

# **Effectiveness of port state control inspection using Bayesian network modelling**

## **Abstract**

As a key factor in ship safety, the effectiveness of the Port State Control (PSC) is very important. This study investigates the effect of the PSC inspection on ship accident and its impacts on the ship safety level in the next inspection, together with the ship inherent attributes and the time interval between inspections. The ship safety level is judged by the number of defects found in the PSC inspection and the risk of ship accident in this study. The Bayesian Network (BN) model is employed and the Bayesian Search algorithm is used to learn the structural networks using the data from various data sources. In addition, the safety level of ships at different time is also introduced into the model as latent variables. The results suggest that the safety level in the first inspection has a significant impact on the inspection time interval and the safety level of the next inspection. It is optimal to select vessels with a medium inspection time interval for inspection to improve ship safety quality effectively. This model can not only help to detect and monitor the dynamic changes in the effectiveness of PSC inspection, but also improve the PSC inspection system to provide guidance for stakeholders.