

## PROPULSION LOSS PREVENTION

### **BACKGROUND:**

A significant percentage of propulsion failures occur on vessels with direct drive diesel propulsion plants. These problems typically occur when a vessel is reducing speed or changing direction, where a stop or backing bell is ordered. For example: While picking up a pilot, the vessel has to reduce speed often below the vessel's slow ahead bell; a stop bell is ordered to further slow the vessel; this is followed some time later by an ahead bell which, on occasion, is unable to be answered, typically due to a failure of the air start system. This type of propulsion system failure suggests that this evolution is the first engine operation in anything other than the ahead mode since the vessel departed the last port, and that the required testing in 33 CFR 164.25(a)(5) of the vessel's propulsion in the ahead and astern mode 12 hours prior to port entry was not performed. Since such testing would have likely revealed problems with the propulsion system, *it is apparent that a complete test of the propulsion plant in the ahead and astern modes is often not being done prior to port entry. While not testing may be permitted (upon notification to the Captain of the Port)* due to rough sea conditions prohibiting safely conducting the tests, the tests must in all other cases be conducted. Programming engine slow down to properly reduce from sea speed to maneuvering speed for temperature management should be managed to enable conducting the propulsion tests. Failure of the air start system upon first use at port entry has been shown typically to be due to problems that can be minimized by increased vigilance in checking or testing of the air system.

In addition to air start system failures, fuel switching is another cause of failure. Vessels utilizing two fuel types can minimize risk by conducting a positive risk assessment prior to initiating the change. When switching fuels before entering the 200 nm North American ECA Zone as required by MARPOL Annex VI, Regulation 14, the Master should positively evaluate the situation, taking into account these and other factors:

- Traffic conflicts and general congestion
- Weather/sea/current conditions
- Vessel's current operating condition
- Local tug availability
- Proximity to navigationally challenging portions of the transit

In order to reduce the threat posed by propulsion losses, the Puget Sound Harbor Safety Committee has adopted the above measures and below action items to be conducted by vessels arriving in Puget Sound ports. The Puget Sound Harbor Safety Committee hopes that by describing propulsion loss information, and presenting this Standard of Care doctrine and Coast Guard expectations, the frequency and severity of propulsion losses can be significantly reduced.

**PROPUSION LOSS PREVENTION: ACTION ITEMS**

**ENHANCED MAINTENANCE PROCEDURES:**

**1. Starting and Control Air Systems for Direct Drive Diesels**

- a. Remove, clean, and replace filters as necessary
- b. Inspect, clean O rings, repair and replace as necessary
- c. Inspect, clean, and test air tanks as necessary, consider inner coatings
- d. Inspect, clean, and test air lines. Conduct frequent blow downs to remove moisture.
- e. Inspect and test air compressors
- f. Install air dryers or heaters in the air start/receive system as necessary
- g. Incorporate enhanced maintenance procedures into the vessel's ISM system.
- h. Do not conduct maintenance on the starting or control air systems while underway in pilotage waters.

**2. Fuel Switching**

- a. Consult engine and boiler manufacturers for fuel switching guidance.
- b. Consult fuel suppliers for proper fuel selection. Please note that the viscosity of 1% low sulfur fuel oil (LSFO) varies widely.
- c. Consult manufactures to determine if system modifications or additional safeguards are necessary for intended fuels.
- d. Develop detailed fuel switching procedures and diagrams. Ensure that they are easily accessible and easy to understand. Conduct periodic training and familiarization.
- e. Establish a fuel system inspection and maintenance schedule. Please note that 1% sulfur fuel may require an increased amount of maintenance and inspections due to a decrease in lubrication qualities compared to fuel with a higher percentage of sulfur content.
- f. Ensure system pressure and temperature alarms, flow indicators, filter differential pressure transmitters, etc., are all operational.
- g. Ensure system purifiers, filters and strainers are maintained.
- h. Ensure that the fuel oil viscosity and temperature control equipment is accurate and operational.
- i. When changing fuel, slow vessel's speed and allow sufficient time for equipment to adjust to temperature changes.
- j. Report any safety issues to Sector Puget Sound Joint Harbor Operations Command (JHOC) at (206) 217-6002.

**PRE ARRIVAL TESTS AND VESSEL OPERATION:**

1. Follow the requirements of 33 CFR 164 including testing propulsion system, ensuring that the vessel's astern propulsion is available, if needed. If weather or sea conditions prohibit such as test, you must report this to the applicable Cooperative Vessel Traffic Service (CVTS) Center and the COTP to gain port entry.

2. Do not test propulsion in the Traffic Separation Scheme (TSS) or within 12 miles of the coastline unless you have permission from CVTS. Test farther from the coastline if onshore wind and sea conditions are severe and there is no immediately available tug; coordinate with CVTS. If testing at sea must be delayed for safety reasons, then report this to CVTS and request permission to conduct the test in the open but more protected waters of the Strait of Juan de Fuca before arriving at the pilot station.
3. Coordinate testing with CVTS. Although tests are required within 12 hours (not at 96 hour advance notice), the tests will be required in an area where tug assistance can be provided in a timely manner, if needed. The tests shall not be conducted on approach to the pilot boarding area off Ediz Hook or off Victoria.
4. Tests are also to be done prior to departure from the dock or while the vessel has tugs tethered/alongside.
5. Check air tank, air line pressures (classification societies and U.S. Coast Guard standards typically require 12 starts).
6. Implement blow down procedures to reduce moisture in the air start system.
7. Ensure a licensed engineering officer is in the engine control room while the vessel is in pilotage waters.

**AFTER FUEL SWITCHING:**

Upon completion of fuel switching, it is recommended that pre-arrival tests are completed well offshore before entering the traffic management system.

**IN THE EVENT OF A PROPULSION OR STEERING LOSS**

**The master and/or pilot must:**

1. Obtain tug assistance immediately if the vessel is in danger of running aground, or if the propulsion or steering loss cannot be repaired in a timely manner. Vessel masters should err on the side of caution in ordering tug assistance, as casualties can take longer than expected to repair, tugs may need extended time to reach the stricken vessel, and weather and sea conditions can deteriorate rapidly. The applicable CVTS Center can assist in determining the locations of the nearest tugs.
2. Immediately inform the applicable CVTS Center and establish a communications schedule.
3. Track the vessel's position in relation to land, determine and monitor the drift rate.
4. Set the anchor detail.
5. Place the emergency generator on line.
6. Identify the source of the problem, conduct and test repairs.

**The U.S. Coast Guard will:**

1. Require immediate tug assistance if the vessel is in danger of running aground or if the casualty cannot be repaired in a timely manner.
2. Assist in locating nearest tug capabilities via the Vessel Traffic Service.

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3. Issue Captain of the Port orders as appropriate to ensure required responses are undertaken.
4. Hire tug(s) directly if COTP order to obtain tug assistance is not met within a timely manner.
5. Require classification society inspection, technical representative oversight, and Coast Guard inspection and/or approval of repairs.
6. Apply some or all of the above for partial propulsion or steering losses.