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香 港 商 船 資 訊
HONG KONG MERCHANT SHIPPING INFORMATION NOTE

A serious fire accident on board an underway container ship in tropical waters

To: Shipowners, Ship Managers, Ship Operators, Masters, Officers and Crew

Summary

A serious fire accident occurred on board a Hong Kong-registered container ship (*the ship*) while navigating in tropical waters. Despite the crew's strenuous efforts to combat the fire, *the ship* was ultimately abandoned due to the fire could not be brought under control. This Note draws the attention of shipowners, ship managers, ship operators, masters, officers and crew to the lessons learnt from this accident.

The Incident

1. While *the ship* was navigating in tropical waters at night, the duty crew on the bridge noticed light smoke emanating from the forward deck and responded promptly. Shortly afterwards, the assigned crew arrived at the scene and discovered flames emitting from the bottom of a deck container stowed on the first tier above hatch no.1. The fire quickly spread to adjacent containers. Although *the ship*'s firefighting team attempted to cool the containers in neighboring bays with fire hoses, the fire could not be brought under control and further spread into the cargo holds. After nearly eight hours of firefighting, the fire approached the accommodation area and the master decided to abandon *the ship*. All personnel on board evacuated to the lifeboat and were rescued by a passing vessel. *The ship* then drifted at sea while the fire continued to burn fiercely toward the stern. The accommodation area above the upper deck was destroyed by the fire, and the fire spread from the upper deck into all cargo holds forward of the accommodation. Due to prolonged smoldering and high temperatures in the holds, the fire persisted for nearly three months, after which the owner declared *the ship* a constructive total loss due to extensive damage sustained.

2. As most of the evidence had been destroyed by the fire, the investigation could only rely on the crew statements and information related to the voyage and the cargoes on board. The probable causes deduced include:

Marine Department
Harbour Building
38 Pier Road
G.P.O. Box 4155
Hong Kong

Telephone No. : (852) 2852 3001
Fax No. : (852) 2544 9241
E-mail : hkmpd@mardep.gov.hk
Web site : https://www.mardep.gov.hk

(i) the fire most likely involved the exothermic decomposition of Sodium Carbonate Peroxyhydrate (*the cargo*), which released oxygen and heat, intensifying combustion of packaging materials and adjacent cargoes;

(ii) since the ambient air temperature was insufficient to trigger the decomposition of *the cargo*, the fire might have been triggered by one of the following mechanisms:

(a) contamination/moisture of *the cargo*, i.e. ingress of moisture or impurities into the container and triggered chemical reaction; or

(b) external heat source, i.e. thermal runaway of Lithium-ion batteries stowed in the sun-exposed upper-tier container, which transmitted heat or molten debris to *the cargo* in the lower tier.

(iii) the stowage of thermosensitive Lithium-ion batteries under direct sunlight in tropical zones increased the risk of thermal runaway, while the dense stowage of dangerous goods (oxidizers) together with combustible cargo accelerated the rapid spread of fire.

Lessons Learnt

3. In order to prevent the recurrence of similar accidents in the future, ship management companies, all masters, officers and crew should note the following items (a) to (c):

(a) enhance the fire safety awareness of the crew during the carriage of dangerous goods in tropical regions, particularly involving cargoes classified as Class 5 under the International Maritime Dangerous Goods Code;

(b) ensure that the watertightness of containers carrying Sodium Carbonate Peroxyhydrate (UN 3378) is properly inspected to prevent moisture ingress, and ensure that containers with thermosensitive cargoes (including Lithium-ion batteries) are stowed in proper positions to avoid direct sunlight exposure (e.g. in well-ventilated shaded tiers) when transiting tropical zones; and

(c) review relevant shipboard emergency procedures to ensure the crew can timely apply water directly when combating fire involving dangerous goods UN 3378. However, it should be noted that prior to effective cooling, application of water may accelerate decomposition due to chemical reaction.

4. The attention of shipowners, ship managers, ship operators, masters, officers and crew is drawn to the lessons learnt above.

Marine Department
Multi-lateral Policy Division

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