



# National Transportation Safety Board

Washington, D.C. 20594

## Marine Accident Brief

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**Accident No.:** DCA-05-MM-008

**Vessel:** Malaysian-registered bulk carrier M/V *Selendang Ayu*, International Maritime Organization No. 9145528, 738 feet long, 39,755 gross tons, steel construction, built in 1998

**Accident Type:** Loss of power with subsequent grounding

**Location:** Bering Sea, north shore of Unalaska Island, west of Skan Bay, latitude 53° 38.37' N, longitude 167° 07.67' W

**Date:** December 8, 2004

**Time:** 1705 Alaska standard time<sup>1</sup>

**Owner:** Ayu Navigation Sdn. Bhd.<sup>2</sup>

**Operator:** IMC Shipping Co. Pte. (private) Ltd.

**Damages:** \$12 million vessel (total loss)

**Crew Complement:** 26

**Injuries:** 1 serious, 6 fatal

### Accident Description

On November 28, 2004, after loading 1,000 metric tons<sup>3</sup> of fuel and 60,200 metric tons of soybeans, the bulk freighter *Selendang Ayu* departed Seattle, Washington, for Xiamen, China, with a crew of 26. The vessel was of the Panamax class (meaning it had the maximum dimensions that would fit through the Panama Canal), was powered by a single 11,542-horsepower MAN B&W direct-drive diesel engine, and could make 14.5 knots. Before setting sail, the vessel had passed inspection by port authorities and Coast Guard officials.

The vessel's master, a citizen of India, was on his second transit of the Bering Sea. He had approximately 32 years of seagoing experience and held an unlimited master's license issued by India. He had been employed by IMC Shipping since

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<sup>1</sup> Times given in this report are Alaska standard time (Universal Coordinated Time minus 9 hours; same as military time zone Victor), according to the 24-hour clock.

<sup>2</sup> Sendirian Berhad, abbreviated Sdn. Bhd., is a commercial term used in Malaysia for a private company with limited liability.

<sup>3</sup> One metric ton = 2,204.6 pounds.

December 1998. The chief engineer (on his fourth trip in that capacity on the *Selendang Ayu*) was also a citizen of India and had an unlimited chief engineer's license issued by India in 1992. Most of the other crewmembers were from India or the Philippines.<sup>4</sup>

## **Heavy Weather**

The *Selendang Ayu*'s estimated arrival date in China was December 17. Once through the Straits of Juan de Fuca, the vessel set a westerly course toward Unimak Pass in the Aleutian Islands (figure 1). During this passage, the vessel encountered head (bow on) seas and winds ranging from Beaufort force 7 (near gale) to force 11 (violent storm) but averaging force 8 to force 9 (gale to strong gale).<sup>5</sup>

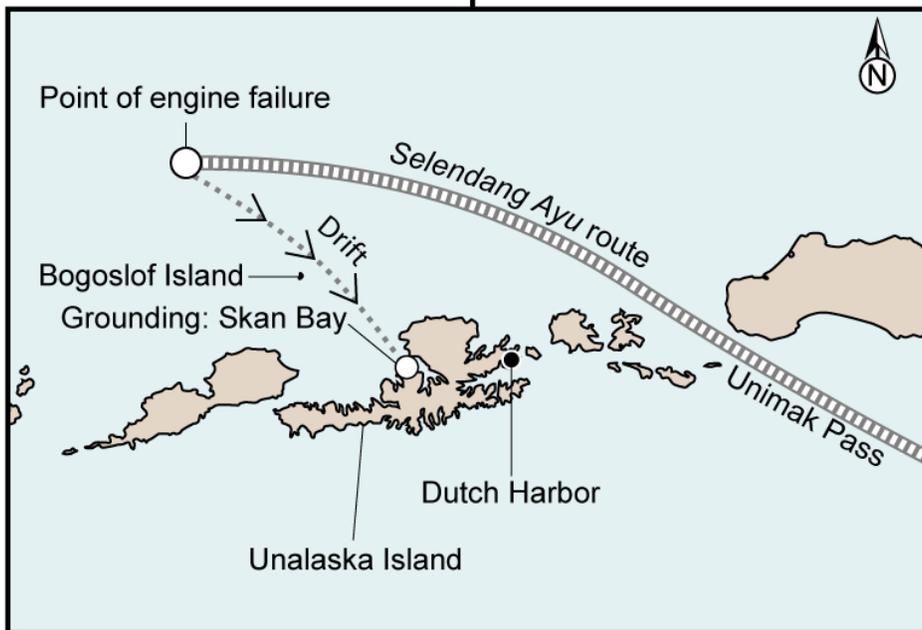
According to the *Selendang Ayu*'s deck logbook, the wind and sea were primarily out of the west, and the vessel pitched and pounded heavily while shipping seas on deck. The master stated that he instructed the mates to reduce the vessel's speed whenever the engineers requested them to, to prevent the engines from working too hard against the sea state. He stated that he and the chief engineer would also, when necessary, slow the vessel using the engineroom controls on the bridge. The engineers on watch were instructed to notify the bridge and reduce the engine speed if the turbocharger exceeded 12,000 to 12,500 revolutions per minute.

According to the deck log, the average speed of the *Selendang Ayu* from Seattle to Unimak Pass was about 9.5 knots. When the vessel arrived at Unimak Pass the evening of December 5, the weather had moderated to force 6. The transit through the pass was uneventful. As the vessel entered the Bering Sea, the wind continued to blow out of the west, generating rough seas and a long, heavy swell.

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<sup>4</sup> The vessel's nine officers were all from India. The vessel carried four cadets, three from India and one from the People's Republic of China. Twelve of the 13 deckhands were from the Philippines; one was from India.

<sup>5</sup> In 1805, Sir Francis Beaufort developed the Beaufort Scale, which is a method for estimating wind strengths without the use of instruments. It is still used for this purpose as well as for tying various components of weather (wind strength, sea state, and observable effects) into a unified picture. Force 6 winds range from 22 to 27 knots on the scale, with sea heights of 9.5 to 13 feet. At force 7, winds range from 28 to 33 knots, with sea heights of 13.5 to 19 feet. Force 8 winds are 34 to 40 knots, with seas from 18 to 25 feet high. In force 9 conditions, winds range from 41 to 47 knots and sea heights from 23 to 32 feet. At force 11, winds are 56 to 63 knots and seas from 37 to 52 feet high.



**Figure 1.** Accident location in Bering Sea. Inset shows route of *Selendang Ayu* through Unimak Pass, approximate point at which engine failed, path of vessel's drift without power, and site on Unalaska Island where it grounded.

## **Engine Failure**

The *Selendang Ayu* continued without incident until Monday, December 6. At 1200 (1000 by the *Selendang Ayu*'s clock<sup>6</sup>), the fourth engineer, who was standing watch in the engine room,<sup>7</sup> reported to the chief engineer and the second engineer in the control room that "a jet of water [was] coming out from" the main engine's No. 3 cylinder. The second engineer immediately instructed the fourth engineer to shut down the evaporator and went below.<sup>8</sup> According to the fourth engineer, when the second engineer returned from the engine room, he said he was going to shut down the main engine. The fourth engineer said that by the time he had secured the evaporator, the main engine had stopped.

The master told investigators that he heard the engine alarm and noticed the rapid reduction in engine revolutions per minute on the bridge meters. After the chief engineer informed him that the liner in cylinder 3 was cracked, the master said that he confirmed his vessel's position and its distance from Dutch Harbor, the closest port of refuge.

At the time of the engine failure, the vessel was approximately 100 miles from Dutch Harbor and about 46 miles from the nearest point of land, Bogoslof Island. The weather was less severe than what the vessel had experienced since leaving Seattle. According to the vessel's deck log, winds were from the west-southwest at Beaufort force 6. The vessel was rolling, pitching, and shipping seas in a rough sea and swell. The sky was cloudy with good visibility.

## **Vessel Adrift**

**Company Notified.** From about 1230 to 1545 on December 6, the senior engineering staff and master assessed the engine. They decided to isolate the No. 3 cylinder (disconnect air, fuel, and cooling water from the cylinder), according to instructions in the manufacturer's manual, then restart the engine (which could operate on fewer than all six cylinders), proceed at reduced speed to safe anchorage in Dutch Harbor, and repair the No. 3 cylinder. In accordance with the company's safety management procedures,<sup>9</sup> they notified the company's vessel technical superintendent in Singapore about the problem and their plan of action. The master told the superintendent that the

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<sup>6</sup> The *Selendang Ayu* had already retarded its clocks by 2 hours, expecting to continue through the Bering Sea. Geographically, the vessel was in the time zone observed at Dutch Harbor and on board the U.S. Coast Guard cutter *Alex Haley*, which responded to render assistance. Ship times have been converted to Alaska standard time in this report.

<sup>7</sup> Normally, the *Selendang Ayu* operated with an unmanned engine room, but watches had been set and maintained since December 2 because of the rough weather.

<sup>8</sup> Securing the evaporator is a step in the sequence of a controlled main engine shutdown. The evaporator uses the heat generated by the main engine to turn seawater into fresh water for use on the ship.

<sup>9</sup> Cargo ships and other vessels that make international voyages are required to follow the 1998 International Safety Management Code (International Management Code for the Safe Operation of Ships and for Pollution Prevention). The code establishes safety management objectives and requires shipowners, or those responsible for ship operation, to establish safety management systems for their vessels. Procedures are compiled in a safety management manual, and a copy of the manual is kept on board.

vessel was not in imminent danger or close to land. The superintendent agreed with the proposed action.

**Engine Work Begins.** From 1600 to 2100 on December 6, the engineroom staff worked to isolate cylinder 3. At 2100, the chief engineer began trying to restart the main engine. Meanwhile, the sun had set and the weather had deteriorated to Beaufort force 8, with winds from the northwest. The vessel continued to drift southeasterly at approximately 1.6 knots. Gale warnings were forecast across the entire Unalaska Island area, with sustained winds up to 45 knots, seas to 25 feet, and reduced visibility in snow showers.

**First Attempt to Contact Shore.** At 2300 the night of December 6, when the *Selendang Ayu* was about 90 miles from Dutch Harbor, the master made his first attempt to contact the harbormaster over VHF channel 16 (the international calling and distress frequency). VHF radio range is about 20 miles. The master received no response or call back. He did not try at that time to contact the harbormaster by the ship's satellite telephone.

**Engine Does Not Restart.** The crew continued trying to restart the main engine, but all attempts were unsuccessful. At 2330 on December 6, the chief engineer called the technical superintendent again and informed him of the continuing problems with restarting the engine. The superintendent instructed the chief engineer to e-mail him the steps taken to isolate cylinder 3. The superintendent forwarded this e-mail to the engine manufacturer's representative in Singapore. The manufacturer's representative suggested in response that the crew try isolating the No. 3 cylinder using a different method, then try again to restart the engine.

**Coast Guard Notified.** At 0245 on Tuesday, December 7, the *Selendang Ayu* master called the harbormaster in Dutch Harbor using the vessel's satellite telephone. The harbormaster contacted the Coast Guard in Dutch Harbor, which sent notification of the situation to the Coast Guard Marine Safety Office in Anchorage and the Coast Guard District 17 command center in Juneau. About an hour later, according to information provided by the company, the Coast Guard notified IMC Shipping through the *Selendang Ayu* master that the company would have to arrange for a tug.<sup>10</sup>

At 0512, the Coast Guard cutter *Alex Haley*, as directed by District 17,<sup>11</sup> began proceeding to the *Selendang Ayu*'s position at best speed (about 10 knots because of the sea state).

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<sup>10</sup> Since the accident, IMC Shipping has contracted with a spill management company to prepare an emergency response plan for IMC vessels transiting the Aleutian Islands.

<sup>11</sup> The Coast Guard diverted the *Alex Haley* from a fisheries patrol 65 miles to the northeast in the Bering Sea.

**Engine Work Continues.** At 0555 on December 7, the technical superintendent in Singapore instructed the chief engineer to open the scavenging doors<sup>12</sup> and check the condition of the rings on the engine's cylinders. Thirty minutes later, the chief engineer reported that all but two of the cylinders had broken rings. Following instructions, the chief engineer sent a report of the condition of each cylinder's rings and digital photos of the cylinders to the superintendent. After consultation with the engine manufacturer's representative, the superintendent instructed the chief engineer to change the rings in the No. 6 cylinder, which was determined to be in the worst condition. The superintendent said that he reported that a lack of compression was the "root cause" of the engine's failure to restart.

At 0900, the *Selendang Ayu's* engineering crew began changing the No. 6 cylinder rings. The engineering crew and the master had now been up for about 24 hours. Sunrise was an hour away. The vessel was beam to the seas and drifting southeast at 1.8 knots in a force 7 northwesterly near-gale of 30-knot winds and 15-foot seas.

### **Towing Attempts**

**Rescue Vessels Arrive.** At 1000 on December 7, the *Alex Haley* commanding officer contacted the *Selendang Ayu* by radio. At 1100 by the *Alex Haley* deck log, the 283-foot, 3,040-ton, 6,800-horsepower Coast Guard cutter arrived on scene (latitude 54° 06.3' N, longitude 168° 14.2' W), carrying an HH-65 Dolphin helicopter.<sup>13</sup> At 1230, Coast Guard District 17 informed the *Alex Haley* that the oceangoing tug *Sidney Foss* was due to arrive in 4 to 6 hours. The *Sidney Foss* had been hired by IMC Shipping. At 1255, District 17 advised the *Alex Haley* that two Coast Guard HH-60 Jayhawk<sup>14</sup> helicopters had been launched from Air Station Kodiak to Cold Bay, where they would be in position to evacuate the *Selendang Ayu's* crew if necessary.<sup>15</sup>

By 1330, the *Selendang Ayu's* No. 6 cylinder head—which weighed 3,306 pounds and was 23.5 inches in diameter and 11 feet long (with rod attached)—had been removed and was lashed to the deck. The chief engineer stopped the engine work because of the danger to the crew posed by the vessel's rolling in the rough seas and the possibility of damaging the cylinder. The crew stood by in case conditions improved. For the next 18 hours, no further work was attempted on the freighter's engine. Hourly reports on the vessel's status went by e-mail from the *Selendang Ayu* to the management company in Singapore.

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<sup>12</sup> An airbox around each cylinder allowed fresh air to enter that would blow out ("scavenge") the exhaust gases. Openings on the outside of the engine next to the airbox, called scavenging doors, allowed inspection of the cylinder rings.

<sup>13</sup> The HH-65 Dolphin is a medevac (medical evacuation)-capable short-range recovery helicopter that normally carries a crew of four (pilot, copilot, flight mechanic, and rescue swimmer).

<sup>14</sup> The HH-60 Jayhawk is a twin-engine, medium-range search and rescue helicopter. Its fuel capacity is 6,460 pounds and its rescue hoist can lift 600 pounds. The helicopter's maximum speed is 180 knots.

<sup>15</sup> Cold Bay is 177 miles north of Dutch Harbor, about an hour's distance by Jayhawk helicopter. Air Station Kodiak is 610 miles away.

By 1530, the wind and sea conditions had increased to Beaufort force 8 or 9. The wind was from the northwest. The *Selendang Ayu* was about 3.0 miles north-northeast of Bogoslof Island and drifting clear of the island to the southeast. The *Alex Haley* stood by and monitored the situation.

At 1630, Coast Guard District 17 directed the *Alex Haley* to take the disabled freighter in tow and slow its drift. The *Alex Haley* had a 1,000-foot, 8-inch towing hawser on board. Before its conversion to a Coast Guard cutter, the *Alex Haley* had served as a rescue and salvage ship (named the U.S.S. *Edenton*) for the U.S. Navy, at one time towing the battleship *Wisconsin* (58,000 tons displacement). During its conversion from the *Edenton* to the *Alex Haley*, the vessel's tow winch had been removed, but its propulsion had not been altered. In 2001, the *Alex Haley* had performed a 41-hour tow of a 593-foot, 46,000-ton bulk freighter adrift about 80 miles north of Unalaska Island.

At 1730, the *Alex Haley* contacted the tug *Sidney Foss* on radar and by radio. The tug was then 11 nautical miles away. At 1737, District 17 instructed the *Alex Haley* to stand down and allow the *Sidney Foss* to prepare to tow the *Selendang Ayu*. The *Alex Haley* was to remain on scene and assist. At 1745, the *Sidney Foss* established communications with the *Selendang Ayu* and discussed towing plans.

**Attaching Towline.** Carrying a crew of six, the 126-foot, 198-gross-ton, 3,000-horsepower *Sidney Foss* arrived on scene at 1830 and approached the drifting freighter.<sup>16</sup> The sun had set. The tug master reported northwest winds of 45 to 55 knots, with a sea and swell running 20 to 25 feet. The master maneuvered around the *Selendang Ayu*'s bow to find the best angle for passing a heaving line and a messenger.<sup>17</sup> At 1930, according to the tugboat master, as the *Selendang Ayu*'s crew made its way to the bow, the freighter's decks were awash and "the ship was rolling 25 to 35 degrees." The freighter was lying beam to the sea in 25-foot waves and 45- to 55-knot northwesterly winds.

The tug moved close enough under the bow to pass the line to the freighter's crew. The crew hauled in the messenger until they could attach the eye of the towline over a set of bitts<sup>18</sup> on the *Selendang Ayu*'s bow. The towline was then connected to a 2-inch wire on the tug's towing-winch drum. At 2004, the eye was secure on the bitts and the tug master paid out 1,900 feet of wire for the tow. The wire was connected to 600 feet of 9-inch synthetic-line hawser and then to the bow of the *Selendang Ayu*. The crew of the tug had secured chafing gear<sup>19</sup> to the towline at the wear point where the line rode over the edge of the *Selendang Ayu*'s bow. The freighter's crew applied grease to the area to reduce the friction as tension increased on the towline. At 2020, the *Sidney Foss* began the tow.

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<sup>16</sup> When the *Sidney Foss* arrived on scene, another smaller tug, the *Redeemer*, sent by the Coast Guard, was also making its way to the *Selendang Ayu*'s position. The *Redeemer* was rated at 1,550 horsepower, about half that of the *Sidney Foss*. With little chance of effecting a tow on the 738-foot freighter, the *Redeemer* sought a lee near the coastline of Unalaska Island but stood by to render assistance.

<sup>17</sup> A heaving line is a small line with a weighted end used to pass or throw a line over some distance. A messenger is a graduated line that is used to bring the towline to the vessel.

<sup>18</sup> Strong vertical structural metal posts, usually installed in pairs, used to secure heavy lines.

<sup>19</sup> Tubing or cloth wrapping used to protect a line from chafing on a rough surface.

At 2400, the *Selendang Ayu* master sent the third and fourth engineers to their cabins to sleep. According to interviews, the senior engineering staff and the master had now been awake for about 41 hours.

The master of the *Sidney Foss* said that the weather remained the same into the morning of December 8, with 45- to 55-knot northwesterly winds and 20- to 25-foot seas and passing snow and ice squalls. The *Sidney Foss* attempted to tow the *Selendang Ayu* to the northwest, but the wind, seas, and swell pushed both vessels to the east-southeast at approximately 1.5 knots. The freighter's heading drifted between 010° and 110° true.<sup>20</sup> The tug's master, trying to regulate the tension on the towline to avoid parting it, slowed the vessel's drift toward the southeast from 3.0 knots to about 1.5 knots, but he could not turn the freighter's bow into the wind. At the same time, the *Selendang Ayu* master tried to shift the rudder<sup>21</sup> to bring his vessel's bow into the seas. These efforts had little effect on the vessel's heading.

**Towline Breaks.** At 0435 the morning of Wednesday, December 8, the harbor tug *James Dunlap* (101 feet long, 196 gross tons, 4,300 horsepower), carrying a crew of three, arrived on scene from Dutch Harbor. The *James Dunlap* had been hired by IMC Shipping. The *Selendang Ayu* was drifting closer to shore. Sunrise was 5 1/2 hours away. Because of the sea state and the darkness, the masters of the *Sidney Foss* and the *James Dunlap* decided to wait until daylight before attempting to swing the bow of the *Selendang Ayu* around by putting a line on the stern. Management in Singapore urged the *Selendang Ayu*'s engineering staff to return to work on the engine: "Even if it is considered unsafe to extract piston of No. 6 unit, other jobs . . . can be carried out." At about 0700, the *Selendang Ayu* crew returned to work on cylinder 6. According to the *Sidney Foss* master, the wind was still blowing at 45 to 55 knots and the seas were over 25 feet high. Sunrise was 3 hours away.

At 0732, the *Sidney Foss* master notified the *Selendang Ayu* and the *Alex Haley* that his towline had parted. By 0853, the *Sidney Foss* had recovered what remained of its towline. The *Selendang Ayu* master said that 8 to 10 meters (about 26 to 33 feet) of towline were still on his vessel. The *Sidney Foss* crew began splicing an eye in the end of the towline, but the seas kept the aft decks awash, making the work difficult and dangerous. The sea state eventually prevented the *Sidney Foss* from attempting to put another line on the freighter.

### ***Attempts to Anchor***

On the morning of December 8, the *Selendang Ayu* continued to close on the Unalaska Island coast. At 0945, the Coast Guard directed the *Selendang Ayu* to transfer all its fuel to the inboard tanks and secure the fuel oil heaters, to reduce the danger of a spill if the ship grounded. The sun rose at 1009, according to the *Alex Haley*'s deck log.

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<sup>20</sup> Degrees true is direction expressed as an angle from the earth's axis and indicated by a gyrocompass, as opposed to direction indicated by a magnetic compass.

<sup>21</sup> Turn the wheel from hard over on one side to hard over on the other.

Shortly afterward, the *Alex Haley* commanding officer asked the *Sidney Foss* and the *James Dunlap* masters about attempting another tow. Both tug masters responded that conditions were too extreme, but they agreed to stand by and assist.

At 1040, the *Alex Haley* recommended that the *Selendang Ayu* master drop anchor. The vessel was now drifting over the 50-fathom (300-foot) curve, where the anchor might find a purchase and arrest the vessel's drift toward the coast. At 1115, the *Selendang Ayu* master radioed the *Alex Haley* that he had the port anchor down with 10 shackles<sup>22</sup> (900 feet) on the anchor winch. From then until approximately 1200, the freighter slowed almost to a stop, and it appeared that the anchor was holding. The freighter's heading had swung from northeasterly to westerly.

Where the master dropped anchor, the *Selendang Ayu*'s ratio of anchor chain (900 feet) to depth (300 feet) was 3:1. A common rule of seamanship is "to use a length of chain equal to 5 to 7 times the depth of the water. This is satisfactory in depths of water not exceeding 18 fathoms. This amount of chain is perhaps enough for a ship riding steadily and without any greater tension on her cable."<sup>23</sup>

Shortly before 1130, the *Selendang Ayu* master reported that his anchor was dragging, and the vessel resumed drifting to the southeast at about 2.0 knots. The Coast Guard recommended dropping the starboard anchor, but the *Selendang Ayu* master said the starboard anchor might foul on the port anchor's chain. The port chain was tight around the vessel's stem (forwardmost part of the bow) and leading to the north (figure 2). The ship's heading was 235° true. By about 1230, the vessel passed over a shallower patch of ocean only 30 to 15 fathoms (180 to 90 feet) deep, in contrast to the previous depths of 300 feet. The port anchor passed over these depths without arresting the *Selendang Ayu*'s drift.

About 1300, the weather worsened to Beaufort force 9. The *Sidney Foss* master said the seas were steep at 20 to 25 feet, and that periodic wind gusts of up to 65 knots occasionally pushed the waves to 30 or 33 feet. The *Selendang Ayu* master reported that he could not immediately lower the starboard anchor. The *Alex Haley* commanding officer said that he would try to tow the freighter's bow into the wind so the anchor could be dropped.

At 1325, the *Alex Haley* approached the *Selendang Ayu*'s starboard bow. Crewmembers stood by to receive a line as the *Alex Haley* maneuvered slowly across the port bow from a distance of about 350 yards. The Coast Guard crew fired the *Alex Haley*'s line-throwing gun, with a messenger attached, to the bow of the *Selendang Ayu*. The Coast Guard commanding officer estimated that some of the seas through which they were attempting to pass the line were at least 35 feet high (the height of eye on the *Alex Haley*'s bridge).

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<sup>22</sup> One shackle or shot of chain = 15 fathoms or 90 feet.

<sup>23</sup> Austin M. Knight, *Modern Seamanship*, 12th ed. (Princeton, N.J.: D. Van Nostrand Co., 1957), p. 161.



**Figure 2.** *Selendang Ayu* drifting with port anchor chain wrapped tightly around the stem.

The distance between the vessels did not allow enough slack for the *Selendang Ayu* crew to pull in the messenger. The *Alex Haley* decreased its forward motion while continuing to pay out the messenger. The decrease in speed caused the cutter to lose steerageway and turn to starboard, putting the seas on its port beam. The two vessels were now starboard bow to starboard bow and lying beam to the seas. At 1342, with the tension increased, the messenger line parted. When the *Alex Haley* bridge received word that the line had parted, the commanding officer ordered the remaining line on the stern to be cut away so it would not foul the propellers.

### ***Crew Evacuation***

The Coast Guard now turned its attention to evacuating the crew. Radio calls between the *Alex Haley* and the *Selendang Ayu* master document the Coast Guard's desire to start removing crewmembers and the master's desire to keep enough crewmembers on board to deal with the emergency. Because of the diminishing light (it was 3 1/2 hours before sunset), the vessel's proximity to shore, and the flight hours the helicopter crews were accumulating, the Coast Guard recommended evacuating the crew from the *Selendang Ayu* immediately. The Coast Guard advised that after dark, rescuing the crew would be difficult. The master finally allowed a group of 18 crewmembers to depart, those he considered the least essential for dealing with the emergency.

About 1400, the Coast Guard began hoisting the first group of nine *Selendang Ayu* crewmembers, wearing lifejackets,<sup>24</sup> from the deck of the freighter into the first HH-60 helicopter that had arrived from Cold Bay. At 1430, the second HH-60 helicopter arrived on scene.

At 1431, the *Selendang Ayu* master lowered his starboard anchor. The anchor held with 10 shots on the winch. The *Alex Haley's* deck log reports that at 1450, the vessel was about 1 mile from the beach, holding to two anchors with 10 shots of chain on each (figure 3).



**Figure 3.** *Selendang Ayu* off shore of Unalaska Island. Both anchor chains are out and deck lights are visibly illuminated, showing that ship's generators are still producing power.

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<sup>24</sup> None of the *Selendang Ayu* crewmembers wore an immersion suit (a reddish-orange, buoyant suit, also known as a survival suit, that covers the wearer's entire body, except for the nose and eyes, and protects against heat loss and ingress of water). At the time of the accident, the International Convention for Safety of Life at Sea (SOLAS), chapter 3, regulation 32 ("Personal life-saving appliances"), required a cargo vessel to carry at least three immersion suits for each lifeboat, unless the vessel had a totally enclosed lifeboat on each side. The *Selendang Ayu* carried two fully enclosed lifeboats, one port and one starboard, and was equipped with three immersion suits. After the accident, IMC Shipping outfitted all its vessels with immersion suits for all crewmembers. In an amendment effective July 1, 2006, the SOLAS regulation was changed to require one immersion suit for each person on board a cargo ship. An exemption from this requirement for ships that voyage "constantly" in warm climates is not allowed for bulk carriers.

At 1450, the first HH-60 helicopter completed its hoist and flew the nine *Selendang Ayu* crewmembers to the *Alex Haley*. Hovering above the cutter's deck (figure 4), the helicopter lowered the crewmembers one at a time in a basket.



**Figure 4.** Coast Guard HH-60 Jayhawk helicopter hovering above *Alex Haley*'s deck during rescue of *Selendang Ayu* crew.

Beginning at 1455, the second HH-60 helicopter hoisted on board the other group of nine crewmembers, all wearing lifejackets, and flew directly to a rendezvous point on Unalaska Island. By 1514, both HH-60 helicopters had landed at the rendezvous point. The rescued crewmembers were transferred to the first helicopter and flown to Dutch Harbor, where customs officials and medical personnel met them. The second HH-60 flew first to Dutch Harbor and then to Cold Bay for a crew change.

At this point, nine *Selendang Ayu* crewmembers were still on board the *Alex Haley*, with the HH-65 Dolphin helicopter secured in its onboard hangar. One HH-60 Jayhawk helicopter was 30 minutes away in Dutch Harbor, and the other Jayhawk helicopter had left the scene entirely. Eight crewmembers remained on board the *Selendang Ayu*. Seven were the freighter's most senior and experienced personnel; the eighth was a deck cadet who remained on board out of loyalty to the master and who stated that he was confident in the successful outcome of the situation.

## ***Vessel Runs Aground***

Between 1500 and 1700, the crew remaining on the *Selendang Ayu* attempted to finish the engine repairs, while the master was monitoring the bridge, communicating by radio with the Coast Guard, and sending updates to his management office in Singapore. During that time, the *Alex Haley* informed the master of the *Selendang Ayu* that his anchors appeared to be dragging.

About 1700, the commanding officer of the *Alex Haley* called the master to remind him that the Coast Guard wanted to remove his remaining personnel from the freighter before sunset (which would occur at 1749). He told the master that the helicopter would take 30 minutes to arrive. The master then asked the chief engineer how much longer the repairs would take. The chief engineer told him 10 to 15 minutes. As the master made his way topside to inform the *Alex Haley*, he felt the first of several shudders and realized that the vessel had run aground.<sup>25</sup> The master noted the time of the grounding as 1705. Coast Guard logs indicate notification by the vessel at 1715.

## ***Helicopter Crash***

When the *Selendang Ayu* master felt the ship hit bottom, he told the chief engineer to stop work and get everyone out. He then radioed the *Alex Haley* and requested immediate helicopter evacuation. Wearing lifejackets, the eight remaining crewmembers on the grounded freighter assembled on the port bow, where the two previous evacuations had taken place. The vessel was rolling badly in the shallow water and increasing ground swell. The HH-60 Jayhawk helicopter remaining in Dutch Harbor was dispatched to the scene about 1730, and at 1801, the *Alex Haley* launched its HH-65 Dolphin helicopter to the freighter. Both helicopters reached the freighter's location by 1803. The helicopter pilots decided that the HH-60, being larger, would perform the rescue hoist.

The HH-60 lowered a rescue swimmer to help the crewmembers into the basket that would hoist them into the helicopter. At 1816, after the seventh crewmember had been hoisted on board the helicopter and while the *Selendang Ayu* master and the Coast Guard rescue swimmer waited on the freighter's exposed bow, a wave larger than any yet encountered, according to witnesses, struck the bow of the freighter, sprayed up, and engulfed the HH-60. The helicopter's engines stalled, the helicopter descended, and its tail and main rotor blades struck the side of the *Selendang Ayu*. The helicopter then fell into the sea close to the freighter's forward port side, overturned, and sank.<sup>26</sup>

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<sup>25</sup> The *Selendang Ayu* grounded on a small underwater shelf extending out from the coastline. The 10-fathom (60-foot) contour line runs out at an average of 0.25 nautical mile for most of the charted coastline. The *Selendang Ayu* contacted the bottom at the point where the shelf extends about 0.7 nautical mile offshore. The draft of the *Selendang Ayu* was 41.4 feet on departure from Seattle.

<sup>26</sup> An aviation safety investigator from the Safety Board's Anchorage field office investigated the facts and circumstances pertaining to the loss of the HH-60 helicopter and prepared a search and rescue group chairman's factual report in support of the marine investigation.

The HH-65 Dolphin helicopter from the *Alex Haley* had been hovering nearby observing the rescue effort when it witnessed the wave and the crash of the HH-60 Jayhawk. The HH-65 Dolphin immediately went into rescue mode. By 1836, the HH-65 had recovered all three of the Jayhawk's crew from the water but only one of the *Selendang Ayu*'s seven crewmembers. With no other signs of survivors in the water, the HH-65 helicopter flew to Dutch Harbor to get medical attention for those rescued.

At 1913, with the master of the *Selendang Ayu* and Coast Guard rescue swimmer still awaiting rescue, the freighter broke in half on the rocks (figure 5). At 2035, the *Alex Haley*'s HH-65 Dolphin helicopter returned and rescued the master and the Coast Guard swimmer. After sweeping the shoreline for survivors, the Dolphin flew back to Dutch Harbor, where the *Selendang Ayu* master and the rescue swimmer were treated for exposure. On December 11, the *Alex Haley* docked in Dutch Harbor, bringing with it the nine *Selendang Ayu* crewmembers who had been rescued in the first helicopter evacuation.



**Figure 5.** *Selendang Ayu* after breaking in half off Unalaska Island—stern section in foreground, bow section in background. (Photo taken December 9, 2004, day after accident.)

The chief engineer of the *Selendang Ayu*, the second engineer, the chief electrician, the chief mate, the third officer, and the bosun died in the accident. None of their bodies was recovered and they are presumed drowned.<sup>27</sup> The accident resulted in a

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<sup>27</sup>A search for their bodies was suspended at 1730 on December 10, 2004

spill of approximately 336,000 gallons of fuel oil and diesel fuel that led to an environmental cleanup lasting until June 2006.<sup>28</sup>

## **Probable Cause**

The National Transportation Safety Board determines that the probable cause of the grounding of the *Selendang Ayu* was the failure of the main engine's No. 3 cylinder, which led the crew to shut down the engine; the freighter then drifted 100 miles and ran aground off Unalaska Island. Contributing to the cause of the grounding was the inability of the *Selendang Ayu* crew to restart the engine after it had been shut down, and the inability of the responding vessels to effect a tow or otherwise halt the freighter's drift in the extreme wind and sea conditions.

**Adopted: September 26, 2006**

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<sup>28</sup> National Oceanic and Atmospheric Administration, National Ocean Service, Office of Response and Restoration, "M/V *Selengang Ayu* Cleanup Operations Complete," June 29, 2006 <<http://response.restoration.noaa.gov>>.