

ENHANCEMENT OF EFFECTIVENESS OF PORT STATE CONTROL INSPECTION USING A HYBRID AHP-TOPSIS MODEL

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ABSTRACT

During the end of the last century, marine accidents triggered the maritime community to apply and develop the international regulations for safety and environmental protection. Consequently, Port State Control (PSC) regulations were introduced as a new mechanism to enforce the implementation of such regulations, which aim to exclude the substandard ships from the seaborne fleet and ensure ships safety and reliability in clean seas. However, PSC of a port cannot inspect every ship calling at the port at any time; and a selecting ship for inspection system should be adopted due to time and resource limitations.

Two Multi-Criteria Decision Making (MCDM) approaches were first used to rank the alternatives; these approaches are the Weighted Sum Model (WSM) and the Technique for Order Preference by Similarity to Ideal Solution (TOPSIS). In this endeavor, ships to be inspected represent the alternatives and targeting factors represent the attributes; initial results are in favor of TOPSIS.

To further enhance the effectiveness of the selecting-ships-for-inspection system, the Analytic Hierarchy Process (AHP) was used to weigh the attributes through pairwise comparisons. Thus, a hybrid decision-making methodology that employs AHP and TOPSIS is recourse to. As such, AHP technique can be very useful in involving several decision-makers with multiple different factors to calculate the weight for each factor. On the other hand, TOPSIS technique is employed to rank the alternatives, based on their overall performance. An example is given to illustrate the proposed methodology.

KEYWORDS: *Port State Control (PSC), Weighted Sum Model (WSM), Technique for Order Preference by Similarity to Ideal Solution (TOPSIS), Analytic Hierarchy Process (AHP)*