



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







- 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.







 – 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.







 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 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.







 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 thirdparty 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."

DETAIL "B"

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"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."



COMPLIANCE / DOCUMENTATION

- Engineers Design & Stamp
- Material Testing / Verification
- Welding Specifications
- Welding Certifications
- NDT Testing
- Independent Testing and Certifications

	ABC123 Engineering Co.			
	PD, Box 123456			
WHECO	Anytown, WA 12345			
2989 Kingsgate Way Richland, WA 99354-5311	May 8, 2010			
Atta: Mark Williams				
Reference: WHECO Job #47613				
Mid Section (T2) and Outer Mid Sec	tion (T3) Repair			
Repairs to the mid section and outer mid section r adhere to the following;	eferenced above shall consist of and			
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Yield stress (psi) % elongation (in 27)				
Hardness testing (per ASTM E10-0 The report from the laboratory may or may	 indicating Brinell hardness, sot include the interpretation of the 	WHECO		A American Weidlers
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Management will order replacement materia structural capabilities of the material being t	d which matches or exceeds the eplaced.	www.wheco.com	and Qualification Test Record	West year datal (show pass security
Documentation shall include: -Mill certification/Test papers indicating h	est number.	Webg process Washington	Wi1 Miler 52800	Dauble-V-Groove Weit
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WHECO Corporation + Corp	orate Offices + Phone: (800) 937-4772 + Fax: (866) 75	0-9121		
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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





Owner: Crane Company

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













































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 SRUCTURAL REPAIRS Chord Section









Owner: Crane Rental Company

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













































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









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.





































































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









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.





































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









- Formed Booms
- Multi Plate Box Booms





HYDRAULIC BOOM STRUCTURAL REPAIR Radius Damage



























Top Plate Damage























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












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'





























Repair Facilities, Seattle, WA

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









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









Repair Facilities, Houston, TX

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







Repair Facilities Kwajalein Atoll North Pacific Ocean









ASSOCIATION MEMBERSHIPS





CRANE CERTIFICATION ASSOCIATION OF AMERICA







American Welding Society

Sustaining Company Member





INLAND MARINE UNDERWRITERS ASSOCIATION





WHECO WEBSITE







Thank you for your interest in WHECO Corporation



