

MARINE OCCURRENCE REPORT

CAPSIZING

OF THE CHARTER DIVE BOAT "SEADEUCER"

NEAR SIMCOE ISLAND, ONTARIO

20 JULY 1996

REPORT NUMBER M96C0056

The Transportation Safety Board of Canada (TSB) investigated this occurrence for the purpose of advancing transportation safety. It is not the function of the Board to assign fault or determine civil or criminal liability.

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### **Summary**

The charter dive boat "SEADEUCER" proceeded from the Collins Bay Marina near Kingston, Ontario, on 20 July 1996, to a dive site off Simcoe Island in the St. Lawrence River, with nine divers and one operator on board. At the completion of the dive, the vessel took on increasing amounts of water through an opening in the transom used to enable divers to re-board at the stern. The combined movements of the free surface water and of the occupants in the same direction caused the vessel to capsize. All 10 persons on board were thrown into the water, but all survived.

*Ce rapport est également disponible en français.*

## Other Factual Information

### Particulars of the Vessel

Name	"SEADEUCER"
Home Port	Picton, Ontario
Licence Number	50E 122372
Flag	Canadian
Type	Dive boat
Crew	1
Passengers	9
Length	8 m
Built	1988, Picton, Ontario
Propulsion	Chevrolet 5.7-litre V8 gasoline motor
Owner	Mr. John R. Smith North York, Ontario

On the morning of 20 July 1996 at about 1115, the "SEADEUCER" departed from the Collins Bay Marina near Kingston, with nine divers and one operator on board. The vessel also carried diving equipment which was securely stowed.

The marine forecast given by the Ontario Climate Centre issued small craft warnings for eastern Lake Ontario from 0400 until the evening for 20 July. The operator of the boat indicated that the weather information he had listened to on a local radio station at 1000 did not give him any cause for concern as he was going to operate in local confined waters. At 1000, the wind speed for the Kingston area, as recorded by Environment Canada, was seven knots, and at 1100, four knots. The operator complained that local weather forecasts issued by Environment Canada were not as frequently available as in the past for specific time periods and local areas.

The vessel arrived over the dive site off Simcoe Island in the St. Lawrence River, about one mile offshore, at approximately 1230 and was secured by a short securing rope to a mooring buoy connected to a sunken wreck.

The nine divers, which included an instructor, entered the water. The operator (also a qualified diving instructor) remained on the boat to act as the dive tender.

During the dive, the wind rapidly increased to more than 20 knots, gusting to 30 knots, from the north to north-west.

After the dive, 30 minutes later, eight of the nine divers re-boarded the "SEADEUCER" which was now pitching and rolling in moderate waves,

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All times are EDT (Coordinated Universal Time (UTC) minus four hours) unless otherwise stated.

estimated at 1.5 m. The portable door in the transom at the stern, measuring approximately 0.5 m by 0.6 m, had been removed to enable the divers to come aboard. However, as the door had been removed, water could ingress each time the stern dipped into the trough between the crests of several larger swells.

The operator was concerned about the port list which was developing and he instructed the divers on board to move forward. The water level in the boat had reached an estimated 0.2 to 0.4 m above the deck when the list developed. The vessel was still secured to the mooring buoy. The operator then asked that some divers move to starboard as he attempted to move the boat forward with the engine to try to shed the accumulated water. However, the vessel suddenly capsized to starboard when the majority of the divers moved to that side and the free surface water followed. The occupants of the boat were thrown into the water.

One diver reported that, during the capsizing, he temporarily had lost consciousness when struck on the head by a hard object, probably an air tank. There was some concern for an exhausted diver who drifted away from the group, but two other divers quickly rescued him.

All the divers wore wet suits, except the operator who wore a shirt and pants. The wet suits provided the divers with warmth and positive flotation. The water temperature was 22°C.

A short time later, several divers swam, without equipment, below the surface and inside the overturned vessel to get flares which were sealed in waterproof containers. All the persons in the water managed to climb on top of the overturned boat. The operator was eventually provided with a lifejacket retrieved from the cuddy cabin by one of the divers.

After two hours, a power boat about 13 m long passed between the capsized boat and Simcoe Island. Three to five conventional red flares were fired in its path about 300 m away, but the boat did not slow down. Red night-time flares are less visible in daylight than orange smoke flares.

The group discussed their options and it was decided that two of the stronger swimmers would swim to shore in a following sea to get some help. They both were wearing wet suits, and at first, one of them was wearing a Transport Canada-tested vest-type lifejacket, but he found that swimming with it on was too tiring and he later took the lifejacket off. Once ashore, the swimmers alerted the Canadian Coast Guard (CCG).

After three hours, the rest of the group was picked up by a CCG vessel and brought ashore. The operator was treated for mild hypothermia and released from hospital a short time later.

As the boat was over 6 m long, it was not required to have a capacity

plate which would indicate the maximum number of persons that could be carried safely. The vessel construction was such that fully enclosed compartments between the deck and hull comprised built-in flotation. This vessel was never inspected, nor was such an inspection required by regulations. The lifejackets were all stowed forward in the cuddy cabin and were not immediately available when needed by those on board the vessel.

At the time of the investigation, the vessel was found to be tender, easily heeling to 8° with one person standing on the side of the boat.

The "SEADEUCER" had been used in the capacity of a charter dive boat for several years without incident. No documentation, stability criteria or construction plans were available for the boat as the builder has been out of business for a number of years.

### **Analysis**

The all-aluminium construction "SEADEUCER" had built-in flotation which prevented the vessel from sinking after the capsizing. This built-in flotation and the flotation provided by a partially filled fuel tank constituted sufficient buoyancy for the "SEADEUCER" to remain at the surface after the vessel capsized, allowing the occupants to sit on the overturned hull.

The water entering through the transom opening at the end of the dive created a free surface effect which was detrimental to the positive stability of the vessel. When the divers on board began to move from one side to the other, the water quickly followed, thus eliminating any remaining positive stability, and the vessel capsized.

After discussing their options, the group decided that two of the stronger swimmers would attempt to reach the shore to obtain help because a large power boat which had passed within 300 m of their overturned vessel had not seen either the vessel or the flares that were fired, the weather was deteriorating and night was falling. There was also a following sea to the shore.

It is not known why the power boat did not see the flares, but it is possible that the glare of the afternoon sun prevented the operator of the unidentified craft from seeing the flares and the divers with their arm-waving movements. Day signal flares, such as orange smoke flares, are more persistent and inherently more visible in daylight situations than either the handheld or the rocket-type short-lived, conventional, red, night-time flares.

The operator was aware of the broader small craft warning for eastern Lake Ontario, but between 1000 and 1100, the average wind speed had

decreased locally from seven to four knots, which may have reassured the operator about proceeding with the dive. Between 1200 and 1300, however, while the dive was in progress, the wind increased significantly to 20 knots, gusting to 30 knots. Also, over open water, the wind speed could be as much as 30 per cent greater than that recorded at land stations. This view has been confirmed by climatologists at Environment Canada.

As a result of the capsizing, the owner has now decided to limit the number of persons on board to six, including the operator of the vessel.

### **Findings**

1. The "SEADEUCER" was licensed as a pleasure craft and was being operated as a charter boat.
2. There was no information as to the number of persons the boat could carry safely in conjunction with a substantial amount of diving equipment.
3. Although the operator was aware of the overall marine forecast broadcast via VHF radio which issued small craft warnings all day, he may have been reassured about proceeding with the dive after he heard the local radio station weather information.
4. The lull in the wind speed between 1000 and 1100 may have been a factor in the operator's decision to proceed with the dive.
5. The "SEADEUCER" capsized when water, entering through an opening in the transom, created a free surface effect on the deck, detrimental to the vessel's inherent stability. The free surface effect was compounded by the movement of all those on board to starboard.
6. Several red flares fired in the direction of a power boat passing within an estimated 300 m were ineffective in alerting the attention of the operator to the capsized vessel.
7. The glare of the bright afternoon sun may have prevented the operator of the passing craft from seeing the flares fired from the same direction as the sun.
8. The lifejackets did not float free when the vessel capsized and were relatively inaccessible to those on board because they were stowed in the forward cuddy cabin. The flotation and heat retention provided by the wet suits safeguarded the divers from a more tragic outcome.

### **Causes and Contributing Factors**

The charter dive boat "SEADEUCER" capsized because of the effect of free surface water on deck and unequal weight distribution. In deteriorating weather, water accumulated on deck when it was shipped through an opening in the transom used to enable the divers to re-board the vessel.

The operator did not avail himself of the detailed weather forecast on VHF radio which would have indicated that the lull in the wind experienced between 1000 and 1100 was temporary.

#### **SAFETY ACTION TAKEN**

A Hazard Notification was submitted to the Accident Prevention Group of the TSB, concerning the awareness of boaters to the differences between red night-time flares and orange smoke daytime flares. The facts of the occurrence indicated that the flares were either not seen or ignored.

*This report concludes the Transportation Safety Board's investigation into this occurrence. Consequently, the Board, consisting of Chairperson Benoît Bouchard, and members Maurice Harquail, Charles Simpson and W.A. Tadros, authorized the release of this report on 09 June 1997.*