

Engine Bearing Pocket Transplant

Ship owners James Fishers contacted Metalock Engineering UK to see if a repair was possible on their main engine bedplate.

After a routine inspection cracks were found to both sides of the No.4 main bearing pocket, these were thought to have been caused by fretting of the bearing cap due to insufficient tightening of the bearing cap nuts.

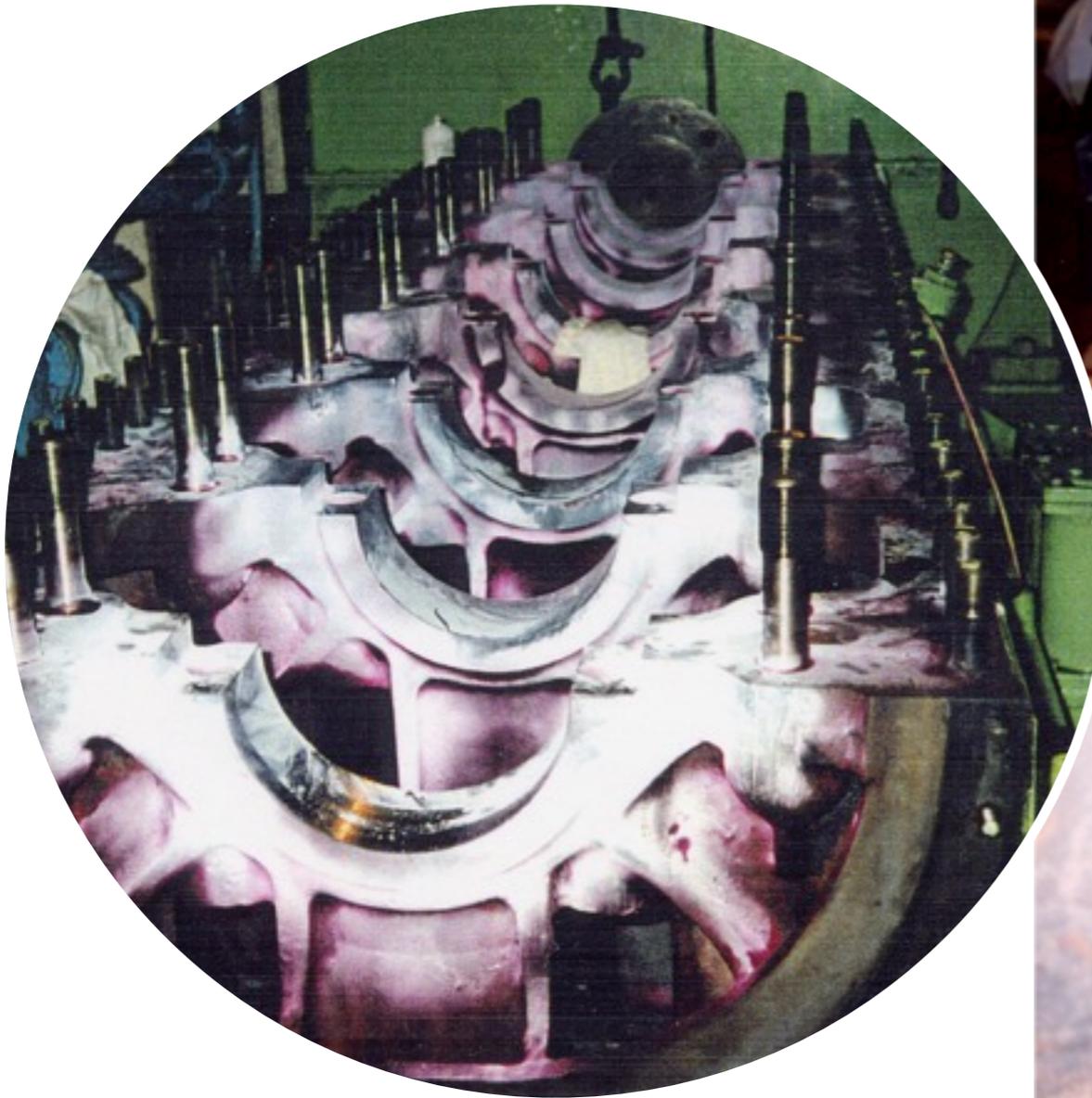
The owners had consulted with the engine manufacturers, who stated a new bedplate would take 6 months to deliver.

If a repair could not be carried out the owners would be in some difficulty.

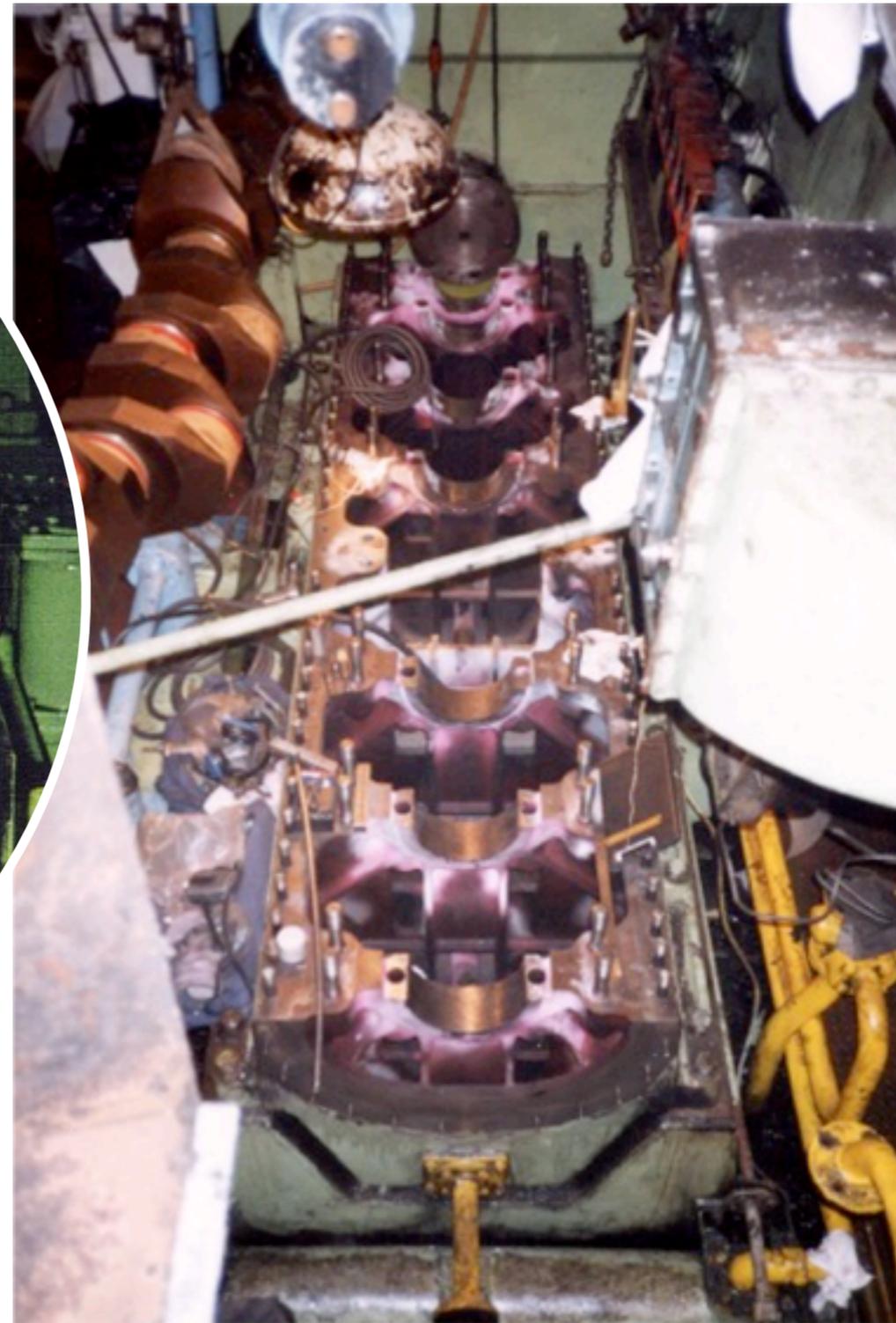


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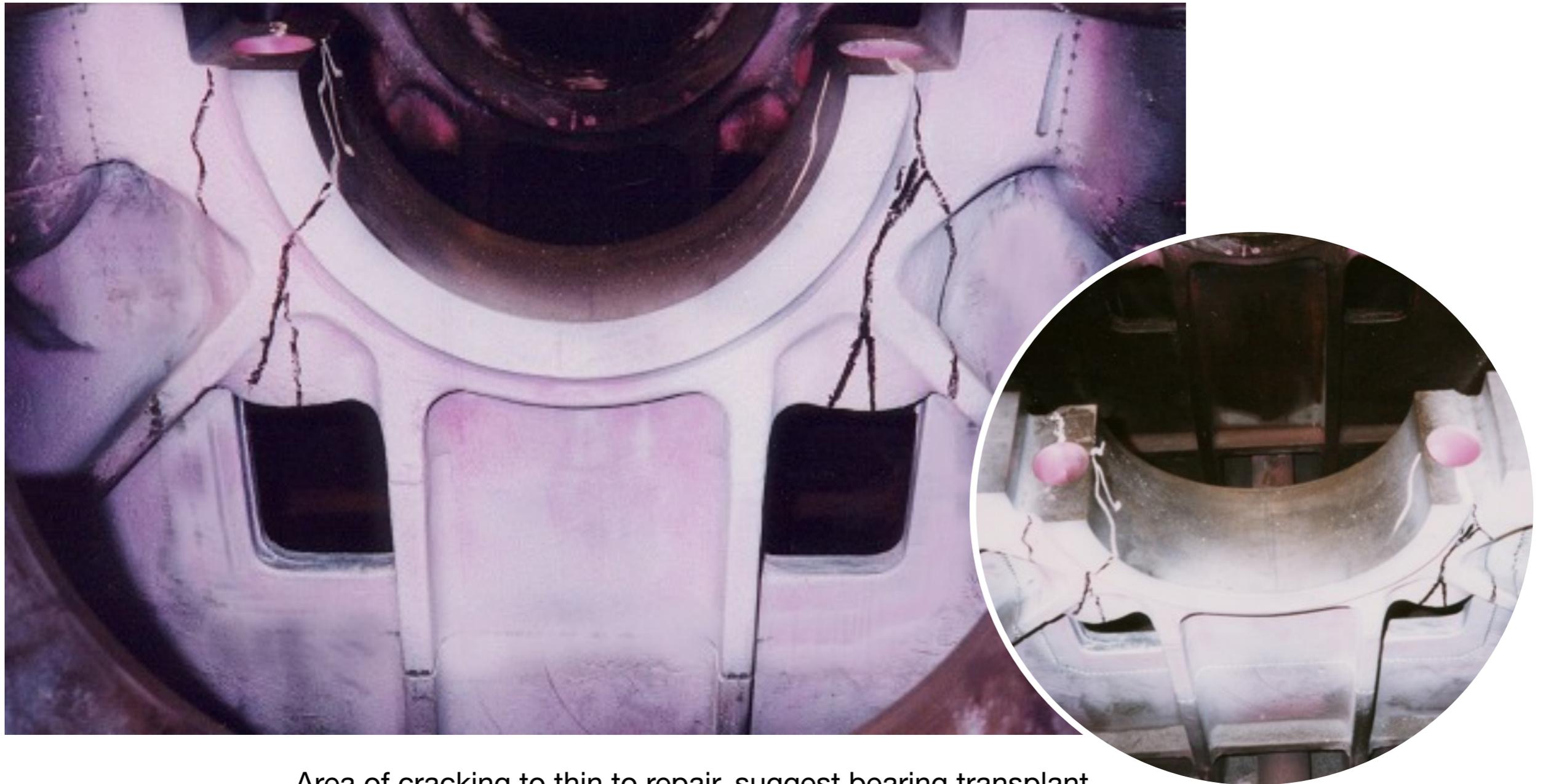
Overall views of the main engine bedplate



Engine type: WH Allen – type6 BCS 37 Delta



Bearing pockets highlighting cracks



Area of cracking to thin to repair, suggest bearing transplant

A photograph of a similar repair convinces shipping company to accept Metalock's proposal

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International News

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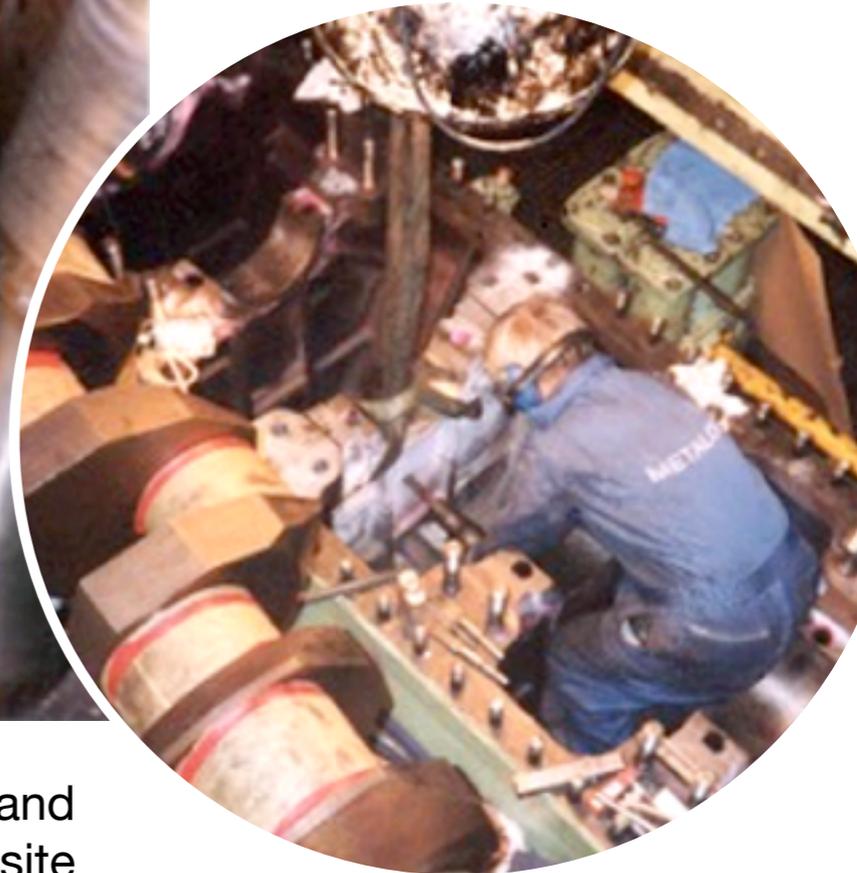
Diesel engine generator undergoing repairs in Brazil - full story page 2.



December 1989/E



Technician marks out area for removal



A repair was designed with the customers approval and the technicians were dispatched to site

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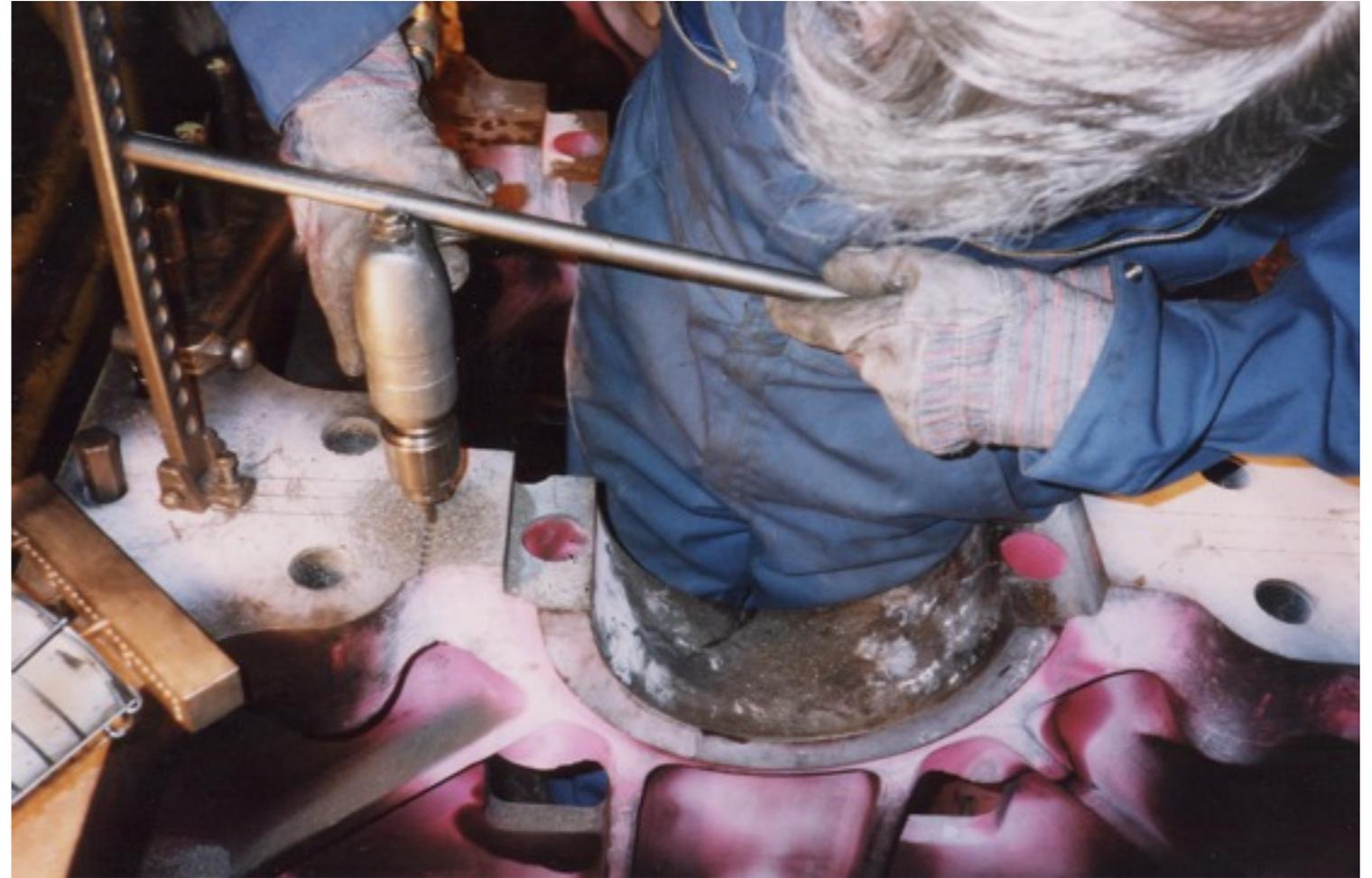
Chain drilling using a series of Metalock jigs



The drilling was through the full depth of the parent casting

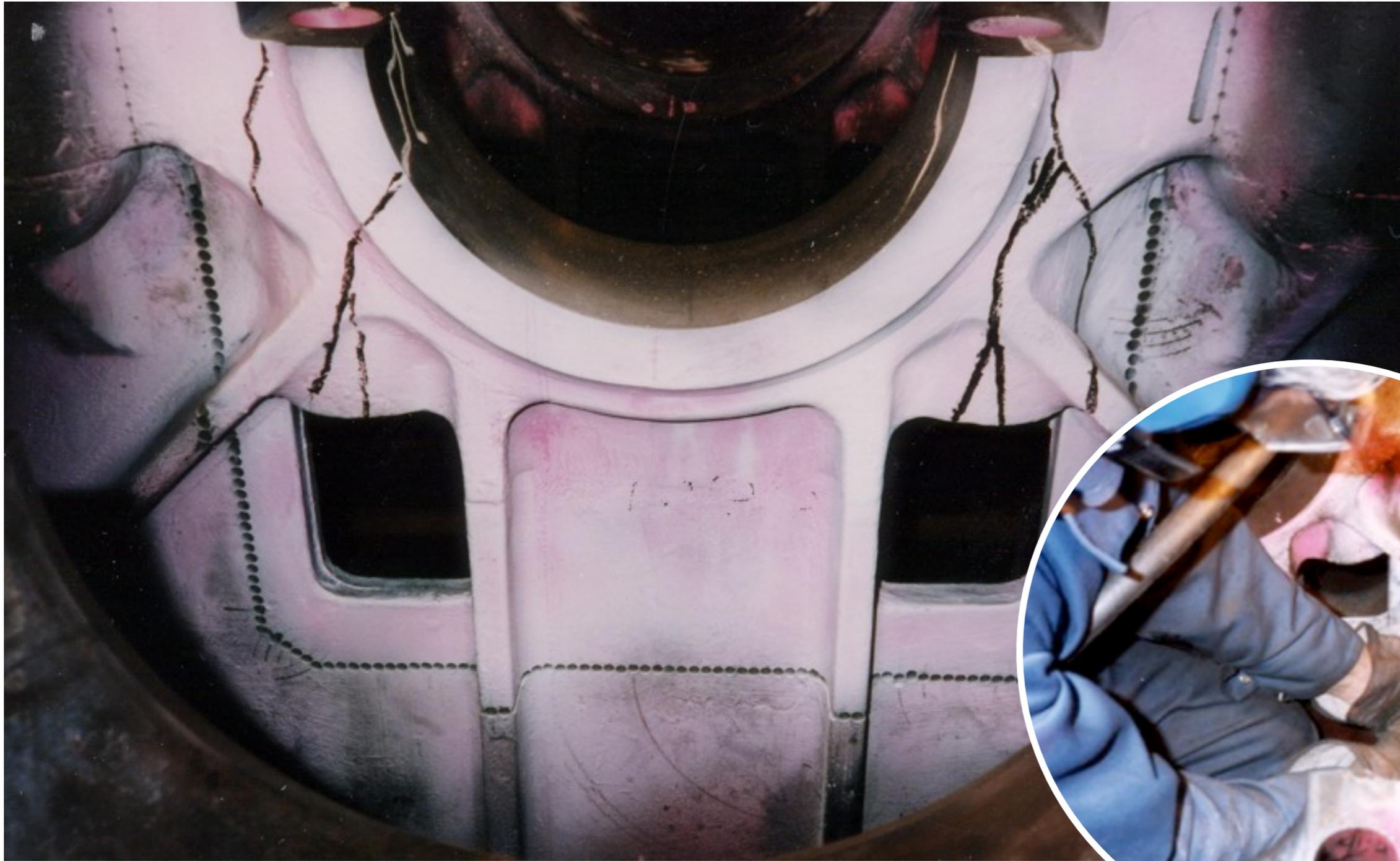
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Vertical drilled holes locate side drilling



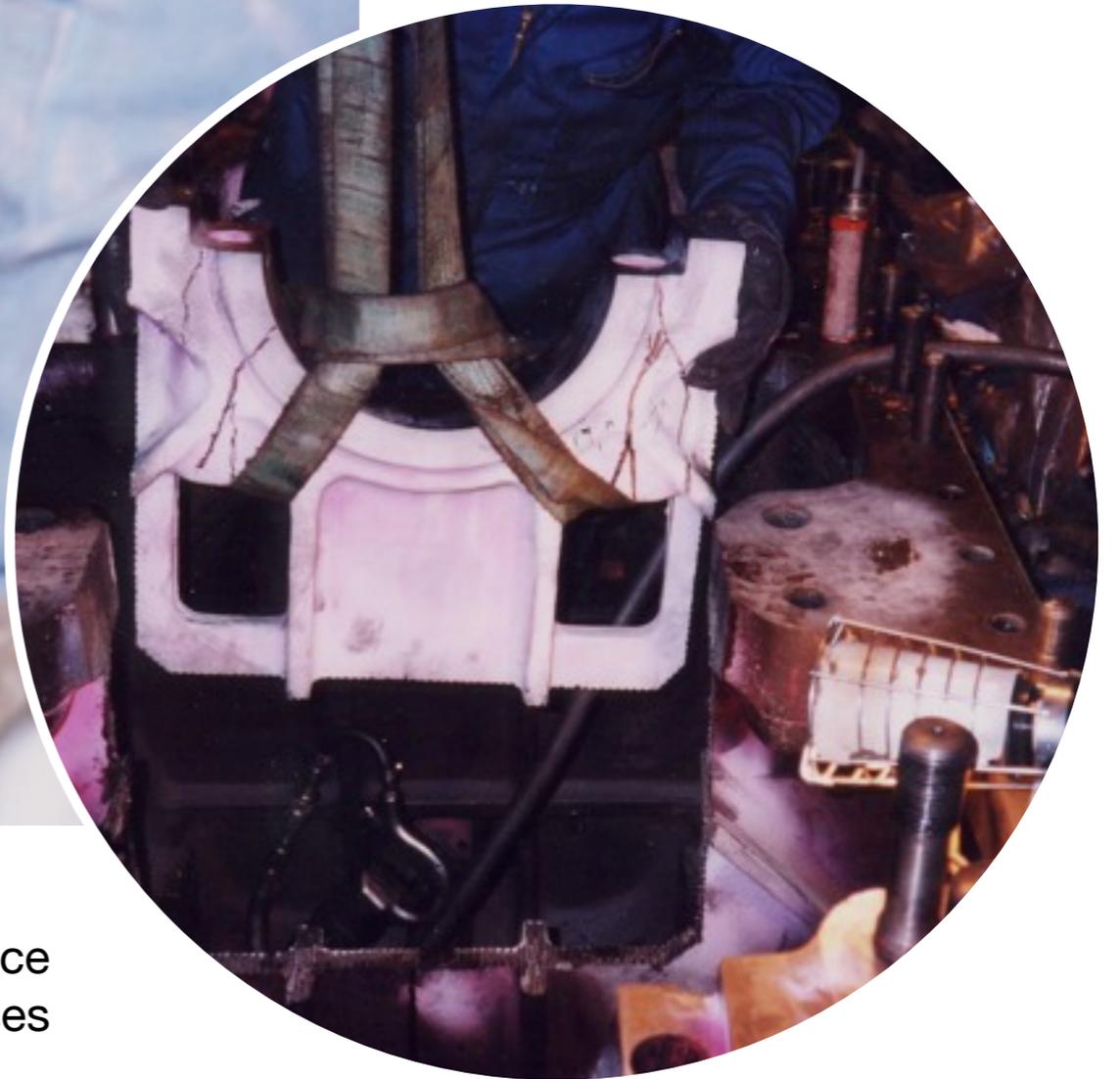
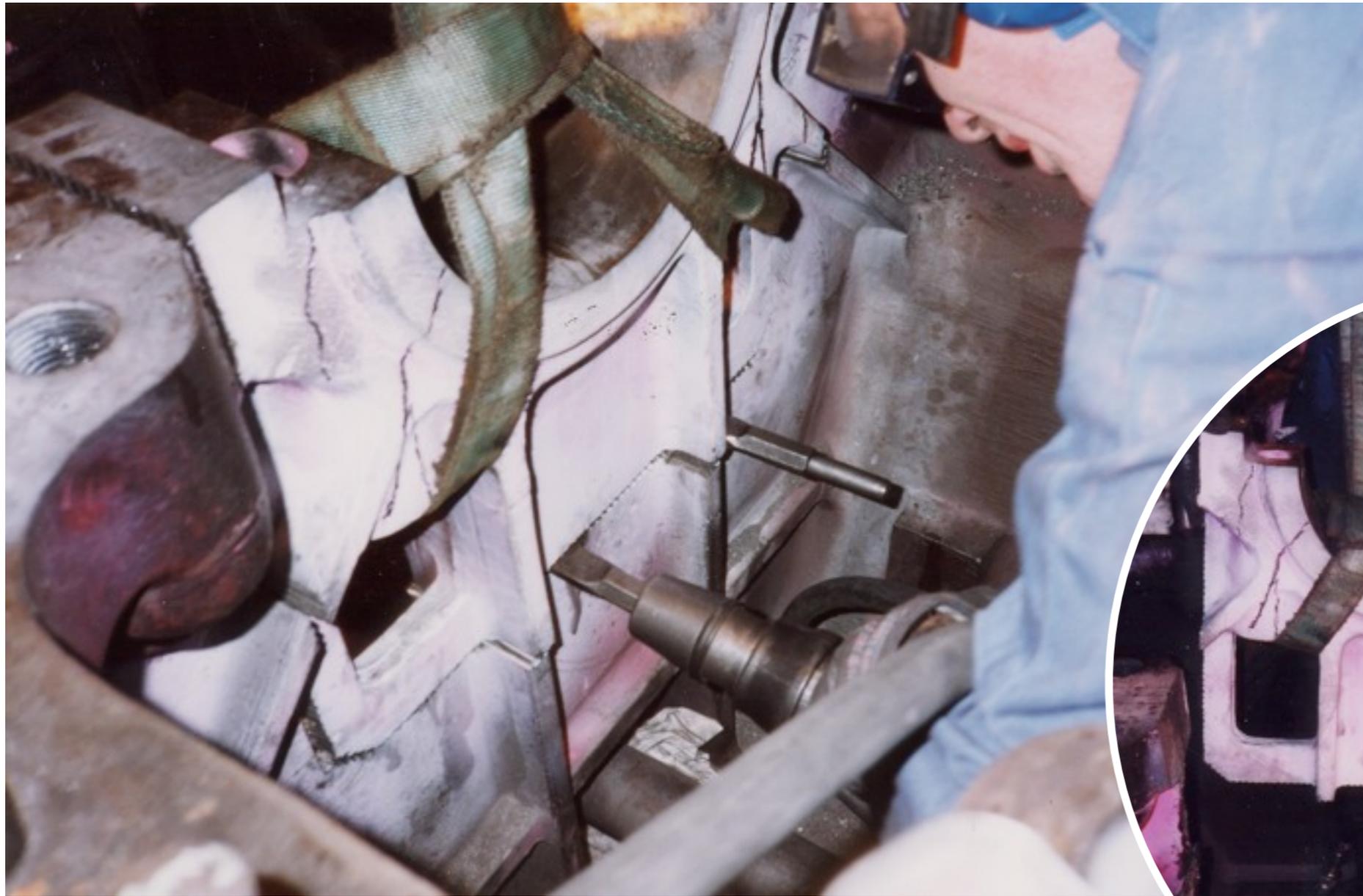
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Sizing the holes ready for the removal of the bearing pocket



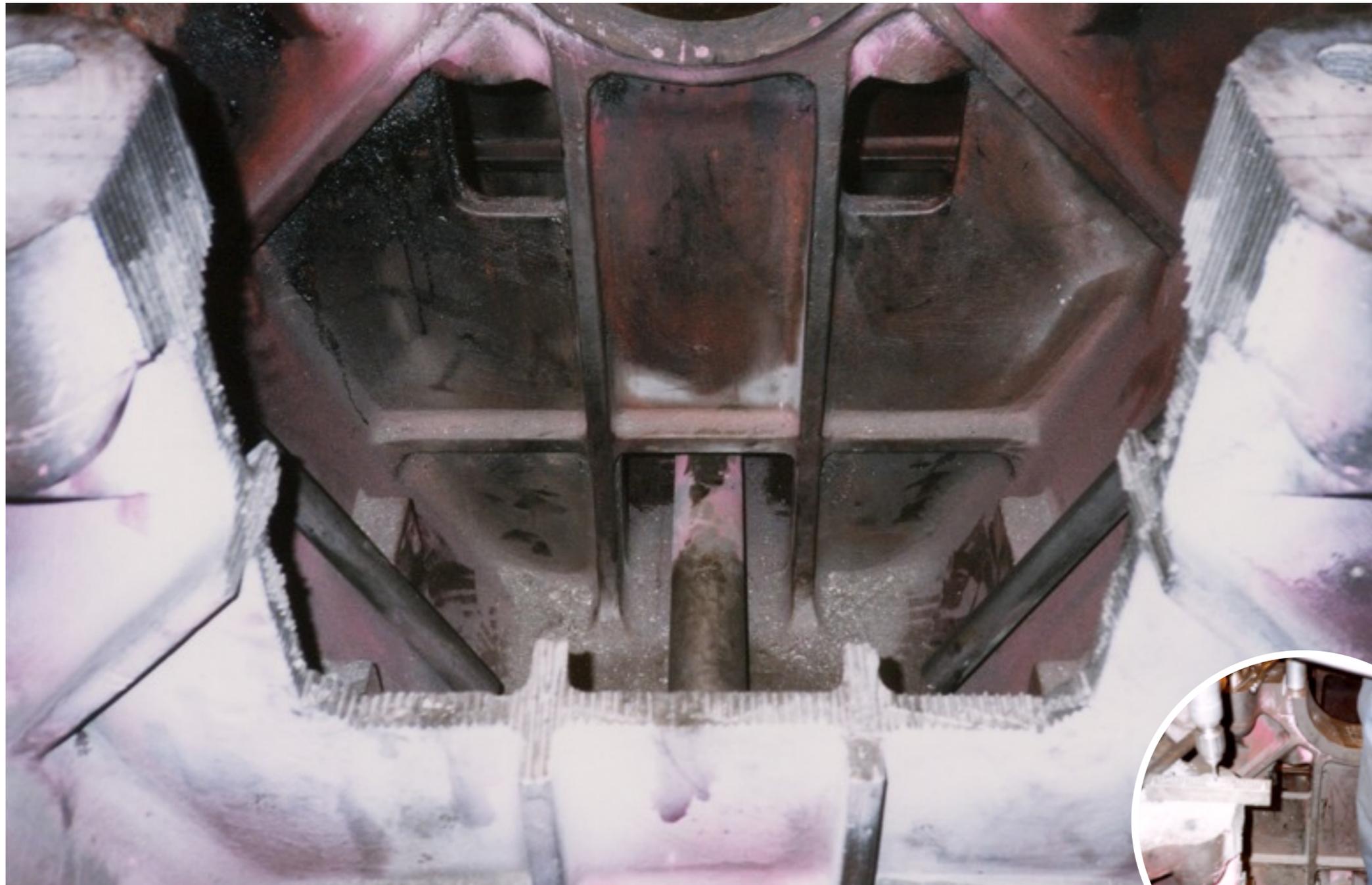
Holes drilled showing the full extent of area to be removed

Driving a wedge into the sized holes to break the seal



Removing the bearing pocket in one piece
to be used for dimensional purposes

Aperture of bearing pocket ready to be cleaned up



Drilling between the Bearing Cap joint face to take fixed Masterlocks

All sharp edges removed to eliminate stress raisers



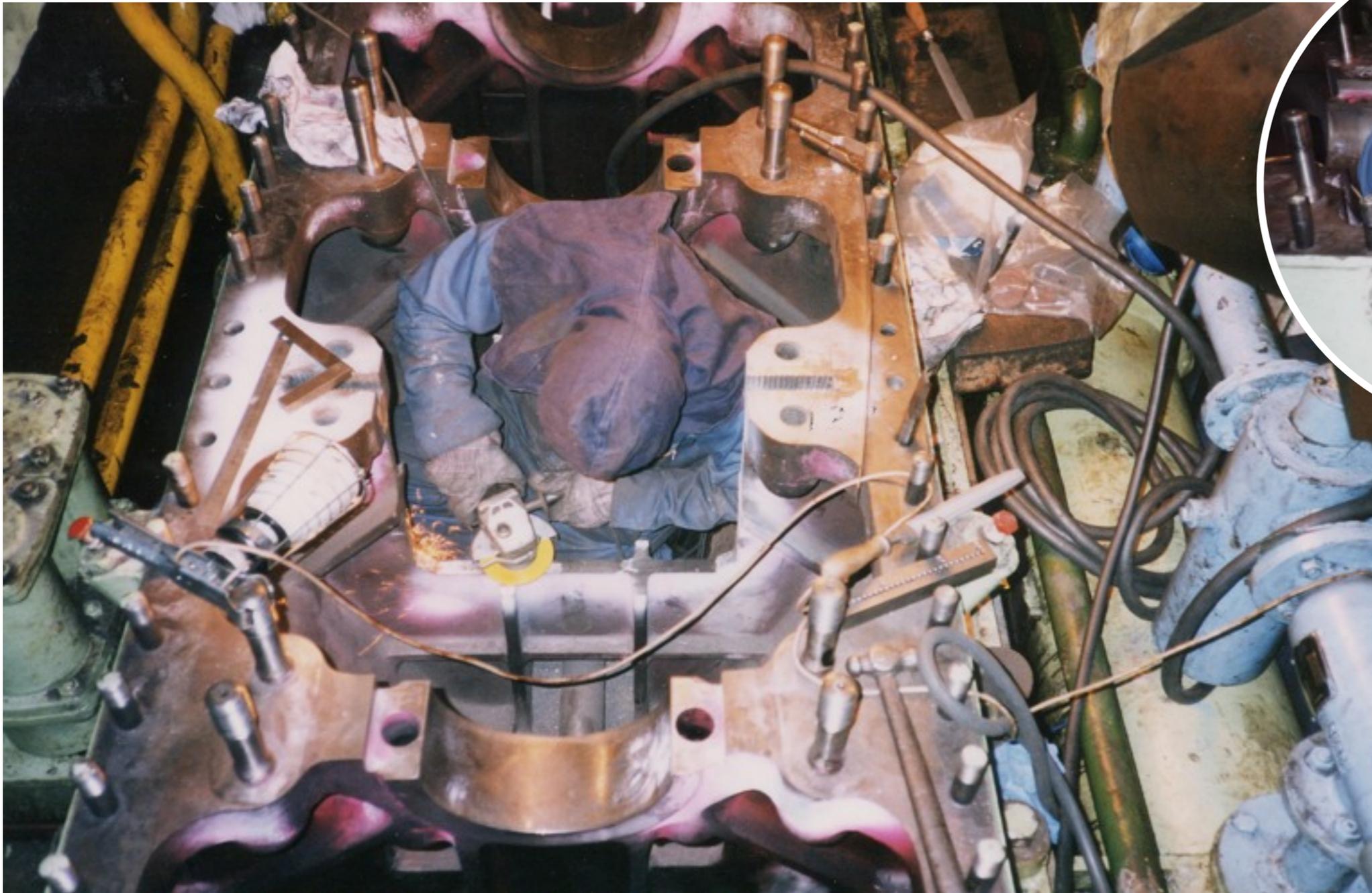
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Non-destructive testing carried out to ensure all cracks have been removed



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All faces hand dressed to accurate dimensions

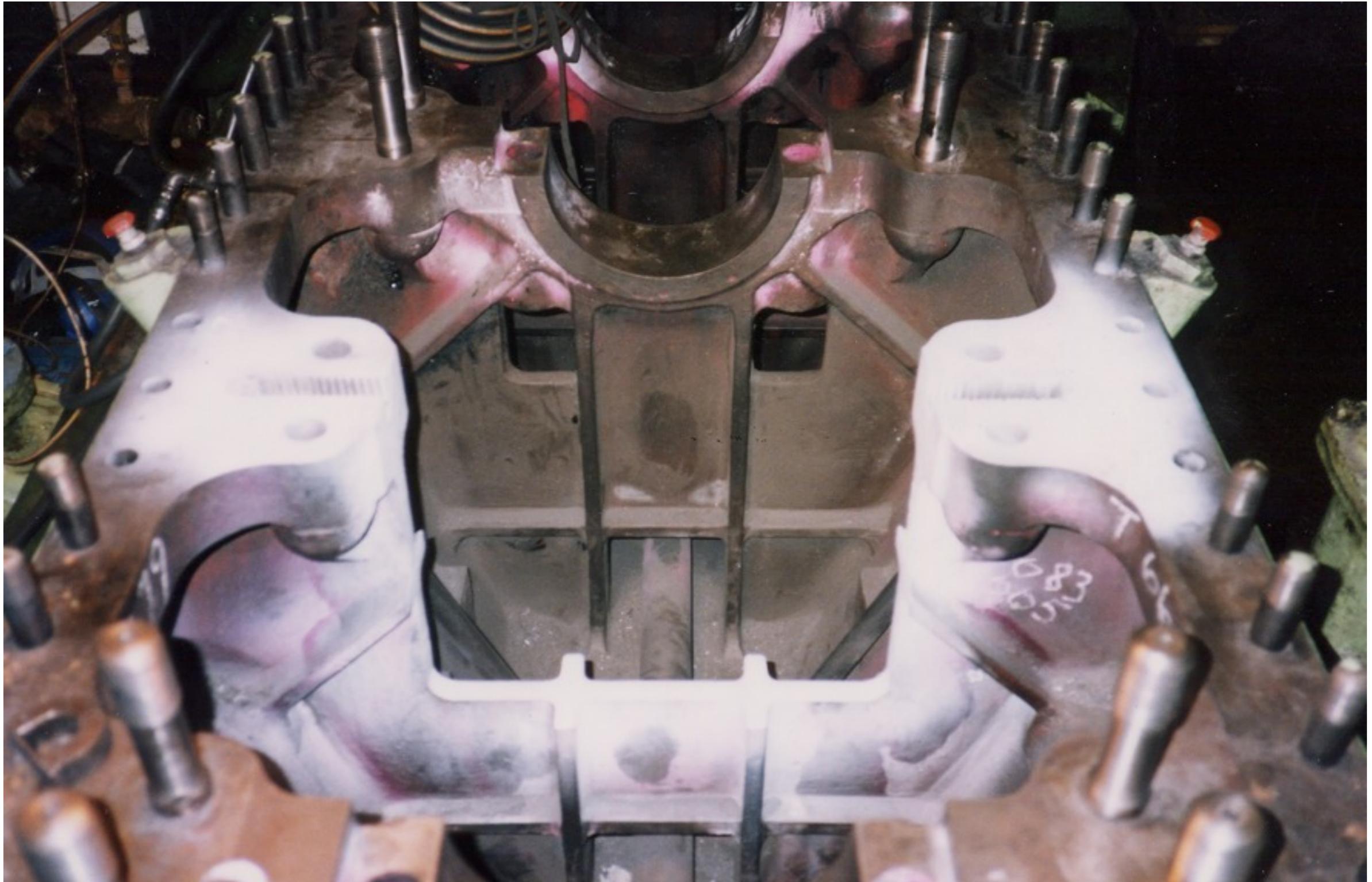


Tools used

- Hand Grinders
- Files
- Tape Measures
- Set Square
- Inside Micrometer

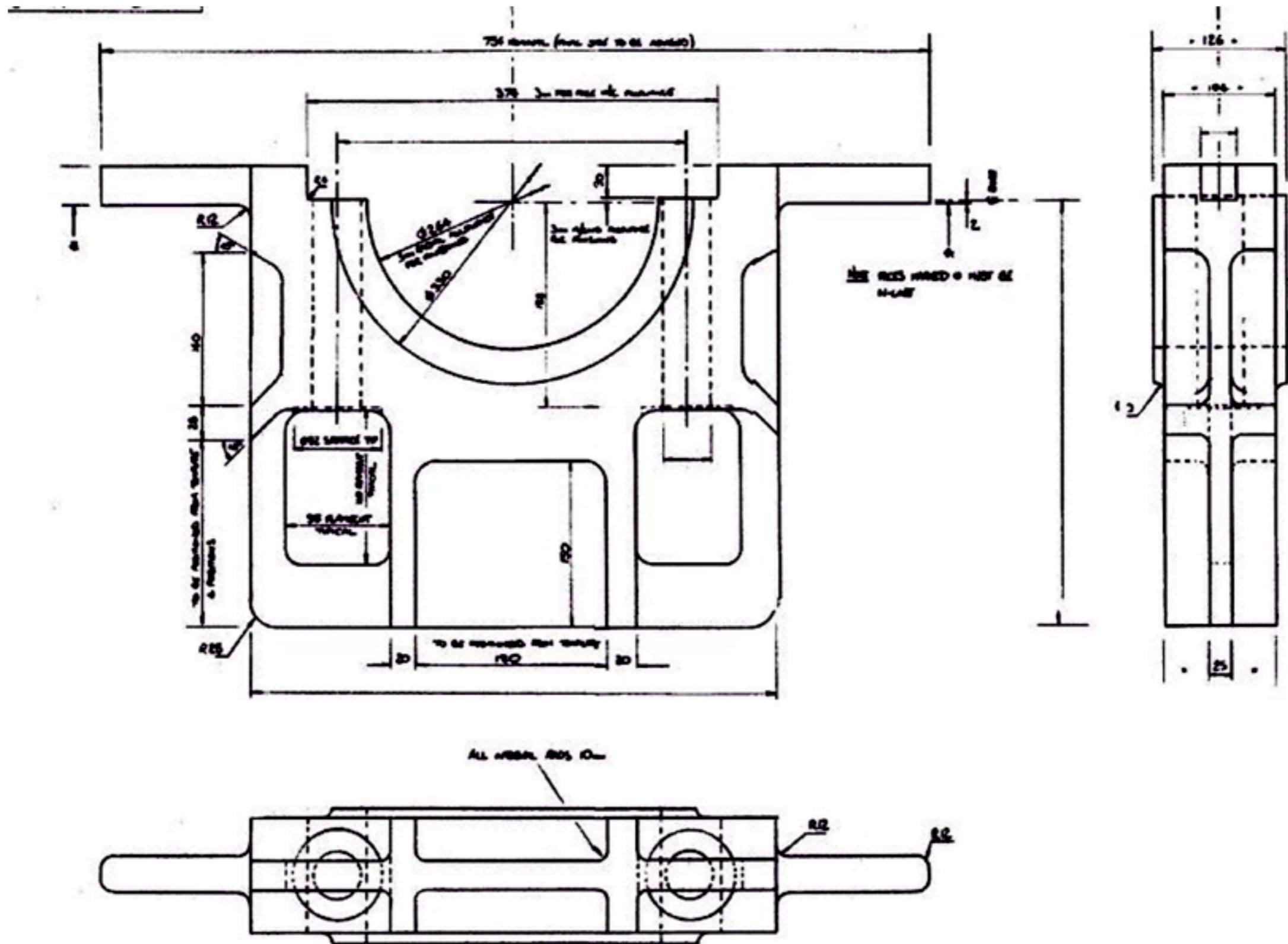
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Completion of hand dressing



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Dimensions taken and transferred to a drawing



Steel insert manufactured from a solid ingot

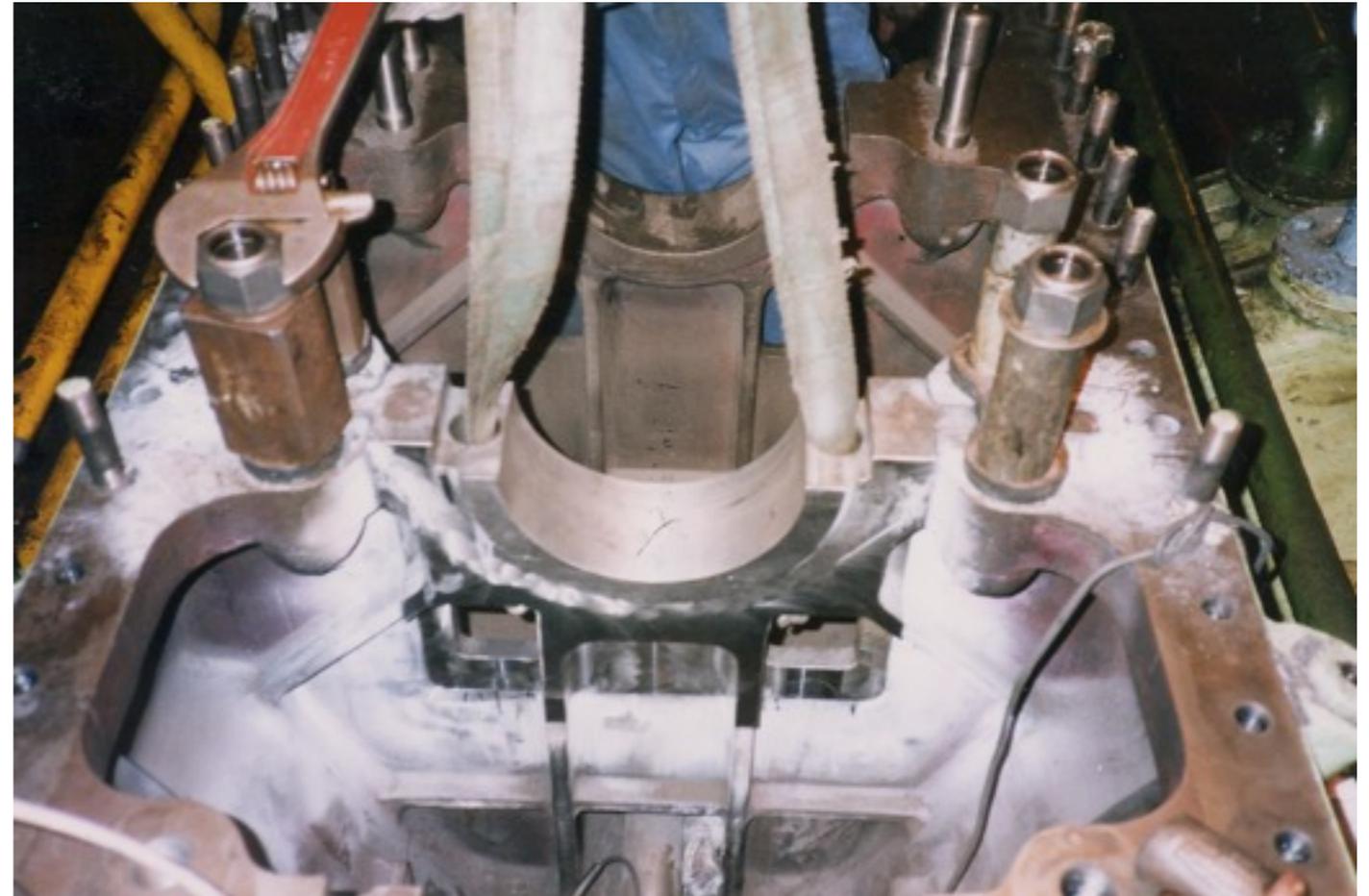


Insert showing attached Masterlocks to help spread the load

Bearing Cap bolt holes drilled at manufacturing stage



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Insert being lowered into the prepared aperture making sure all the ribs are inline

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PLASTIGAUGE

PLASTIC PRECISION CLEARANCE GAUGES

PLASTIGAUGE provides a simple but effective method for the measurement of clearance between fitted surfaces. It is particularly useful for measuring clearances in split bearings or in situations where a feeler gauge cannot be inserted. Measurement of clearance in big-end bearings can be achieved without dismantling the crankshaft.

We recommend that the engine sump cover should be removed to expose the big-end and its retaining setscrews. Remove surplus oil and release the big-end shells by unscrewing the setscrews. Wipe the exposed surface of the journal and shell. Apply a smear of grease to the journal and squeeze a small quantity of silicone release agent on to the shell.

Trim a length of PLASTIGAUGE to fit across the journal using the grease to hold it in place. Replace the shell and tighten the retaining setscrews to the manufacturer's recommended torque setting without rotating the journal.

Now remove the shell once again by unscrewing the set screws to reveal the PLASTIGAUGE which will have been spread across the bearing surface as a stripe or band. Match the width of the PLASTIGAUGE stripe against the card gauge supplied and read off the bearing clearance.

It is advisable to remove the PLASTIGAUGE stripe with a clean oily cloth, but users may be assured that any PLASTIGAUGE left behind is oil-soluble and cannot harm the engine in any way.



Ovality may be determined by placing PLASTIGAUGE around the bearing shaft.

General Information

The normal clearance in the big-end or main bearing should be approximately one part in 2,000 of the diameter. Thus a journal of 2" (50.8mm) diameter may be expected to show a clearance of 0.001" (0.025mm).

The oil escape from a pressure fed bearing increases by roughly the square of the clearance. Thus a clearance of 0.002" (0.050mm) can pass almost twice as much oil as with 0.0015" (0.038mm). If the pump capacity cannot meet this demand the pressure will fall and the bearing will be damaged. This illustrates the importance of accuracy in fitted bearings.

PLASTIGAUGE may be used to detect high spots in cylinder heads, pipe flanges, etc. It is useful in production, inspection and servicing.

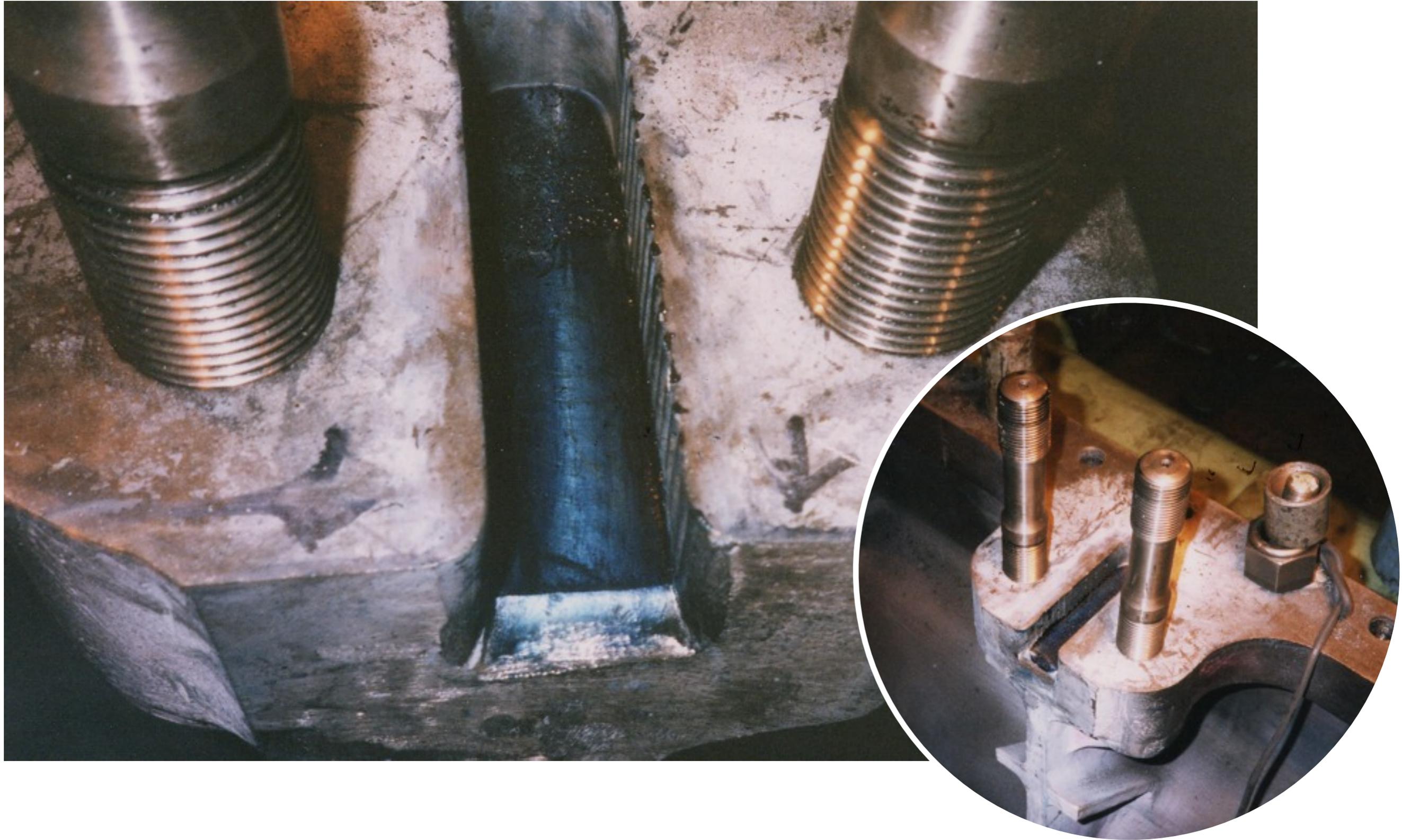
THE PLASTIGAUGE MANUFACTURING CO.

HEWARTS LANE, BOGNOR REGIS, SUSSEX.
Tel: STD. (0243) 263613 Fax: (0243) 262682

Suppliers of plastic precision clearance gauges to H.M. Naval Dockyards and to major engine companies throughout the U.K. and Commonwealth.

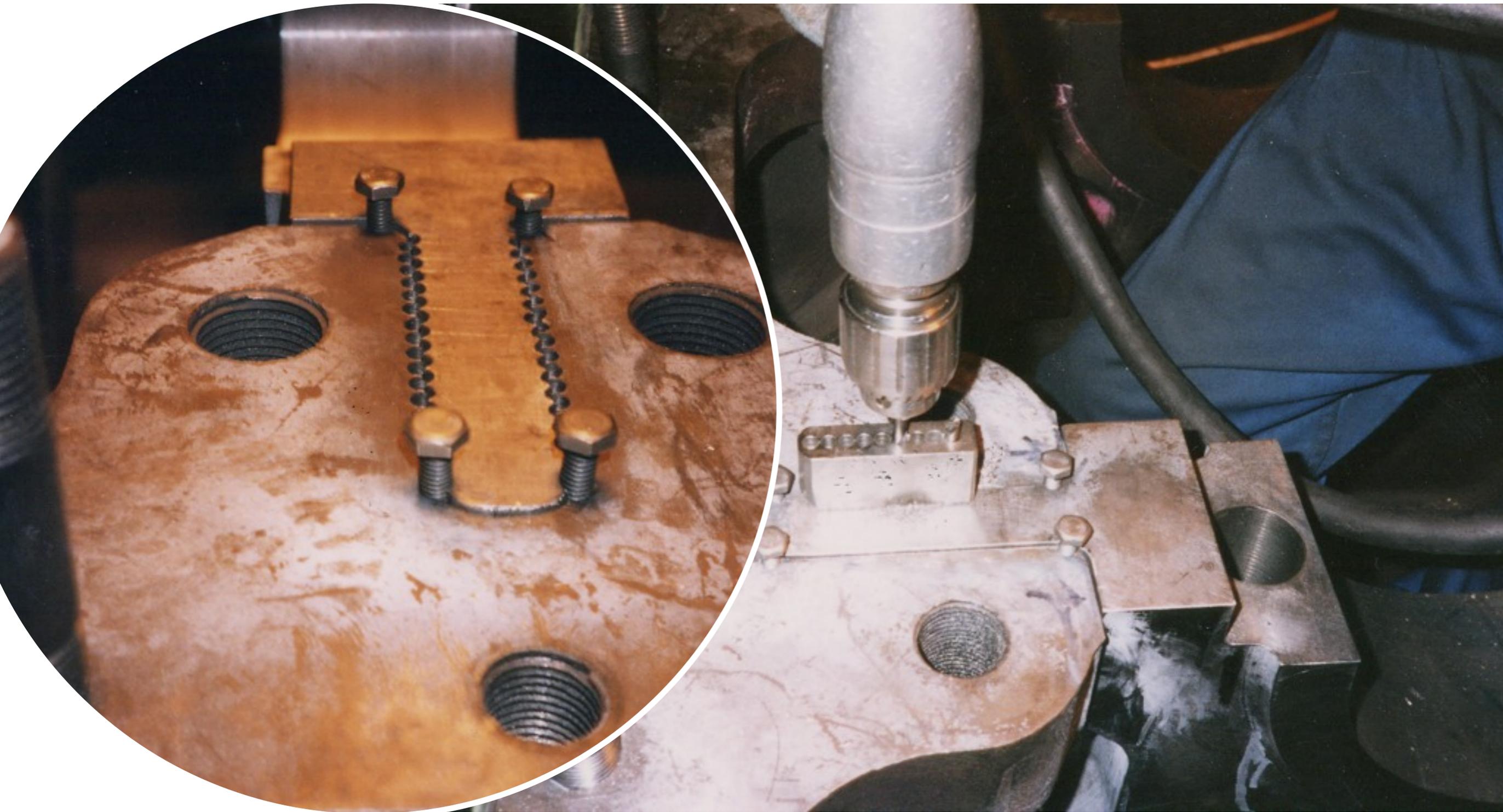


Attached Masterlocks are checked for correct seating using engineering blue



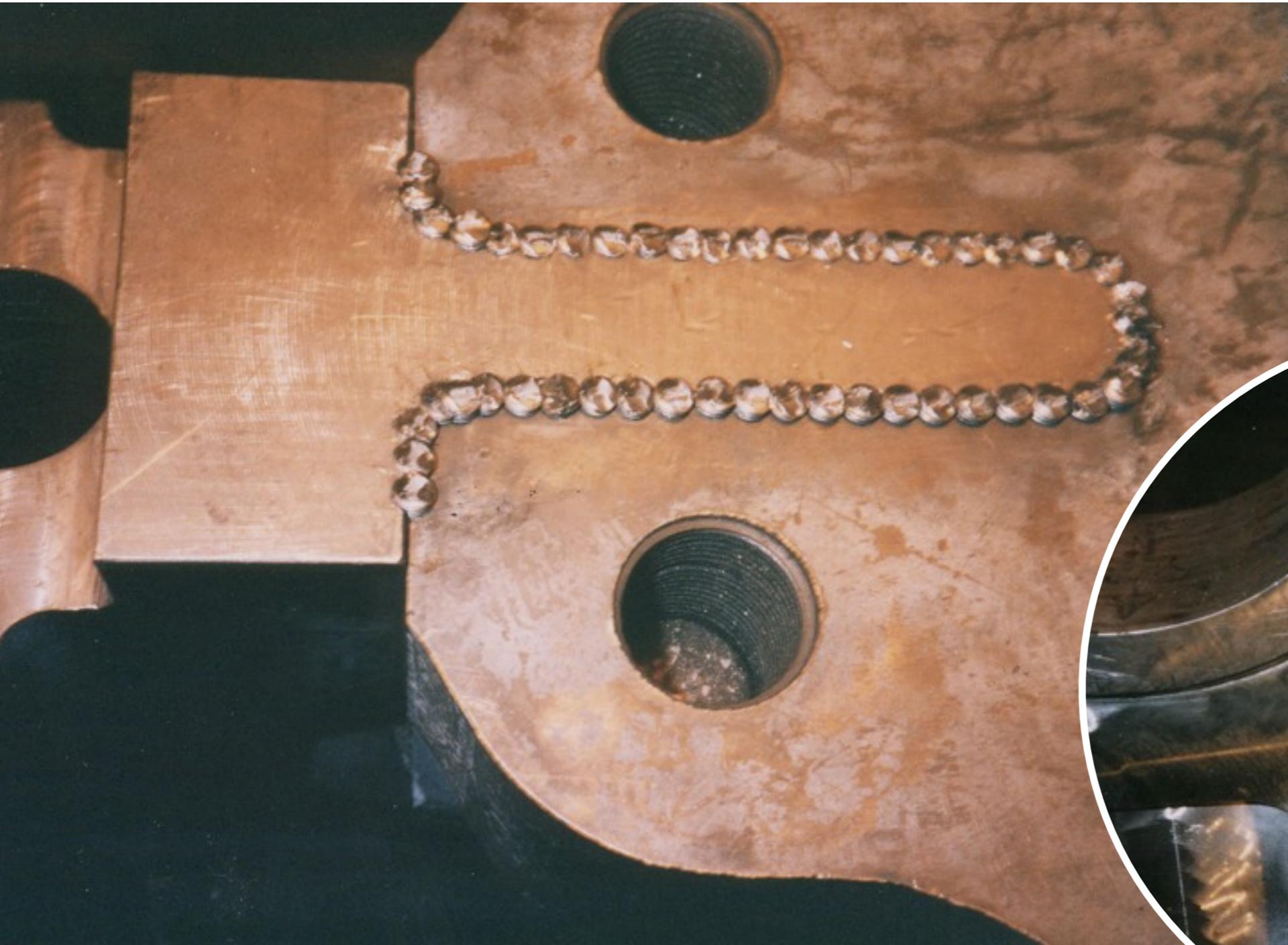
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The process of securing the Insert begins with securing the Masterlocks



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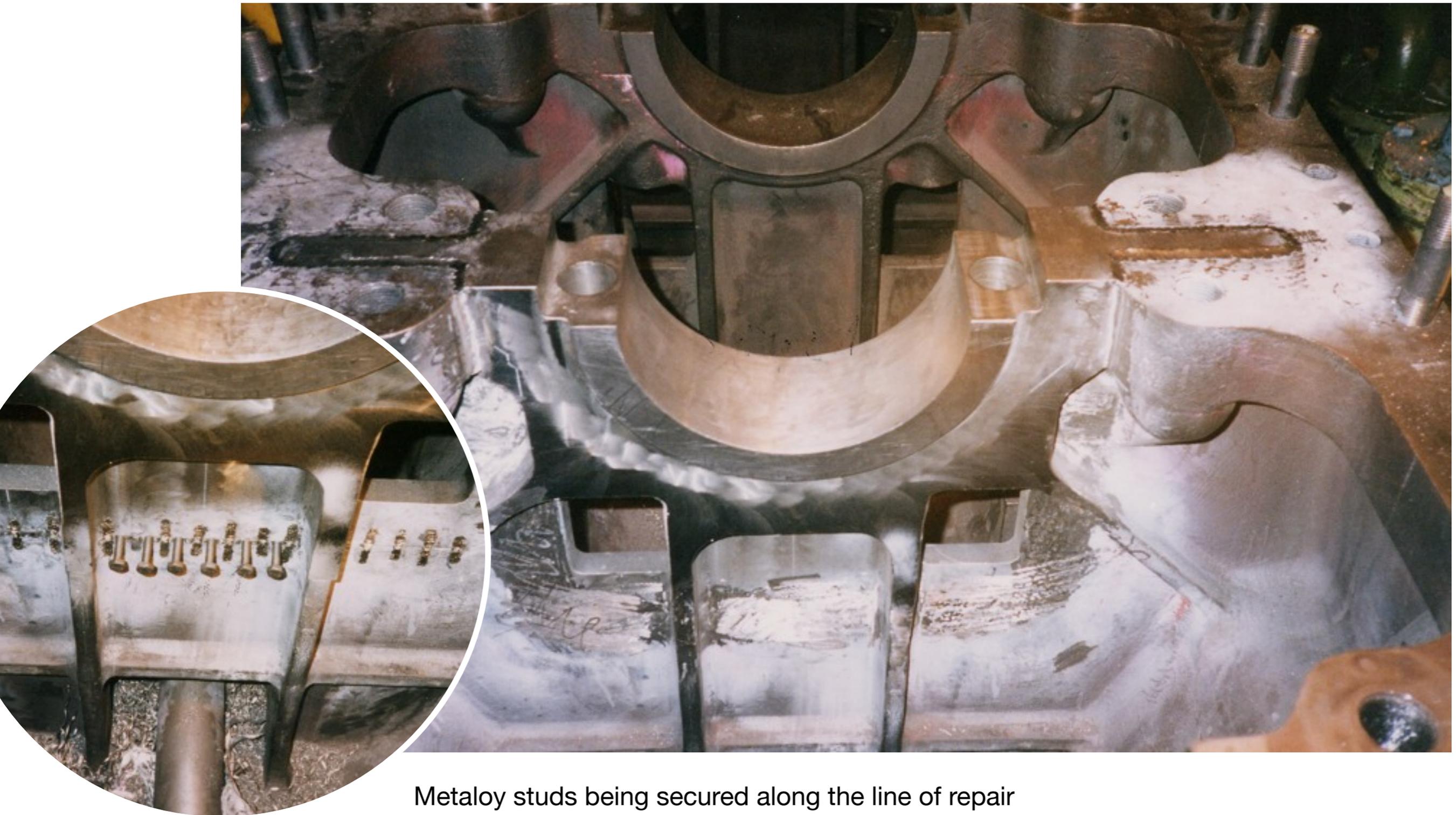
Line of Metaloy studs prior to peening



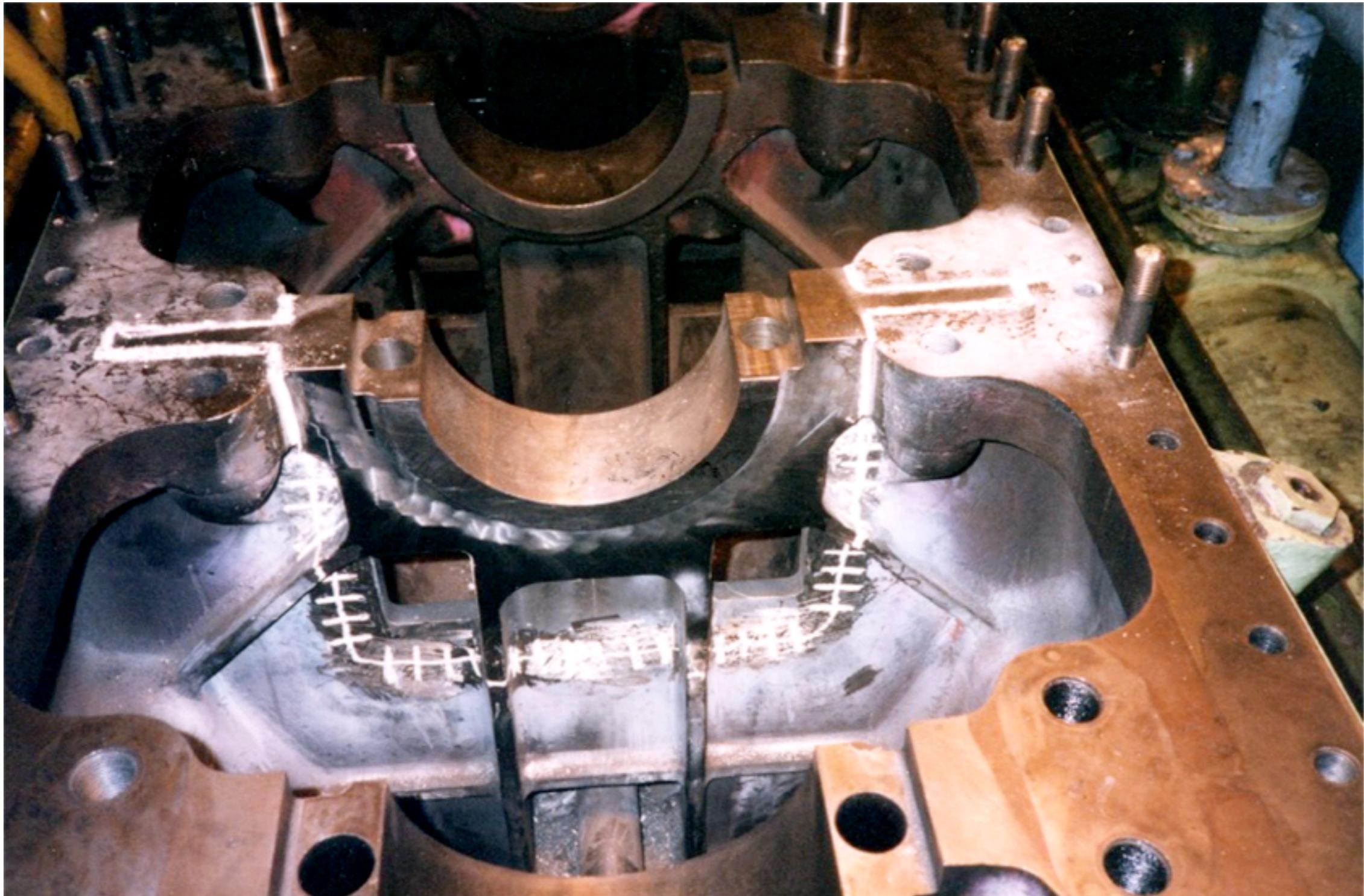
Apertures drilled off and filled with Metalock keys

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Repaired areas are hand dressed to complete the repair leaving the relevant faces and bore for machining



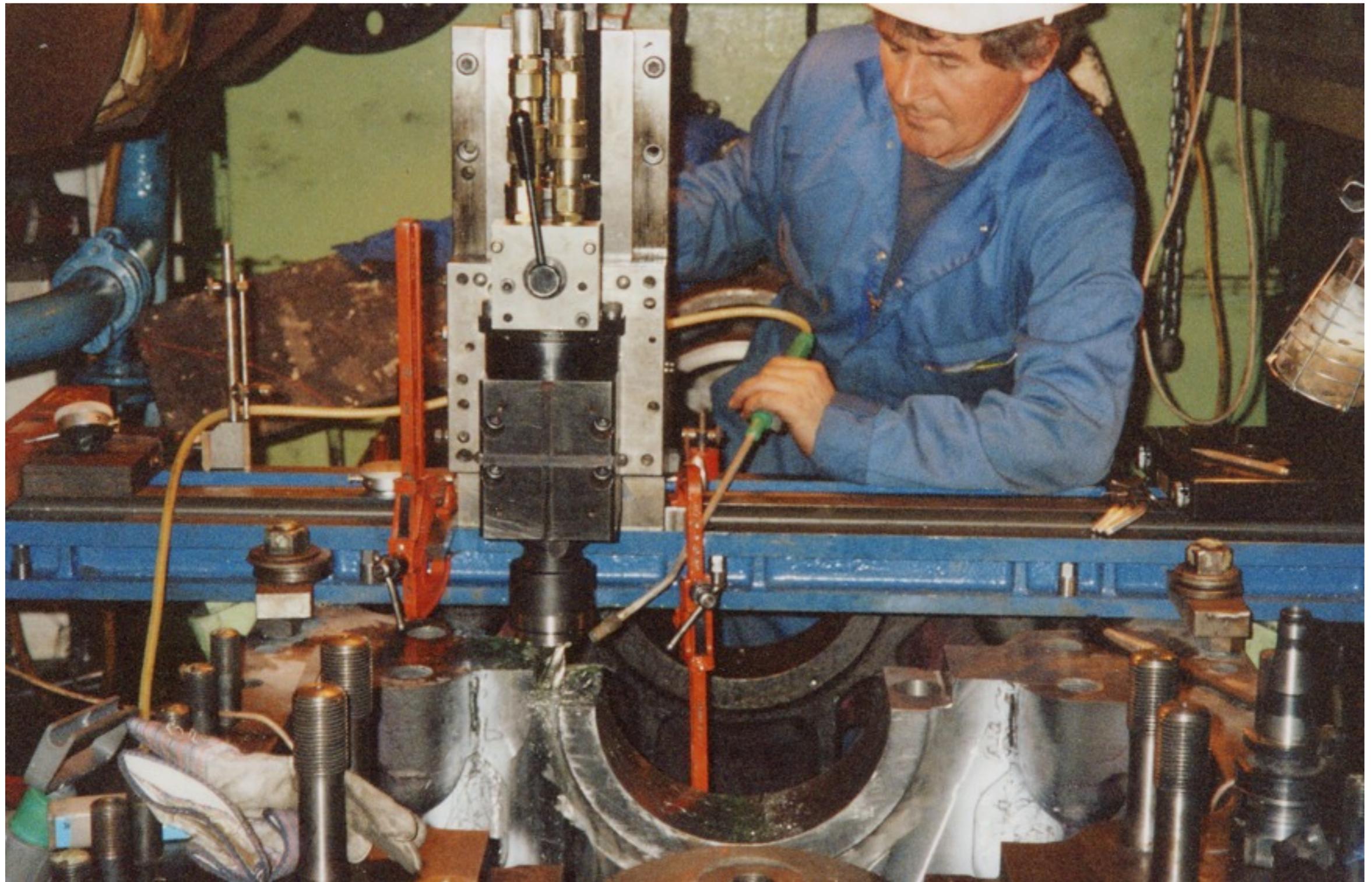
Metal studs being secured along the line of repair



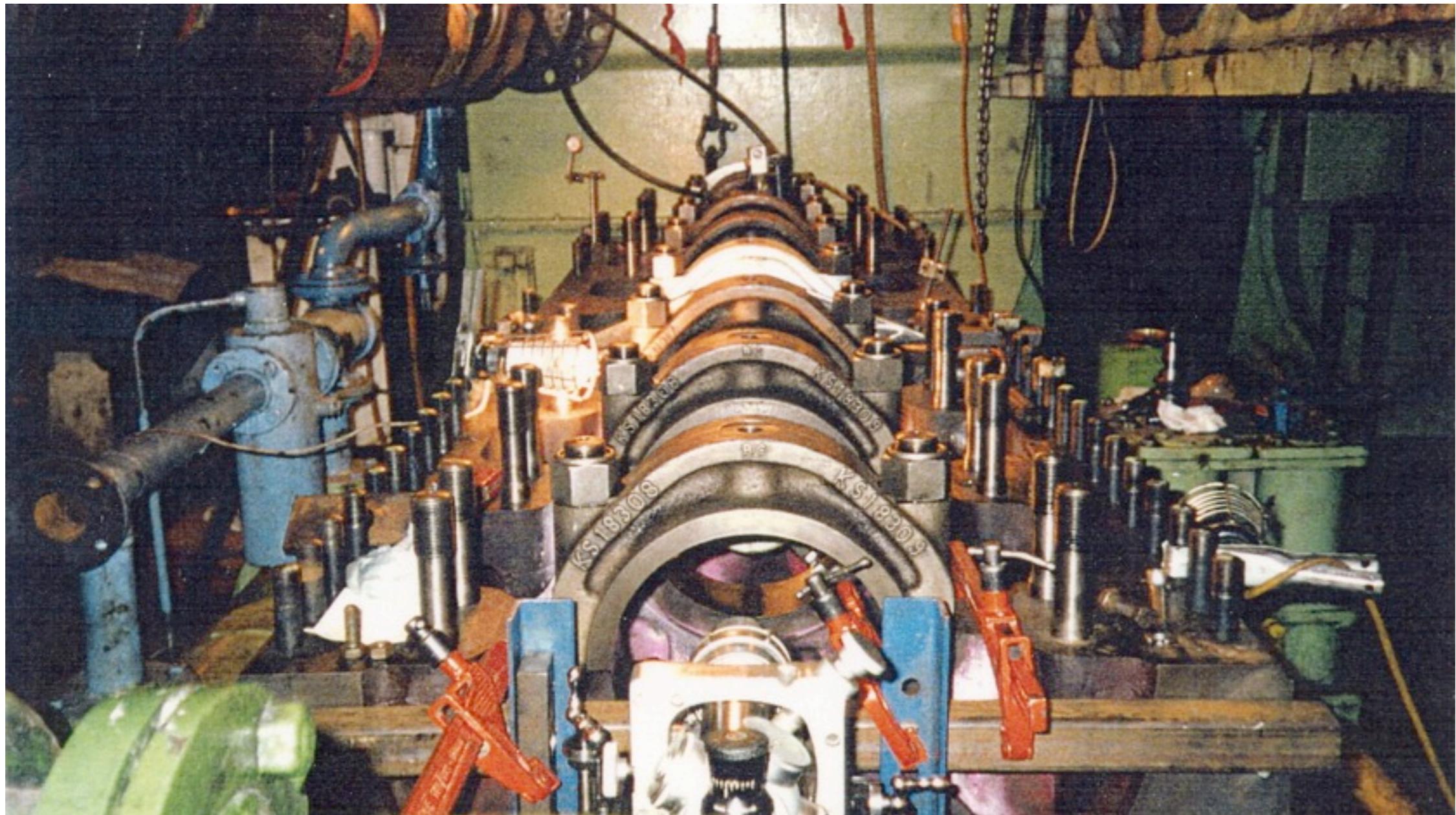
Completed repair awaiting On-Site Machining division

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On-Site Machining division mill the top face

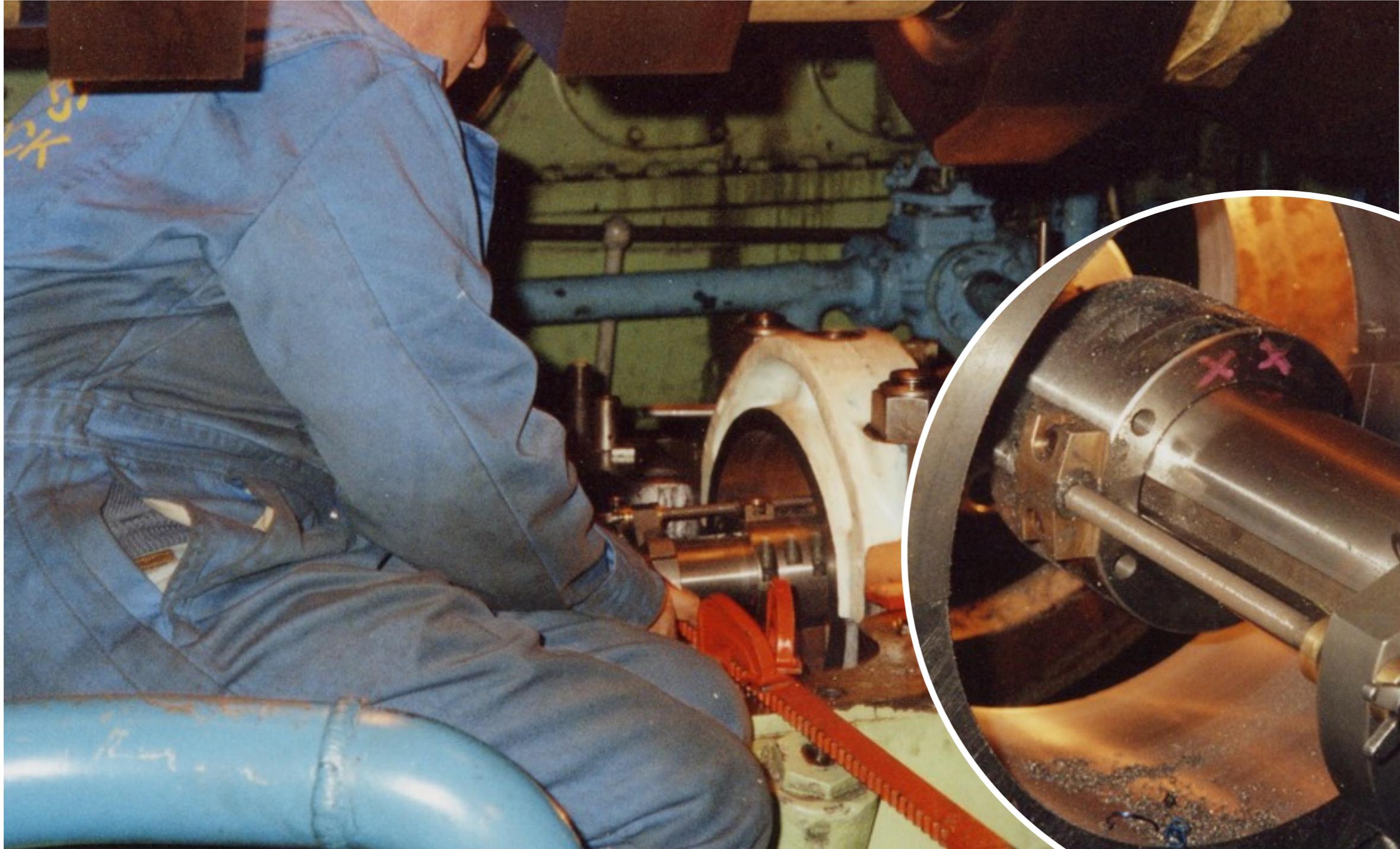


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With a new bearing cap fitted a boring bar with integral optical targets mounted in the centre of the bar was optically aligned true to the centre line of the undamaged bearing pockets.

A new bearing cap is fitted alignment is checked and the bore machined back to standard



Line boring in progress

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The engine was rebuilt, sea trials were carried out the Metalock repair was a complete success and the vessel regained its full classification



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Global service, 24/7

When marine crankshaft fail or engine bedplates need repair, we'll save you time and money by avoiding the cost and inconvenience of removal and replacement.

Whether a vessel is docked or mid-ocean, our specialist service is available 24/7, around the world.



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to welcome

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Established in 1949 Metalock UK are acknowledged as one of the worlds' leading specialists in marine mechanical repairs ranging from in situ machining, metal stitching, welding and metal spraying. We offer a rapid responsive service providing high quality repairs techniques to all ship and offshore operators anywhere in the world. We specialise in orbital crankpin and main bearing machining, engine line boring and Metalock cold repairs to cracked or broken cast iron components. On call 24 hours per day every day.

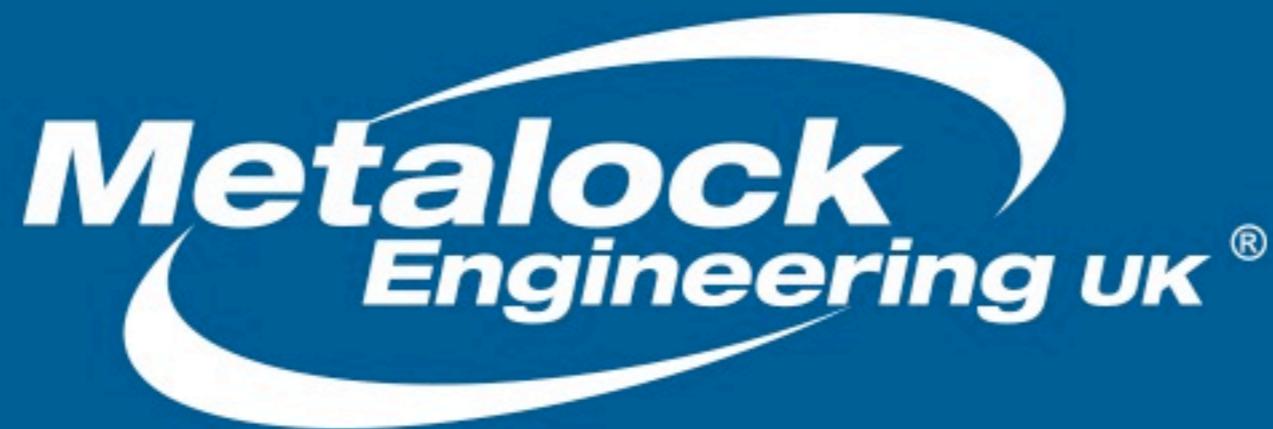
www.metalock.co.uk

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Metallock Engineering UK Limited is a **BS EN ISO 9002** registered company; this shows our commitment to a policy of continuous improvement and excellence.

Our LRQA certificates:

ISO 9001: 2008 for Quality Management.

ISO 14001: 2004 for the Environmental Management.

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