



HYPOTHETICAL RISK MANAGEMENT PLAN DEVELOPMENT

OPERATIONAL SYNOPSIS:

The Research Vessel ZENITH SAFETY, a 41 foot ex-USCG aluminum hulled utility boat, has been acquired by a NOAA program for use in the protected bays and sounds of Southeast Alaska. The vessel hull was surveyed prior to acquisition and thickness tests showed the hull to be sound. The vessel will operate in waters no greater than 5 miles from nearest land. The vessel can, and will, carry up to 5 persons, including the vessel operator for voyages up to 3 days away from port. The vessel was modified from the original USCG mission and is currently configured for fishing operations using bottom trawls. Modifications to the boat include the addition of a trawling winch and an aluminum frame structure on the aft section of the vessel which will be used as a towing point and a means to lift catch on to the vessel. Safe working loads for the modifications are not known and have not been calculated or tested. The vessel's trim and stability characteristics are known because of an inclining experiment performed following the fishing mission modifications. The vessel will cease operations and seek refuge each night in protected coves, or dock at small villages, because of restrictions on overtime compensation.

IDENTIFICATION AND RANKING OF RISKS

The following hazards exist for:

Personnel - exposure to cold water, attack by wildlife in remote areas, blunt trauma or skin piercing injuries consistent with fishing operations in general, incapacitating injury caused by failure of fishing modifications.

Vessel - capsizing or swamping due to net hangs or marginal stability encountered during lifting of heavy loads or icing. Machinery and equipment failure, fire, collision, allision.

Environment - accidental discharge of fuel or any product capable of producing a sheen upon the water. Current diesel main propulsion engines do not meet IMO requirements for reduced NOx emissions. Unintentional discharge of trash caused by wind or seas.

Mission - destroyed gear or lost instruments due to hangs or obstructions, lost time due to machinery failure.

Public Relations - The old main engines produce a greater amount of air pollution than newer diesel engines.

The hazard severity and probability criteria and risk hierarchy matrix were used to determine the relative hazard ranking below. The hazard severity and probability are listed as a parenthetical remark after each hazard. For example, (II-B) would indicate a hazard which is likely to cause serious injury or temporary loss of boat use and will probably occur over time. The ranking is based on a scale of 1 to 10. A value of 10 presents the greatest risk. The list is presented in order of decreasing risk with the greatest risk presented first:

Structural Failure (I-B) - Risk hierarchy ranking 10, modifications to the vessel to accommodate the fishing mission had not been reviewed by a qualified marine engineer. Load tests have not been conducted on the aluminum fishing structure. Trawl winch mounts have not been tested to a known safe working load.

Allision (II-B) - Risk hierarchy ranking 9, wooden debris in the form of large trees and ice bergs are commonly found adrift in the planned operating area. These obstructions generally float slightly above or near the surface of the water making detection and avoidance difficult.

Man Overboard (I-D) - Risk hierarchy ranking 8, the risk of a man falling overboard is slight due to the placement of adequate hand rails and toe rails around the vessel included as part of the prior use of the vessel by the USCG. However, due to the cold water environment of Southeast Alaska, the consequence of this hazard raises its hazard ranking.

Grounding (III-B) - Risk hierarchy ranking 7, Shallow rocky reefs exist throughout the area, however most are well marked. The more likely cause of unintentional grounding would occur due to the inability to anchor prior to becoming grounded. This situation is common in southeast Alaska due to the steepness of the bathymetry close to land.

Stability (II-D) - Risk hierarchy ranking 6, The vessel stability characteristics have been changed from the original design due to the addition of the weight of the trawl frame and winch on the after deck. The inclining experiment and resultant trim and stability booklet will allow the operator to make informed decisions regarding the operation of the vessel in varying conditions of loading. However, fishing operations present unique hazards in that unknown weights or unanticipated forces may act to upset the vessel. The dangerous nature of fishing operations combined with the possibility of the vessel taking additional weight above the water line due to icing adds to the potential capsizing hazard.

Collision (II-D) - Risk hierarchy ranking 6, Common vessel traffic include ferries, cruise ships, tugs towing barges, fishing vessels, fast excursion and sight seeing vessels, and occasional recreational traffic. In general, few vessels will be encountered in the intended operating area. Restricting operations to daylight hours further reduces the risk of collision.

Fire (II-D) - Risk hierarchy ranking 6, the vessel is aluminum hulled with adequate fire extinguishing capability remaining from prior USCG outfitting. Use of combustible materials are limited. The vessels machinery spaces and bilges are maintained free of grease and oil.

Hazardous Material Reactions (II-D) - Incompatible, or reactive, chemicals are identified and kept in separate compartments. Oily rags are disposed of in an air tight metal container. Chemicals used to preserve biological samples are removed after each cruise. An accurate and up-to-date inventory of Material Safety Data Sheets are maintained aboard the vessel.

Human Systems Failure (III-D) - Risk hierarchy ranking 3, The Program Manager in charge of the laboratory has implemented an extensive training program. Certified boat operators have many years of experience in the operations area and have maintained an impeccable safety record. Any issues pertaining to vessel safety are addressed or corrected immediately. However, even though all persons aboard the vessel are highly skilled, cramped quarters, long work hours, and noise contribute to crew fatigue and increase the potential for accidents. Although the probability of a hazard caused by human systems failure is very low due to excellent training, experience, and management, the severity of the consequences of human systems failure (human error) are generally high.

Mechanical/Systems Failure (IV-C) - Risk hierarchy ranking 2, the vessel had been maintained and operated by the USCG. A maintenance service contract with a local marine repair company is utilized to maintain engineering systems. Therefore, all systems were maintained and continue to be maintained in excellent condition by strict adherence to a preventive maintenance schedule. Boat operators are familiar with common signs and symptoms of system weakness or disrepair and report their concerns directly to the marine engineering contractor.