

# Nuovo Pignone 6B Gas Turbine Shell Crack Repair



Repaired Dec. 2009

Torino, Italy

Cofely Italia S.p.A.

# Scope of Work

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- 1. Grind off welds and inspect cracks by magnetic particle method.**
  - 2. Drill, tap, and install CASTMASTER stitching pins in an overlapping process over the full length of the cracks.**
  - 3. Drill L 40 Lock pattern and install locks.**
  - 4. Drill L50 Lock Pattern and install locks.**
  - 5. Mount the floating drill plate as a platform to mount the drilling and tapping machine for the Full-Torque thread repair insert.**
  - 6. Drill Spotface, tap, and install the thread repair insert.**
  - 7. Modify the bottom of the bore scope hole to allow the pin to seat properly and prevent future overheating of the shell.**
  - 8. Assemble and install the bore scope pin and plug.**
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# Cracked Bore Scope Access Hole

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Owner had attempted a weld repair which failed.

The weld was only on the surface with no preparation or grooving.

This turned out to be good as the weld was easily ground off and all of the parent steel was intact.



# Cause of the Crack is Found

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The cause of the crack appears to be misalignment of the holes of the diaphragm and the shell that allowed combustion heat to escape past the bore scope hole plug.

After repairing the cracks and threads the lower hole was slightly oversized to allow the plug to seat into the smaller hole in the diaphragm.



# Installing the stitching pins

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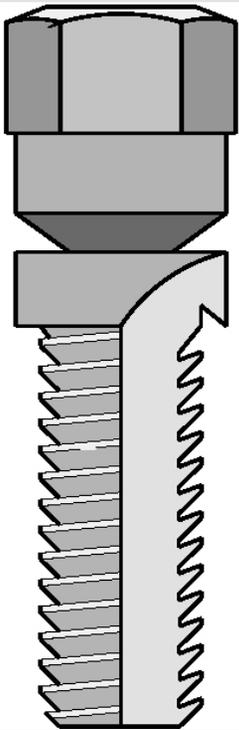
Large CASTMASTER stitching pins were installed along the crack.

These special stitching pins have our patented Spiral hook threads that add strength and high pressure seal.

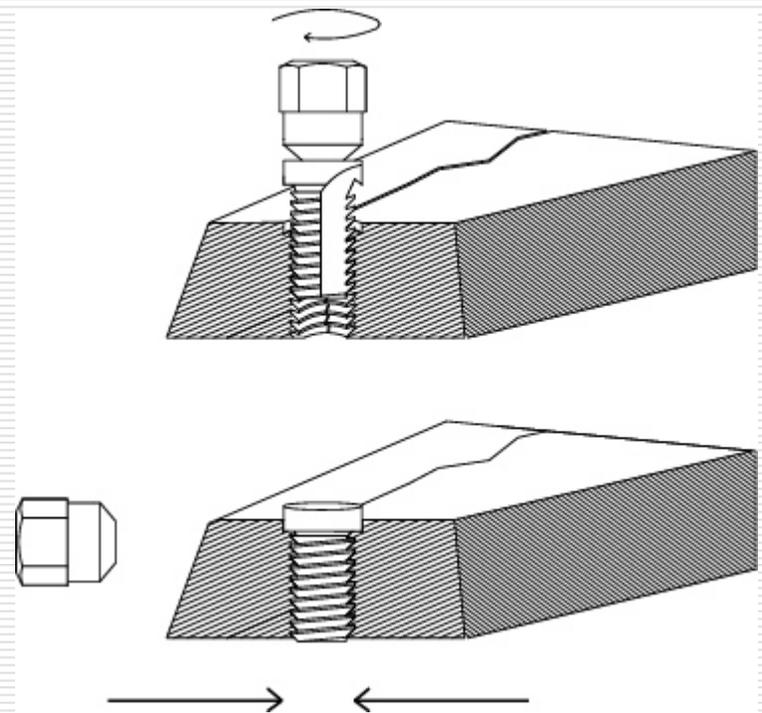


# CASTMASTER® Stitching Pins

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**CASTMASTER stitching pins have the unique ability to draw the sides of a crack together when tightened into the drilled, Spotfaced and tapped hole.**



# Installing Locks for Added Strength

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L40 Lock hole pattern is drilled across the repair to add additional strength



# L40 Lock Installed

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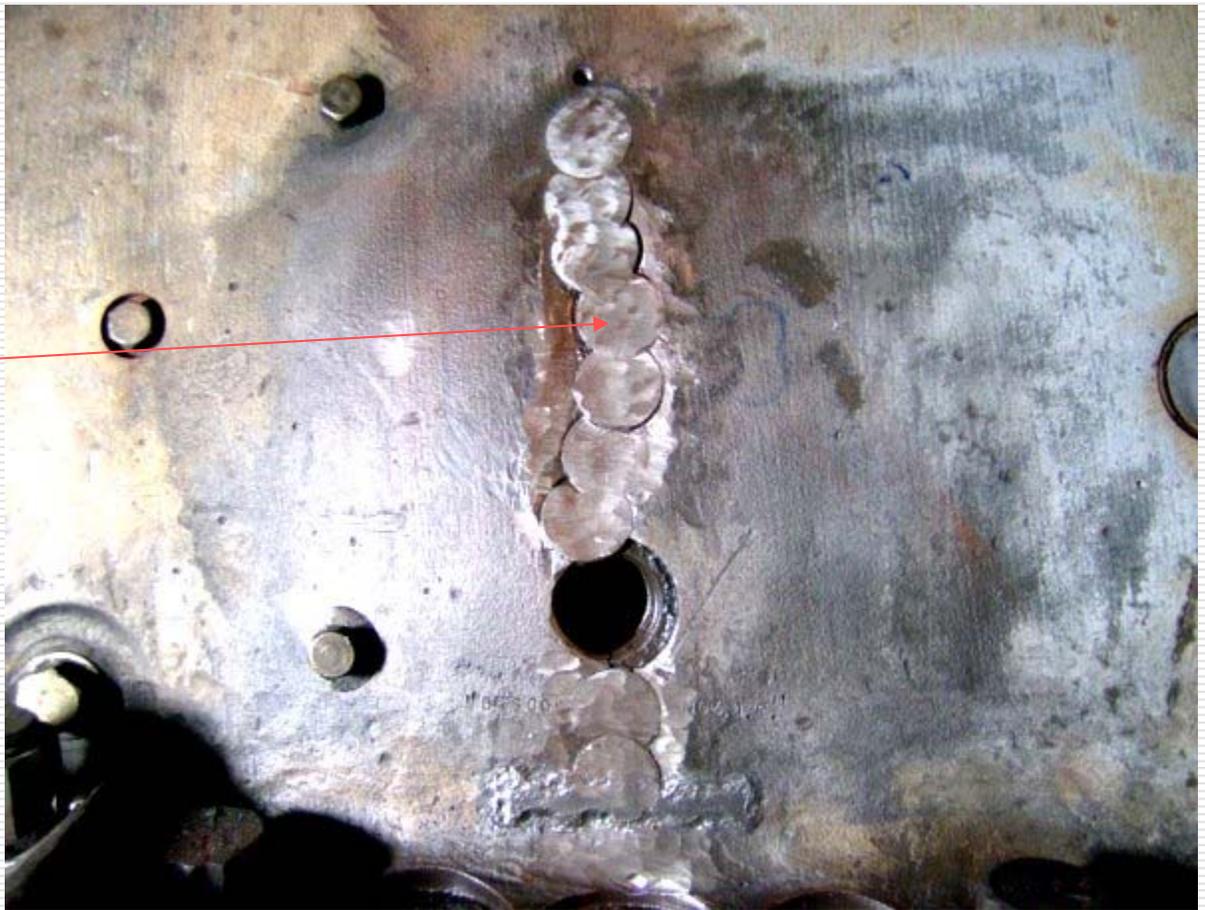
L40 Lock installed  
adding additional  
strength.



# Remaining Pins Installed

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Remaining  
CASTMASTER  
stitching pins are  
installed into the  
upper crack.



# L50 Lock Pattern Drilled

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The L50 Lock pattern is drilled and ready to accept the Locks



# L50 Lock Ready to be Installed

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L50 Lock can be driven into the drilled out hole pattern to add more strength to the repair site.



# Mounting Floating Drill Alignment Plate

The drill alignment plate is mounted and adjusted to provide a platform to mount the drilling and tapping machine to the surface.

Perfect alignment to the original hole is critical to make sure the pin will seal the hole.



# Full-Torque Thread Repair Insert Installed

Special Full-Torque thread repair insert is installed to repair and seal the cracked bore scope access hole.

Perfect alignment is required to assure perfect alignment of the pin.

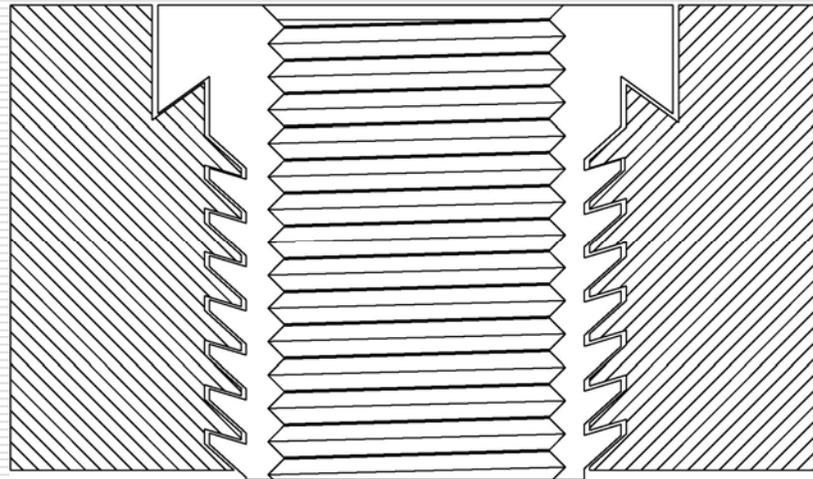


# Full-Torque FST Style Insert

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Full-Torque thread repair inserts are made with our patented Spiralhook threads on the outside and standard threads on the inside. The shoulder seats into a special machined spotface that adds to the drawing force when installed.



# Completed Repair

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The repair is finished and ready to accept the new pin assembly. Note that the insert is installed at a compound angle to the surface.

The floating drill plate makes it possible to drill and tap the hole to receive the thread insert and the correct angles.

