

ENHANCED DESIGN OF SEARCH AND RESCUE CRAFT

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“Enhanced Design of Search and Rescue Craft”

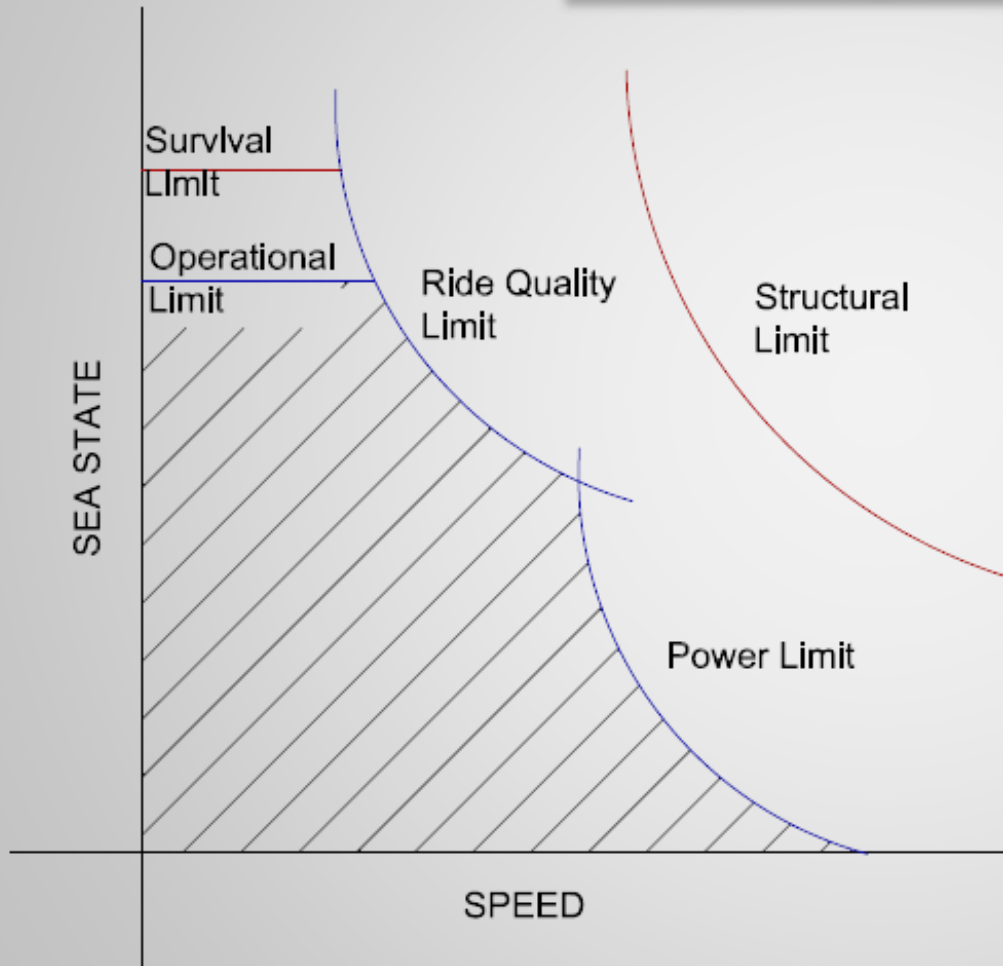


Address the structural design of Search and Rescue craft
to further improve design and operational practice

Explore how new technologies and approaches can improve
the in-service performance on lifeboats



Background



Maximum allowable speed
for a given sea state

Research Strategy

Systematic approach based on:

Theoretical:

- **Numerical model** global hydrodynamic loads and structural response

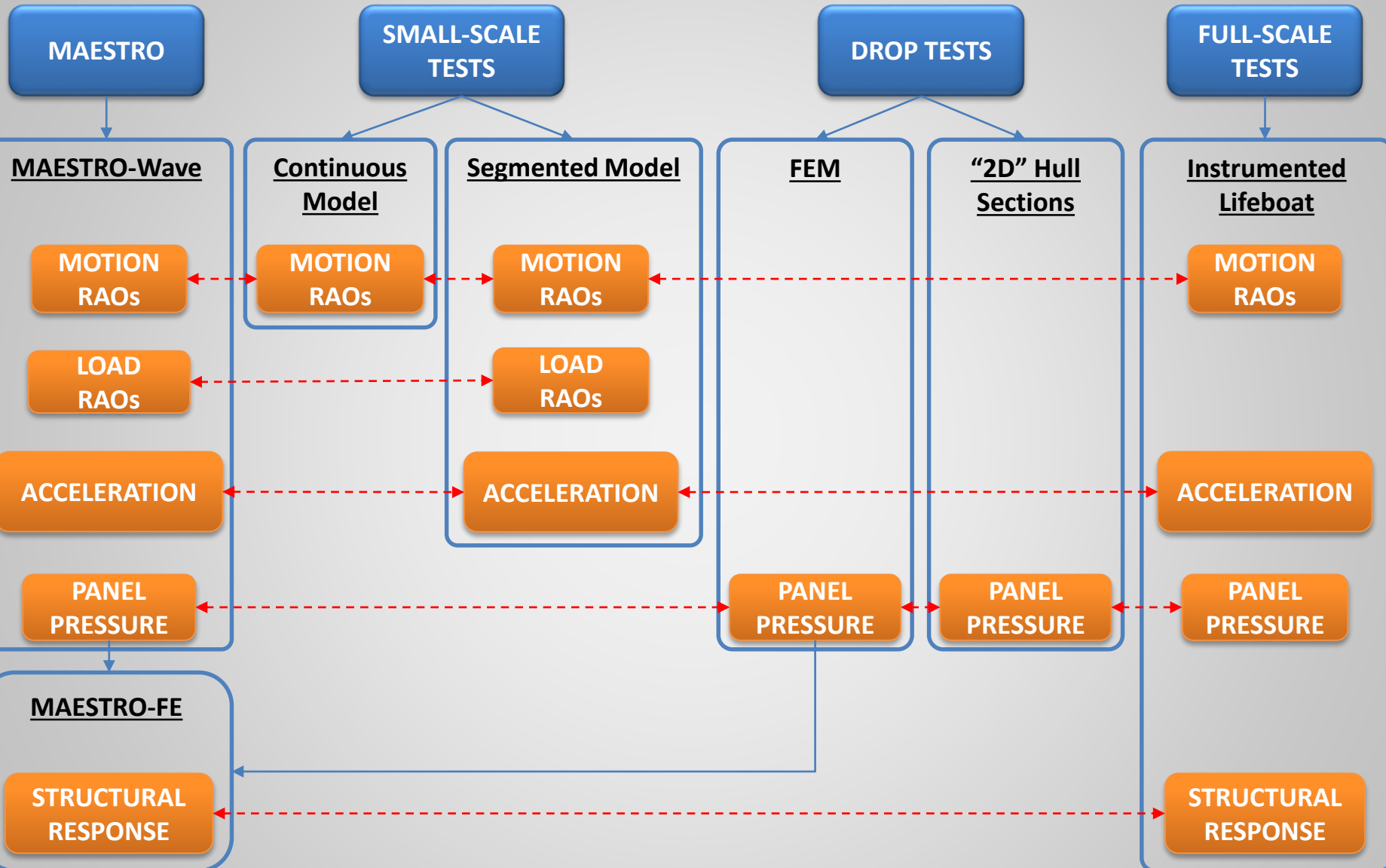
Experimental:

- **Towing tank tests** acceleration, body motions and hull loads
- **Full-scale sea trials** acceleration and strain
- **Drop tests of sections** bottom pressure gradient

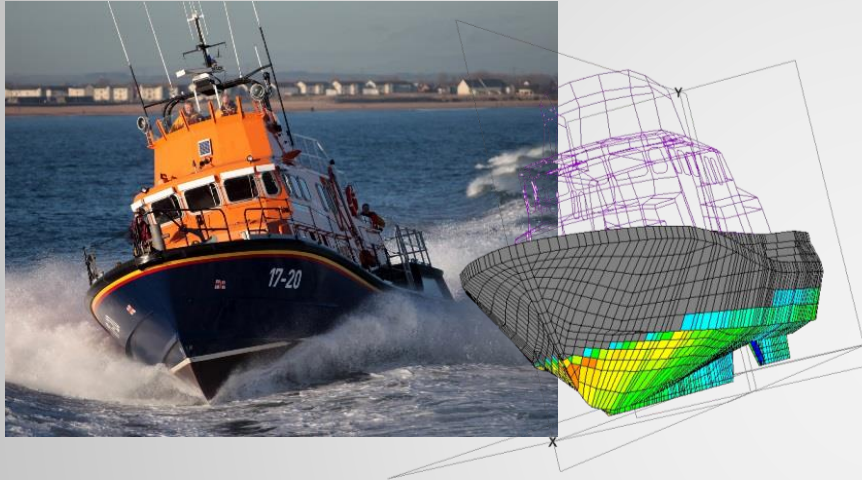
Focus on the **RNLI's Severn Class**

Aim for results with wider applicability



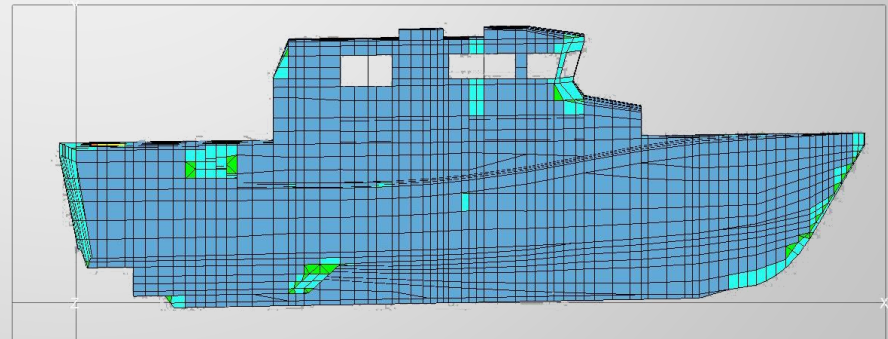


Finite Element Model



- FE package MAESTRO
- Full-ship global model
- 14000 elements
- Material: fibre reinforced composites (Glass and Glass/Aramid, epoxy resin, foam core)

Length overall	17.00	m
Length waterline	15.50	m
Beam max	5.62	m
Depth	2.52	m
Draught	1.37	m
Displacement (full load)	42	t
Speed max	25	kn



Hydrodynamic Performance

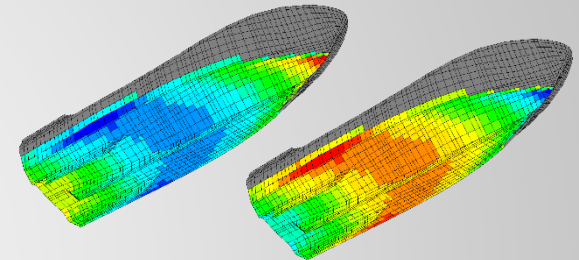
3 potential theory codes:

Output:

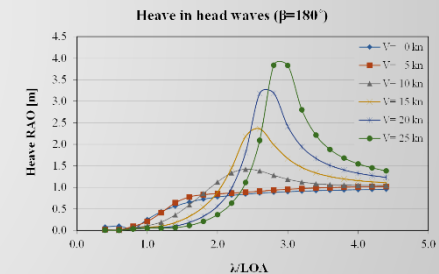
Frequency Domain

- 2D strip theory
- 2.5D strip theory
- 3D panel method

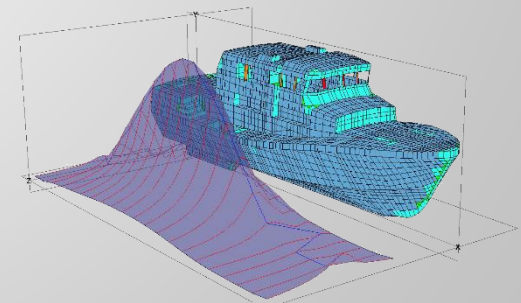
- Panel pressures



- Motion RAOs



- Hull Girder Load RAOs



Results

“Seakeeping Analysis of a High-Speed Search and Rescue Craft by Linear Potential Theory”

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Peter J Sheppard

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Richard W Birmingham
Robert S Dow

Jesus Mediavilla Varas

RNLI

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Lloyd's Register

Validation

Systematic approach based on:

- **Numerical model** global hydrodynamic loads and structural response
- **Towing tank tests** acceleration, motions and hull loads
- **Full-scale sea trials** motions, acceleration and strain
- **Drop tests of sections** bottom pressure distribution

Summary

- Address the structural design of Search and Rescue Craft
- Systematic approach based on theoretical and experimental methods
- Numerical model integrating hydrodynamic and structural analysis has been completed
- Experimental tests necessary to validate the numerical model and identify its predictive capability

