**Thesis Abstract cohort 2012-2014**
**The International Master of Science in Fire Safety Engineering**

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**Modeling the Effect of the Use of Fiber Reinforced Plastics on the Evacuation of a Ro-Pax Passenger Deck**

Modern ship design and construction is striving to make sea transportation more fuel efficient and more environmentally friendly. One of the possible solutions is to make the ships lighter by reducing the weight of the superstructure, constructing it completely or partially with lightweight materials such as Fiber Reinforced Plastics (FRP), like glass fiber composites or carbon fiber composites. However, the use of these materials would have an impact on the acceptance criteria for safe evacuation in case of fire, mainly due to the differences on the thermal, chemical and physical properties that have a direct effect on the smoke production and fire development. The evacuation module of FDS is used to couple the fire development with its influence on the evacuation process in 12 fire scenarios, including four design fires and three material set-ups. The unprotected FRP set-up proved to be the most critical one, hence passive fire protection must be provided. Performance-based design can be applied for ship evacuation, however, with close support of literature and prescriptive IMO codes. Implementing FDS EVAC simplifies the coupling of fire development with the evacuation process, allowing the user to model this interaction in an easier way.