United States Coast Guard

Investigation into the Circumstances Surrounding the Allision of The

P/V RACHEL MARIE

With the Washington Street Public Boat Landing in Seattle, Washington on SEPTEMBER 26, 2010

MISLE Activity Number: 3858257
Originating Unit: Sector Puget Sound

U.S. Department of Homeland Security
United States Coast Guard

Commandant
United States Coast Guard

2703 Martin Luther King Jr. Ave. SE
Stop 7501
Washington, DC 20593-7501
Staff Symbol: CG-INV
Phone: (202) 372-1032
E-mail: CG-INV1@uscg.mil

16732/IIA #3858257
25 Jun 2025

ALLISION OF THE SMALL PASSENGER VESSEL RACHEL MARIE (O.N. 932672) WITH THE WASHINGTON STREET PUBLIC BOAT LANDING AND SUBSEQUENT INJURIES IN SEATTLE, WASHINGTON ON SEPTEMBER 26, 2010

ACTION BY THE COMMANDANT

The record for the investigation into this marine casualty was approved and closed on October 17, 2022. The following is the Coast Guard's response to the safety recommendations issued in conjunction with the investigation.

ACTION ON RECOMMENDATIONS

Recommendation 1: The RACHEL MARIE is an inspected small passenger vessel. At the time of the incident the vessel was operating as a ferry between West Seattle and Downtown Seattle. The vessel is operated by the King County Department of Transportation Marine Division. On September 26, 2010, the vessel allided with the Washington Street Public Boat Landing at approximately 6 knots. Thirty-one seats onboard the vessel were dislodged during impact resulting in passenger injuries.

The bench style passenger seats were secured to the deck in several different ways. Several of the seats were mounted to sheet metal boxes. The boxes that the seats were mounted to were riveted together and rolled on the top and bottom to create a flat surface to mount and secure the seats to, with the bottom being bolted to the deck using 3/8" bolts. A piano hinge was then riveted to the box top on one side and the seat was attached using rivets on 8 points along the seat framing. Other seats onboard the vessel were attached to their frames using sheet metal screws and a few seats were secured using small #6 or #8 bolts.

Currently both Title 46 Code of Federal Regulations (CFR), Subchapters T and K have regulations concerning passenger vessel seating. The regulations do not provide adequate guidance on how to secure a seat to the deck. Both 46 CFR 177.820 and 46 CFR 116.820 state that a seat must be constructed to minimize the possibility of injury and avoid trapping occupants and that installation must provide for ready escape. There are currently no standards for inspectors to use to determine the effectiveness and safety of seating installations. In addition, the fixed seating requirements found in 46 CFR 176.113 (3) and 46 CFR 115.113 (3) only address the requirement for fixed seating.

Recommend that the Commandant of the Coast Guard amend 46 CFR Subchapters T and K to include standards for fixed seating installation. The regulations should require that all fixed

seating be installed such that it can withstand collisions at moderate speed without becoming dislodged.

If implemented, all inspected small passenger vessel seating installations will be able to withstand collision at moderate speeds. This will reduce the potential for passenger injuries in emergency scenarios.

> **Action:** I concur with the intent of this recommendation. However, I disagree with the recommended course of action. Title 46 CFR Parts 116.820 and 177.820 prescribe seating construction and arrangements. These regulations provide a standard that allow for flexibility in the various arrangements for installation of fixed seating, based on the intended route and service of the vessel. These regulations allow the Coast Guard to authorize the appropriate operation as dictated on the Certificate of Inspection. To address the safety concern raised by the recommendation, a Safety Alert will be published to remind the industry and Officers in Charge, Marine Inspection that deeming a vessel fit for service and route should including ensuring construction techniques are consistent with the certificated route.

Recommendation 2: King County Marine Division implemented a training program prior to the operation of the King County Water Taxi Service. The training program did not contain sufficient information on the RACHEL MARIE's installed ZF Control Systems and the RACHEL MARIE's ship handling characteristics, such as stopping distances and emergency actions.

Currently, the Crew Training Manual does not address how to properly take command of the ZF Control system at a particular control station. Specifically, it does not address the requirement to depress the "control" button for at least two seconds in order to activate a particular control station. In addition, the Manual does not provide sufficient information pertaining on how to correct a loss of throttle input control scenario, particularly the need to check the status of the system's circuit breaker. Furthermore, it does not address emergency actions and crash stop distances.

Recommend King County Marine Division update the Crew Training Manual for the RACHEL MARIE to reflect correct and detailed vessel-specific information on the proper operation of throttle control systems, procedures regarding ship handling characteristics, and procedures regarding the use of the vessel's engine stop system.

If implemented, RACHEL MARIE captains and crewmembers will be better equipped to respond to incidents involving the need to address a loss of propulsion and the execution of emergency stop procedures.

> **Action:** I concur with this recommendation. Title 46 CFR Part 15.405 requires that each credentialed crewmember must become familiar with the relevant characteristics of the vessel appropriate to their duties and responsibilities prior to assuming those duties and responsibilities. As such, the U.S. Coast Guard supports any action by an

operator that improves crew familiarity with vessel systems, and this recommendation will be forwarded to the King County Marine Division for their consideration.

Recommendation 3: The passenger vessel RACHEL MARIE's electronic control system was not installed in accordance with manufacturer specifications on September 26, 2010. The system was manufactured by ZF Control Systems. At the time of the allision there was no audible alarm indicating a loss of power to the system. The outlined condition represented a latent unsafe condition on September 26, 2010.

The Master diagnosed the situation as one that could be solved by using the throttle controls. In reality, the correct solution would have been to activate the engine emergency stop button, or the circuit breaker to the port control box could have been reset. The Master was unaware that these solutions were necessary in this situation due to the lack of a loss of power audible alarm onboard.

Recommend that King County Marine Division install an audible loss of power alarm for the electronic main engine throttle control system aboard the RACHEL MARIE.

If implemented, the crew will easily be able to discern whether or not the circuit breaker has been tripped. This will allow the operator to make vital choices concerning the safe navigation, operation and maneuverability of the vessel.

Action: I partially concur with this recommendation. While the regulations for vessels inspected under Title 46 CFR Subchapter T do not require an audible loss of power alarm for the electronic throttle system, the regulations generally support the master's situational awareness. Following the casualty, the company elected to install an audible loss of power alarm for the electronic main engine throttle control system aboard the RACHEL MARIE. Local Coast Guard marine inspectors subsequently confirmed the proper operation of the alarm. I consider that the above actions sufficiently rectified the safety concern raised in this recommendation and no further action will be taken by the Coast Guard at this time.

Recommendation 4: The passenger vessel RACHEL MARIE's electronic control system was not installed in accordance with manufacturer specifications on September 26, 2010. The throttle control system circuit breakers for the port and starboard engines were installed in an unmanned location. This made it nearly impossible for the master to determine that the circuit breaker had been tripped. Had the circuit breakers been installed in a continually manned space the master may have been able to ascertain that the port circuit breaker had been tripped and would have been able to reset them.

In addition, the circuit breaker was located in a position prone to being tripped accidentally. The outlined conditions represented a latent unsafe condition on September 26, 2010.

Recommend that King County Marine Division move the RACHEL MARIE's throttle control system circuit breaker to a location that will prevent accidental breaker tripping, and is easily

accessible to the master and crew so that it can be seen and reset quickly in an emergency situation.

If implemented, the circuit breaker associated with the vessel's throttle control system will be more accessible to the crew, and there will be less likelihood that it will be accidentally tripped.

Action: I partially concur with this recommendation. While the regulations for inspected small passenger vessels under Title 46 CFR Subchapter T do not specifically require the circuit breakers to be located in a normally manned space, they do generally support the following: (1) protecting the circuit breakers from unintended manipulation, (2) providing situational awareness to the master, and (3) having the ability to be quickly accessed during emergencies. The recommendation's proposed relocation of the circuit breakers would contribute to the advancement of those three general goals. Local Coast Guard personnel subsequently verified that the involved circuit breakers were replaced and relocated to an enclosed breaker panel designed to prevent inadvertent tripping. Additionally, reset breakers were installed in the pilothouse to ensure they are readily accessible to the vessel's Master in the event of an emergency. I consider that the above actions sufficiently rectified the safety concern raised in this recommendation and no further action will be taken by the Coast Guard at this time.

R. C. COMPHER
Captain, U. S. Coast Guard
Director of Inspections & Compliance (CG-5PC)

U.S. Department of Homeland Security

United States Coast Guard

Commandant
United States Coast Guard

US Coast Guard Stop 7501
2703 Martin Luther King Jr. Ave. SE
Washington, DC 20593-7501
Staff Symbol: CG-INV
Phone: (202) 372-1032
Email: CG-INV1@uscg.mi

16732/IIA #3858257
17 October 2022

THE ALLISION OF THE FERRY VESSEL RACHEL MARIE WITH THE WASHINGTON STREET PUBLIC BOAT LANDING IN SEATTLE, WA ON SEPTEMBER 26, 2010

ACTION BY THE COMMANDANT

The record and the report of the investigation convened for the subject casualty have been reviewed. The record and the report, including the findings of fact, analysis, and conclusions are hereby closed.

The investigation's safety recommendations remain under review and consideration by the responsible Coast Guard program offices. The response to the recommendations and any resultant actions will be documented separately.

[redacted]

J. D. NEUBAUER
Captain, U.S. Coast Guard
Chief, Office of Investigations & Casualty Analysis (CG-INV)

U.S. Department of Transportation
United States Coast Guard

United States Coast Guard
Sector Puget Sound

1519 Alaskan Way South
Seattle, WA 98134
Phone: (206) 217-6642
Fax: (206) 217-6213

16732
April 1, 2011

MEMORANDUM

From: [redacted]
Lead Investigating Officer

To: Commander, CG Sector Puget Sound

Subj: ALLISION OF THE P/V RACHEL MARIE IN SEATTLE, WASHINGTON ON SEPTEMBER 26, 2010.

Ref: (a) USCG Marine Safety Manual, COMDTINST M16000.10A, Volume V

Preliminary Statement:

In accordance with reference (a), an informal investigation was conducted into the allision of the P/V RACHEL MARINE, O. N. 932762, with the Washington Street Public Boat Landing on September 26, 2010 in Seattle, Washington. The Lead Investigating Officer was assisted by the following members of the Sector Puget Sound Investigations Division: LCDR [redacted], LT [redacted], and CWO's [redacted] and [redacted].

Factual evidence was collected in order to conduct a thorough analysis of the incident. The resulting conclusions led to five safety recommendations intended to improve safety regarding the operation of the RACHEL MARIE and her sister ship, the P/V MELISSA ANN. The MISLE activity number is: 3858257.

Executive Summary:

On September 26, 2010 at 1100 local time (all times approximate) the RACHEL MARIE departed West Seattle with 73 passengers and four crewmembers bound for Downtown Seattle's Pier 50. The weather and sea conditions for the duration of the voyage were calm; visibility was good and marine traffic was light.

The RACHEL MARIE is a 72.2 foot aluminum, two deck, twin-hull catamaran with a single propulsion engine located in each hull (two total). The wheelhouse is located on the top deck and passenger seating is available on both decks. The vessel is operated by King County Marine Division as a passenger-only ferry on routes that service West Seattle, Vashon Island and Downtown Seattle.

The vessel traveled across Elliot Bay at 12 knots. The voyage was uneventful until 1113 when the vessel was approximately 200 yards from landing at Pier 50. The master attempted to slow the vessel in preparation for landing by re-positioning the throttles from ahead to neutral. He realized immediately that the engines were not responding to his throttle inputs as he would have expected. The port engine remained engaged (unchanged) at 1200 RPM's while the starboard engine slowed to idle. He attempted to troubleshoot the problem as the vessel continued towards the seawall, under power by the port engine, at approximately eight knots.

At 1114, the master realized that he could no longer continue troubleshooting the problem and shut down both of the vessel's engines. Approximately 30 seconds later, he told the passengers to brace for impact just prior to the vessel's allision with the Washington Street Public Boat Landing. The vessel's speed was approximately six knots at the time of impact.

Six passengers, one crewmember, and one bystander on the Landing were injured, and the vessel's hull, two forward main deck windows and several main deck passenger seating benches were damaged as a result of the allision. Coast Guard and Seattle Police and Fire units were on-scene within minutes to assist.

Human error, inadequate training and policies, and an inappropriate throttle control system component installation were the predominant causal factors that contributed to this marine casualty.

Vessel Data:

Name:	RACHEL MARIE
Official Number:	932762
Service:	Passenger (46 CFR Sub-Chapter T)
Year Built	1988
Built By:	Nichols Brothers Boat Builders
Gross Tons:	60
Net Tons:	39
Length:	72.2 FT
Breadth:	28.5 FT
Depth:	8.9 FT
Propulsion:	Diesel Reduction
Horsepower:	1800
Owner:	Four Seasons Marine Services Corp.
Operator:	King County Dept. of Transportation, Marine Division

The vessel was inspected and was issued a Certificate Inspection by U. S. Coast Guard Sector Puget Sound.

(Photo shows the RACHEL MARIE underway in Elliot Bay, Washington)

(Photo shows the Washington Street Public Boat Landing in the foreground, and the RACHEL MARIE moored to Pier 50 in the background.)

Personnel Data:

Crewmembers:

Name	Position	Experience	USCG Credential Type	Status
[redacted]	Master	10 years	Licensed Officer	Uninjured
	Deckhand	Unknown	Ordinary Seaman/Wiper	Uninjured
	Deckhand	Unknown	Ordinary Seaman/Wiper	Uninjured
	Engineer	Unknown	Ordinary Seaman/Wiper	Injured, Broken Nose

Injured Passengers/Bystander:

Name	Sex	Age	Injury Type	Classification
[redacted]	Male	40	Laceration, Head	Minor
	Female	33	Bruise, Head	Minor
	Male	41	Back Pain	Minor
	Male	41	Facial Abrasion, Sore Right Shoulder	Minor
	Male	41	Head Trauma	Moderate
	Female	34	Back Pain, Dizziness	Minor
	Male	26	Left Shoulder Pain	Minor

Environmental Data:

The weather conditions on scene at the time of the incident were described as mostly calm conditions.

Weather: Partly Cloudy
Visibility: 10 miles
Seas – 0 to 1 foot
Swells – 0 to 1 foot
Wind – light and variable

Findings of Fact:

Note: All times are approximate and reflect local Pacific Standard Time. Vessel speeds, distances and times were calculated using an average speed of eight knots beginning when the throttles were positioned in neutral on approach to Pier 50, and ending when the vessel allied with the Landing going six knots.

1. December 1, 2008 - The bench-style seating for the vessel's main deck passenger area was secured to the deck with dry-wall type screws.

2. January 5, 2009 – The vessel's throttle control system was not installed in accordance with the manufacturer's installation recommendations. Specifically, a circuit breaker was mounted on the housing of the micro-commander junction box.

3. March 10, 2010 - The King County Marine Division Crew Training Manual (section 8, Bridge Operations) was developed for the RACHEL MARIE. The manual did not provide specific details regarding the proper operation of the vessel's throttle control system.

4. March 11, 2010 - A Coast Guard Sector Puget Sound Marine Inspector conducted an annual examination of the vessel. Five deficiencies were noted. All five deficiencies were corrected on March 22, 2010; the vessel was issued a new Certificate of Inspection.

5. March 22, 2010 - King County instituted a policy dictating that every crewmember on the RACHEL MARIE complete vessel familiarization training prior to working aboard the vessel. All crewmembers completed the training at various dates prior to the allision.

6. September 21, 2010 - A Coast Guard Marine Inspector from Sector Puget Sound attended the vessel to examine and approve repairs made to the hull as a result of a minor allision with Pier 50.

7. The Master's 96 hour work-rest history collected by Coast Guard Investigators indicated that he received adequate and regularly scheduled rest for the 96 hour period prior to the incident.

September 26, 2010 (all times local and approximate)

8. The RACHEL MARIE departed West Seattle at 1100 with 73 passengers and four crewmembers aboard. It transited across Elliott Bay at 12 knots en route Downtown Seattle's Pier 50. At some point from when the vessel departed to 1113, the port throttle control system circuit breaker tripped. The exact time that the breaker tripped is unknown because there were no audible or visual alarms to indicate the tripped status, and the engine's RPM remained constant and unchanged.

9. A crewmember conducted a routine visual inspection of the port and starboard engine compartments somewhere between five and ten minutes into the voyage. He did not recall noticing the status of the throttle control circuit breaker.

10. Approximately 100 yards from the end of Pier 48, which is adjacent to Pier 50, the Master adjusted the throttles to the neutral position in order to slow the vessel in preparation for docking. The port engine did not respond to the throttle input; the starboard engine was responsive and slowed to idle speed.

11. The Master observed that the control indicator light for the port engine was extinguished on the center throttle control station. He yelled for a crewmember to lay to the bridge and asked the crewmember to troubleshoot the problem with the throttle control system. The crewmember was unable to offer any explanations or solutions for the problem. The Master depressed the control button on the center throttle control station in an attempt to regain control of the port engine at that station. He momentarily engaged the starboard throttle in reverse. He did not believe that the engine was responding so he positioned the throttle to the neutral position. At this point the vessel's speed was estimated to be between seven to eight knots.

12. The Master attempted to use the port and starboard throttle control stations but was unable to gain control from either station. The port engine remained engaged at 1200 RPM's; the starboard engine was still at idle. At 1115 the Master made an announcement over the vessel's public address system advising the crew and passengers to brace for impact. He attempted to take control at the center station one more time, but to no avail. He depressed the main engine stop buttons and both engines responded accordingly and shut down.

13. The RACHEL MARIE's forward momentum continued, and at 1115 the vessel allided with the Washington Street Public Boat Landing while traveling at approximately six knots. The vessel's hull was damaged, several windows shattered, a life raft container was damaged, and several of the passenger bench seats were dislodged as a result of the allision. The Washington Street Public Boat Landing sustained minor damage from the allision.

14. Six passengers, one crewmember and one bystander standing on the Landing were injured as a result of the allision. Injuries ranged from sore necks, backs and shoulders, to a broken nose, minor lacerations and abrasions, and a concussion that cause one passenger to momentarily lose consciousness. All injuries, with the exception of the one person on the Landing, were the result of being thrown forward at the moment of impact. None of the injuries were considered life-threatening or serious.

15. Post-casualty drug and alcohol testing was conducted on the master and crew. None of the test results indicated the presence of alcohol or drugs.

(Photo shows the RACHEL MARIE wedged underneath the Washington Street Public Boat Landing after the allision.)

(Photo shows damage to the bow of the RACHEL MARIE as a result of the allision.)

(Photo shows the location of the port engine throttle control system circuit breaker. The manufacturer of the system recommends against placing the breaker on the box itself.)

Analysis:

1. *Vessel Engineering*: The circuit breaker for the port and starboard engine throttle control system was mounted in a location inside the unmanned port engine compartment that made it difficult for the crew to detect a tripped condition. It was also mounted on the outside of the system's control box, which was not recommended by the manufacturer. The cause or reason that the port engine throttle control box circuit breaker tripped was never discovered; however, extensive testing conducted and attended by King County, ZF Controls, and the Coast Guard revealed that the tripped breaker was the most likely cause of the loss of throttle control.

2. The main deck passenger bench-style seating attachment fasteners were inadequate to prevent the seating from becoming dislodged in the event of a collision or allision at speeds above six knots.

3. *Crew Training*: The King County Marine Division Crew Training Manual (section 8, Bridge Operations) was inadequate with regard to providing accurate and clear information as it pertained to the operation of the RACHEL MARIE's throttle control system. The Master and crew did not have a thorough understanding of how the throttle control system

worked as is evident by the fact that they failed to realize that the tripped circuit breaker was the reason that the port engine was unresponsive to throttle inputs. Given the situation, whereby the Master believed that he had lost control over the vessel's propulsion, he waited too long before depressing the engine stop buttons.

The Master failed to realize that the starboard engine was completely functional throughout the incident. If he would have realized the actual status of the starboard engine, he could have used the starboard engine to slow the vessel's approach towards the Landing.

4. *Other Aspects*: Fatigue and drug and alcohol intoxication were not contributory factors for this casualty. Other vessel traffic, and weather and sea conditions were also not contributory factors for this casualty.

Conclusions:

This marine casualty was the byproduct of equipment failure, improper equipment installation, inadequate training and the master's incorrect decision making process.

A certified marine electrician conducted a thorough investigation of the vessel's electrical system. Several bad connections and shorts were discovered; however, none of these problems were shown to have caused, or have given reason, for the circuit breaker to trip. The vessel's throttle control system was installed in such a manner that it did not provide the master with an audible indication that power to the port throttle control system had been lost. The location of the circuit breaker also made it virtually impossible for the master to visually detect the tripped condition

King County's Training Program did not provide specific guidance on the control system installed on board the RACHEL MARIE. The Master was not provided sufficient training on the proper operation of the control systems. The King County Training Program did not address the proper operation of the vessel's control system. In addition, the training program did not address stopping distances. The training program spent far more time discussing the control system installed on the RACHEL MARIE's sister ship, the P/V MELISSA ANN than the system installed onboard the RACHEL MARIE. The two vessels have entirely different control systems.

The Master's decision to depress the engine stop buttons was not timely. Had he stopped the engines at the onset of the problem, the vessel would have simply drifted in relatively protected waters with ample sea room until the problem could have been more thoroughly diagnosed.

Coast Guard Investigators attended the vessel upon its return to sea from dry dock repairs for the specific purpose of testing the throttle control system and to determine the vessel's engine shut-off stopping distance. The Investigators discovered that the vessel slows considerably, and quickly, once the engine stop buttons are depressed. As such, had the Master shut the engines down at the first indication of engine control problems, the vessel would likely have

not allided with any of the surrounding structures with a force capable of causing damage or resulting in personnel injury.

Safety Recommendations:

Recommend King County Marine Division update the Crew Training Manual for the RACHEL MARIE to reflect correct and detailed vessel-specific information on the proper operation of throttle control systems, procedures regarding ship handling characteristics, and procedures regarding the use of the vessel's engine stop system.

Recommend that the Commandant of the Coast Guard amend 46 CFR Subchapters T and K to include standards for fixed seating installation. The regulations should require that all fixed seating be installed such that it can withstand collisions at moderate speed without becoming dislodged.

Recommend that King County Marine Division install an audible loss of power alarm for the electronic main engine throttle control system aboard the RACHEL MARIE.

Recommend that King County Marine Division move the RACHEL MARIE's throttle control system circuit breaker to a location that will prevent accidental breaker tripping, and is easily accessible to the master and crew so that it can be seen and reset quickly in an emergency situation.

Enforcement:

No enforcement action was taken against the Master, the crew or the vessel's operating organization. Neither the Master's nor the crew's actions during the course of this casualty were deemed negligent. The operator was in compliance with all applicable laws and regulations and therefore was not subject to violation of law or regulation enforcement actions.

Administrative Recommendations:

This case/investigation should be closed, agency action complete.

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