



# Offshore Crane Operator Training Simulators



November 2006



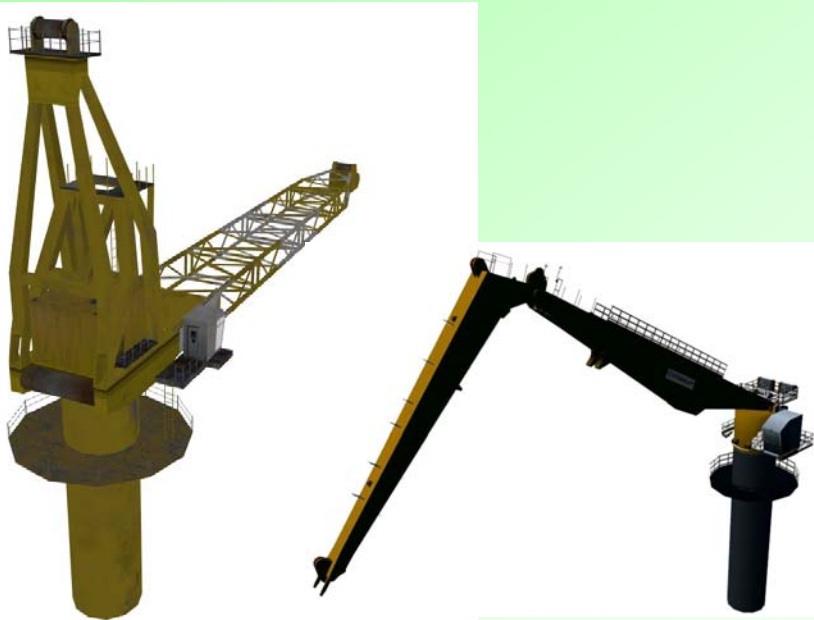
# The Benefits of Interactive Simulator Training

- Realistic Experience in a Controlled and Safe Environment  
**Earlier Productivity**
- Repeatable / Focused Training Capability  
Fair & Unbiased Measuring  
**Initial Assessments of New and Mid Career Hires**
- Non-Threatening Environment for Emergency Action Training  
**Greater Confidence**  
Teach the limits of both operator and machine
- Test Communication & Understanding Skills
- No Short Cuts - Maintain Decision Making Process
- Crane Operator  
Trainees should see the mechanism for Self Advancement  
**Enjoyment Factor - an important aspect**
- Forces **Proactive** rather than **Receptive** Learning Methodology

# Oil and Gas – Offshore Cranes

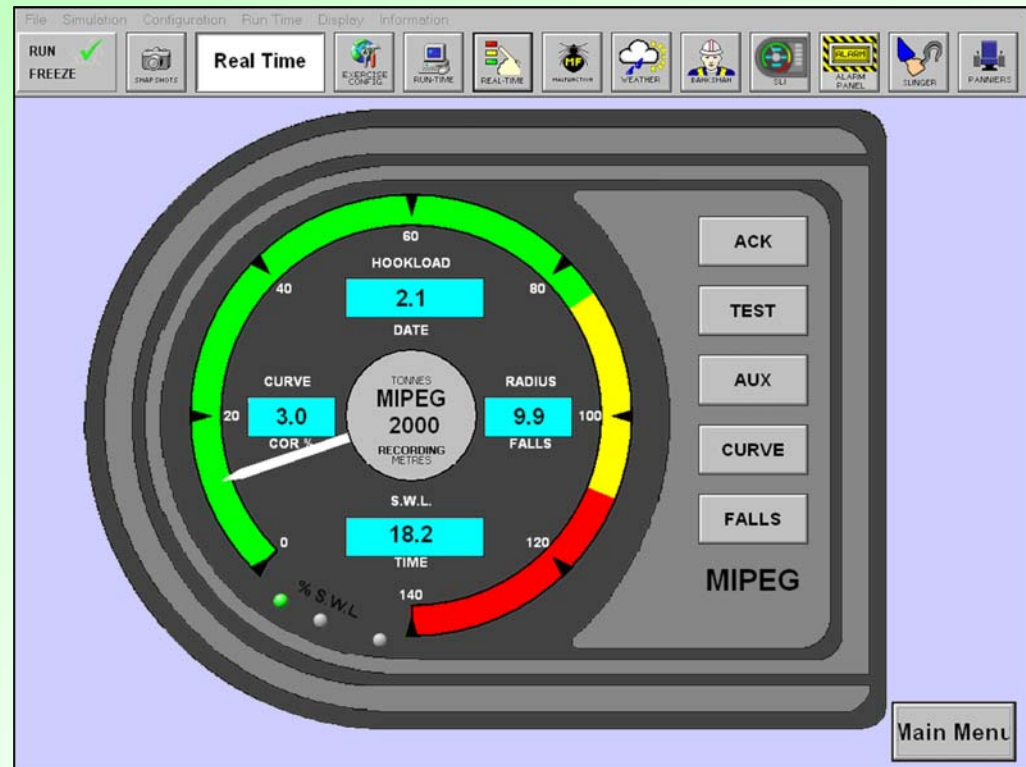


- Offshore Pedestal
- Offshore Knuckle Boom
- Offshore King Post
- Offshore Gantry



# Operators Cab / Chair

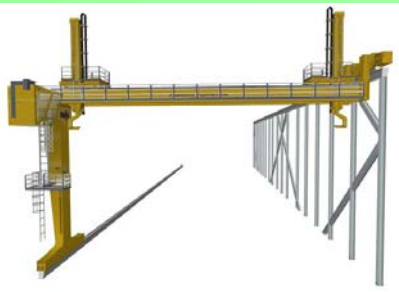
- Discrete Controls (Joysticks & Tactile Switches)
- Motion System
- Safe Load Indicator (MIPEG) & HMI Alarm Displays
- Boom Tip Camera Views
- 2 Way Radio Communication System



# KraneSIM® - Plug and Play Panniers



# KraneSIM-6000 – Plug and Play (Optional Pannier Sets)



MH Riser Gantry  
Crane



Seatrax Pedestal  
Crane



Plus others....

# KraneSIM® : Flat Screen – Base Version





Seatrax Pedestal Crane on the BP Thunder Horse Platform



# KraneSIM<sup>®</sup> – Front & Down Views



View with Offshore Configuration

# KraneSIM – New Simulator – Front & Down Views



Blurred view due to camera shake !

# Various Other Crane Types



# Instructor Station

- Exercise Setup
- Performance Monitoring
- Malfunctions
- Session Plotting
  - Proof of Competency

Configuration Run Time Display Information

Real Time

**Exercise Configuration Menu**

- Environment Configuration
- Weather & Ambient Conditions
- Crane Configuration
- Cable Configuration
- Limit Switch Configuration
- Load Management
- Boat Position

File Simulation Configuration Run Time Display Information

Real Time

**Simulator Load Management**

Load Number		Load Type	Weight Distribution
1	6	None	
2	7	Drill Pipe Basket	Wire Basket
3	8	Fuel Tank	1/2 Height Container
4	9	Skip	Riser
5	10	Small Container	Large Container
		Personnel Basket	Empty 2
		Cable Spool	Empty 3
		Wooden Crate	Empty 4

PREV NEXT

1 to 10  
11 to 20  
21 to 30

Position Mode

Load on Hook Management

Load Style

Main Menu

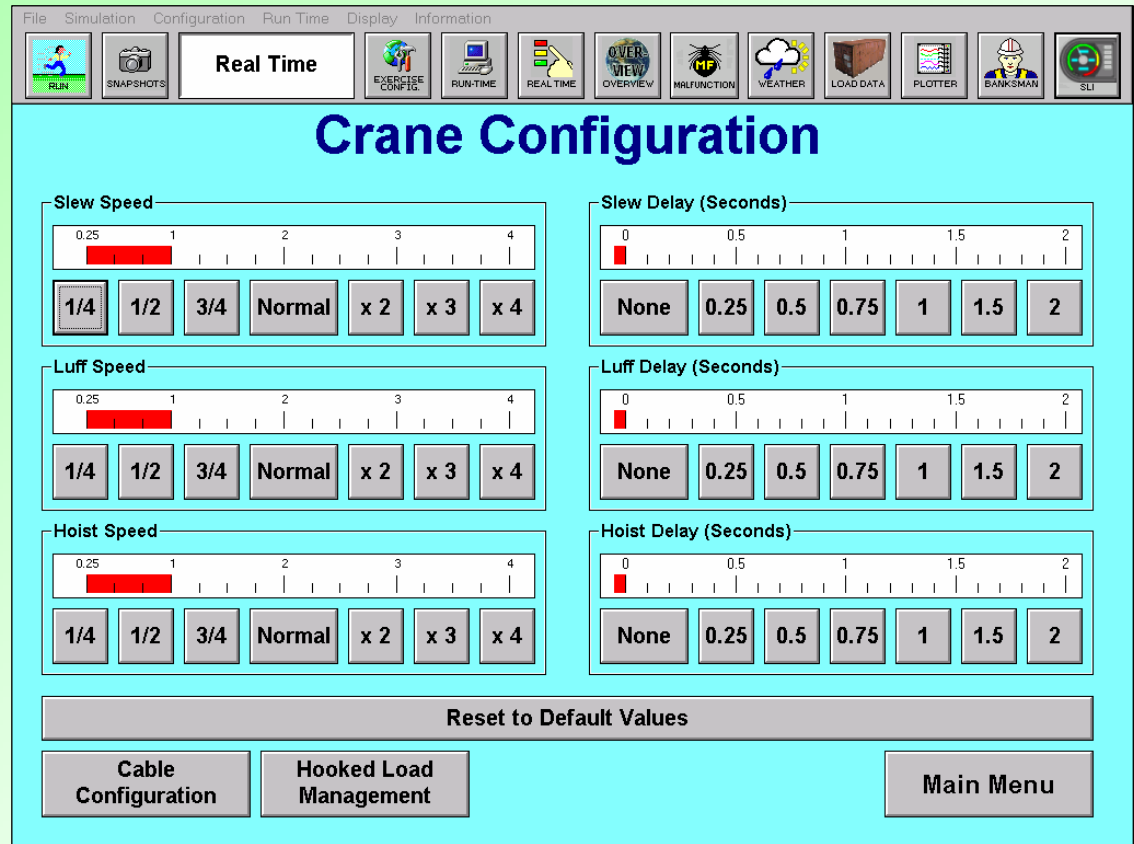
TARE Weight (kg) 800.0

Net Weight (kg) 0.0

Gross Weight (kg) 800.0

# Simulator Modeling (Crane Characteristics)

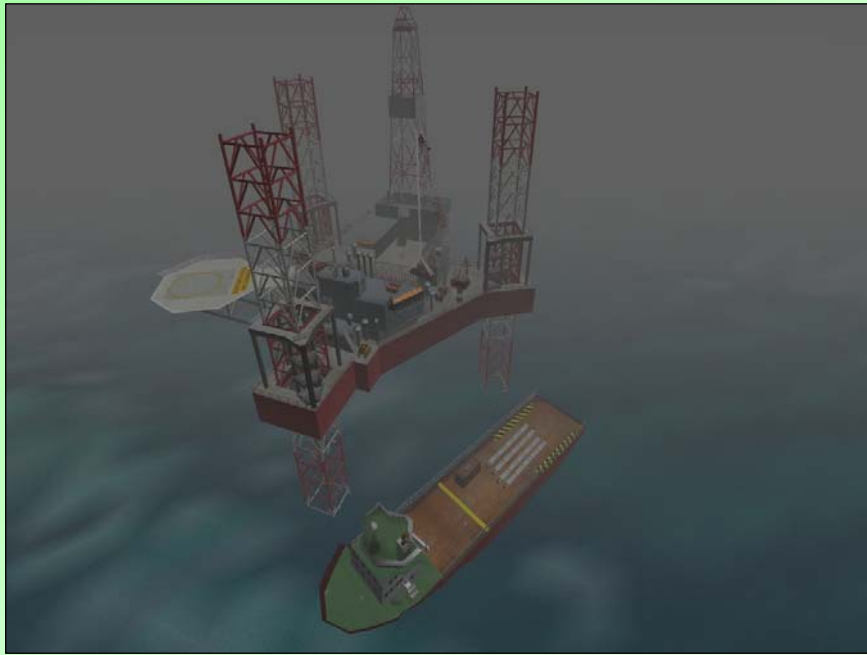
- Diesel Hydraulic and Diesel Electric
- Lifting capacity of main and whip line at different position (radius)
- Speeds and delays
  - Booming
  - Hoisting
  - Slewing
- Ramp up & down times
- Limit Switches for boom
- Etc...



# But the Training is in the Contingencies.....

- Operational Malfunctions
  - Weather worsening
  - Helicopter Movements
  - Inconsistent Communications during Blind Lift Scenarios

## Fog Alert



# But the Training is in the Contingencies.....

- Equipment Failure
  - Engine, Hydraulics, Slings, SLI malfunctions

Malfunction Control		
<b>Crane Malfunctions</b>	<b>Control Malfunctions</b>	<b>Alarms</b>
Diesel Engine Failure	Lock Hoist Joystick at current setting	Low Lube Oil Pressure
Winch Spooling Out	Lock Slew Joystick at current setting	High Lube Oil Temperature
Cavitation of Winch Motor	Lock Luff Joystick at current setting	High Coolant Temperature
Hydraulic System Failure		Low Hydraulic Oil Level
PLC Failure - Joysticks reversed	<b>Load Malfunctions</b>	High Hydraulic Oil Temperature
PLC Low Voltage - Crane moves by itself	Sling Break	Low Hydraulic Oil Pressure
Load Winch Valve stuck - Load Falling	Load Shift	
Slewing Brake Activates Unexpectedly	Load Overweight	
Boom is Falling	Load Snagged	
Crane Swinging in Wind		
Limit Switch Malfunctions		
		Exit

# But the Training is in the Contingencies.....

- Overload Problems
  - Incorrectly manifested loads, Maximum Wave Considerations
- Major Contingencies
  - Fouling Lines on a drifting vessel
  - Loads Still Secured to Vessel
  - ESD, Quick Release & Emergency Braking Systems



Weight Distribution	
TARE Weight (kg)	800.0
Net Weight (kg)	0.0
Gross Weight (kg)	800.0


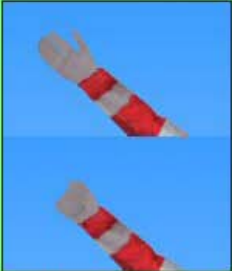









# Integrated Banksman / Slinger Training

- Dedicated Station or Instructor Controlled
- Hand Signals as used in the North Sea
  - Easy to develop API / International versions



## Berth Operator Hand Signals

Manual Control

Simulator Control

					
Hoist	Take the Strain	Lower	Inch the Load	Travel Right	
					
-None-	Travel Left	Cease Lowering	Stop	Emergency Stop	Twistlock

Select Banksman to give signal

Banksman A		Banksman C	
	A		D

Student 1 Student 2

Enter Position Mode

Set As Student 1

Set As Student 2

Reset Banksman

Main Menu

# ADVANTAGES OF SIMULATOR TRAINING

- The development of the Crane Simulator has been partially funded by the Health and Safety Executive (HSE) - thus it has their full backing.
- The HSE has agreed that the simulator can be used for 2 yearly crane operator assessments as required by British Standards BS 7121 Part Eleven.
- The simulator can be used for reassessment of a crane operator's existing level of competence. It should not be used to move an operator to a higher level of competence.

# COST/ OPERATIONAL ADVANTAGES

- No disruption to offshore operations.
- No requirement for supply vessel presence.
- Event is not weather dependent
- Saving on helicopter seats/transportation.
- No day rate charges for crane operator assessor to travel offshore.
- Crane operators can be assessed during their leave time.
- The crane operator is trained in the correct responses to emergency situations that can not be exercised offshore.
- Use of the simulator is HSE approved.
- The most cost effective way to comply with BS 7121 Part 11 re-assessment requirements.

**END OF  
PRESENTATION**