



A Wheco Corp. welder makes repairs to a section of a lattice boom.

Repair or Replace?

Booms and other structural work must be handled with care

Editor's Note: *It seems boom repair is a topic that everyone wants to talk around but not about. This article was supposed to be a crane owner's guide to successful lattice boom repair. Instead, it is more of a crane owner's guide to risk assessment. Lattice booms were picked specifically in order to keep the discussion more focused, but many of the issues also pertain to telescopic booms and other structural repairs.*

Lattice booms get dinged up in transport, bent during everyday operations, and of course, catastrophically damaged in accidents. Lacings can generally be repaired, but when chords are damaged, a crane owner's options become more complicated.

Crane manufacturers have boom repair policies in place governing the dos and don'ts. This primarily relates to lacing repair and replacement, as most manufacturers will not approve repairs to chords. When chords are damaged, the manufacturer is likely to tell the crane owner that replacement of the damaged boom section is the only option.

Kobelco's policy is typical. "We develop a lattice boom repair policy for each crane when it is designed. Each model and boom section has a detailed procedure for repair as well as a detailed description of what is in or not in the allowable tolerance, such as details of size and depth of a ding that requires repair/replacement," explains Jack Fendrick, general manager for Kobelco Cranes North America Inc., Houston, Texas.

He continues: "We request the welder doing the repair be American Welding Society (AWS) 6GR certified. The welder and the customer take full liability for any repair. We dictate the number of lattices allowed to be repaired/replaced per boom section over the life of the section. We also require that any repair on a Kobelco crane use genuine Kobelco parts.

"Kobelco does not allow repair work to be done on any chords. If a chord has been damaged beyond acceptable tolerance, the boom section is not allowed to be repaired and should be replaced with a complete boom section."

One company that differs on this point is Liebherr. Cranes produced by Liebherr Ehingen – that is LTM 1030 to LTM 11200 all-terrain cranes and LR 1350 to LR 11350 crawler cranes – can have structural repairs made by the company's repair team in Houston or by authorized third parties. This includes chord repair, depending on the damage.

"Liebherr Ehingen takes a global approach to servicing our customers," says Ralf Vieten, executive vice president of service for Liebherr Cranes Inc., Newport News, Va. "We believe we must provide value to the customer. Boom replacement is expensive and time consuming." Through a contract with WHECO Corp., a crane repair and restoration services company based in Richland, Wash., Liebherr Ehingen authorizes structural repairs to its cranes in North America. "We have a similar arrangement with others around the world. We see value in being able to provide structural repairs where the customer is instead of shipping everything back to Germany," says Vieten.

Sharing the responsibility

Editor's Note: *In reality many crane owners choose to have booms repaired, even ones with damaged chords. While some may do the work themselves, many will hire a boom repair or welding shop to do it for them. Yet many crane owners were hesitant to discuss repairs other than those authorized by the manufacturer. The reason they don't want to talk about it is because they don't want the manufacturer to flag their file on that particular crane. It's all about liability. It's not surprising then that boom repair companies keep their customer lists confidential. One representative said his company's client list reads just like the manufacturers' lists and includes large fleet owners, major rental companies and even crane dealers.*

When a crane accident occurs there are lots of parties that get pulled into the resulting lawsuits, not the least of which is the crane manufacturer. So it's understandable why manufacturers have strict boom repair policies. Likewise, many crane owners are cautious for the same reasons.

"Due to the nature of cranes – a repair performed incorrectly puts people's lives at risk. This is a very serious matter and end users should take it into consideration before making a hasty decision to get the crane back up and running. An improper weld or using faulty material can cause catastrophic damage and is not worth any risk," says Fendrick.

Scott Moreland, vice president of sales for Liebherr Nenzing Crane Co., Houston, Texas, elaborates this point with an example: A luffing jib collapsed on an LR model during a wind storm. After simulating the accident through finite element analysis, the manufacturer found a hot spot on a flat plate at the boom butt. "Even though you could not see damage, that spot saw an impact, and its integrity could have been affected. Once steel has yielded, you can't un-yield it." Moreland says a third-party repair facility might not catch that type of damage. Liebherr Nenzing Crane currently does not authorize boom or structural repairs to its cranes by outside companies.

"Ultimately any repair made by someone other than the manufacturer will become the crane owner's responsibility, and it in-

creases their liability," says Moreland. "If the repair is made by a third-party repair shop, they share in the responsibility and liability. The size and capability of the repair shop to defend its work will be important if something ever happens to the crane that can be partly blamed on the repair."

"I don't want to be the company that makes the news because of an accident," says Corey Roberts, operations manager for Zeiger Crane Rental Inc., West Palm Beach, Fla. "That's why when we have damaged lacings, we order replacement lacings from the manufacturer, then we have the dealer or a certified welding company perform the work. We don't do it ourselves. If a chord is damaged we buy a replacement section from the manufacturer."

A crane manager at another crane rental company, who requested anonymity, says his company will send boom sections with damaged chords to a third-party boom repair facility. "But if they determine the boom can't be repaired, we scrap it," he says.

A good boom repair company will also bear some of the responsibility, offering work that is warranted and insured. There are hundreds of boom repair and welding shops operating across North America, but they are not all created equal. Make sure you know who you are dealing with.

"Structural repair services are very specialized and often challenging," says Jay Shiffler, vice president and director of business development for Wheco. "It is for this reason that some OEMs may only be able to provide limited structural or replacement alternatives to damaged structural components. Too often this leaves the customer with few alternatives and often drives them to use discreet, non-reputable sources for repairing their equipment."

How a crane owner proceeds is ultimately impacted by cost, how long either replacement or repair will take, whether they think repairs can be made according to an acceptable standard, and the chance of future liability due to a faulty repair. The market also has a bearing on these factors. "Manufacturers don't generally have a surplus of boom on hand," says Roberts. "With the market the way it is right now, you might have to wait four to six weeks to get a new boom section."

According to Shiffler, boom repairs can be done that are compliant to all known OSHA, Cal-OSHA, ANSI and AWS standards. "Like repairs to other consumer, commercial and industrial equipment, compliance with federal, state and local laws and regulatory standards must be met and maintained but are not proprietary to the OEM or their distributors and agents," explains Shiffler. "This position is supported by a U.S. Department of Labor standard interpretation letter (01/18/1995 - PPM crane repairs) that addresses repairs and compliance with federal standards. Regarding repairs, OSHA only requires the approval of the manufacturer where 'modifications or additions which affect the capacity or safe operations of the equipment shall be made....' The standards interpretation letter is careful to distinguish between repairs and modifications and additions."

But as the crane owner, if you don't follow the regulations to the letter, you could be the one left responsible should a future failure occur, says Greg Augustine, Manitowoc Crane Care manager of technical support for crawler cranes, Manitowoc, Wis.

A second OSHA interpretation letter on the subject exists. The letter, dated Dec. 8, 2003, addresses the issue of modifications or additions to a crane without manufacturer approval where the manufacturer is still in existence. As it relates to a manufacturer denying approval of changes, it states: "In the case of both modifications and operational specifications, where the manufacturer is in existence, reviews the technical merits of the application for approval and denies the application, the employer must abide by that decision – the standard does not permit the employer to override the denial by obtaining approval from a qualified engineer."

The letter also notes that this issue is being discussed as part of the wording of the new cranes and derricks portion of Subpart N, currently under revision.

To find either letter in its entirety go to www.osha.gov and conduct an advanced search in Interpretations for "1995 - 01/18/1995 - PPM crane repairs" and "2003 - 12/08/2003 - Modifications or additions to a crane without a manufacturer approval where the manufacturer is still in existence."

Proper training

Editor's Note: *It's crucial that whoever works on your boom, whether it's your own welders or an outside company, knows what they are doing. Certain processes need to be followed, especially if the work is outside the scope of the manufacturer's policies.*

Crane Care's Augustine says Manitowoc will consider repairs to boom chords. After review, if the manufacturer's engineering department determines the repair can be done, they may turn it over to their EnCore rebuild center. In North America, there is an EnCore facility in Arkansas. Elsewhere in the world there are facilities in Germany and China.

Through Crane Care, Manitowoc also offers a boom inspection and repair training program covering standard policy repairs. The course, available only to qualified welders, explains what repairs are allowed, how to do inspections and how to perform repairs properly. Last summer All Erection & Crane Rental Corp. sent 10 of its welders through the course. Crane Care shipped all of the metal stock to the All Erection

training facility in Cleveland, Ohio, where All constructed a mini-welding lab.

The rigorous course consisted of both classroom and hands-on welding training. Manitowoc instructors examined test pieces for defects and quality and also sent sample weldments from each student back to the Manitowoc facility for final destructive testing. After passing all elements of the course and a final written test, the 10 technicians received certification from Manitowoc.

Liebherr Ehingen's training regimen for Wheco and all other third-party providers is similar. "Wheco welders are certified by us to Liebherr Ehingen processes," says Vieten. "Training is conducted in Germany and all welders must be re-certified by the company every two years. In addition to the re-certification, welders from around the world send work every six months to Germany for testing and analysis. We keep a very close eye on the process," he says.

Once a boom repair facility, such as Wheco, is authorized by Liebherr Ehingen, each boom brought in is handled individually. "All instructions come from the factory and repairs must be done with our

instructions and certain materials," says Vieten. But there are limitations. Sometimes repair is not possible and the boom section will need to be replaced.

Shiffler explains that with Liebherr products, Wheco works directly with the manufacturer to determine proper materials and processes. "But if it's another manufacturer's product, Wheco does metallurgical tests to determine proper materials. Then we use an engineer to design each individual repair and welding specifications. The repaired piece is non-destructive tested and certified. Every repair Wheco makes is documented and insured." Wheco has performed repairs on lattice boom cranes, booms and jibs up to 600 metric tons.

As a crane owner, when your equipment needs structural repairs, you want quality work done by qualified people. If you choose not to deal directly with the manufacturer or your dealer, look for a company that's familiar with the industry standards, whose work is documented and independently inspected and certified, and that offers warranty and insurance on repairs. ■