

# DMaC

## Dynamic Marine Component test facility

### Control Centre

- ❖ Fully autonomous control and data logging
- ❖ Programmable test design
  - Force driven
  - Displacement driven
- ❖ NI Compact RIO / Labview
  - Data acquisition and control channels
    - **32** analogue inputs
    - **8** differential strain gauge inputs
    - **64** digital inputs
    - **32** Digital Outputs
    - **16** Analogue Outputs
  - Sampling frequency (combined) **250 kHz**
  - Position control frequency **120 kHz**
- ❖ Replicate any measured marine induced force and motion cycle
- ❖ Simulate marine component response to real sea state conditions in a controlled environment
- ❖ Internet enabled for real time viewing and control

### Headstock: 3 Degrees of Freedom Gimbal

- ❖ X and Y bending
  - Displacement **±30°**
  - Frequency **0.25 Hz**
  - Off-axis load **10 kNm**
- ❖ Torsion
  - Angle **Infinite 360°**
  - Torque **1500 Nm**
  - Speed **10 rpm**
- ❖ Maximum specimen properties
  - Diameter **800 mm**
  - Base to pivot point **300 mm**
  - Weight **500 kg**

### Test Bed

- ❖ Maximum specimen dimensions
  - Length **6 m**
  - Diameter **800 mm**
  - Weight (including tether) **1000 kg**
- ❖ Wet or dry operation
- ❖ Full fresh water submersion operation
- ❖ Watchdog system with safety interlocks
- ❖ 6mm Polycarbonate safety shield
- ❖ Spare data acquisition inputs for specimen specific data recording applications
- ❖ Adjustable Z position

### Hydraulic Power Supply

- ❖ Electrical Power Supply
  - Power **130 kW**
  - Voltage **415 V**
- ❖ Hydraulic Power Unit
  - 2off 55kW induction motors
  - 2off variable displacement pumps
  - Drive Circuit Pressure **140 Bar**
  - Flow Rate **362 l/min**
  - Pilot Circuit Pressure **210 Bar**
- ❖ Hydraulic Accumulators for average flow
- ❖ Oil tank capacity **1700 litres**

### Tailstock: Z Actuator

- ❖ Z actuator dimensions
  - Stroke **1 m**
  - Rod diameter **70 mm**
  - Bore diameter **160 mm**
- ❖ Maximum Dynamic Force **30 Tonnes**
- ❖ Maximum Static Force **45 Tonnes**
- ❖ Equal area actuator
- ❖ 2 Stage Servo-hydraulic control valve **462 l/min**
- ❖ Preload force **14 Tonnes**
- ❖ Frequency at 1m stroke) **0.1 Hz**
- ❖ Frequency (at 0.1m stroke) **1 Hz**
- ❖ Frequency (at 0.01m stroke) **10 Hz**



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*Investigating reliability in harsh dynamic offshore environments*



Peninsula Research Institute for Marine Renewable Energy

