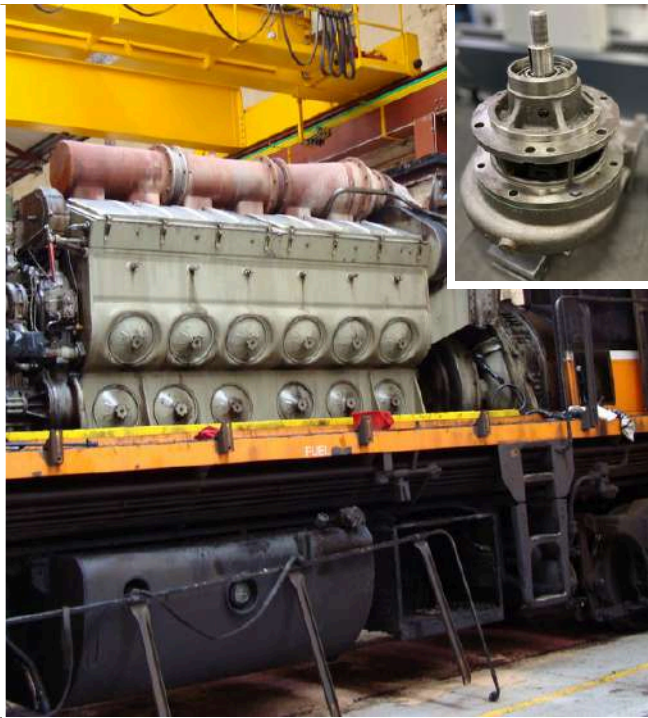
BRAHMA3

MICRO-FINISHING INTERNAL SEAT LAPPING

High-precision internal seat lapping & micro finishing engineering solutions to the order of less than 2 microns



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CASE STUDY

How we plugged a 50 year problem through 7 light bands

A case story of indigenisation & engineering accuracy of 8052224 bush component of the coolant water pump of EMD engines 567, 645 & 710

The Problem

Water leakage in the coolant water pump of the engine.

The Challenge

Achieving a flatness of within 2 microns on this internal face of the rotary joint bush component.

Our Approach

Our team delved into process engineering, machine design, material analysis, and prototyping.

Our Work

We engineered a highly specialized internal lapping tool that consistently maintained optimal contact, achieving a flatness target on every bush component, resulting in a remarkable 100% success rate.

Our Process

Before machining, we conducted a material study of the high nickel cast iron. The lapping process involved placing the bush component in a customized tool with abrasives and lubrication. Precise pressure control ensured uniform material removal and flatness. Iterative calibration adjusted parameters for micron-level accuracy. Real-time metrology tools, including laser interferometry and CMMs, maintained stringent tolerances.

The Result

This technical accomplishment played a pivotal role in resolving the water pump leakage issue. With the newly optimized water pump assembly, approximately 300 units underwent field trials in locomotive engines for five months. The results were outstanding, with no reported water leakage incidents. The end users, including Indian Railways, expressed their satisfaction.

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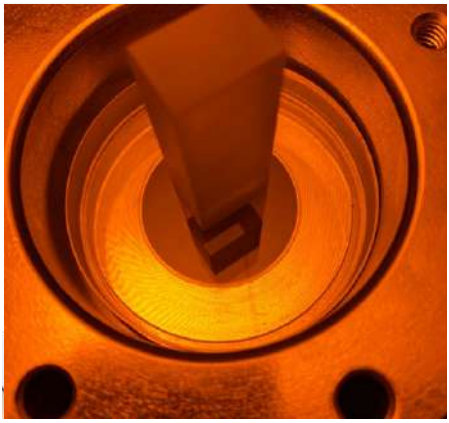
Flatness measurement through light bands

Our components meet the stringent flatness criteria of within 7 light bands (2 microns flatness) under a monochromatic light source.

Internal seat lapping

We engineered a highly specialized super finishing tool that consistently maintained optimal contact, achieving a flatness target on every bush component, resulting in a remarkable 100% success rate.



Light bands on our Bush component

Light bands

Light bands are formed on flat surfaces by using an optical flat and a monochromatic light source. This method is an accurate method of checking surface flatness. The monochromatic light comes from a Sodium filled tube source which eliminates all colors except a “yellowish” orange.

1 sodium light band is equal to 0.29 microns.

Surface geometry		1 Light band 0.00029 mm	2 Light bands 0.00058 mm	3 Light bands 0.00087 mm	9 Light bands 0.00261 mm
Convex or Concave Surface parallel to flat Symmetrical Pattern					
Convex With concave surface band will curve in opposite direction Non-Symmetrical Pattern					
Cylindrical Convex or Concave Symmetrical Pattern					
Saddle Shaped Symmetrical Pattern					

* source - Kemet

“Brahma3’s approach to understand the problem through visits to the locomotive yard, meeting railway authorities and a sound application of engineering principles has helped them grab the opportunity at hand which invariably has helped us retain this business. In fact, we are now confident of taking orders from the end user like never before.”

- CEO, Elixir Engineering

Reach out!

BRAHMA3

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