwales. All the canoes were 5.2 metres in length and 0.84 metres in width.
- 2.9 The polyethylene construction of the hull gave each canoe what was known as 'high impact resistance'. The canoes were inspected regularly and any defects found were repaired. Cracks in the hulls were repaired professionally by thermal plastic welding. The gunwales were one of the most vulnerable parts of the canoes and were replaced whenever they showed signs of wear and damage. In 1997, a modification was made by the previous owner when heavy gauge plastic pipe was used to cover the gunwales. This gave them additional protection from physical damage. The seats and cross thwarts were repaired or replaced as necessary.
- 2.10 **Lynne Cee**, one of the original canoes, was well maintained and had been repaired as required with new parts being fitted as and when necessary. When the canoe was inspected after the accident, the hull was found to be damaged about the stern. The damage was considered to be consistent with the action that was taken by the digger to remove the canoe from the rock. Slight damage was also found to the gunwales at the mid point of the canoe.
- 2.11 When supplied fully assembled by the manufacturers, this type of canoe was additionally fitted with 'Flotation bags', consisting of blocks of polystyrene, that were located at each end of the canoe. The canoe's central buoyancy chamber and the two flotation bags were designed to maintain positive buoyancy when the canoe was swamped. They were not, however, designed to keep the crew and other equipment afloat. When the canoes were bought as a kit set, as occurred in this case, the flotation bags that fitted at each end of the canoe, were not supplied by the manufacturers but were available as an optional extra. None of the canoes owned by the company were fitted with flotation bags. The Instructor said he had never been advised by anyone regarding the need for flotation bags. Since the accident, he had been told that these bags were used to assist in the event of a canoe sinking, particularly in open water situations.
- 2.12 When freed from the rock by the digger, the canoe floated to the surface immediately and remained afloat until it was recovered.
- 2.13 The manufacturer did not state specifically to customers the maximum capacity of the canoe but did indicate that the canoe was suitable for two adults and sufficient equipment for a multiday trip. The manufacturer estimated that a conservative loading of 250 kilograms would be acceptable for this type of canoe. The total laden weight of **Lynne Cee** at the time of the accident was less than 250 kilograms. On some occasions, two children and one adult were carried on one of the company's canoes. Other operators of this type of canoe who were canvassed by the Investigator, indicated that they would only allow one child in the centre of the canoe with an adult at each end.
- 2.14 The manufacturer of the canoe was of the opinion that the type of canoe used at the time of the accident was designed for use up to and including Grade 3 rapids. Some canoe operators, however, were of the opinion that it was suitable for use only up to and including Grade 2 rapids.



- 2.15 Some experienced canoeists stated that this type of canoe was cumbersome and difficult to handle, particularly when they took on water. For this reason, they said it was important to fit additional flotation when engaged in whitewater conditions, as occurred in this case. Canoeists that ran their canoes in whitewater conditions stated that they usually fitted additional flotation. This was to assist primarily with recovery of a swamped canoe. The Instructor was unaware of the use of additional flotation when canoes were used in white water operations.

The Clients

- 2.16 The trip had been arranged for the class of years 7 and 8 (Forms 1 and 2) students of Hanmer Springs Primary School. The class consisted of fifteen students who were aged between 11 and 13 years. It was decided between the School Principal and the Instructor that they would run the trip in two groups, one of which would leave in the morning and the other in the afternoon. It was agreed that a parent aide, a school teacher and the Instructor would accompany each group. There were seven students in the group that left in the morning and the remaining eight were due to leave in the afternoon group. In the event this group did not go on their trip. Three of the students in the morning group were female.
- 2.17 The Risk Management Plan of the company required a maximum adult to student ratio of 1 to 5. The School required a number of factors to be taken into account when assessing the adult to student ratio (paragraph 2.27). The Principal indicated that he was comfortable with the ratio of three adults to seven students that comprised the morning group.
- 2.18 In lieu of asking for volunteers from the parents, the Principal chose the parents that would accompany the students. He stated that the parent aide on the morning trip was chosen because of her swimming ability and because she had canoed this stretch of the river before.
- 2.19 The Principal was on a first aid course when the accident occurred. A relief teacher, who was hired to replace the Principal, was assigned to be on the trip from its inception. Although she had never been in a Canadian canoe before, she had paddled kayaks during other school trips.
- 2.20 The parent aide stated that whilst she had canoed on the river before, it was during the summer and with a different school. At that time, there was a drought, and the river level was very low. These conditions resulted in the group spending a great deal of time out of their canoes to push them clear of the river bottom and other obstructions. This was very different from the conditions that were experienced at the time of the accident.
- 2.21 The staff members assigned to accompany the students were changed about a week before the trip. The risk assessment for the trip was processed by the company and passed by the Principal.

Education Outside the Classroom (EOTC) (Condensed from Ministry of Education Guidelines for Good Practice 1995)

- 2.22 Outdoor education for students is commonplace throughout the education system. The complexity and extent of the activity is usually dependent on the age of the students. In recent years, there have been a number of injuries and fatalities during organised school trips (*none at Hanmer Springs*).
- 2.23 The aim of EOTC is to assist students to gain knowledge, skills and attitudes needed for continuous lifelong learning. It enhances learning in all areas of the general curriculum. The programmes may have a particular emphasis. They may include:
- ◆ Development of outdoor recreational skills
 - ◆ Increase in self esteem and self confidence



- ◆ Ability to overcome challenges and the satisfaction that brings
- ◆ Improvement of communication skills
- ◆ Environmental education

2.24 To achieve the above goals there has to be a balance between the risk (particularly perceived risk) and the safety of the participants.

2.25 When a school decides that they intend for the students to take part in an EOTC activity, a process needs to be put into place to confirm that all aspects of the trip are considered for the safety of the participants. A safety management system should cover the following items:

- ◆ A risk analysis process. This may take the form of a Risk Analysis and Management System (RAMS).
- ◆ A plan covering the activity including an itinerary and transportation.
- ◆ A group profile covering the health and behavioural aspects and identifying considerations linked to age, experience and ability of all involved.
- ◆ Links to the organisation's emergency plan
- ◆ Communication with parents and caregivers
- ◆ Equipment and food lists as appropriate
- ◆ A budget.

2.26 The RAMS method of assessing the risks that may be encountered during an EOTC activity has been designed to provide organisers with a simple tool to ensure that all eventualities are covered. It provides a base format that allows the organiser to look at the activity. It covers the following aspects:

- ◆ Clearly identify potential risks and subsequent areas of loss
- ◆ Determine the areas of priority for planning outdoor activities
- ◆ Assess needs, skills and competencies of those involved
- ◆ Determine appropriate strategies
- ◆ Assess the adequacy of contingency planning.

The system then goes on to identify how the risks that have been identified should be dealt with.

2.27 The Guidelines recommend that when assessing the leader to student ratio the following should be taken into account:

- ◆ Teacher/instructor competence, qualifications, skills, knowledge and experience for the activity to be undertaken.
- ◆ The age, ability, experience and maturity of the students.
- ◆ The degree of risk involved.
- ◆ The level of control and supervision required.



- ◆ The standard and level of the equipment available.
- ◆ Climate, other environmental factors and the time of year.
- ◆ Site and locality features.
- ◆ The nature and availability of emergency support.
- ◆ The desired educational outcomes of the activity.

2.28 Guidelines established by recognised national advisory bodies for the activity concerned.

EOTC Reference Group and the School's EOTC Policy

2.29 In 2000, following two double fatality drowning accidents, industry groups formed a forum to discuss how best to prevent a recurrence. The forum initiated a working group. This group made three recommendations, one of which was that the Ministry of Education should convene a Risk Management Reference Group to look into EOTC.

2.30 To implement the above recommendation, the Ministry of Education convened a group of experts to investigate guidelines and other resources available to schools. At the time of this accident, the Group was in the process of compiling a comprehensive information resource for school principals and Boards of Trustees to guide them on the preparation of policy and procedures to provide safe EOTC. This information will include risk and safety management techniques and processes, current codes of safe practises for various outdoor activities and advice of how to ensure that EOTC activities result in better learning outcomes for the students.

2.31 The Principal stated that when he completed the RAMS, he was relying on the company's risk management plan to ensure that the safety of the group was not compromised when they were on the water. In addition, he identified the need for the teachers and parents to have basic first aid skills, effective group management skills and common sense. He assumed that the company would provide the necessary skill for the canoeing part of the trip.

2.32 The school did have an EOTC policy in place. Its guidelines were followed prior to the canoeing trip. A RAMS was completed. The Principal stated that this was compiled in conjunction with the owner of the company with reference being made to the risk management policy of that company. Neither the teachers (save for the teacher who was assigned to replace the Principal) nor the parent aides were involved in the organisation of the trip. Neither the teachers nor the parent aides were involved in the compilation of the RAMS. It was the opinion of the Principal, that it would not have made any difference who had written the RAMS. The Investigator was of the opinion that it would have been better had all the adult participants engaged on the canoe trip, been involved in the preparation of the RAMS.



Environmental Conditions

2.33 The National Institute of Atmospheric and Water Research (NIWA) measured and recorded the Clarence River water flows at Jollies Pass. The river gauge was situated in position 023611 on Map N31 – Acheron - of NZMS260 series 1:50000 scale map; this position was approximately 3.5 kilometres downstream of the accident site.

- 2.34 The flows on the day of the accident were reducing. At 0945 hours, the flow was 20.16 cubic metres per second (cumecs) and at 1115 hours 20.04 cumecs. The records over the previous forty years indicate that the mean flow of the Clarence River for October was 23.7 cumecs. The mean flow for October 2001 was 17.3 cumecs.
- 2.35 The Instructor stated that he generally inspected the river after there had been rain in Hanmer Springs or Lake Tennyson or when he hadn't canoed the area for a period. On this occasion, he inspected the river the previous evening. He found there was no discolouration of the river; that the flow was normal for that time of year and was of an acceptable height. He considered that the river conditions fell within his safe operating parameters for canoes.
- 2.36 The Instructor stated that the river conditions were better on the morning of the accident than they had been the previous evening.
- 2.37 At the time of the accident the weather was fine with light winds.

The Trip, Equipment and Briefing

- 2.38 The trip had been arranged during the first week of October 2001. It was agreed that fifteen students from school years 7 and 8 would take part in a canoeing trip. The school had not been on a canoeing trip for several years but had used the company for other outdoor activities.
- 2.39 On Monday 23 October, the Instructor went to the school to discuss meeting times; the equipment that the students (and helpers) would need for the trip and how the trip would be run.
- 2.40 On arrival at the "put in" position, the Instructor unloaded and explained the wet weather clothing and safety equipment. He stressed the importance of the order of donning the clothing and the need to select the correct sizes. The safety equipment and clothing included (*in the order of donning*), a polypropylene 'skivvie', a wetsuit, a spray jacket, a personal flotation device (PFD) and a plastic water sports helmet.
- 2.41 The PFD's worn by the students and by the two students who were trapped, were made by Topsport Ltd. These were manufactured to comply with New Zealand Standard NZS 5823 and were designed to be worn by a person of between 22 and 40 kilograms and provide 59 Newton's of buoyancy. The PFD's indicated signs of wear consistent with their age and the amount of use but were in a fully serviceable condition. All fastenings were intact and there were no tears or rips in the external fabric. Once the canoe was removed from the rock, the two students floated to the surface immediately.
- 2.42 Before the canoe trip commenced and whilst the parent and the Instructor were taking the Landrover to the "get out" point, the students were given a problem to solve. They were asked to identify which end of the canoe was the 'front' and to provide a number of reasons to support their conclusion. Later, the students correctly identified the front of the canoe and gave a number of reasons in support.
- 2.43 The Instructor split the group of seven students into three crews. They were all expected to paddle. Each crew had a "captain" namely, the person in charge of steering the canoe, a "navigator" namely, the person in the bow of each canoe whose duty was to get out and hold the canoe when they beached and the "power house" namely, the person(s) in the centre of the canoe who was to paddle.



- 2.44 Once the crews were arranged, the Instructor gave the whole group a full safety briefing. This included the safe position to float down the river should the canoe capsize; how a throw bag would be used to rescue someone in the water and, according to the group, that they should "hug the rock" or lean into the rock if the canoe passed close to or hit a rock; *the Instructor denied ever making any mention of passing close to or hitting a rock to the group.* The Instructor showed the group how to hold their paddles and reminded them that they should kneel in the canoe. He showed the "captains" how to steer the canoe and told them that they should paddle on one side only. He also told the group that the canoe should be kept between "10 and 2 o'clock" relative to the flow of the river. This was to reduce the risk of the canoe turning broadside to the river flow, which would make it difficult to control and also liable to capsize should it hit an obstruction. The briefing lasted about 15 minutes.
- 2.45 The canoes were launched in an area of calm water that was adjacent to the "put in" point. The crews boarded their respective canoes and practised paddling and steering in the slow moving water. They were told the limits of the area in which they could practice.
- 2.46 During the practice session, the crew of **Lisa Marie** found it difficult to maintain a straight course. The Instructor decided to put one of the students from his canoe into **Lisa Marie** to act as "captain" and moved the teacher in **Lisa Marie** to the front of the canoe. The student who had been navigator of **Lisa Marie** was moved to **Il Bossy**.
- 2.47 After this exchange of personnel, they continued to practice for a short while longer before they headed down the river.
- 2.48 Prior to setting off, the Instructor gave them a further safety briefing, which described the hand/paddle signals he would use on the river. He also reminded them to closely follow the line that his canoe took.
- 2.49 The canoes negotiated the first section of the river, which was a Grade 1 or less (on the International Scale of Whitewater), without incident. However, the canoes did bounce over a few boulders, which was sufficient to cause concern to a couple of the paddlers. The anxiety of one of the female students was such that when they stopped at the eddy she said that she was frightened and insisted on joining the canoe (**Lynne Cee**), that had her mother as "captain". The Instructor, who was party to these discussions, insisted that it would be best for the student to remain in her original canoe but relented when she persisted. A male student in **Lynne Cee** moved to **Lisa Marie** to enable the female student to join her mother.
- 2.50 While stopped at the eddy, the Instructor briefed the crews on how he expected the upcoming rapid to be negotiated and reiterated that they should follow the line of his canoe. He told them that they should remain at the eddy until he was in position to provide 'foot cover'. He would signal them when it was safe to proceed down the rapid.
- 2.51 **Lynne Cee** cleared the eddy and headed across the river towards the right hand side. They had difficulty in getting across the river. This was exacerbated when they reached the confluence of the stream from the right arm of the river and the stream from the left. The Instructor stated that **Lynne Cee** was angled about 45° to the direction of the flow of the river and that the canoe was quickly set down onto the rock.
- 2.52 When the stream caught the canoe, the Instructor could see that it was likely to collide with Rock "A". He shouted directions and gave hand signals to the parent aide. Because of the ambient noise of the flowing river, it is unlikely the parent aide would have been able to hear anything. In her testimony the parent aide indicated that she was concentrating so hard to avoid the rock she neither heard nor saw the Instructor's directions.



2.53 Prior to the canoe hitting the rock, the parent aide stated that there was a small amount of water in the canoe. She estimated that it covered the bottom of the canoe to the depth of 25 to 50 millimetres. She thought that it might have been brought into the canoe when the crew disembarked and embarked at the eddy. The Instructor said he would be "very surprised" if there was that amount of water in the canoe.

Geography and Topography of the Area

2.54 The area where the canoeing trip took place was approximately 10 kilometres north of Hanmer Springs. Access was over an unsealed mountain pass road.

2.55 There was no cellular telephone coverage on the northern side of the pass. It was necessary to travel down the southern side of the pass, until the town came into sight, before good reception was obtained.

2.56 The stretch of the Clarence River that was used for the canoeing trip was approximately two kilometres between the "put in" and "get out" points. The river was divided by an island over the first two to three hundred metres. Predominately, the river was smooth easy flowing water with occasional Grade 1 and 2 rapids. There were no known entrapment dangers in the stretch of water used on this occasion. Canoes had capsized in the past but those incidents had only resulted in minor injuries to the paddlers. Swamped canoes had been known to 'wrap' on Rock "A" and on one occasion, about 7 years previously, a canoe had wrapped with its bottom against the rock and had required a truck to free it. On those occasions, the paddlers had fallen out of the canoes before they made contact with the rock and had floated safely down to the eddy below the rock.

2.57 Rock "A" had an upstream face that was perpendicular to the surface of the water. It did not appear to be undercut. The rock face measured approximately two metres in width. On this occasion, it appeared that the overall length of the canoe overhung the rock face equally on either side and was lying at a depth of between 0.5 and 1.0 metre below the surface.

2.58 Foot access on either side of the river was good. There was easy vehicular access on the southern side of the river. There were ample areas for a helicopter to land on either side of the river.

Legislation and Industry standards

2.59 The Maritime Transport Act 1994 (MTA) applied to the operation of any ship in New Zealand waters (**Ship** is defined in the MTA as: - every description of boat or craft used in navigation, whether it has any means of propulsion). Apart from the above, there were no specific statutes, regulations or rules that referred specifically to the operation of canoes.

2.60 The company maintained operational procedures and risk management plans for each of the activities that they carried out.

2.61 There were a number of similar operations that provided canoeing trips for schools in other parts of the country. In addition, kayaking instruction was found to be wide spread.

2.62 The New Zealand Outdoor Instructors Association (NZOIA) was established in 1986, to provide a nationally recognised assessment scheme for outdoor instructors. The scheme was performance based, reflecting the minimum requirements for a person to lead or instruct others in a given environment and situation. It should be noted that it was a pre-requisite of the scheme that the personal skill level of an instructor had to be at least one grade higher than the grade of water the award allowed them to teach on.



- 2.63 Presently, NZOIA administers a nationally recognised award scheme for bush, alpine, abseiling, rock climbing, canoeing, kayaking, caving, and sailing (through NZYF). Due to the limited number of practitioners, the canoe course and award had never taken place. The scope of the Canoe 1 award includes placid or moving water up to a Grade 1 rapid. There is insufficient demand for an award for waters above Grade 1. However, the scope of the Kayak 1 award includes skills on moving water up to and including Grade 2. In addition, the Kayak 2 award includes skills on moving water up to and including Grade 3. The majority of the skills in the Kayak awards are transferable to canoeing.
- 2.64 The New Zealand Recreational Canoeing Association (NZRCA) also runs training courses. Primarily, these are focussed on river safety and river rescue. However, the majority of the skills are equally applicable to canoeing.

General Information

- 2.65 When the female student expressed her concern about the forthcoming part of the trip, no action was taken apart from her changing to her mother's canoe. It was, however, usual in situations like this, particularly where access along the river bank was easy and safe, that a client who was unhappy about running a rapid, would be given the opportunity to walk alongside the rapid and rejoin the canoe on a more placid stretch of the river. No such option was offered on this occasion. The Instructor stated it was his recollection that the female student asked at the beginning of the trip if she could go with her mother and that her concern was to travel with her mother and was not about any anxiousness as regards the trip per se.
- 2.66 On a previous occasion, there had been an incident where a student had left her canoe and returned to the vehicle that was at the "put in" position. However, the student had not sought permission and had absented herself without advising anyone. The owner stated that arising from this accident, he had changed his procedure such that, should anyone not want to continue on the trip, the whole party would be pulled off the river and the trip abandoned. However, this would only occur if there was an insufficient number of adults to accompany the child/children back to the vehicle at the put in position. If there was a spare adult, then the trip would continue. He mentioned that his primary concern, if such an event was to occur, was that he would be unable to maintain sufficient adult control over all the students to ensure their safety.
- 2.67 The owner was renowned for his safe attitude and application of safety techniques. On this occasion, he ensured that his instructions were clear and fully understood. Moreover, he reiterated the 'safety message' throughout the trip and gave clear directions on how to negotiate forthcoming obstacles.
- 2.68 The Risk Management Plan of the company required an adult to student ratio of 1 to 5. This was met on this occasion but the skill level and training of the other adults was not taken into account. Their lack of sufficient skill in a canoe effectively reduced the instructor to client ratio to 1 to 9. There was a ratio of one instructor to three canoes which, according to the Instructor was a better ratio than could be found on some kayak trips. An instructor on kayak trips disagreed with this remark, stating the ratio should be between adults and students and not the number of craft involved. Further, that the ratio of adults to students would be dependent upon the skill level and training of the adults and the grade of river being undertaken.
- 2.69 When a canoe hits an obstacle, such as the rock in this accident, at a time when it is lying broadside to the flow of the river, the downstream side of the canoe almost always starts to lift on the pillow wave in way of the obstacle. In turn, this causes the upstream side of the canoe to lean or heel over towards the surface until water eventually starts to flood into the canoe and it 'flips' over, spilling the occupants into the river. To prevent this happening, canoeists are taught to lean towards the rock (*to "hug the rock"*) to prevent the downstream side of the canoe from lifting on the pillow wave. Usually, the force of the water will push the canoe to one side of the rock, or the paddlers may be able to work their way across the face of the rock and push the canoe back into the water flow.



- 2.70 On this occasion, the crew of **Lynne Cee** did the correct thing by leaning towards the rock. This caused the canoe to lean towards the rock but more so than expected, with the result that the downstream gunwale became submerged and the canoe rapidly filled with water and wrapped around the rock, trapping the two students.
- 2.71 The crew in the three canoes was changed after they had been selected for weight and strength and had launched the canoes. According to the Instructor, the students who were shifted were not substantially different in size and that the balance of each canoe was not materially affected.
- 2.72 The Instructor and owner of the company, through his legal advisors, has advised the Maritime Safety Authority that because of the "substantial effect" this accident has had upon him, he no longer wishes to be involved in water instruction and accordingly has sold all the company's canoes to the Christchurch Polytechnic.

Qualmark

- 2.73 Qualmark is New Zealand tourism's official quality assurance agent. It is best known for its work in the accommodation sector, licensing and assessing properties annually, and awarding star grades against set criteria.

Qualmark, following a \$2.5 million government funding package, is expanding its operation to undertake assessments against standards across sectors such as adventure tourism and eco tourism.

Qualmark and the Adventure Tourism Council have been working with several sectors to draft quality tourism standards with the intention on developing a set of professional operating standards, including safety standards, for each sector.



The development of quality standards is focused on the following areas:

- General safety and welfare.
- Customer service.
- People
- Facilities and equipment
- Environmental and cultural aspects
- Overall business operations.

The standards will be generic across all sectors, with industry specific components developed as appropriate for each sector. Considerable additional focus is to be placed on safety for adventure tourism operations. The following adventure sectors are well advanced and will be piloted from July 2002: sea kayaking, horse trekking and all terrain vehicles.

The development and implementation of these quality standards will provide the following benefits:

- One consistent standard for each sector
- The acceptance by regulatory authorities of 'best professional practice'
- Lower costs through pre-approval of safety plans for concessions and consents
- Raising of industry standards
- Better meet customer expectations
- Provide written assurances regarding their safe operation

CONTRIBUTING FACTORS

- 3.1** There was some water in the canoe. This would have increased its weight and made it more difficult to manoeuvre.
- 3.2** The participants were not sufficiently experienced or capable to manoeuvre the canoe through a Grade 2 rapid. In addition, they may have had insufficient power to propel a heavy and cumbersome canoe.
- 3.3** When it became obvious that they were going to hit the rock, the paddlers were reported to have stopped paddling. This may have been through fear or in preparation for expected impact.
- 3.4** The training provided to the participants was rudimentary and did not prepare them sufficiently for the task ahead of them.
- 3.5** The student to adult ratio was superficially more than adequate. However, it did not allow for the inexperience of the teacher and the parent aide in the activity that they were required to control. In effect, this increased the ratio to 9:1.
- 3.6** The flotation of the canoe was insufficient to keep the swamped canoe on the surface. If there had been more flotation, the canoe would have ridden higher in the water. This might have been sufficient to prevent the downstream gunwale from becoming immersed and the canoe subsequently sinking after it became wrapped against Rock "A".



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 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 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 The canoe wrapped with its gunwale against the rock, entrapping the two students in the centre section.



OPINIONS & RECOMMENDATIONS

Opinions

- 5.1 The "on-water" training period for the paddlers and in particular the "captains" was clearly insufficient for them to negotiate the whitewater rapid safely. A more structured and measured training period, by initially training those in the canoes over several practice sessions, initially on flat water, and gradually building their confidence should have been introduced, before they were permitted to navigate a canoe in white water conditions up to Grade 2 level. This is an important lesson that should be learned by all participants in the sport, particularly by teachers, parent aides and those who are engaged in instruction.
- 5.2 The canoe became wrapped with its gunwale against the rock, thereby trapping the two students between the canoe and the rock. This was extremely unusual given that most canoes and other white water craft, such as kayaks and rafts, flip in an upstream direction and become wrapped with their keel or underside against a rock or obstacle. The exact reason why the downstream side of the canoe became submerged in this case is unclear. However, the utilisation of more flotation in the canoe, using barrels and/or flotation bags, would have increased the canoe's buoyancy thereby helping to minimise the risk of water entering the canoe.
- 5.3 The Instructor had not attended a whitewater rescue course for three years. Neither did he have a recognised canoe instructor's award. There was no legislation that required him to have either.
- 5.4 The student/adult ratio did not allow for the inexperience of the teacher and parent and grade of the river to be undertaken. The Instructor, who had no formal training, was the only person present with any canoeing or swiftwater rescue skills.
- 5.5 The weight in the canoe was within the limits specified by the manufacturer. Also, the grade of water that the canoe was negotiating was below the maximum recommended grade for this type of canoe.



Recommendations

It is recommended that:

- 6.1 Commercial canoe/kayak operators consider the development of a sector specific code of safe practice in conjunction with Qualmark.
- 6.2 Commercial canoe operators adopt the Qualmark system for voluntary, self-regulating code of practice for adventure tourism operators when it becomes commercially available.
- 6.3 The Ministry of Education, through the reference group, expedite the publication of the guidelines for EOTC in order that schools can learn to take the appropriate steps to reduce risk to students.
- 6.4 The Ministry of Education further consider providing schools with information and access to professional development. Further, that this training include a decision making process that helps schools to identify if they have the internal capability or if they need to utilise expertise. The training and information should then lead schools into how to choose a good provider of services, how to contract them and how best to minimise, isolate or eliminate risk. Schools should be particularly appraised of the importance of initiating structured and measured training of students in low risk conditions, so that they obtain the necessary skills and experience before they are subjected to higher risk situations.

- 6.5** The Ministry of Education request school principals to take into account the experience and capabilities of teachers and parent aides when they are assigned to EOTC activities. Should there be an insufficient number of experienced persons available, they should consider the use of additional professional instructors or failing that, defer the activity until such time as suitably experienced personnel are available.
- 6.6** If the company involved in this accident decides to resume the activity of canoeing or any other white water operation, they should use suitably qualified and experienced instructors. In addition, the company should implement appropriate staff training by a person suitably qualified in that particular white water activity. The Instructor stated that no courses were available or had taken place for canoes since they had taken over the business.
- 6.7** The company audit their operational procedures and risk management plans internally on an annual basis.
- 6.8** The company, should they decide to resume canoeing, consider more suitable craft for this grade of water. In any event they should ensure that adequate additional buoyancy is fitted and limit to two the number of persons each canoe can carry when engaged in white water activities.
- 6.9** The Instructor, before he resumes canoeing instruction, apply to the New Zealand Recreational Canoe Association (NZRCA) to refresh his swiftwater rescue skills and complete, as a minimum, a Canoe 1 Award as set out in *Appendix 6*.
- 6.10** A copy of this report be sent to the NZOIA and the NZRCA for dissemination amongst their members.

