Meteorological Risk Assessment for Ships with Fuzzy Logic Designer

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Abstract : Fuzzy Logic, an advanced method to support decision-making, is used by various scientists in many disciplines. Fuzzy programming is a product of fuzzy logic, fuzzy rules, and implication. In marine science, fuzzy programming for ships is dramatically increasing together with autonomous ship studies. In this paper, a program to support the decision-making process for ship navigation has been designed. The program is produced in fuzzy logic and rules, by taking the marine accidents and expert opinions into account. After the program was designed, the program was tested by 46 ship accidents reported by the Transportation Safety Investigation Center of Turkey. Wind speed, sea condition, visibility, day/night ratio have been used as input data. They have been converted into a risk factor within the Fuzzy Logic Designer application and fuzzy rules set by marine experts. Finally, the expert's meteorological risk factor for each accident is compared with the program's risk factor, and the error rate was calculated. The main objective of this study is to improve the navigational safety of ships, by using the advance decision support model. According to the study result, fuzzy programming is a robust model that supports safe navigation.

Keywords : calculation of risk factor, fuzzy logic, fuzzy programming for ship, safety navigation of ships
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