Dynamic Positioning Conference

DP System Considerations

Global Marine - Hull’s 456

MTS DYNAMIC POSITIONING COMMITTEE

Bob Donley - Global Marine
Latest DP Drillship Design Criteria

- Riser Storage Capacity - 10 ~12,000 ft.
- Crude Storage Capacity - 100 ~200,000 bbl.
- Connected Environment & Current Loading ~ GOM Loop Currents
- Derrick Capacity - 2MM lbs.
- Deck Storage Area - Long Riser Strings, 6-5/8” Drill Pipe and Space for Well Testing Gear.
Estimated Deck Load Requirements

The diagram illustrates the relationship between water depth (in feet) and total deck load (in tonnes). The graph shows a linear trend indicating that as water depth increases, the total deck load also increases.
Glomar Hull 456

- **Length**: 752 ft
- **Breadth**: 118 ft
- **Depth**: 58 ft
- **Variable Load**: 22,000 tonnes
- **Displacement**: 53,000 tonnes
- **Quarters**: 150 persons (1/2 Pax rooms)
- **Moonpool**: 42 ft x 42 ft
- **Operating Water Depth**: 12,000 ft
Global Hull Size Comparison

Glomar R. F. Bauer
444 ft. & 15,000 mt.

Glomar Hull 456
752 ft. & 53,000 mt.
Glomar Hull 456

Rig Layout
Ship/DP System Design Considerations

- DPS Class Selection
- Main Power Requirements
- Thrusters
- DP system
- DP Model Testing
ABS DPS Class 3 Separation

2 engine rooms

2 switchboard rooms

LOWER TWEEN DECK (9000 A.B.)
Main Power Requirements
Based on:

- Hull Form
- Displacement

w/approximate requirements for:

- Drilling systems
- Top Speed
- Dynamic Positioning

◆ Power Generation
- Eight (8) MAN B&W Engines, 9 cylinder in-line
- TOTAL ELECTRICAL POWER = 34.6 MW (46,300 HP)
Glomar Hull 456 Class
Power and Stationkeeping

- Capsule Thrusters - Kamewa
  - Three (3) Fwd 5 MW Azimuthing
  - One (1) Aft 5 MW Azimuthing
  - Two (2) Stern 5 MW Azimuthing
- TOTAL THRUSTER POWER = 30 MW (40,200 HP)
Retractable Capsule Thrusters

Stern Thrusters #5 & #6

Bow Thruster #1
Glomar Hull 456 Class
Power and Stationkeeping

- DP System - Nautronix
  - DPS 3, Triple Redundancy
  - Two Control Locations
Dynamic Positioning Equipment

Primary DP Control Console
Glomar Explorer - primary DP console
DP Model Tests

- Total Testing Program
- Wind Tunnel
- Full DP tests
- Resistance and Propulsion
- Sea Keeping
Glomar Hull 456

DP Model Testing

Wind
DP
Glomar Hull 456

Propulsion
Sea Keep

DP Model Testing

No. 980027
Glomar Hull 456
Sudden Squall

WIND = 61.0 knots @ 180°
WAVES = 0.0 ft @ 180°
CURRENT = 0.0 knots @ 180°

19 MW
19 MW
19 MW
18 MW
16 MW
14 MW
12 MW
11 MW
9 MW

#1 THRUSTER : 5 MW
#2 THRUSTER : 5 MW
#3 THRUSTER : 5 MW
#4 THRUSTER : 5 MW
#5 THRUSTER : 5 MW
#6 THRUSTER : 5 MW
Glomar Hull 456
1 YR Winter Storm

WIND = 42.2 knots @ 180°
WAVES = 15.1 ft @ 180°
CURRENT = .72 knots @ 180°

#1 THRUSTER : 5 MW
#2 THRUSTER : 5 MW
#3 THRUSTER : 5 MW
#4 THRUSTER : 5 MW
#5 THRUSTER : 5 MW
#6 THRUSTER : 5 MW
Glomar Hull 456
10 YR Loop Current

WIND = 32.1 knots @ 180°
WAVES = 11.8 ft @ 180°
CURRENT = 3.2 knots @ 180°

#1 THRUSTER : 5 MW
#2 THRUSTER : 5 MW
#3 THRUSTER : 5 MW
#4 THRUSTER : 5 MW
#5 THRUSTER : 5 MW
#6 THRUSTER : 5 MW
Glomar Hull 456
50 YR Winter Storm (intact)

WIND = 52.5 knots @ 180°
WAVES = 23.95 ft @ 180°
CURRENT = 0.89 knots @ 180°

#1 THRUSTER : 5 MW
#2 THRUSTER : 5 MW
#3 THRUSTER : 5 MW
#4 THRUSTER : 5 MW
#5 THRUSTER : 5 MW
#6 THRUSTER : 5 MW
**Glomar Hull 456**

**10 YR Loop Current**

- **WIND = 32.0 knots @ 180°**
- **WAVES = 6.0 ft @ 180°**
- **CURRENT = 4.0 knots @ 90°**

# THRUSTER : 5 MW
- #1 THRUSTER : 5 MW
- #2 THRUSTER : 5 MW
- #3 THRUSTER : 5 MW
- #4 THRUSTER : 5 MW
- #5 THRUSTER : 5 MW
- #6 THRUSTER : 5 MW
Glomar Hull 456
50 YR Winter Storm (thruster failure)

WIND = 52.5 knots @ 180°
WAVES = 23.95 ft @ 180°
CURRENT = 0.89 knots @ 180°

#1 THRUSTER : 5 MW
#2 THRUSTER : 5 MW
#3 THRUSTER : 5 MW
#4 THRUSTER : 5 MW
#5 THRUSTER : 5 MW
#6 THRUSTER : OFF
Glomar Hull 456 Class
Harland and Wolff