

## SUCCESS STORY

# Coal Nozzle Burner Tips for Raichur Thermal Power Station



*Raichur Thermal Power Station — Raichur, India*

### THE CHALLENGE

In 2006, Kennametal approached Karnataka Power Corporation Limited about using its infiltration-brazed tungsten carbide cladding at the Raichur Thermal Power Station to protect the plant's coal nozzle tips. KPCL accepted the proposal and encouraged experimentation on the cladded coal nozzle tip. Due to Kennametal's previous success at protecting and extending the life of burner tips, they were extremely confident that the erosion issues at Raichur Thermal Power Station (RTPS) could be resolved.

RTPS is part of Karnataka Power Corporation Limited, which is owned and operated by Karnataka State. RTPS is located approximately 20 kilometers north of Raichur, India. It includes seven 210 MW capacity units that generate approximately 10,000 million units annually. The plant burns roughly seven million tons of coal at 40% ash per year, which results in extreme erosion and wear issues with the burner tips.

Life expectancy for coal nozzle tips at RTPS was 8–12 months. The tips were stainless steel (SS310) with a 6mm layer of weld overlay for protection. During annual overhauls, the tips were refurbished by replacing the eroded portion with new stainless steel plates protected with the weld overlay. After two to three rounds of repairs, the tips were discarded and replaced.

### FIELD TEST

In November 2006, Kennametal began a field test with two burner tips placed side-by-side in one of RTPS's units. One of the tips was the standard SS310 weld overlay protected piece while the other was SS310 protected with 1mm of Kennametal infiltration-brazed tungsten carbide which metallurgically bonds with the base substrate (SS310). After one year of service, both coal nozzle tips were removed and examined.



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## THE RESULT

The weld overlay protected tip showed extreme erosion — the top splitter was completely eroded and severe erosion was found in the rest of the splitters and partition plates (right top photo). The inner annulus plate was severely eroded on the boiler side of the weld overlay protected tip (bottom left photo). The Kennametal protected tip maintained its size and shape and showed no erosion on the boiler side (bottom right photo). Using these results, the Kennametal burner tip was expected to last a minimum of two years. However, after reviewing the findings of the field test, Kennametal designed an improved coal nozzle tip for RTPS with improved protection on the splitter, leading edge, and top plate that extended the performance of the tips even further.



*Side by side comparison (boiler side view) of the weld overlay protected coal nozzle tip (right) and the Kennametal tip (left).*

**“After one year we found the service nozzle tip coated with tungsten carbide to be in better condition than other standard coal nozzle tips.”**

*- Mr. Murlidhar Rao,  
Technical Director of KPCL*



*Comparison of weld overlay protected coal nozzle tip (top) and the Kennametal tip (bottom) from coal entry side.*

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