ABSTRACT

An analysis methodology is proposed according to the guidelines for Formal Safety Assessment approved by IMO. Variation Tree Analysis, Database Analysis and Event Tree Analysis are applied to the marine casualty data on collision accidents involving fishing vessels and cargo vessels. Trial calculations of probabilities are attempted with the ship traffic survey to proceed with risk assessment and cost benefit analysis. The results of analyses and calculations indicate that the proposed analysis methodology is effective to safety assessment focused on human factors.

KEY WORDS: Human factor; Variation Tree Analysis (VTA); Database Analysis; Event Tree Analysis (ETA); collision accidents; safety assessment; reliability.

INTRODUCTION

Most marine accidents related to vessels are caused by human errors, such as mis-perception, mis-judgment and mis-operation in functional systems contributing to safety navigation onboard vessels. In recent years, collision accidents involving fishing vessels and cargo vessels have broken out in seas close to Japan, and have been reported widely in the media. The collision accident between a fishing vessel and a state-of-the-art Aegis destroyer broke out in February 2008, was reported sensationally in the media and gained the attention of the public.

Fig. 1(a) shows number of collision accidents happened from 2001 to 2008 by type of vessel released by Marine Accident Inquiry Agency. This figure indicates that collision accidents involving fishing vessels break out most frequently, and the second most frequent collision accidents were related to cargo vessels. It’s reported that the collision accidents break out most frequently among all of marine casualties, such as grounding, capsize, flooding, fire and so on. Fig. 1(b) shows loss of life due to marine casualties at sea by type of vessel. Loss of life is the highest with fishing vessels and it is clear that their damages suffering from marine casualties are extensive.

Fig. 1 Statistics data of collision accidents at sea in Japan