

InterAct

Safe Replacement of Offshore Cranes in the Cook Inlet - Challenges and Lessons

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an **ACTEON** company



Safely Remove and Replace (2) Offshore Platform Cranes

- **Erect Temporary Crane**
 - 35 Ton Capacity
 - 120 ft Boom

- **Remove and Replace (1) Pedestal**
 - 26 Ton x 50 ft

- **Remove and Replace (2) Pedestal Cranes**
 - 31.5 Ton Capacity
 - 70ft Radius



Environmental

- **Cook Inlet Tidal Currents**
 - 14-Knot Peak Flow
 - Reverse Direction Twice Daily
- **Solution**
 - Plan Lifts for Slack Tide
 - 1-2 hour Window
- **Winter Ice**
 - 6 months
- **Solution**
 - Execute April-September



March 2013

Existing Crane Load Limitations

- South Crane Capacity
 - 28,000 lbs @ 35ft Radius
- New Crane Component Weights
 - 40,000 lbs Machinery House

Work Boat Logistics

- Locate and Secure Contract
 - Mobilize from Gulf of Mexico
 - 105ft x 30ft Deck Space

Solutions

- Temporary Crane
 - 27,000 lbs Skid Beams
 - Pre-Engineered Lift Plans
- Boat Loading Plans
 - Equipment Weights
 - Crane Capacity



June 2013

Mobilize Temporary Crane InterAct

Transportation to Cook Inlet

Houston to Seattle

- Trucks w/ Trailers

Seattle to Anchorage

- Barge w/ Trailers

Anchorage to Docks

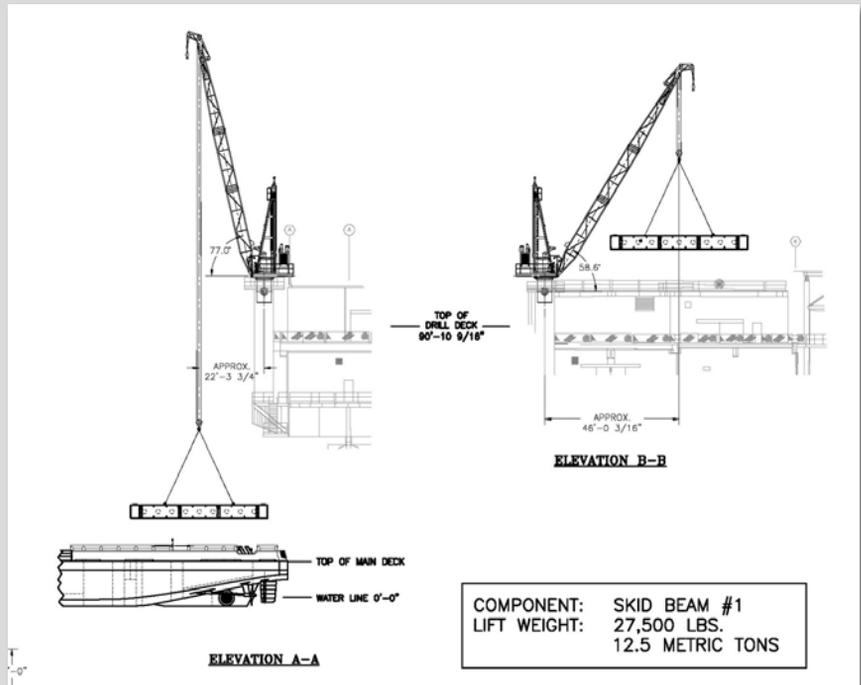
- Trucks w/ Trailers

Docks to Platform

- M/V w/ Components

Lift Plan

- Boat Captain
- Crane Operator



ECR-12000 Skid Beam Lift Plan

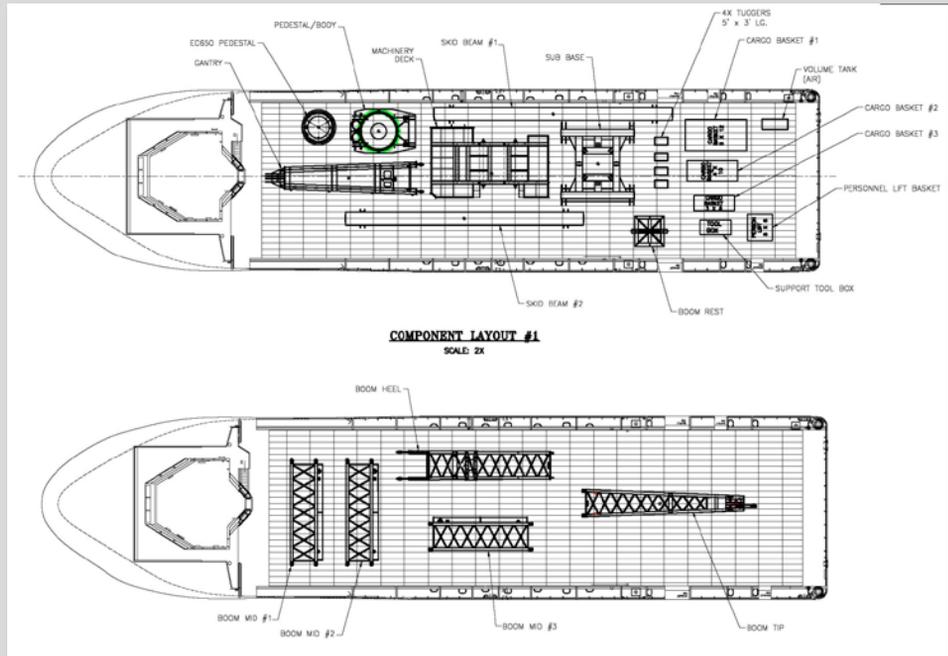
M/V Masco Endeavor with EC-12000 Load Layout

➤ Split Load

- Reduce Risk of Injury
- Decrease Congestion
- Reduce Risk of Equipment Damage

➤ Contingency Plan

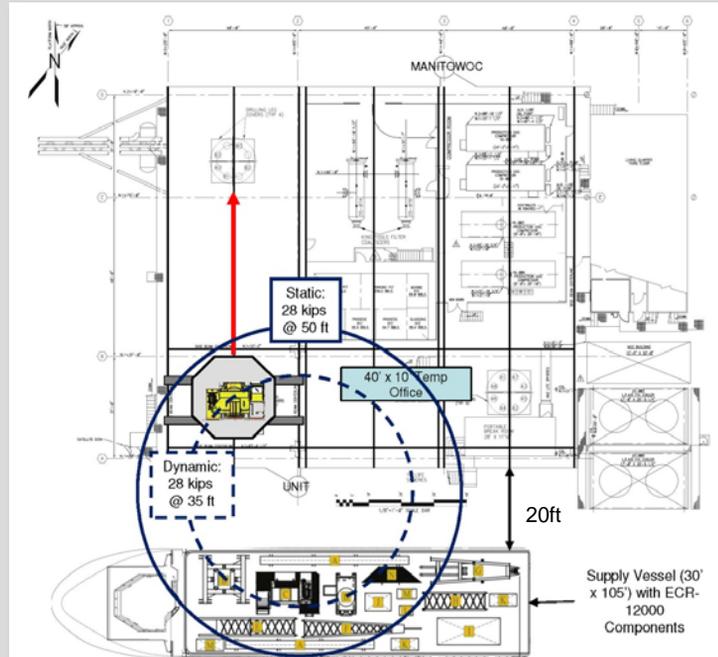
- Spare Boom Section at On-Shore Base



ECR-12000 Crane and Boom Loads

Pre-Engineered Lift Plans InterAct

- ECR-12000
- Unload & Install
- Skid Beams-Max Lift
 - 27,500lb each
- Unit Crane Load Radius
 - Dynamic - 35 Feet
 - Static – 50 ft
- Boat Location
 - Max Lift at Centerline
 - 20 ft to platform edge
 - 35 feet to platform legs



Lift 1. Use Unit to install ECR-12000 (ex. Boom) over WR 2; skid north skid beam to grid line C (27,500 lb max lift for skid beams)

Safely Working Over the Water

Rig and Remove Existing Pedestal

- 26 Ton x 50 ft long

Rescue Boat

- Supply Vessel Maintains Position Down Current

Work Basket

- Static Load Test Prior to Use

2 Man Work Crew

- Full Body Flotation Suits



July 2013

Safely Rotate Pedestal from Vertical to Horizontal Position

Problem

- Single Crane Lift with Limited Deck Space

Solution

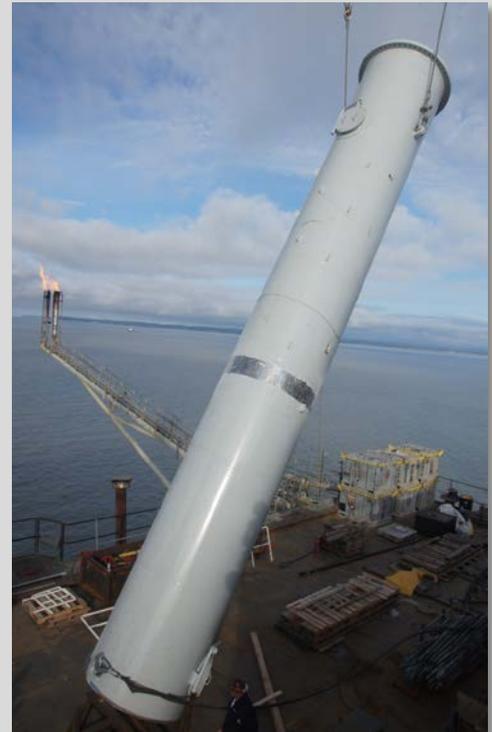
- Design and Fabricate Pivot Plate for Lay Down
- Vertical Lift with Spreader
- Pin to Pivot Plate
- Lower to Deck



Minimize Offshore Installation Costs and Schedule

Collaboration Solution

- Pre-Fabricate New Pedestal and Landing Onshore
- Pre-Fit Stairs and Landings Onshore
- Pre-Rig all Components Onshore
- Tilt-up New Pedestal with Pivot Plate



Safety

- Crane Rigging Management Procedure
 - Engineering Analysis
 - Experienced Crane Rigging Lead
 - Operations Job Safety Analysis

Contingency Planning

- Crew Rotations
- Extra Equipment
- Well Defined Scope of Work
- Team Approach to Problem Solving



Notable Successes

- Safe transfer of new pedestal from horizontal to vertical position
- Pre-fabricated landing provided safe access for welding
- Minimized offshore welding on new South Crane pedestal



Project Shortcomings & Solutions

Problem: Commissioning revealed hydraulic problems not found at factory

Solution: A rigorous FAT to expose and repair deficiencies at the factory shop

Problem: Field service from hydraulic vendor was not available when required

Solution: Plan ahead to have factory representatives on site during commissioning

Problem: Crane delivery was schedule driven requiring completion on the job

Solution: Allow sufficient time to meet customer specifications and test final product



“Project will not be successful if there is a single lost time accident”

Key to Project Success....Plan, Implement, Audit, Empower

- Plan overall project, schedule, and engineer months ahead considering work scope, work site location, project contingencies, logistical issues, and safety considerations
- Implement group safety meetings to create an “incident free culture”
- Audit each others daily activities to ensure the task is being performed safely
- Empower each individual with the ability and responsibility to shut down the job if they feel the task is not being done safely.

Results

- **>23,000 Man Hours w/o LTA**

We plan. We engineer. We deliver. You succeed.