



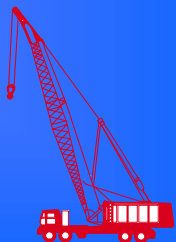
Crane Rental Association of Canada

Crane Boom and Other Crane Structural Repairs

David Wood

President, WHECO Corporation

June 7, 2014

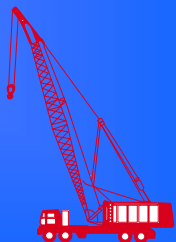




CHANGING THE PARADIGM

Truth vs. Fiction

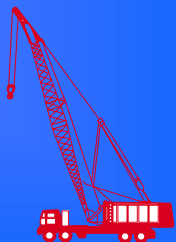
- For years the manufacturers have pushed new versus repair to crane owners
- Don't confuse manufacturer policy with Federal law
- **Manitowoc & Tadano** – are taking the lead as they understand the importance of taking care of the customer





PROJECT DRIVEN

- Repair companies take on challenges that others can't or don't want to do
- A repair services vendor must be reputable and provide safe, compliant, documented, warranted, insured, time and cost effective repairs
- Help you understand your right to repair your equipment





TOP REASONS TO CONSIDER A REPAIR OPTION

- Strengthens the Decision Making Process
 - Knowing the facts and options help make a more informed decision
- Measures Vendor Competency and Candor
 - Is replacement the only option?
- Compares Vendor Facilities, Methods, Processes and Practices





TOP REASONS TO CONSIDER A REPAIR OPTION

- Benchmarks the Total Cost to Repair
 - Allows you to factor in hard costs of the repair and soft costs like down-time
- Challenges Vendors to Compete at a Higher Level
 - Forces competition





CAN A REPAIR BE BETTER THAN NEW?

Yes!

- Manufacturing is process driven and processes can be faulty and variations occur
- We know this because we see it in product that comes to us for repair
- We know this because we see it in new product we purchase for replacement





CAN A REPAIR BE BETTER THAN NEW?

What Makes it Better Than New?

- Survey Process
- Scope of Work
- Oversight
- Documentation
- Post-Repair Inspection
- Warranty





OSHA

- The new OSHA Standard addresses repaired/adjusted equipment in the **1900.1412** under the title “**Inspections**”, specifically **1900.1412 (b)(1)**
 - Essentially, regular inspections to cranes are required by federal law. So if a repair or adjustment has been made to a crane it needs to be inspected by a “qualified person” prior to being put back into service.





OSHA

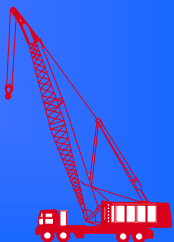
- **1926.1412 (b)(1)** specifically provides for the qualified person to use the OEM criteria or an RPE (registered professional engineer) to develop criteria for the repair or adjustment.





OSHA

- The manufacturers are very quick to say that if they do not perform the “repair” that it then becomes a “modification”, which then under OSHA regulations they say requires the approval of the manufacturer.





OSHA

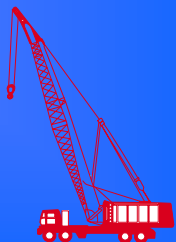
- OSHA does say that, however they also have a provision if the manufacturer refuses to review the request or declines to review the technical merits of the proposal then a qualified person is allowed. OSHA regulations are also there to protect the interests of the crane owners as well as the insurance companies.





OSHA

- Where manufacturer equipment criteria are unavailable or inapplicable, the qualified person can determine if a registered professional engineer (RPE) is needed to develop criteria for the repair/adjustment. If an RPE is not needed, the employer must ensure that the criteria are developed by the qualified person. If an RPE is needed, the employer must ensure that they are developed by an RPE.

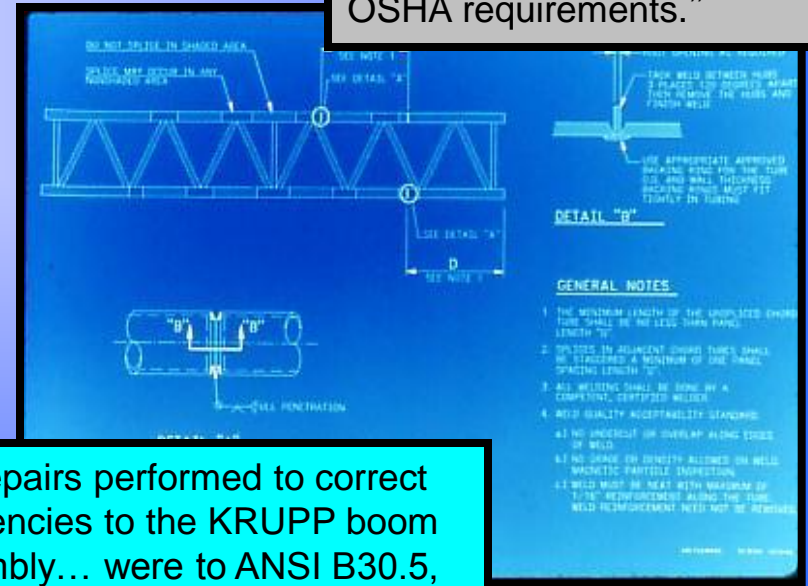




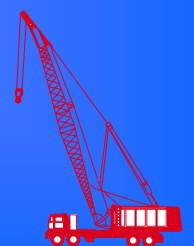
COMPLIANCE / DOCUMENTATION

All repairs should be performed and guaranteed to be compliant and third-party certifiable to OSHA, Cal-OSHA, ANSI and AWS standards

“All repairs performed to correct deficiencies to the Terex T-340 carrier assembly...were to ANSI B30.5, AWS D14.3, and applicable OSHA and CAL-OSHA requirements.”



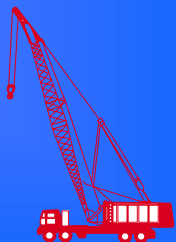
“All repairs performed to correct deficiencies to the KRUPP boom assembly... were to ANSI B30.5, AWS D14.3, WHECO Weldox 130 Procedure and applicable OSHA and CAL-OSHA requirements.”





TYPES OF STRUCTURAL REPAIRS

- Super Structure
- Lattice Boom
- RT Torsion Box
- Hydraulic Truck Crane Torsion Box
- Conventional Chassis
- Hook Roller Tub
- Slew Bearing and Swing Pinion
- Field Campaigns
- Documentation
- Hydraulic Booms – Formed and Box





SUPER STRUCTURE REPAIR

Owner: Crane Company

- Super structure ripped in accident
- Mandrels machined to assure winch alignment maintained
- Damaged removed and replaced with same material

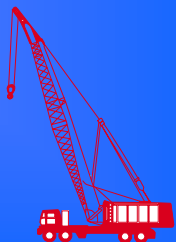




SUPER STRUCTURE REPAIR

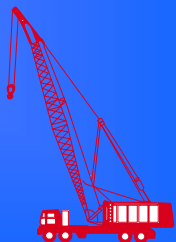
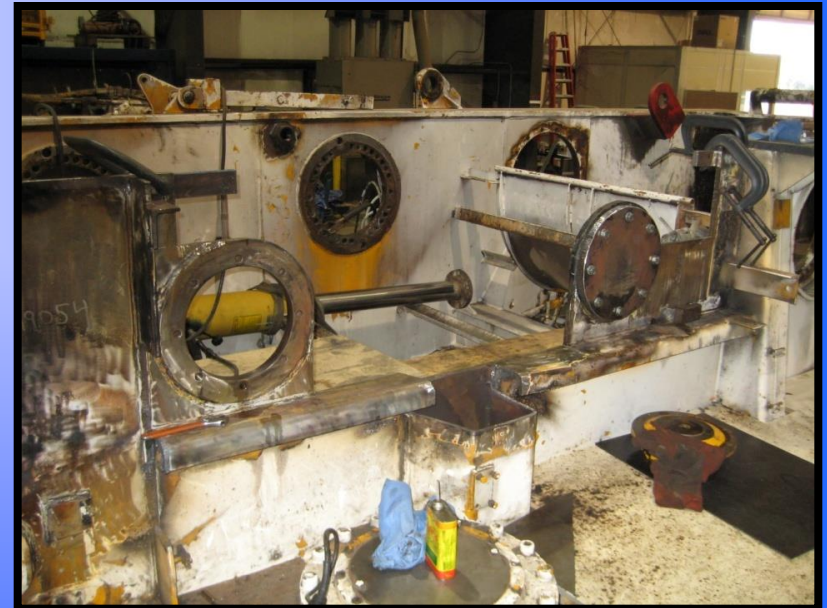
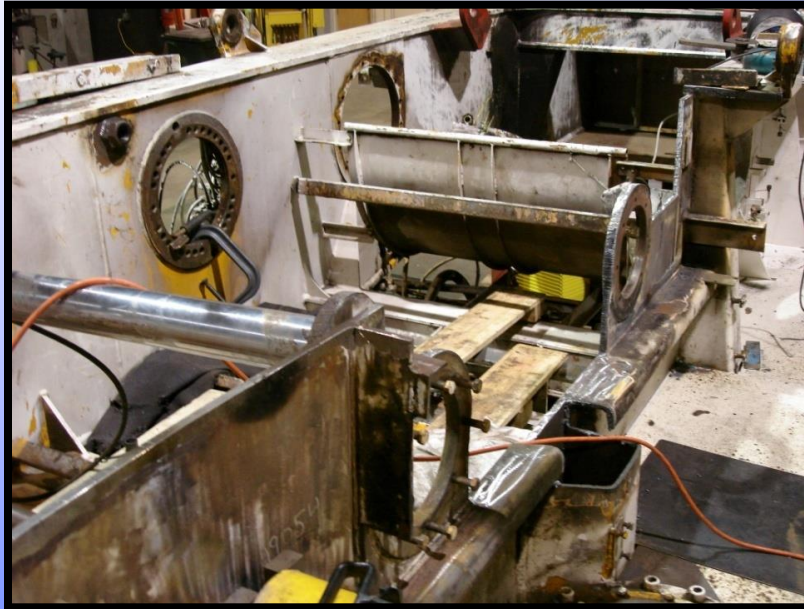


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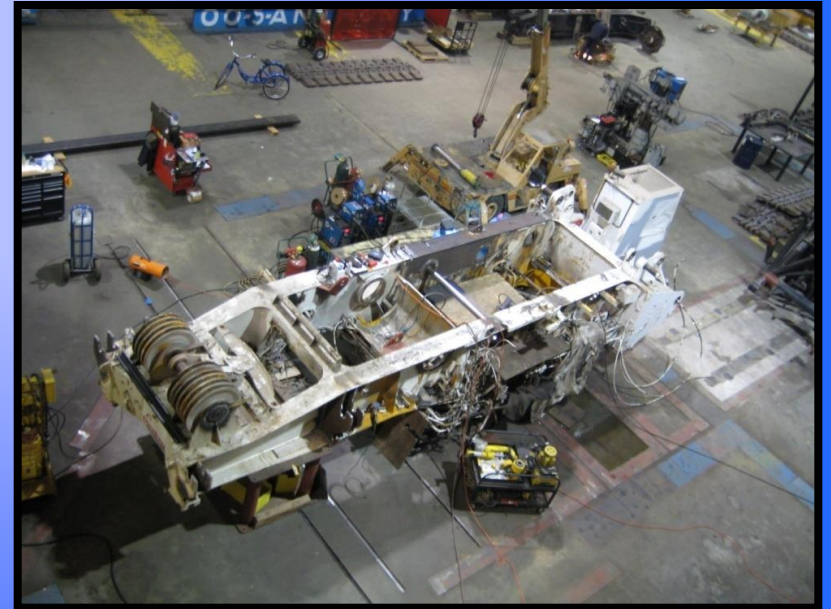




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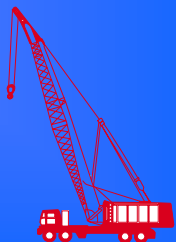


SUPER STRUCTURE REPAIR





SUPER STRUCTURE REPAIR





LATTICE REPAIRS

Four Chord Replacement





LATTICE STRUCTURAL REPAIRS





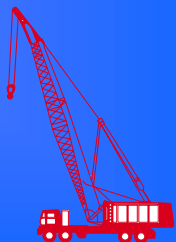
LATTICE STRUCTURAL REPAIRS





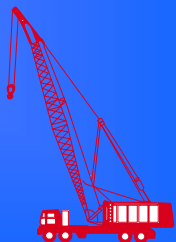
LATTICE STRUCTURAL REPAIRS

Top Chord Replacement





LATTICE STRUCTURAL REPAIRS





LATTICE STRUCTURAL REPAIRS

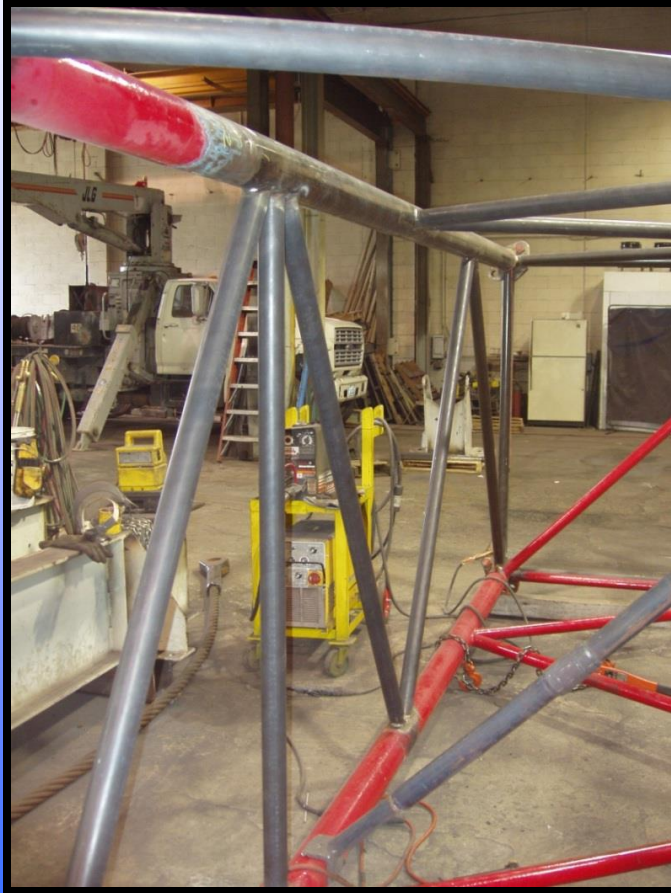
Chord Replacement





LATTICE STRUCTURAL REPAIRS

Chord Section





RT TORSION BOX STRUCTURAL REPAIRS

Owner: Crane Rental Company

- WHECO performed a frame repair and a service life extension project



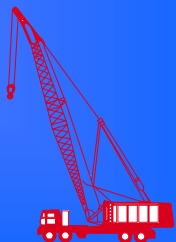


TORSION BOX STRUCTURAL REPAIRS





TORSION BOX STRUCTURAL REPAIRS



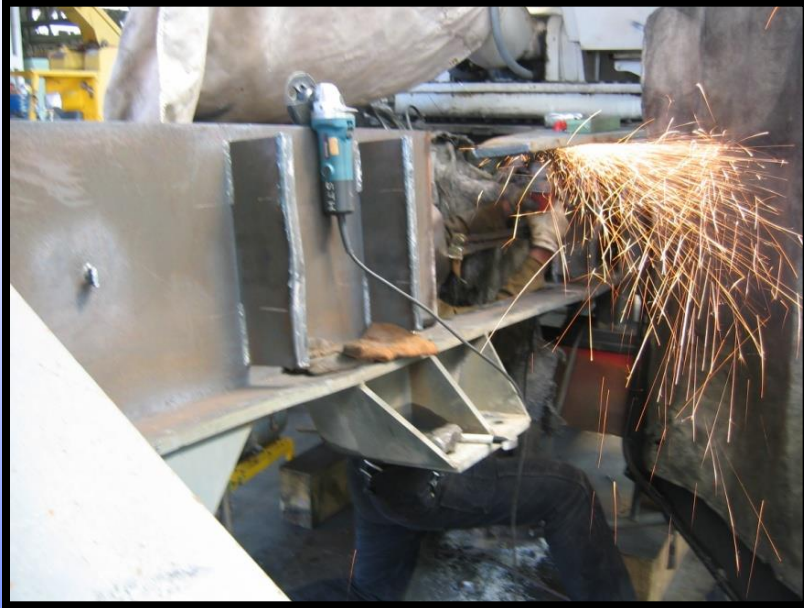


TORSION BOX STRUCTURAL REPAIRS



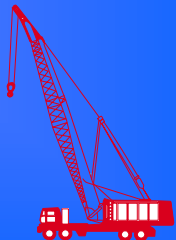


TORSION BOX STRUCTURAL REPAIRS





TORSION BOX STRUCTURAL REPAIRS





TRUCK CRANE TORSION BOX STRUCTURAL REPAIRS

Owner: Crane Rental Company

- WHECO performed a torsion box repair to remove damage between bearing and front outrigger box





TORSION BOX STRUCTURAL REPAIRS





TORSION BOX STRUCTURAL REPAIRS





TORSION BOX STRUCTURAL REPAIRS





CONVENTIONAL CHASSIS STRUCTURAL REPAIRS

Owner: Crane Rental Company

- WHECO performed a structural frame repair to the chassis. The steel was delaminating where the bearing attachment ring was welded to the deck plate.



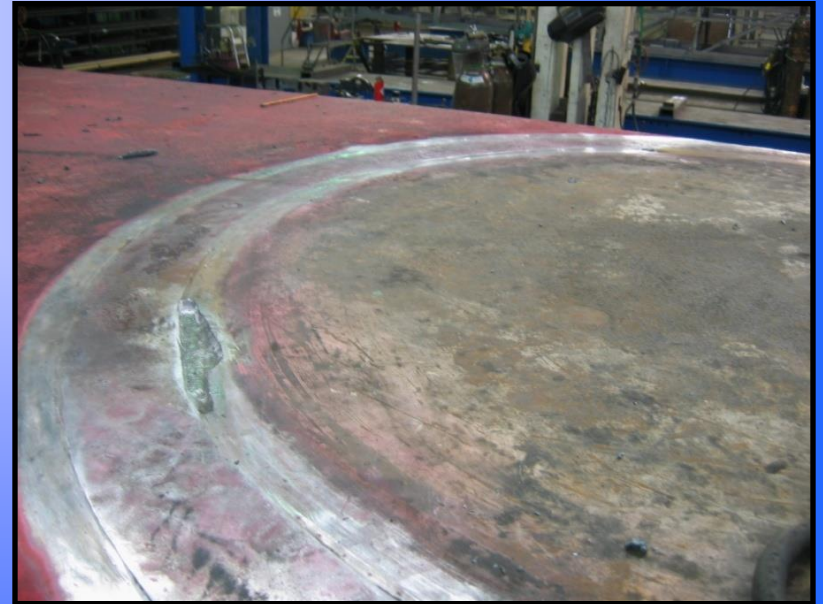


CHASSIS STRUCTURAL REPAIRS





CHASSIS STRUCTURAL REPAIRS





CHASSIS STRUCTURAL REPAIRS

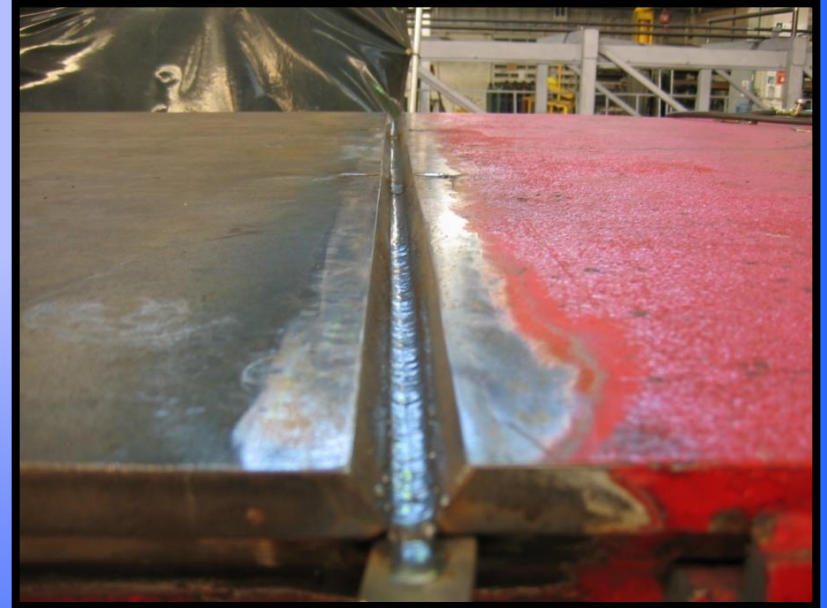


CHASSIS STRUCTURAL REPAIRS





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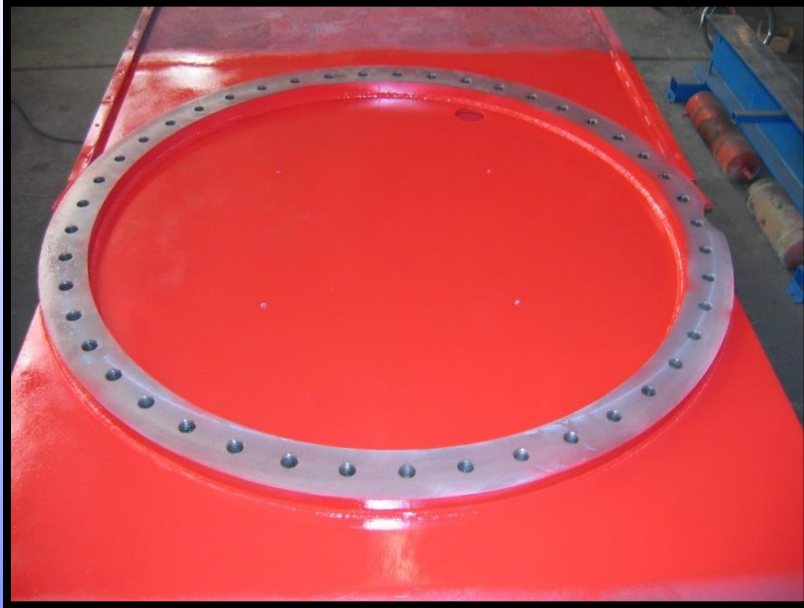


CHASSIS STRUCTURAL REPAIRS





CHASSIS STRUCTURAL REPAIRS

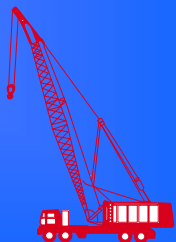




TUB STRUCTURAL REPAIR

OWNER: Stevedoring Company

- A section of the hook roller tub on a 300 ton crane broke causing the crane to un-deck. WHECO removed the tub and replaced it with a used tub in good condition. The used tub was first NDT inspected to assure no hidden flaws were present.



STRUCTURAL REPAIRS



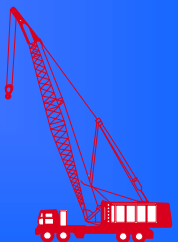


TUB STRUCTURAL REPAIR





TUB STRUCTURAL REPAIR

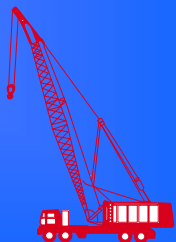




SLEWING BEARING STRUCTURAL REPAIR

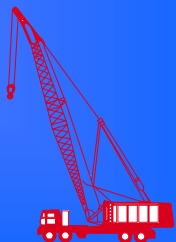
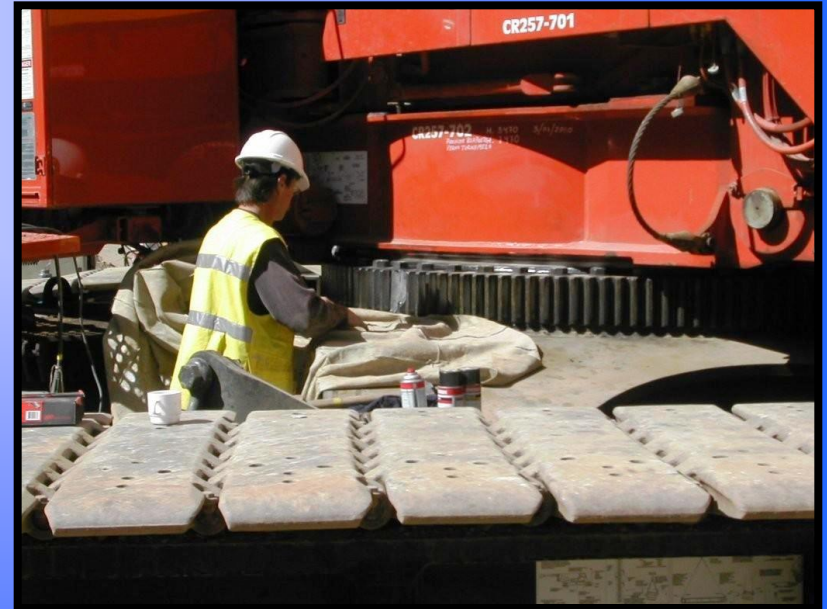
LOCATION: CHILE

- Moving the crane with house lock disengaged caused teeth on the bearing and pinion to fracture.
- WHECO was called in to perform an emergency, temporary repair.
- Items were later replaced when crane was returned to the owner.



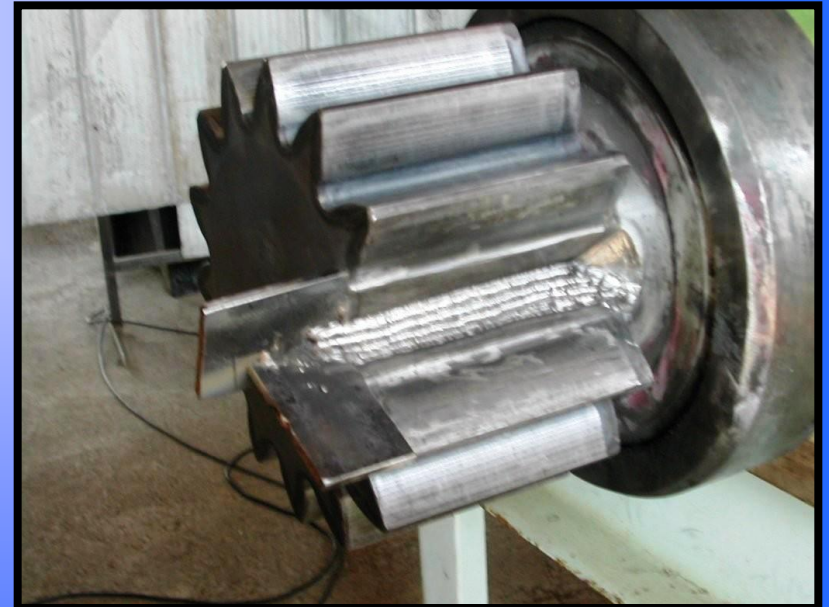


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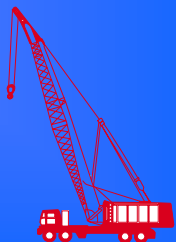


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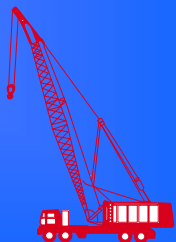
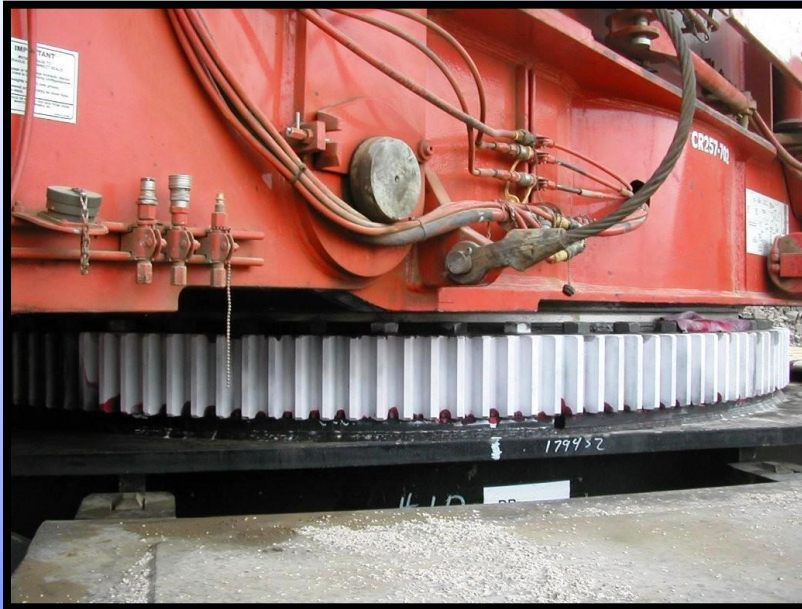


SLEWING BEARING STRUCTURAL REPAIR





SLEWING BEARING STRUCTURAL REPAIR





FIELD CAMPAIGN STRUCTURAL REPAIR

Tower Cranes

- Location: Europe
- Provided 5 welders to perform factory field campaign repairs



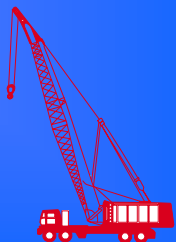


FIELD CAMPAIGN STRUCTURAL REPAIR





FIELD CAMPAIGN STRUCTURAL REPAIR





HYDRAULIC BOOM STRUCTURAL REPAIR

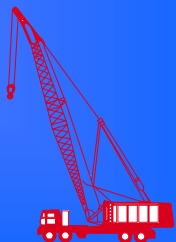
- Formed Booms
- Multi - Plate Box Booms





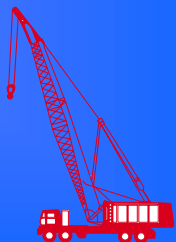
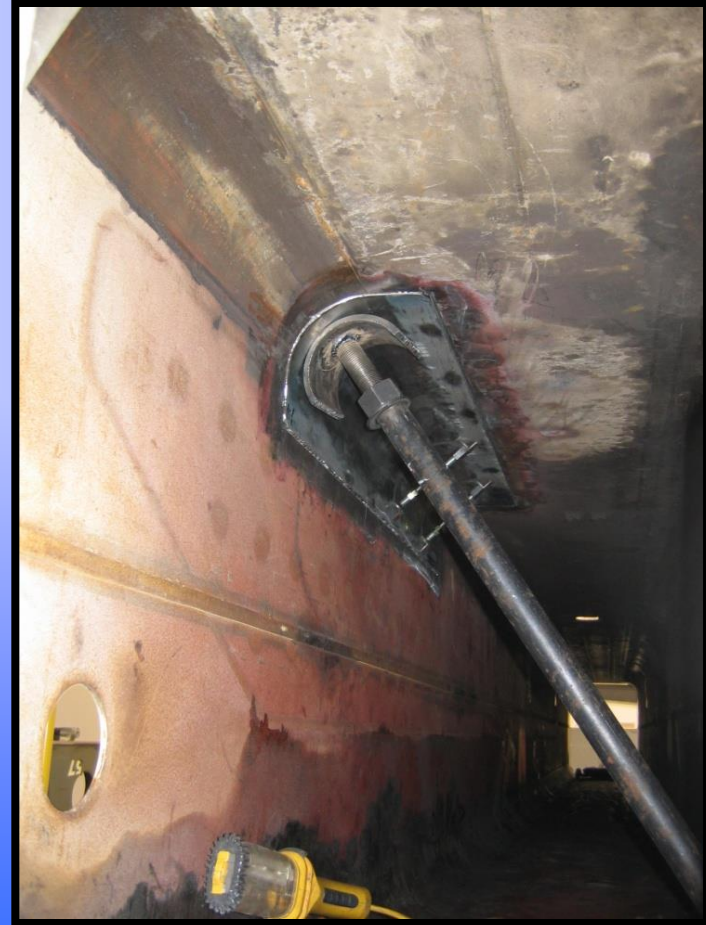
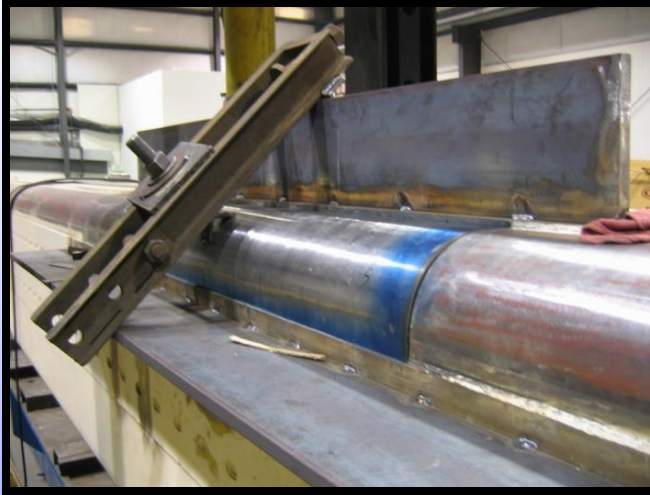
HYDRAULIC BOOM STRUCTURAL REPAIR

Radius Damage





HYDRAULIC BOOM STRUCTURAL REPAIR





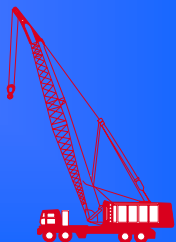
HYDRAULIC BOOM STRUCTURAL REPAIR





HYDRAULIC BOOM STRUCTURAL REPAIR

Top Plate Damage





HYDRAULIC BOOM STRUCTURAL REPAIR





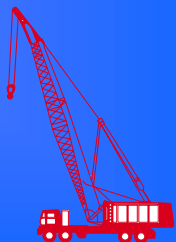
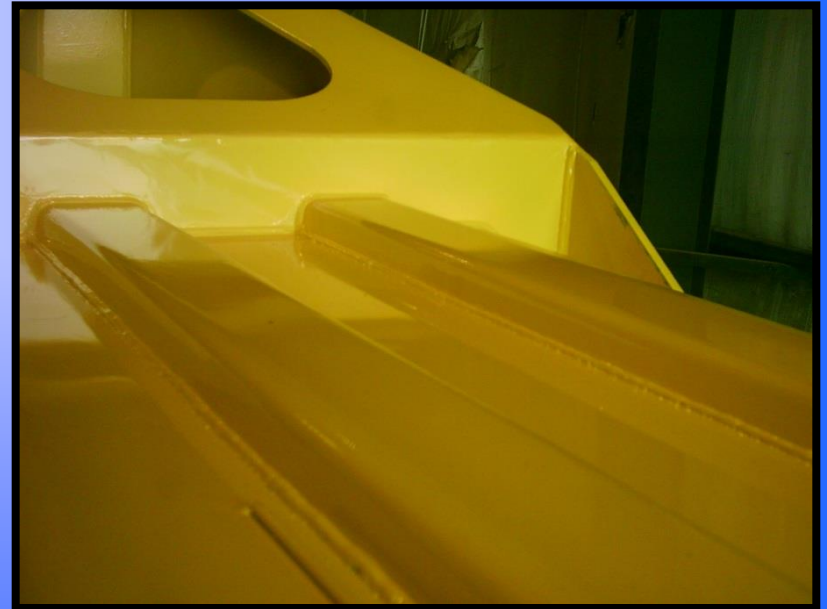
HYDRAULIC BOOM STRUCTURAL REPAIR



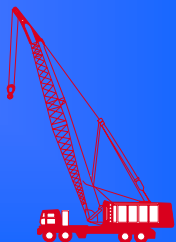


HYDRAULIC BOOM STRUCTURAL REPAIR

Ball Impact Damage



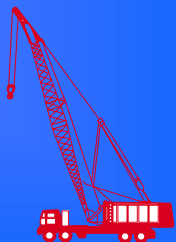
WHAT YOU DON'T WANT TO SEE





CONSIDERATIONS FOR STRUCTURAL REPAIR

- Reputable Repair Service Company
- Insured and Bondable
- Expertise, Facilities & Resources
- Project Experience
- Testing, Inspection & Certification Documentation
- Full Fabrication, Electrical, Mechanical & Hydraulic & Service Capabilities (Turn-Key)
- Knowledge of Laws, Regulations & Standards
- Warranty for Repairs

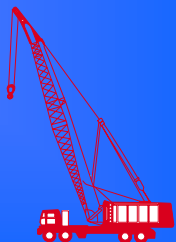




WHECO REPAIR FACILITIES

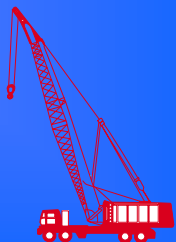
Corporate Offices & Repair Facilities, Richland, WA

- 28,000 square feet / 10 acres
- Boom Tables & Straightening Presses
- Welding & Fabrication
- Hydraulic Service Center
- Machine Shop
- Portable Line Boring & Milling Equipment
- Paint Booth / Shot Blast



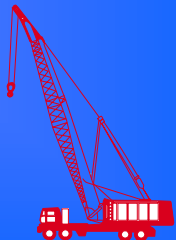
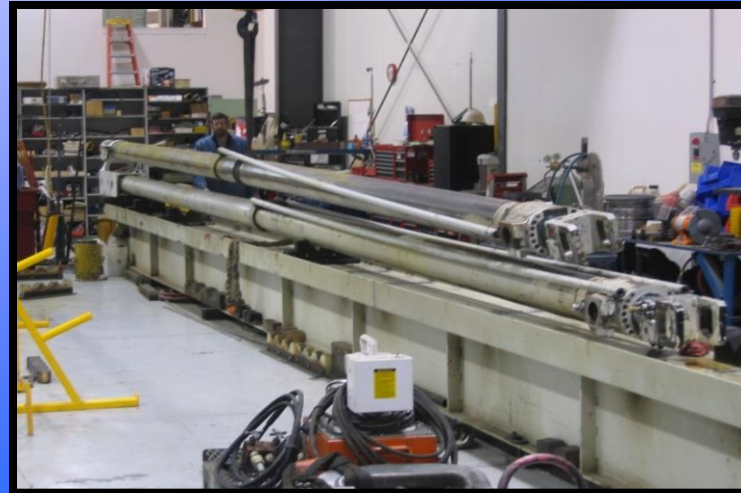


WHECO REPAIR FACILITIES





WHECO REPAIR FACILITIES

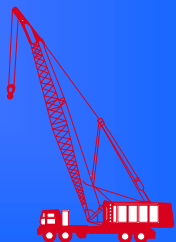




WHECO REPAIR FACILITIES

Repair Facilities Aiken, South Carolina

- 44,000 square feet / 80 acres
- Boom Tables & Straightening Presses
- Welding & Fabrication
- Machine Shop
- 2 – 30 Ton Bridge Cranes that span 100'



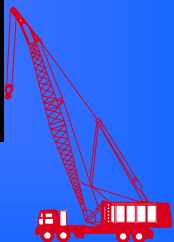


WHECO REPAIR FACILITIES





WHECO REPAIR FACILITIES





WHECO REPAIR FACILITIES

Repair Facilities, Seattle, WA

- 9,000 square feet
- Boom Tables & Straightening Presses
- Welding & Fabrication
- Field Service Trucks



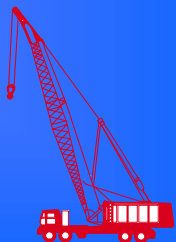
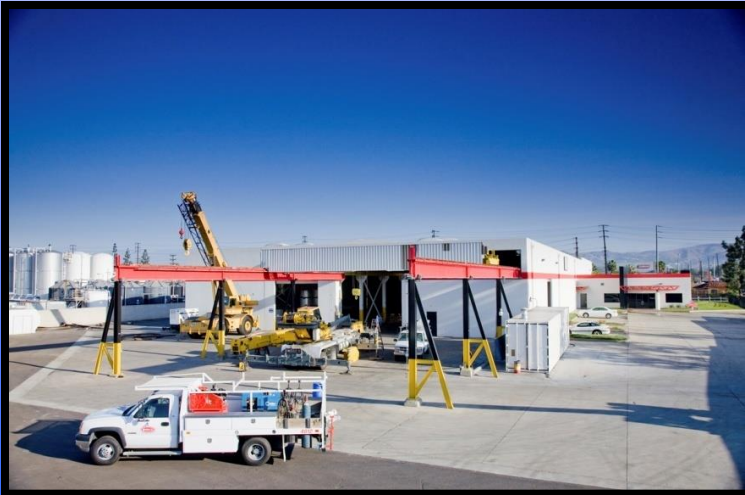


WHECO REPAIR FACILITIES

Repair Facilities

Santa Fe Springs CA (Los Angeles)

- 43,000 square feet / 3.5 acres
- Boom Tables & Straightening Presses
- Welding & Fabrication
- Machine Shop
- Field Service Vehicles





WHECO REPAIR FACILITIES

Repair Facilities, Houston, TX

- 36,000 square feet / 3.5 acres
- Boom Tables & Straightening Presses
- Welding & Fabrication
- Machine Shop
- Field Service Vehicles





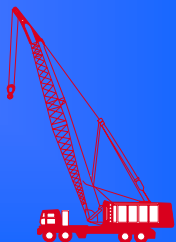
WHECO REPAIR FACILITIES

Repair Facilities
Kwajalein Atoll
North Pacific Ocean





ASSOCIATION MEMBERSHIPS



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**WHECO IS THE INDUSTRY LEADER
IN TURNKEY CRANE ACCIDENT REPAIR AND RESTORATION**

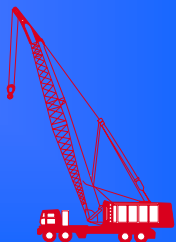
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SUBMIT AN RFP ONLINE!
Receive an estimate for repairs within 5 days.

LEARN MORE
Find out why replacement is not your only option.

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