

# **Ocean Researcher Ship NEW OCEAN RESEARCHER 1 Major**

## **Marine Occurrence**

### **Executive Summary**

On November 13, 2022, at approximately 2109 local time, a ROC-registered research vessel "New Ocean Researcher 1" with a gross tonnage of 2155 and IMO number 9827504, equipped with a fully electric propulsion system, carrying 22 crew members and 22 operation and research personnel, a total of 44 people, drifted at sea due to an abnormality in the power system and resulting in a loss of propulsion power. A tugboat towed the vessel back to Kaohsiung Port on November 18. This occurrence caused no casualties or environmental pollution.

In accordance with the Taiwan's Transportation Occurrence Investigation Act and the Casualty Investigation Code of the International Maritime Organization, the TTSB is an independent transportation occurrence investigation agency responsible for conducting this investigation. The investigation team also included members from the Maritime Port Bureau of the Ministry of Transportation and Communications, the Coast Guard Administration of the Ocean Affairs Council, the CR classification society, the National Taiwan University, and the ABB Company.

After comprehensive investigation and analysis of the factual data, a total of 8 findings and 2 safety recommendations were obtained.

#### **The findings related to probable causes are as follows:**

1. The dry laboratory on the vessel is the main working area for the operation and research personnel. Due to the presence of an unprotected non-fixed seat in front of the charging panel, the personnel unintentionally leaned against

the seat back, causing it to touch and cut off the switch of the charging panel. As a result, the vessel's electricity was switched to battery power supply at 24V. After the battery power was depleted, the main engine-related equipment lost the 24V power supply, leading to protection of the main distribution panel and abnormal signals of parallel controllers and causing activation of the self-protection mechanism of main generators. The main generators subsequently shut down one by one, ultimately resulting in the loss of power and propulsion of the vessel at sea.

2. Both low insulation and charging panel power failure alarms were displayed as general alarms in the vessel's monitoring system. The occurrence of frequent low insulation abnormalities caused "alarm fatigue" among the watchkeeping engineers when general alarms were activated. Their response to lost propulsion did not comply with the training, certification, and watchkeeping standards specified in Section A-VIII/2 Part 5-4 of the International Convention on Standards of Training, Certification, and Watchkeeping for Seafarers (STCW). They did not go to the dry laboratory to check the cause of alarm activation. The watchkeeping engineers were unaware that the main power switch at 24V had been turned off, which eventually led to the depletion of battery power and loss of electrical power and propulsion.

**The findings related to risk are as follows:**

1. The chief engineer of the vessel is unable to effectively monitor and improve or assess the long-term low insulation alarms in the engine department, resulting in the persistence of the underlying causes.
2. The vessel experienced successive alarms related to abnormal power in the carbon dioxide fire extinguishing system, main distribution panel signals, and main propulsion control system failure. The personnel in the engine room did

not check the 24V control power supply, indicating their unfamiliarity with the distribution system and failure to recognize that various faults were caused by low voltage in the 24V control power supply.

3. The personnel in the engine room neglected the troubleshooting key points mentioned in the original manufacturer's main distribution panel education materials and failed to eliminate system faults derived from 24V power supply issues, missing multiple opportunities for error correction.
4. The vessel lacked a sound maintenance management system. As a result, the tracking and management of the handling repeated fault was not implemented for the reported grounding fault of the dry laboratory battery charging and discharging device. This ultimately caused the engine room personnel to think that the abnormal alarm of the charging plate occurred as the grounding fault, therefore no on-site inspection was conducted.

**The other findings are as follows:**

1. The ship's superintendent ashore (DPA), who is frequently involved in shipboard safety management as a front-line supervisor familiar with crew performance, but lacks a mechanism for assessing and providing guidance on safety management for crew members.
2. Teachers and students engaged in research work on the vessel did not understand that alarm sounds are important warnings on ships and requested crew members to silence the alarm sounds. Therefore, there were no audible alarms during the occurrence, which did not comply with the safety points mentioned in familiarization training for newly embarked personnel and reinforcement of safety awareness.

**Safety Recommendations**

**To the National Taiwan University**

1. The highest management position in the engine department on board should effectively supervise all alarms in the engine room. When watchkeeping engineers are unable to handle or fail to handle alarms, timely monitoring and appropriate emergency measures should be taken to comply with the content specified in the Safety Management System Manual.
2. Revise ship maintenance system management mechanisms to ensure proper handling of reported repairs, assignment of tasks, completion, and tracking of problem improvements, thereby enhancing ship safety management systems.

**Note:** The final report of this occurrence investigation is published in Chinese. To facilitate understanding for non-Chinese readers, the Executive Summary has been translated into English. While every effort has been made to ensure accuracy, discrepancies may occur. In the event of any inconsistency, the Chinese version shall prevail.