



# United States Coast Guard

Report of Investigation into the  
circumstances surrounding the fire  
onboard the ROGER BLOUGH on  
February 1st, 2021



MISLE Activity Number: 7139261  
MISLE Case Number: 1249272

U.S. Department of  
Homeland Security

United States  
Coast Guard



Commandant  
United States Coast Guard

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16732/IIA #7139261  
30 November 2023

**THE FIRE ON THE U. S. CARGO VESSEL ROGER BLOUGH (O.N. 533062) WHILE  
MOORED AT THE FINCANTIERI BAY SHIPYARD IN STURGEON BAY, WI  
ON FEBRUARY 1, 2021**

**COMMANDANT'S ACTION ON REPORT OF INVESTIGATION**

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, conclusions, and recommendations are approved subject to the following comments. This marine casualty investigation is closed.

**COMMANDANT'S ACTION ON RECOMMENDATIONS**

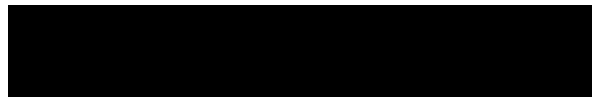
**Recommendation 1:** Recommend Commandant evaluate the following potential gaps in regulations as they relate to oil fired equipment and proposed change recommendations: 1) 46 CFR 63.01-3 Scope and Applicability – consider adding “other oil fired equipment”. Specifically, “Oil fired heaters or furnaces that do not meet the criteria of an auxiliary boiler, water heater or thermal fluid heater shall be installed and operated in accordance with NFPA 31.”, 2) 46 CFR 63.05 incorporation by reference – include NFPA 31 Standard for the Installation of Oil-Burning Equipment”, 3) 46 CFR 61.20 Periodic Tests of Machinery and Equipment – modify to include “Other oil fired equipment and their safety control systems shall be verified at installation and at each regular inspection for certification.”

**Action:** I concur with this recommendation. The Coast Guard's Office of Design and Engineering Standards (CG-ENG), in consultation with other Coast Guard Headquarters and field offices, will publish guidance for oil-fired air heating furnaces on board inspected commercial vessels. The Coast Guard will also conduct a rulemaking evaluation to determine whether specific regulations for this equipment are required.

**Recommendation 2:** Recommend Commandant evaluate the prevalence and risk of fire spread through rubber belts common on board self-unloading bulk carriers. Multiple maritime incidents indicate that a cargo unloading belt fire can result in the significant spread of fire, causing substantial damage to vessels as demonstrated in past casualties including the ROGER BLOUGH (IIA 7139261) in 2021, the ST. CLAIR (IIA 6630678) in 2019, and the AMBASSADOR (Canadian Marine Investigation Report M94M0057) in 1994. A continued trend of large-scale fires on board vessels have involved substantial damages as a result of the spread of fire through cargo unloading belt systems where their arrangements do not allow for effective structural fire protection installations along the beltways. The U.S. Department of Labor Mine Safety and Health Administration (MSHA) has long been aware of the increased risk

and lethality of belts that are not fire-resistant. MSHA developed standards to address those concerns, requiring the use of fire-resistant belts proven through approved tests such as MSHA's "BELT test." The reoccurrence of conveyor belt fire casualties, and the significant financial losses in those cases indicate a need for further evaluation of regulatory standards and consideration of requirements similar to MSHA conveyor belt fire resistance requirements.

**Action:** I concur with the intent of this recommendation. Although combustion of the rubber cargo belts ultimately contributed to the fire spread, this casualty was the result of an inadequate vessel layup process, ineffective monitoring of operating equipment, and lack of knowledge for casualty control procedures by the one person onboard. The Coast Guard believes the most effective way to prevent similar future casualties is to prevent the fire from starting through the development of guidelines on the design, installation and maintenance of oil-fired equipment. The Ninth Coast Guard District has implemented several steps to raise awareness of fire prevention best practices ahead of each winter layup period, including conducting an annual meeting with vessel owners and classification societies. During those sessions, the Coast Guard provides stakeholders with the *Ninth Coast Guard District Work Instruction – Great Lakes Layup Safety* (D9DPI-WI-DOM-(008)(1). The Work Instruction encourages owners to identify additional risks associated with a layup period and to develop the appropriate mitigation strategies. Potential mitigation strategies related to conveyor belts include implementation of vigilant watchkeeping practices, installation of fire-resistant conveyor belts, and inclusion of fire detection and suppression systems in cargo handling spaces, particularly those with vertical or inclined conveyor belts.



A. M. BEACH  
Captain, U.S. Coast Guard  
Director of Inspections and Compliance



16732  
September 19, 2022

**ROGER BLOUGH (V.I.N. 533062) FIRE IN STURGEON BAY, WI FEBRUARY 1, 2021**

**ENDORSEMENT BY THE COMMANDER, NINTH COAST GUARD DISTRICT**

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, conclusions, and recommendations are approved subject to the following comments. It is recommended that this marine casualty investigation be closed.

**COMMENTS ON THE REPORT**

1. In this marine casualty, and the fire aboard the M/V St. Clair (IIA 6630678) in 2019, ad hoc heating equipment, a lack of engineering controls, and late detection were contributing factors to the unmitigated spread of fire aboard these vessels conducting winter maintenance. The fire spread throughout both vessels, resulting in total constructive loss in both events.
2. In response to these tragic incidents, the Ninth District Response Advisory Team spearheaded a Great Lakes Marine Firefighting Task Force working group. This newly created interagency group is designed to provide local incident commanders (fire departments) training and support during marine fire incidents, to increase understanding of local, state and federal authorities and responsibilities in response to a marine fire-fighting response, and to enhance the local incident commander's understanding of the strategic and tactical considerations necessary to respond to a marine fire aboard a vessel or at a waterfront facility.
3. I have directed the finalization of a Ninth District Work Instruction through a collaborative District-wide work group to provide consistent guidance to Officers in Charge Marine Inspection (OCMIs). The instruction will outline the authorities and procedures to reduce the risk for fires onboard commercial freight vessels during winter maintenance periods within their areas of responsibility. These fires were costly and potentially hazardous to the facility, the port, and nearby vessels. Based on lessons learned from these catastrophic fires, Commander, Ninth Coast Guard District, has determined that freight vessels conducting winter maintenance pose an unique fire hazard to Great Lakes vessels, waterfront facilities, and navigable waters.

**ENDORSEMENT/ACTION ON RECOMMENDATIONS**

**Safety Recommendation 1.** Recommend Commandant evaluate the following potential gaps in regulations as they relate to oil fired equipment and proposed change recommendations: 1) 46 CFR 63.01-3 Scope and Applicability: consider adding "other oil-fired equipment." Specifically, "Oil-fired heaters or furnaces that do not meet the criteria of

an auxiliary boiler, water heater or thermal fluid heater shall be installed and operated in accordance with NFPA 31.”; 2) 46 CFR 63.05: change incorporation by reference to include NFPA 31 Standard for the Installation of Oil-Burning Equipment”; and, 3) 46 CFR 61.20 Periodic Tests of Machinery and Equipment: modify to include “Other oil-fired equipment and their safety control systems shall be verified at installation and at each regular inspection for certification.”

**Endorsement:** I concur with this recommendation. There are several Lakers that employ oil fired heaters in their engineering spaces to keep pipes from freezing during winter maintenance. In the Ninth District Work Instruction, I have directed marine inspectors in the Ninth District to inspect this heating equipment for potential hazardous conditions that may pose a fire risk leveraging industry best practices and manufacturer recommendations.

**Safety Recommendation 2.** Recommend Commandant evaluate the prevalence and risk of fire spread through rubber belts common on board self-unloading bulk carriers. Multiple maritime incidents indicate that a cargo unloading belt fire can result in the significant spread of fire causing substantial damage to vessels as demonstrated in past casualties including the ROGER BLOUGH (IIA 7139261) in 2021, ST. CLAIR (IIA 6630678) in 2019, and the AMBASSADOR (Canadian Marine Investigation Report M94M0057) in 1994. A continued trend of large scale fires on board vessels have involved substantial damages as a result of the spread of fire through cargo unloading belt systems where their arrangements do not allow for effective structural fire protection installations along the beltways. The U.S. Department of Labor Mine Safety and Health Administration (MSHA) has long been aware of the increased risk and lethality of belts that are not fire resistant. MSHA developed standards to address those concerns, requiring the use of fire-resistant belts proven through approved tests such as MSHA’s “BELT test.” The reoccurrence of conveyor belt fire casualties, and the significant financial losses in those cases, indicate a need for further evaluation of regulatory standards and consideration of requirements similar to MSHA conveyor belt fire resistance requirements.

**Endorsement:** I concur with this recommendation, with the following comments: In addition to mandatory minimum standards for the fire resistance properties of conveyor belts used in shipboard systems, recommend Commandant consider the necessity for dedicated fire detection and fixed-extinguishing systems in cargo handling spaces, especially those with vertical or inclined conveyor belts. A fire that has spread to these critical areas has shown to severely accelerate in intensity and likely result in catastrophic loss to the vessel. Further recommend Commandant examine the detailed safety report published on May 11<sup>th</sup>, 2021 by the Australian Transport Safety Bureau for fire on board IRON CHIEFTAIN (Report MO-2018-011) as it pertains to the aforementioned high levels of risk and inadequacy of fire standards or regulations. This report outlines actions to engage the International Association of Classification Societies (IACS) General Policy Group to determine Unified Requirements for mitigation of fire risks in conveying spaces. The USCG should engage IACS as an interested party for the establishment of these provisions.

There are nearly four dozen U.S. flagged self-unloading bulk carriers operating within the Great Lakes as well as numerous other foreign flag self-unloaders operating in U.S. waters nation-wide. The cargo handling spaces of these vessels will continue to present a very high fire risk without adequate standards or regulations for shipboard conveyor belt systems.

**Administrative Recommendation 1.** Recommend the Captain of the Port Sector Lake Michigan formally recognize all fire departments that responded to the fire aboard the ROGER BLOUGH and specifically the Sturgeon Bay Fire Department. Without their efforts the Marine Transportation System could have suffered tremendous losses to shore side infrastructure, the navigable waterway, and the Great Lakes fleet.

**Endorsement:** I concur with this recommendation.

**Administrative Recommendation 2.** Recommend Commandant release the Investigating Officer's report to the public at the conclusion of Commandant's review and approval.

**Endorsement:** I concur with this recommendation.

**Administrative Recommendation 3.** Recommend the Commandant close this investigation.

**Endorsement:** I concur with this recommendation.



M. D. Dooris  
Captain, U.S. Coast Guard  
Chief, Prevention Division  
By Direction



16732  
February 23, 2022

**ROGER BLOUGH (V.I.N. 533062) FIRE IN STURGEON BAY, WI FEBRUARY 1, 2021**

**ENDORSEMENT BY THE OFFICER IN CHARGE, MARINE INSPECTION**

After careful review, I approve the record and report of investigation, including the findings of fact, analysis, conclusion and recommendations, subject to the following comments. I recommend this marine casualty investigation be closed.

**COMMENTS ON THE REPORT**

1. I concur with the Investigating Officer's recommendations made to the Commandant.
2. I have initiated the process to recognize the courage and contribution of the local first responders' actions during the response to this marine casualty.
3. I have convened a working group to address short falls with manning of laid up vessels.



DONALD P. MONTORO  
Captain, U.S. Coast Guard  
Officer in Charge, Marine Inspection



16732  
February 23, 2022

## **ROGER BLOUGH (V.I.N. 533062) FIRE IN STURGEON BAY, WI FEBRUARY 1, 2021**

### **EXECUTIVE SUMMARY**

At approximately 0131 on February 1, 2021, the Great Lakes vessel ROGER BLOUGH caught fire while moored at Fincantieri Bay Ship in Sturgeon Bay, WI. The ROGER BLOUGH was an active Coast Guard Certificated dry cargo vessel for service upon the Great Lakes and is commonly known as a Laker. The vessel was moored for the winter months to undergo normal maintenance and repairs in preparation for the upcoming 2021 operating season. The "winter lay-up" of this vessel is a common occurrence across all Lakers and fleets due to winter ice conditions preventing cargo carriage and navigation. The only person on board the vessel at the time of the fire was a ship keeper employed by the managing company. The vessel utilized an installed oil-fired furnace during "winter lay-up" to warm the engine room and prevent piping systems from freezing. The furnace functioned automatically and was controlled by an external thermostat.

While the ship keeper was asleep the winter lay-up furnace experienced a failure resulting in a fire within the furnace's burner enclosure. The fire in the enclosure continued until heat was significant enough to heat the boundary between the engine room and the port side cargo unloading trunk. The port side cargo unloading belt, laying upon the boundary between the engine room and the unloading trunk, heated to the point of combustion. The fire then spread throughout the vessel's cargo unloading system working aft to the shuttle unloading boom and then to the starboard unloading belt. When the fire was finally extinguished by local fire departments it had reached the entry point of the cargo unloading tunnel on the starboard side of the vessel and it had burned for approximately 14 hours. The vessel sustained substantial structural damage as a result of the fire and was claimed as a total constructive loss.

As a result of its investigation, the Coast Guard has determined that the initiating event for this casualty was the mounting failure of the furnace's burner assembly. This was followed by the fuel supply piping breaking as the burner fell and then the ignition of the fuel spraying from the broken fuel line. This was followed by the unmitigated fire spreading to the vessel's rubber unloading belts and cargo system which burned throughout the aft section of the vessel. The causal factors that contributed to this casualty include: (1) burner mounting failure, (2) failure to address marine conditions, (3) failure to consider appropriate mounting options for the burner assembly, (4) lack of fuel system flexibility, (5) disabled fixed CO2 suppression system, (6) missing smoke detector, (7) violation of manufacturer's installation requirements, (8) inadequate regulation of shipboard oil fired furnaces, (9) lack of alternative fixed fire suppression system, (10) inadequate monitoring of operating machinery, (11) operator's failure to address Coast



Guard safety recommendations, (12) Inconsistent Coast Guard interpretation and implementation of lay-up safety recommendations.



16732  
February 28, 2022

**ROGER BLOUGH (V.I.N. 533062) FIRE IN STURGEON BAY, WI FEBRUARY 1, 2021**

**INVESTIGATING OFFICER'S REPORT**

**1. Preliminary Statement**

- 1.1. This marine casualty investigation was conducted in accordance with Title 46, Code of Federal Regulations (CFR), Part 4, and under the authority of Title 46, United States Code, Chapter 63.
- 1.2. The National Transportation Safety Board participated in this investigation.
- 1.3. Gallagher Sharp LLP was designed as a party-in-interest on behalf of the vessel owners.
- 1.4. All times listed in this report are in Central Standard Time using a 24-hour format. The Incident Investigation Activity Number for this investigation is 7139261.
- 1.5. The Coast Guard was designated as the lead investigative agency. The Investigating Officer for the Coast Guard was Chief Warrant Officer [REDACTED], Lead Investigator, from Marine Safety Detachment Sturgeon Bay. The Investigating Officer for the NTSB was Mr. [REDACTED].

**2. Vessels Involved in the Incident**

Vessel Name:	ROGER BLOUGH
Vessel Identification Number:	533062
Flag:	U.S.
Vessel Class/Type/Sub-Type	General Dry Cargo Ship/General/General 2
Build Year:	June 24, 1971
Gross Tons:	22,041
Length:	833
Breadth:	105
Depth:	28

Main/Primary Propulsion: (Configuration/System Type, Ahead Horse Power)	Diesel Reduction, single screw, 14,000 horsepower.
Owner:	Great Lakes Fleet Inc.
Operator:	Key Lakes Inc.



- 2.1. The ROGER BLOUGH, shown in Figure 1 above, is a Coast Guard Certificated U.S. flagged commercial vessel with a Certificate of Inspection for service as a dry cargo ship. The vessel is certified for service upon the waters of the Great Lakes. The ROGER BLOUGH is regulated under Title 46 Code of Federal Regulations (CFR) Subchapter I. The vessel's engineering systems are regulated under 46 CFR Subchapter F. The ROGER BLOUGH is also enrolled in the Coast Guard's Streamlined Inspection Program (SIP). Since it is an SIP vessel, the Coast Guard conducts regulatory inspections of selected systems during each annual SIP audit. Under the SIP program the owner and operator are responsible for conducting their own inspections for overall regulatory compliance in accordance with the program. In addition the Coast Guard conducts SIP audits to verify compliance and proper documentation of company inspections.

- 2.2. The ROGER BLOUGH, and many other Lakers utilize a cargo conveyor system to discharge cargo to shore side facilities. While each vessel's unloading system may be unique, there are commonalities between them. Almost all Lakers utilize a cargo conveyor system which uses rubber belts to transfer bulk cargo. The ROGER BLOUGH is arranged with a two belt system meaning there are two separate belt conveyors that run below the cargo holds. These belts move cargo aft to deliver it to a vessel's unloading boom for shore side delivery.

### **3. Deceased, Missing, and/or Injured Persons**

- 3.1. There were no deaths or injuries as a result of the fire on board the ROGER BLOUGH.

### **4. Findings of Fact**

- 4.1. Background:

4.1.1. The Great Lakes are a unique area of operation for commercial vessels. The Great Lakes host a fleet of specialized vessels known as "Lakers." These vessels operate almost exclusively upon the waters of the Great Lakes. The vessels range in length with the largest being more than 1,000 feet long and capable of carrying up to 70,000 tons of iron ore. With a northern area of operation, their cargo operations are seasonal due to ice conditions. From spring to early winter these vessels call on numerous ports across the Great Lakes between the U.S. and Canada. Typical cargoes consist of iron ore, salt, grain, stone and coal. As ice conditions increase and the Soo Locks in Sault Ste. Marie, MI close for the season. These vessels then enter what is commonly referred to as "winter lay-up." During this time Lakers moor for extended periods of time at facilities and shipyards throughout the Great Lakes. Owners and operators take advantage of this down time to complete regulatory inspections, repairs, and modifications for vessel improvement. While in this "laid-up" condition, vendors and shipyards begin work to prepare the ships for the upcoming season.

4.1.2. Winter lay-ups present unique conditions for the Great Lakes fleet. Once a vessel is laid-up it is common for the crew to depart shortly afterward, leaving vessels unmanned in many instances. In the absence of a qualified crew, many companies employ an individual to keep an eye on the ship, commonly referred to as a ship keeper. Ship keepers are generally responsible for being available to facilitate vendor work and monitor shipboard conditions. These individuals may or may not reside on board during lay-up. Additionally, there may only be one ship keeper assigned to monitor several vessels. Due to freezing weather conditions, these vessels are at risk of piping systems and sea chests freezing, which can result in significant damage and flooding. To mitigate these hazards many vessels, including the ROGER BLOUGH, often utilize various heating systems to prevent this from occurring. Heating methods include heat lamps, heat tapes, auxiliary boilers and oil fired furnaces. The ROGER BLOUGH utilized all of these methods for various systems and spaces on board. For the heating of the engine room and the main sea chests, the ROGER BLOUGH had an oil-fired furnace in operation in the lower engine room.

4.1.3. The ROGER BLOUGH is managed by Keystone Shipping, Co. and Key Lakes, Inc. Great Lakes Fleet, Inc. owns Key Lakes, Inc. and the ROGER BLOUGH.

4.1.4. The ROGER BLOUGH's classification society is the American Bureau of Shipping (ABS).

4.1.5. On August 15, 2019 as a result of the Major Marine Casualty fire aboard the vessel ST. CLAIR, the Coast Guard's 9<sup>th</sup> District Command released Marine Safety Information Bulletin (MSIB) 002-19 to address fire hazards on board laid-up vessels. The MSIB stated that companies should develop plans for lay-up procedures. Plans were expected to address issues including training for ship keepers, alternate means of firefighting, company policy on the use of heating appliances and continuous watches. The MSIB was an outreach document designed to open a dialog regarding the safe lay-up of Great Lakes vessels between Coast Guard field units and vessel operators. The MSIB was not policy or regulation; it was provided for informational and recommendatory purposes only.

4.1.6. From October 29, 2019, through March 23, 2020, the ROGER BLOUGH was laid-up in Sturgeon Bay, WI. Coast Guard inspections were completed during that period which included Continuous Internal Structural Examinations and testing of select engineering systems. A new oil-fired "winter lay-up" furnace was installed on board the vessel during that time. The Coast Guard inspection record covering that period did not mention the installation or inspection of a new winter lay-up furnace.

4.1.7. There are no specific Coast Guard regulations that apply to the ROGER BLOUGH in 46 CFR Subchapter F, requiring the inspection or testing of oil-fired furnaces without pressure vessels. The furnace installed on the ROGER BLOUGH did not have associated pressure containing components known as pressure vessels. Coast Guard regulations do exist in 46 CFR Subchapter F for oil-fired equipment that is similar to oil-fired furnaces, such as boilers that have pressure vessels. There are also regulations in 46 CFR Part 63 for auxiliary heaters that contain pressure vessels.

4.1.8. There are no American Bureau of Shipping standards that apply to the installation or survey of furnaces on board classed vessels.

4.1.9. The National Fire Protection Agency has a national standard that addresses oil-fired furnaces: NFPA 31 Standard for the Installation of Oil-Burning Equipment. NFPA 31 is not incorporated by reference into Coast Guard regulations. Since the standard was not incorporated by reference it was not directly enforceable by Coast Guard Inspectors on board the ROGER BLOUGH. The NFPA 31 standard includes numerous requirements including Fusible Link Safety Shutoff Valves for the closure of fuel valves in the vicinity of the oil-burning equipment required by NFPA 31 8.7.3 and 8.10.6.1.

#### 4.2. Winter Furnace Installation:

4.2.1. Key Lakes Inc. hired Tweet Garot, a local heating system installation and maintenance company, to install a new oil-fired furnace in the lower engine room of the ROGER BLOUGH.

4.2.2. On February 25, 2020 and February 26, 2020, a new “winter lay-up” furnace was installed on board the ROGER BLOUGH by a Tweet Garot technician. The primary components of the new furnace consisted of a Powrmatic CA-100 furnace and a Carlin 601CRD Burner Assembly with a SUNTEC Fuel Unit, model B2TA-8260 (P/N 98042).

4.2.3. Tweet Garot’s technician mounted the burner assembly to the furnace without using a pedestal mount option. Instead the burner assembly was mounted directly to the flame tube. The mounting support method for the installation consisted of “hanging” the burner on the flame tube by sliding it on, and then used two small “set” screws to prevent the burner from slipping off of the flame tube. No other supporting hardware was installed above or below the burner to help support its weight. A pedestal support is another mounting option for the burner in accordance with Carlin Combustion’s documentation. An example of a pedestal mount is shown in Figure 11.

4.2.4. The burner assembly weighed approximately 65 pounds. The burner and furnace were not specifically designed for marine use, which is subject to variable forces, including shifting weights, dynamic loads and increased vibration. The design documents and manuals for the unit do not indicate suitability for shipboard use.

4.2.5. The Carlin Combustion Technology Instruction Manual for the Model 601CRD Oil Burner stated, “United States installations: Burner/appliance installations in the United States must comply with the latest editions of NFPA 31, ANSI/NFPA 70, and all applicable local codes.” It also states: “WARNING Installer/servicer – Except where specifically stated otherwise, this manual must be used only by a qualified service technician. Failure to comply with this or other requirements in this manual could result in severe personal injury, death or substantial property damage.”

4.2.6. Installation Information Form 2100 dated 12-30-2014 for the SUNTEC Industries SUNTEC Fuel Unit model B2TA-8260 (P/N 98042) states: “This product must be installed, adjusted and started only by a qualified and licensed technician and done so in accordance with all appropriate local and national codes and ordinances, such as NFPA 31”.

4.2.7. The SUNTEC fuel unit attached to the Carlin 601CRD Burner Assembly was installed by Tweet Garot without a Fusible Link Safety Shutoff Valve required by NFPA 31. NFPA 31 8.10.6 states: “A readily accessible fusible link safety shutoff valve that closes against the supply pressure shall be installed at each of the following points, (1) As close as practical to the filter on the tank side of the filter, and (2) As close as practical to the inlet connection to the burner.”

4.2.8. The new furnace and its burner installation did not have a fusible link safety shutoff valve. A fusible link safety shutoff valve is a fuel system piping component. The valve is designed to shut off the fuel flow from the fuel storage tank in the event of a fire. As shown in Figure 2, below, a fusible link is attached to a spring-operated lever that holds the valve open to allow for fuel flow under normal operation. In the event of a fire, the fusible link melts at a preset temperature and the spring-actuated poppet shuts off the flow of fuel in the fuel supply line. The valve's close proximity to the burner assembly would ensure the fuel can be secured as quickly and closely to the burner as possible in the event of a fire.



Figure 2: Example of a Fusible Link Safety Shutoff Valve shown in the open and closed positions.

4.2.9. Key Lakes' winter engineer for the ROGER BLOUGH installed new stainless fuel supply piping from the quarter turn shutoff ball valve in the fuel system just forward of the furnace to the fuel connection on the SUNTEC Fuel Unit model B2TA-8260 P/N 98042. The newly installed stainless steel piping from the fuel shutoff ball valve forward of the furnace to the mild steel connection on the SUNTEC fuel unit was rigid and did not provide flexibility in the fuel system's attachment to the fuel unit. The new piping did not include a fusible link safety shutoff valve.

4.2.10. On February 25, 2020, during the installation testing of the furnace, Tweet Garot's technician determined that the furnace was not functioning as designed. The furnace would not stay lit. The technician noted that while servicing the unit that the wrong oil nozzle was installed which was affecting the ability of the furnace to stay lit.

4.2.11. On February 26, 2020, Tweet Garot's technician was back on board the ROGER BLOUGH assisting with the new furnace installation. After discussing the "light off" issues over the phone with a Carlin Combustion employee, the technician with Tweet Garot reduced the draft for primary air from 60% to 40%. After the primary air was set at 40% the furnace lit-off.

4.2.12. The fuel tank for the furnace was located one deck above the burner resulting in an approximate head pressure of 3.218 psi.

4.2.13. On February 26, 2020, the new furnace installation was complete and the furnace was determined to be functioning properly by Tweet Garot's technician.

4.2.14. On or about March 23, 2020, the ROGER BLOUGH was found fit for route and service by USCG Marine Safety Detachment Sturgeon Bay. The vessel departed Sturgeon Bay, WI to begin cargo operations for the season.

#### 4.3. Vessel Winter Lay UP:

4.3.1. On July 9, 2020, the ROGER BLOUGH laid-up in Sturgeon Bay, WI as the result of a lack of work due to the COVID pandemic.

4.3.2. No formal plan as described in MSIB 002-19 "Winter Lay-up and Spring Breakout Safety in the Great Lakes" was received by the Coast Guard from Key Lakes or Great Lakes Fleet, Inc.

4.3.3. The "Great Lakes Fleet Ship Keeping Program" document dated November 15, 2019 did not address specifics for rounds (i.e. monitoring of on board equipment, identification of hazards). The document was one page and only generally listed expectations as line items such as "fuel transfer, Waste Oil Transfer, and Test Boiler Water" etc. The document did not discuss any details or establish policy such as emergency procedures, availability of firefighting systems, or any expectations for watch keeping.

4.3.4. The ROGER BLOUGH's fixed CO2 system for the engine room was disabled by Van's Fire and Safety for servicing at the request of Key Lakes. The system was disabled sometime between the vessel's initial arrival to Sturgeon Bay and the time of the fire. The exact date of the system being disabled is unknown. The system was not functional at the time of the fire. It is also industry practice for vessels to temporarily disable fire suppression systems to prevent accidental discharge during maintenance periods.

4.3.5. On December 29, 2020, the winter lay-up furnace was in operation on board to warm the engine room. The furnace experienced a failure and would not stay lit.

4.3.6. On December 29, 2020, the Chief Engineer on the ROGER BLOUGH pulled the burner assembly out of the furnace and re-gapped the electrodes (incorrectly) to 3/8<sup>th</sup>. He also cleaned the burner oil nozzle and then reinstalled the burner. The Chief Engineer attempted three times to light the furnace without success.

4.3.7. The furnace automation system then experienced a "hard lockout" as a result of three failed firing attempts. The "hard lockout" prevented further attempts by the Chief



Engineer to light the furnace.

4.3.8. During the vessel's lay-up the smoke alarm nearest to the furnace in the lower engine room was found to be inoperable. The detector was removed by Key Lakes' Port Coordinator who planned to replace it on February 5, 2021. After it was removed there was no longer a functional detector in that location during the time preceding the fire. The other detectors in the alarm system were reportedly operational.

#### 4.4. Winter Furnace Service Call:

4.4.1. On December 29, 2020, the Port Engineer for Key Lakes contacted Tweet Garot to request an evaluation of the furnace issues and to make necessary repairs to the furnace.

4.4.2. On December 29, 2020, Tweet Garot's technician conducted maintenance on the ROGER BLOUGH's winter furnace. He removed the burner and discovered that the electrodes were improperly gapped to 3/8<sup>th</sup> - inch. The technician adjusted them to the gap indicated in the manual for the unit which was 1/8<sup>th</sup> - inch. He then reinstalled the burner assembly. The technician was able to get the furnace back up and running by clearing the "lockout" and resetting the furnace.

4.4.3. While Tweet Garot's technician was observing the furnace in operation, he heard "chattering" from one of the electrical contacts within the control panel. The technician could not determine which contactor "chattered." He left the cover off of the control panel so the crew could monitor and report if the "chattering" recurred and if so identify the contactor. At the conclusion of the service call Tweet Garot's technician recommended normal preventative maintenance be conducted at a later date to ensure continued proper operation of the furnace.

#### 4.5. The Incident:

4.5.1. On January 31, 2021, the ROGER BLOUGH's ship keeper was in the Engine Control Room making gaskets. The ship keeper finished for the day and departed the engineering spaces at approximately 1500. Upon departure the ship keeper did not notice any concerns or issues. The ship keeper went to his room to rest.

4.5.2. From approximately 1500 on January 31, 2021 through 0131 on February 1, 2021 the oil-fired furnace was in operation in the engine room of the ROGER BLOUGH. During this time there were no personnel in the engine room to monitor the operation of the equipment.

4.5.3. At approximately 1930, the ship keeper woke up and headed into town for dinner, leaving the vessel unattended with the furnace running in the engine room. The ship keeper did not conduct a round prior to leaving the vessel. Company Policy did not require ship keepers to remain on board at all times.

4.5.4. Sometime between 2130 and 2200, the ship keeper arrived back on board the ROGER BLOUGH and headed to the galley to make food. He did not notice any signs of fire or any other concerns while in the galley. He did not conduct any rounds or enter the engineering spaces. He brought his food back to his room and then went to sleep.

4.5.5. Prior to around 0131 on February 1, 2021, the furnace burner assembly's cast retention ring, where the burner mates up with the flame tube, had a deficiency in the casting where the mounting set screws penetrated the retention ring to allow for tightening of the assembly to the flame tube. Fractures were present at both screw hole locations.



Figure 3, below, shows a post fire photo of the fractures.

4.5.6. Prior to or around approximately 0131 on February 1, 2021 the burner assembly's mounting fractured at the retention screw holes on the retention ring. The burner fell to the bottom of the burner's enclosure box as shown in Figure 4



Figure 4: Burner Assembly in its Enclosure Box, Broken Free of the Flame Tube.

4.5.7. When the burner assembly fell, the rigid fuel piping connection to the burner assembly fractured, allowing #2 fuel to spray into the burner's enclosure box, shown in Figures 5 and 6. The broken fuel line allowed fuel to flow unrestricted through the broken connection into the burner's enclosure.



Figure 5: Fuel Supply to the Fuel Pump



Figure 6: Broken Fuel line at the Fuel Pump

4.5.8. The fuel spraying into the burner's enclosure box from the fractured fuel line ignited causing a fire within the enclosure.

4.5.9. The fuel supply system did not have a Fusible Link Safety Shutoff Valve installed adjacent to the burner assembly as required by NFPA 31. The fuel system was not arranged to automatically secure the fuel to the fire as heat increased in the burner's



enclosure box.

4.5.10. The fire within the burner's enclosure continued burning. Directly above the furnace, as shown in Figure 7, the steel overhead increased in temperature. The overhead formed the bottom boundary of the port side unloading conveyor trunk. The temperature reached a point at which the port side rubber cargo unloading belt laying upon the steel ignited. The fire migrated aft, up the port unloading belt, transferred to the vessel's unloading shuttle boom belt, and then transferred from the shuttle boom belt to the starboard side unloading belt where it progressed towards the unloading tunnel. The path of fire spread is shown in Figure 8. Areas damaged by the fire are indicated in Figure 9.



Figure 7: Winter Lay-up Furnace in the Lower Engine Room of the ROGER BLOUGH, Post Fire

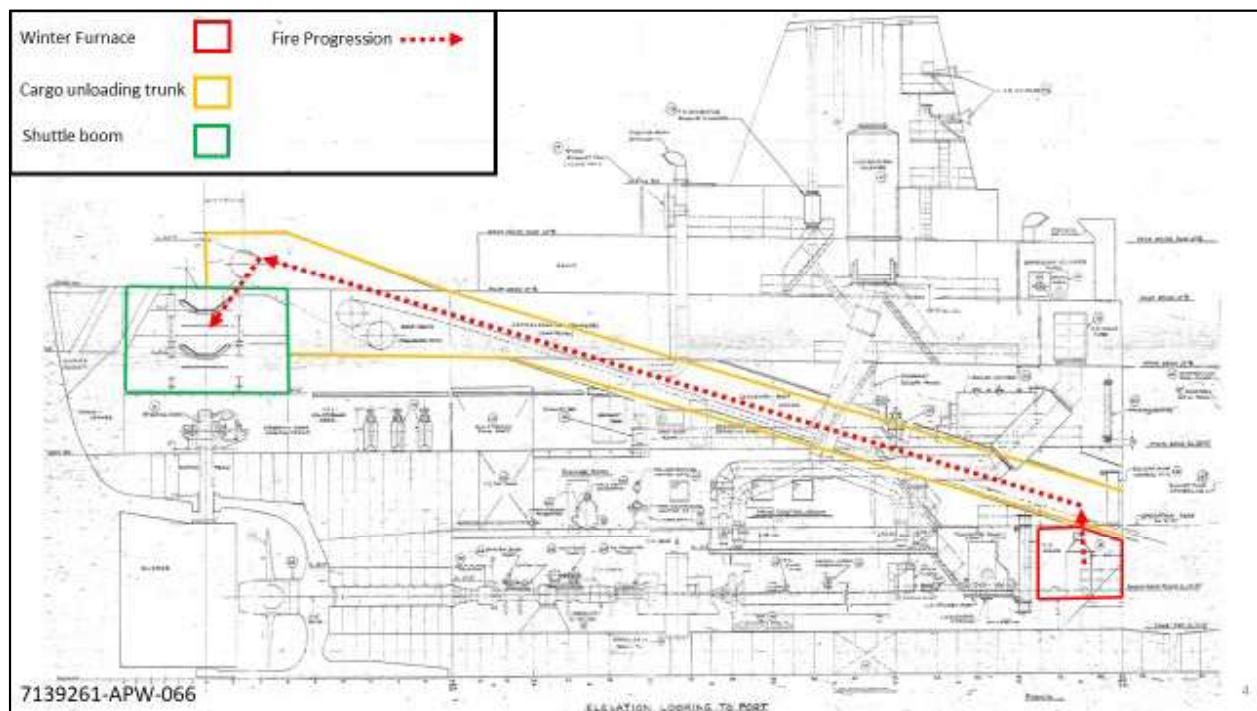


Figure 8: Arrangement Drawing Indicating Path of Fire Spread on the ROGER BLOUGH.

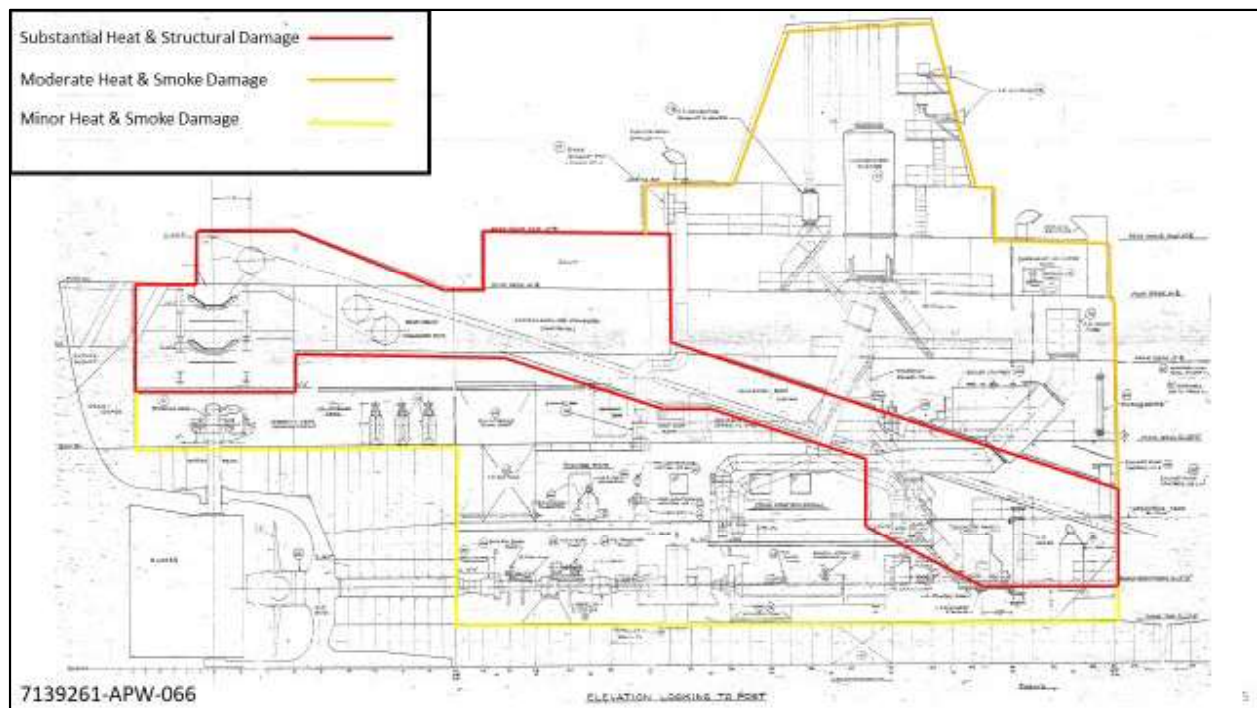


Figure 9: Arrangement Drawing Indicating the Fire Affected Areas on the ROGER BLOUGH.

4.5.11. At 0131:43, the automated Sentinel Sensaphone system installed on board the ROGER BLOUGH identified that one of the vessel's smoke alarms was activated. The

system does not differentiate between detectors so it could not be determined which detector identified the fire. The system sent alarm notifications via automated phone calls to select personnel. Notifications were delivered to the ROGER BLOUGH's winter engineer, the shipyard's gate guard, and the ship's cell phone. The only person on board the vessel, the ship keeper, was not included on the list of automated notifications.

4.5.12. Sometime between approximately 0131 and 0138 the ship keeper woke up to his room filling with black smoke and alarms sounding. The ship keeper's room was located on the main deck on the starboard side of the vessel. He ran from his room and noticed black smoke in the halls of the starboard side accommodation spaces. When he got outside to the brow, he saw the shipyard's gate security guard and the guard immediately called 911.

4.5.13. At 0138:52, the Sturgeon Bay Fire Department was dispatched to the ROGER BLOUGH.



Figure 10: ROGER BLOUGH on Fire at Fincantieri Bay Ship Building in Sturgeon Bay, WI.

4.5.14. At 0148 the Sturgeon Bay Fire Department arrived and began firefighting efforts, shown in Figure 10. Thereafter, nine additional fire departments also responded to the



dispatch call.

4.5.15. On February 1, 2021 at approximately 1557, the fire was extinguished and the Sturgeon Bay Fire Department cleared the scene.

4.5.16. On February 1, 2021 at 1137, an alcohol test was administered to the ROGER BLOUGH's ship keeper. The results were negative.

4.5.17. On February 1, 2021 at 1139, a drug test was administered to the ROGER BLOUGH's ship keeper. The results were negative.

## **5. Analysis**

- 5.1. Burner mounting failure: This investigation revealed that the burner's retention ring had deficiencies which included fractures in the casting where retention screws attach the burner to the flame tube. The fractures appear to have propagated, resulting in the mounting failing and allowing the burner to fall off the flame tube. The cause of the fractures is unknown, however, if the defects had been identified during inspection or routine servicing then repair or replacement may have prevented the mounting failure and subsequent fire.
- 5.2. Mounting method may not have been appropriate: The 601CRD burner manufacturer provides a pedestal-mount installation option as shown in Figure 11. Tweet Garot did not use this option and instead "hung" the burner on the flame tube, another manufacturer specified option. The equipment's shipboard service may not have been fully evaluated prior to installation. The pedestal mount installation option would have provided additional support to the 65-lb burner which may have been more appropriate considering the dynamic forces and stresses which are typical in a marine application. The pedestal mount option may have prevented the burner from falling despite material failure of the retention ring, and may have prevented the casualty.



Figure 11: Example of a Carlin Burner Installed with the Pedestal Mount Option.

- 5.3. Failure to address marine conditions: Tweet Garot may not have sufficiently considered the marine operating environment for the equipment installation. Marine conditions include variable loads, dynamic forces, vibration, and ship movements. These are additional hazards that shore side installations do not commonly encounter. Marine conditions may have instigated or exacerbated the mounting failure that caused the unit to fall. Thorough consideration of marine hazards during equipment selection and installation of the unit may have prevented the casualty.
- 5.4. Lack of fuel system flexibility: All fuel supply piping from the external shutoff valve to the burner's fuel unit was rigid stainless steel and provided no flexibility. Short runs of copper tubing are common marine practice for line connections to equipment prone to movement or vibration. If flexible piping was utilized, the fuel line may not have broken when the burner fell. This may have prevented fuel from spraying onto the burner assembly, and prevented the subsequent fire.
- 5.5. Failure to monitor operating equipment: Personnel were not conducting a watch or conducting periodic rounds to monitor running equipment or identify hazards on board. A round had not been conducted in the engine room for over 10 hours. If a round had been conducted, the person may have noticed the large loss of fuel as a result of decreasing fuel levels or through seeing, hearing or smelling the fuel spraying from the broken piping. If the fuel discharge had been discovered by a watch stander, it could have been secured to prevent ignition.



- 5.6 Disabled fixed fire suppression system: The CO2 system that normally protected the engine room was disabled for servicing and, was therefore, inoperable. The absence of an operational fixed system left the engine room vulnerable to increased risk of fire spread. If the system had been operational, the ship keeper or emergency personnel could have quickly discharged CO2 into the engine room. It is possible that timely CO2 injection into the space could have extinguished the fire before it spread to the unloading system belts. It is also highly likely that CO2 injection into the space may have drastically reduced the rate of fire spread which may have permitted fire fighters more time to prevent fire spread to the shuttle or starboard side cargo unloading belts.
- 5.7 Missing smoke detector: The ROGER BLOUGH had a “winter lay-up” fire detection system which was not required by regulation, but was utilized as an additional level of protection during vessel lay-up periods. The detector closest to the furnace had previously failed, was removed from the vessel, and was scheduled for replacement on February 5, 2021. If this detector in close proximity to the running equipment had been functional, the smoke may have been detected sooner resulting in quicker notification and fire response efforts that could have prevented or minimized fire spread. However, the system (which is not required to be installed) did identify the fire, resulting in notification and a more timely response than if the system had not been installed.
- 5.8 Violation of manufacturer’s installation requirements: The 601CRD burner and the SUNTEC fuel unit installation manuals both stated that NFPA 31 must be followed. NFPA 31 requires the use of “fusible link safety shutoff valves.” A fusible link shutoff valve was required by the manufacturer to be installed as close to the burner as practical. If the fusible link shutoff valve had been installed, when the heat increased in the burner’s enclosure, the missing valve would have actuated due to heat (as designed). Activation of such a valve would have automatically secured the fuel supply and could have prevented the spread of fire through the vessel via the elimination of the fuel source. As shown in Figure 12, the installation did not have a fusible link shutoff valve.



Figure 12. Fuel Supply Line to the Burner Assembly. A Fusible Link Safety Shutoff Valve is not Installed as Required by NFPA 31.

- 5.9. Inadequate regulation of shipboard oil-fired equipment: The shipboard installation of oil-fired equipment (i.e. boilers, thermal fluid heaters) have applicable CG regulations. However, furnaces without pressure vessels are not specifically regulated by the CG. NFPA 31 covers safety devices and operations, but it is not incorporated into CG regulation and therefore cannot be strictly enforced. If NFPA 31 had been incorporated into CG regulations, then safety devices and proper installation may have been enforced by CG inspectors to include the installation of a fusible link shutoff valve which would have significantly limited the fire's fuel source.
- 5.10. Lack of fixed alternative fire suppression system: Since the engine room's CO2 system was disabled, there were no immediately available fixed means to extinguish the fire. Unmonitored oil-fired equipment posed an increased fire risk to the vessel. Alternative fire suppression options exist for smaller equipment-specific automatic or remote operated fixed systems which are utilized by industry on similar applications (i.e. thermal fluid heaters, generators). A specific system installed on the furnace capable of remote or automatic discharge may have extinguished or reduced the fire's progression and may have been an appropriate alternative for protection during a time when the engine room's

installed fire suppression system was inoperable.

- 5.11. Inadequate monitoring delayed initial response efforts: Even though a ship keeper was assigned to the vessel, the engine room was unattended for 10 hours while equipment was in operation. It is highly likely that a watch stander mindfully conducting rounds may have identified the fire before it spread to surrounding spaces. Early detection could have allowed for better initial firefighting measures, including securing fuel sources and ventilation, use of portable extinguishers and more effective boundary setting before the fire became out of control. These initial measures may have been able to extinguish the fire before it spread to the vessel's unloading belt system.
- 5.12. Key Lakes, Inc. and Great Lakes Fleet, Inc. failed to address Coast Guard recommendations: As a result of the Major Marine Casualty fire investigation for the vessel ST CLAIR, the Coast Guard's Ninth District Command issued MSIB 002-19, "Winter lay-up and Spring Breakout Safety in the Great Lakes Fleet". The Coast Guard also released Marine Safety Alert 07-19, "For want of a watchman the ship was lost." The 2019 release of both documents allowed for ample time for the company to address their contents and implement measures to increase vessel safety during lay-up. The Safety Alert strongly recommended that owners and operators ensure that "continuous fire, safety, and security watches are maintained and that the watchman are provided specific written instructions regarding their duties in the event of a fire or other emergency situation." Key Lakes and Great Lakes Fleet failed to provide written instructions and did not implement continuous watches as recommended. The MSIB urged company action and stated that a plan should be submitted to the Officer in Charge of Marine Inspection (OCMI) to address numerous areas of concern listed in the document. A plan for the ROGER BLOUGH was not submitted to the OCMI. The lack of a company plan resulted in the following concerns not being formally addressed as urged by the Bulletin and Safety Alert: vessel risk assessment, alternate means of firefighting, practices to minimize ignition sources by ensuring equipment and materials are properly stored, fire watch and emergency response policies should a fire or other emergency event occur, and implementation of continuous watches. The failure to address Coast Guard recommendations for preventing shipboard fires directly and indirectly contributed to the severity of the casualty.
- 5.13. Inconsistent Coast Guard implementation and enforcement of MSIB 002-19 and MSA 07-19: After the 2019 fire that occurred aboard the Great Lakes vessel ST. CLAIR, MSIB 002-19 and MSA 07-19 were distributed by the Coast Guard. The guidance was an effort to inform and encourage industry to make reasonable efforts to increase vessel safety through the use of continuous watches, company plans addressing firefighting equipment, and emergency procedures. Lay-up safety plans were also recommended to be submitted to each respective Captain of the Port. While the MSIB and MSA succeeded in raising awareness, they were not consistently followed to ensure vessel and port safety. The Coast Guard recognized that laid-up and inactive vessels posed an increased risk when not adequately monitored through continuous watches. The Coast Guard identified that vessels in these statuses have reduced firefighting capabilities such as disabled suppression and firefighting systems. The Coast Guard guidance was not

specific regarding: manning of vessels while laid up or inactive, acceptable means for alternative fire suppression, and did not provide clear guidance of enforcement for submitting plans described by the MSIB. The local Coast Guard unit failed to ensure a proper lay-up plan was submitted and implemented. Coast Guard policy may have provided clearer expectations, means of enforcement to encourage compliance, and ensure full CG participation to minimize shipboard fires.

## **6.0. Conclusions**

### **6.1. Determination of Cause:**

6.1.1. In accordance with Marine Safety Manual, Volume V, the initiating event (or first unwanted outcome) for this casualty was the mounting failure of the furnace's burner assembly. Causal factors contributing to the failure were:

6.1.2. Causal Factor 1 - Burner mounting failure.

6.1.3. Defects that propagated in the burner's mounting were unknown and therefore went uncorrected. Thorough inspection during manufacturing and installation, or maintenance by the involved parties may have been able to identify and rectify the deficiencies prior to complete failure of the mounting.

6.1.4. Causal Factor 2 - Failure to address marine conditions.

6.1.5. Tweet Garot and their employees did not consider the marine operating environment's unique conditions when selecting or installing the furnace equipment. Assuming that shore side installation methods were adequate, and employing a heuristic approach, resulted in conditions which may have over stressed components past their material limitations potentially resulting in pre-mature failure of the equipment.

6.1.6. Causal Factor 3 – Failure to consider appropriate mounting options.

6.1.7. More secure methods of supporting the burner assembly, such as a pedestal mount, existed and were available from the manufacturer. The method of mounting was the least secure method, considering the marine environment the vessel operated in. This resulted in subsequent failures, leading to further equipment failure and ultimately a fire.

6.1.8. Subsequent Events.

6.1.9. The fuel supply line to the burner assembly's fuel pump fractured as it was stressed by the falling weight of the burner.

6.1.10. Causal Factor 1 – The fuel supply connection to the burner's fuel pump was rigid and provided no flexibility. The lack of flexibility resulted in the fuel connection breaking and allowed fuel to discharge into the burner's enclosure box.

6.1.11. Fuel flowing from the broken fuel line ignited causing a fire in the burner enclosure box.

6.1.12. The fire then spread to the vessel's cargo unloading system through heat transfer to the overhead.

6.1.13. Causal Factor 1- There were no immediately available means to extinguish the fire before it spread to the unloading system since the fixed fire suppression system for the engine room was previously disabled.

6.1.14. Causal Factor 2 – The smoke detector nearest to the furnace was missing, which may have delayed initial fire identification and allowed the fire to grow uninhibited before detection.

6.1.15. Causal Factor 3 - Violation of the manufacturer's installation requirements which required adherence to NFPA 31. A fusible link safety shut off valve was not installed adjacent to the burner or its fuel pump as required by the manufacturer.

6.1.16. Causal Factor 4 – Absence of specific regulations for shipboard oil-fired furnaces resulted in limited regulatory oversight by the Coast Guard and ABS.

6.1.17. Causal Factor 5 - Lack of alternative firefighting equipment. Alternative means of fighting fires were not addressed or provided to mitigate the fact that the fixed CO2 suppression system was inoperable.

6.1.18. Causal Factor 6 – Inadequate monitoring of operating machinery. Insufficient active monitoring (i.e. watch) allowed for hazards to progress resulting in unmitigated fire spread.

6.1.19. Causal Factor 7 - Key Lakes, Inc. and Great Lakes Fleet, Inc. failed to address recent Coast Guard safety recommendations which resulted in missing emergency preparedness procedures, inadequate monitoring of on board conditions, and unavailable firefighting equipment.

6.1.20. Causal Factor 8 – Inconsistent Coast Guard interpretation and implementation of lay-up safety recommendations. Despite Coast Guard findings in the ST. CLAIR investigation that laid-up vessels presented numerous risks requiring mitigation, no policy or requirements were developed for action or enforcement to improve fire safety for laid-up of vessels.

6.2. Evidence of Act(s) or Violations(s) of Law by Any Coast Guard Credentialed Mariner Subject to Action Under 46 USC Chapter 77.

6.2.1. No actions by any involved Coast Guard Credentialed Mariner's was discovered.

- 6.3. Evidence of Act(s) or Violation(s) of Law by U.S. Coast Guard Personnel, or any other person.
  - 6.3.1. No evidence of any violations of law by U.S. Coast Guard Personnel, or any other person.
- 6.4. Evidence of Act(s) Subject to Civil Penalty.
  - 6.4.1. No evidence discovered meriting any type Civil Penalty actions.
- 6.5. Evidence of Criminal Act(s).
  - 6.5.1. No evidence of any criminal act(s) discovered.
- 6.6. Need for New or Amended U.S. Law or Regulation.
  - 6.6.1. A need for new or amended regulations was identified in this investigation. A recommendation to amend current regulation is proposed as a Safety Recommendation below.
- 6.7. Unsafe Actions or Conditions that Were Not Causal Factors.
  - 6.7.1. No unsafe actions or conditions that were not causal factors were discovered.

## **7. Actions Taken Since the Incident**

- 7.1. The Commander, U.S. Coast Guard Ninth District, has established a working group to develop guidance and policy for the District's Prevention Departments and industry representatives to formally implement consistent District-wide policy covering the minimum requirements or acceptable alternatives to the following topics: alternative manning, fire suppression, content of company lay-up plans, means of enforcement, and engagement with local fire departments and port resources.

## **8. Recommendations**

- 8.1. Safety Recommendation:
  - 8.1.1. Recommend Commandant evaluate the following potential gaps in regulations as they relate to oil fired equipment and proposed change recommendations: 1) 46 CFR 63.01-3 Scope and Applicability: consider adding "other oil-fired equipment." Specifically, "Oil-fired heaters or furnaces that do not meet the criteria of an auxiliary boiler, water heater or thermal fluid heater shall be installed and operated in accordance with NFPA 31.", 2) 46 CFR 63.05: change incorporation by reference to include NFPA 31 Standard for the Installation of Oil-Burning Equipment", 3) 46 CFR 61.20 Periodic Tests of Machinery and Equipment: modify to include "Other oil-fired equipment and

their safety control systems shall be verified at installation and at each regular inspection for certification.”

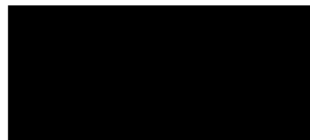
8.1.2. Recommend Commandant evaluate the prevalence and risk of fire spread through rubber belts common on board self-unloading bulk carriers. Multiple maritime incidents indicate that a cargo unloading belt fire can result in the significant spread of fire causing substantial damage to vessels as demonstrated in past casualties including the ROGER BLOUGH (IIA 7139261) in 2021, ST. CLAIR (IIA 6630678) in 2019, and the AMBASSADOR (Canadian Marine Investigation Report M94M0057) in 1994. A continued trend of large scale fires on board vessels have involved substantial damages as a result of the spread of fire through cargo unloading belt systems where their arrangements do not allow for effective structural fire protection installations along the beltways. The U.S. Department of Labor Mine Safety and Health Administration (MSHA) has long been aware of the increased risk and lethality of belts that are not fire-resistant. MSHA developed standards to address those concerns, requiring the use of fire-resistant belts proven through approved tests such as MSHA’s “BELT test.” The reoccurrence of conveyor belt fire casualties, and the significant financial losses in those cases indicate a need for further evaluation of regulatory standards and consideration of requirements similar to MSHA conveyor belt fire resistance requirements.

8.2. Administrative Recommendations:

8.2.1. Recommend the Captain of the Port Sector Lake Michigan formally recognize all fire departments that responded to the fire aboard the ROGER BLOUGH and specifically the Sturgeon Bay Fire Department. Without their efforts the Marine Transportation System could have suffered tremendous losses to shore side infrastructure, the navigable waterway, and the Great Lakes fleet.

8.2.2. Recommend Commandant release the Investigating Officer’s report to the public at the conclusion of Commandant’s review and approval.

8.2.3. Recommend the Commandant close this investigation.



Chief Warrant Officer, U.S. Coast Guard  
Lead Investigating Officer.