



# 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

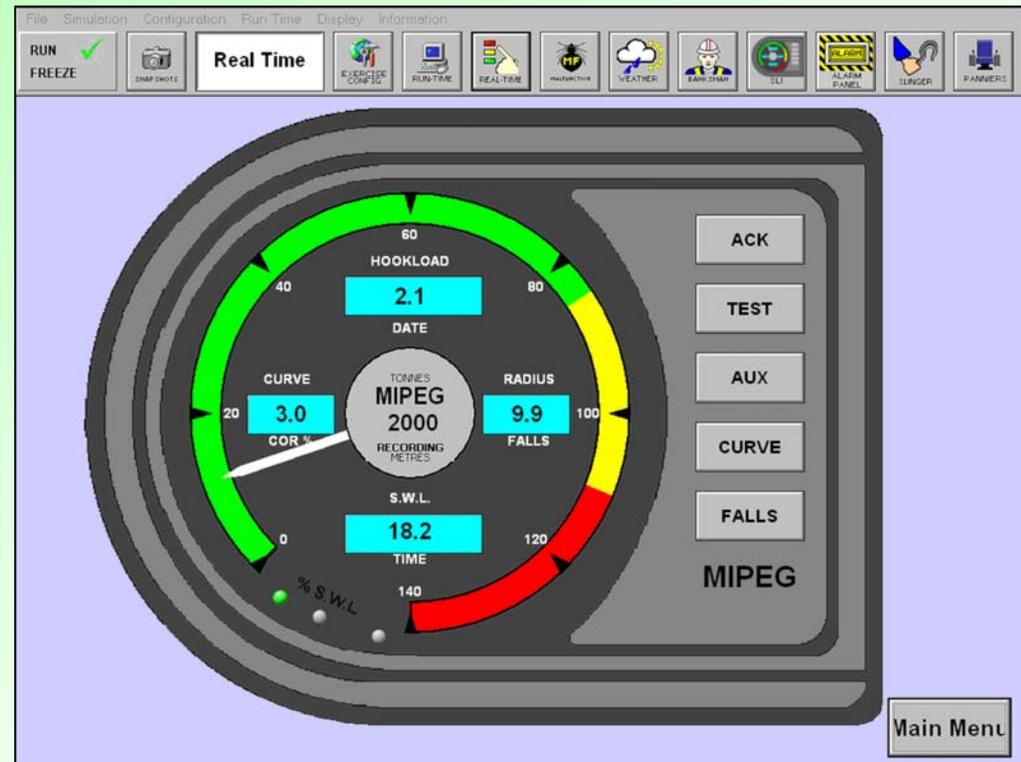


- Offshore Pedestal
- Offshore Knuckle Boom
- Offshore King Post
- Offshore Gantry



# Operators Cab / Chair

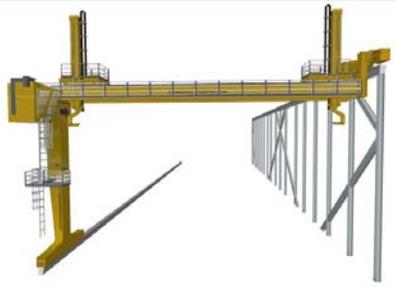
- Discrete Controls (Joysticks & Tactile Switches)
- Motion System
- Safe Load Indicator (MIPEG) & HMI Alarm Displays
- Boom Tip Camera Views
- 2 Way Radio Communication System



# KraneSIM® - Plug and Play Panniers



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



MH Riser Gantry  
Crane



Seatrax Pedestal  
Crane

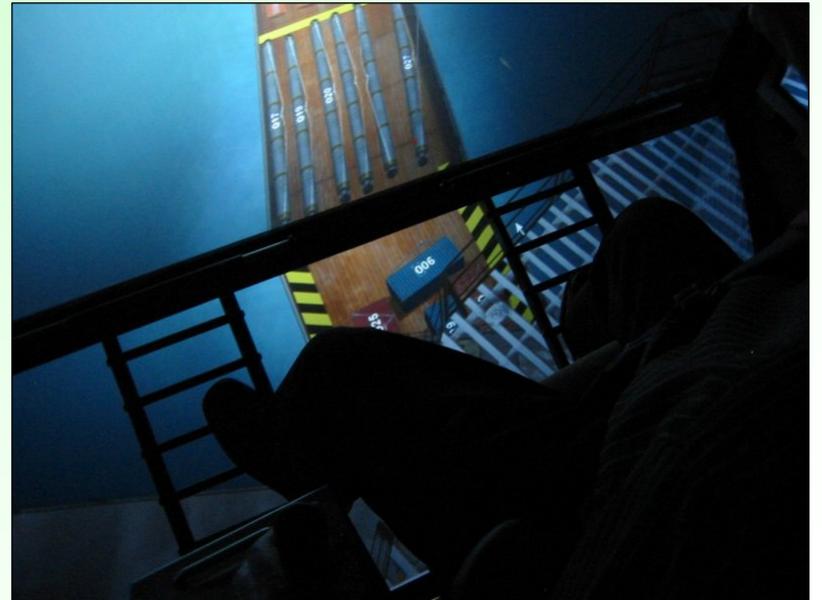


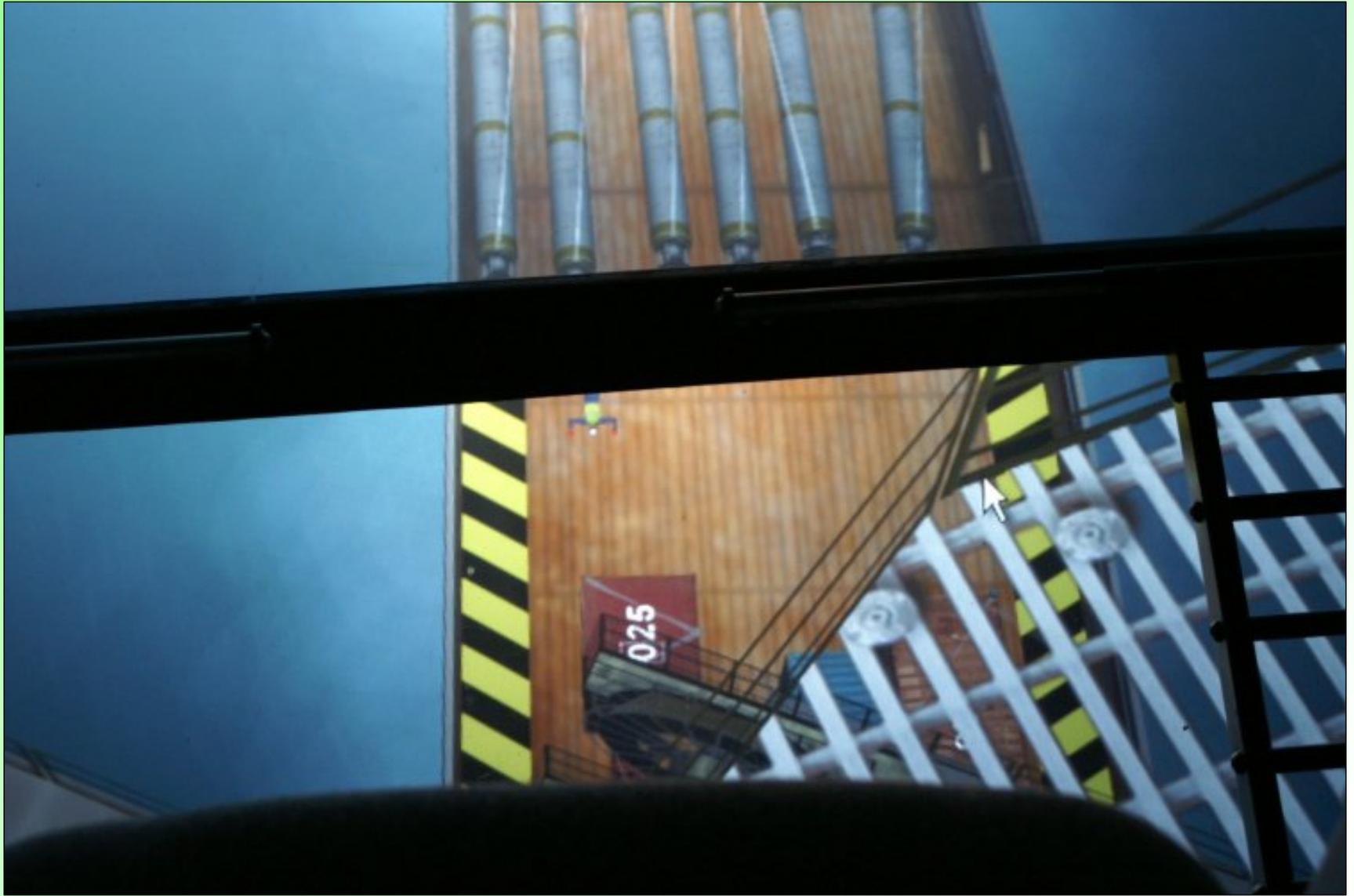
Plus others....





Seatrax Pedestal Crane on the BP Thunder Horse Platform





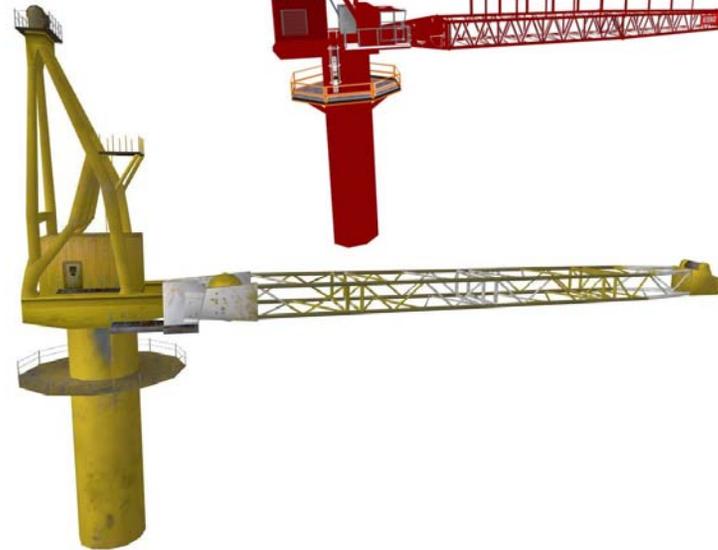
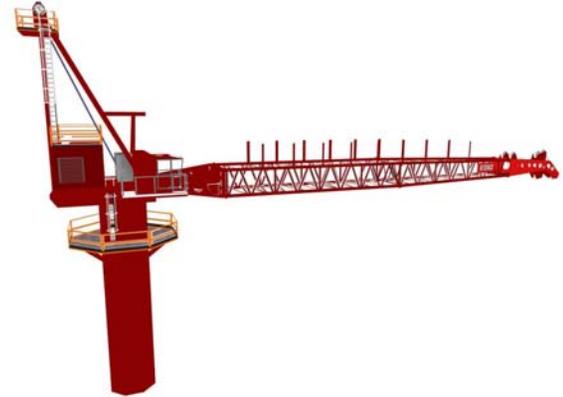
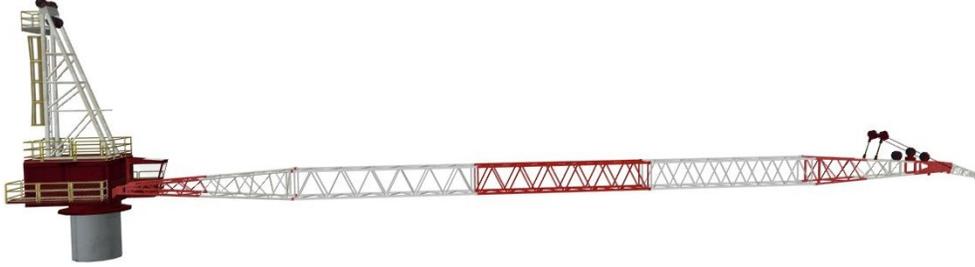
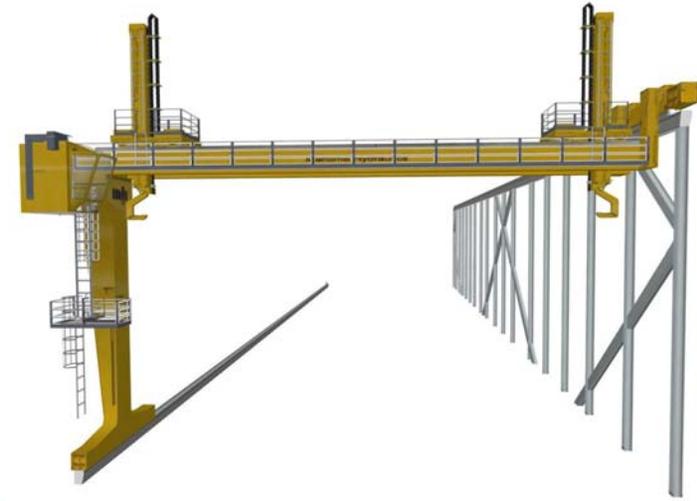
View with Offshore Configuration

# 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 CONFIG RUN-TIME REAL TIME OVERVIEW MFLFUNCTION WEATHER LOAD DATA PLOTTER

## 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 EXERCISE CONFIG RUN-TIME REAL TIME OVERVIEW MFLFUNCTION WEATHER LOAD DATA PLOTTER BANKSMAN SLU

## 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

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

Position Mode Load on Hook Management Load Style Main Menu

# 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...

**Crane Configuration**

**Slew Speed**

0.25 1 2 3 4

1/4 1/2 3/4 Normal x 2 x 3 x 4

**Slew Delay (Seconds)**

0 0.5 1 1.5 2

None 0.25 0.5 0.75 1 1.5 2

**Luff Speed**

0.25 1 2 3 4

1/4 1/2 3/4 Normal x 2 x 3 x 4

**Luff Delay (Seconds)**

0 0.5 1 1.5 2

None 0.25 0.5 0.75 1 1.5 2

**Hoist Speed**

0.25 1 2 3 4

1/4 1/2 3/4 Normal x 2 x 3 x 4

**Hoist Delay (Seconds)**

0 0.5 1 1.5 2

None 0.25 0.5 0.75 1 1.5 2

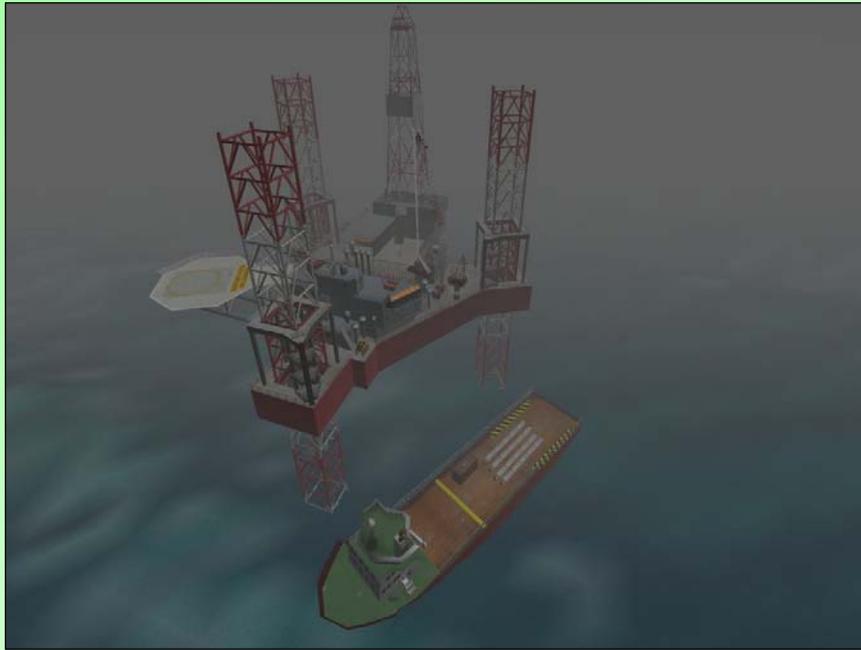
Reset to Default Values

Cable Configuration Hooked Load Management Main Menu

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

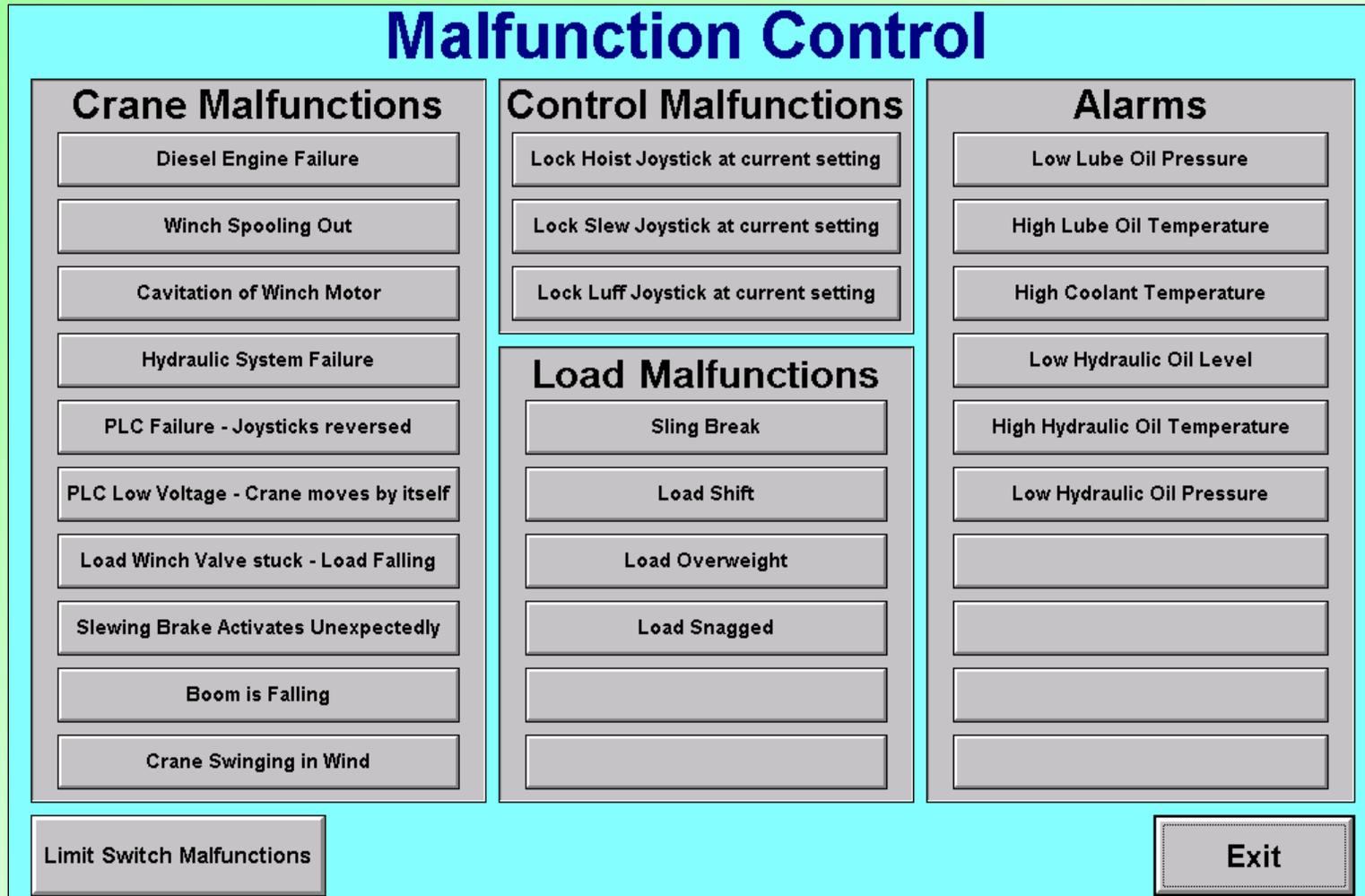
- Operational Malfunctions
  - Weather worsening
  - Helicopter Movements
  - Inconsistent Communications during Blind Lift Scenarios

## Fog Alert



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

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



# 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

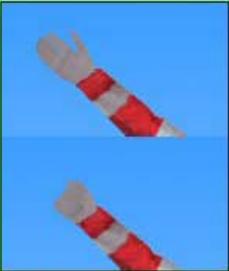
## Berth Operator Hand Signals

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



A

Banksman B



B

Banksman C



C

Banksman D



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**