

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

Balapur P.O., Hyderabad – 500005, Telangana, India



Repair and Refurbishment of Pressure Die Casting Die Components using Laser Material Deposition (Laser Cladding)

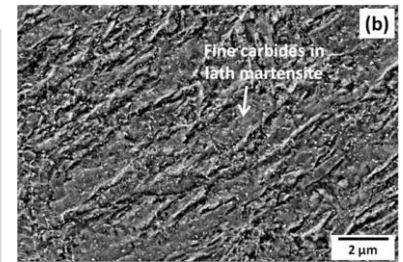
Overview

Enhancing service life by surface treatment and recovering component after post damage could have significant economic benefits. Die tool costs 10% of cast part. Repair and refurbishment are increasingly common practices, seeking to maximize unit lifetime, availability and profitability.

During hot forming of aluminum alloys, dies made up of hot work tool steels get exposed to severe operating conditions that cause significant thermal and mechanical fatigue, high pressure and high hot erosion from flowing molten alloy and result into surface damages like heat checks, erosion and chemical attack in prime locations, limiting or diminishing the service life of the tools. Laser cladding has been successfully used to repair the damaged dies and put to re-use.

Key Features

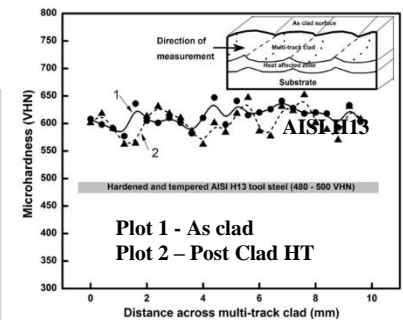
- Repair is possible without preheating of the components/tools
- Low heat input to the component, so less damage
- Narrow soft zone created with relatively high hardness
- Fully automated and repeatable
- Precise deposition and less post processing



Microstructure of Post Clad Heat treatment

Potential Application Sectors

- Pressure die casting tools
- High Temperature Extrusion tools
- Hot Forging tools
- Hot forming and Punching tools



Microhardness comparison at different conditions

Intellectual Property Development Indices (IPDI)

- Successfully completed testing of repaired PDC tools on real-time conditions (Case study)

Status	1	2	3	4	5	6	7	8	9	10
--------	---	---	---	---	---	---	---	---	---	----

Centre for Laser Processing of Material (CLPM)

ARCI, Balapur PO., Hyderabad 500005, Telangana, India
Tel : +91 40 24452457 / 24452454; Fax : +91 40 24442699

Email: easwar [at] arci [dot] res [dot] in / ssakhivel [at] arci [dot] res [dot] in / tata [at] arci [dot] res [dot] in