



# AMERICAN CLADDING TECHNOLOGIES

A **Joining** INDUSTRIES COMPANY

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## CLADDING IN POWER GENERATION: Extend boiler tube life with laser cladding



# LASER CLADDING ADVANTAGES

**Laser cladding**, also known as **laser metal deposition (LMD)**, uses metal alloy powders to enhance the surfaces of metal components. These enhancements are usually focused on extending component life by minimizing erosion/corrosion of the base material.

Advantages of LMD over more traditional additive processes include:

- **Lower material costs** due to thinner coatings
- **Improved metallurgy** with higher material hardness
- **Less stress** due to lower heat input
- **Shorter process time** than traditional processes like GTAW and MIG

## Typical Boiler Tube Challenges

- High temperatures
- High pressure
- Highly corrosive/erosive fuel
- Replacement costs of pressure components

## Benefits of Laser Cladding vs. Inconel Overlays

In the power generation industry, Inconel 625 is commonly used as an overlaying alloy on boiler pressure components to help minimize the wear rates from corrosion and erosion. Laser cladding offers a number of advantages over traditional methods of Inconel overlays.

- **Extended component life:** Laser clad superheater tubes have been in operation for 5 years without failure
- **Improved thermal efficiencies** compared to Inconel overlays
- **Reduced maintenance costs** from reducing or eliminating costs of shielding procurement and installation
- **Reduced fly ash erosion** due to the increased wear resistance of the coating
- **Reduced hot spot formation** by eliminating or reducing superheater tube shielding
- **Reduced soot blower cleaning cycles** – up to 79% reduction in cleaning cycle frequency
- **Production costs equal to or less than** traditional Inconel coatings
- **Improved metallurgy**
- **Minimal heat input** results in low base material dilution
- **Minimal heat affected zone (HAZ)**

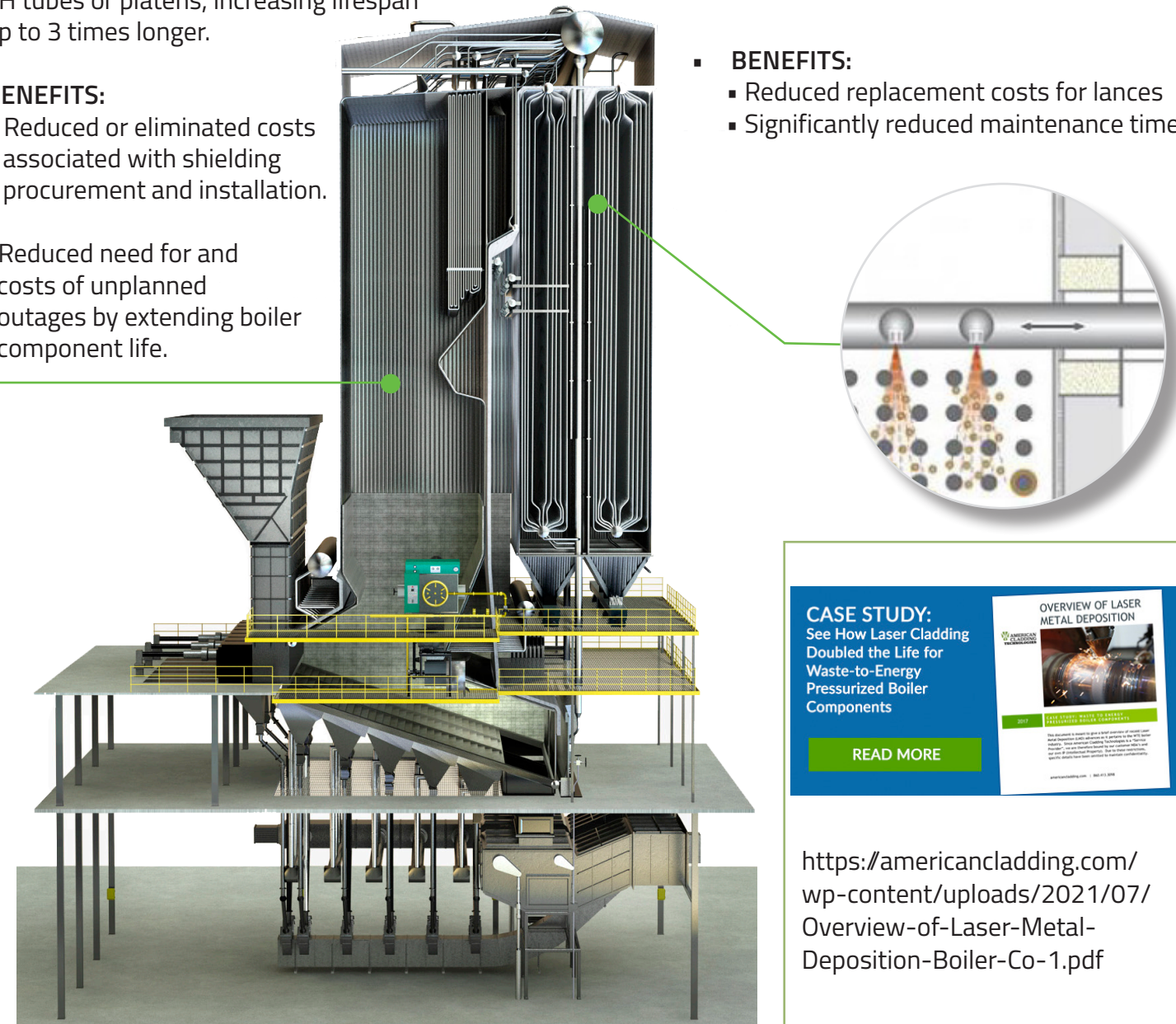
## Superheater Tubes

- **PROBLEM:** Pressurized boiler components are subjected to high temperatures (1,600° -2,000°F), high pressures (850-1,200 psig) and fuel that is both highly corrosive and erosive. The superheater (SH) lifespan can be 16-24 months with Inconel 625 overlays. After this, the entire primary and secondary SH is usually replaced at significant cost.
- **SOLUTION:** Laser clad a highly corrosive- and erosive-resistant coating onto the SH tubes or platens, increasing lifespan up to 3 times longer.
- **BENEFITS:**
  - Reduced or eliminated costs associated with shielding procurement and installation.
  - Reduced need for and costs of unplanned outages by extending boiler component life.

# BOILER TUBE APPLICATIONS

## Soot Blowers

- **PROBLEM:** Soot blower lances are exposed to the same harsh environments as the superheater tubes, resulting in downtime and significant maintenance costs.
- **SOLUTION:** Laser clad the soot blower lances with a highly corrosive- and erosive-resistant coating, extending the life of the lances up to 6 times longer.
- **BENEFITS:**
  - Reduced replacement costs for lances
  - Significantly reduced maintenance time



**CASE STUDY:**  
See How Laser Cladding Doubled the Life for Waste-to-Energy Pressurized Boiler Components

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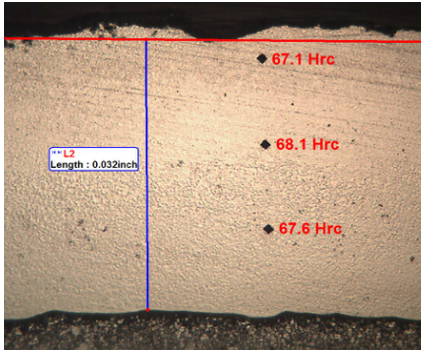
<https://americancladding.com/wp-content/uploads/2021/07/Overview-of-Laser-Metal-Deposition-Boiler-Co-1.pdf>



**Our Laser Clad Guarantee:**  
We will continue to be a leader in the laser cladding industry.  
We will *always* apply best-in-class practices to deliver consistent metallurgy.  
We will *only* deliver metal deposition solutions of exceptional precision and quality.



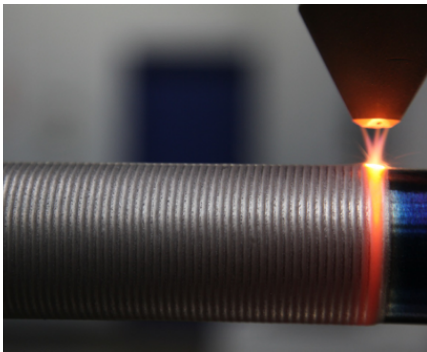
Laser clad SH tubes were removed for evaluation from a local WTE facility. At the time of removal, the SH tubes had been in operation for 49 months. SH tubes have been in operation for more than 5 years without failure.



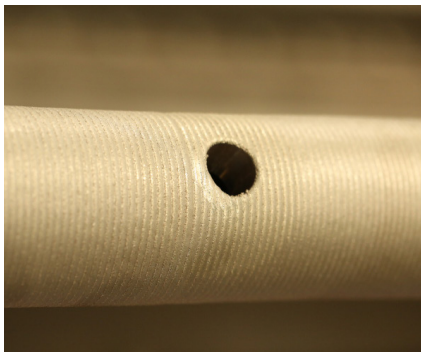
Metallurgical cross section from one of the "49 month" SH tubes removed for evaluation. Original coating thickness was approximately 0.040" – 0.044" thick.

## WHAT MAKES US DIFFERENT

**Laser metal deposition (LMD)** is not a niche offering for us.... it's what we do. Constantly striving to stay at the forefront of this fast-growing technology has resulted in a full staff dedicated to the science of **LMD**. This expertise ranges from metallurgical sample evaluations to custom **LMD** equipment designs. Helping you through feasibility, qualification, serial production and up to onsite vertical integration is our daily routine. With annual powder deposition amounts now exceeding 32 tons, we've learned how to help you stay successful. We currently offer 24 hour/day **LMD** work cells whose part capacity ranges from ounces to multiple tons that are over 40 feet in length.



Base Material: SA-213-T22  
Overlay Material: Ni-Cr-W  
Cladding Thickness: 0.035"  
Typical Hardness: 66 – 70 Rc



Laser clad soot blower with coating that has extended its lifespan up to 6 times longer.

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### ACCREDITATIONS & CERTIFICATIONS

- ISO 9001
- AS9100
- ASME boiler & pressure vessel
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[americancladding.com](http://americancladding.com)  
860.413.3098



American Cladding Technologies  
15 International Drive  
East Granby, CT 06026  
860.413.3098  
[americancladding.com](http://americancladding.com)