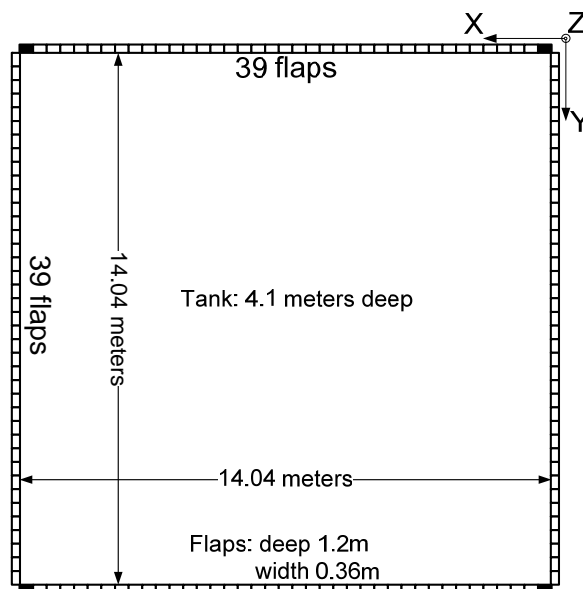


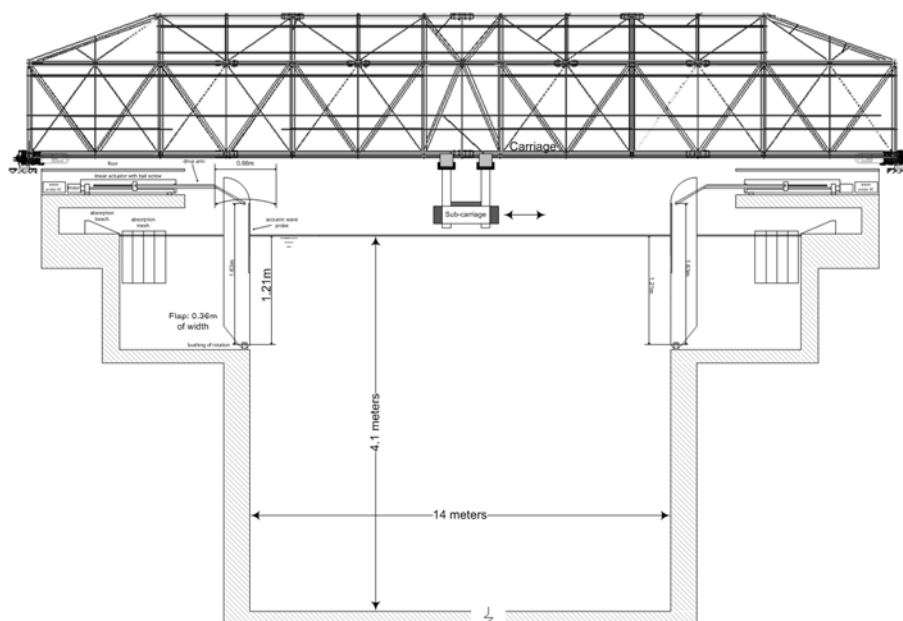
Name of organization Numerical Offshore Tank (TPN) – University of São Paulo		Year of information updating 2017
Year established 2009		Year of joining the ITTC 2017
Address Av. Prof. Mello Moraes, 2231 - Cidade Universitária São Paulo, SP, Brazil - CEP 05508-030		Status in the ITTC Member
Contact details (phone, fax, e-mail) +55 11 2648 6094 , pedro.mello@tpn.usp.br		Website www.tpn.usp.br www.tpn.usp.br/calibrador-hidrodinamico/
Type of facility Generation and active absorption Wave Tank	Year constructed/upgraded 2009	
Name of facility CH-TPN	Location (if different from the above address)	
Main characteristics (dimensions of tank/basin/test section; for simulators: full mission, part task or desk top) <ul style="list-style-type: none"> • Dimensions: 14m x 14m x 4,1m (depth) 		

Drawings of facility

Top-view plan:



Corss-section-view plan:



Detailed characteristics (carriages, wave/current/wind generators, instrumentations, etc.)

- Carriage:
 - Length of 17 meters constructed in steel.
 - Stiff structure to make captive tests. First natural mode is 10Hz.
 - Reinforced side arm to block torsion movement.
 - Rail and motors to move to the side position.
 - Sub-carriage in aluminum to move below the carriage, close to the water line.
- Wave generator
 - Active absorption of waves with 152 flaps distributed around the four sides of the tank.
 - Generation of regular, irregular, white noise and transient waves.
 - Can generate regular waves with periods between 0.5s to 2.5s.
 - Maximum wave height 250mm (1.4s period).
 - Can generate irregular long-crested waves with peak period between 0.8s to 2.2s
 - Can generate waves from either side of the tank; tank has symmetrical shape.
 - Servo-actuators and ball screw drives activates the flaps, made in fiberglass.
 - Control system was made by industrial automation computers.
- Instrumentations
 - HBM acquisition system: 4 x MX-840 (8 channels each) and 2 x MX1601 (16 channels).
 - Qualisys tracking system: 7 x Oqus 300 aerial camera and 4 x Oqus 300 underwater camera.
 - 22 capacitive wave probes.
 - 16 capacitive wave probes embedded in model.
 - 8 x ATI 6 degree of freedom load cells (different sizes).
 - 33 x uniaxial load cell (different sizes)
 - 6 x PCB piezoelectric pressure gages 100Psi
 - 33 x Kistler piezoelectric pressure gages 50Psi
 - High speed camera Photron SA-3
 - Precision Trimble GPS (3 antennas and 2 radios)
- Stewart 6 degree of freedom movement platform E2M technologies eM6-400-1500 – Capacities 1500Kg
- Kits of propellers, bow thrusters and azimuth thrusters for dynamic positions model tests

Applications (Tests performed)

Year	Main scope	Model type
2010	Trapped waves – Captive	Semi submersible platform
2010	New concept Y subsea equipment installation – Forced excitation	Manifold
2010	Seakeeping behavior – free floating	Mono-column platform
2010/2011	Aspects ratio and moonpool influences – Captive	Mono-column platform
2011/2012	Optimization of heading and roll damping behavior – free floating	FPSO
2012	Optimization of heading and roll damping behavior – free floating in directional waves	FPSO
2012	Seakeeping of a Logistic Hub – free floating	Mono-column platform
2012	Studies on Green Water in FPSO platforms – free floating	FPSO
2013	Seakeeping of a Logistic Hub – free floating	Semi submersible platform
2013	Studies of VIM and VIV – Circular Towing; Rankine code validation	Hoses, lines and cylindrical platforms
2014	Isolated and Side-by-side influence of Sloshing of inner tanks of FLNG – free floating	FLNG platform and LNG carrier
2014	Low-Speed Maneuvering Tests With an Oceanographic Research Vessel – Maneuvering by DP system	Oceanographic ship
2014	Sloshing in prismatic gas tanks of FLNG – Forced movements using 6GoF platform	Prismatic tank
2015	Studies on wave inference – free floating	Semi submersible platform
2015	New concepts for ultra large FPSO project	FPSO
2015	Side-by-Side operation of a FPSO and a PSV in DP – free floating	FPSO and PSV
2016	Advanced studies on Green Water in FPSO platforms – free floating	FPSO
2016	Towing Marine Seismic Source Prototype – Circular towing in waves	Marine Seismic Source Prototype
2016	Studies on wave inference – free floating	FPSO
2016	Advanced roll damping behavior – free floating	FPSO
2016	Side-by-Side of two FPSO to study GAP influence – free floating	Two FPSOs
2016	Side-by-Side operation of a FPSO and a PSV in DP – free floating	FPSO and PSV
2017	Side-by-Side of two FPSO to study GAP influence – Captive	Two FPSOs
2017	Slamming on splash zone – Captive in waves and forced movements	Manifold
2017	Advanced roll damping behavior (10 headings) – free floating	FPSO
2017	Irregular wave statistics influence of the seeds	
2017	Cryogenic hose behavior in waves	Cryogenic hose
2017	Side-by-Side of two FPSO to study GAP influence – Free floating and Captive	Two FPSOs

Published description (Publications on this facility)**Journals:**

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