









Case Histories: Power Generation

Biach engineers respond to one of a kind problems encountered by customers in many diverse industries.

Foreign Object Surveillance & Retrieval (FOSAR)- Knowledge & Procedure Documentation	
<p>Customer: Arizona Public Service - Foreign Object Surveillance & Retrieval (FOSAR)</p> <p>Problem: Customer was facing the loss of undocumented worker knowledge, experience and lessons learned by the Maintenance and Fuels groups surrounding the use of the FOSAR system at Palo Verde station.</p> <p>Solution: Biach conducted on-site data collection and interviews with SME's (Subject Matter Experts) from the Maintenance, Radiation Protection and the Fuels groups.</p> <p>We analyzed and organized the data using a structured format to provide both new and experienced crews with easily accessible and understandable" just-in-time" and refresher training, as well as pre-job briefings.</p> <p>Biach produced both web-suitable electronic versions as well as hard-copy bound versions for delivery and access at Palo Verde station.</p>	
Gas Turbine	
<p>Customer: Westinghouse</p> <p>Problem: Customer was having Problems balancing turbine rotors. During high speed testing, rotor bolts would shift outward due to centrifugal force. This was due to the difference in diameter between the bolt and the clearance hole in the turbine discs, which was necessary. To overcome this it would be necessary to force the rotor bolts outward during tensioning.</p> <p>Solution: Biach provided a system consisting of dual tensioners mounted on a rigid frame. We included a cam actuated device to hold the rotor bolts and nuts against the outer portion of the disc hole during tensioning.</p>	
Wind Turbine	
<p>Customer: General Electric</p> <p>Problem: 150 foot diameter blades on windmill caused severe vibrations on couplings joining blade shaft to turbine generator and connecting shafts to gearing.</p> <p>Solution: Biach provided special high capacity tensioners having heavy duty gearing to properly seat the high torque lock nuts being used.</p>	
RPV Stud Tensioning	
<p>Customer: Nuclear Generation Stations throughout the United States</p> <p>Problem: RPV stud tensioning with manual tensioners took 2-3 shifts to complete.</p> <p>Solution: Today's version of the QD-H tensioner and EPN pump allow tensioning in less than one hour, saving critical path replacement power costs, reducing dose to workers and getting plants back on line to produce power sooner.</p>	

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Case Histories: Power Generation, Continued

Reactor to Containment Anchoring	
<p>Customer: GETSCO Leibstadt Nuclear Plant</p> <p>Problem: General Electric wanted a vendor to build equipment for anchor bolts; do the actual tensioning, run tests, verify loads, provide QA data, provide manuals, obtain approvals and release a final report.</p> <p>Solution: Biachs personnel designed special tensioning equipment and successfully handled the entire contract including the approval of the Swiss government.</p>	
Reactor Internals - Bolting	
<p>Customer: General Electric</p> <p>Problem: Customer had two major Problems. One was large tab washers under the nuts; the second was the lack of access for their personnel inside the reactor. Elongation readings had to be taken during assembly and at periodic intervals during the life of the reactor. Personnel had to operate the equipment 25 feet above the joints from outside the reactor.</p> <p>Solution: Biach built compact, two piece tensioners having special bridge type bases, flexible shafts 25 feet long for engaging puller bars with the studs and to rotate the nuts. A built-in electronic sensing device indicated stud elongation. All equipment was operated remotely.</p>	
Heat Exchangers	
<p>Customer: Manning & Lewis</p> <p>Problem: Customer had difficulty tightening nuts and experienced repeated leaks. Current methods involved torque and impact wrenches. Project took all day and frequently they had to shut down and tighten again.</p> <p>Solution: Biach technicians, using our "C" style tensioners, assisted our customer and secured the cover in a little over two hours. They were amazed at the ease and speed of tensioning. Additionally, there were no leaks. They were now able to decrease their assembly time of heat exchangers.</p>	
Circulating And Reactor Coolant Pumps	
<p>Customer: Byron Jackson BWIP International</p> <p>Problem: Manufacturer was having problems assembling large tapered pump shafts to coupling flanges. Conventional methods of assembling these components utilized sledge hammers, brute force and hope.</p> <p>Solution: Biach developed a special type of hydraulic jack which mounts on the coupling to facilitate assembly and disassembly of pump shafts. Referred to as the "push-pull" hydraulic jack, the equipment consists of a common hydraulic jack that can be pressurized in both directions. By simply reversing the puller bar, component's position and using dual pumping control levers on a special portable hydraulic pumping unit, the crew can easily use the same equipment for both operations.</p>	

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Case Histories: Power Generation, Continued

Primary Manway Cover

Customer: Duke Power McGuire Nuclear Plant

Problem: This aluminum primary manway tensioning ring was designed to tension 16) 1-7/8" studs simultaneously. Duke was using individual tensioners previously and experiencing excessive time and dose in the process of opening and closing the manway covers.

Solution: Biach designed a tensioning system providing 100% tensioning, greatly reducing time and exposure cost.



High Pressure Turbine - Nuclear Plant

Customer: Duke Power McGuire Nuclear Plant

Problem: Customer asked Biach to design a tensioner to replace units supplied by another manufacturer (Diamond). Due to mechanical problems with those units, the tensioning activities were taking Duke crews in excess of 65 hours to complete. This equipment had been supplied with the turbine by Westinghouse Electric. Duke wanted easier means of handling since working conditions were difficult and hoist facilities limited. They also wanted a faster means of nut turning as the current tommy bar method took extensive time. Additionally, they wanted the tensioner to address two different stud sizes: 3.5" and 2.5" diameters with residual loads of 50Kpsi and 45Kpsi, respectively.

Solution: Biach engineers addressed the problem with a tensioner consisting of several components, which made lifting and transporting easier since it could be done manually, by one man. Hoists were no longer required (each component was kept under 100# and lifting handles were mounted on each).

Result: Duke could now perform the tensioning process quickly and easily, without requiring an overhead hoist and crane. The Biach gearing system provided a more accurate and faster means of seating the nuts, thereby assuring them reliable performance.



Metal Rod Shearing

Customer: Allis Chalmers

Problem: Customer was looking for a method to cut contaminated control rods. The radioactive rods had to be sheared under water.

Solution: Biach provided a portable, hydraulically operated, remotely operated, 100 ton cutoff tool.



ICI - Flange Bolting

Customer: Baltimore Gas & Electric Calvert Cliffs



Problem: Process was too slow and very costly using torque wrenches on critical path. Too much exposure for crews.

Solution: Biach provided a tensioning system to tighten 50% of the studs simultaneously. This greatly reduced the bolt-up time and saved customer substantial money and exposure.



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Case Histories: Power Generation, Continued

Vessel Head Bolt-up	
<p>Customer: Perfex</p> <p>Problem: Fabricator of pressure vessels was looking for ways to save time and money in their manufacturing and for their customer's maintenance. They decided to standardize on one size stud and nut.</p> <p>Solution: Biach developed a tensioner to handle their application. Perfex standardized the Biach tensioners, bought them in quantities and shipped four with each vessel they manufactured which provided their customers with real "cost of ownership" benefits.</p>	
Stop Valve Cover	
<p>Customer: General Electric</p> <p>Problem: Recently, General Electric requested Biach Industries, Inc. to design a stud tensioning system for their stop valve covers. We considered the following data: • Stud Diameter: 3-1/4", special tapered thread • Number of Studs:17 • Required Residual Load: 22,000 psi • Nut Design: Special, slotted • Special Heavy Washer Used: 5-3/8" x 3-1/2"</p> <p>Solution: We developed a special tensioner to meet their requirements, Its design incorporates: • Spring Powered Piston Return System "to provide quick piston retracting to start the next stroke. • Bevel Gear Drive for Turning and Seating the Nut - fast, simple and accurate for even loading. • A unit with 252,000 lbs. capacity @ 7975 psi pump pressure. • Dual hydraulic ports to allow inlet from either side. • A special tall base assembly to fit over their unique nut and washer. • Substantial radial cut-outs to clear adjacent nuts and washers.</p>	
Steam Generator Ringless Nozzle Seal	
<p>Customer: Westinghouse Electric</p> <p>Problem: Customer needed to expand Ringless Nozzle Seal legs prior to seal insertion. Also needed to exert 15,000 lb. axial load to cover after installation in the nozzle.</p> <p>Solution: Biach designed tensioners with 3" strokes, male puller bar, annular thread design and nut drive with reversible air motor control.</p>	