

Maritime Hydrodynamics Research Laboratory

Physical model testing

Mathematical modeling & analysis

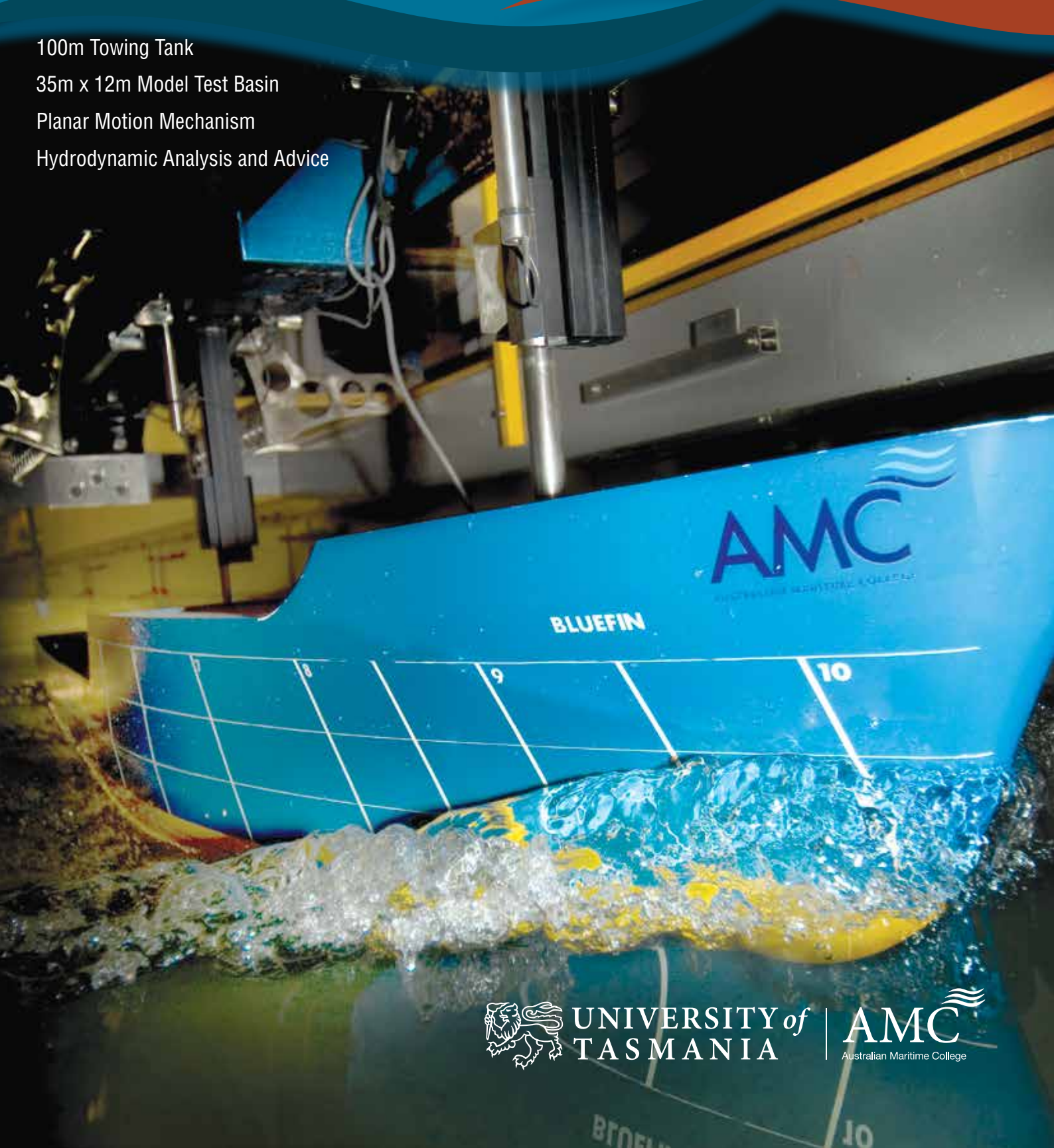
Australian Maritime College ~ Launceston Tasmania Australia

100m Towing Tank

35m x 12m Model Test Basin

Planar Motion Mechanism

Hydrodynamic Analysis and Advice



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Australian Maritime College



Towing Tank

The Australian Maritime College's (AMC) Towing Tank has been testing models of powered craft and yachts since 1983. AMC has built up considerable experience in test and analysis techniques, not only for straight forward towing tank tests on conventional craft but also for specialist experimentation and unusual configurations.

Catamaran hull prepared for tests in Towing Tank



Towing Tank ready for seakeeping tests

Specifications

Dimensions: L 100m x W 3.55m
 Water Depth: 0 to 1.5m
 Carriage speed range: 0 to 4.6m/s
 Ship model lengths: 1.0 to 3.0m
 PC based data acquisition and processing

Wave Generation

Hydraulically driven single flap type paddle
 Regular and irregular waves
 Wave lengths: 0.4 to 6.5m
 Maximum wave height: 0.4m

Capabilities

- Calm water resistance tests
- Powering predictions
- Vessel manoeuvring characteristics predictions
- Flow visualisation
- Appendage alignment
- Seakeeping tests
- High-performance yacht tests
- Hydrodynamic analysis and advice
- Horizontal Planar Motion Mechanism (HPMM)
- Self-propulsion dynamometer
- Particle Imaging Velocimetry (PIV)



Model Test Basin

The Model Test Basin is ideally suited for conducting hydrodynamic experiments with an emphasis on maritime operations within shallow water environments such as ports, harbours, rivers and coastal regions.

The basin has a fixed Qualisys video motion capture system. This system consists of 8 digital cameras and a data acquisition and analysis software package, which provides the capability to track a model's motion under different wave conditions without the use of any contact-type sensors.

Measurement of vessel motions using a radio controlled model of a container ship in a seaway



*Measurement of six degrees of freedom motions in wind and waves
(photo courtesy of BlueScope Steel)*

Specifications

Dimensions: L 35m x W 12m

Water depth: 0 to 0.9m

Maximum towing speed: 3.6m/s

Typical model lengths: 2 to 5m

Wave Generation

Multi-element wavemaker: 16 paddles

Maximum wave height: 0.3m

Wave periods: 0.6 to 3.5s

Regular and irregular waves

Long and short-crested seas

Normal and oblique wave angles

Capabilities

- Hydrodynamic tests on model ships and maritime structures
- Physical modeling of shallow water environments
- Measurement of ship-generated waves (wave wake)
- Simulation of ship manoeuvring within restricted waterways
- Berthed ship-passing ship interaction
- Ship-seabed interaction
- Ship-bank interaction
- Wind generator
- Marine renewable energy converters

Maritime Hydrodynamics Research Laboratory

AMC's Towing Tank and Model Test Basin are Australia's National Hydrodynamic facilities and are complemented by a suite of numerical prediction tools. For example, time domain simulation of berthed ship behaviour, and a hull resistance data base comprising more than 800 hull form configurations.

AMC has been an active member of the International Towing Tank Conference (ITTC) since 1987. ITTC assists in resolving technical problems of importance to all model test laboratories. These laboratories provide advice and information regarding full-scale performance to designers, builders, and operators of ships and marine installations based on physical and numerical modeling. In 2008, AMC was elected to the ITTC Advisory Council.

Model Construction Services

AMC has a number of highly professional and experienced model makers who are accustomed to the demanding requirements associated with the manufacture of experimental scale models.



Vessel Interaction - Measurement of forces and moments on berthed bulk carriers by a passing ship



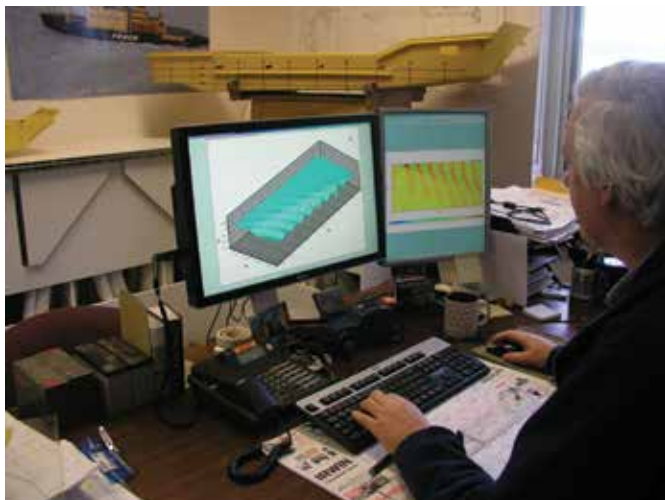
Horizontal planar motion mechanism predicts manoeuvring characteristics of vessels and underwater vehicles



Model of a bulk carrier in the Model Test Basin to measure vessel squat and ship-bank interaction forces



Hull resistance tests analyse speed/power ratios of full scale ships and craft



Computer-based analysis and numerical time domain simulation are sometimes suitable alternative methodologies to physical model testing

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