Risk-based Ship Design, Approval and Operation

Ninth Bieleschweig Workshop, Hamburg, May 14-15 2007

SAFEDOR facts

Motivation and expected benefits

SAFEDOR Vision and roadmap

Challenges and expectations

Outlook

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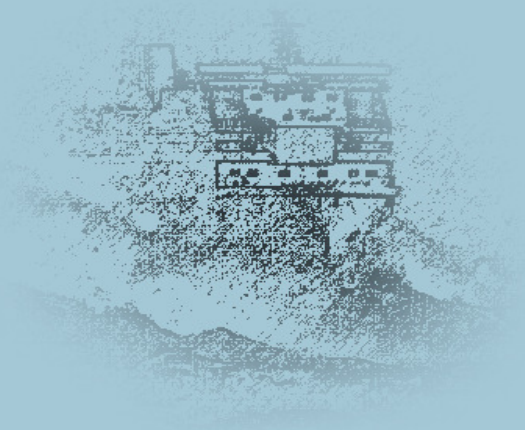


SAFEDOR facts

SAFEDOR is an integrated project in the 6th framework programme of the European Commission (CEC).

- **Project start: Feb. 2005, duration: 4 years**
- **Project volume: €20m, of which €12m funding by CEC**
- **Participants: 53 organisations representing all stakeholders of the maritime industry**
- **Coordinator: Germanischer Lloyd**


Fischland

What is risk-based ship design and approval?

A new methodology integrating probabilistic / risk-based approaches in the design process for ships and ship systems

Safety is one additional design objective along traditional objectives such as speed and cargo capacity

Risk is used as measure to evaluate effectiveness of design changes with respect to safety

Risk-based approval is the process of approving risk-based designed ships and their intended operation

Motivations to use risk-based approaches

Implement a new and safe solution which cannot be approved today

- **example: alternative design and arrangements for fire safety**

Optimise an existing solution which is in range of being approved today

- **example: probabilistic damage stability**

Both ideas need

- **a new design approach that includes safety as objective**
- **a modern regulatory framework**

Expected benefits

Owners and operators benefit from improved economics of novel solutions

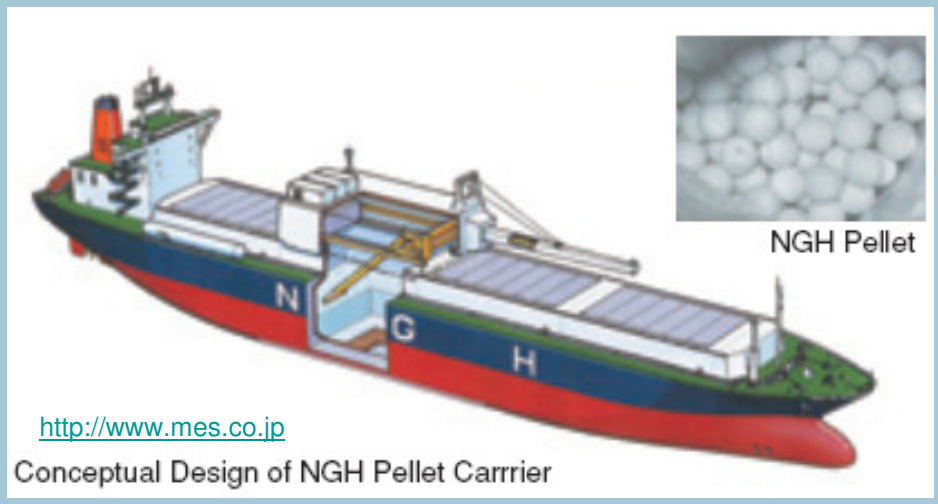
- **example: more cabins with balcony on a cruise ship with larger than prescribed lifeboats**

Yards and equipment manufacturers benefit from sustained competitive position

- **example: offer innovative layouts for cruise ship super structures**
- **example: offer new ship systems with increased safety performance**
- **example: reduce production costs with new fire insulation layout**

With proof of safety compliance becoming more complex, patenting new solutions becomes more attractive.


Chantiers de l'Atlantique



http://www.mes.co.jp

Conceptual Design of NGH Pellet Carrrier

The vision of SAFEDOR

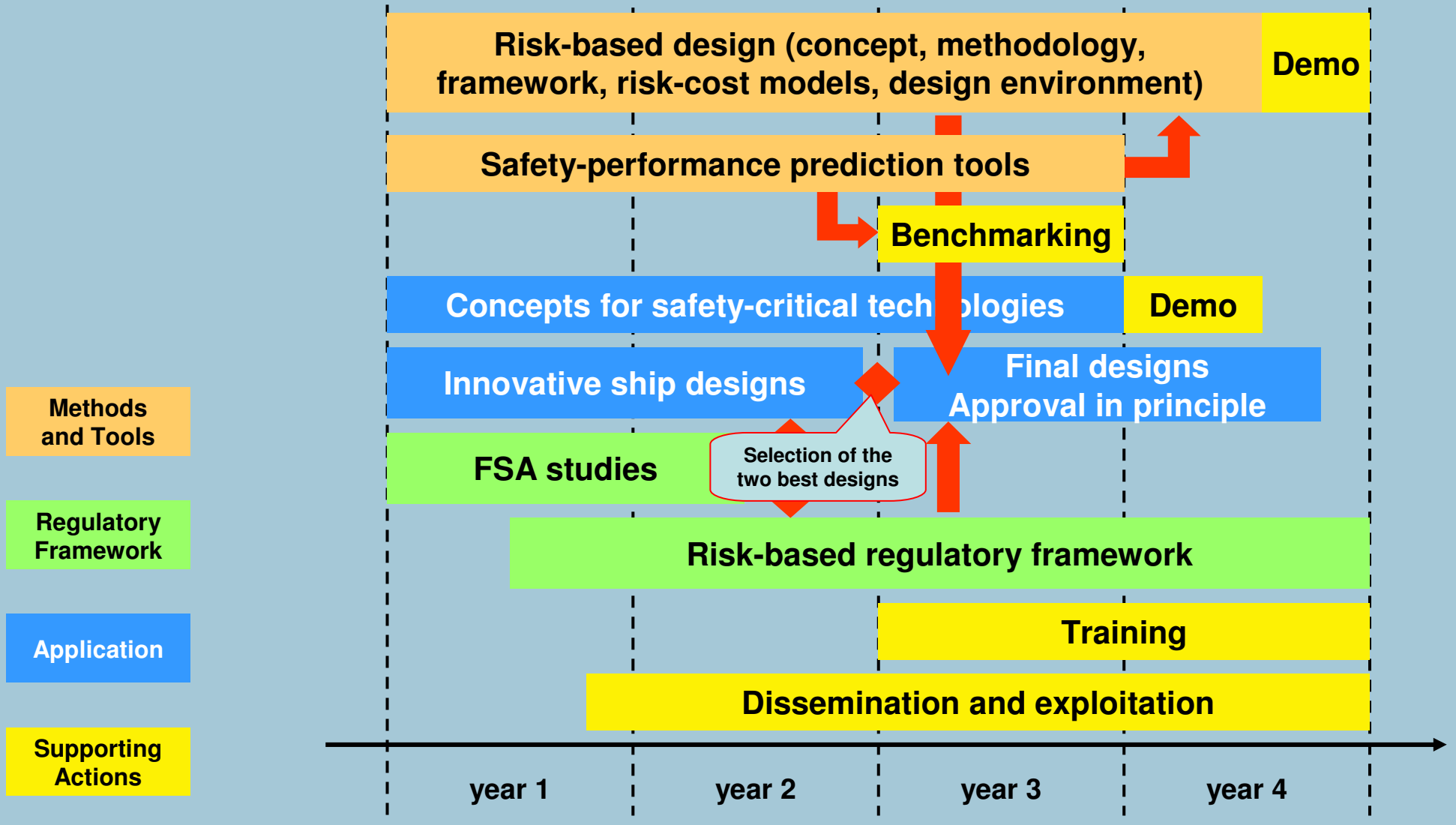
ENHANCE SAFETY THROUGH INNOVATION

TO STRENGTHEN THE COMPETITIVENESS

OF THE EUROPEAN MARITIME INDUSTRY

SAFEDOR partners

The SAFEDOR-roadmap



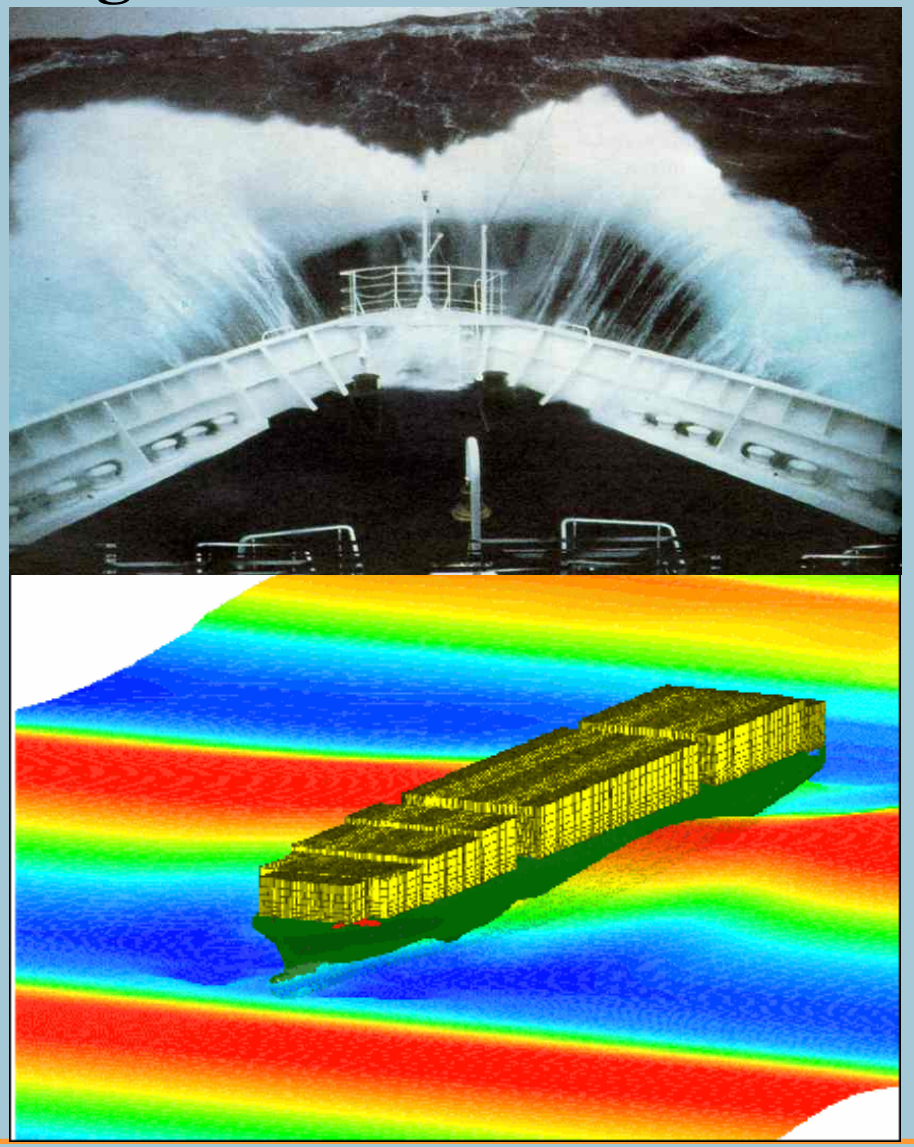
Challenges and for risk-based design

Availability of advanced simulation software and experimental tools to predict ship and system performance at sea in extreme and accidental conditions

Determination of involved uncertainty through tool validation and benchmarking

Harmonisation of risk models to ensure consistent application

Parametric modelling of ships and integration of tools to fully exploit optimisation potentials



Challenges for risk-based approval

Formal establishment of risk-based regulatory framework at IMO linked to Goal-based Standards and the Safety-Level Approach

Uniform interpretation of modern regulations to ensure consistent application to increase ship safety

Agreed top-level risk acceptance criteria at IMO

Derivation of lower-level functional risk acceptance criteria through continuous submission of Formal Safety Assessment studies

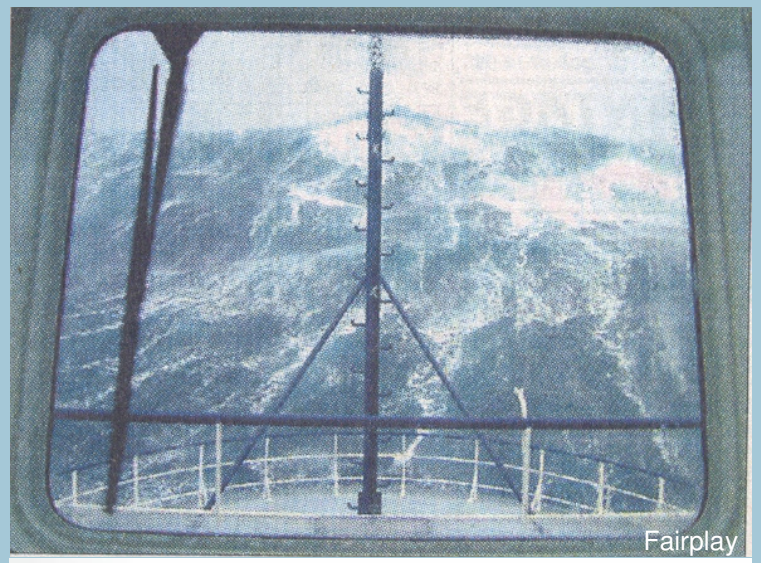
Expected effects on ship operation

Operation must reflect any relevant assumptions used in the design and approval process

Special training needed for owners and crew to learn the risk-based approaches involved

Clear and concise documentation in an agreed format needed onboard the vessel to ensure that PSC does not lead to vessels being delayed or detained

Integration with other risk-based approaches in ship operation like ISM, risk-based inspection and reliability-centred maintenance



Outlook

Risk-based approaches for shipping industry are being implemented today

- **most large passenger ships have some risk-based elements**
- **several new projects are in the pipeline with greater challenges**
- **high priority for European maritime industry documented in Vision 2020**

SAFEDOR presents more results at an open workshop in Tokyo, 22+23 May 2007.


Thank you for your kind attention! Visit www.safedor.org.
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