

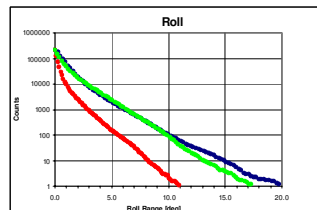


Status Report September 2005

FPSO ROLL JIP

Background

Recent experiences with several FPSO's in various areas have learnt that they exhibit large roll motions even in operational (day to day) conditions. As the system is not designed for transverse loads and motions, roll motions may lead to significant degradation of safety and efficiency of the operation.



In some cases roll motion has resulted in delays and even in production down time.

Roll is a resonant motion with large amplitudes due to the small radiation damping. Excitation originates from non-collinear wave current conditions or from combinations of wind driven seas and swells. In such cases even a turret moored FPSO will experience transverse wave loading.

Objectives

The final objective of the FPSO ROLL JIP is to provide means for the reduction of roll motions of FPSO's. To this end the JIP is aiming at:

- Assessment of the roll behaviour of existing spread moored and turret moored FPSO's;
- Quantification of the dominant factors in the roll response of FPSO's;
- Physical understanding and modelling of roll;
- Evaluation of practical means to reduce roll.

Scope of work

Monitoring

Roll motions, waves and vessel conditions have been monitored on the spread moored Girassol FPSO offshore Angola, on the turret moored Glas Dour FPSO offshore South Africa and on the turret moored P-35 in Brasil.

Roll motions are analysed in relation to the wave condition and the results are being compared with numerical simulations.

Modelling

A screening study was conducted to quantify the individual contributions of hull, bilge keels, mooring and risers.

Model tests with Glas Dour FPSO at scale 1:43 have been conducted in Marin's Seakeeping Basin. Free oscillation tests were conducted in calm water and waves for various bilge keel configurations. Motions, hull pressures, and bilge keel

loads were recorded and analysed.

ROLLEST software has been developed to estimate the roll damping and response for various cross-sections and bilge keel configurations.

Investigation into design and devices to minimise roll

Bilge keels, anti-roll tanks, cargo and ballast tanks as well as heading control and thruster have been evaluated on their effectiveness, design implications and costs.

Model tests are in preparation to verify the most promising concept.

Organisation

Meetings will be held every 6 months during the FPSO JIP Week in conjunction with the FPSO Research Forum. The next meeting is on October 29 in Cambridge.

Participation

The JIP is supported by 8 oil companies, 6 contractors, 3 yards and 3 authorities.

Time schedule

Completion June 2006

Contact

Henk van den Boom
H.v.d.boom@marin.nl
Johan Wichers
Jewwichers@earthlink.net