IMO INF PAPER SUMMARY - The SAFEGUARD Validation Data-Set and Recommendations to IMO to Update MSC/Circ. 1238

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Two evacuation model validation data-sets collected as part of the EU FP7 project SAFEGUARD are presented. In addition, a validation protocol and acceptance criteria are developed based on the collected data. It is proposed that the validation data-sets, suggested validation protocol and the acceptance criteria could be adopted by IMO as part of a validation suite to determine acceptability of maritime evacuation models in a future enhancement to IMO MSC.1/Circ. 1238. Here we present a summary of the findings and recommendations from project SAFEGUARD relating to the SAFEGUARD Validation Data Sets (SGVDS) proposed for adoption in a modified version of IMO MSC.1/Circ. 1238. A full paper describing this work will be presented at the "SAFEGUARD Passenger Evacuation Seminar" hosted by RINA on 30 November 2012. The full paper will be available shortly after the seminar on the SAFEGUARD website at http://www.safeguardproject.info/downloads/.

The data-sets are based on two semi-unannounced assemblies at sea for a RO-PAX ferry with 1349 passengers and a Cruise ship with 2292 passengers. The trials took place at an unspecified time, however passengers were aware that on their voyage an assembly exercise would take place. The data-sets consist of passenger: response time data, starting location, end location (assembly station) and arrival time at the designated assembly stations. The response time data was collected using digital video cameras while the other data was collected using a novel data acquisition system consisting of ship-mounted beacons, each emitting unique Infra-Red (IR) signals and IR data logging tags worn by each passenger. The collected data is used to define two unique validation data-sets for ship evacuation models. The data-sets are considered unique for a number of reasons, primarily because unlike most validation data-sets, they contain information defining; occupant response times, starting locations, end locations and final arrival times. Furthermore, the trials were conducted on real ships, at sea and were semi-unannounced making the results relevant, credible and realistic.

A validation protocol and acceptance criteria are proposed based on the collected data. The acceptance criteria are objective and are determined by a metric consisting of three measures, the Euclidean Relative Difference, Euclidean Projection Coefficient and Secant Cosine. Collectively the metric measures the magnitude of the distance between the predicted and experimental data and the similarity of the shapes of the predicted and experimental arrival time curves. As a whole, the metric assesses the goodness of fit between the predicted model data and the measured data. The proposed acceptance criteria take into consideration uncertainties associated with the measured data.

In blind applications of the validation protocol using the ship evacuation simulation software maritimeEXODUS, EVI and ODIGO, each software tool was found to satisfy the acceptance criteria for each of SAFEGUARD Validation Data Sets SGVDS1 and SGVDS2, suggesting that they are capable of predicting the outcome of the assembly process for the vessels to a given level of accuracy.

It is proposed that the suggested validation protocol and the acceptance criteria should be adopted by the IMO as part of a validation suite to determine acceptability of maritime evacuation models in a future enhancement to IMO MSC.1/Circ. 1238.

SAFEGUARD

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