

Report on the sinking of MS Explorer

The *Explorer*, an expedition cruise ship, sank in Antarctica on 23rd November 2007. All 154 persons aboard safely abandoned the ship and were subsequently rescued by the Norwegian vessel *NordNorge*. Andy White, a Fellow of the Royal Institution of Naval Architects, was a passenger aboard the vessel and attempts to use his first hand experience to draw some conclusions about the incident.

Background

Explorer was commissioned by Lars-Eric Lindblad, the Swedish-American pioneer of exotic expedition tours, and built in 1969 at Nystads Varv shipyard in Uusikaupunki, Finland.¹

Principal particulars:

Tonnage:	2398
Length:	72.88 m
Beam:	14.08 m
Draught:	4.48 m
Ice class:	ICE-A
Propulsion:	2 x MAK Diesel M452 AK each 1,800 bhp (1,300 kW) , driving a single variable-pitch propeller, 4 blades
Speed:	12.5 knots (23 km/h)
Capacity:	104 passengers
Crew:	54

The ship, under the Liberian flag, was equipped with four lifeboats. The aft pair mounted port and starboard had a capacity of 59 persons each, whilst the forward pair, mounted port and starboard, had a capacity of 39 persons each. In addition the ship carried 4 liferafts of 25/20/16/10 capacity. The ship also carried ten 6.0m Zodiac inflatable boats powered by 50HP 4 stroke outboard motors. These were manned by expedition staff to transfer passengers to and from the ship during the cruise. Although not officially part of the Life saving appliances they would play a crucial role in the incident.

¹ http://en.wikipedia.org/wiki/MS_Explorer#_note-BBC35

The vessel was one of the first to carry fare paying passengers to Antarctica and started a trend which has seen numbers of tourists visiting Antarctica nearly quadruple since 1997. In 2006 approximately 30,000 tourists visited the continent²

Antarctica experiences the worst weather on Earth³. The Admiralty Antarctic Pilot⁴ summarises the difficulties for ships operating in the area.

- The presence of sea ice
- Sudden, violent and unpredictable changes in the weather
- An unusually high proportion of dangerous shoals which rise precipitously from deep water
- Large seas and swells
- Instability of the compass in very high latitudes
- Inadequate charts
- Absence of aids to navigation
- Whiteout conditions
- Kelp
- Obscuration of salient points and landmarks by icebergs
- Loss of echo sounding trace in drift ice.

An old seafarers saying summarises the problems in more emotive terms:

“Below 40 degrees, there is no law, but below 50 degrees, there is no God”

The *Explorer* departed from Ushuaia, Argentina on November 11, 2007 on a 19-day cruise whose theme was “Spirit of Shackleton” after the Edwardian polar explorer Sir Ernest Shackleton. Aboard were 91 passengers, 54 crew and 9 expedition staff (154 persons in total)

The vessel had visited the Falklands and South Georgia (where Shackleton is buried) and on 22nd November had entered the Bransfield Strait which separates the South Shetland Islands from the Antarctic Peninsula. At around 1030 that evening the ship attempted to transit an area which was a mixture of densely packed drift ice intermingled with icebergs of differing sizes. Wind was relatively light, air temperature around freezing and water temperature the same. Survival time if one entered the water without an immersion suit would be less than one hour with the possibility of many passengers dying of cold shock within minutes.⁵

² http://www.iaato.org/tourism_stats.html

³ The Antarctic Pilot NP9

⁴ The Antarctic Pilot NP9

⁵ Review of probable survival times in the North Sea. HSE January 1996

Personal narrative

It is said that “*an adventure is a disaster that did not quite happen*” and for a time during the incident that claimed the Explorer I felt that the line between adventure and disaster was stretched paper thin.

I have written an online account of the incident for friends and family⁶, but as a Naval Architect felt a duty to consider the first hand experience and draw some conclusions. The flag state Liberia is conducting an investigation which will hopefully be available Mid 2008 and I will restrict my report to areas that I had first hand experience of, namely the evacuation, time in the lifeboat and subsequent rescue. Any opinions that I may draw are mine alone.

Problems experienced

- **Muster station**

The General alarm sounded at around 1130, we had been kept awake by the impacts caused by the ship moving through the ice and we got dressed and moved quickly to the Muster station

- **Lack of warm clothing:** Having sailed all my life, attended sea survival courses and operated hovercraft close to the Arctic circle, I well understood the problems of hypothermia. I had suggested to my partner early on in the trip that we lay out all our warm weather gear each night in case we were woken up by the general alarm. So, we were dressed warmly. I am not sure from looking around me at the Muster station that other passengers were as clear as to the need to dress warmly.
- **Lack of control over passenger movement. :** At one point some passengers (us included) were allowed to leave the muster station to go down to our cabins and pack suitcases. As we entered our cabin, the lights failed and without prompting, we left our suitcases and returned to the Muster station. To my knowledge, no further roll call was taken to ensure no-one was still away from the muster station. In addition, at such moments of stress the bodies natural “fight or flee” reaction leads to the need for a toilet! On Explorer this was located away from the muster station and meant that, until expedition staff instigated an escort system, some people left the muster area without any tally system to ensure they had returned safely.
- **Lack of emergency lighting:** When the power failed all lights in the cabin went out, we were fortunate that we were well acquainted with the cabin and in the Austral summer there was just sufficient light coming through to enable us to see.

- **Entering lifeboats**

- **Confusion over which lifeboat;** Once the order to abandon ship had been given there was considerable confusion over which lifeboat to enter. We

⁶ <http://www.flickr.com/photos/andywhite70/sets/> See “Spirit of Shackleton; the last voyage of the MS Explorer”

had been given a safety briefing on day one of the cruise and had been taken to our lifeboat which was on the starboard side. We were now on day 12 and had not had another abandon ship drill. The first day of the cruise was packed with large amounts of information and although I could remember it was on the Starboard side I was not sure which life boat to enter. In the event we boarded lifeboat No 3, starboard aft. At one point a crew man gestured for us to leave the lifeboat and get back on the ship. We stayed where we were.

- **Difficulty moving around the lifeboat:** When we entered the lifeboat there was a rope stretched athwartships hindering us moving to the bow. When we had gone back to our cabin I had decided to ditch the large foam lifejackets in favour of the inflatable lifejackets provided for Zodiac excursions. I took the view that mobility was key to our survival and this played an important factor in being able to move past the obstructions.
- **Length of time waiting for launch:** The confusion over which lifeboat caused considerable delays to the launch of the lifeboat. I saw the crew members counting passenger numbers at least three times and as stated, at one point we nearly had to get off our lifeboat. At the abandon ship drill we had not seen the lifeboat swung away from the side of the ship, nor seen it launched so there was considerable apprehension, as we waited, as to what would happen next. I felt at the time that the delays and lack of understanding of the process caused the real potential for panic amongst the passengers. That no panic occurred is largely due to the passengers response and also the relatively benign incident. (The rate at which the list increased was very gradual)
- **Launching lifeboats and away from ship**
 - **Releasing the hook:** The lifeboats were not fitted with on load release and I turned to help the crew man wrestle with the forward hook release. I estimated the waves were 4 to 6 ft maximum with the occasional wave lipping over into a white horse. Winds were around 15 knots maximum. Relatively benign conditions for Antarctica. I would expect in rougher conditions that it would have been a much more difficult task to release the hook.
 - **Engine did not start:** The lifeboat engine did not start and this meant we could not move quickly away from the side of the ship or the swinging falls block. We drifted under the forward lifeboat, which if released, would have come down on top of us. No-one seemed to be in charge of the lifeboats and it was very much left to the passengers to work out what to do.
 - **Oars broke/lack of space:** I grabbed an oar and with another passenger pushed against the side of the ship. The oar snapped. From the size of timber I would not have expected this to happen which would indicate some rot within the timber. Again no-one seemed in charge and it was left to the passengers to work out what to do. We managed to get enough separation from the side of the ship for us to start rowing, but the lack of

command and restricted space onboard the lifeboat meant that not all oars were put into service

- **Onboard the lifeboats**

- **No sea anchor/no engine:** The crew were unable to find a sea anchor to stream and with the engine not working it meant the lifeboat took up a beam on attitude to the seas and started to roll, such that on occasions the gunwhales just rolled under. The lifeboats were open and it would not have taken very much worse conditions for the lifeboat to have been swamped.
- **Engine failure:** In conversation with a number of passengers immediately after the rescue I learned that only one lifeboat out of four had a functioning engine. I believe all ten Zodiacs were launched and they moved in to assist by picking up a tow or helping manoeuvre the lifeboats which were now drifting down onto the ice that had most likely damaged the Explorer. We were the first to launch and the closest to the ice when the Zodiac that had picked up our tow managed to sort out how to tow us and in the right direction. I estimate we were within ten minutes of coming into contact with the ice.
- **Defective Thermal Protective Aids (TPA)** In our area of the lifeboat sat 6 people. At some point after the launch we were handed a plastic packet containing the TPA's. Again no-one seemed in charge and no instructions were given as to what these were for, how they should be fitted. Of the six in our area only 4 were operational. At least two had their zips corroded on when the plastic packet was opened. I ripped my TPA open and wore it as best I could. As we were sitting right in the bow we were starting to ship water over the bow as the Zodiac took up the tow into wind and waves. I found a spray dodger and wrapped it round four of us to provide extra protection.
- **Seasickness:** Out of our group of six, four people were sea sick. One almost continuously, which incapacitated him. Again no-one seemed in charge and handed out any of the sea sick tablets which according to the ship safety booklets were carried aboard the lifeboat.
- **Lack of command.** At the safety drill at the start of the cruise we had been briefed by one of the expedition staff that he would be present with us on the lifeboat and that there would be an officer in charge. In the event the expedition staff member left the lifeboat to help drive a Zodiac and there appeared to be no one in charge. This caused several problems.
 - The lifeboat was listing to port, in rougher seas this would have become a problem and passengers needed to have been redistributed to correct the list.
 - Passengers were not organised to row the lifeboat in the event that the tow failed.
 - No information was given to passengers as to the need to conserve heat to help with survival times in cold weather.
 - No information was clearly given as to the likely time we would be in the lifeboat.

- The result of all these factors led to a lowering of morale amongst many of the passengers. This was evidenced by the look of resignation and lack of expression that could be witnessed.
 - **Space aboard the lifeboat:** Our lifeboat was approved to carry 59 passengers. After the incident from a photo taken, I estimate she carried only 35 people. Other lifeboats offloaded some of their passengers into the Zodiacs. Wearing bulky cold weather gear and bulky lifejackets it is difficult to imagine that our lifeboat could have carried an additional 24 people without further increasing the possibility of swamping in anything other than calm conditions. Nor being able to use the oars or move around the lifeboat to find the emergency stores that we were unable to locate.
- **Rescue**

The MS NordNorge arrived about 5 hours after we abandoned ship. The Captain provided a lee from the worsening conditions and a combination of the NordNorge rescue boats and the Zodiacs transferred passengers out of the lifeboats and then onto the MS NordNorge port lifeboat which was used to lift passengers aboard or to a hatch which was opened close to the waterline. Without the Zodiacs this would have taken considerably longer or would have required the lifeboats being bought alongside the NordNorge lifeboats. Again; it would not have taken very much worse conditions for this to have become considerably more difficult.

Conclusions

Considering the problems listed above, all of which I consider to be potentially life threatening, it is my opinion that the survival of every person aboard Explorer was down to a combination of factors:-

- **Timely evacuation:** The Captain recognised the problems posed by the ice and ordered the ship to be abandoned. In view of our experience of being within minutes of coming onto the ice that decision was made at the right time.
- **Expedition ship:** All the passengers had to take the itinerary to their doctor and get approval that they were fit to travel on such a trip to Antarctica. We had to be able to scramble in and out of small boats. We had ten Zodiacs with good drivers to get on and off the ship, they were to play a vital role in helping us survive.
- **Small Ship** Less than 100 passengers, we got to know the ship. When the lights went out we could find our way around. It made it easy for the Captain and crew to address us at one muster station.
- **11 Days into the trip:** We had got to know each other. We could assess which people needed some support and it was given. We looked out for each other. We had become a team.
- **We were lucky:**
 - The weather was benign, The next day a ship in the same area reported Force 8 winds and blizzards.
 - The damage to the ship meant that the list increased gradually allowing time for evacuation.

- There was a ship close by which meant we were not exposed in the lifeboats long enough to cause fatalities due to hypothermia.
- We were in open water when we abandoned ship having managed to push out of the dense drift ice that had most probably caused the damage to Explorer

The incident raises a number of questions:-

- **Train hard, fight easy** is a military adage that applies to civilian life. The abandon ship drill at the outset of the cruise was cursory and came at a time when there were a number of other distractions. SOLAS calls for an abandon ship drill every week. This was not carried out on Explorer.
- **Small ships** also have small crews. This compromised the ability to have sufficient crew able to command each lifeboat. Again SOLAS recognises this and requires someone clearly in command and also a 2nd in command.
- **Inspection** Both Port control and Classification. In 2007 the ship had undergone inspection by the MCA in the UK and also classification authorities after refit. The problems with the TPA's and potential engine problems had not been picked up.

These points would be applicable to any cruise ship operating anywhere in the World. Operations in Antractica, due to the problems outlined in the Admiralty pilot coupled with the likely air and sea temperatures and the distance from suitable refuge/shipping lanes, pose particular problems which call into question the suitability of the current Safety of Life at Sea (SOLAS) regulations for Passenger operations in Antarctic waters.

- What would have been the outcome if the ship had to be abandoned when surrounded by dense drift ice? Rather than just meet the current SOLAS regulations should cruise companies not carry out a safety case analysis based on the reality of working in these harsh waters? Such a safety case could use the presence of expedition gear such as Zodiacs to justify operations in such an area
- With increasing reliance on inflatable liferafts, how would they cope in sea conditions with the presence of ice? Considering the potential for damage to lifeboats from icebergs when the ship has lost propulsion and is drifting out of control is there not a case for passenger ships operating in Antarctica to be equipped with 100% capacity on each side? Such lifeboats to be conventional covered lifeboats to the latest standard, irrespective of the age of the ship. (On December 28th 2007 such an incident occurred to the MS Fram. With engine failure she drifted into an iceberg which damaged a starboard lifeboat⁷)
- That such lifeboats should be designed to a higher passenger weight (75kg) and hip width (430mm) than currently required by SOLAS?
- Is it appropriate that passengers on ships operating in Antractica should be denied the benefit of immersion suits?
- Should such passengers, already encumbered by heavy clothing, be further restricted by existing conventional lifejackets?

⁷ <http://www.foxnews.com/story/0,2933,318969,00.html>

- Is it appropriate that vessels carrying thousands of passengers operate in these waters, when the likely size of vessel available to respond to a Mayday coupled with the size of land based refuge, is taken into account.?

I believe that passenger operations in Antarctica have a useful role in educating people especially with regards to global warming and the need for change, but just as Explorer helped start this process, her demise also provides a stark warning for ships operating in this area. If not heeded there exists the very real possibility that next time it will be a disaster rather than an adventure that is reported in the media.