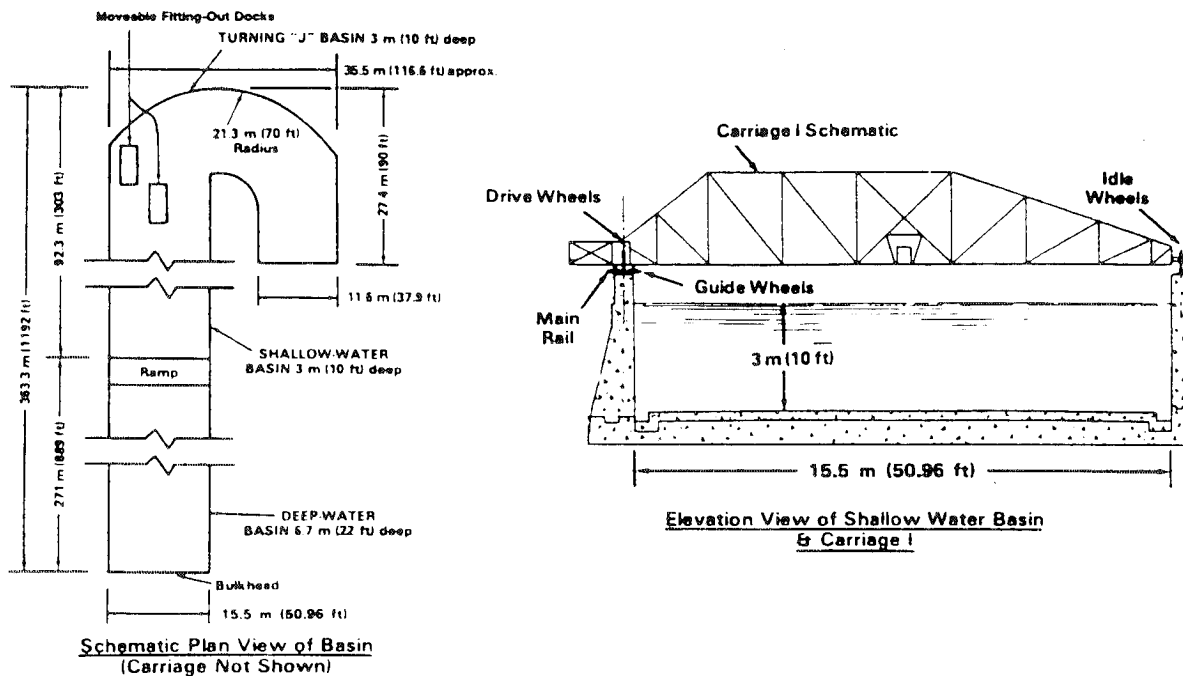


INTERNATIONAL TOWING TANK CONFERENCE CATALOGUE OF FACILITIES
TOWING TANKS, SEAKEEPING AND MANOEUVRING BASINS

DAVID TAYLOR MODEL BASIN, Carderock Division, NSWC
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UNITED STATES

TOWING CARRIAGE NO. 1 (1941)



DESCRIPTION OF BASIN UNDER TOWING CARRIAGE NO. 1: This indoor rectangular basin comprises three adjoining sections:

- DEEP-WATER section 6.7 m (22 ft) deep, approx. 27.1 m (88.9 ft) long and 15.5 m (50.96 ft) wide.
- SHALLOW-WATER section 3 m (10 ft) deep, approx. 92.3 m (303 ft) long and 15.5 m (50.96 ft) wide in which the depth may be varied by lowering the water level from 3 m (10 ft) to a few inches; located in this area is a moveable fitting-out dry dock with inside dimensions of 9.4 m (30.8 ft) by 2.1 m (6.8 ft), and a moveable fitting-out wet dock with inside dimensions of 10.1 m (33 ft) by 1.5 m (5 ft).
- TURNING BASIN in the form of the letter "J" with an average width of about 13.7 m (45 ft), a mean radius of about 14.6 m (48 ft) and an arc of 180 deg, this basin configuration permits running a self-propelled model up to speed before beginning a steering maneuver in the J-Basin.

BEACH TYPE & LENGTH: "U"-shaped steel wave absorber skimming troughs with their upper edges set about 6 mm (0.25 inch) below the water surface extend along the walls on each side of the basin.

DESCRIPTION OF CARRIAGE: In plan view the carriage is triangular in shape, in effect a monorail structure with two outrigger idle wheels supporting the light side of the carriage frame, four drive wheels & 4-pairs of horizontal guide wheels operate in tandem on the main rail, carriage is double ended & will function equally well when towing in either direction.

TYPE OF DRIVE SYSTEM & TOTAL POWER: Electro-hydraulic drive & regenerative braking system with 4-drive wheels each direct coupled to an in-line axial piston type hydraulic motor receiving oil from hydraulic pumps driven by constant speed AC synchronous motors.

- TOTAL POWER: 2-electric motors, 56 kW (75 hp) each

MAXIMUM CARRIAGE SPEED: 9.3 m/s (30.4 ft/s, 18-knots) (uniform to within 0.01 knot, total variation)

OTHER CAPABILITIES: Pneumatically powered boom pivots from corner of carriage for tracking self-propelled tethered models during turning basin experiments, vertical PMM, heave oscillator, vertical planar oscillator.

INSTRUMENTATION: Floating-beam (girder) type towing dynamometer (fully reversible when carriage tows in opposite direction), rudder servo controls for self-propelled model turning experiments, propeller boat with torque & thrust dynamometers for open water propeller characterizations, Pitot tube rakes for wake surveys, force balance dynamometers, propeller unsteady blade force dynamometer, model propeller transmission dynamometers, ultrasonic transducers for wave cut experiments, minicomputer for data collection & on-line analysis, model motor variable voltage DC power supplies:

- (1) 5 kW, 0-120 volts, 40 amps
- (2) 5 kW, 0 to 400 volts, 12.5 amps
- (3) 50 kW, 0-400 volts, 125 amps

MODEL SIZE RANGE: 6.1 to 12.2 m (20 to 40 ft)

MODEL TRACKING TECHNIQUES: In the Turning J-Basin tracking is accomplished by overhead photography with flashing lights on the model.

TESTS PERFORMED:

- (1) resistance & self-propulsion in calm water
- (2) open water propeller characterizations
- (3) self-propelled model steering maneuvers
- (4) unsteady propeller blade force measurements
- (5) wake surveys
- (6) knot-meter calibrations under simulated dynamic conditions
- (7) vertical planar motion experiments
- (8) hydrodynamic forces on submerged bodies, foils, etc.
- (9) towed body experiments
- (10) longitudinal wave cut experiments

PUBLISHED DESCRIPTION:

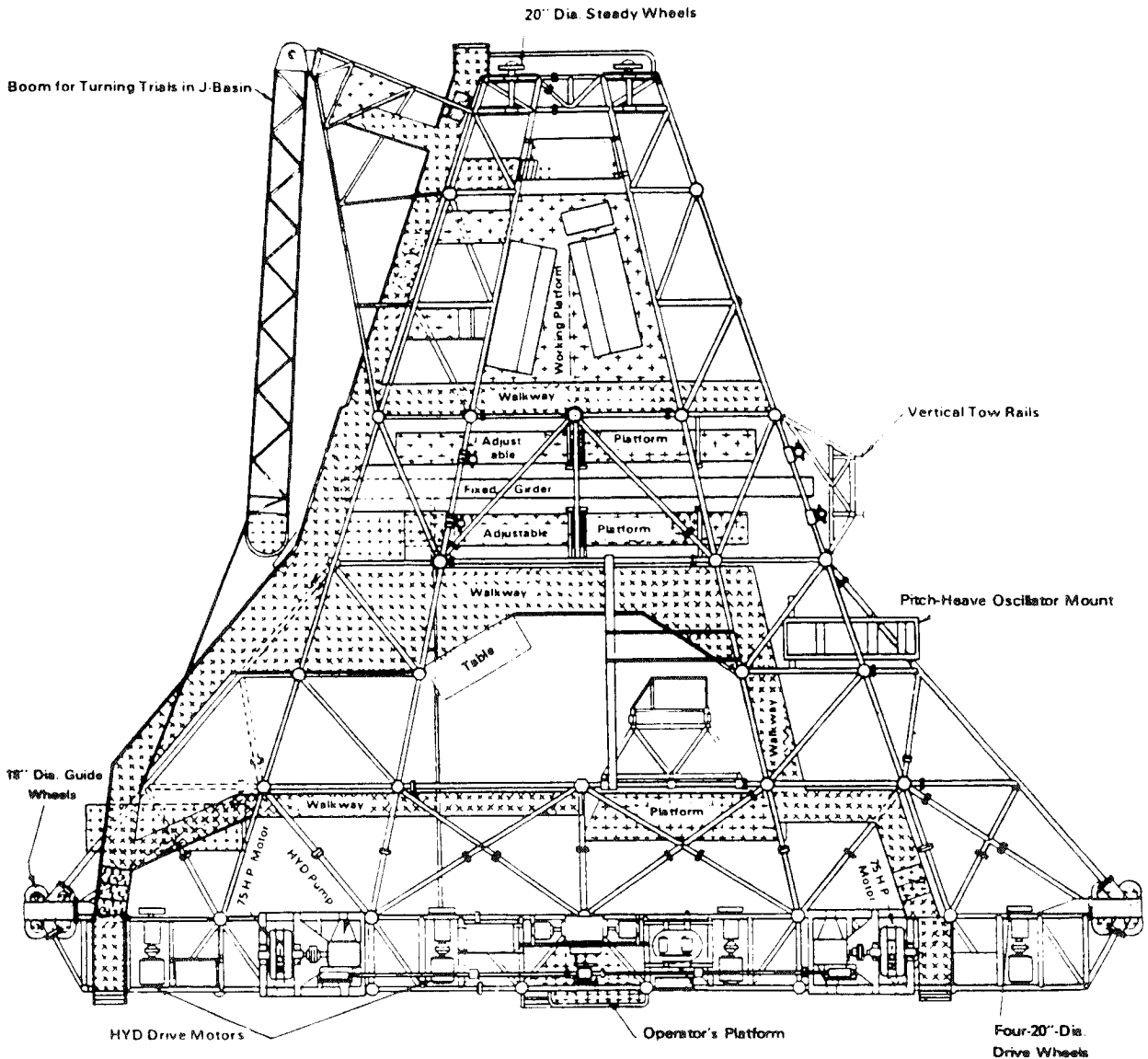
- Saunders, H. E. "The David W. Taylor Model Basin, Parts 1, 2 & 3," SNAME Transactions Volumes 46, 48 & 49 (1938, 40 & 41).

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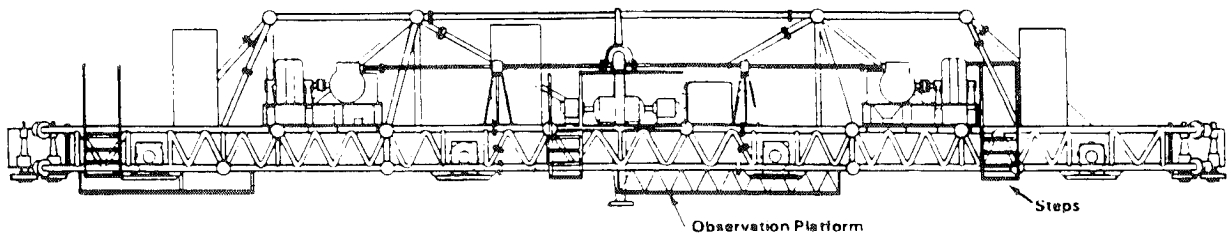
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Plan View of Towing Carriage No. 1



Elevation View of Towing Carriage No. 1