Research on The Safe Return of Ships Based on Typical Accident Sampling Method Based on Risk Probability
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ABSTRACT
At present, the cruise ship design technology introduced from abroad in China does not include the real ship verification technology for the safety return system function, and the safety return system function method and verification means vary depending on the ship owner, classification society requirements, and the conditions of the shipyard where it is built. In this paper, based on the target ship design and safe return requirements, all the premises that meet the accident threshold definition of SOLAS Convention will be used as the samples for potential sampling analysis, and the risk probability sampling principle will be used to analyze each premises on the ship, and the premises with the highest risk will be selected to simplify the inspection process of safe return.

KEY WORDS: Safe return to port; probability—sampling; Delphi Method; grayscale evaluation method.

INTRODUCTION
In recent years, "passenger ship safety" has been a hot issue in the shipping industry. 100 years after the catastrophe of the "Titanic" cruise ship, on January 13, 2012, the tragedy of the luxury cruise ship "Costa Concordia" was re-enacted, and the luxury cruise ship "Costa Concordia", an Italian cruise company with 4,229 passengers and crew, capsized off the island of Giglio, Italy, and 32 people were killed; A fire on the passenger ship Scandinavian Star in 1988 killed 158 people; The sinking of the passenger ship Estonia in 1994, killing more than 850 people, was the same as the 1987 shipwreck of the Free Enterprise Herald, which was caused by the accumulation of water on the deck that caused the ship's stability to deteriorate and caused the ship to capsize; In 2006, the passenger ship Star Princess suffered a fire accident. The fire first broke out on the exterior balcony and then spread to the deck. (Xia, 2019)
Passenger ships built around the world, especially luxury cruise ships, are growing in size and carrying more passengers. When passenger ships are shipwrecked, they often cause tragic loss of life and property due to the limited rescue capacity at sea. The International Maritime Organization is increasingly concerned about the safety performance of passenger ships and has put forward an idea: it is hoped that these passenger ships can be used as their own "lifeboats" in the event of a shipwreck. After some period of discussion, in August 2006, the Maritime Safety Committee (MSC) adopted resolution MSC.216(82), (Qiu and Chen, 2017) which amends the SOLAS Convention on system performance and operational data following passenger ship flooding accidents and adds a new requirement for "safe return". In June 2010, MSC also provided a specific explanation of the system capability assessment after a fire or flooding incident in passenger ships through circular MSC.1/Circ.1369, of which Article 7 clearly states that the required assessment of ship system capability should be carried out in a manner that submits the design balance to be followed to achieve ship system capability and outlines the entire process of the assessment, including test methods and test facilities provided.
In this paper, the typical accident sampling method based on the principle of risk probability sampling is studied on the H1508 luxury cruise ship produced by Shanghai Waigaoqiao Shipbuilding Co., Ltd. as the target ship.

INTRODUCTION TO THE PRINCIPLE OF RISK PROBABILITY SAMPLING
The principle of risk probability sampling is based on the research results of actual risks at sea, the probability of accidents obtained by relevant risk assessment methods, the sampling test samples guiding the aforementioned principles, and then combined with the sampling principle based on loss evaluation, the final sample is screened according to the risk calculation formula: risk = risk probability × loss. Research and formulate a sampling principle based on a certain probability of fire or flooding accident as the risk probability, the current existing theoretical methods can not carry out a completely objective and data-based theoretical calculation method for ships and even cruise ships, and have to rely on the experience of relevant personnel. Therefore, in view of the above research part of the typical accident sampling method based on risk probability, the theoretical method and Delphi method are analyzed.