

International Advanced Research Centre for Powder Metallurgy & New Materials (ARCI)

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Laser Assisted Machining for AUSC Boiler

Overview

The proposed AUSC boiler will have IN617 and IN625 parts / components in very high volume. However, nickel-based alloys are known as difficult-to-machine materials due to high strength and low thermal conductivity that make the cutting forces and cutting temperature very high leading to a short tool life. Hence, machining cost of these parts will be very high.

Laser Assisted Machining (LAM), the material is locally heated and softened by an intense laser source prior to material removal, without melting or sublimation of the work piece as depicted in fig. This enables the difficult-to-machine materials to be machined more easily and with low machine power consumption, which leads to increase in material removal rate and productivity.

Key Features

- Softening of the material by heating
- Reduction in tool forces
- Better finish
- Lower tool wear



Laser Assisted Machining Setup

Potential Applications

- Component made of hard to machine alloys
- Ni based super alloys, Ti-based alloys, ceramics

Technology Readiness Level **20%**

- Performance and stability are validated at laboratory scale
- Scale-up and prototype module fabrication underway
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<i>Preliminary</i>	<i>Proof of concept</i>	<i>Scale-up</i>	<i>Prototyping</i>	<i>Validated</i>
20%	40%	60%	80%	100%

Major Publications

Centre for Laser Processing of Materials (CLPM)

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