Human Reliability Analysis of Ship Maneuvers in Harbor Areas

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Abstract

During a ship life cycle, one of the most critical phases in terms of safety refers to harbor maneuvers, which take place in restricted and congested waters, leading to higher collision and grounding risks in comparison to open sea navigation. In this scenario, a single accident may stop the harbor's traffic as well as incur in patrimonial damage, environmental pollution, human casualties, and reputation losses. In order to support the vessel's captain during the maneuver, local experienced maritime pilots stay on board coordinating the ship navigation while in restricted waters. Aiming to assess the main factors contributing to human errors in pilot-assisted harbor ship maneuvers, this work proposes a Bayesian network model for human reliability analysis (HRA), supported by a prospective human performance model for quantification. The novelty of this work resides into two aspects: (a) incorporation of harbor specific conditions for maritime navigation HRA, including the performance of ship's crew and maritime pilots and (b) the use of a prospective human performance model as an alternative to expert's opinion for quantification purposes. To illustrate the usage of the proposed methodology, this paper presents an analysis of the route keeping task along waterways, starting from the quantification of human error probabilities (HEP) and including the ranking of the main performance shaping factors that contribute to the HEP.

Palabras clave

Palabras clave de autor:human reliability analysis; Bayesian networks; TECHR; risk analysis; maritime pilotage
KeyWords Plus:SIMULATOR DATA; COLLISION; PERFORMANCE; NETWORKS

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