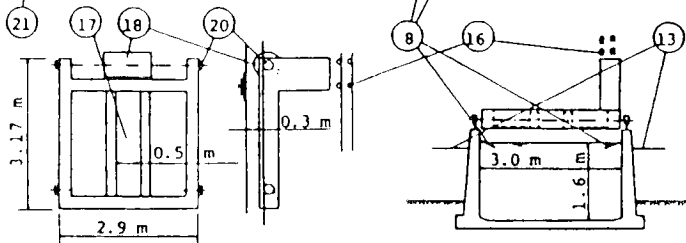
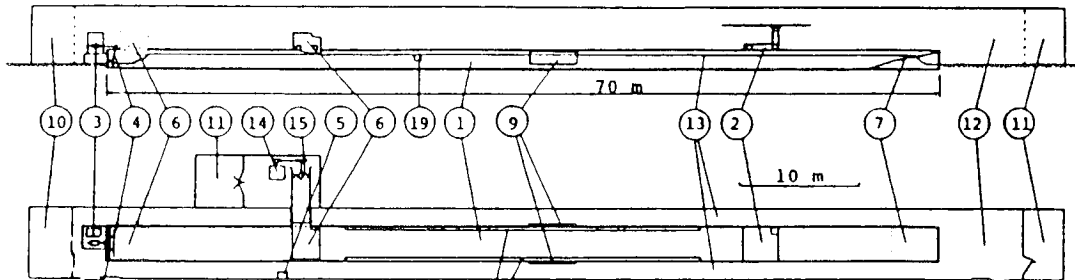


JAPAN TOWING TANK CONFERENCE CATALOGUE OF FACILITIES & INSTRUMENTATIONS
FOR OCEAN ENGINEERING

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FACILITIES

TOWING TANK (1949)



DETAILS OF CARRIAGE AND TANK SECTION

- | | | |
|----------------------|--------------------------|----------------------|
| 1 towing tank | 5 wave generator control | 9 observation window |
| 2 towing carriage | 6 wind tunnel | 10 laboratory |
| 3 hydraulic actuator | 7 beach | 11 store |
| 4 flap | 8 movable side beach | 12 workshop |
| | | 13 passage |
| | | 14 motor |
| | | 15 fan |
| | | 16 trolley |
| | | 17 measuring section |
| | | 18 motor |
| | | 19 overflow hole |
| | | 20 wheel |
| | | 21 wave suppressor |

DESCRIPTION OF TOWING CARRIAGE: box-girder type, motor driven
 SUB CARRIAGE: 2 wooden
 TYPE OF DRIVE SYSTEM AND TOTAL POWER: automatic speed control with SCR, 7.5 KW
 MAXIMUM CARRIAGE SPEED: 2.5m/s
 OTHER CAPABILITIES: (1) arbitrary mode drive is available
 (2) vertical and horizontal forced oscillation mechanisms can be fitted

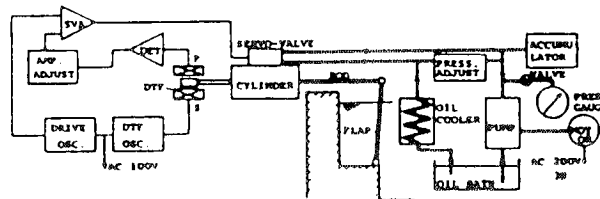
WAVE MAKER

Type: Oscillatory flap type
 Drive system: Hydraulic actuator with servo control
 Regular waves:

Wave length (m)	10	5	2	1	0.5	0.3
Max. height (m)	0.1	0.15	0.1	0.1	0.05	0.03
Max. steepness	1/100	3/100	1/20	1/10	1/10	1/10

Irregular waves: waves having specified wave spectra
 Transient waves: transient waves which coalesce at any specified position of the tank is available
 Others: tele-control system on the carriage is available for generating waves

Sketch of wave maker



WIND GENERATOR

Type: movable gust wind tunnel; operates at a fixed position and is at rest in front of the wave maker

Wind direction: follow to waves

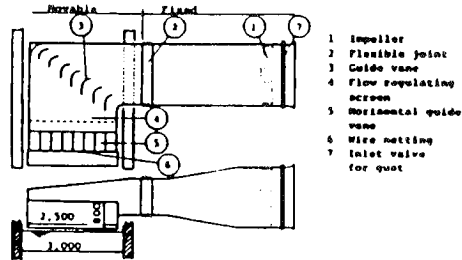
Area: 3.0 m wide x 0.6 m high

Speed: 20 m/s max.

Wind gust: available

Generator: 55 KW axial blower

Sketch of wind generator



INSTRUMENTATION

TEST PERFORMED

- Motions of ships and off-shore structures in waves and in wind/waves in moving, floating, moored and fixed conditions.
- Forces and pressures acting on ships and off-shore structures in waves and in wind/waves in moving, floating, moored and fixed conditions.
- Forced oscillation of ships in calm water.
- Resistance and self-propulsion tests in waves
- Measurements of diffracted waves around ship model

MEASURING APPARATUS AND TRANSDUCER

Wave: resistance, conductance and servo type wave probe

Wind: hot-wire and hot-film anemometers

Speed: tachometer fitted on the carriage

Motions in waves: touched roller and low-friction precise potentiometer

Total forces and moments: block-gauge with linear-transformer

Local forces: cantilever pick-up with strain-gauge on it

Pressure on the structure: piezo-electronic pressure transducer

DATA ACQUISITION

- (1) a micro-computer is available for preparation of test signals, data acquisition and data analysis on the carriage
- (2) 7 and 4 channel analogue data recorders and 8 channel digital data recorder (1024 words each) are available for data acquisition on the carriage

DATA PROCESSOR

- (1) Data can be processed at the data process center of the university (ACOS 77 Model 600)
- (2) A mini-computer with 32KW mos memory, cartridge and floppy disc, 8 channel A-D and 2 channel D-A converters is available for data processing

METHOD OF TESTING

MODELS

Size: 1.0 - 3.0 m for ship model
1.5 m x 1.5 m for off-shore structure
Material: wooden, FRP, polyurethane

SIMILITUDE

Wave: according to Froude law
Wind: according to equivalent speed

USED WAVES

- Regular waves, irregular waves & transient waves: for estimating linear frequency response functions of motion characteristics
- Regular waves & irregular waves: for estimating quadratic frequency response function of slowly varying drifting force
- Extreme wave: transient waves having a specified design spectra are used for estimating extreme response of ships and off-shore structures

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