Top 3 Issues for FPSOs

Johan Wichers (MARIN USA) & Steve Balint (SHELL)

FPSO Global Workshop

September 24, 2002 - Houston

3 Most Important Issues

- Integrity
- Integrity
- Integrity

Need confidence in ability to stay on station for life of field

FPSO vs. Tanker

FPSO

- In place for life
- Expensive repairs
- Significant deck loads
- Design for specific metocean
- Varying functional requirements

Tanker

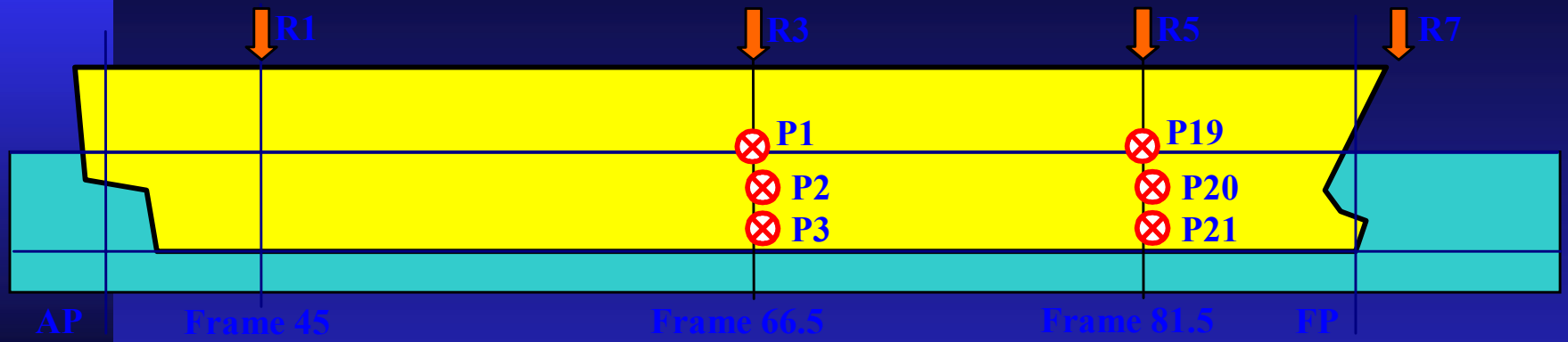
- Often in port, dry dock on 5 year cycle
- Designed for worldwide service
- Avoids severe seas
- Redundant design

Recent & Ongoing JIPS

- FPSO Integrity JIP finished
- Fatigue Capacity JIP on-going
- Alternative Fatigue Methodology JIP on-going
- DP JIP on-going
- Safeflow (Greenwater) JIP nearly finished
- Offloading Operability JIP start
- Roll JIP start

FPSO Integrity JIP

FPSO Integrity JIP



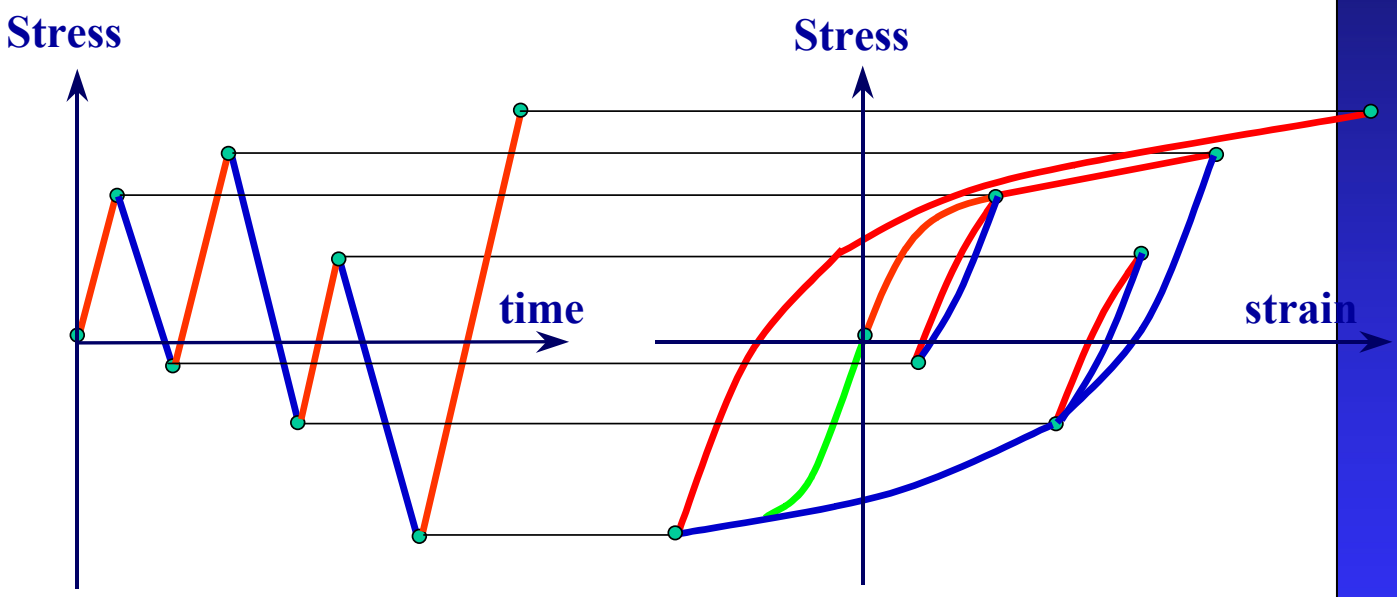
What was measured?:

- **Cargo and ballast pressures in the holds and the draft and trim of the ship**
- **Sea water pressures from 12 gauges in the side shell**
- **Relative wave heights around the ship from 7 wave radars on the weather deck**
- **All 6 ship motions**
- **Wave conditions from wave buoy**

FPSO Integrity JIP

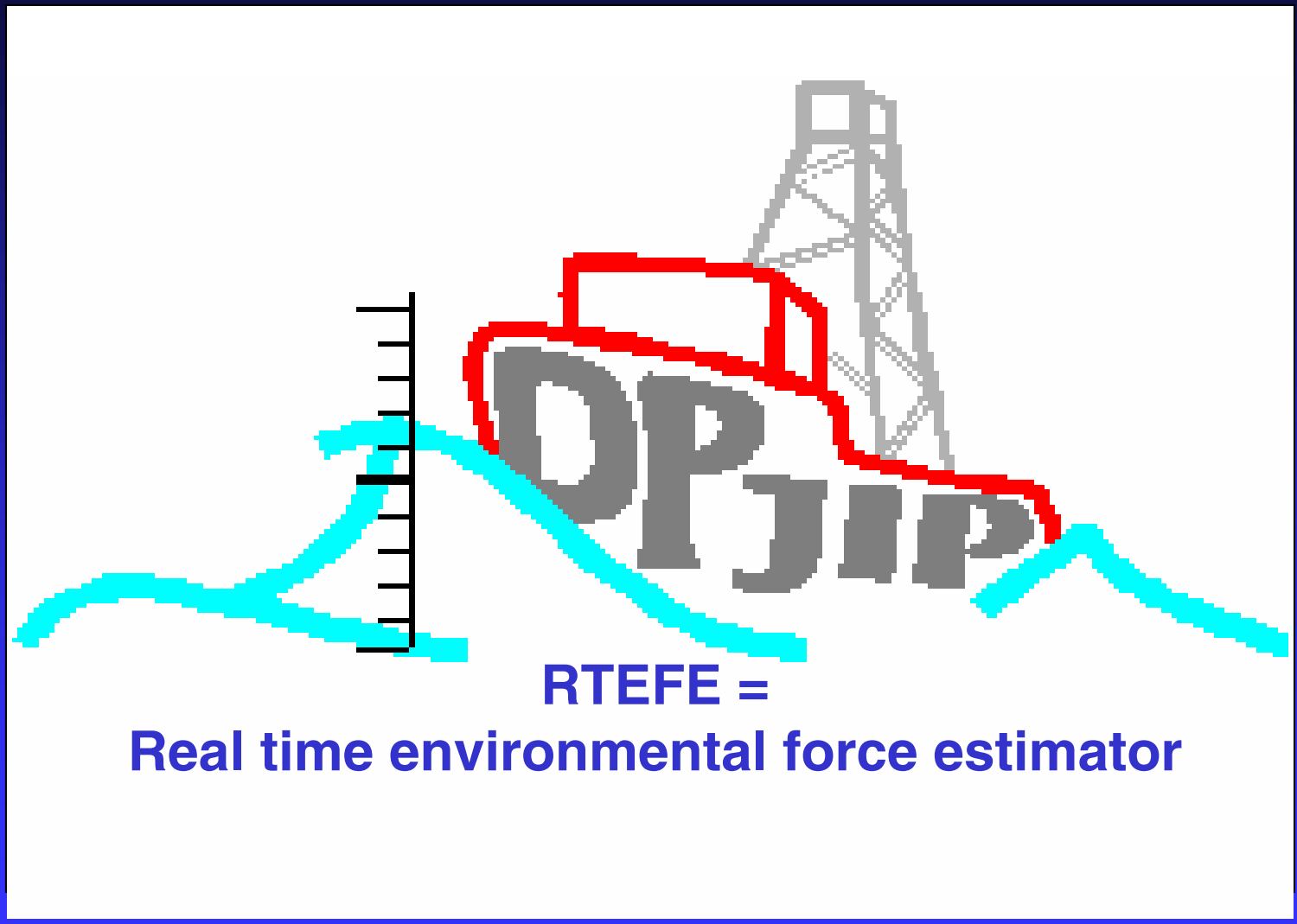
Fatigue Capacity JIP/Alternative Fatigue Methodology JIP

Fatiguing cycles



6

DP JIP



Safeflow (Greenwater) JIP

BOW DAMAGE: a close-up photograph of the damaged bow section of BP's Schiehallion FPSO taken from a helicopter chartered by Greenpeace. The environmental pressure group is unhappy with safety on this and the Foinaven FPSO and has sent an open letter highlighting its fears to the Health & Safety Executive.

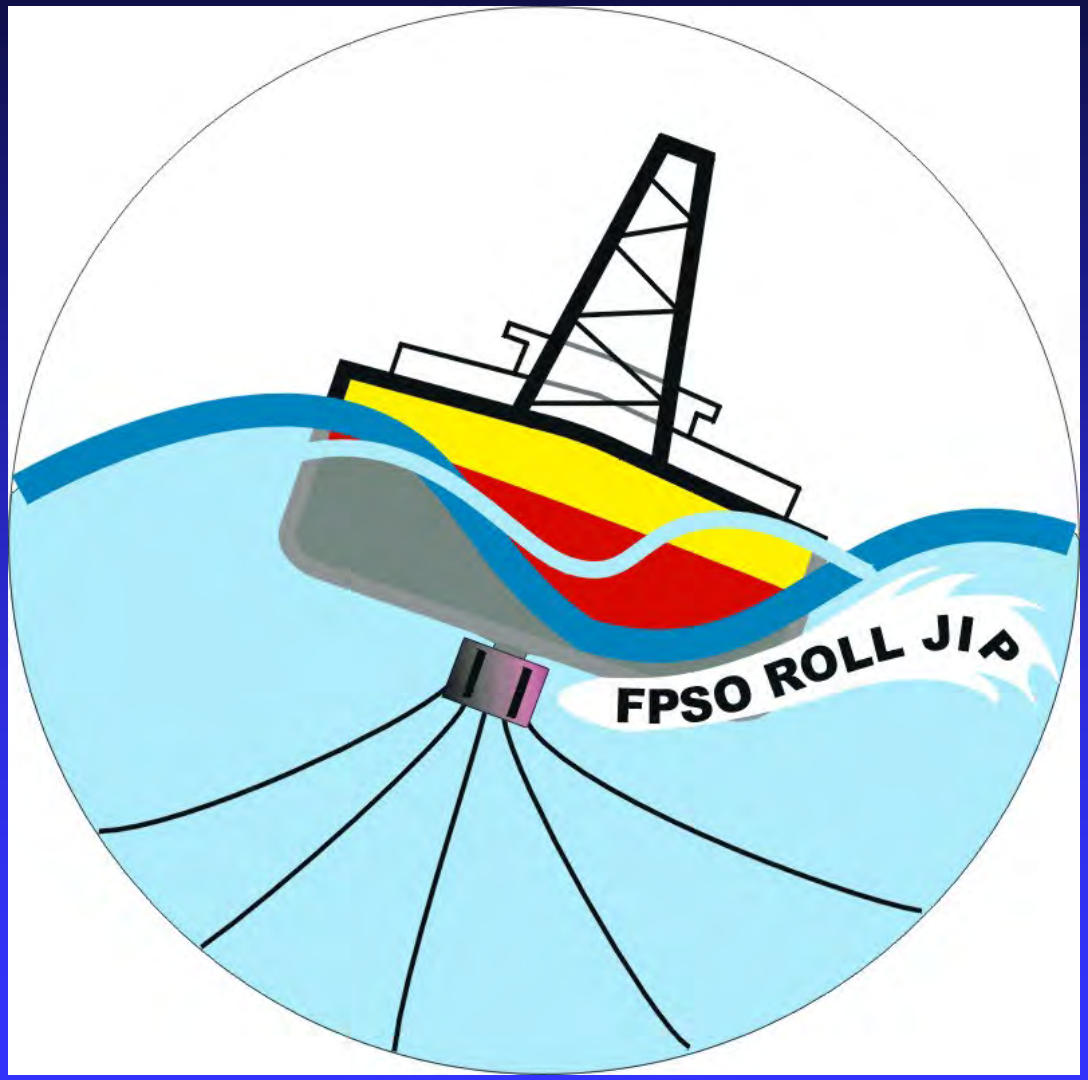
Offloading Operability JIP

start

Offloading Operability JIP

start

Roll JIP



Proposed JIPS

- FPSO Guidance (ABS)
- Stiffened Plates (DnV)
- DP FPSO (Izar)
- W. Africa Coupled Design Methodologies (MCS)

Other Identified Issues

- Guidelines (ISO/API/Class Rules & Instructions)
- Appurtenance Design
- Metocean around the World
- Mooring Systems (incl. DP, Synthetic)
- Fire & Explosion
- Offloading (guidelines, mid-water, LNG)
- Inspection/Repair Procedures on board
- Double side/Double Bottom
- Offshore Quality/Marine Productivity

Offshore vs. Marine Standards

Offshore

- History is fixed jackets
- Equations based on 1st Principles
- Low tolerance for downtime
- Large, costly, complex developments

Marine

- History is floating vessels
- Rules based on experience
- Frequent opportunities for repair
- Less capital intensive

3 Most Important?

- FPSOs and tankers are not the same thing
- Technical issues still exist
- Need for continued industry debate and cooperation to share learnings and assure **technical integrity** of the structures.

How we can achieve that?

By means of the FPSO Research Forum

An example of the FPSO Research Forum

Next meeting FRF at IZAR-yard Santiago de Compostela-Galicia-Spain

Monday October 14:
PM: DP Consortium meeting
PM: SAFEFLOW Project meeting
Tuesday October 15:
AM+PM: DPJIP meeting
AM+PM: SAFEFLOW meeting
Wednesday October 16:
FPSO Research Forum
Thursday October 17:
AM+PM: DNV Fatigue JIP meeting
AM+PM: Offloading Operability
Friday October 18:
AM+PM: ROLL JIP meeting
AM: DNV Fatigue JIP meeting

Participants present during the FPSO Research Forum in Greenwich:

Oil companies	Contractors	Regulatory Bodies	Builders	Research Parties
ExxonMobil	SBM-Imodco	DNV	IZAR	MARIN
ChevronTexaco	Sofec-Modec	ABS	HHI	OTRC
Shell	Bluewater	BV	Deawoo	Principia
BP	APL	LR	Samsung	HR Wallingford
ConocoPhillips	Prosafe	GL		TU-Harburg
Total FinaElf	Corrocean	NPD		University Lisbon
Petrobras	Noble Denton	HSE		RUGroningen
Statoil	WSAtkins	MMS		
Norsk Hydro	Rolls-Royce			
	Konsberg-Simrad			
	PAFA			
	IHC-Gusto			
	Bouygues-Offshore			
	ACMA Inc			