December 8, 2025 MIR-25-42

Collision between Offshore Supply Vessel *Jack Edwards* and Cargo Vessel *Julie C*

On March 17, 2024, at 2253 local time, the offshore supply vessel *Jack Edwards* was in the Atlantic Ocean transiting inbound to Georgetown, Guyana, when it veered to port and collided with the outbound general cargo vessel *Julie C* (see figure 1 and figure 2).[1] After the collision, the *Jack Edwards* continued to Georgetown under its own power. The *Julie C* returned briefly to Georgetown before proceeding on its intended voyage. Two crewmembers on the *Jack Edwards* sustained minor injuries. As a result of the collision, an estimated 2,200 gallons of diesel fuel were released into the water from the *Jack Edwards*. Damages to the *Jack Edwards* and *Julie C* were estimated at $1.025 million.

Figure 1. *Left to right*: *Jack Edwards* arriving at a repair shipyard in April 2024 after the collision, and the *Julie C* at an unknown date before the collision. (Source: Edison Chouest Offshore; The CSL Group Inc.)

[1] (a) In this report, all times are Guyana time, and all miles are nautical miles (1.15 statute miles). (b) Visit ntsb.gov to find additional information in the public docket for this NTSB investigation (case no. DCA24M030). Use the CAROL Query to search investigations.

Casualty Summary

Casualty type	Collision
Location	Atlantic Ocean, about 3 miles northeast of Georgetown, Guyana 06°51.99′ N, 058°08.18′ W
Date	March 17, 2024
Time	2253 Guyana time (coordinated universal time –4 hrs)
Persons on board	10 (*Jack Edwards*), 17 (*Julie C*)
Injuries	2 minor (*Jack Edwards*)
Property damage	$1.025 million
Environmental damage	2,200 gal diesel fuel released into the sea
Weather	Visibility 10 mi, scattered clouds, winds northeast 6 kts, seas slight, air temperature 79°F, water temperature 81°F, evening twilight 1848
Waterway information	Unprotected approach channel, width 148 ft; charted depth 16 ft in channel, 8 ft outside of channel

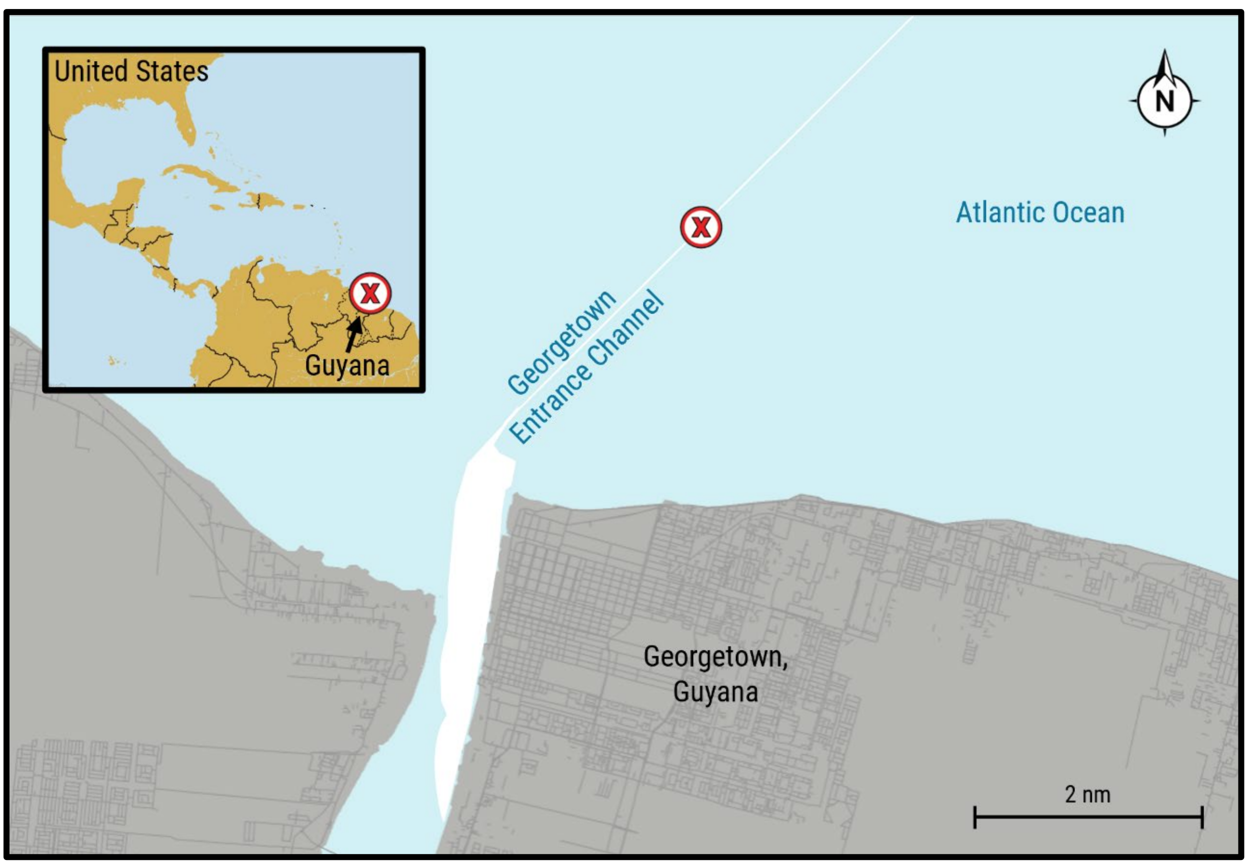

Figure 2. Area where the *Jack Edwards* and *Julie C* collided, as indicated by a circled *X*. (Background source: Google Maps)

1 Factual Information

1.1 Background

The 278-foot-long, US-flagged offshore supply vessel (OSV) *Jack Edwards* was constructed of steel and built in 2012 by Tampa Ship LLC in Tampa, Florida. The vessel was owned by Jack Russel LLC and operated by Galliano Marine Services LLC, doing business as Edison Chouest Offshore (ECO), based in Cut Off, Louisiana.

The *Jack Edwards* had two main propulsion diesel engines, each driving a controllable pitch propeller (CPP) and a shaft generator through a gear box. Each of the vessel's CPPs produced a maximum output of 3,600 hp. The vessel had two rudders located aft of the propellers (see figure 3).

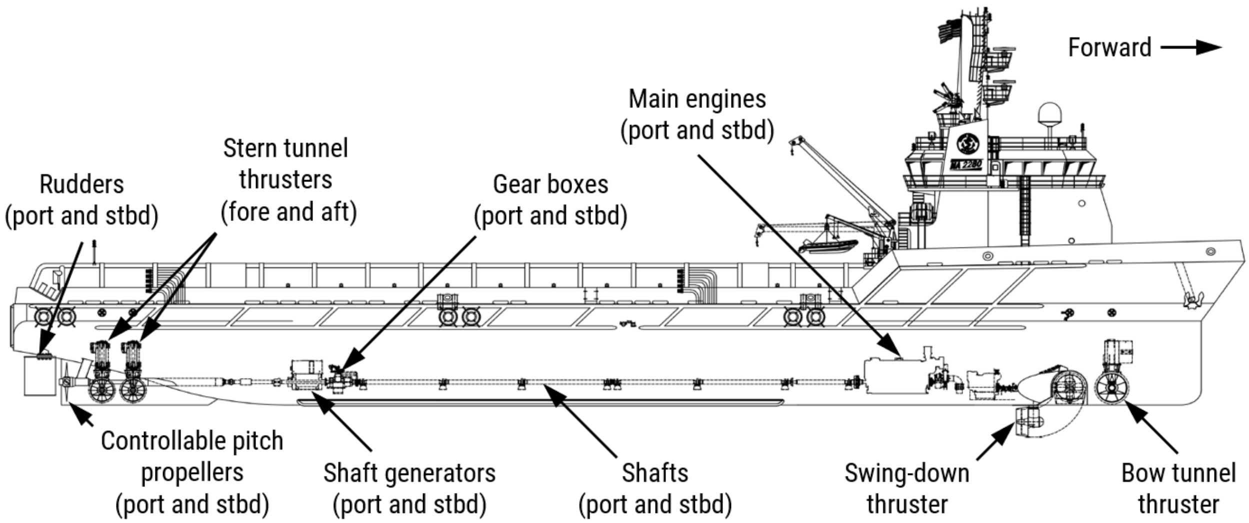

Figure 3. *Jack Edwards* side profile with propulsion engineering equipment. (Background source: ECO)

The *Jack Edwards* was equipped with a bow tunnel thruster, rated at 1,700 hp, which was electrically driven by the port main engine shaft generator. A 1,200-hp azimuthing "swing-down" thruster was installed aft of the tunnel thruster on the bow.[2] The swing-down thruster was powered by a dedicated diesel engine and could be retracted into the hull when not in use. Two tunnel thrusters located at the stern of the *Jack Edwards* were each rated at 1,072 hp. The forward stern thruster was powered

[2] An *azimuthing* thruster is shaft driven by its associated engine and able to rotate 360° via an electro-hydraulic system. This rotation, used in conjunction with engine throttle control, allows for thrust in any direction.

from the port main engine shaft generator. The aft stern thruster was powered from the starboard main engine shaft generator (see figure 4).

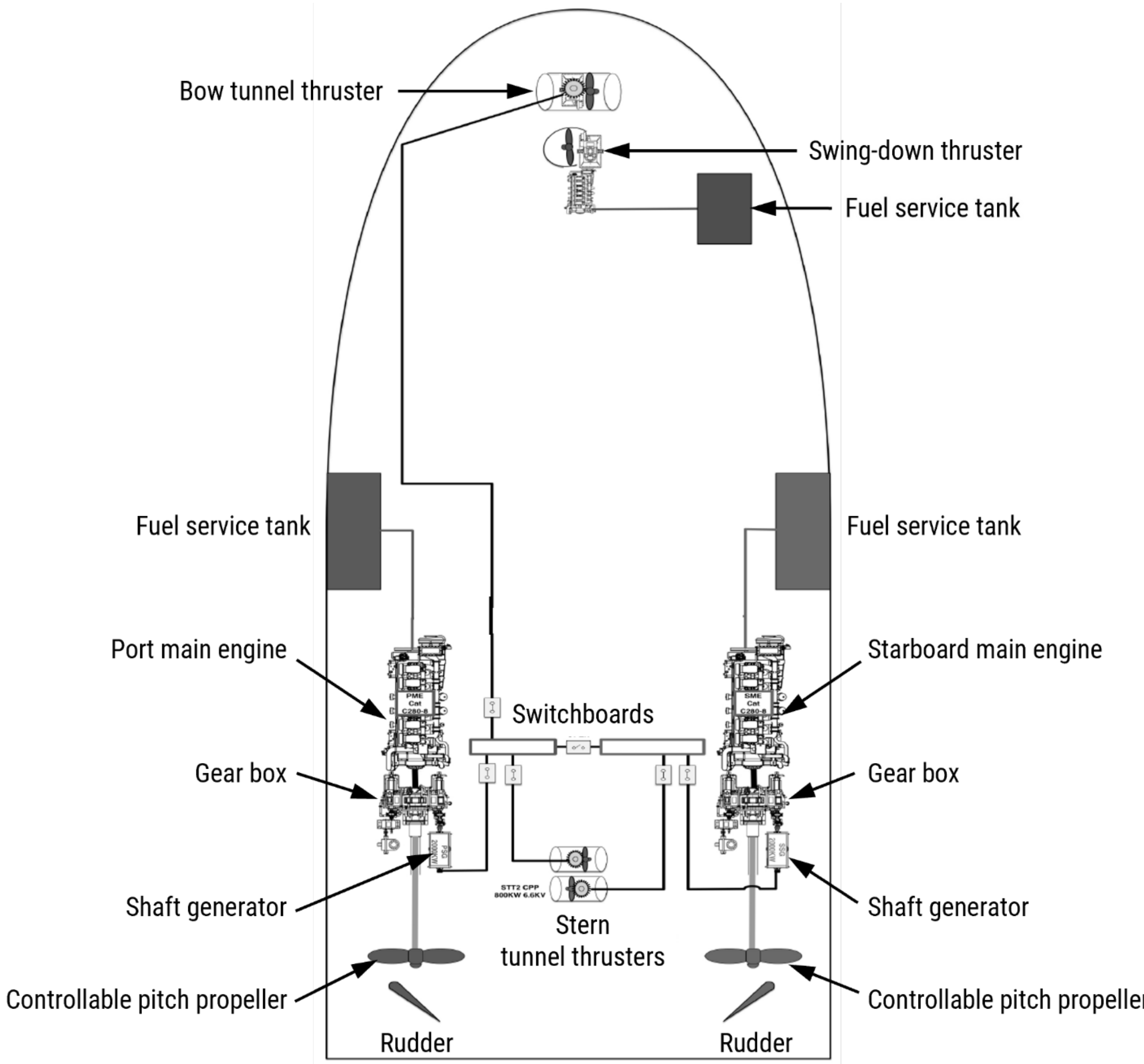

Figure 4. *Jack Edwards* propulsion and rudder simplified arrangements. Not to scale. (Background source: ECO)

The propulsion systems and rudders on the *Jack Edwards* could be controlled from two consoles on the bridge: a forward-facing console used during general navigation and an aft-facing console that could be used while maneuvering near piers or oil and gas structures and platforms. Under normal conditions, control was shifted between the consoles by depressing a "general takeover" button two times on the receiving console. In the event the button was inoperable, control could also be shifted by selecting "general takeover" on touch screen displays on the vessel's consoles. In an emergency, control could be taken at a console by depressing an "emergency transfer" button one time. To prevent an inadvertent shift of control, the emergency transfer button had a protective cover that had to be rotated away from the button before pushing it (see figure 5).

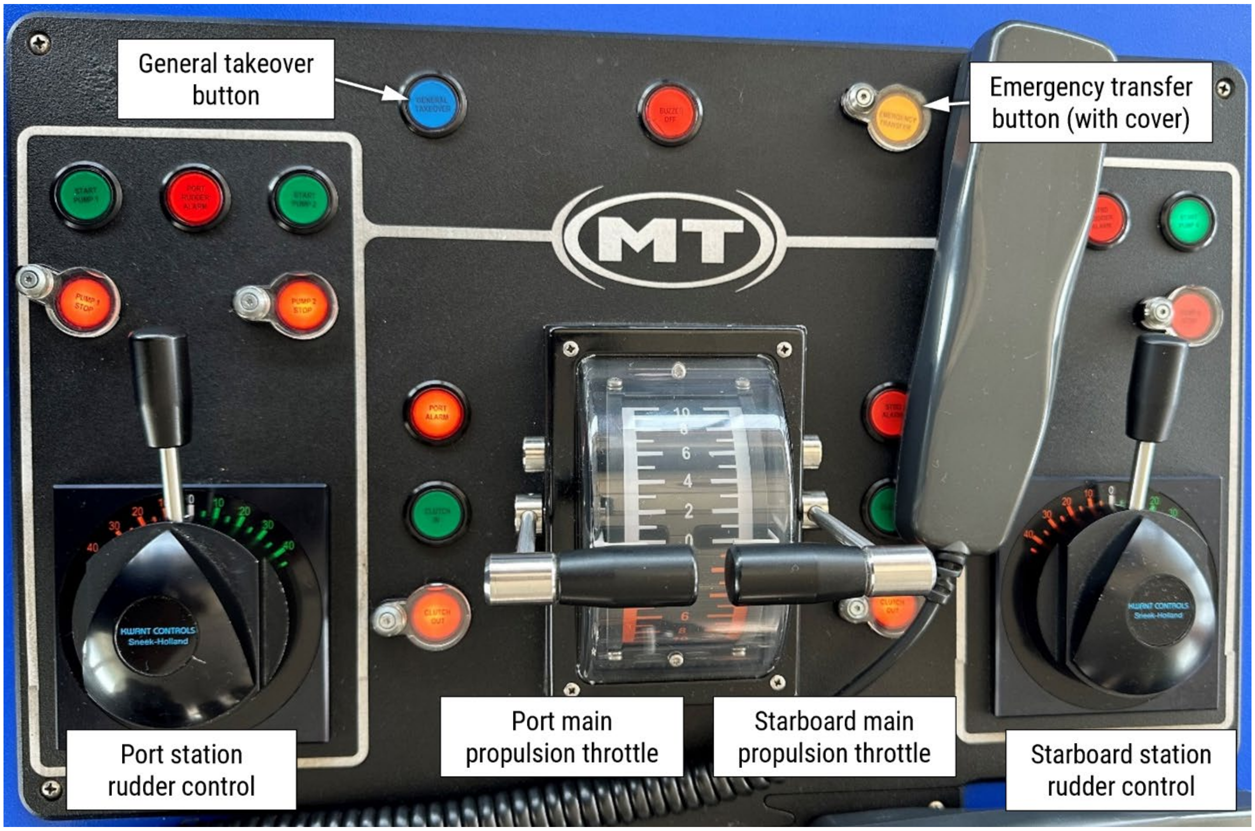

Figure 5. *Jack Edwards* propulsion and rudder controls on the forward bridge console. (Background source: Coast Guard)

The 453-foot-long, United Kingdom-flagged general cargo vessel *Julie C* was constructed of steel and built in 2009 by Jiangsu Yangzijiang Shipbuilding Co., Ltd. in Jingjiang, Jiangsu, China. The vessel was owned by CSMT Julie Shipping, Ltd., and operated by Carisbrooke Shipping, Ltd., based in Cowes, England, United Kingdom.

The *Julie C* had a single main propulsion diesel engine driving a fixed-pitch propeller at a maximum output of 7,242 hp. A single rudder was located aft of the propeller. The vessel was equipped with a 670-hp bow thruster.

1.2 Event Sequence

On March 2, 2024, the *Jack Edwards*, with a crew of nine, got underway from Port Fourchon, Louisiana, bound for Georgetown, Guyana (while en route, the vessel made a brief stop in Chaguaramas, Trinidad). The vessel had recently completed a major drydocking maintenance period, and the crew was delivering the vessel for work in the oil and gas industry based in Georgetown.

The chief mate and second mate told investigators that, while the *Jack Edwards* was in the shipyard in Port Fourchon and continuing throughout the voyage to Georgetown, they had received regular steering system alarms. According to the second mate, the system generated “dozens” of alarms a day, and “you'd be hard pressed to know what was an important alarm or not an important alarm.” The chief mate stated that the crew was told by shipyard personnel that the steering alarms were “something normal.” (The vessel did not log steering alarms, and therefore investigators were unable to review the types and times of the alarms reported by the crew.)

The *Jack Edwards*’s chief mate, who stood watch as officer in charge of the navigational watch (OICNW) from midnight to 0800 during the transit to Guyana, stated that, on the day before arrival in Georgetown, he noticed that the vessel’s steering had become erratic and that the autopilot was “having to work harder” than he was accustomed to seeing on other vessels. In the morning on March 16—the day the *Jack Edwards* arrived in Guyana—he made the following entry in the Daily Navigational Watch Change Form before turning over to the master: “The vessel’s steering seems to be off – must hold approx. 8° of stbd. [starboard] rudder to steer straight.” The entry was repeated in the next watch change form, when the master was relieved by the second mate. The chief mate said that the master told him that the steering issue was normal for the *Jack Edwards*. The chief mate had only 2 weeks’ experience on the vessel, so he said he did not question the master’s statement. The steering issue was not reported to the *Jack Edwards*’s chief engineer by the bridge watchstanders.

Arriving in Georgetown on March 16, the *Jack Edwards* transited the port’s entrance channel and moored without incident. Later that evening, the vessel shifted berths in the port, again without incident.

At 0840 the next morning, the *Jack Edwards* got underway to conduct a brief sea trial a few miles off the Guyana coast for the vessel’s charterer. A representative of the charterer company had boarded the vessel, bringing the total complement to ten. The OSV’s departure drafts were 13 feet 5 inches forward and 14 feet 2 inches aft. The sea trial was completed by 1530. A half hour later, the vessel anchored, awaiting high tide and an available berth in Georgetown.

At 2100, the *Jack Edwards* crew began preparing the vessel to get underway for the inbound transit to the port. The second mate was the OICNW on the bridge.

The master was also on the bridge, working at a desk. About 2130, the chief mate went to the bridge to watch over and assist the second mate. According to the chief mate, the master had requested that he assist the second mate because the master was not confident in the second mate's shiphandling ability.

About 2200, the *Jack Edwards* got underway with its main engines and bow thruster online. The second mate steered the OSV and controlled the engines via the forward console, while the chief mate stood nearby.

The "Navigational Procedures" contained within the *Jack Edwards*'s safety management system (SMS) required that "all available thrusters" except the swing-down thruster be online "prior to departing, arriving, or transiting through ports, channels, or other navigationally restricted areas." However, shortly after getting underway to enter into Georgetown, the bow thruster was taken offline (the stern thrusters were not started when getting underway from anchorage, and the swing-down thruster was retracted). The second mate stated, "Once you get over a few knots, thrusters are ineffective and you can get cavitation effects, which can damage the equipment. So, in the interest of not causing equipment damage, the chief mate secured the thruster." The master's standing orders also required all tunnel thrusters to be online "when entering/departing ports and in confined waters," but the master told investigators that whether the thrusters were online or not was the "preference of the individual that is handling the vessel."

At 2215, the *Julie C* got underway from its berth in Georgetown with a Georgetown pilot at the conn. The vessel was bound for Cartagena, Columbia.

Fifteen minutes later, as the *Jack Edwards* continued inbound at a speed of 9 knots, it was hailed on VHF radio by "Georgetown Pilots" and informed that it was "way out of the [Georgetown entrance] channel." At the time, the *Jack Edwards* was about 0.48 miles to the northwest of the channel. Georgetown Pilots advised the vessel to come to port toward the channel. The *Jack Edwards*'s chief mate acknowledged the Georgetown Pilots radio call and instructed the second mate to steer toward the channel.

The second mate and chief engineer told investigators that, while outside the channel, the *Jack Edwards* was "shuddering" and had a "serious vibration." According to the second mate, the shuddering stopped when the *Jack Edwards* got closer to the channel. The second mate and chief engineer stated that it was possible that the vibration was caused by the vessel contacting the soft mud bottom. In a statement to investigators, the charterer representative, who was on the bridge during the casualty voyage, noted that the vessel's handling was "sluggish" and suggested that this was possibly due to the mud. However, the chief mate believed the vibration was caused by cavitation from the close proximity to, and not contact with, the shallow bottom. Data from the *Jack Edwards*'s voyage data recorder (VDR) showed that, throughout the inbound transit, the vessel's echo sounder measured depths beneath the keel of 8 feet or greater.

While at the controls, the second mate struggled to keep the *Jack Edwards* on a consistent heading. He recalled to investigators that "the boat kept falling off to the port side." ECO Remote Monitoring Center (RMC) and VDR data showed that he used predominantly starboard rudder to steer the vessel.[3] At 2249, the second mate moved the rudders to 45° starboard and told the chief mate "we're falling off bad." The second mate then told the master that he could no longer maintain control of the vessel. The chief mate moved over to the control station to take control of steering and propulsion.

Before turning over to the chief mate, the second mate put the rudders to midship (the vessel's speed remained between 9 and 10 knots). According to the chief mate, the *Jack Edwards* immediately began turning to port, so he put the vessel's rudder control lever over to hard (45°) starboard (see figure 6). Soon after, the *Julie C* pilot radioed the *Jack Edwards* proposing a port-to-port passage. The *Jack Edwards* chief mate responded to the radio call, stating, "Yeah, port to port. Sorry about that. We just lost our heading there for a second."

The chief mate told investigators that he initially believed that the second mate's steering difficulties had been the result of his inexperience. However, after taking control, the chief mate also struggled to maintain a consistent heading. Like the second mate, the chief mate used predominantly starboard rudder while attempting to steer the vessel. He stated, "I brought it back on to course, but as soon as I got it back on the course, it started taking a dive over to the port side and so that I was having to counter-steer. I was having to counter-steer really strongly."

ECO RMC data showed that whenever the *Jack Edwards* mates gave a starboard rudder order, the starboard steering gear responded slower than the port steering gear (RMC data showed the rudders nearly synchronized when moving to port). When the chief mate ordered hard starboard rudder, the starboard rudder was at 34° when the port rudder reached 45°. The starboard rudder continued to move and reached 45° three seconds later. VDR data for the transit also showed that the

[3] ECO's RMC was located at the company's headquarters in Cut Off, Louisiana, and provided remote monitoring of vessel and cargo movement throughout its fleet. For the *Jack Edwards*, the RMC monitored engine orders and RPM, rudder orders and responses, and the station where steering and propulsion control was located, among other parameters.

starboard rudder consistently lagged the port rudder—up to 10°—when turning to starboard.

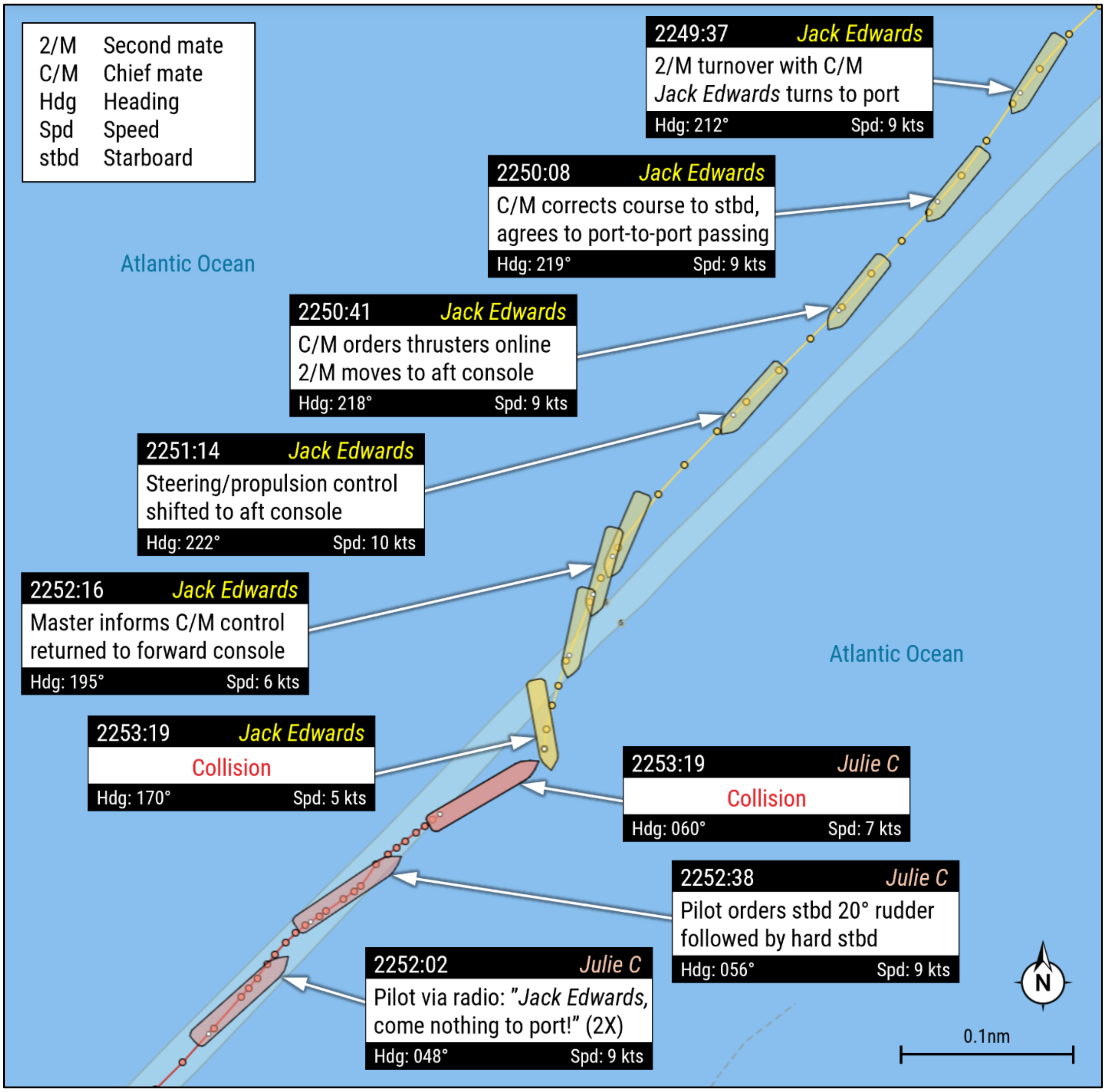

Figure 6. *Jack Edwards* and *Julie C* collision. (Background source: United Kingdom Hydrography Office ENC Z14EH9R0.C00 as viewed on Made Smart on July 16, 2025)

As a result of his difficulties controlling the vessel, the chief mate ordered the tunnel thrusters brought online at 2250:41. The second mate responded, "I'll get them." The tunnel thrusters could be brought online using the touch screen displays on the bridge control consoles, and the second mate went to the aft console to complete the task.

ECO RMC data showed that, shortly thereafter, control of the ship's rudders and engines shifted from the forward bridge console to the aft console. The chief mate now had no control over the vessel's steering or propulsion from the forward console. The pitch on the *Jack Edwards*'s controllable pitch propellers went to neutral (zero thrust), and the vessel began slowing and turning to port. About the same time that control shifted, the second mate at the aft console announced that he did not know how to start the thrusters and that he was concerned that he would do something incorrectly. Seconds later, the chief mate reported "I got a hundred percent [starboard] rudder over. I'm losing heading hard [to port]." At 2252:02, the pilot on the *Julie C* called out over VHF radio, "*Jack Edwards*, *Jack Edwards*, come nothing to port, come nothing to port!"

Realizing that the second mate had likely taken control of steering and propulsion at the aft console, the *Jack Edwards* master went to the forward console and pressed the "emergency takeover" button, returning control to the forward console 57 seconds after it had shifted to the aft console. At 2252:16, the master informed the chief mate that he had control back.

The *Jack Edwards* was now crossing the channel in front of the *Julie C*. Determining he could not avoid a collision by turning back to starboard, the chief mate turned the rudders 45° to port in an attempt to clear the channel on the opposite side.

At 2252:30, the *Julie C* pilot again called out to the *Jack Edwards* over VHF radio, stating, "*Jack Edwards*, *Jack Edwards*, you cannot come. You impede my passage here!" Eight seconds later, the *Julie C* pilot ordered starboard 20° rudder, followed quickly by an order of hard starboard rudder. These orders turned the *Julie C* in the same direction that the *Jack Edwards* was now turning.[4] The *Jack Edwards* chief mate concluded that a collision was imminent and ordered the ship's general alarm to be sounded. The second mate responded but could not find the general alarm button. The alarm was eventually sounded by the master.

Still unsure whether he had rudder control, the chief mate attempted to steer the *Jack Edwards* using the engines to avoid a direct hit by the *Julie C*. However, at 2253:19, the *Julie C* struck the *Jack Edwards* at a near perpendicular angle on the OSV's starboard side forward of midships.

[4] Investigators were not able to interview the Guyanese pilot on the *Julie C* and therefore were not able to collect his account of the accident. The commands of starboard 20° and hard starboard rudder were overheard on the *Jack Edwards*'s VHF radio, as recorded by the OSV's VDR.

After the collision, the *Jack Edwards* master went below to conduct a damage assessment. The chief engineer, who had injured his shoulder in the collision, joined the master during his examination of the vessel. The master and chief engineer checked for flooding and determined the vessel to be safe; however, they discovered the starboard steering gear was "out of commission" and covered in black-colored oil (see figure 7). The chief engineer also saw "black mud" coming out of the rudder stock. A later inspection identified that the oil level in the starboard steering gear hydraulic oil expansion tank was low.

Figure 7. *Jack Edwards* starboard steering gear as found immediately after collision. (Background source: ECO)

Once the *Jack Edwards* crew concluded that the vessel was not in danger, the OSV proceeded into Georgetown using engines and thrusters to steer the vessel. The *Julie C* returned to the port briefly before proceeding outbound again toward its intended destination.

1.3 Additional Information

1.3.1 Damage

1.3.1.1 *Jack Edwards*

As a result of the collision, the *Jack Edwards*'s hull plating was breached and other structural components were compromised, resulting in seawater intrusion into the swing-down thruster fuel service tank, the starboard-side main engine lube oil tank, the starboard-side fuel oil settling tank, a starboard-side double-bottom fuel oil storage tank, and two spare tanks (see figure 8). About 2,200 gallons of diesel fuel leaked into the water from the swing-down thruster service tank. Although each of the tanks flooded with seawater, the stability of the vessel was not compromised.

Figure 8. *Jack Edwards* external damage. (Source: ECO)

Deck plating, bulwarks plating, and hull plating at the deck edge on the 01-level weather deck were bent inward and fractured, and the starboard-side exhaust funnel plating was fractured at the 02 level. Two liferafts stowed aft of the exhaust funnel were destroyed, and the stowage rack was damaged. Various other components and piping systems in the engineering spaces were also damaged. The total cost of repairs to the *Jack Edwards* was estimated at $900,000.

1.3.1.2 *Julie C*

Shell plating on the *Julie C*'s forepeak tank was indented, and internal structural members within the tank were damaged (see figure 9). The bulbous bow was punctured on the port side, leaving an 8-inch-by-8-inch hole. About 50 feet of shell plating on the port side, as well a small area of shell plating above the forepeak tank, was indented. Guardrails on the bow were also damaged. The cost of repairs to the cargo vessel was estimated at $125,000.

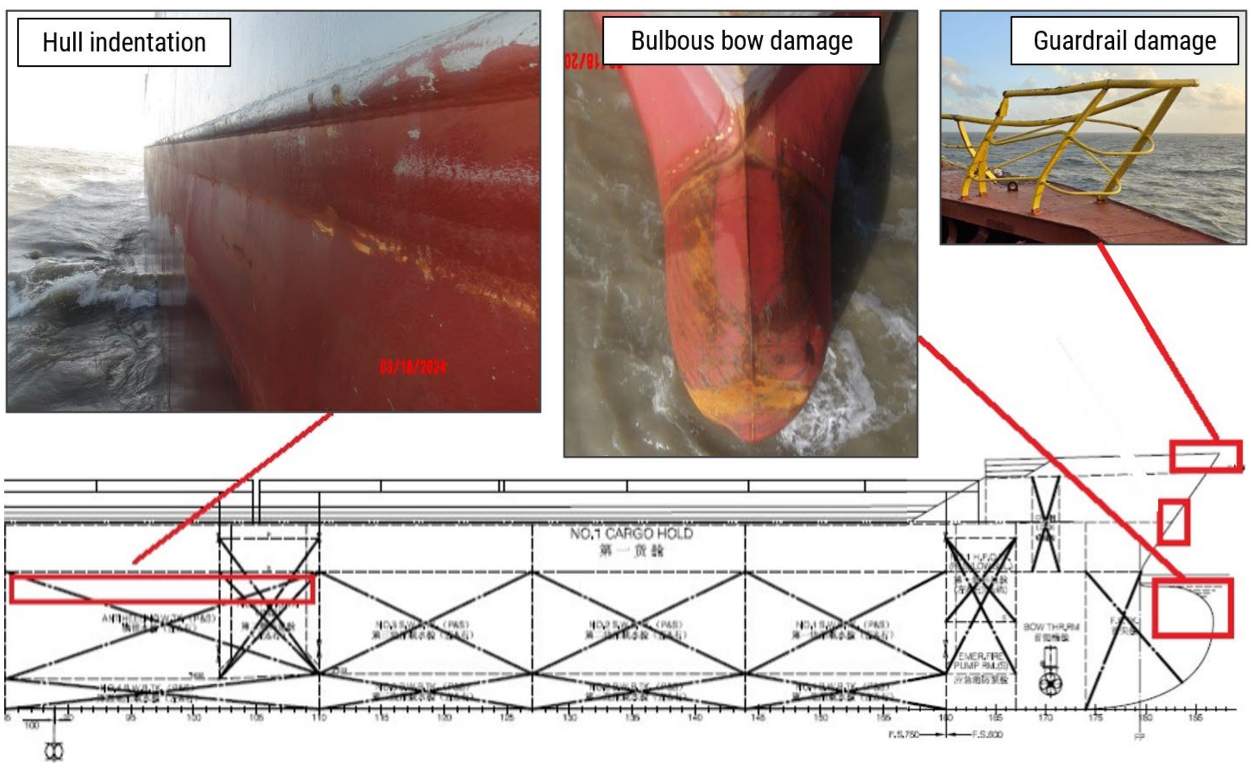

Figure 9. *Julie C's* external damage. (Background source: Carisbrooke Shipping Ltd.)

1.3.2 Personnel

The *Jack Edwards* second mate held valid US Coast Guard-issued credentials as master and officer in charge of a navigation watch of vessels less than 3,000 gross tons and as second mate on self-propelled vessels of unlimited tonnage upon oceans. He had over 26 years' experience as a mariner and had worked for ECO as a deck officer on various OSVs since 2005. He told investigators that his experience had been almost entirely on vessels that did not have touch screen interfaces like those on the *Jack Edwards*. The second mate joined the *Jack Edwards* in January 2024 while the OSV was in the shipyard. He was trained on the vessel's systems by the senior officers but noted that the "training time was pretty limited because we spent most of our time tied to the dock." The second mate stated that he was "not fully qualified" to be at the controls of the *Jack Edwards* while docking the vessel, but he felt confident and comfortable handling the OSV in a straight-line transit of a channel. However, he described being nervous during the casualty voyage due to his unfamiliarity with the vessel.

The *Jack Edwards* chief mate held valid US Coast Guard-issued credentials as master (OSV) of self-propelled vessels of less than 6,000 gross tons upon oceans and chief mate (OSV) of self-propelled vessels less than 10,000 gross tons upon oceans, along with other endorsements. He had over three decades' experience in the maritime industry. He had worked for ECO as a deck officer on various OSVs since 2007 in positions up to and including master. The chief mate joined the *Jack Edwards* in February 2024 while the OSV was in the shipyard. Although he had not previously sailed on the vessel, he stated that he had sailed on vessels of the same class for long periods of time. The chief mate told investigators, "I consider myself a very good boat handler."

The *Jack Edwards* master held a valid US Coast Guard-issued credential as a master (OSV) of self-propelled vessels less than 10,000 gross tons upon oceans, along with other endorsements. He had sailed as a master of OSVs since 2012 and had been the master of the *Jack Edwards* for about a year total (not continuous).

1.3.3 *Jack Edwards* Steering Systems

1.3.3.1 Overview and Basic Maintenance

The *Jack Edwards* was fitted with vane-type Rolls-Royce SR 662 steering gears for the port and starboard rudders.[5] When a rudder command signal was sent to a steering gear, two hydraulic pumps on the gear started and ported oil via a valve block into a ring-shaped cylinder (see figure 10). Vanes within the cylinder, which were connected to the rudder stock, moved under the hydraulic pressure and turned

[5] In 2019, Rolls-Royce Commercial Marine was acquired by Kongsberg Maritime; product support for Rolls-Royce steering gears was provided by Kongsberg at the time of the casualty. In September 2024, Norvestor IX SCSp signed an agreement to acquire Kongsberg's steering gear and rudder division, with the intent to set up a new company to support the business.

the rudder to the ordered angle. Once the rudder reached the ordered angle, the pumps stopped. To move the rudder in the opposite direction, the pumps operated in reverse. A feedback unit attached to the steering gear provided the rudder's position to the rudder indicating system and bridge control system. The feedback unit followed the rudder by means of a gear and chain system.

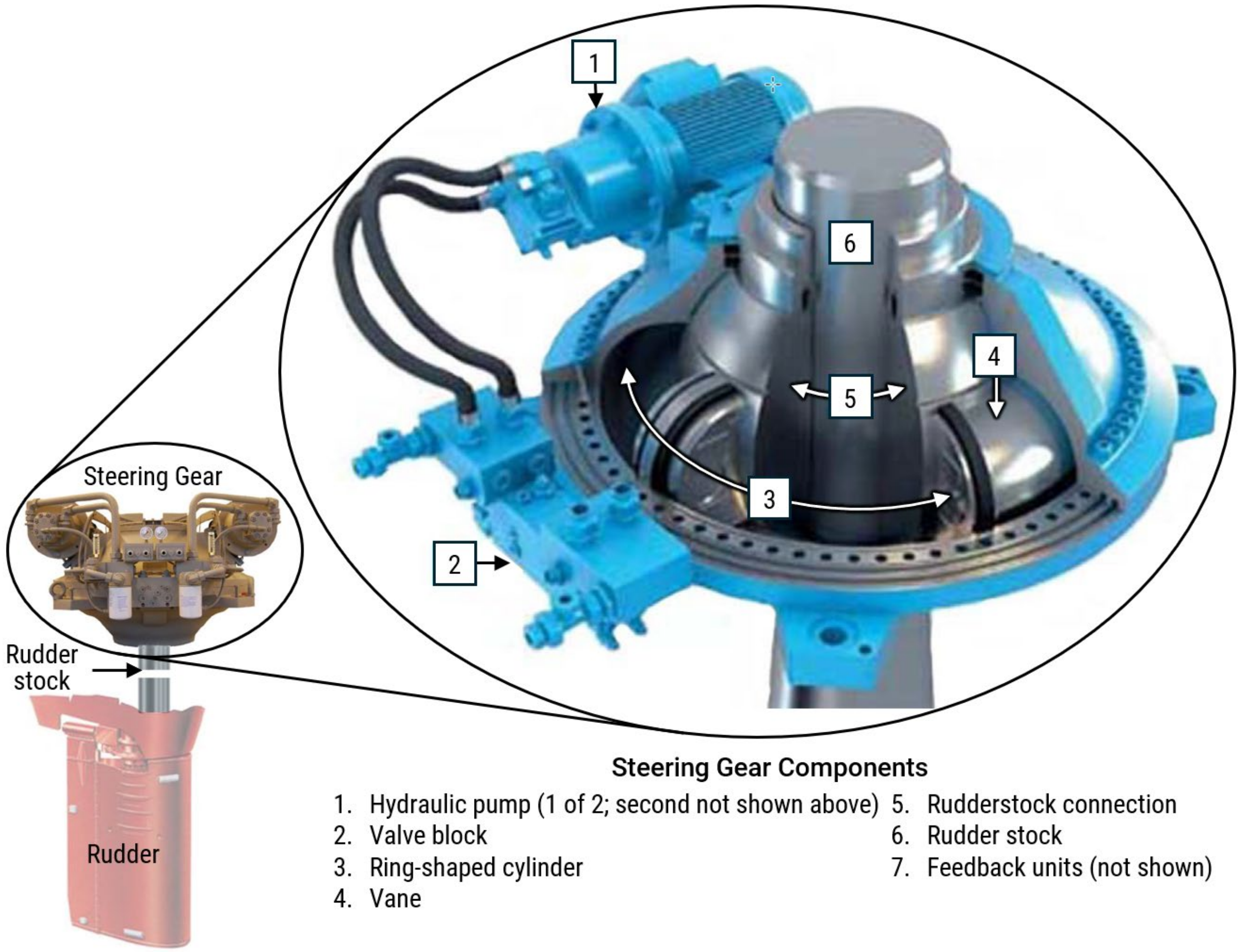

Figure 10. *Jack Edwards* steering gear. (Background source: *User Manual, Rolls-Royce Steering Gear SR*)

The user manual for the Rolls-Royce steering gear required semiannual sampling of the hydraulic oil, monthly checks of the pumps and filters, and weekly checks of the hydraulic oil expansion tank level. The *Jack Edward*'s oil sample log contained no records of oil samples taken from the steering gears in 2023 or in 2024 before the collision, and the company's maintenance database had no records of sampling or testing of the oil during this period.

The expansion tank was low after the collision; however, it could not be determined how long the tank had been low. According to a steering gear manufacturer representative, a low oil level in the expansion tank would not cause a failure of the system unless the tank was completely emptied.

The user manual directed that the hydraulic oil in the steering system be replaced if the components of the hydraulic system had been opened up or when laboratory tests showed the oil had:

- High acidity.
- A low amount of extreme-pressure additives.
- High amounts of insoluble particles.
- Oil cleanliness no longer within International Standards Organization (ISO) or National Aerospace Standards criteria.

High acidity indicates the presence of organic acids, which cause oil to darken, increase in viscosity, and form varnish and sludge.[6] Low extreme-pressure additives increases the risk of adhesive wear.[7] Insoluble particles cause erosion to interior mating surfaces of valves, jamming of moving surfaces (such as a pump impeller), or wear between the moving surfaces.[8]

According to the International Safety Management Code (ISM Code), companies "should identify equipment and technical systems the sudden operational failure of which may result in hazardous situations. The safety management system should provide for specific measures aimed at promoting the reliability of such equipment or systems."[9] In accordance with the ISM Code, the *Jack Edwards*'s SMS designated the steering system, along with propulsion and other navigation systems, as "critical equipment." Critical equipment was required to be inspected daily using a checklist. Any deficient items were to be annotated in the checklist and a repair task was required to be created. The *Jack Edwards*'s daily critical equipment checklist for March 15, 2024, which was approved by the chief engineer and master, recorded no deficiencies in the steering gear or other equipment. The checklist for March 16,

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[6] Brendan Casey, "Why You Should KNOW Your Hydraulic Oil's 'A.N.' | Power & Motion," July 15, 2015.

[7] Lubricant Additives - A Practical Guide, *Machinery Lubrication*, accessed February 7, 2025.

[8] Wade Babcock and Brigitte Battat, Reducing the Effects of Contamination on Hydraulic Fluids and Systems, *Machinery Lubrication*, accessed February 7, 2025

[9] ISM Code, section 10.3. As a freight vessel greater than 500 gross tons (ITC) engaged on a foreign voyage, the *Jack Edwards* was required to comply with the ISM Code per Title 33 *Code of Federal Regulations* part 96.

which was marked as completed on March 17 and approved by the chief engineer and master, also recorded no deficiencies.

1.3.3.2 Precasualty Repairs

In November 2023, a vessel engineer reported that the chain for the feedback unit on the *Jack Edwards*'s starboard steering gear was broken. A replacement chain was ordered and installed on February 4, 2024, while the vessel was in the shipyard. According to the steering gear manufacturer, installation of the chain was not a difficult procedure, but an improper installation could give faulty feedback to the rudder angle indicator or the bridge control system.

On February 13, 2024, a vessel engineer reported that steering pump no. 4, one of the two steering pumps on the starboard steering gear, was "getting a hydraulic lock." As a result, when a command to turn the rudder was received, either from the bridge or locally at the steering gear, the rudder did not turn. During troubleshooting, technicians replaced solenoids and fuses in the steering gear. After these repairs, the rudder could turn to port but would still not move to starboard. Troubleshooting further, a technician replaced steering pump no. 4 and disassembled the steering gear valve block. Upon opening the valve block, he found that a plastic cap on a hydraulic-lock sensor was missing and a cap on another hydraulic-lock sensor was melted. He also reported that the hydraulic oil was dirty. After replacing the sensors and reassembling the valve block, the system operated correctly, according to documentation for the repair. There was no record that the hydraulic oil was replaced during the repairs.

Investigators asked the steering gear manufacturer what could cause the high temperature that melted the sensor cap. A company representative responded,

> Faulty solenoid coils can cause no response from pump 4. Faulty solenoids cause hydraulic blockage and full system pressure. This also causes high temperature and, in cases where it is not caught in time, melting of the hydraulic-lock sensor cap is possible.

1.3.3.3 Postcasualty Repairs

On March 23, 2024, six days after the collision, an ECO technician boarded the *Jack Edwards* to repair the starboard steering gear that the master had reported out of commission. During testing of the system, the technician determined that the system's high-pressure seals were intact. After breaking down the system, the technician found a "bad wiper seal, along with a bad upper low pressure void seal." The seals were replaced, the seal faces and housings were cleaned, parts were lubricated, and the system was reassembled. A functional test was performed, with no further leakage observed. The technician attributed the wiper and low-pressure void seal failures to "a damaged dust ring, allowing trash buildup past the wiper seal and into the low-pressure void." According to the manufacturer representative, the poor condition of the low-pressure seals would not directly affect the performance of the steering gear, but if "dirt" got into the steering gear system, it could affect other seals and valves.

During postcasualty drydock repairs to the vessel conducted in Navegantes, Brazil, the starboard steering gear pumps were serviced, during which an elastic coupling was replaced and the hydraulic oil in the system was changed out.

1.3.4 Environmental and Waterway Conditions

The 9.3-mile entrance channel to the Port of Georgetown made a straight cut through an area of mud flats off the coast of Guyana. The channel was narrow: 148 feet wide at the location of the *Jack Edwards*/*Julie C* collision, per electronic navigation charts for the area. The charted depth in the channel was 16 feet, with water depths of 8–10 feet immediately outside the channel. On the day of the casualty, high tide within the port was predicted at 6.5 feet above charted datum at 2215; the range of tide was 2.3 feet.

The National Geospatial-Intelligence Agency's (NGA) *Sailing Directions (Enroute), East Coast of South America* describes the bottom type as follows:

> The mud on the bottom is known locally as "sling mud." It is from 0.6 to 1.2m [2.0 to 3.9 feet] thick, and is of a very soft, almost liquid consistency. Ships of 10 knots or more can force a passage through this "sling mud" even though drawing 0.3m [1 foot] more than the actual depth of water.[10]

The *Jack Edwards* crew stated that they were experiencing a flood tide at the time of the transit into Georgetown. According to the *Sailing Directions*, currents ranged up to 1.5 knots on a flood tide.

[10] NGA, *Sailing Directions (Enroute), East Coast of South America*, Pub. 124, 15th Edition, 2017 (updated through July 20, 2024), page 6.

2 Analysis

While transiting inbound to Georgetown, Guyana, the OSV *Jack Edwards* had an apparent loss of steering control and veered to port, crossing the channel in front of the outbound general cargo vessel *Julie C*. The *Jack Edwards*'s chief mate attempted to avoid a collision by continuing across and exiting the channel on the opposite side. However, the *Julie C*, also attempting to avoid a collision, turned to starboard, heading in the same direction as the *Jack Edwards*. Consequently, the *Julie C*'s bow struck the starboard side of the *Jack Edwards*.

The *Jack Edwards*'s chief mate and second mate stated that, throughout the vessel's transit from the United States to Guyana in the weeks prior to the accident, numerous steering system alarms sounded. On the day before arrival in Guyana—2 days before the accident—the chief mate noticed that the *Jack Edwards*'s steering was erratic, and the autopilot was "working harder" than he expected it to. In the watch turnover checklist for that day, the chief mate logged that "the vessel's steering system seems to be off" and that it required 8° of starboard rudder to maintain course.

Before the apparent loss of steering control during the casualty voyage, the second mate had difficulty steering the *Jack Edwards* as it made its way inbound to the Port of Georgetown. The second mate's difficulty with steering led him to turn over control to the chief mate, who likewise encountered steering difficulties. Both of the mates reported that the OSV tended to veer to port, requiring significant corrective rudder to starboard. ECO RMC and VDR data showed that they used predominantly starboard rudder throughout the transit. ECO RMC and VDR data also showed that the starboard rudder consistently lagged behind the port rudder when turning to starboard. Further, the charterer representative noted that the steering was "sluggish." Immediately after the collision, the captain and chief engineer found the starboard steering gear "out of commission" and leaking large amounts of black hydraulic oil.

Because the steering gear was located at the stern of the *Jack Edwards*, the failure of the system was not likely the result of the collision near the bow. Rather, given the numerous steering alarms, the chief mate's reports of erratic performance of the steering system, the steering difficulties experienced by both of the mates, the tendency of the vessel to veer to port, the sluggish response of the starboard steering gear, and the condition of the starboard steering gear as found after the collision, the starboard steering gear was likely degraded throughout the casualty voyage. The degraded steering system reduced the mates' ability to control the vessel and prompted the order from the chief mate to bring the ship's thrusters online, precipitating the chain of events that led to the collision.

The second mate responded to the chief mate's order for thrusters and went to the aft console on the bridge to bring them online. RMC data showed that, as the second mate was attempting to bring the thrusters online, control of the *Jack Edwards*'s rudders and engines shifted to the aft console, where it remained for 57 seconds. Once control was taken away from the chief mate at the forward console, the *Jack Edwards* veered to port—as was its tendency to do—crossing in front of the *Julie C*. The shift in propulsion and steering control prevented the chief mate from taking immediate action to avoid a collision with the *Julie C*. Although he regained control about a minute after the shift, it was too late to avert the collision.

To shift control to the aft console, the second mate would have either depressed the general takeover button twice, selected general takeover on the touch screen display, or depressed the emergency transfer button once after moving the button's protective cover. Given the actions necessary to transfer control from one console to the other, it is unlikely that the transfer occurred by inadvertent contact. Rather, the second mate likely intentionally pressed one of the takeover buttons or selected takeover on the touch screen display without understanding what he was doing. When considered with other factors, such as the second mate's inability to locate the general alarm when the collision was imminent and his unfamiliarity with the *Jack Edwards*'s touch screen controls, the second mate's actions suggest that he was not adequately trained for the duties and responsibilities he was expected to perform. The second mate stated that, while the *Jack Edwards* was in the shipyard in Port Fourchon, he was trained on the vessel's systems by the senior officers, but the training was limited because the vessel spent very little time underway. The second mate's erroneous shifting of propulsion and steering to the aft bridge console, which directly led to the final loss of control of the vessel, was the result of inadequate training.

Before and during the casualty voyage, there were several indicators that the steering gear was not operating correctly, including alarms and erratic performance. However, no action was taken to address the steering problems, because the degradation to the system had become normalized. The crew was told by shipyard workers that the steering alarms were normal, and the master informed the chief mate that the erratic steering that he experienced was normal for the *Jack Edwards*. The chief engineer was not informed of the issues that the deck officers were having with the steering. No discrepancies were noted in the daily critical equipment checklist, even when 8° starboard rudder was required to maintain the *Jack Edwards* on a straight course. Had the discrepancies observed with the steering system been reported to the chief engineer, the system could have been examined and repaired before the collision occurred.

The cause of the degradation in the starboard steering unit was not determined, but the evidence offers possible explanations: a faulty repair, oil breakdown or contamination, or a combination of these factors. While the vessel was in the shipyard prior to the transit to Guyana, the chain for the feedback unit on the starboard steering gear was replaced after it had broken. If the new chain was not installed correctly, the feedback to the rudder angle indicator and bridge control systems could have been faulty, leading to incorrect positioning of the rudder. If the rudder was aligned to port when the rudder angle indicator displays on the bridge showed the rudder midship, it would explain the need for the crew to use 8° starboard rudder to maintain course prior to arrival in Guyana and could have caused the vessel to veer to port during the casualty voyage.

While the *Jack Edwards* was in the shipyard, technicians conducted a second repair to the starboard steering gear after the rudder failed to turn when ordered either from the bridge or locally. When the system was opened up, technicians found plastic caps for hydraulic-lock sensors were melted or missing. They also found that the oil in the system was dirty. The technicians replaced one of the two pumps on the steering gear, along with solenoids and fuses, and the system was reported to be operational.

The presence of dirty oil during the repair and the black color of the oil leaking out of the system following the collision suggest that the oil was breaking down or was contaminated. A breakdown in the oil can cause it to darken, increase its viscosity (resistance to flow), create varnish or sludge, and increase wear. Contamination of hydraulic oil by insoluble particulates can cause jamming or wear between mating surfaces, such as in pumps or valves. Any one of these conditions or a combination of them would have resulted in degraded performance of the steering system.

The user manual for the steering system required semi-annual testing of oil quality; however, records for the *Jack Edwards* showed no evidence of testing for the steering gear in the 15 months before the accident. If the oil in the system had been degrading over time, there was no way the company or crew would have known. The opening of the steering gear's hydraulic components during precasualty repairs also presented the opportunity to introduce contaminants in the oil, and the user manual required the oil to be replaced whenever the system was opened up. There is no record, however, that the oil was changed out during repairs. The failure to follow manufacturer's requirements for testing and changing the oil in the starboard steering system increased the risk of oil breakdown and contamination and degraded steering system performance or failure.

The *Jack Edwards* SMS and the master's standing orders required that the vessel's tunnel thrusters be online before entering port or transiting channels.

However, the crew of the OSV deenergized the bow thruster after getting underway and before attempting the channel transit, and the stern thrusters were never energized. If the mates had placed the tunnel thrusters online and kept them online throughout the transit, in accordance with the SMS and standing orders, there would have been no need to place them online while underway in a channel, and the second mate would not have erroneously shifted propulsion and steering control away from the forward console. Changes to critical equipment configuration or setup are not advisable during higher risk maneuvering operations, unless the changes cannot be avoided. When they cannot be avoided, it is best to conduct the changes using the most qualified personnel.

The management and crew of the *Jack Edwards* did not test or replace hydraulic oil in the vessel's steering system in accordance with the manufacturer's procedures. The crew did not accurately assess the steering gear in accordance with the critical equipment checklist and did not align the vessel's thrusters for entry into port in accordance with the SMS and master's standing orders. Had any of these procedures been properly followed, it is unlikely that the collision would have happened. Therefore, the failure to follow written procedures from the steering system manufacturer, SMS, and master's standing orders contributed to the accident.

During the initial part of the casualty voyage, the *Jack Edwards* was transiting almost a half mile outside the entrance channel to Georgetown. After being warned by Georgetown Pilots, the second mate steered the vessel back toward the channel through waters with charted depths of about 8–10 feet (the vessel never fully entered the channel until it veered to port just prior to the collision). High tide, which occurred at 2215, added 6.5 feet to the charted datum, bringing the water depth to 14.5–16.5 feet and falling. The *Jack Edwards*'s aft draft was 14 feet 2 inches, putting the vessel in, or nearly in, the soft "sling mud" on the bottom as it transited inbound. Although the vessel's echo sounder recorded depths beneath the keel of 8 feet or greater, echo sounder readings can vary in areas with a "fluid-mud" layer.[11]

Research has shown that a vessel transiting with its keel near the water-mud interface can experience sluggish maneuvering at low speeds (3 knots). The effect decreases at higher speeds (7 knots).[12] The NGA *Sailing Directions* notes that ships transiting at 10 knots can navigate through the mud in the approaches to Georgetown with drafts that exceed the depth of water by up to 1 foot. The *Jack Edwards* was transiting between 9 and 10 knots throughout the time that the

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[11] M. Vantorre, "Ship Behavior and Control in Muddy Areas: State of the Art," *Third International Conference on Maneuvering and Control of Marine Crafts*, 1994, page 1.

[12] Vantorre, 1994.

mates were struggling with steering. Therefore, while it is possible that the *Jack Edwards*'s transit through shallow water prior to the collision had some effect on its maneuverability, this effect was minimized by the speed the vessel was transiting.

3 Conclusions

3.1 Probable Cause

The National Transportation Safety Board determines that the probable cause of the collision between the offshore supply vessel *Jack Edwards* and the cargo vessel *Julie C* was the normalization of degradations to the vessel's steering system, which reduced the ability to effectively steer the vessel and led to a mistaken transfer of steering and engine controls from the primary navigation station as the *Jack Edwards* prepared to meet the outbound *Julie C*, resulting in a temporary loss of vessel control.

3.2 Lessons Learned

Reporting Issues

Maintenance issues and other conditions affecting the safe operation of a vessel should be promptly reported to senior officers and the operating company. Reporting systems should provide specific guidance regarding critical equipment, hull integrity, and operational safety. A robust reporting system should also include procedures for company oversight to ensure that crews are reporting issues and that the operating company is tracking and promptly addressing them.

Adhering to Written Procedures

This accident illustrates the potential safety hazards of failing to follow the written procedures for maintenance and operations. Mariners should review manufacturer manuals, the safety management system, and the planned maintenance system on a regular basis to ensure conformance with recommended maintenance and operations plans and procedures. Without proper maintenance, equipment cannot be relied on to perform as designed. Operational procedures are designed provide maximum safety and efficiency for various situations, such as transits through restricted waters. Not following these procedures increases the risk of casualties.

Vessel Particulars

Vessel	*Jack Edwards*	*Julie C*
Type	Offshore (Offshore supply vessel)	Cargo, General (Cargo vessel)
Owner/Operator	Jack Russell LLC/Galliano Marine Services LLC (Commercial)	CSMT Julie Shipping Ltd/ Carisbrooke Shipping Ltd (Commercial)
Flag	United States	United Kingdom
Port of registry	Galliano, Louisiana	Cowes, England
Year built	2012	2009
Official number	1238612 (US)	N/A
IMO number	9530008	9430143
Classification society	American Bureau of Shipping	Bureau Veritas
Length (overall)	277.9 ft (84.7 m)	453.1 ft (138.1 m)
Breadth (max.)	60.0 ft (18.3 m)	69.9 ft (21.3 m)
Draft (casualty)	12.8 ft (3.9 m)	16.1 ft (4.9 m)
Tonnage	3,242 GT ITC	9,530 GT ITC
Engine power; manufacturer	2 x 3,600 hp (2,685 kW); Caterpillar C280-8 diesel engines	1 x 7,242 hp (5,400 kW); Caterpillar Motoren Rostock/MAK 6M43C diesel engine

NTSB investigators worked closely with our counterparts from **Coast Guard Sector New Orleans** throughout this investigation.