

Safe Return to Port - “Zero – Vision” for passenger ships?

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- Safe Return to Port
- FSA – RoPax Ships
- Safe Ship Research Strategy



Safe Return to Port - Principle

- **Casualty < threshold**
 - The ship is capable to *return to port under its own power*
 - A *safe area* is provided to passengers and crew members
 - *Essential systems* for the safe return to port and the safe area are operational
- **Casualty > threshold**
 - The ship is evacuated / abandoned
 - Systems for evacuation and abandonment are operational during 3 hours (fire only)

Safe Return to Port - Principle

- **Safe Area**
- Any area, not flooded and outside fire zones, which can safely accommodate all persons onboard
- **Safety Centre**
- Is a control station for the management of emergency situations
- Safety systems operation, control and monitoring

”Safe return to port”

Requirements

- At least 3 hours before capsizing
- Redundant engine room
- Safety center onboard
- Safe areas onboard

Pre-Accident-Survivability-Evacuation / SAR



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Pequot pegó en el lado de



Safe return to port – RoPax ships F-N Curve (Historical Risk)

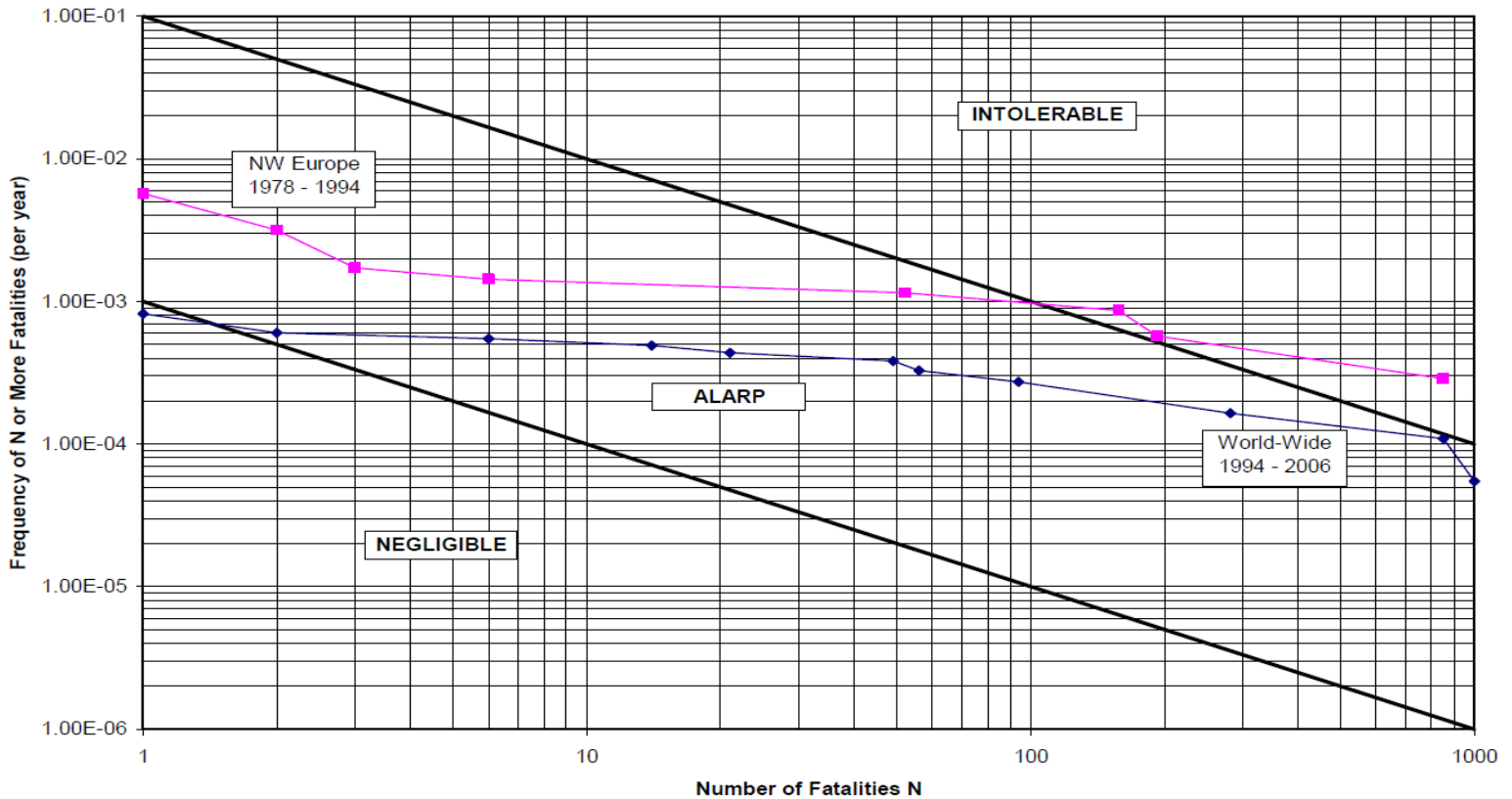


Figure 2: RoPax F-N Curve (Historical Risk)

Safe return to port - RoPax ships F-N Curve (FSA - Risk Model)

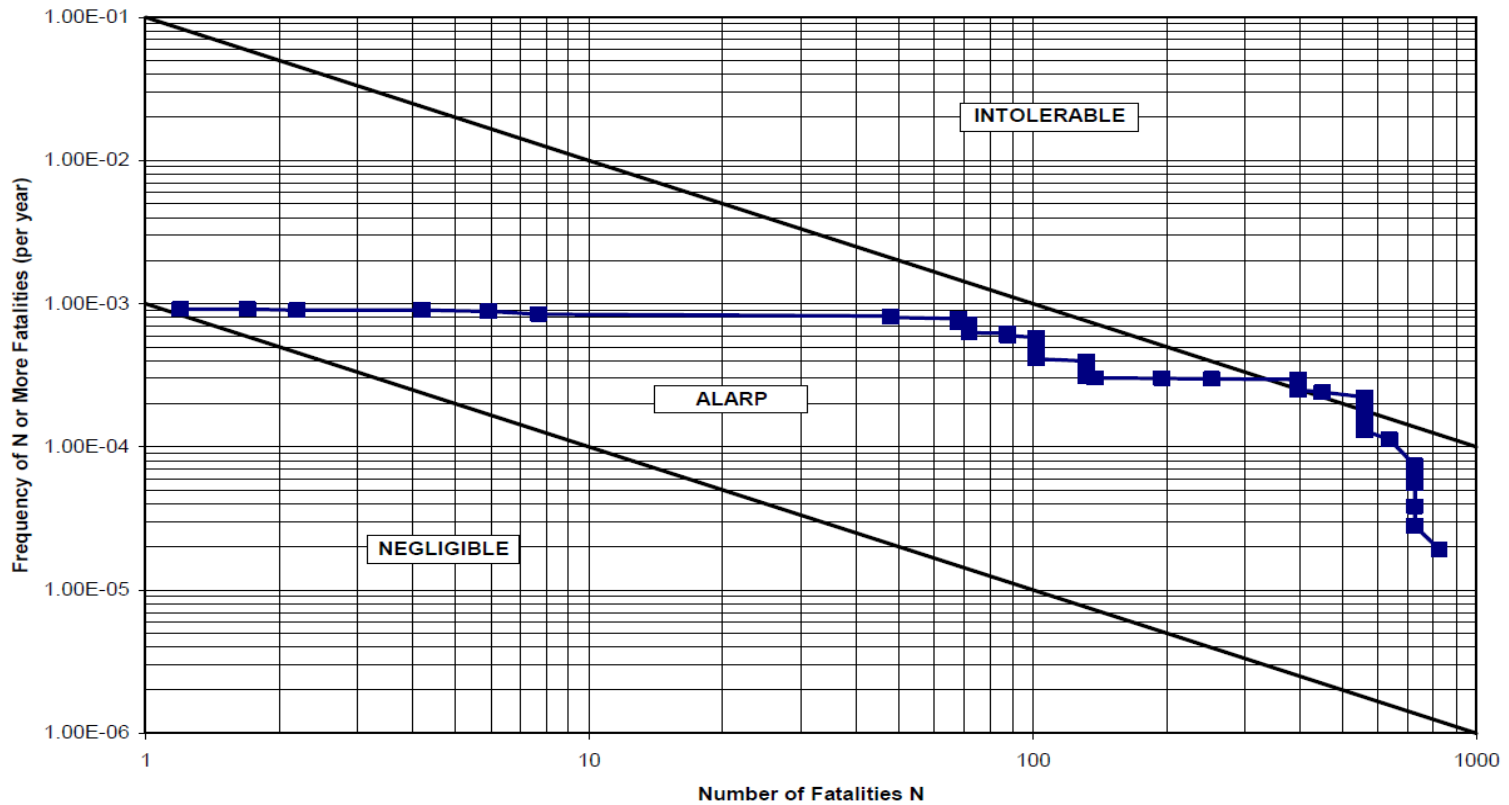


Figure 8: RoPax F-N Curve (Risk Model)

Safe return to port RoPax ships
FSA - Risk Control Options (RCO)

- **1: Upright and afloat**
Required index A 0.95
Reduced risk 62%
- **2: Better/safer navigation**
Reduced risk 29%
- **3: Better/safer abandonment and SAR**
Maximum risk reduction 100%
Reduced risk 22%
- **4: Improved fire protection in machinery spaces**
Reduced risk 15%

Safe return to port - RoPax ships Societal risk with RCOs 1-4 90% risk reduction

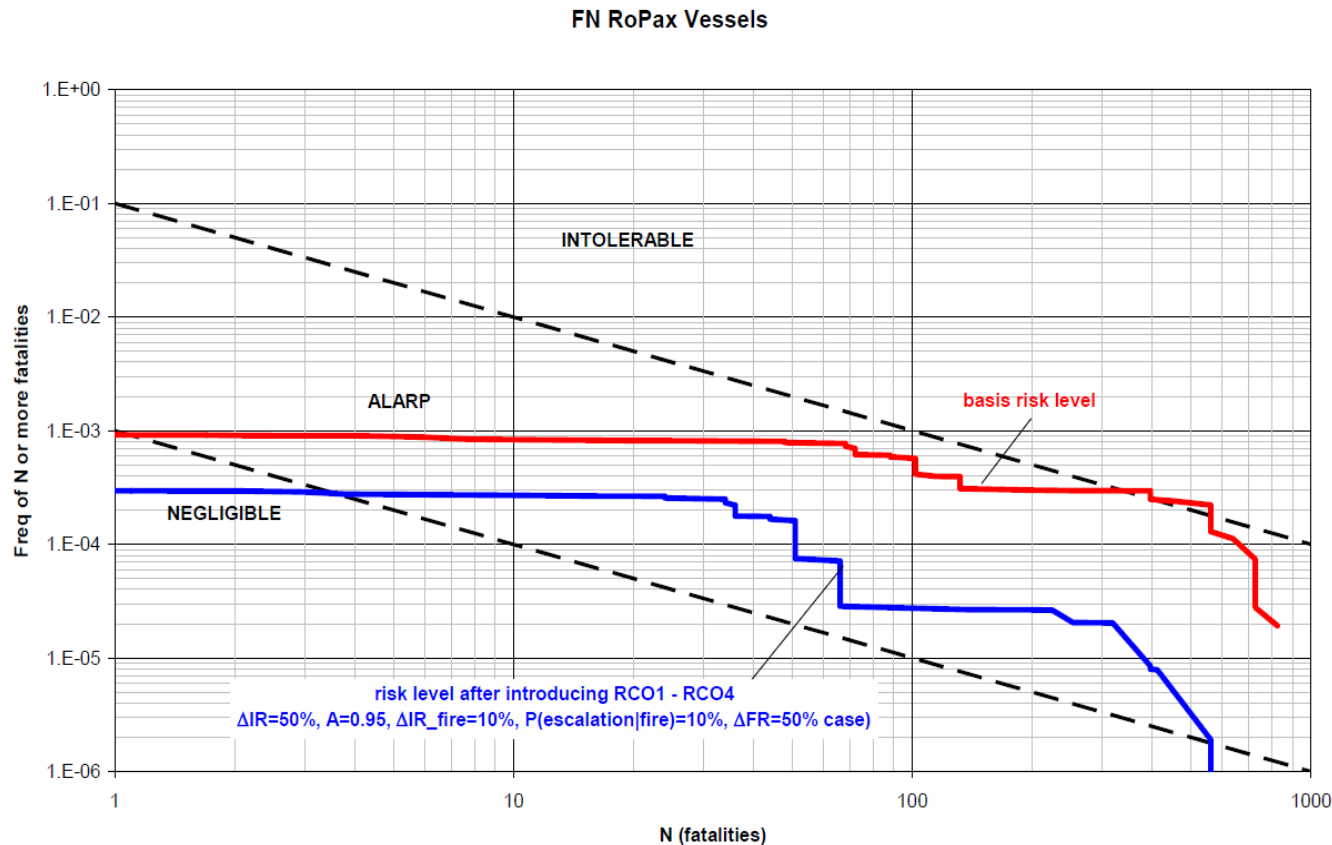


Figure 8: Societal risk level after the introduction of RCOs 1-4

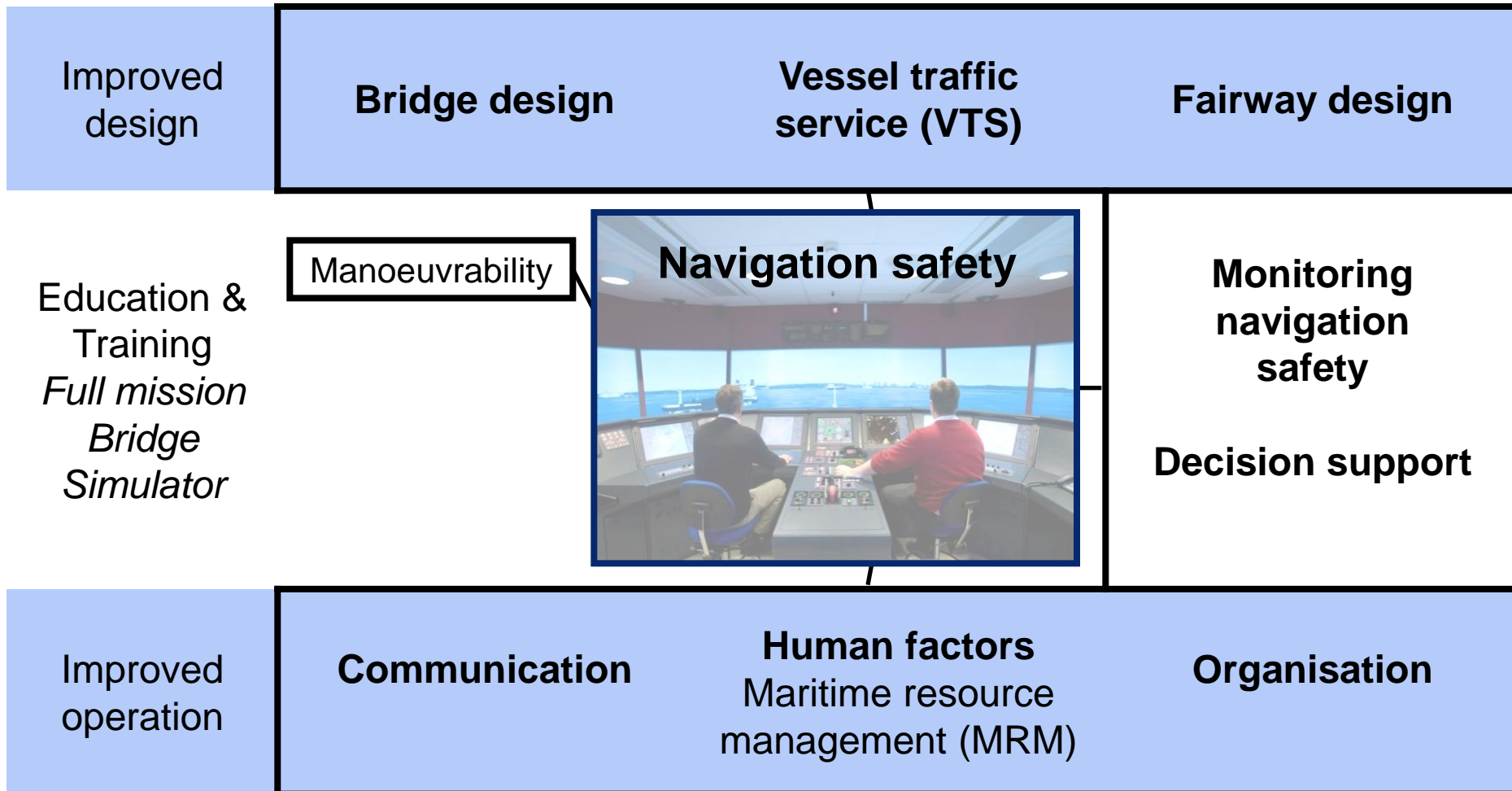
Pre-Accident-Survivability-Evacuation / SAR



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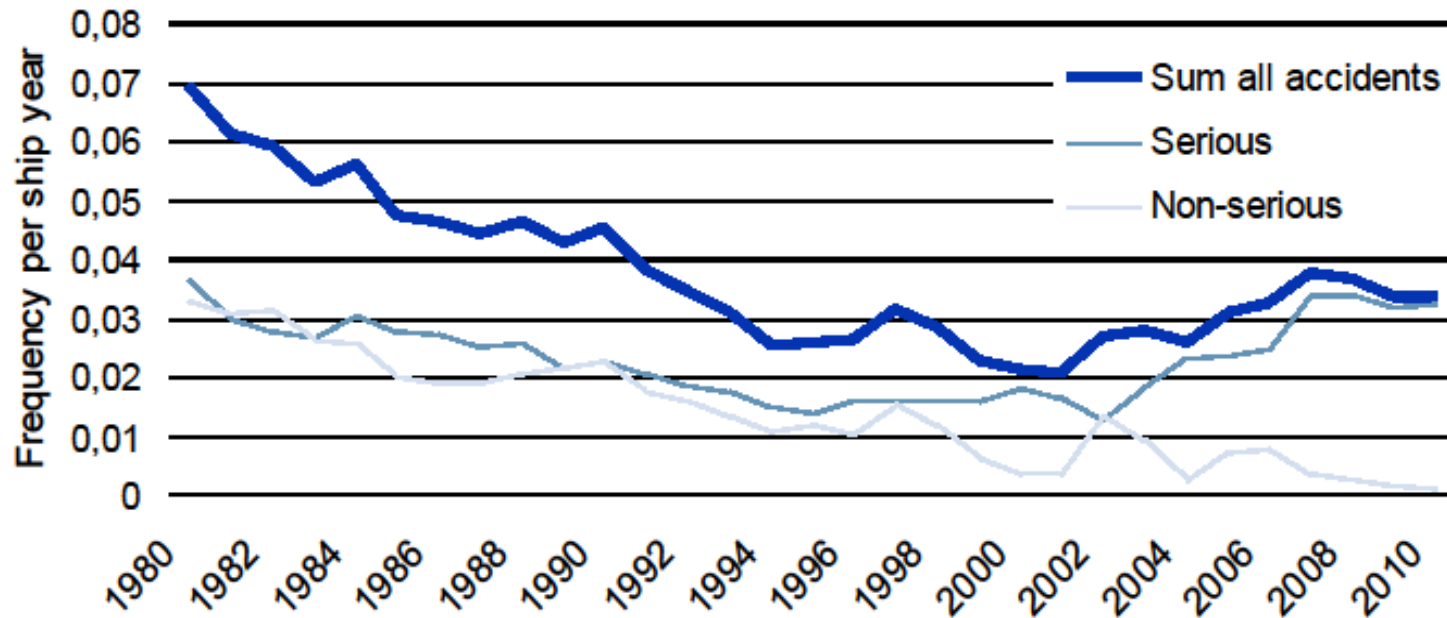


Measures related to improved
Pre accident / Navigation safety



Registered accident frequency

Accident frequencies
(all accident types and severity categories)

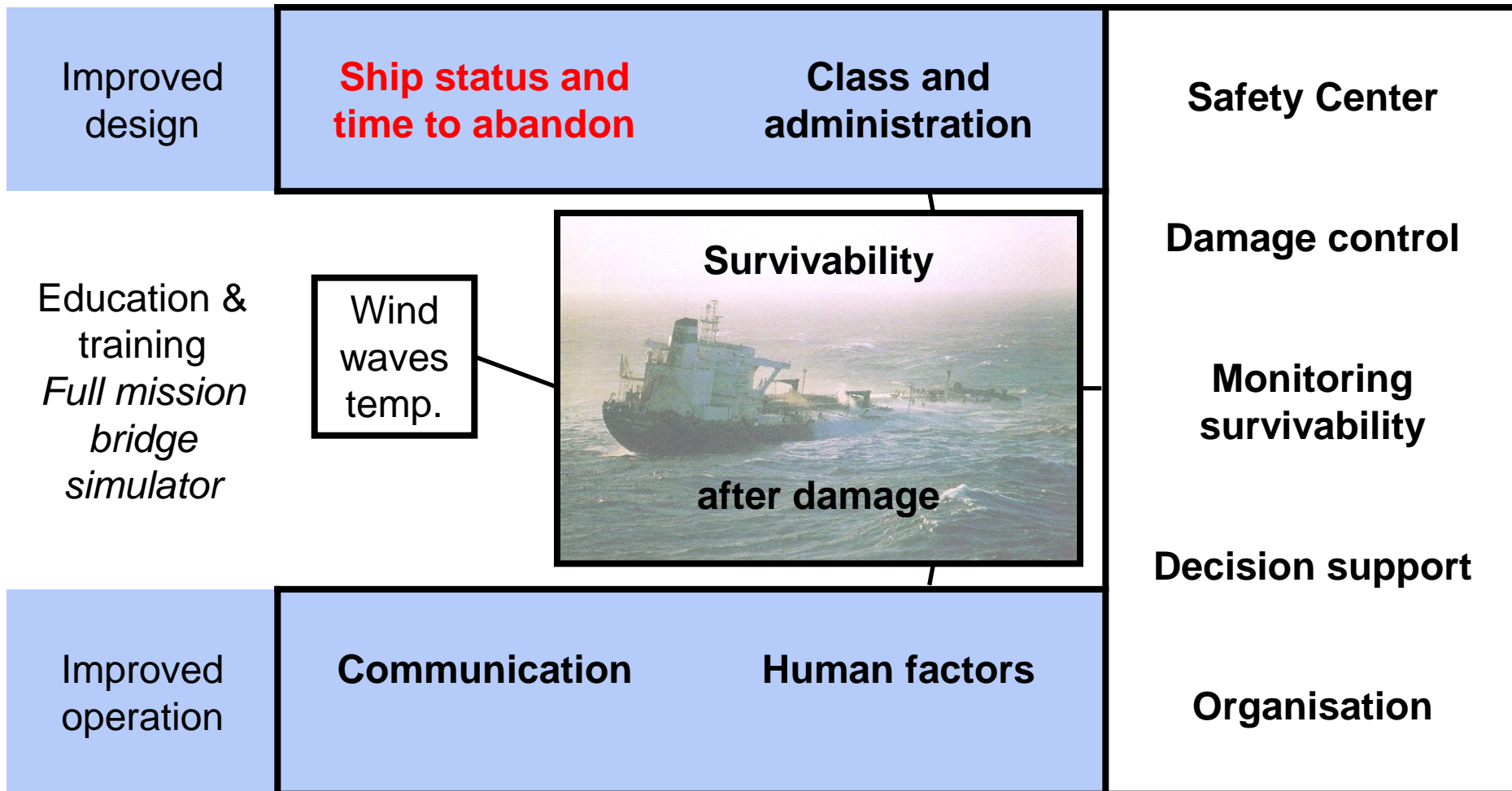


(Seagoing tankers, bulk carriers, dry cargo and passenger vessels (A) 500 GT and above)

Team Training in Bridge/VTS -Simulator



Measures related to improved Survivability after damage

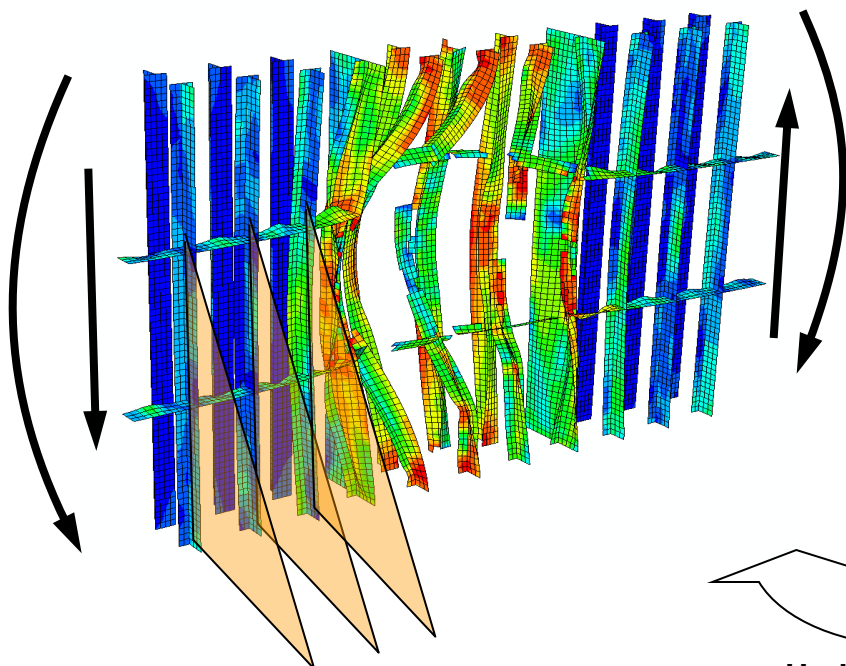


**HASARD/
MARINE STRUCTURES**

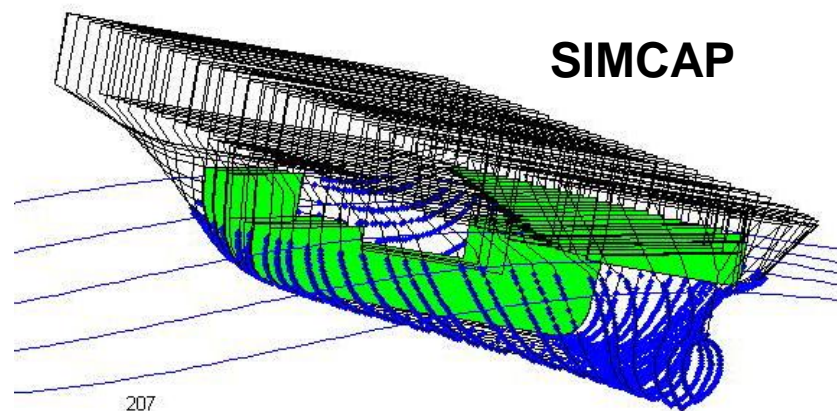
Damage patterns on
the hull for various
collision scenarios

**HASARD/
SEAKEEPING**

Global loads



Local loads



Updated ship stability
conditions and loads
acting on the structure

Risk analysis



CHALMERS



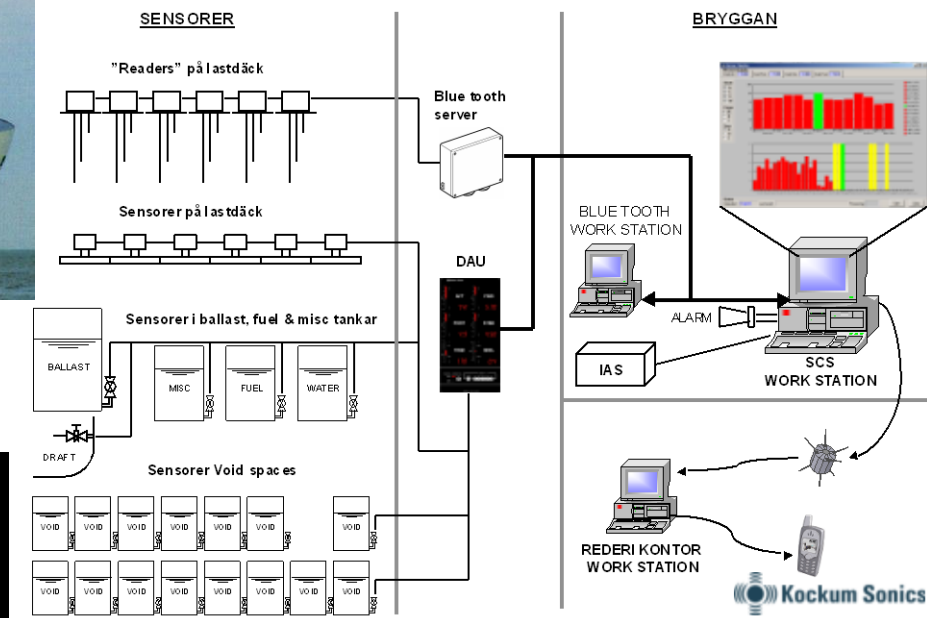
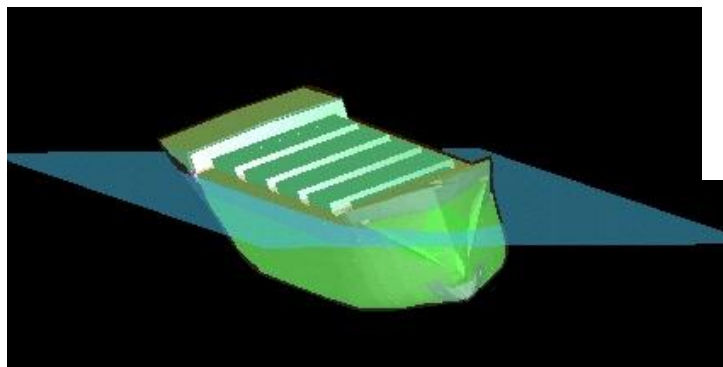
GLOBTECH MARINE AB



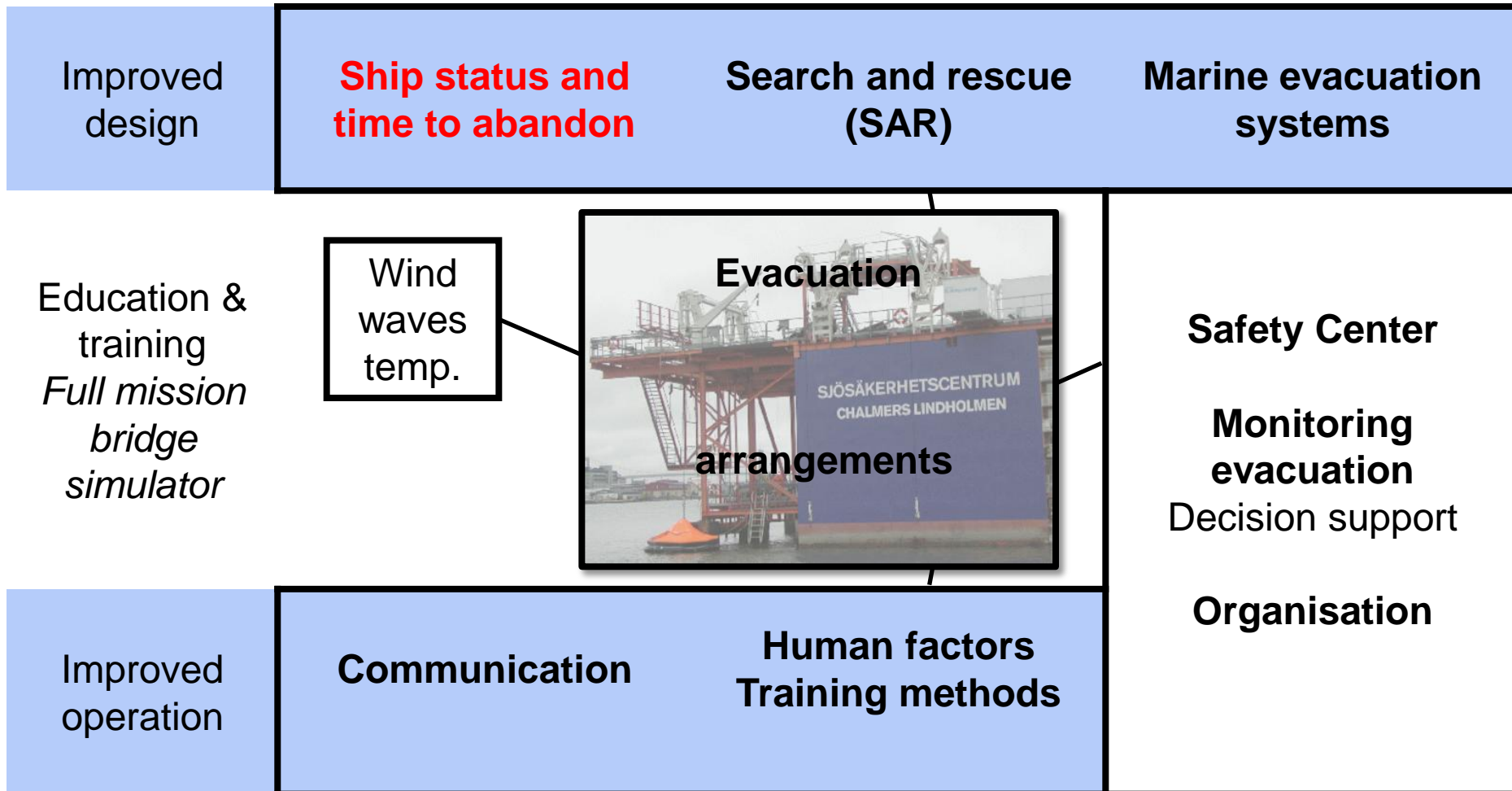
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SCS today



Measures related to improved Evacuation and SAR



Evacuation and SAR



Evacuation and Human Performance

PhD. Monica Lundh



m/s Silja Symphony



m/s Stena Carisma

Ship Operation and Safety



Conclusions

Zero vision may be the added result of **cooperation**

- between organisations
- Between work in different disciplines
- between practical and theoretical work
- between research and development