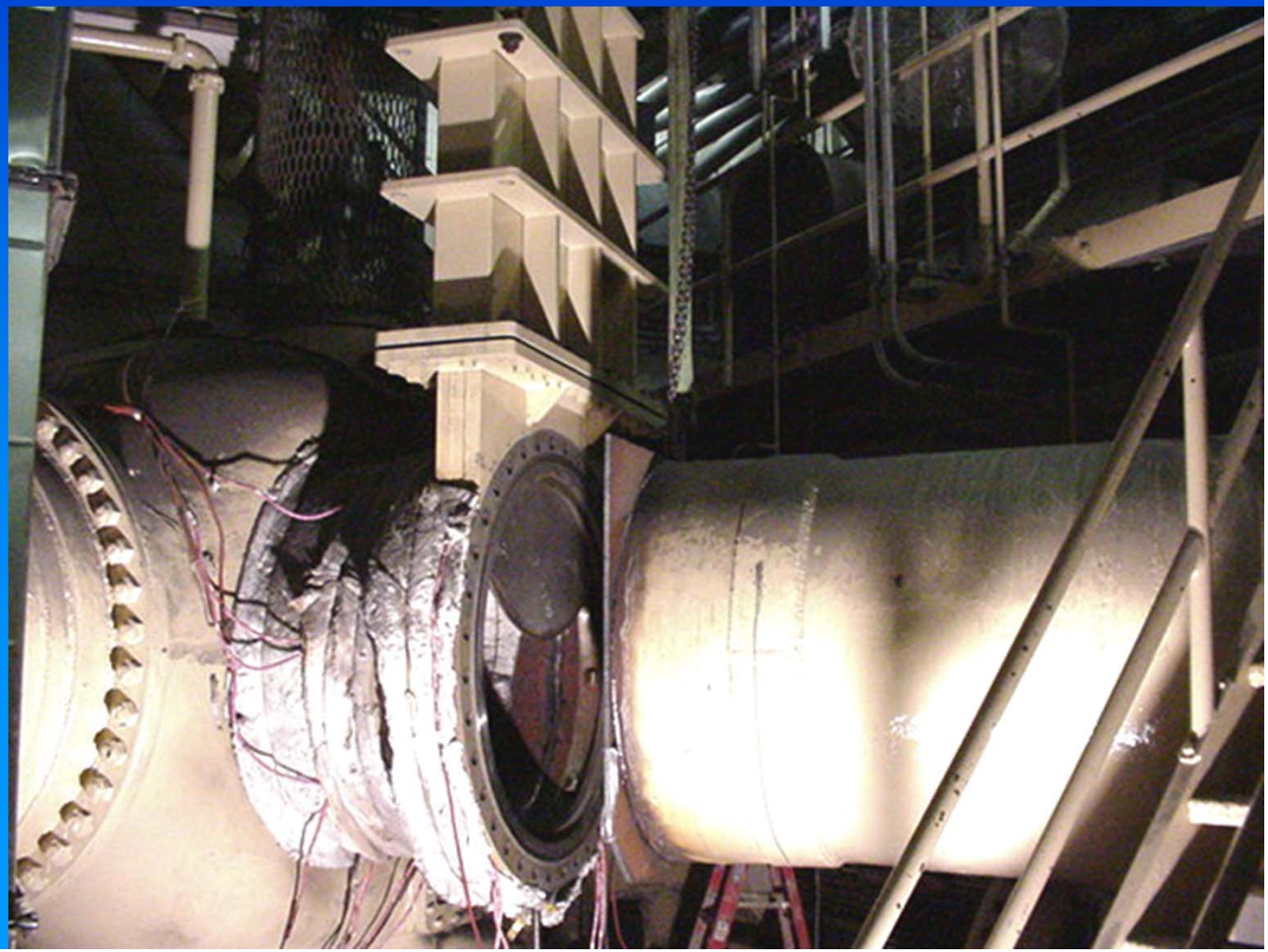
Sacramento City flood control pump, capacity 5 Million gallons per day



The pump discharge port flange cracked during replacement of the gate valve

The new gate valve had a raised hub on the gasket surface that caused the crack. A raised hub flange should never be bolted to a cast iron flat faced flange or cracking will occur.

The crack was in the corner of the port/flange area.

The contractor attempted to arc-weld the crack with 99% nickel rod

The contractor had never heard of metal stitching so he consulted with the welding rod suppliers, manufacturers and even AWS for a procedure to weld the casting.
Very sophisticated methods were used to comply with pre-heat and post-heat instructions.
The weld attempt had a zero chance of success from the beginning.

The crack was Vee’d out from both sides

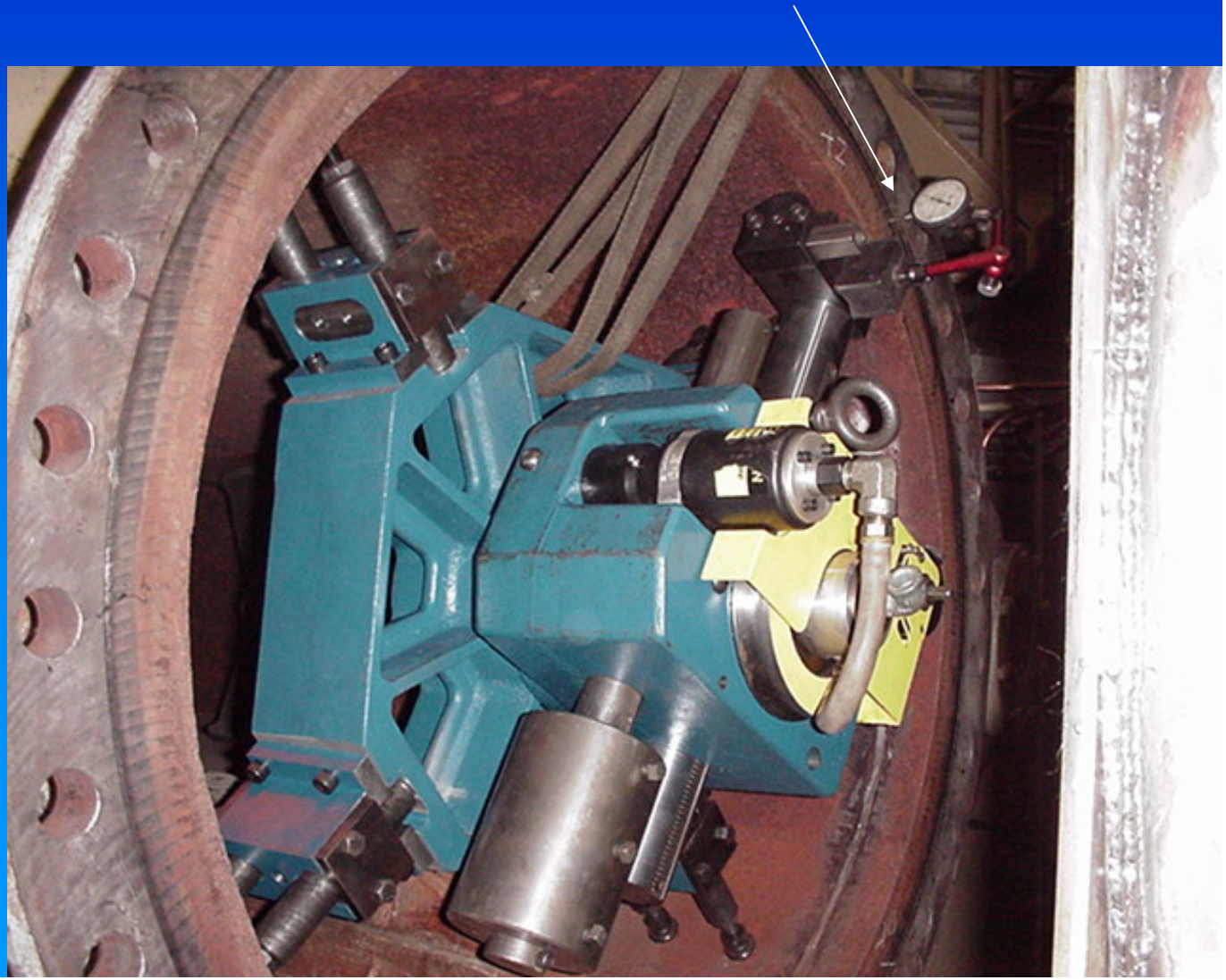
The more they welded, the more it cracked.

Even though it was pre-heated to 500°F., there were more inches of crack after two weeks of welding.

Arc welding causes the cast iron next to the weld to crack and get very hard. The casting wall is 2” thick and the Vee was over 2 “ wide. Stitching the crack was impossible.

Repairing the damage in place could only be done by replacing the damaged flange and port wall

Before removing the flange, a portable mill was set up and dialed-in to the face



The flange was then removed using an abrasive cut-off saw

The end of the discharge port was hand ground to remove the hardened iron and then machined flat

The machined end was machined parallel to the original flange face

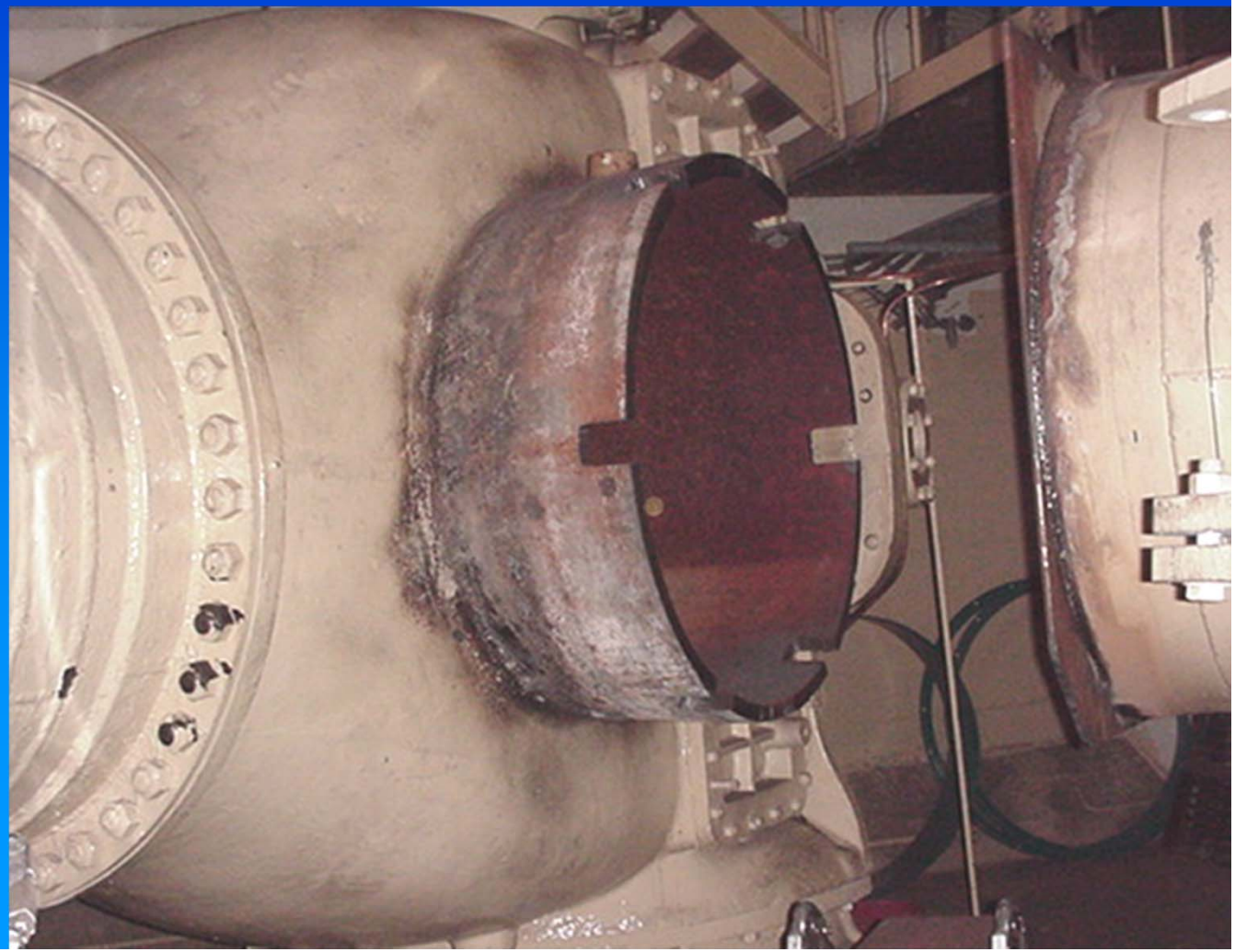
This procedure removed all of the damaged, cracked and hardened cast iron.

The iron could then be stitched.

Six equally spaced, 3” X 4” slots were machined into the end of the port

Machining the slots

The slots were created to accept steel locking-lugs welded to the new steel flange

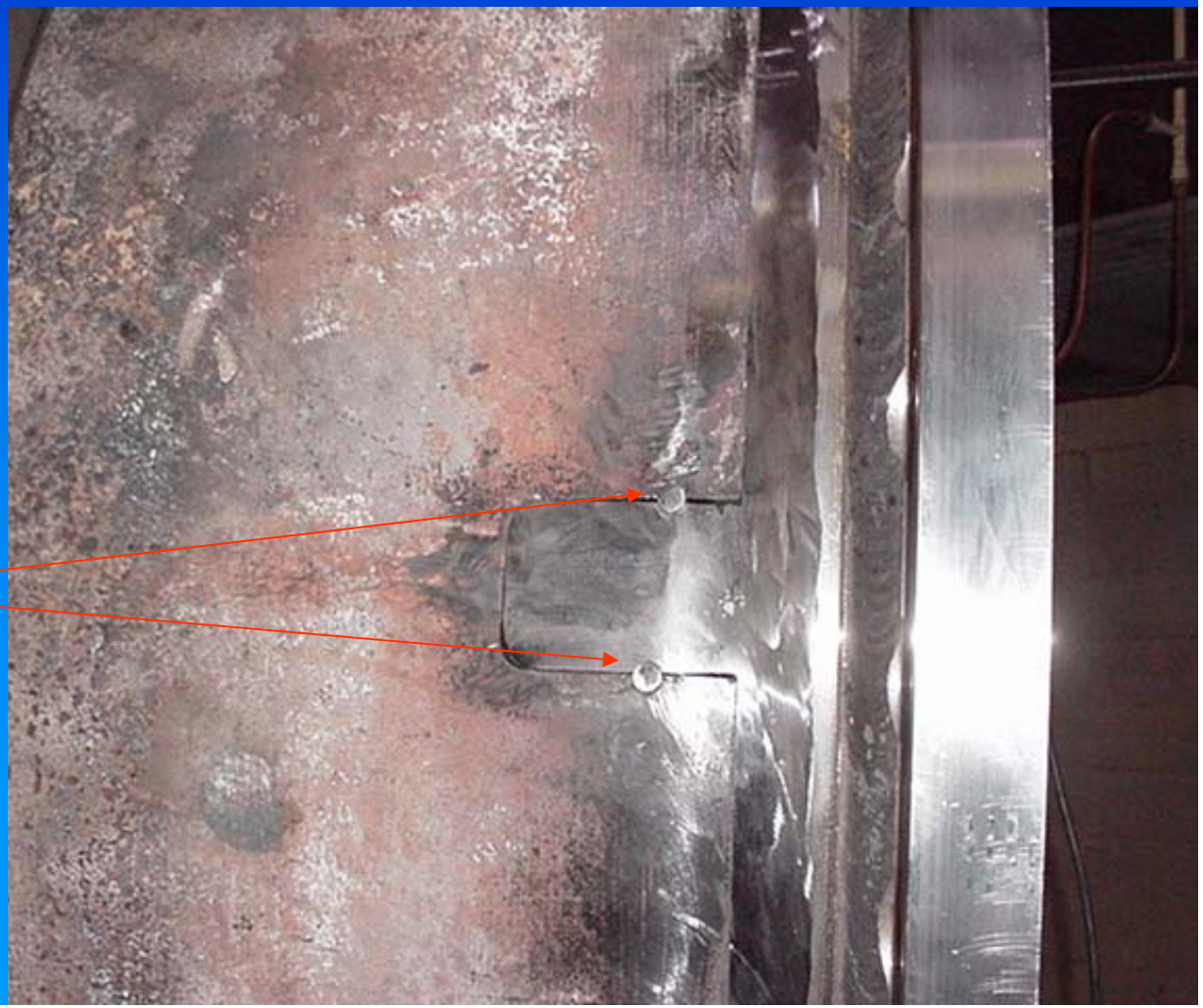


The steel flange with the locking-lugs welded on

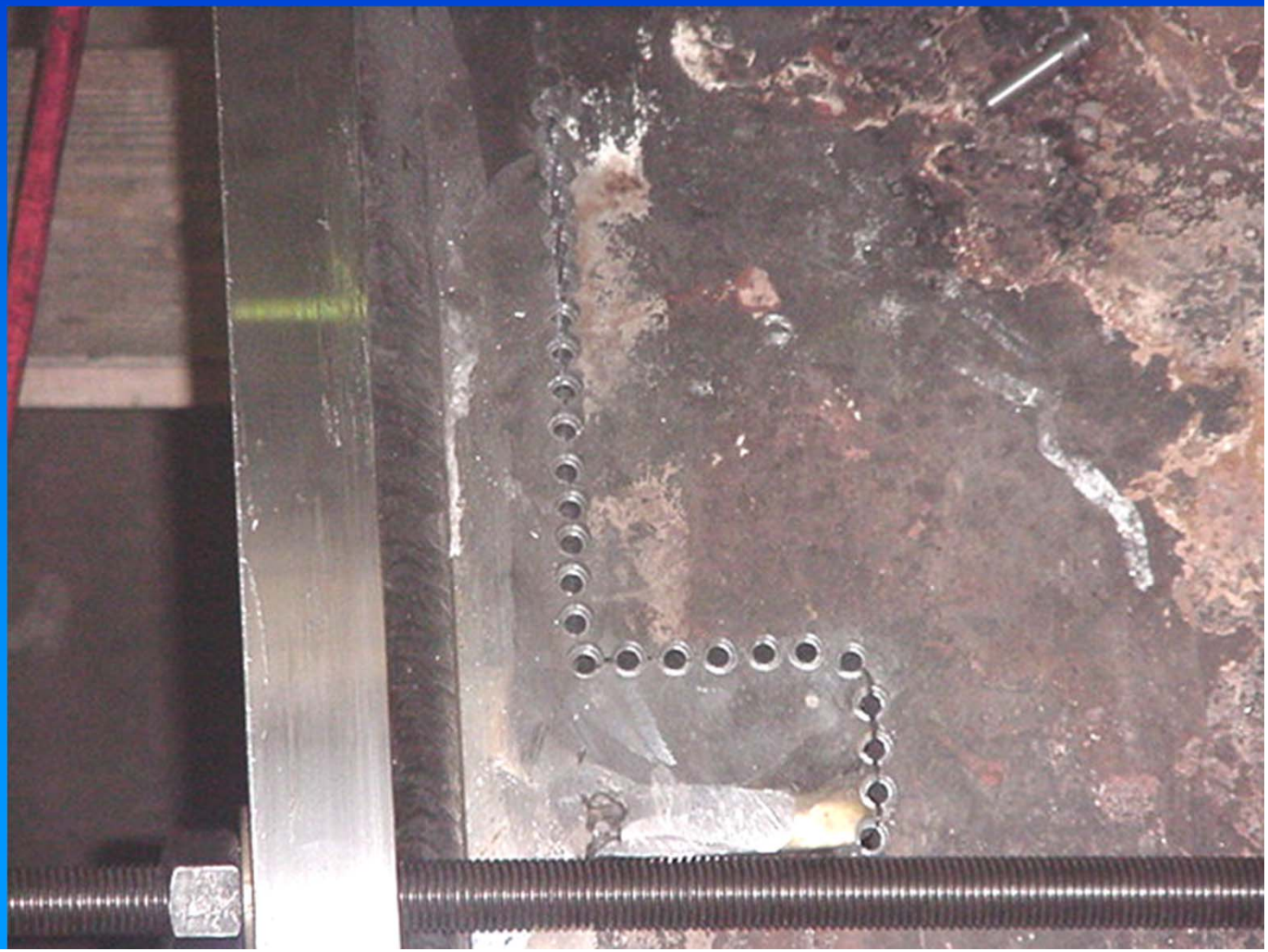
C3D CASTMASTER Stitching Pins were used on the entire repair

A few stitching pins were installed at the locking lugs to secure the new flange in place.

No Locks were used in this repair to save money.



Stitching around the locking-lugs adds strength to the joint



Stitching continued until the entire circumference of the new flange and lugs were stitched with C3D pins

A completed section where the pins have been installed overlapping each previous installed pin

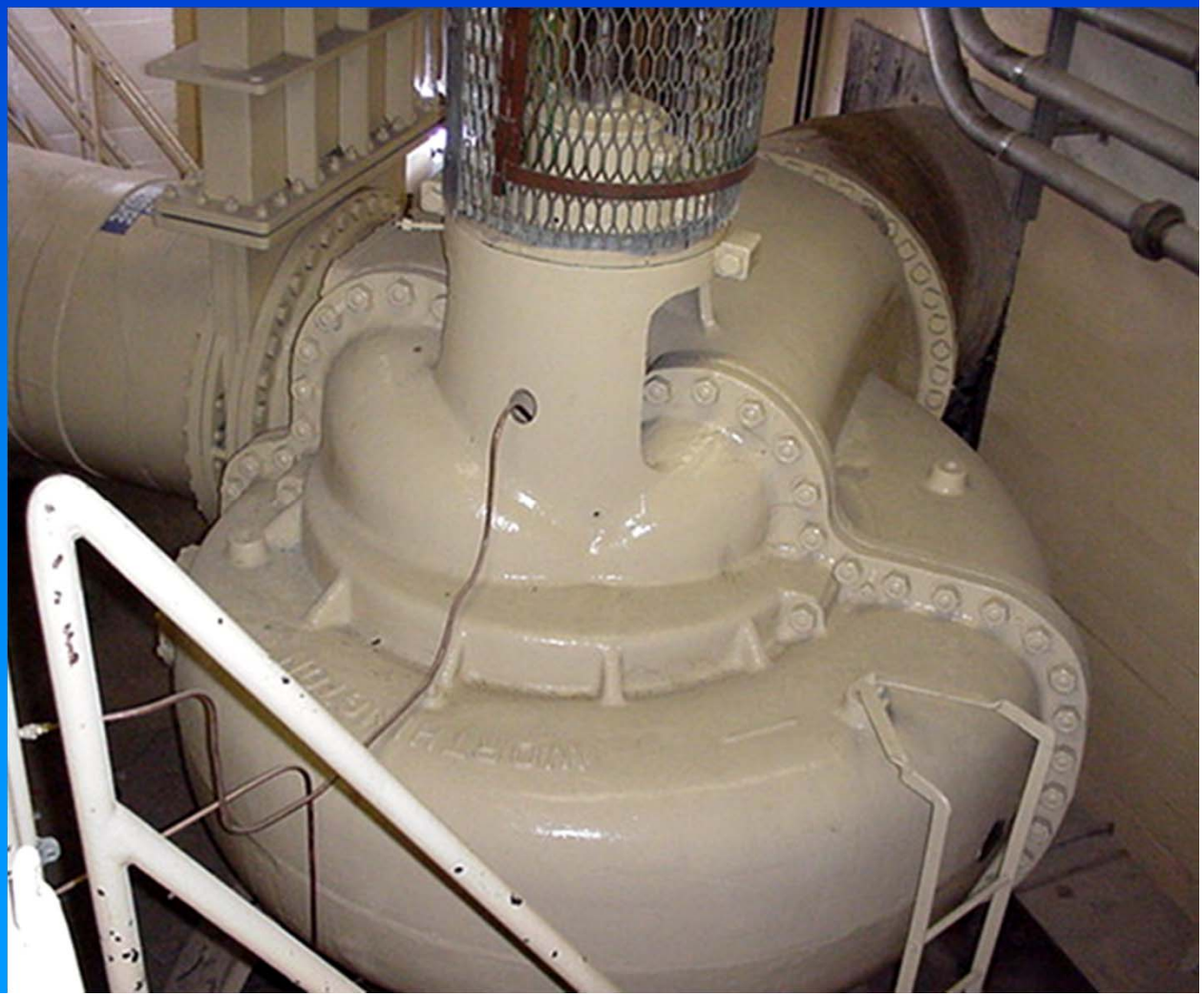
The overlapping process assures that there are no gaps left between the pins for a pressure tight joint.

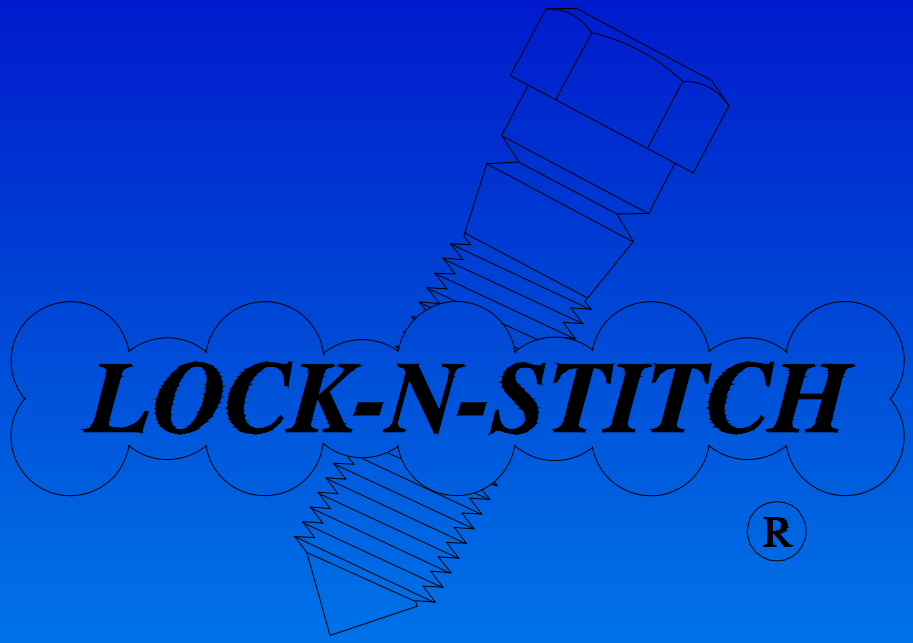
The pump is finished and placed back in service, November 2000

Total repair time was three weeks. The pump was manufactured in 1919 and the damaged half could not be replaced.

A new pump would cost over 1 million dollars to install.

The total repair price was $80,000.00.





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The repair was completed in 2001 and is still in service today