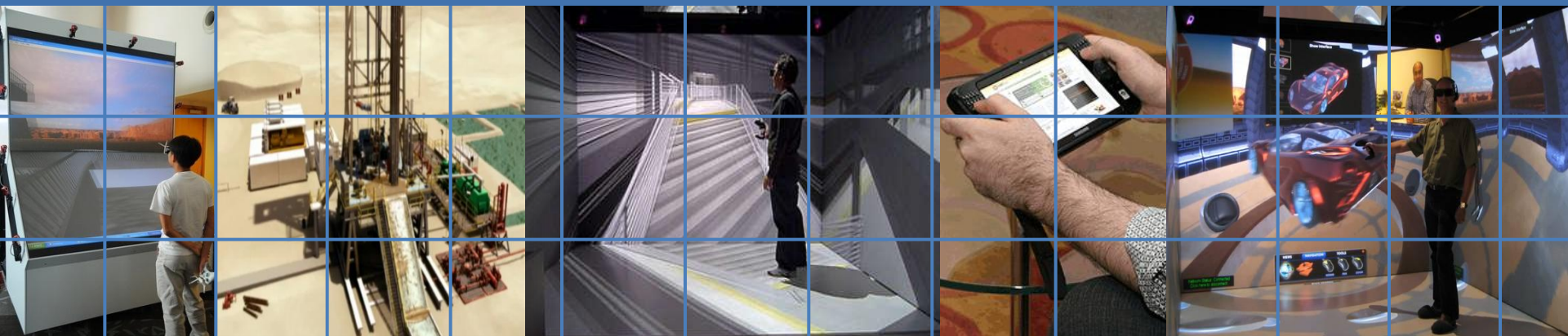


Simulation Center

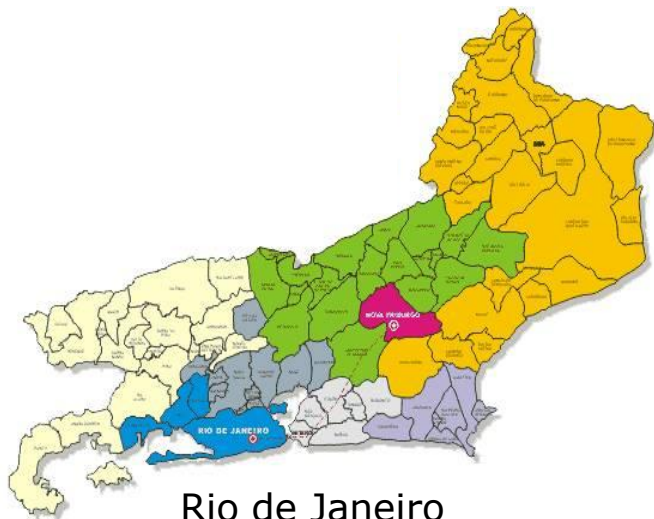


Sergio Villarreal
Simulation specialist

SENAI

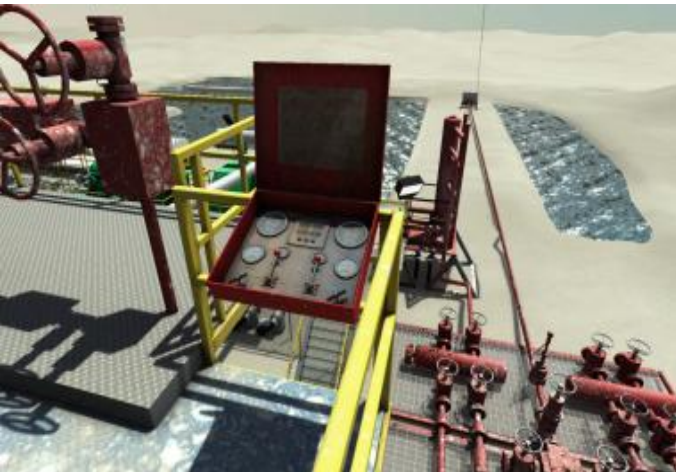


- **781** Operational Units
 - **458** Based
 - **323** Mobile
- **200** Laboratories
- **250** Formation Centers
- **39** Technological Centers
- **118** Formation Agency
- **320** Mobile actions



58 Operational Units
9.275 Industrial members
4 Technological Centers

SENAI-RJ thinking on a demand of **Operational Safety**, expand the use of simulators in the Brazilian industry.



Amplifying the area of 1200 m²

Aproximated Investiments of U\$ 3.500.000,00



SENAI Technological Center - RJ
automation and simulation

Sistema
FIRJAN



Simulation Center

Advanced Nucleus of simulation in virtual reality, augmented reality and immersive 3D environments, providing professional training and characterized technological solutions, using the latest technologies and partnerships.





SENAI Technological Center - RJ
automation and simulation

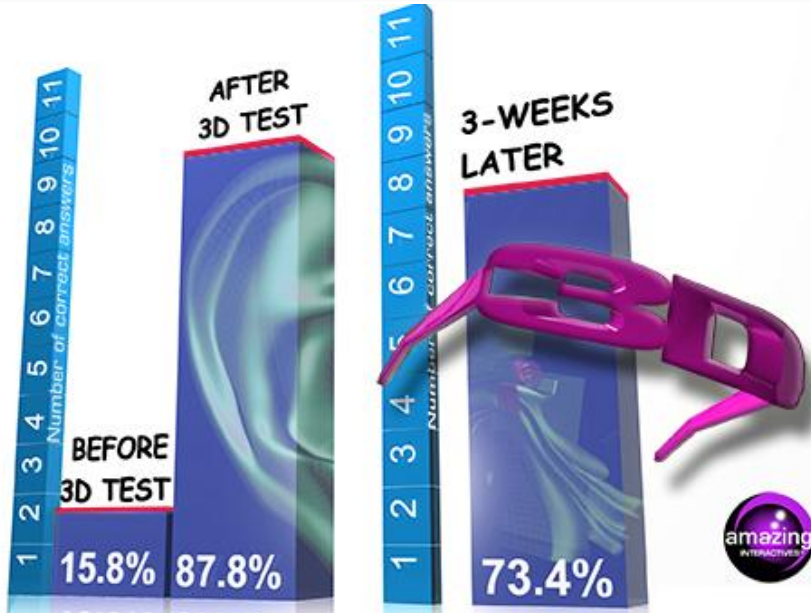
Sistema
FIRJAN

SENAI-RJ



Why the use of simulation tools ?

(Digital Cave)

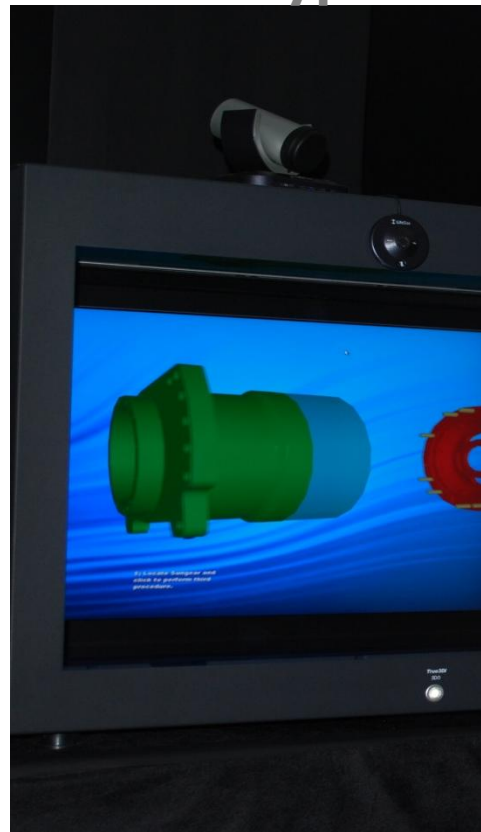


(Equipments)

3D Screen



Prototype



Holographic



3th Vision



Augmented Reality



3D portable units Augmented reality tables



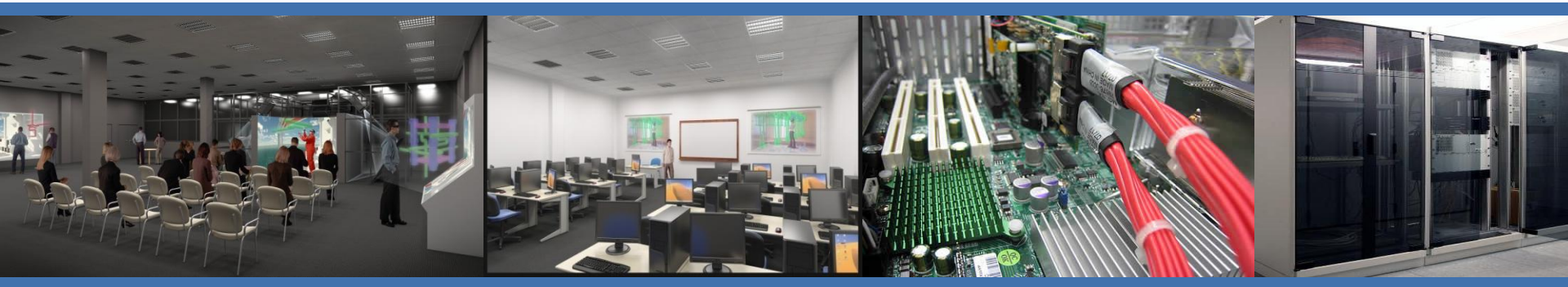
3d Projection



Mobile Solutions

Simulated and display assembly, Interactivity maneuvers, Positions and Security, Layout Overview, Mobile Maintenance, Design of New Products, Equipment, Installation and Systems Maintenance

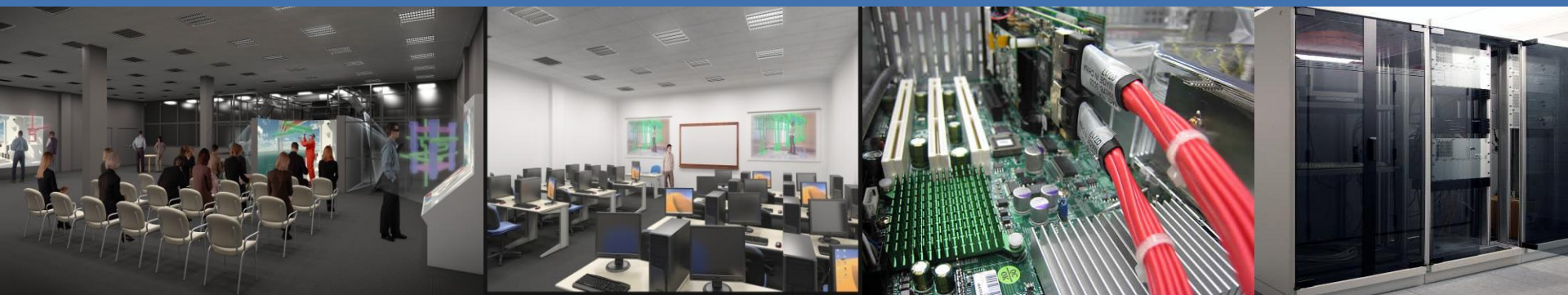
By being in constant technological upgrades, the **CTS Automation and Simulation** Becomes the ideal place for solutions in Augmented and Virtual Reality.



(Partners)



Thank You!



Contact:

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svillarreal@firjan.org.br

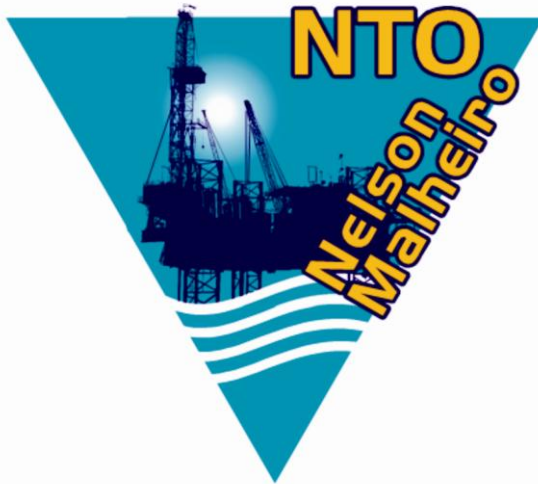
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OFFSHORE TRAINING CENTER

Helber Macedo
Instructor

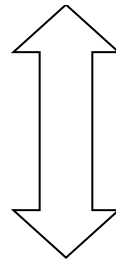
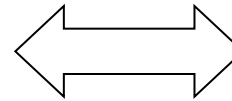
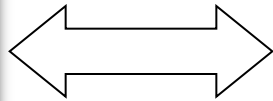
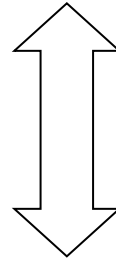
MPMS - Multi Purpose Maritime Simulator (*Stability and Ballast*)

AMBTREI - Process and Facilities of Production Unit Simulator

EX CENTER - Explosive Atmospheres Center



Partnerships



**DRILLING AND PRODUCTION
COMPANIES**



SENAI Technological Center - RJ
automation and simulation

Sistema
FIRJAN

SENAI-RJ



MPMS – Multi Purpose Maritime Simulator



SENAI-RJ

PiS4S
Global IT Solutions



Stability and Ballast

MPMS

INSTRUCTORS' ROOM



EVENTS
VALUATION

SOLUTIONS
TRAINING

OPERATORS' ROOM





SENAI Technological Center - RJ
automation and simulation

Sistema
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SENAI-RJ



MPMS CONTROL ROOM – ROOM FPSO UNIT

(ABOUT THE MPMS)

The equipment that imitates the existing ballast control system on oil rigs has as its main characteristic a flexible computer system and can be used for different types of platforms like SS's, auto-elevatory (Jack-Up) and FSO/FPSO's units.

Unique high fidelity Simulator using the latest technology linked to electrically actuated motion, providing exceptional realism to practical training.

- Total control of Unit, normal and emergencies operations.
- Exercises in normal time or accelerated (x10).
- Snapshot of exercises; re-start in same step.
- Trainig to BCO, BS and OIM (SS, FSO, FPSO and JACK-UP)

The teachers at SENAI-RJ have been skilled and
certified by ASET

(Aberdeen Skills and Enterprise Training Ltd), Aberdeen,
Scotland, one of the best reference centers for petroleum &
natural gas sector.

(COURSES)

Stability Theory (Stability 1)

Stability & Ballast Control for Semi-Submersibles (Stability 2)

(SIMULATOR TRAINING)

Stability & Ballast Control Operation for Semi-Submersibles
(Stability 3)

Offshore Operation for FPSO/FSO

Offshore Operation for Jack-Up's

Management of Major Emergencies in Offshore Installations
(MME/OIM)

(Stability Theory)

To provide introductory training and a sound understanding in the theory and practice of basic stability that meets the needs of the marine and offshore industries.

COURSE CONTENT

Terminology
States of equilibrium
Initial stability
Longitudinal and transverse stability
Hydrostatics

TAUGHT HOURS: 40

(Stability I)

(Stability & Ballast Control for Semi-Submersibles)

To provide an understanding of response of column-stabilised floating units to loading and environmental forces and damage control.

COURSE CONTENT

Hydrostatic parameters
Damage stability
Deck loading
Motions in a seaway
Mooring system effects

TAUGHT HOURS: 40



(Stability II)

(Stability & Ballast Control for Semi-Submersibles)

To provide training in the handling of ballast control operations in simulated, normal and emergency situations.

COURSE CONTENT

Comprehensive stability instruction utilizing fullmotion simulators to replicate extreme wind and sea conditions and emergency situations.

- Collision
- Flooding (internal and external causes)
- Loss of watertight integrity
- Shift of cargo
- Severe weather
- Mooring failure



MPMS CONTROL ROOM – SEMI-SUBMERSIBLE UNIT

TAUGHT HOURS: 32

(Stability III)

(Offshore Operation for FPSO/FSO)

To provide delegates to the practical and operational considerations of offshore loading, storage and oil offloading operations on an FPSO/FSO and the background and ongoing development of these units.



COURSE CONTENT

Hull bending moments & shear forces
Structural damage
Transfer operations (oil and ballast)
Offloading
Tank cleaning operation
Inert gas system

TAUGHT HOURS: 35

(Offshore Operation for Jack-Up's)

To introduce participants to the theoretical and practical considerations for safely moving a jack-up unit from one location to another. The theory is enhanced with hands on practical experience of simulated operational problems when afloat, jacking, elevating and pre-loading.

COURSE CONTENT

- Management of operations
- Foundation and elevated operations.
- Stability and marine operations
- Rig moving practice
- Accidents and losses

TAUGHT HOURS: 35



Management of Major Emergencies in Offshore Installations (MME/OIM)

To provide OIM's, Deputy OIM's and Supervisors a concise understanding of the responsibilities and procedures to be adopted during emergency response situations and, through practical scenarios, to develop experience of such situations leading to greater levels of experience and competence.

COURSE CONTENT

- Emergency conditions
- Pre-planning
- Leadership
- Command and control & Teams
- Stress situations
- Assertiveness techniques

TAUGHT HOURS: 35



MPMS ERT ROOM – MME/OIM TRAINING

(ABOUT THE CERTIFICATION)

The courses and training are recognised internationally by the offshore oil and gas industry;

A Senai/Aset Certificate will be issued on successful completion of this course and examination;

The courses meets of the IADC/NI Comprehensive Stability Programme;

The courses shall be delivered to the standards required by the Nautical Institute and in accordance with the guidelines laid down by UKOOA and Canada, Liberia and Vanuatu (flag states) and US Coast Guard (USCG);



Recognised by the MOU code that contains the requirements for selection, competence and training to the (personal key) BCO, BS and OIM, which is contained in the IMO Convention (Resolution A 891 (21)).

Provide also OIM's and "personal key" with suitable emergency scenarios and exercises and be given feedback on their performance;

Courses and Training in accordance with the standards guidelines emergency situations approved by the OPITO (Offshore Petroleum Industry Training Organization).

(Screen Shots)

RIG VIEW

HEEL (°) -0.0 **TRIM (°)** -0.1
LCG (m) 0.0 **TCG (m)** 0.0 **VCG (m)** 58.5
PORT FWD. DRAFTS (ft) 81.9 **STBD FWD.**
MEAN 82.2 **STBD AFT.** 82.5
PORT AFT. 82.6

LOADING SUMMARY (T)
DISPLACEMENT: 28974.3
 LIGHTSHIP WEIGHT: 85575.0
 SW BALLAST TANKS: 9114.8
 FUEL OIL TANKS: 694.4
 DRILL / FRESH TANKS: 1214.3
 DRY BULK & RUDS: 372.4
 OTHER TANKS: 32.6
 STORES & OTHER: 235.0
 MOORING LOADS: 510.6
 FLOODWATER: 1.2

TRANSVERSE (m) 71.5 **LONGITUD. (m)** 73.5
 GM: 13.0 15.0
 FBC: 0.8 1.8
 GMC: 12.2 13.3
 GZ: 0.0 0.0
 KG ALLOWABLE: 58.7
 KG MARGIN: -0.6

Screen Navigation

Weather
WIND DIRECTION (T) 9.0 **SEA STATE** DIRECTION (T) 9.0 **CURRENT** DIRECTION (T) 246.0
SPEED (kts) 5.0 **PERIOD (s)** 1.6 **SPEED (kts)** 0.5
SPEED (m/s) 2.6 **(m) Sig. HEIGHT (ft)** 0.2 0.7 **SPEED (m/s)** 0.3

Vessel
HEADING (T) 1.5 **WATER DEPTH (m)** 100.0
PITCH (°) 0.0 **WATER DEPTH (ft)** 328.1
ROLL (°) 0.0 **Movement**
YAW (°) 0.0 **SWAY (m)** 0.0
HEAVE (m) 0.0
HEAVE (ft) 0.0

NAVIGATION
 XDRIFT: -1.8 (m) -6.2 (ft)
 Y: 0.8 (m) 2.6 (ft)
 Z: 70.8 (m) 232.6 (ft)
 XDRIFT: 23306.0 (m)
 Y: 6495249.4 (m)
 Z: 23385.0 (m)
 649250.0 (m)
 BEARING: 287.2 (°)
 WPT to PORT: RANGE: 2.0 (m) 6.6 (ft)
 WPT to STBD: RANGE: 2.0 (m) 6.6 (ft)
 BEARING: 287.2 (°)
 WPT to WPT: RANGE: 1.9 (m) 6.2 (ft)
 BEARING: -0.6 (m) -2.0 (ft)

Screen Navigation

MOORINGS

FWD
 1 Amps 0 2 Amps 0
 Tension (kN) 114.4 Tension (kN) 103.8
 Length Out (ft) 4068 Length Out (ft) 4068
 Rate (ft/min) 0.0 Rate (ft/min) 0.0
 Brake Brake

PORT
 8 Amps 0 7 Amps 0
 Tension (kN) 112.5 Tension (kN) 103.8
 Length Out (ft) 4068 Length Out (ft) 4068
 Rate (ft/min) 0.0 Rate (ft/min) 0.0
 Brake Brake

STBD
 4 Amps 0 3 Amps 0
 Tension (kN) 91.5 Tension (kN) 91.5
 Length Out (ft) 4068 Length Out (ft) 4068
 Rate (ft/min) 0.0 Rate (ft/min) 0.0
 Brake Brake

AFT
 6 Amps 0 5 Amps 0
 Tension (kN) 92.2 Tension (kN) 92.2
 Length Out (ft) 4068 Length Out (ft) 4068
 Rate (ft/min) 0.0 Rate (ft/min) 0.0
 Brake Brake

Screen Navigation

SHEAR FORCES & BENDING MOMENTS

FRAME: 51 53 58 64 70 76 82 88 94 99
 DIST. AP(m): 47.8 58.1 64.2 115.4 147.8 178.3 208.7 241.1 272.5 298.8
 S.F.(t) ACT: 1719.0 4572.0 3582.0 1099.0 -1068.0 -1490.0 -2576.0 -3044.0 -412.0
 S.F.(t) PERM: 3658.0 9198.0 8673.0 8980.0 11409.0 12309.0 10814.0 8197.0 8568.0 12232.0
 %: 54 58 41 12 -8 -8 -12 -32 -41 -7
 B.M. (kNm) ACT: 111.1 198.1 271.3 349.9 353.7 306.3 270.2 197.3 84.1 24.3
 B.M. (kNm) PERM: 306.0 368.0 535.4 820.0 820.0 820.0 512.0 309.3 138.6
 %: 37 43 51 58

Note: ALARM at 90%

Screen Navigation

STABILITY

STARBOARD VIEW **AFT VIEW**

TRIM (ft) -0.39 **HEEL (°)** -0.02

VESEL DATA
 DEPTH: 600.0 GMT: 38.0 LCG (m) 4.8 TCG (m) 0.0 VCG (m) 21.1
 HEADING: 108.2 GMCT: 38.0 DISPLACEMENT: 51025.3
 PITCH: 0.0 CFT: 0.0 LIGHTSHIP WEIGHT: 51025.3
 ROLL: 0.0 FBC: 0.0 CARGO TANKS: 0.0
 SURGE: 0.0 KMT: 59.1 BALLAST TANKS: 0.0
 SWAY: 0.0 KG ALLOW: 45.1 PORT DRAFT (m) 2.8 2.8 2.8 FRESH WATER TANKS: 0.0
 YAW: 0.0 KG MARGIN: 23.9 MEAN DRAFT (m) 3.9 STORES & OTHER: 0.0
 HEAVE: 0.0 WOT: 7178.80 A MOORINGS: 1501.8
 WOTL: 4762.00 B RISERS: 0.0
 FLOODWATER: 0.0

Screen Navigation

WELLHEADS & RISERS

PRODUCTION WELLS
 PROD. WELLHEAD 01
 PROD. WELLHEAD 02
 PROD. WELLHEAD 03
 PROD. WELLHEAD 04
 PROD. WELLHEAD 05
 PROD. WELLHEAD 06
 PROD. WELLHEAD 07
 PROD. WELLHEAD 08
 PROD. WELLHEAD 09
 PROD. WELLHEAD 10
 PROD. WELLHEAD 11
 PROD. WELLHEAD 12

INJECTION WELLS
 INJECTION WELL 13
 INJECTION WELL 14
 INJECTION WELL 15
 INJECTION WELL 16
 INJECTION WELL 17
 INJECTION WELL 18
 INJECTION WELL 19

(Screen Shots)

VESSEL DATA

WIND SPEED (knts.)
20.0

WIND DIR. (°)
150.0

WAVE HEIGHT (ft)
4.0

CURR. SPEED (knts.)
0.5

CURR. DIR. (°)
180.0

DRAFT (ft)
17.3

DEPTH (ft)
199.5

DEPTH (fa)
33.2

HULL TANKS LAYOUT

Screen Navigation

FIRE WATER PUMPS

Screen Navigation

Table Motion Data:

- TRIM: -0.0
- HEEL: -0.0
- WIND (KTS): 20.0
- WIND DIR: 150.0
- WAVE (ft): 4.0
- CURR (KTS): 0.5
- CURR DIR: 180.0
- DEPTH (ft): 200.1
- DEPTH (fa): 33.4
- TIDE (ft): 0.1
- REL. HOGY: 150.0
- AMPLT. (ft): 2.5
- PERIOD (s): 12.0
- PITCH (°): 0.0
- ROLL (°): 0.1

Table Motion Graph:

Screen Navigation

LEG 2

175.6
LEG EXTENSION (ft)

Reset **-4.4**
COUNTER (ft)

0.0
MOTOR LOAD

ALL LEG 2 OVERTEMP
ALL LEG 2 OVER CURRENT

Screen Navigation

Navigation Menu:

- JACK-UP
- BIG VIEW
- POWER
- FIRE WATER PUMPS
- ALL LEGS LIST
- LEG 3 STATUS
- LEG 1 STATUS
- LEG 2 STATUS
- ISSD
- TRUSS & SPURS
- LEG CONTROLS
- PIPE & CABLE PANEL (Accommodation Levels 1 & 2)
- PIPE & CABLE PANEL (Accommodation Levels 2 & 3)
- TRAC
- WELLBORE DATA
- PIPE & CABLE PANEL (Maindeck Deck)
- PIPE & CABLE PANEL (Accommodation Deck & Other Decks)
- BIG LAYOUT

Screen Navigation



Our Numbers

	SS	FPSO	JU	MME	Total
	342	168	16	102	628



Certified by ASET (Aberdeen Skills & Enterprise Training Ltd, Aberdeen, Scotland).

Instructors:

ATAIDE de Freitas Silva

Fernando Henrique de Melo **ABREU**

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