

Marine Safety Investigation

Report No 2008/13

Snorkeller Injury

Oceanic Explorer

The Annulus (Pope’s Eye) Port Phillip

28 December 2008



TABLE OF CONTENTS

[The Chief Investigator 5](#_Toc453751612)

[Executive Summary 7](#_Toc453751613)

[1. Circumstances 9](#_Toc453751614)

[1.1 The incident 9](#_Toc453751615)

[1.2 Consequences 11](#_Toc453751616)

[2. Factual Information 12](#_Toc453751617)

[2.1 Background 12](#_Toc453751618)

[2.2 The Vessel 12](#_Toc453751619)

[2.3 Personnel 15](#_Toc453751620)

[2.4 The Annulus 16](#_Toc453751621)

[2.5 Interview Information 17](#_Toc453751622)

[2.6 Statement of safety briefing 23](#_Toc453751623)

[2.7 Environment 24](#_Toc453751624)

[2.8 Dive Victoria Group 24](#_Toc453751625)

[2.9 Marine Safety Victoria 26](#_Toc453751626)

[2.10 Legislation, Rules, Guidelines 27](#_Toc453751627)

[2.11 Propeller injury avoidance technology 28](#_Toc453751628)

[3. Analysis 30](#_Toc453751629)

[3.1 The Incident 30](#_Toc453751630)

[3.2 Vessel operations 30](#_Toc453751631)

[3.3 Guarding against propeller injuries 32](#_Toc453751632)

[4. Conclusions 34](#_Toc453751633)

[4.1 Findings 34](#_Toc453751634)

[4.2 Contributing Factors 34](#_Toc453751635)

[5. Safety Actions 36](#_Toc453751636)

[5.1 Recommended Safety Actions 36](#_Toc453751637)

[6. Appendixes 38](#_Toc453751638)

[Appendix A Pope’s Eye Marine Park 38](#_Toc453751639)

[Appendix B Vessel Particulars 39](#_Toc453751640)

The Chief Investigator

The Chief Investigator, Transport and Marine Safety Investigations is a statutory position established on 1 August 2006 under Part V of the *Transport Act 1983*.

The objective of the position is to improve public transport and marine safety by independently investigating public transport and marine safety matters.

The primary focus of an investigation is to determine what factors caused the incident, rather than apportion blame for the incident, and to identify issues that may require review, monitoring or further consideration. In conducting investigations, the Chief Investigator will apply the principles of ‘just culture’ and use a methodology based on systemic investigation models.

The Chief Investigator is required to report the results of investigations to the Minister for Public Transport and/or the Minister for Roads and Ports. However, before submitting the results of an investigation to the Minister, the Chief Investigator must consult in accordance with section 85A of the *Transport Act 1983*.

The Chief Investigator is not subject to the direction or control of the Minister(s) in performing or exercising his or her functions or powers, but the Minister may direct the Chief Investigator to investigate a public transport safety matter or a marine safety matter.

Executive Summary

On the afternoon of Sunday 28 December 2008, the Victorian dive charter vessel Oceanic Explorer operated a combined dive and snorkel cruise in Pope’s Eye Marine Park. There were 20 persons on board comprising the master, the deckhand (who was also the dive supervisor), nine snorkellers, eight SCUBA divers and one passenger.

At about 1610[[1]](#footnote-1) the vessel anchored in the bight of the rock formation of The Annulus and all divers and snorkellers entered the water. A short while later Oceanic Explorer weighed anchor and positioned itself approximately south-west of the rock formation. Due to the prevailing weather, the master reported that Oceanic Explorer kept drifting towards the rocks and he needed to operate the engines intermittently to back the vessel away from the rocks.

Some time later, two snorkellers attempted to board the vessel via the stern ladder, near the propeller. The first snorkeller boarded the vessel and as the second snorkeller attempted to board, the master operated astern propulsion on the engines. The snorkeller’s leg fell foul of the propeller causing it severe lacerations.

The investigation found that there was a breakdown in communication and routine procedure between the master and the deckhand. The master was concerned that Oceanic Explorer would run aground on the rocks and before obtaining clearance from the deckhand (that the propellers were clear) he operated the engines.

The investigation also found that the safety briefing did not provide guidance or warnings with regard to boarding the vessel in the vicinity of the propellers, and that the vessel crew were unaware of the fact that this was the victim’s first ever attempt at snorkelling.

The report makes recommendations for the vessel operator to upgrade its safety briefings and to implement systems to ensure safe access; and for the regulator to ensure that all dive vessels provide a safe means of access when retrieving persons from the water.

# Circumstances

## The incident

On the afternoon of Sunday 28 December 2008, the Victorian dive charter vessel Oceanic Explorer operated by DVG (Dive Victoria Group) conducted a combined dive and snorkel cruise in Pope’s Eye Marine Park (see Appendix A).

The vessel departed Queenscliff at about 1445 with a master, a deckhand and nine snorkellers on board, bound for Portsea. At Portsea, eight divers and one passenger boarded the vessel. Oceanic Explorer departed Portsea at about 1510, bound for Chinaman’s Hat. At the commencement of each trip the master conducted the vessel safety briefing.

On arrival at Chinaman’s Hat at about 1515, the snorkellers were given a safety briefing by the deckhand in accordance with the DVG check-list (see section 2.6), before entering the water. The items were checked off by the master. All nine snorkellers including the victim entered the water.

After retrieving the snorkellers, the vessel departed Chinaman’s Hat at about 1600 and headed to The Annulus where it anchored in the bight of the rock formation at about 1610.

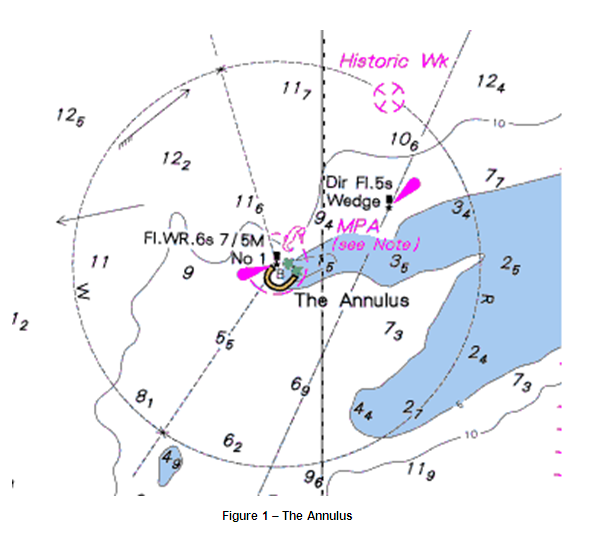


Figure 1 – The Annulus

At The Annulus, after assisting the divers and snorkellers to don their gear, the deckhand once again briefed them on the activities to be undertaken. The brief included the location of the pick-up point, which was to be to the east of the rock formation and the procedure for embarking the vessel.

All the snorkellers and divers entered the water, but a few minutes later one of the divers and a child snorkeller got back on board. Soon after, the other snorkellers swam around the northern tip on the west side of the rock formation. Oceanic Explorer weighed anchor and followed the snorkellers and then lay stopped and drifted in the general vicinity south-west of The Annulus.

The current was reported to be negligible but due to the prevailing wind, the vessel kept drifting in a generally north-east direction towards the rocks. The master had to operate the engines intermittently to maintain the vessel a safe distance from the rocks.

Some time later, the deckhand advised the master that one snorkeller in the group wished to return to the vessel. The master acknowledged and navigated the vessel towards the snorkellers and called out to them to board the vessel “one at a time”. The master noted that when the first snorkeller boarded the vessel it was very close to the rocks.

The master said that he called to the deckhand to enquire if all was clear at the stern and pointed to a few snorkellers a few metres off the vessel, before he engaged the engines into astern propulsion to back the vessel away from the rocks. Almost immediately, the occupants of the vessel heard a snorkeller scream that her leg was hurt.

The engines were stopped and the snorkeller was recovered by the master and the deckhand. They noticed that the snorkeller had suffered a severe cut to the leg and commenced rendering first aid.

The deckhand contacted the vessel’s shore office by telephone and advised them of the situation. An ambulance was arranged to meet Oceanic Explorer at the Queenscliff wharf and another vessel was despatched from Queenscliff to pick up the divers.

When the vessel arrived at Queenscliff the injured snorkeller was transferred to an ambulance and transported to hospital.

## Consequences

The victim suffered a severe laceration of the outside of the left leg between the knee and the ankle, about 6 to 10 centimetres wide, severing three tendons and exposing the bone. She also suffered less severe lacerations to her right leg. There was no injury to other persons or damage to the vessel.

# Factual Information

## Background

The master and deckhand conducted two dive charters earlier in the day which were SCUBA training dives in the vicinity of Port Phillip Heads. The trainee divers were accompanied by their own dive supervisors and the charters concluded without incident. The incident occurred on the third trip which was a combined SCUBA dive and snorkelling charter.

When Oceanic Explorer arrived at the Annulus, there were two vessels anchored inside the bight, one was retrieving divers and the other had divers in the water. A third vessel was anchored north of the bight, engaged in recreational fishing.

## The Vessel

MV Oceanic Explorer is a monohull with transom stern and single open deck dive charter vessel, built by Hampton Yachts, Western Australia in February 2000. It is owned and operated by DVG. At the time of the incident the vessel was under survey with MSV (Marine Safety Victoria), to operate in Port Phillip and up to 15 nautical miles off the Victorian coast.

Oceanic Explorer is of aluminium construction. It has an overall length of 9.5 metres, an extreme breadth of 3.5 metres and depth of 1.6 metres. At the time of the incident it had a draught of about 0.8 metres forward and aft.

Propulsion power is supplied by twin outboard Suzuki 4-stroke engines, each of 186.4 kW at 5,000 RPM. Each engine drives an inward turning 3-bladed 15 degree fixed pitch propeller of diameter 406.4 mm, giving the vessel a service speed of about 28 knots[[2]](#footnote-2).

The vessel’s navigational equipment complied with the requirements of the USL (Uniform Shipping Laws) Code. At the time of the incident the vessel’s certificate of survey required the vessel to be operated by a Coxswain and three general purpose hands when carrying up to 20 passengers in Port Phillip.

### Diver embarkation arrangement

Oceanic Explorer has a rectangular shaped deck. There are two embarkation points, a mid-ship bulwark door and a stern ladder, both on the starboard side of the vessel. The deck level at the mid-ship boarding point is about 800 mm above the water line. At the time of the incident Oceanic Explorer did not have a ladder fitted to its mid-ship embarkation point.

At the stern of the vessel, Oceanic Explorer is fitted with an aluminium ladder (see figure 2) which swivels down. The ladder drops to a depth of about 800 mm into the water and has a width of 460 mm. The distance between the edge of the ladder rung and the tip of the propeller blade is about 490 mm. The investigation did not notice any warning signs posted for divers to beware of propellers when exiting or boarding the vessel.



Figure 2 – Stern arrangement

The helm position is in the forward starboard side of the vessel. From the helm position, persons in the water at the mid-ship door can be sighted only if the helmsman looks out the window and leans over the side but persons at the stern ladder are hidden from view.



Figure 3 – The helm position



Figure 4 – View along the vessel from the helm position

There was a hand-rail running fore-and-aft along the starboard side of the vessel at about 650 mm above the waterline.



Figure 5 – Starboard side hand-rail just above the water level

### Certificate of survey and manning

Oceanic Explorer entered MBV[[3]](#footnote-3) (Marine Board of Victoria) survey in August 2000. The original owner requested, and the Board agreed, to the vessel being operated by a Coxswain (the master) and three general purpose hands when carrying up to 20 passengers within Port Phillip.

In February 2002 MSV issued a certificate of Survey to Oceanic Explorer which stated that the vessel could be operated by a Coxswain and one general purpose hand. However, in March 2002 MSV issued a letter to the owner stating that the manning of Oceanic Explorer and its two sister vessels was revised to a Coxswain and three general purpose hands.

On 31 March 2004, the owner was informed by letter from MSV that only two members of the crew needed be on board while the vessel remained on station during dive activities, one of whom must be the master. The letter also stated that the two crew members who may be off the vessel during dive activities must be bona fide crew who are fully trained in the operation of the vessel.

In April 2004 Oceanic Explorer was taken over by Dive Victoria. All subsequent certificates of survey up to the time of the incident stated that the vessel required a Coxswain and three general purpose hands when operating with up to 20 passengers in Port Phillip. When the vessel was inspected after the incident, the investigation noted that the certificate of survey was not posted in a position where it could be readily seen (see sub-section 2.10.1).

## Personnel

### The master

The master of Oceanic Explorer had about 10 years experience operating small vessels, having commenced his career as a deckhand in 1998. Prior to this, the master served as a leading seaman musician for about 11 years in the Royal Australian Navy. The master commenced integrated rating training in January 2008 and joined DVG in October 2008. After completing two charters as understudy master, this was his seventh charter in command of a dive charter vessel and third on Oceanic Explorer.

He obtained his certificate of competency as Coxswain in January 2002 issued by MBV in accordance with the provisions of the USL Code. Since that time the master has operated vessels similar in size and structure to Oceanic Explorer in the ports of Port Phillip and Westernport. At the time of the incident his certificate of competency as Coxswain was considered appropriate by MSV to take command of Oceanic Explorer.

The master’s certificate of competency was endorsed by MSV in February 2002 for ‘Passenger Operations Port Phillip Heads’ and ‘Sailing Vessels Fore-and-Aft Rigged’. He also held an Advanced Open Rescue Diver Certificate and was working towards obtaining a Dive Supervisor certificate.

The master had undergone a medical examination for employment in offshore vessels in mid-December 2008. The result of the examination indicated that he was fit for duty. He had a history of high blood pressure which was kept under control by medication. On the day of the incident the master commenced work at 0800. His previous shift was on 24 December 2008. He was not breathalysed after the incident.

### The deckhand

The deckhand of Oceanic Explorer had about 16 months experience as deckhand on dive charter vessels, having joined DVG in August 2007. Her experience was mainly in Port Phillip and in the vicinity of Port Phillip Heads. At the time of the incident the deckhand was assisting the master with navigational duties and was also the designated Dive Supervisor.

The deckhand held a valid Dive Supervisor certificate, issued by PADI (Professional Association of Dive Instructors) in May 2004 and a Dive Leader licence issued by SSI (Scuba Schools International) in November 2008. She had also completed the training course pursuant to obtaining a certificate of competency as Coxswain.

The deckhand had undergone a PADI medical examination in February 2008. The result of the examination indicated that she was fit for duty. On the day of the incident the deckhand commenced work at 0800. Her previous shift was on 7 December 2008. She was not breathalysed after the incident.

### The occupants

The occupants on Oceanic Explorer for the third charter of the day comprised nine snorkellers, eight SCUBA divers and one passenger. This was the victim’s first experience at snorkelling whilst her friend was a regular snorkeller. The other seven snorkellers on board were from the same family. The group ranged in age between 10 years and 70 years, with varying levels of experience in snorkelling. The divers came aboard in two separate groups and were generally known to each other. They were all relatively experienced divers. The passenger was part of one dive group but came aboard solely for the cruise.

This was the first time that the victim had attempted snorkelling. At the request of her friend, the victim agreed to go snorkelling on Oceanic Explorer. On the evening preceding the incident, the victim and her friend checked in at the DVG (Dive Victoria Group) dive centre, where the victim received basic lessons in snorkelling from her friend.

## The Annulus

The Annulus is located in Pope’s Eye Marine National Park at the southern end of Port Phillip. It is about 1.8 nautical miles east of Shortland Bluff and about 2.1 nautical miles north of Portsea.

The Annulus is an artificial environment made of bluestone boulders that have been laid in a semi-circular ring which rise approximately 2.5 metres above the surface at low tide. Originally intended to become one of the fortresses guarding the entrance to Port Phillip but never completed, this structure provides a safe anchorage for pleasure craft and the substrate for a rich community of animals and plants that attach to the rocks and associated fish fauna. The charted depth of water inside the ring is only around 1.5 metres but deeper water is on the outside.



Figure 6 – The rock formation

Because of its unique shape and protection from tidal currents, The Annulus is one of the most accessible snorkelling and dive sites in the bay with many people learning to SCUBA dive having this site as their first open water dive.

While the eye of The Annulus is sheltered, the waters surrounding it are exposed to the wind and are also prone to tidal currents, sometimes up to six knots. However, snorkelling and diving activities usually take place around the times of slack water.

## Interview Information

### The victim

The victim stated that when she and her friend arrived at the dive centre, she informed the male shop attendant that she had never snorkelled before, to which (she stated that) he offered to give her basic snorkelling lessons later that evening in the pool. The victim stated that no fees were mentioned during that conversation. However, that evening, a female shop attendant told the victim that there was a fee of $35 to be paid for the lessons, so the victim decided against the lessons and instead her friend gave her a few basic lessons in snorkelling.

The victim recalled that the deckhand gave the passengers a safety briefing at the commencement of the cruise, advising the passengers of procedures to follow in case of a person falling overboard.

On arrival at Chinaman’s Hat the deckhand gave them a snorkel safety briefing. The victim recalled that the deckhand advised them to raise one hand in a closed fist if they wished to board the vessel and then swim over to the vessel and board it by the ladder at the stern.

The victim did not recall receiving a briefing regarding communications between the vessel and diver on when it was clear to swim to the vessel or of any safety instructions about boarding by the stern ladder. But the victim recalled that the master or the deckhand making “some joke that divers should keep clear of fishermen’s propellers.”

The victim stated that she got into the water at Chinaman’s Hat, along with the other snorkellers but after about five minutes she decided to return to the vessel. She said that her friend raised her hand in a closed fist and swam towards the vessel and that she followed her back to the vessel. She did not use the hand signal.

On reaching the boat, they made their way along the side rail before boarding by the stern ladder.

The victim stated that the boarding was uneventful and she had a hazy recollection that the deckhand was “off and on” assisting the divers at the stern to board the vessel. She stated that she did not notice any signals or communication between the master and the deckhand.

The victim stated that the vessel next went to The Annulus where it anchored in the eye. She recalled that they were given instructions to swim along the perimeter of the rocks, going around the north-west tip and continue on the outer side of the rocks. The victim could not recall where the pick-up point was to be.

After about five minutes of swimming on the outside, the victim wanted to get out of the water. At that time she and her friend were on the south side of the rocks. She noticed that two other snorkellers, a mother and her son were nearby and observed the mother raise her hand.

The victim said she also raised her hand and then followed the mother (witness 1) towards the vessel, which she reckoned was about 25 metres away. She could not recall whether she was seen by the master or the deckhand.

On arriving alongside the vessel, the victim stated that Oceanic Explorer was facing towards the rocks. She followed witness 1 to the starboard side of the vessel and held on to the rail and then slid along the rail to the stern.

The victim stated that she had just reached the stern ladder and was preparing to board, when the propeller started turning. She felt a numb and painful sensation in her legs and started screaming “my leg”. At that same time, she observed the deckhand look over the side and shout out to the master. The victim recalls that the propellers stopped for a short while, started up again and then stopped.

At this point, the victim stated that the deckhand attempted to pull her up so she let go of the rail. Both her legs were very painful and she drifted away from the vessel. She recalled that the deckhand then passed her a boat hook, shouting to her to grab the boat hook and that they would pull her in. The victim stated that she was towed to the stern platform and that the master and deckhand pulled her on board.

Once on board, the victim was made to lie down. She recalled that the deckhand looked at her leg and then told her “not to look as she would not like it” or words to that effect. She stated that she was in severe pain now and could not speak. She recalled that the master initially wanted to cut off the wetsuit but another passenger on board (witness 2) applied compression bandages to her leg and rendered first aid. She also recalled being given a bundle of cloth to bite on.

During this time, the victim stated that she heard the master talking to someone that he needed an ambulance. She was shifted inside the boat to make way for the other snorkellers to board after which the vessel headed back to shore. She also recalled that she was fitted with an oxygen mask just before the vessel reached Queenscliff. At Queenscliff, the victim stated that she was attended to by the ambulance staff and then driven to hospital.

### The master

The master stated that this was his sixth voyage in command of a commercial dive vessel since joining Dive Victoria Group on a casual basis in October 2008. He stated that on joining the company, he had a one day initiation with a senior master. The initiation consisted of training in the administrative procedures and paperwork involved with a dive charter and pre-departure operational checks. He said that he did not recall receiving safety training for activities specific to dive operations and was unaware of the DVG ‘Operations and Procedures Manual’ until after the incident.

In his evidence, the master stated that he reported for duty at the Portsea office at about 0800 on the day of the incident. He stated that he had worked with the deckhand on previous cruises and was comfortable with her proficiency. She was also the designated dive supervisor for the vessel.

The master stated that the safety briefings were carried out in accordance with DVG guidelines at the commencement of each trip and each dive (see section 2.6). During a dive the deckhand was the dive supervisor but both he and the deckhand maintained a look-out for the snorkellers and divers and he also monitored the position of the vessel. If required, the master would also move to the stern to assist the deckhand in retrieving persons from the water. He stated that communication between him at the steering position and the deckhand at the stern was verbal only.

With regard to the vessel, the master stated that the stern ladder was the preferred method for boarding. He said that the mid-ship door was not usually used for boarding as the vessel’s rolling motion could injure persons attempting to board from the side.

The master stated that the first two trips of the day passed uneventfully. On the third trip, he picked up nine snorkellers at Queenscliff and eight divers and a passenger at Portsea.

The vessel arrived at Chinaman’s Hat at about 1515. The master stated that the deckhand helped the snorkellers don their equipment and then gave them the snorkel safety briefing. He confirmed that the deckhand covered all the points listed in the safety briefing check-list.

The master stated that while retrieving the snorkellers at Chinaman’s Hat, he noted that the victim was “all over the place” at the stern of the vessel and that the victim had some difficulty when mounting the ladder. He stated that he did not advise the victim how to safely board the vessel or of associated danger from the propellers when at the stern of the vessel. The master does not recall whether the deckhand spoke to the victim regarding this issue.

Oceanic Explorer then proceeded to The Annulus and anchored in the bight at about 1610. The master stated that once again the deckhand helped the snorkellers and divers don their gear then she delivered the safety briefing.

The master stated that there was a predominant north-easterly drift therefore the preferred option to retrieve the snorkellers was at a point east of the rock formation so that the snorkellers and the vessel could drift clear of the rocks during retrieval. He stated that once all persons had entered the water, he stationed himself at the steering position while the deckhand stayed at the stern, monitoring the snorkellers and divers.

The master stated that the visibility was good and that he could see the snorkellers from a distance, whilst he kept looking for surface bubbles to note the position of the divers. The master opined that usually monitoring only snorkellers or only divers was not a problem, however, when the two activities happened simultaneously it was more difficult to maintain a proper watch on all the persons.

The master recalled that a diver (witness 2) and a child snorkeller returned to the vessel whilst it was still anchored inside The Annulus. He noted that soon after that the other snorkellers swam around the tip of the rock formation to the west side of the rocks. He stated that he weighed anchor and then positioned the vessel about 150 metres south-west of the rocks from where he could see the snorkellers.

The master stated that at that time there was no current. The vessel remained on a general northerly heading, the wind was from west south-west causing the vessel to drift towards the rocks. He stated that normally the engines would have been switched off but under the circumstances, the engines were stopped[[4]](#footnote-4) but not switched off, so that he could use astern propulsion “every so often” to maintain a safe distance from the rocks.

He stated that some time later, he saw one of the snorkellers about 30 to 40 metres off looking at the vessel and called out to her whether she would like to get back on board. He stated that another voice answered “yes” so he shouted back at them “one at a time”.

The master said that he positioned the vessel about 60 metres south of the rocks. He noticed a mother (witness 1) and a child swimming up to the boat. He stated that he ensured that the engines were stopped, the mother first boarded the vessel and then he went to the stern to help the deckhand pull the child out of the water. At that time, the master noted that the vessel was drifting close to the rocks.

As he returned to the helm position, he looked around the vessel to check if there was anyone in the vicinity. He recalled that there were snorkellers about four metres off to the starboard side and about two metres ahead of the vessel. He stated that he twice called out to the deckhand that he needed to go astern on the engines and asked her “is it clear?” He could not recall getting an answer from the deckhand, but was concerned for the vessel so he “went astern” on the engines.

As soon as he went astern on the engines, the master heard someone at the stern shout “I’m cut” or words to that effect. He stated that he immediately stopped the engines. He recalled that he shifted the engine throttle once or twice to make sure that he had stopped the engines. He then rushed to the stern where he saw the deckhand had a boat hook out and was attempting to pull the victim in. He stated that he reached over the side, placed his hands under the victim’s armpits and pulled her up on board.

Once on board, the master noted that the victim had a severe laceration to her lower left leg. Witness 2 came to his assistance and shouted for the first aid kit. The master stated that the deckhand brought the first aid kit then he and witness 2 proceeded to bandage the victim’s leg whilst the deckhand called the dive centre on her mobile phone asking for an ambulance.

Once the master was satisfied that the victim was stabilised, he retrieved the other snorkellers, advised the divers that another vessel was being despatched to pick them up and then departed for Queenscliff.

At about 1652 the master reported that the vessel arrived at Queenscliff and at about 1655 the victim was handed over to the waiting paramedics.

### The deckhand

The deckhand stated that on 28 December 2008 she started work in the morning at the Portsea office and then met the master at the vessel. She assisted the master with the pre-departure checks then, as the designated dive supervisor, she completed the dive administrative documents and obtain a brief dive history from each person so that she could group them appropriately.

The deckhand stated that this was not required for snorkellers and therefore she was unaware that this was the victim’s first snorkelling trip.

The deckhand stated that on arrival at Chinaman’s Hat, she provided the snorkellers with the standard safety briefing which included procedures for getting into the water, attracting attention to get back on board and procedures for boarding. She said that only the snorkellers got into the water and they stayed there for about 15 to 20 minutes. She could not recall the victim having any difficulty boarding the vessel at Chinaman’s Hat.

The vessel then proceeded to The Annulus and anchored inside. She assisted all to don their respective gear and prior to them entering the water, she briefed the snorkellers and divers together about the site, where to swim and the preferred pick-up location east of the rock formation.

The deckhand stated that before the vessel could move to outside the Annulus, witness 2 and a young boy got back on board. The vessel then shifted its position to stay south-west of The Annulus from where she and the master could monitor the snorkellers and divers. She opined that she did not have any problems monitoring two different activities.

She stated that just prior to the incident the snorkellers were in a group still on the west side of the rocks when she observed a snorkeller (witness 1) had her mask on the top of her head and the deckhand assumed that she wanted to be picked up. She informed the master accordingly and stated that the master started up the engines and proceeded towards the snorkeller. She stated that she heard the master call out for only one person at a time to board.

The deckhand assisted witness 1 get onto the boat and advised the master that the rudder area was clear. She stated that she did not notice the victim, following witness 1. The deckhand stated that at about that time she noticed that the vessel was in close proximity to the rocks and would drift closer with the current and wind. At about the same time the master advised her that there was a person at the starboard side of the vessel.

The deckhand stated that she checked over the side, saw the victim hanging on and reported that to the master. She stated that she then turned to attend to witness 1, who had just got on. She stated that she did not wait to verify whether the master heard her reply and she did not hear the master state that he needed to go astern on the engines.

The deckhand stated that she turned around again and saw the victim at the stern ladder. At that very moment, the engines were started, she heard the victim scream and she shouted to the master to stop. She said that the master immediately stopped the engines.

The deckhand said that the victim “yelled out about her leg” and let go her hold on the ladder. She grabbed the boathook, reached it out to the victim and dragged the victim back to the vessel. She called the master to assist her to get the victim onboard, which he did. Once the victim was onboard, the deckhand and the master lay her down on the deck and observed that her leg was severely lacerated. The master collected the first aid kit from the forward cabin and started to apply a bandage to the victim’s leg whilst she phoned the Portsea office to request assistance. She stated that after completing the phone call she retrieved the oxygen kit and returned to the deck to assist the master and witness 2.

Enroute to Queenscliff, the deckhand fitted an oxygen mask over the victim’s face and commenced administering oxygen. The deckhand stated that the vessel reached the shore at about 1655 and the victim was handed over to paramedics.

With regard to the safety briefing, the deckhand stated that she believed everyone had understood the briefing however she did not query or cross-question them to confirm whether they understood all that she had said.

### Witness 1

Witness 1 was a member of the family of seven snorkellers and the mother to the two children in the group. She said that she had some boating and snorkelling experience. When asked, the witness advised the investigation that they were not given instructions on how to approach the vessel or how to board the vessel.

She stated that at Chinaman’s Hat and then at The Annulus, the snorkellers disembarked through the side opening and were retrieved from the stern. She said that at The Annulus all nine snorkellers got into the water but her son got back onto the vessel along with a diver (witness 2) while it was still anchored in The Annulus. She stated that she then swam with the other snorkellers to the outside of the rock formation.

A short while later the witness decided to get back to the vessel to look after her son and left her other child with her husband in the water. She stated that she put her hand up as she was instructed and that the master acknowledged her. She then swam 10 to 15 metres to the vessel and boarded it from the rear, after sliding along the starboard side hand-rail. At that time she was not aware of anyone following her. The witness recalled that the engines were ‘on’ but the propeller was not turning.

The witness stated that after she boarded the vessel, she became aware of the victim attempting to board the vessel but she could not recall how or why she became aware of this. The witness stated that the victim was almost onboard and that the deckhand was at the stern when the master started the engines and almost immediately she heard the victim scream “Oh my God, my leg!”

She could not recall any communication between the master and the deckhand immediately prior to the incident.

The witness recalled that the victim moved about two metres away from the boat and the deckhand pulled the victim back using the boathook. Then the master and deckhand pulled the victim onboard and the diver who had boarded the vessel earlier helped them render first aid to the victim.

### Witness 2

Witness 2 is an experienced diver who had completed a Divemaster course in August 2008. At the same time she also completed an upgrade to her ‘dive’ first aid qualifications. She stated that when Oceanic Explorer arrived at The Annulus, she got into the water but it was too cold so she re-boarded the vessel along with a young boy.

The witness stated that soon after that, Oceanic Explorer sailed around the rock formation to the outside of the Annulus. She noted that the vessel was drifting towards the rocks. She recalled that the master mention that he had to move the vessel away from the rocks.

The witness recalled that soon after the deckhand mentioned to the master “someone wants to come on board” or words to that effect. She stated that she thought she heard the master say something about “two at a time”. Witness 2 then recalled witness 1 boarding the vessel. She then noted that the engines were started and almost immediately she heard a scream of “my leg!” She could not recall any communication between the master and the deckhand immediately prior to the engines being started.

Witness 2 stated that the deckhand called out to the victim to “hang on”, then use the boathook to bring the victim alongside. She stated that the master helped the deckhand to bring the victim onboard. She noted that the victim’s leg was cut from her knee to her ankle and that she could see the bone. Witness 2 stated that she assisted the master and deckhand to bandage the victim’s leg and administer her oxygen.

She stated that she stayed with the victim until the vessel arrived at Queenscliff harbour and was handed over to the paramedics.

## Statement of safety briefing

In accordance with DVG guidelines, the master is to provide a vessel safety briefing at the commencement of each trip. The vessel safety briefing covered general shipboard emergencies such as man overboard, fire, emergency muster stations and the location of safety equipment.

Prior to each dive, the DVG guidelines required the dive supervisor to provide a dive/snorkel safety briefing, including procedures for embarkation and disembarkation, weather and environmental features at the dive site, how to conduct oneself when in the water including safety tips. The topics to be covered in the briefing were listed on a check-list, which the master cross-checked while the dive supervisor gave the safety briefing.

The following is an excerpt from a statement of the safety briefings given by the deckhand:

**At Chinaman’s Hat** – “When getting into the water today we can do so from either the mid-ship door or the rear exit. Please go to the side if exiting off the stern platform as the ladder is in the water and it is not very comfortable to land on. Having your fins and mask on and snorkel in, simply come right up to the exit holding your mask in place, taking a big step out. Please move away from the exit when in the water to allow others to follow. Once it is time for you to get back on board we will give a couple of blasts on the horn which is the signal to return, or if you wish to be picked up earlier please put one hand straight in the air with a clenched fist and we will come over to collect you. For pickups we will bring the boat alongside you so that you are along the right hand side. Just above water height there is a hand-rail. Please aim to swim to this to this rail and grab hold so that if the boat drifts away you will be with it. You may then come up the ladder one person at a time.”

**At The Annulus** – “The current at the moment is heading out through the Heads so for the dive or snorkel what you should do is head to the edge of the eye then let the current take you around the corner until it dies down within the back eddy at the back. For snorkellers if you do not wish to take the current there is a cut through the southern part of the eye that you may go through. For pick-ups we will pick up from the eastern corner. This is due to the fact that the wind and the current will push the boat away from the rocks there, not only protecting the boat but also making it safer for you. Please follow the same pick-up procedure as before swimming to the rail alongside and then one at a time coming up the ladder. The boat will not remain anchored during this dive and will head out approximately 10 minutes after all divers, picking you up from the eastern section.”

## Environment

At the time of the incident there was a west south-westerly wind of about 16 to 20 knots, causing sea waves up to half a metre in height. The tide was in ebb flow at about half a knot and the height of tide was about 0.74 metres above chart datum.

The incident took place in early afternoon. The sun was at an altitude of about 49.5 degrees to the west of the vessel. The sky was cloudy and visibility was clear. No precipitation was recorded at that time. The ambient temperature was about 22 degrees Celsius and the pressure was about 1001 hectapascals.

## Dive Victoria Group

### The group

DVG is a dive charter company. The group conducts dive and snorkel charters within Port Phillip and near coastal waters around Port Phillip Heads. DVG operates a fleet of five vessels. It acquired Oceanic Explorer in April 2004.

The company’s head office is located at Queenscliff (also known as the dive centre) and a second office is located at Portsea. The dive centre houses the dive shop, where divers can purchase various dive and snorkel equipment. There is an indoor pool for practice or training in SCUBA and snorkelling and hostel style accommodation for charter clients. The accommodation is included in the charter fees however the training (with a qualified dive or snorkel trainer) is provided at the option of the client for an additional charge.

The company has compiled an OPM (Operations and Procedures Manual) in order to comply with the requirements of Standards Australia (AS/NZS)[[5]](#footnote-5) and the Dive Industry Victoria Association (DIVA) Code of Practice[[6]](#footnote-6). The manual provides guidance on the administrative and operational procedures ashore and onboard.

The manual is available in each office and a copy is placed on every vessel. Every person employed by DVG is required to read and understand the contents of the manual. However at the time of the incident DVG did not have systems in place to verify whether their employees had read and understood the contents of the manual.

### Recruitment and training

DVG policy requires that all dive supervisors are qualified in accordance with AS/NZS and DIVA licensing requirements and that all masters and engineers certificates are issued or recognised by MSV as appropriate to operate assigned vessels.

When new crew are recruited, the new recruit first undertakes four voyages (each voyage is a day’s charter) with a senior dive supervisor and a master (separate persons). The recruit then undertakes a further six voyages under training of the master (who may also be the dive supervisor). During these 10 voyages the recruit completes a set of deckhand skills and a company-based safety at sea program, after which he or she may be offered a job as a deckhand.

The deckhand is then encouraged to complete the formal training to obtain a dive supervisor licence and a certificate of competency as Coxswain. In practice, it is usual for dive supervisors to apply to DVG and then be put through the training to become deckhands.

DVG also recruits masters. New masters train under a senior master of the fleet. The new master usually undertakes two voyages as understudy master during which time the master is also trained in company policy and procedures in accordance with the OPM. Once the master is seen to be proficient, he or she is given command of a vessel however newly recruited masters will always be accompanied by a senior deckhand.

Masters are also encouraged to obtain a dive supervisor licence. Where the master also holds a dive supervisor licence, the deckhand may be unqualified, but will still have completed the 10 mandatory voyages.

DVG also conducts formal refresher training and skills checks for all shipboard and shore-based personnel. Spot audits are carried out randomly to ensure that vessel crew are conducting the charter in accordance with the operations and procedures manual.

### Operations and procedures manual

The manual was developed by DVG to provide operational and procedural guidance to their employees conducting diving or snorkelling activities. It is also intended to be a training manual for all staff. The manual addresses the duties of the master and the dive supervisor in vessel operations and at the dive sites. The manual also provides check-lists for safety briefings and emergency procedures.

With regard to retrieving persons from the water, the manual states that:

* Always monitor the engines and inform master when they are CLEAR or NOT CLEAR of divers.
* Make sure the motors are not started until the “*All Clear*” from the crew.
* Consider having divers hold onto rope and not the side of the boat when conditions are rough especially high wind.
* Be aware of the positions of all your divers and any SMBs (surface marker buoys).
* Maintain a good look out at all times. Know where your divers’ bubbles are.

The investigation noted that the manual required the dive supervisor to verify the experience of divers for the purpose of grouping them appropriately, but this action was not required for snorkellers. Furthermore, the manual did not address familiarisation and induction briefings for first-time snorkellers and the dive (or snorkel) safety briefing check-list did not address precautions when attempting to board the vessel.

The manual also does not provide any guidance or strategies to crew to maintain divers and snorkellers within sight simultaneously, especially if the two groups get separated.

### Manning for Oceanic Explorer

In their evidence, DVG stated that they had not checked the certificate of survey for Oceanic Explorer. They stated that they assumed the manning to be a coxswain and one general purpose hand, in accordance with MSV’s determination for other vessels in the fleet. The operator provided the investigation with certificates of survey issued by MSV for other similar vessels, requiring only a Coxswain and one general purpose hand.

## Marine Safety Victoria

Marine Safety Victoria is the State regulatory authority responsible for the efficient and safe operation of vessels on State waters by coordinating waterway management, developing and implementing vessel standards and operator competencies, protecting the marine environment and by funding the improvement and development of associated infrastructure to provide for the efficient and safe operation of vessels on State waters.

MSV has a responsibility to ensure that the design, construction and equipment of new and existing commercial vessels meet the minimum standards as specified in the USL Code and to develop standards for the operation of these vessels and to ensure that those standards are maintained. MSV also has a responsibility to issue certificates and to develop appropriate standards for the training of crews and to take steps to ensure that those standards are maintained so that the persons who operate vessels are appropriately qualified.

Vessels entering Victoria are surveyed by MSV to ensure compliance with the provisions of the USL Code. If the vessel meets the requirements, MSV will issue a certificate valid for not more than one year.

Each certificate of survey issued to the vessel also states the number of qualified and unqualified crew the vessel is required to carry. MSV makes this manning determination in accordance with the requirements of the USL Code, also taking into account the intended operations of the vessel and the number of passengers it will carry.

At least once a year thereafter, the vessel is surveyed by MSV to ensure that it complies with the standards; on successful completion of which a new certificate of survey is issued.

The investigation noted that MSV survey practice does not have any procedures to verify safe means of access to or exit from dive vessels. MSV also reported that they have not developed any standards for the safe operation of dive charter vessels. In lieu, MSV expects dive charter operators to comply with the AS/NZS and DIVA guidelines.

## Legislation, Rules, Guidelines

### Legislation

The USL Code does not specify the requirements for safe means of access for persons being retrieved from the water but Section 13 of the Code states that the vessel must have a gangway capable of being used on either side of the vessel or a safe means of access approved by the Authority.

Paragraph 216A of the Marine Regulations 1999 requires that the vessel’s certificate of survey must be displayed on the vessel in a manner that it can be readily seen by any person on board the vessel.

### Guidelines

The DIVA Code of Practice defines “snorkel swimming” as where a person breathes continually through their snorkel while staying positively buoyant on the surface and “snorkel diving” as where a person holds their breath to descend to depth.

Paragraph 5.5 of the DIVA Code of Practice states that look-outs should be out of the water and be able to monitor the whole area where snorkelling is taking place for the whole of the snorkelling session, preferably be involved only in look-out functions and observe snorkellers as they enter and exit the water.

Paragraph 5.6 of the DIVA Code of Practice states that the snorkelling supervisor’s role is to identify risks that may arise due to a change in circumstance, for example adverse changes in the weather, tides, currents, etc and act accordingly.

The DIVA Code of Practice does not address the issue of safe means of exit from and entry to the vessel.

Paragraph 3.2(a) of Section 3 of AS/NZS 2299.3:2003 states that before snorkelling takes place, the activities coordinator shall find out whether there are any persons who have not previously snorkelled and carry out a special briefing and introduction to snorkelling for these persons.

AS/NZS 2299.3:2003 states that the means of access to or egress from the vessel has minimal risks to the safety of divers and that the means of entry to and exit from the water should be in good condition and appropriate to the numbers.

AS/NZS 2299.3:2003 also states that the activities coordinator shall be supported by one or more look-outs and that there should be adequate look-outs present. The master may perform these roles.

**Note:** The provisions of the AS/NZS and DIVA Code of Practice are guidelines only and are not mandatory.

## 

## Propeller injury avoidance technology

### Propeller guards

Propellers can be fully enclosed or partially enclosed. Fully enclosed guards are generally defined as those that fully enclose the propeller, making it impossible for a limb to be in contact with a blade, whereas partially enclosed guards are those that have a surrounding ring of some sort which makes it difficult for the blade to be in contact with something approaching from the side, but doesn’t prevent something hitting the blade from either ahead or astern.

Propeller guards can be roughly categorised into three different types:

Cage guards Ring guards Ringed propellers.

Cage guardsRing guardsRinged propellers.

Figure 7 – Propeller guards

There are a wide variety of propeller guards available ‘off the shelf’ for outboard motors up to 150kW and speeds as high as 26 knots, but as yet none exist for larger outboard engines at higher speeds.

The main effect of a propeller guard on performance is that it increases drag, which has a much more significant detrimental effect at high speeds than at low speeds. In fact, at low speeds it is possible that the guard could be beneficial (like a Kort nozzle on a tug) as it can be designed to increase the thrust from the propeller.

An important secondary effect of the guard is the explicit impact that it will have on the propeller. The increased drag will result in the vessel going slower, which will mean that a propeller which has been well matched to the boat without the guard may now have too coarse a pitch, resulting in a further reduction in performance. This is likely to be noticed by the boat operator if the engine is unable to achieve its designed rpm. If this occurs it will further reduce the boat’s top speed, and in addition put extra load on the engine.

A final effect of the guard on the propeller is the implicit effect of disturbing the flow into the propeller, which will minimally reduce its efficiency. This is probably not a major factor for most guards, however full guards which have extensive covering over the suction side of the propeller may suffer from this.

In addition to the effect on top speed and fuel economy, a propeller guard can also modify the manoeuvring performance, and stopping distance. Research studies[[7]](#footnote-7) have reported considerable reductions in the ‘manoeuvrability index’ with some propeller guards, in particularly with the ‘cage’ type. However, in the same study, it was also noted that with some ‘ring’ type of guards the reductions in manoeuvrability were small and in some cases manoeuvrability improved. The study also confirmed that manoeuvring can be improved with ringed propellers.

None of the major outboard motor suppliers provide propeller guards as standard equipment. Propeller guards need to be bolted to the legs of outboard motors after purchase, often drilling through parts of the unit’s leg. This could result in increased corrosion or the engine warranty may be voided.

As noted above, the fitting of a guard to an outboard may result in the speed being reduced, which may in turn require a new propeller with a finer pitch. On the other hand, a ringed propeller is a complete unit, which can simply be used to replace the existing propeller.

Although the *Oceanic Explorer* is actually larger and more powerful than those for which data is available, expert opinion predicts that the corresponding top speeds with guards fitted would be approximately as follows:

Cage guard: 15 – 20 knots;

Ring guard: 20 – 25 knots; and

Ringed propeller: 25 – 26 knots.

This compares with the vessel’s top speed of 28 knots without propeller guards.

### Alternative control devices

A variety of alternative (to propeller guards) technologies are available for reducing the risk of propeller related injuries, such as emergency cut-of sensors or ladder inter-locks may be more appropriate for some vessels.

Emergency cut-off sensors are designed to be worn by vessel operators and passengers. The sensor automatically shuts off the engine when a person enters the water. The ‘prop stopper’ is another device which protects swimmers by preventing the engine from starting while the ladder is down.

Rear facing video cameras might be installed on larger vessels with restricted fields of vision behind the vessel. Other safety defences could be the installation of a solid retrievable barrier between the ladder and the propeller or, in the case of twin screw vessels, to implement a system preventing the near side engine from running when the ladder is down.

Boarding from the mid-ship ladder may be possible in certain circumstances but where the vessel is subject to rolling, there is danger of injury if the vessel ‘rolls’ onto a person attempting to climb the ladder.

# Analysis

## The Incident

The victim and each witness to the incident have slightly different recollections of the events immediately preceding the incident. A reconstruction of the sequence of events based on the evidence of the crew, the victim and the witnesses indicates that:

* Oceanic Explorer anchored in the bight of The Annulus and all divers and snorkellers entered the water.
* A short while later one diver and a child snorkeller returned to the vessel.
* The snorkellers exited the bight via the northern tip of the rock formation on the west side and Oceanic Explorer followed them into open water.
* When Oceanic Explorer lay drifting south-west of The Annulus, the master stayed at the helm the entire time.
* The deckhand noticed witness 1 (with face mask up) in the group of snorkellers and informed the master that she may want to board.
* The victim may have raised her hand at that time but was not noticed by the deckhand or the master.
* The master navigated the vessel to within 15 or 20 metres of the snorkellers and called to them to board one at a time.
* Witness 1 swam to the vessel and was followed by the victim; there was no child between them.
* The master and the deckhand did not notice the victim following witness 1 to the vessel.
* At the time that the deckhand was monitoring witness 1 board the vessel, the master was monitoring the vessel’s proximity to the rocks.
* When witness 1 boarded the vessel, the deckhand reported to the master that the stern was clear.
* The master was concerned that he had to go astern on the engines to clear the rocks, at which time he looked out the windows and noticed a few snorkellers in the water a few metres off.
* The master mentioned to the deckhand that he had to go astern on the engines and called out to her to check whether the stern and sides were clear, also pointing out the snorkellers in the water.
* The deckhand looked over the side and saw that a snorkeller (later confirmed to be the victim) was holding onto the mid-ship hand-rail but did not monitor that person moving to the stern along the rail.
* The deckhand reported the snorkeller to the master but the master did not hear the deckhand’s reply and the deckhand did not verify that the master had heard her.
* The master put the engines into astern propulsion at the same time that the victim attempted to board the vessel.

## Vessel operations

### Safety briefings

As this was the victim’s first attempt at snorkelling, she was probably unaware of the dangers associated with boarding a ladder adjacent to the propeller. The vessel crew were unaware of her lack of experience.

DVG procedures required the dive centre and the dive supervisor to verify the experience of divers, but the same was not required for snorkellers. Had the crew identified that the victim was snorkelling for the first time, they should have briefed the victim on what to expect and what to look out for while on the vessel as well as safety warnings when entering the water and when re-boarding. Notwithstanding, there was an opportunity to brief the victim when the master noted that she was “all over the place” when trying to board the vessel at Chinaman’s Hat, which was not taken.

The investigation also noted that the safety briefing mentioned to keep clear of other vessel’s propellers whilst engaged in diving or snorkelling but did not provide specific warnings to persons boarding the vessel in the vicinity of its own propellers. Had the initial safety briefing included precautions while boarding the vessel in the vicinity of the propeller, it is possible that the victim would have taken appropriate precautions to stay well clear of the propellers.

The evidence also indicates that although the safety briefing was comprehensive, not all of it was ‘digested’ by the victim or the other persons on board, and the vessel crew did not have strategies to ensure that all significant parts of the briefing were understood by all. For example, one witness and the victim could not remember where the pick-up point was to be at The Annulus. Sometimes, simple questions like “have you understood?” or “do you remember what I said about …?” will help recipients remember the critical features of a safety briefing.

### Actions of crew

The DVG operations and procedures manual provided clear instructions to the master and deckhand regarding retrieval of persons from the water. However, in this incident, there was a lapse in procedures in that the master did not wait for the “all clear” before starting the engines and the deckhand did not actively monitor the persons in the water.

The master was relatively inexperienced in operating vessels on dive charters and the deckhand stated that this was the first time that she experienced the vessel drifting onto the rocks and at the same time, attempting to retrieve persons from the water. It is probable that the inexperience of the master placed the vessel in a position where it should not have attempted to retrieve persons from the water. A more experienced master may have instructed the snorkellers to proceed to the designated pick-up location before allowing them to board the vessel.

As the vessel drifted towards the rocks, the master became concerned with clearing the vessel from the rocks rather than monitor the persons approaching and attempting to board the vessel. It is possible that the master was pre-occupied with the task of manoeuvring the vessel away from the rocks when he started the engine.

As the deckhand had never experienced this situation before, it is probable that she too was ignorant of the dangers associated with picking up divers (or snorkellers) while the vessel was drifting onto the rocks. This may explain why the deckhand did not monitor the person in the water after it being pointed out by the master. Neither did she ensure that the master heeded her warning before turning her attention towards the person who had just boarded the vessel.

Had communication between the master and deckhand about the person in the water been carried out in a more prescribed or formal manner, it is likely that the master would not have started the engine until the victim was clear of the propeller or alternatively, the victim would have been advised to stay clear of the stern until the vessel was in deeper water.

### Manning determination

MSV required Oceanic Explorer to be crewed by a coxswain and three general purpose hands when operating with 20 passengers in Port Philip.

In their evidence, DVG advised the investigation that they were mistaken into believing that only a coxswain and one general purpose hand were required to be on board, as was required by MSV for other similar vessels. However, it is apparent that DVG did not check the certificate of survey each time that it was issued.

Had the certificate of survey been posted in a prominent position on board the vessel, then it is possible that someone on board the vessel – master, crew or passengers – would have noted the lapse in manning long before the incident occurred.

In this incident, the lack of manning did not directly lead to the incident as both the master and the deckhand saw the victim at the side of the vessel, but neither followed the progress of the victim to the stern ladder. Having the extra crew may have relieved the master of some of his monitoring duties and may have permitted him to concentrate more on the navigation of the vessel. At the same time, the deckhand would have had sufficient assistance to monitor the persons in the water as well as assist those who had come aboard.

The DIVA guidelines advise that the lookout should be able to monitor the whole area where snorkelling is taking place for the whole of the snorkelling session and preferably be involved only in lookout functions and observe snorkellers as they enter and exit the water. In this incident, the master’s main task was the safe navigation of the vessel and as such he was not in a position to adequately monitor the snorkellers as well.

## Guarding against propeller injuries

In this incident, had the master and deckhand followed the operations and procedures manual, the master would not have started the engines until he had received the “all clear” from the deckhand. However, humans operate in ways that may be unforseen therefore there must be defences to compensate for (or prevent) human error.

Propeller injury avoidance control technologies are available as guards, alternative propulsion, interlocks, and sensors. Each of these types of technology can be suitable in certain circumstances for particular types of vessels. In determining the efficacy of a guard device, the operator must consider hull type, propulsion characteristics, and vessel operating environment.

In accordance with the USL Code, a vessel is required to have a safe means of access to and from the vessel. Although the provisions AS/NZS are not mandatory, the Standard also specifies that dive vessels must have a safe means of access. This incident has shown that without proper defences in place, there could be serious danger to life.

The operator had attempted to provide a safe means of access, by advising through the operations and procedures manual, that the engines should not be started until the “all clear” was received. However, the incident has shown that there should also be secondary defences to separate persons in the water and the propeller, as human error will occur.

# Conclusions

## Findings

1. The master and deckhand were appropriately qualified.
2. Oceanic Explorer was not manned in accordance with its certificate of survey.
3. The certificate of survey was not posted in a prominent position onboard the vessel.
4. This was the victim’s first attempt at snorkelling.
5. The activities coordinator did not find out whether there were any persons who had not previously snorkelled and did not carry out a special briefing and introduction to snorkelling for these persons.
6. The master and the deckhand were aware of their respective duties and the recommended procedures for retrieving persons from the water.
7. The investigation has not been able to identify any standards, developed to ensure safe means of access to or from dive vessels.
8. The vessel did not provide guidance or information for passengers on the dangers associated with boarding the vessel in the vicinity of the propellers.
9. The snorkellers did not proceed to the designated pick-up area east of The Annulus.

## Contributing Factors

1. The vessel was in an unsafe position when attempting to retrieve the snorkellers from the water.
2. The movement of the victim was not adequately monitored and the victim attempted to board the stern ladder without being supervised.
3. There was a lapse in communication between the master and the deckhand regarding the victim in the water and the need to start the engines.

4. The master started the engines before receiving the “all clear” from the deckhand.

# Safety Actions

## Recommended Safety Actions

Issue 1

In this incident, the vessel crew were unaware that the victim was snorkelling for the first time and the victim was not aware of the dangers associated with boarding the vessel in the vicinity of the propellers. Furthermore, the vessel operator did not have systems to inform passengers of such danger.

RSA 2008055

That Dive Victoria Group upgrades its procedures to ensure that vessel crew are made aware of the dive/snorkel history of every passenger and that the passengers are made aware of the dangers associated with boarding the vessel in the vicinity of the propellers.

Issue 2

The incident has shown that there needs to be defences against human error to maintain a safe separation between the propeller and persons attempting to board the vessel.

RSA 2008056

That Dive Victoria Group reviews its defences to ensure that persons cannot come into contact with the propeller when exiting from or boarding the vessel.

Issue 3

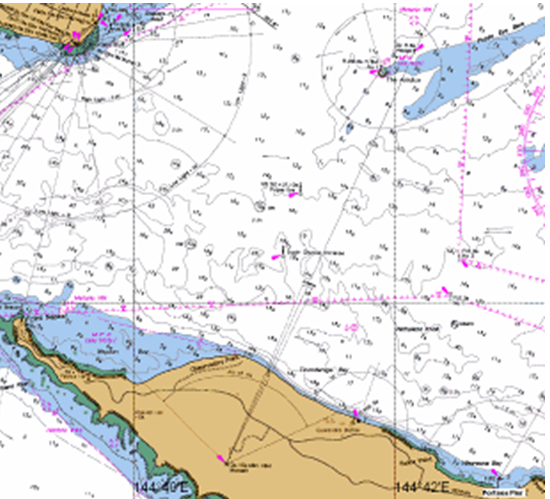
There is a legislative requirement to ensure safe means of access to a vessel however there are no standards to ensure that this is achieved by dive charter vessels.

RSA 2008057

That Marine Safety Victoria as the State regulator, review this legislative requirement with the intention of developing appropriate standards for dive charter vessels.

# Appendixes

Appendix A Pope’s Eye Marine Park



Appendix B Vessel Particulars

Name of vessel Oceanic Explorer

ID Number MB 10139

Built February 2000

Builder Hampton Yachts, Western Australia

Location Queenscliff

Owner Dive Victoria Group

Operator Dive Victoria Group

Survey Authority Marine Safety Victoria

Last survey 21 May 2008

Next survey 22 May 2009

Length Overall 9.5 metres

Extreme Breadth 3.5 metres

Moulded Depth 1.06 metres

Extreme Depth 1.6 metres

Draught 0.8 metres

Main Engine 2 x Suzuki 4 stroke outboard engines

Propulsion power 2 x 186.4 kilowatts at 5,000 RPM, independently operated

Type of Propeller 2 x 3-bladed inward turning, 15 degree fixed pitch of diameter 40.64 centimetres

Service Speed 28 knots

Steering systems Sea Star 1.7 Helm hydraulic steering system for outboard engines

Wheelhouse equipment GPS/Sounder: Li Lowrance X-25

VHF Marine radio: GME Electrophone CX558A

1. All times are denoted in Australian Eastern Daylight Time. [↑](#footnote-ref-1)
2. 1 knot = 1 nautical mile per hour = 1.852 kilometres per hour. [↑](#footnote-ref-2)
3. The Marine Board of Victoria was superseded by Marine Safety Victoria in February 2002 by an Act of Parliament. [↑](#footnote-ref-3)
4. The engine was kept idling but the propeller was disengaged. [↑](#footnote-ref-4)
5. Australian/New Zealand Standard AS/NZS 2299.3:2003 “Occupational diving operations” Part 3: Recreational industry diving and snorkelling operations. Compliance with the Standards is not mandatory. [↑](#footnote-ref-5)
6. DIVA (Dive Industry Victoria Association) “Code of Practice for Commercial providers of Recreational Snorkelling & Scuba Diving Services in Victoria” June 2005. Compliance with the Code is not mandatory. [↑](#footnote-ref-6)
7. Milligan, MW and Tennant, JS, 1998, Propeller injury protection, an evaluation of commercially available protection devices, a report of the Marine Technological Society prepared for the Office of Boating Safety, United States Coast Guard. [↑](#footnote-ref-7)