Appendix 1

Additional slides describing & some parts of the work carried out and results produced in

WP 4, 5, 6 and WP7

of project FLOODSTAND (218532)

experiment

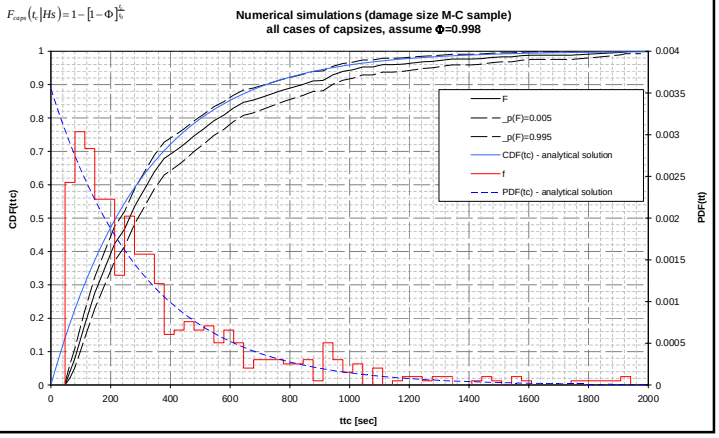
Time to capsize

$$F_{cap}(t|Hs) = 1 - \left[1 - \Phi\left(\frac{Hs - (H_{crit} - \varepsilon)}{0.061 \cdot (H_{crit} + \varepsilon)}\right)\right]^{\frac{t}{t_0}}$$

$$H_{crit} = 4 \cdot \left(\frac{GZ_{max}}{0.25} \cdot \frac{Range}{25}\right)$$

$t_0 = 30\,\text{min}$

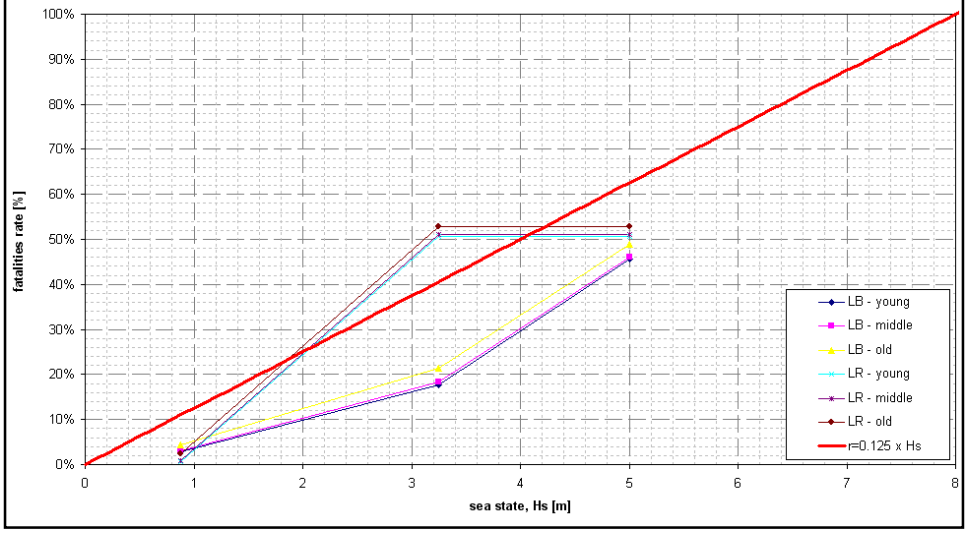
$\varepsilon = 10^{-12}$



Abandonment and Rescue

$$\mu_a = 0.125 \cdot Hs \cdot N_{\max}$$

16 hours exposure



Decision standard – based on risk

$$E(N) = \sum_i i \cdot p_{N|cap}(i) + \sum_i i \cdot \left(1 - p_{N|cap}(i)\right) \cdot p_{N|resc}(i)$$

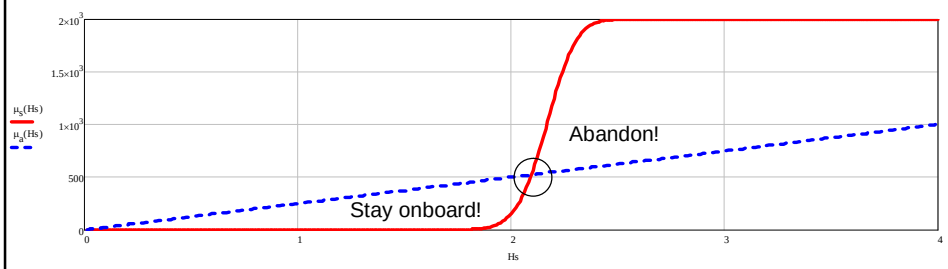
$$\mu_s = \sum_i i \cdot p_{N|cap}(i) = F_{cap} \cdot N_{\max}$$ stay onboard

$$\mu_a = \sum_i i \cdot \left(1 - p_{N|cap}(i)\right) \cdot p_{N|resc}(i) = 0.125 \cdot Hs \cdot N_{\max}$$ abandon

Decision standard

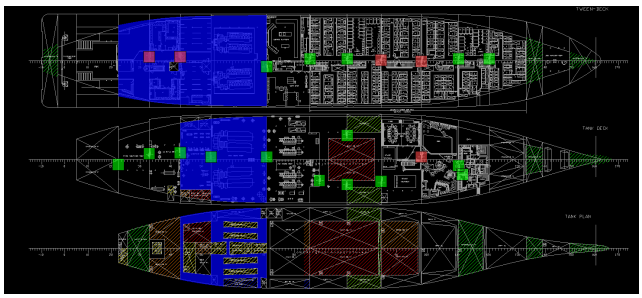
Abandon if:

$$1 - \left[1 - \Phi\left(\frac{Hs - \left(H_{crit} - \varepsilon\right)}{0.061 \cdot \left(H_{crit} + \varepsilon\right)}\right)\right]^{\frac{t}{t_0}} > 0.125 \cdot Hs$$



Uncertainty

- Accurate assessment of extent of flooding is critical!!!
- Mustering should commence always immediately.
- Decision “stay onboard” ONLY if the extent of flooding is known exactly (and the standard permits), otherwise abandon.

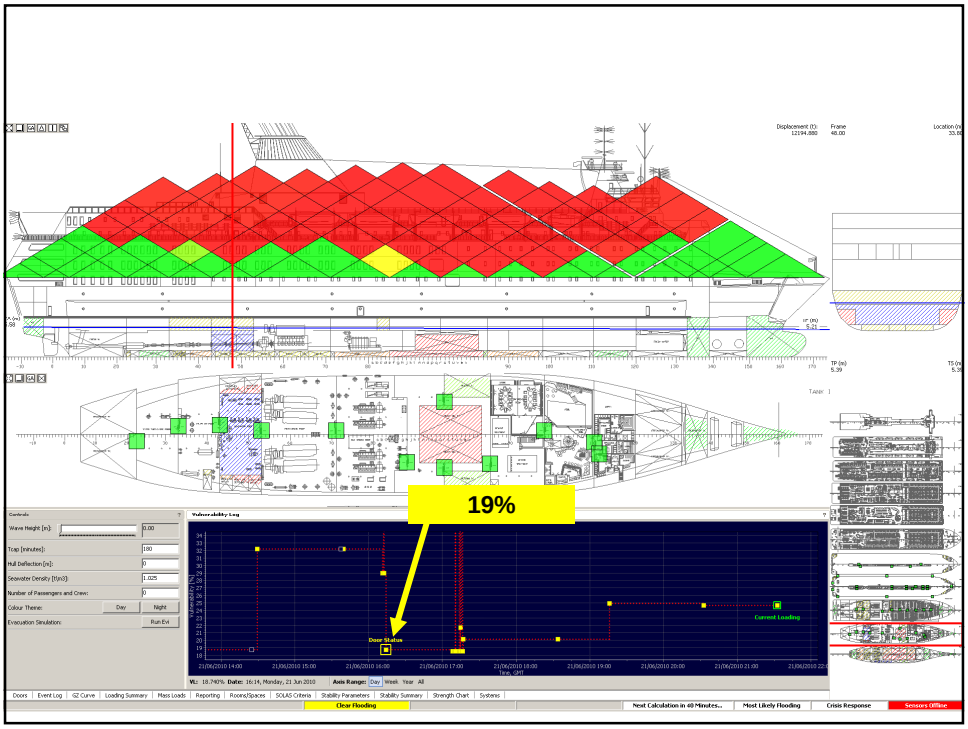


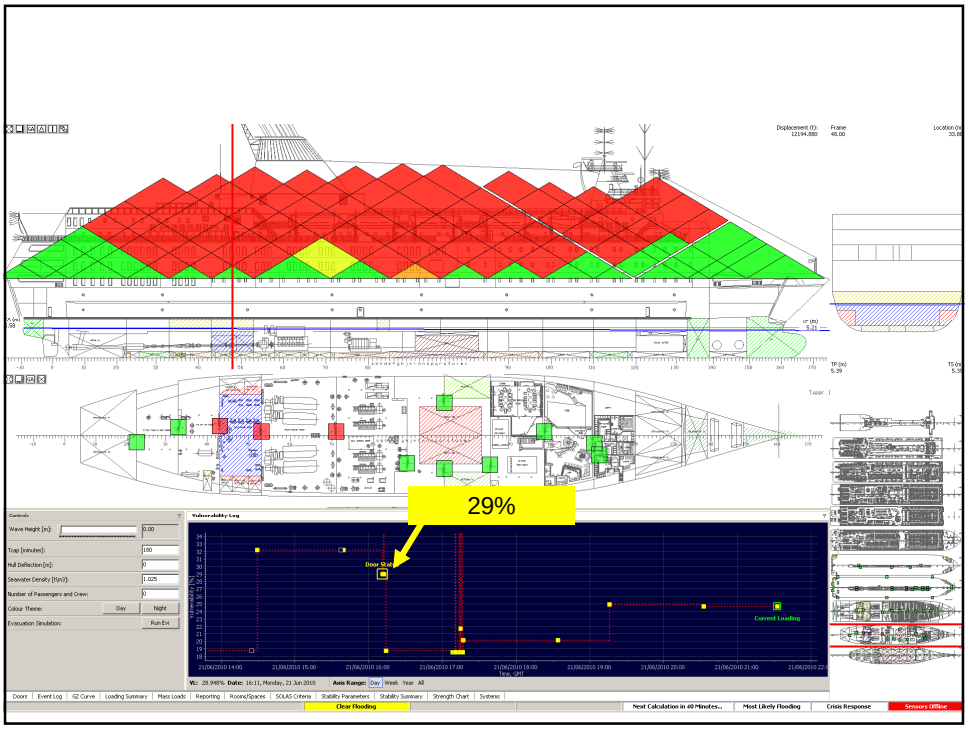
SOLAS Regulation II-1/22.4

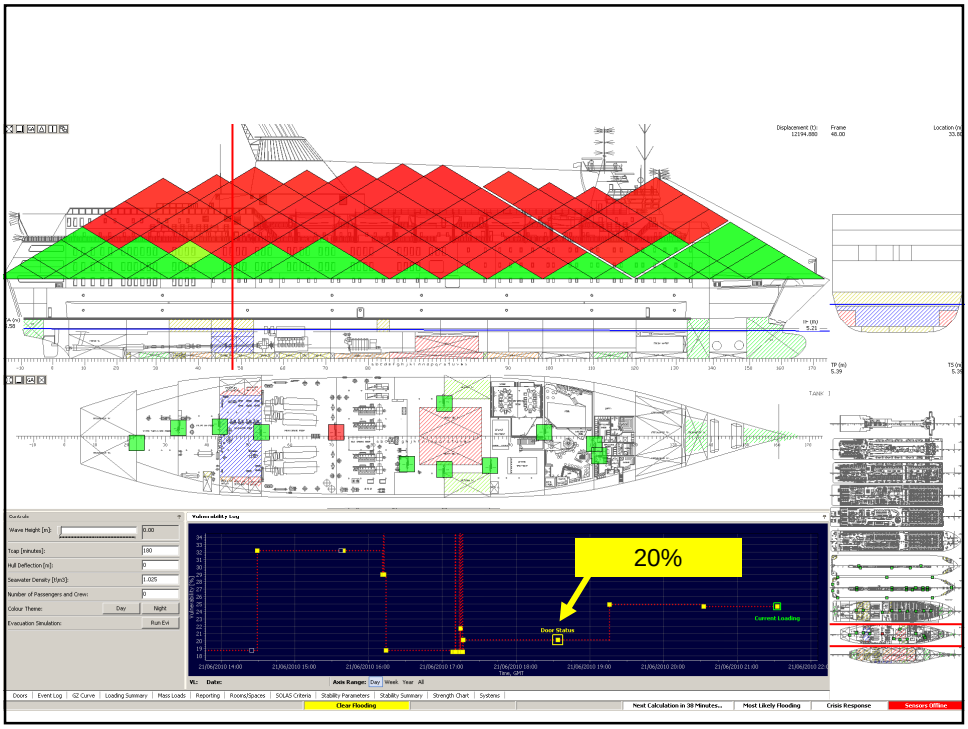
“Certain watertight doors **may be permitted to remain open** during navigation only **if considered absolutely necessary**; that is, being open is determined essential to the safe and effective operation of the ship's machinery or to permit passengers normally unrestricted access throughout the passenger area. Such determination shall be made by the Administration only **after careful consideration** of the impact on ship operations and **survivability**. A watertight door permitted to remain thus open shall be clearly indicated in the ship's stability information and shall always **be ready to be immediately closed**.”

Door exemptions and preparedness

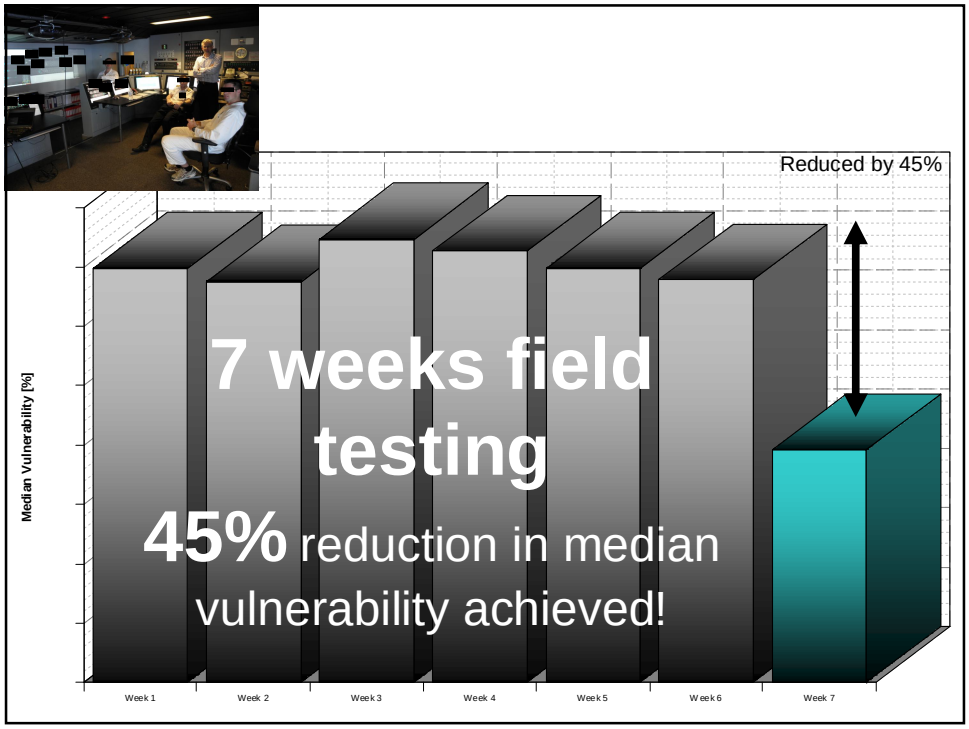
$$F_T\left(t_c \middle| Hs\right) = \sum_j p_j \cdot F_{T|*}\left(t_c \middle| Hs, j\right)$$


19%
Door Status
Current Loading


29%
Door Status
Current Loading



WP 7



Vulnerabilities can be identified at the **design stage**