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An Assessment of Environmental Emergencies Arising from Activities in Antarctica

Background

Resolution 6 of ATCM XXII requested that COMNAP undertake an assessment of the risks of environmental emergencies arising from activities in Antarctica, including, but not limited to an analysis of incidents which have occurred over the past ten years within the Antarctic Treaty area.. The original paper XXIII (ATCM/WP16) was submitted to the 1999 ATCM held in Lima Peru.

ATCM XXIII, Committee of Environmental Protection requested that IAATO provide relevant information with regard to environmental emergencies resulting from tourist vessels.

Survey Results

The COMNAP Survey (MNAP Notice 175: Questionnaire on Environmental Hazards) was sent to all current IAATO operators as well as Orient Lines/operating the M.V *Marco Polo* and Adventure Network International. Responses were received from all IAATO members and Orient Lines. Adventure Network claimed no incidences during the 1999/2000 but no further information was provided.

Eleven incidents have occurred since the formation of IAATO in 1991

- 6 transport

Consisted of: three groundings, one ship beset in the ice, two vessels with propeller damage.
(#1,3,4,7,9,10)

- 1 oil leakage

One incident resulted in the spillage of a small amount of gearbox/TEBO pressure oil leaking from a rudder casing. (# 5)

- 3 medical evacuations (two at McMurdo and one at Rothera)

The two medical emergencies required assistance from McMurdo and Rothera stations.
(#6,8,2 respectively)

- 1 environmental

Collision with the humpback whale as noted below (#11).

No lives were lost in any of the above mentioned incidents.

Antarctic Peninsula medical emergencies that were handled amongst ship operators or with assistance from the Chilean Airlines, DAP, or Adventure Network International are not included in this paper.

The following charts represent a detailed assessment of all of the incidents that have occurred since 1991 by tourist vessels. As far as IAATO is aware there are no other incidents involving non-IAATO member vessels.

*Specific Incidents***1. M/V *World Discoverer***

Date	21 January 1991, 18.30 hrs UTC
Vessel-tourist Ship	<i>World Discoverer</i>
Operators/Charter	Society Expeditions
Location-	At sea/Adjacent to Cape Evans/Ross Island, uncharted rock. The Distance to Cape Evans Hut was 064° , and 0.6.NM.
Latitude/Longitude	77 ° 38.5'S, 166 ° 21.9'E.
Type of Incident	Transport Incident. While approaching Cape Evans/Ross Island the vessel grounded on a uncharted rock.
Environmental damage/hazard	None/no pollution was observed.
Damage to vessel	All tanks and cofferdams were checked and the following tanks were thought to be damaged: 1. Freshwater tank I Port and Starboard 2. Diesel Oil Tank II Center 3. Diesel Oil Tank III Center
Response Action Taken	Several attempts with main engine and bowthruster were made to free the vessel. The vessel floated at 20.30 hrs UTC and at 2130 hrs the vessel proceeded
Other Measures Taken	Both radar sets and eco sounders were working faultlessly. After the grounding soundings were taken by sounding-lead all around the vessel. The shallowest depth was ascertained on the starboard side in the midship area.
Was the Environment restored to its condition prior to the accident	There was no environmental degradation.

Estimated Cost of repair	\$200,000 NZD
Injuries or deaths to human beings	No
Injuries or deaths to wildlife	No

2. *M.V. Explorer*

Date	February 1995
Vessel-tourist Ship	<i>Explorer</i>
Operators/Charter	Abercrombie & Kent/Explorer Shipping
Location-	At sea/near Rothera
Latitude/Longitude	N/A
Type of Incident	Medical Emergency- Female tourist/passenger fell and broke her hip.
Environmental damage/hazard	None
Damage to vessel	None
Response Action Taken	Personnel from British Antarctic Survey made the arrangements for the flight and brought an aircraft from Stanley. The passenger overnighted at Rothera Base for one night while the vessel remained in the vicinity.
Was the Environment restored to its condition prior to the accident	There was no environmental damage.

Estimated Cost of repair	N/A
Injuries or deaths to human beings	As noted above
Injuries or deaths to wildlife	No

3. *M/V Professor Multanovskiy*

Date	24 January 1996
Vessel-tourist Ship	<i>Professor Multanovskiy</i>
Operators/Charter	Marine Expeditions Inc
Location-	At sea-6 cables WNW from Penguin Island
Latitude/Longitude	Unknown
Type of Incident	Transport Incident/Vessel was grounded on rocks
Response Action Taken	Adjusted Ballast to float vessel , holes repaired with concrete
Other Measures Taken	Returned to Port of Ushuaia for a full inspection with divers. The vessel has a double hull and only the outer layer was affected.
Was the Environment restored to its condition prior to the accident	There was no environmental degradation.
Estimated Cost of repair	\$32,000 USD

Injuries or deaths to human beings	None
Injuries or deaths to wildlife	None

4. *M/V Professor Khromov*

Date	4 January 1997
Vessel-tourist Ship	<i>Professor Khromov</i>
Operators/Charter	Quark Expedition/Supernova Expeditions
Location-	Neuymayer Channel
Latitude/Longitude	64° 43'5"South, 63° 08'3"W.
Type of Incident	Transport Incident/Vessel grounded on shoal, uncharted rock
Environmental damage/hazard	None
Damage to vessel	Minimal
Response Action Taken	Vessel was pulled off the shoal by Chilean tugboat. Incident was recorded in ship's log. Vessel owner and insurance company informed. Incident reported to all appropriate authorities.
Other Measures Taken	Passengers were transferred to another Quark Expeditions operated vessel the " <i>Alla Tarasova</i> " (now <i>Clipper Adventurer</i>). Vessel then returned to Ushuaia under her own steam and was inspected for extent of damage. Repairs were completed in Ushuaia and vessel resumed sailing schedule.

Was the Environment restored to its condition prior to the accident	There was no environmental damage.
Estimated Cost of repair	N/A
Injuries or deaths to human beings	None
Injuries or deaths to wildlife	None

5. M.V Akademik Sergei Vavilov

Date	18 January 1997
Vessel-tourist Ship	<i>Akademik Sergei Vavilov</i>
Operators/Charter	Marine Expeditions-operator/ Supernova/Quark Expeditions-charterer
Location-	Open water/at sea-Pleneau/Hovgaard area
Latitude/Longitude	N/A
Type of Incident	Oil Spill: Oil was observed leaking from the vessel
Environmental damage/hazard	A total of 4 liters at one liter per hour flowed into the ocean (Gearbox oil, TEBO Pressure oil 68). The oil leak was from a rudder casing.
Damage to vessel	None
Response Action Taken	The oil was very light and self degradable. Crewman (diver), sealed the leak around the stern thruster. The voyage was

	cancelled and the vessel returned to Ushuaia for repairs.
Was the Environment restored to its condition prior to the accident	Yes There was no damage to shore and the oil degraded.
Estimated Cost of repair	N/A
Injuries or deaths to human beings	None
Injuries or deaths to wildlife	None

6. I/B *Kapitan Khlebnikov*

Date	February 2, 1998
Vessel-tourist Ship	<i>Kapitan Khlebnikov</i>
Operators/Charter	Supernova Expeditions/Quark Expeditions
Location-	McMurdo Station/Ross Island-Outside Fire Station
Latitude/Longitude	At McMurdo Station
Type of Incident	Medical Emergency: Passenger collapsed after a 10-15 minute walk up hill on the road from the ice pier. Outside temperature was -9° Celsius.
Environmental damage/hazard	None
Damage to vessel	None

Response Action Taken	Passenger was taken to the hospital at McMurdo, treated for total cardiac arrest and revived. He was later flown to Christchurch with a medivac team from McMurdo.
Other Measures Taken	Follow up was completed by Quark Expeditions. Upon returning home the family doctor believed the problem was heart arrhythmia that could have been exacerbated by physical stress. The passenger was not aware of this condition prior to departure. Passenger recovered from this incident but several months later he died.
Was the Environment restored to its condition prior to the accident	There was no environmental damage.
Estimated Cost of repair	All costs of evacuation were covered by the passenger's travel insurance. (Approximate cost of transport \$72,000)
Injuries or deaths to human beings	As noted above
Injuries or deaths to wildlife	N/A

7. M.V *Hanseatic*

Date	3 February 1999
Vessel-tourist Ship	<i>Hanseatic</i>
Operators/Charter	Hapag Lloyd
Location-	At sea/Paradise Bay
Latitude/Longitude	N/A
Type of Incident	Transport Incident

Environmental damage/hazard	None
Damage to vessel	Starboard propeller sustained damage
Response Action Taken	Vessel sailed to Ushuaia at a speed of 11 knots. The second propeller was fully functional.
Other Measures Taken	Ship was sent to Dry Dock for further repair.
Was the Environment restored to its condition prior to the accident	There was no environmental damage
Estimated Cost of repair	N/A
Injuries or deaths to human beings	None
Injuries or deaths to wildlife	None
Additional Comments	The following cruises were canceled.

8. M/V Marco Polo

Date	February 1999
Vessel-tourist Ship	Marco Polo
Operators/Charter	Orient Lines
Location-	McMurdo station
Latitude/Longitude	N/A

Type of Incident	Medical: The passenger was suffering from lung cancer and his condition had worsened to the extent that he needed to be permanently on oxygen. The supply of oxygen on board was deemed insufficient for him to remain on board all the way to New Zealand.
Environmental damage/hazard	None
Damage to vessel	None
Response Action Taken	Medical evacuation was by Hercules from McMurdo to Christchurch.
Was the Environment restored to its condition prior to the accident	N/A
Estimated Cost of repair	N/A Cost was paid for by the passengers insurance company
Injuries or deaths to human beings	As noted above
Injuries or deaths to wildlife	N/A

9. M.V *Clipper Adventurer*

Date	31 December 1999
Vessel-tourist Ship	<i>Clipper Adventurer</i>
Operators/Charter	Operator:New World Ship Management Co LLC/Clipper Cruise Line/Charterer: Zegrahm Expeditions
Location-	At Anchor, approximately 2 nm NW of Cape Winman near Seymour Island.

Latitude/Longitude	L64° 11.3'S and 056° 40.2'W
Type of Incident	Transport Incident: While at anchor the vessel was contacted by ice damaging 2 of the 5 blades on the port propeller.
Environmental damage/hazard	None
Damage to vessel	2 of the 5 port propeller blades
Response Action Taken	The vessel continued her voyage on one propeller and safely returned to Ushuaia. After disembarking the passengers, the ship then proceeded under her own power to Bahia Blanca, Argentina for repairs.
Other Measures Taken	None
Was the Environment restored to its condition prior to the accident	There was no environmental damage.
Estimated Cost of repair	N/A
Injuries or deaths to human beings	None
Injuries or deaths to wildlife	None

10. M.V *Clipper Adventurer*

Date	1 February 2000
Vessel-tourist Ship	<i>Clipper Adventurer</i>
Operators/Charter	New World Ship Management Co LLC/Clipper Cruise Line

Location-	Pack ice/Martha Strait
Latitude/Longitude	L66° 43.1;S and 067° 31.3'W
Type of Incident	Transport Incident: the vessel was beset in pack ice while navigating in Martha Strait.
Environmental damage/hazard	None
Damage to vessel	None
Response Action Taken	The vessel contacted by radio and was assisted by the Argentinean Icebreaker <i>Almirante Irizar</i> . The Clipper Adventurer was free and clear on the morning of 1 February 2000 and proceeded on her voyage.
Other Measures Taken	N/A
Was the Environment restored to its condition prior to the accident	The environment was not affected.
Estimated Cost of repair	N/A
Injuries or deaths to human beings	None
Injuries or deaths to wildlife	None

11. *Akademik Sergei Vavilov*

Date	1 February 2000
Vessel-tourist Ship	<i>Akademik Sergei Vavilov</i>

Operators/Charter	Quark/Supernova Expeditions
Location-	Approaching Dallmann Bay enroute to Melchoir Islands
Latitude/Longitude	64° 10'S and 63° 03' 1"W
Type of Incident	Transport Incident/Collision with humpback whale. Ship's officers had spotted 2 whales in front of the ship approximately 2 miles at the 1200 position. The whales resurfaced at approximately the 1130 position, one mile ahead of the vessel and then again resurfaced 15 yards in front of the vessel to the port side. They altered course and one whale came up directly in front of the bow and collided with the vessel. Passengers on the stern deck then noted that 2 whales resurfaced about 200 yards off the stern. Both were still breathing on the surface but the whale which had been hit was seen to be bleeding.
Environmental damage/hazard	Noted above
Damage to vessel	None
Response Action Taken	The incident was reported to Quark Expeditions, IAATO, the Marine Mammal Commission, NSF and EPA. Directive was subsequently sent to all expedition leaders and Captains to ensure when any vessel comes into proximity of whales, the vessel must reduce speed and all care taken to change course to avoid any disturbance or collision with whales or in fact any other wildlife present in the water.
Was the Environment restored to its condition prior to the accident	N/A
Estimated Cost of repair	\$0
Injuries or deaths to human beings	None
Injuries or deaths to wildlife	One humpback whale was injured

12. The International Association of Antarctica Tour Operators was formed in 1991. Known incidents that occurred prior to the formation of IAATO are as follows:

(Provided by D. Enzenbacher and Sources: Enzenbacher 1991:91-92, 1994b:111;Swithinbank 1994)

Date	Vessel/aircraft	Tour Operator/party involved	Occurrence
14 Feb 1967	<i>Lapataia</i>	Lindblad Travel	26 Tourists Stranded on Half Moon Island
January 1968	<i>Navarino</i>	Lindblad Travel	Steering engine failure
22 January 1968	<i>Magga Dan</i>	Lindblad Travel	Ship ran aground off Hut Point, McMurdo Sound
22 January 1969	<i>Aquiles</i>	Lindblad Travel	Approximately 70 tourists stranded at Palmer station
23 January 1970	Piper Aztec Twin Engine	Max Conrad (US)	Plane crashed during take off at South Pole, pilot survived
24 December 1971	<i>Lindblad Explorer</i>	Lindblad Travel	Ship grounded in Gerlache Strait, tourists rescued by Chilean Navy
11, February 1972	<i>Lindblad Explorer</i>	Lindblad Travel	Ship grounded on rocks in Admiralty Bay, King George Island
29 November 1972	<i>Ice Bird</i>	David Lewis	Second Capsize of yacht, later reconstructed at Palmer station in 1973
1973	<i>Libertad</i>	DNT/ELMA	Damage to ship
28 November 1979	DC-10 Flight	Air New Zealand	Plane crash on Mt. Erebus, Ross Island, no survivors among the 257 passengers and crew

Note: former IAATO member Lindblad Travel and current IAATO member Lindblad Expeditions are separate companies, and there is/ was no common ownership between the two companies.

Conclusions

Based on the results of the survey it is concluded that:

- There have been very few incidents that have occurred over the last 10 seasons with regard to tourist ships considering that there have been over 800 departures to Antarctica since 1991.
- More experienced officers and crew, better navigational equipment and good communication among tour operators have proven to be effective in being able to avoid many potential problems and mitigate potential impacts.
- All of the vessels have medical doctors on board who can address most medical emergencies The IAATO-EMER (Emergency Medical Evacuation Response). is also in place and works effectively.
- All vessels are required to have Marpol, SOLAS, SOPEP's (Shipboard Oil Pollution Emergency Plans) etc. and other international conventions in place in order to operate.
- Although the possibility of a serious incident does exist, it can be significantly reduced by the use of responsible, best practices, when preparing for and executing expeditions in Antarctica.

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