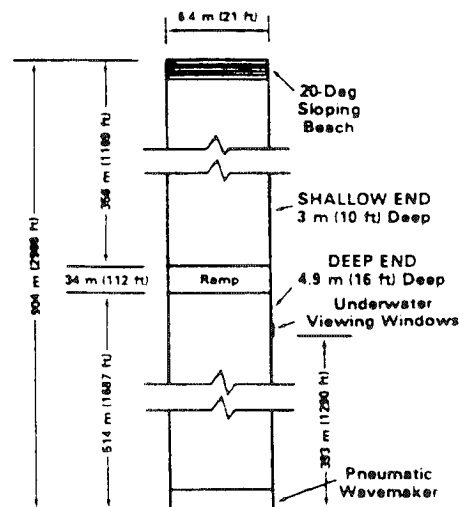


INTERNATIONAL TOWING TANK CONFERENCE CATALOGUE OF FACILITIES
TOWING TANKS, SEAKEEPING AND MANOEUVRING BASINS

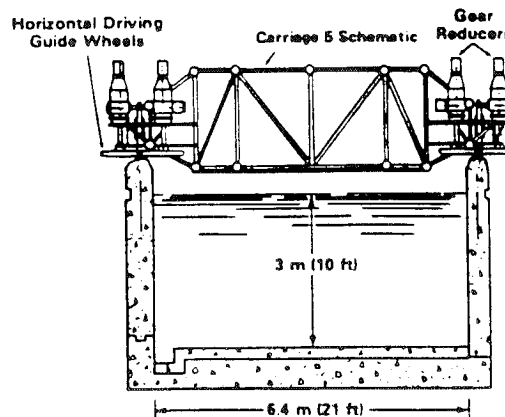
DAVID TAYLOR MODEL BASIN, Carderock Division, NSWC
BETHESDA, MD 20084-5000, Phone: (301) 227-1578, FAX: (301) 227-3679

UNITED STATES

TOWING CARRIAGE NO. 5 (1947)



Schematic Plan View of High Speed Basin
(Carriage Not Shown)



Elevation View of Shallow End of High Speed Basin
& Carriage V

DESCRIPTION OF BASIN UNDER TOWING CARRIAGE NO. 5: This indoor rectangular high speed basin with a total length of 904 m (2968 ft) comprises two adjoining sections:

- DEEP-WATER section 4.9 m (16 ft) deep, approx. 514 m (1687 ft) long and 6.4 m (21 ft) wide.
- SHALLOW-WATER section 3 m (10 ft) deep, approx. 356 m (1169 ft) long and 6.4 m (21 ft) wide.

A pneumatic wavemaker is located at one end and a wave absorbing beach at the other. 3 large underwater viewing windows at different elevations are set into the wall about mid-length.

DESCRIPTION OF CARRIAGE: In plan view the carriage is rectangular in shape approx. 21.3 m (70 ft) long by 7.9 m (26 ft) wide; eight weight bearing vertical drive wheels & 4-opposed pairs of horizontal driving guide wheels operate in tandem on each side of the carriage; an open rectangular test bay 9.6 m (31.5 ft) long by 3 m (10 ft) wide is provided for mounting removable towing bridges to which struts & test vehicles are attached.

TYPE OF DRIVE SYSTEM & TOTAL POWER: Power for the sixteen vertical weight wheels & the sixteen horizontal driving guide wheels is provided by twelve DC electric motors driving through worm gear reducers; each motor is rated at 123 kW (165 hp) (3500 rpm) & is capable of developing 298 kW (400 hp) during acceleration; speed is regulated with an adjustable voltage DC automatic feedback computerized control system; braking is by regenerative action.

MAXIMUM CARRIAGE SPEED: 25.7 m/s (84.5 ft/s, 50 knots); maximum average acceleration rate is about 0.16 g.

OTHER CAPABILITIES: A variety of heavy duty towing bridges, brackets, & struts are available to facilitate the rigging & testing of surface & submerged models.

WAVE GENERATION CAPABILITY: (with water level lowered 0.76 m (30 inches) below the normal water height)

- Regular waves from 0.9 to 12.2 m (3 to 40 ft) in length with corresponding maximum heights of 64 to 610 mm (2.54 to 24 in.).
- Irregular waves with a spectrum resembling typical ocean wave patterns with appropriate scale reductions.

WAVEMAKER TYPE & EXTENT: Pneumatic type, the 6.4 m (21 ft) wavemaker dome is connected to a centrifugal type blower driven by a direct coupled variable speed DC electric motor rated at 75 kW (100 hp), 1150 rpm.

BEACH TYPE & LENGTH:

- The wave absorber spans the full width of the basin at the shallow end opposite the wavemaker dome; the absorbers are a discontinuous 20 deg slope type made up of 7 permeable layers of rectangular precast concrete bar panels resting on an impermeable concrete slab supported by a structural steel framework.
- Extending along the walls on each side of the basin are "U"-shaped steel wave absorber skimming troughs with their upper edges set about 6 mm (0.25 inch) below the normal water level surface.

WAVE MEASUREMENT: Ultrasonic transducers mounted on the towing carriage

INSTRUMENTATION: 63-horsepower (50 kW) (3000 rpm) right & left hand rotation propeller dynamometer for open water characterization of propellers at shaft inclinations of ± 10 deg., hydrofoil dynamometer, six-component force balance dynamometers, propeller unsteady blade force dynamometer, model propeller transmission dynamometers, high speed photographic system at underwater viewing windows, ultrasonic transducers for wave height measurements, minicomputer for data collection & on-line analysis, model motor power supplies:

- | | |
|--|---|
| (1) 800 kW, 0 to 400 volts DC, 2000 amps | (3) portable 20 kVA, 3-phase variable frequency, 0-400 hz, 200/240/600 volts, 57.8/48.2/19.2 amps (for driving model fan motors). |
| (2) 400 kW, 0 to 400 volts DC, 1000 amps | (4) portable 40 kVA, 3-phase variable frequency, 0-400 hz, 200 volts, 115.5 amps (for driving model fan motors) |

MODEL SIZE RANGE: 1.2 to 6.1 m (4 to 20 ft)

TESTS PERFORMED:

- | | |
|---|--|
| (1) open water propeller characterizations of large wetted, partially cavitating, ventilated, & supercavitating props | (3) hydrodynamic forces on hydrofoils, planing boats, & other high speed craft operating in calm water & waves |
| (2) unsteady propeller blade force measurements | (4) towed body experiments & knot-meter calibrations |

PUBLISHED DESCRIPTION:

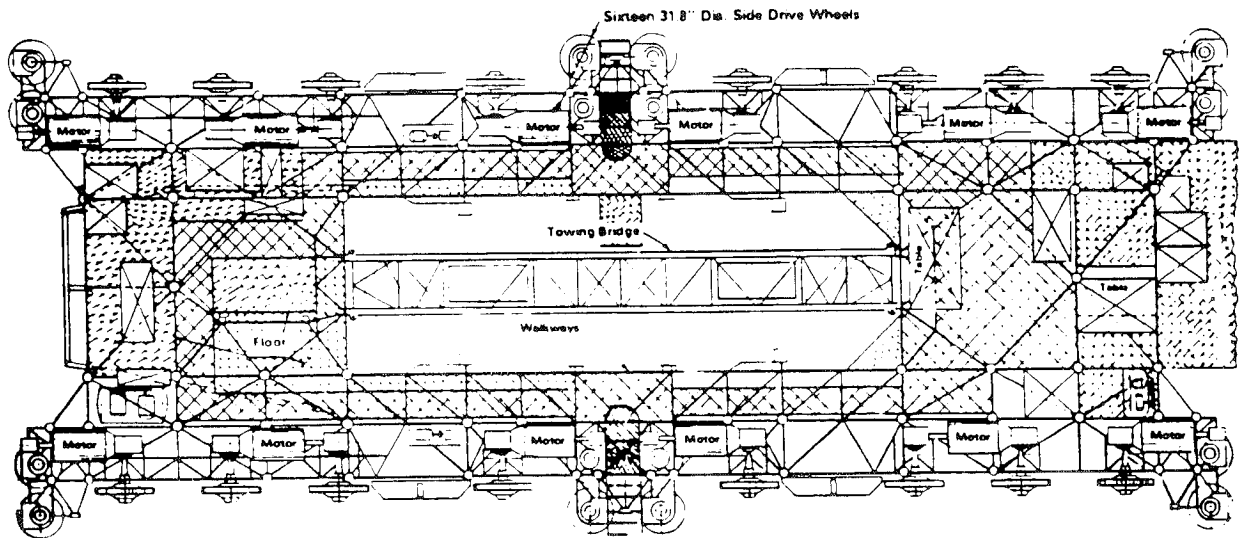
- Schoenherr, K. E. & Brownell, W. F., "The High-Speed Basin and Instrumentation at the David Taylor Model Basin," DTMB Report 1660 (Jan 1963)

INTERNATIONAL TOWING TANK CONFERENCE CATALOGUE OF FACILITIES
TOWING TANKS, SEAKEEPING AND MANOEUVRING BASINS

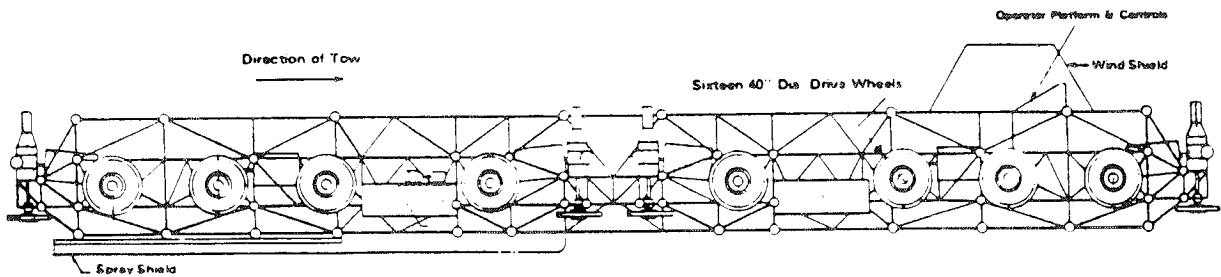
DAVID TAYLOR MODEL BASIN, Carderock Division, NSWC
BETHESDA, MD 20084-5000. Phone: (301) 227-1578. FAX: (301) 227-3679

UNITED STATES

TOWING CARRIAGE NO. 5 (1947)



Plan View of Towing Carriage No. 5



Elevation View of Towing Carriage No. 5