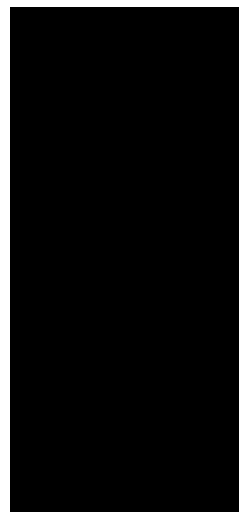
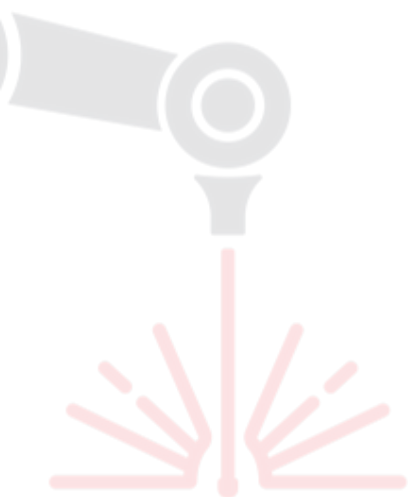
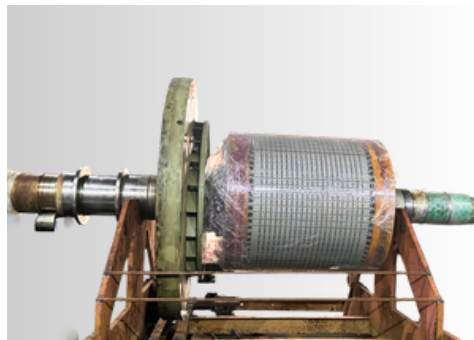


PHUONGDONG
I N D U S T R Y



LASER CLADDING INDUSTRIAL EQUIPMENT



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2026 PHUONG DONG CO.,LTD



Map



Youtube



Website

LASER CLADDING


ISOCERT
Hội Hoa Công Thịnh Vượng

GIẤY CHỨNG NHẬN
Số 1868213837-QMS

CHỨNG NHẬN HỆ THỐNG QUẢN LÝ CHẤT LƯỢNG CỦA
CÔNG TY TNHH THƯƠNG MẠI VÀ CÔNG NGHIỆP PHƯƠNG ĐÔNG
Trụ sở chính: Thôn Ngọc Chi, Xã Vĩnh Thanh, Thành phố Hà Nội, Việt Nam.
Nhà máy: Ngõ 70, Đường Dân Di, Xã Đông Anh, Thành phố Hà Nội, Việt Nam.

Được đánh giá và xác nhận phù hợp với yêu cầu của tiêu chuẩn:
ISO 9001:2015
PHẠM VI CHỨNG NHẬN:
Chế tạo máy móc, sửa chữa thiết bị công nghiệp bằng phương pháp hàn phủ Laser.

Ngày chứng nhận : 28.08.2025
Ngày phát hành : 28.08.2025
Ngày hết hạn : 27.08.2028
Chi tiết tại quyết định số : 280825.02/QĐ-ISOCERT


Mã Truy Xuất Chứng Chỉ: 1868213837


VICAS 067-QMS


ISO 9001:2015


ThS. Vũ Hoàng Tuấn

Trụ sở hiệu lực chứng chỉ tại: <http://isocert.org.vn/tru-so-hieu-luc-chung-chi-iso>
CÔNG TY CỔ PHẦN CHỨNG NHẬN VÀ GIÁM ĐỊNH QUỐC TẾ ISOCERT
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Hotline: 1900 636 538, VP/IN: 02471.036.538, VP/HCM: 02873.056.538, Email: contacts@isocert.org.vn, Website: <http://isocert.org.vn>


BỘ VĂN HÓA, THỂ THAO VÀ DU LỊCH
CỤC BẢN QUYỀN TÁC GIẢ

**GIẤY CHỨNG NHẬN
ĐĂNG KÝ QUYỀN TÁC GIẢ**

CỤC BẢN QUYỀN TÁC GIẢ CHỨNG NHẬN

Tác phẩm: **Auto Turn On/Off Laser** Loại hình: **Chương trình máy tính (Không bao gồm dữ liệu)**

Tác giả: **HOÀNG VĂN CƯỜNG** Quốc tịch: **Việt Nam**
Số 4, Khu 5, phường Hà Lâm, Thành phố Hạ Long, Quảng Ninh Số CCCD: **022086010518**
NGUYỄN THÊ MINH Quốc tịch: **Việt Nam**
Trần Nhân Tông 2, phường Quán Trữ, quận Kiến An, Hải Phòng Số CCCD: **031202003551**

Chủ sở hữu: **HOÀNG VĂN CƯỜNG** Số CCCD: **022086010518**
Số 4, Khu 5, phường Hà Lâm, Thành phố Hạ Long, Quảng Ninh 23/05/2023

Đã đăng ký quyền tác giả tại Cục Bản quyền Tác giả

Hà Nội, ngày 14 tháng 07 năm 2025
QUỐC TRƯỞNG
BẢN QUYỀN TÁC GIẢ


Số: 5740/2025/QTG
Cấp cho Chủ sở hữu

Trần Hoàng


HỘI KHOA HỌC KỸ THUẬT HÀN VIỆT NAM
VIETNAM WELDING SOCIETY

GIẤY CHỨNG NHẬN HỘI VIÊN TẬP THỂ
MEMBER CERTIFICATE
CÔNG NHẬN

PHƯƠNG ĐÔNG LASER THUỘC CÔNG TY TNHH THƯƠNG MẠI VÀ CÔNG NGHIỆP PHƯƠNG ĐÔNG
.....
PHUONG DONG INDUSTRIAL AND TRADING COMPANY LIMITED
.....

Là HỘI VIÊN TẬP THỂ
của HỘI KHOA HỌC KỸ THUẬT HÀN VIỆT NAM

Số: 57/2024-QĐ/HV


CHỦ TỊCH HỘI

Lê Thu Quý

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LASER CLADDING ADVANCED MATERIAL COATING TECHNOLOGY

Laser Cladding is an advanced manufacturing technique in which a metal or alloy layer is deposited onto a substrate surface using a high-energy laser beam. Compared with conventional coating methods, this technology offers superior precision thanks to precise control of heat input, which minimizes distortion and creates a strong metallurgical bond between the coating and the base material.

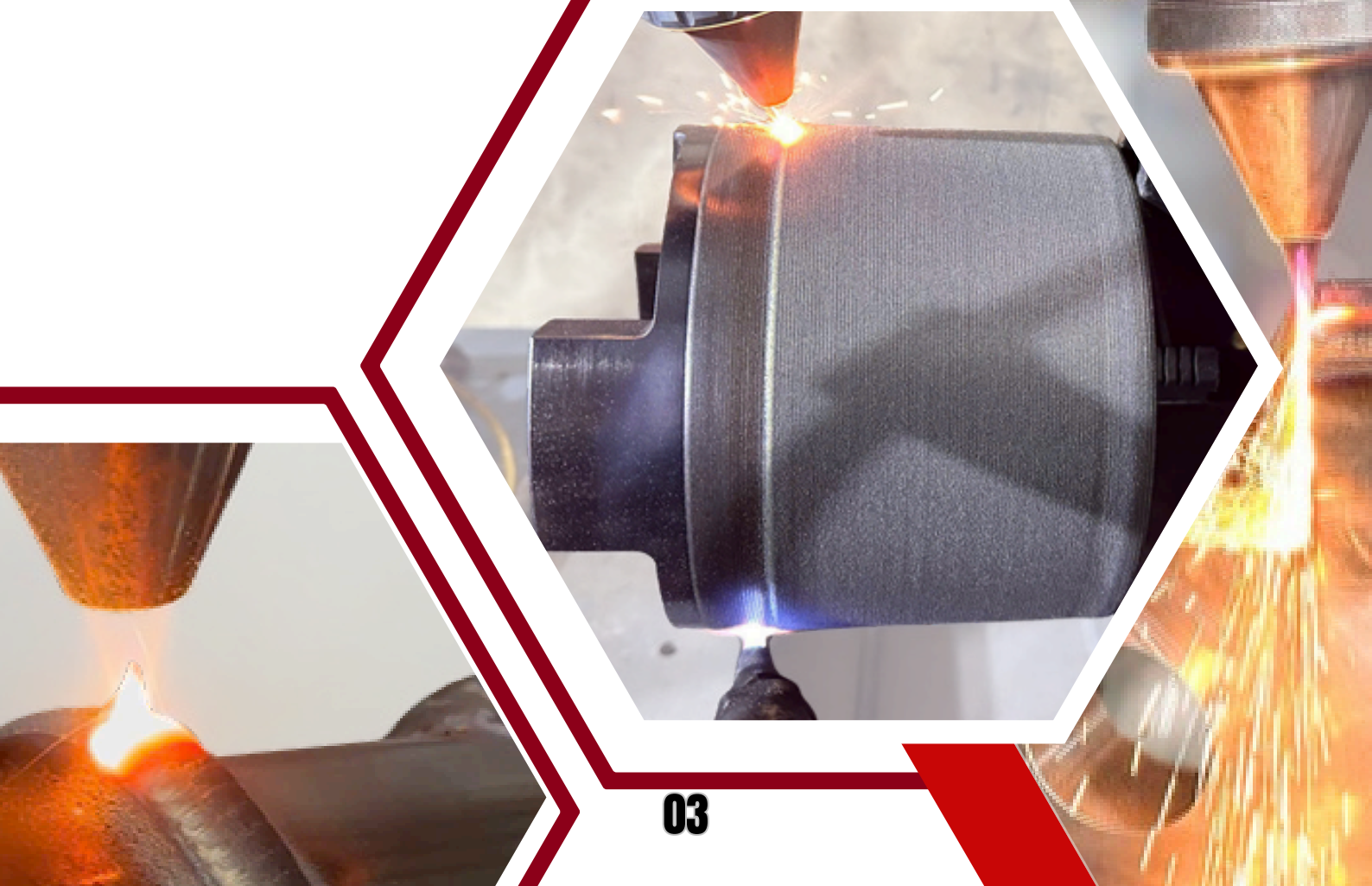
With high flexibility, Laser Cladding allows the use of a wide range of metals and alloys to tailor coating properties, providing enhanced wear resistance, corrosion resistance, or improved thermal conductivity. As a result, this technology is widely applied across aerospace, automotive, oil & gas, and tooling industries—from repairing damaged components and extending equipment service life to building complex structures through metal 3D printing.

Today, Laser Cladding is regarded as a modern manufacturing solution due to its exceptional precision and versatility, meeting the stringent requirements of various industrial sectors.



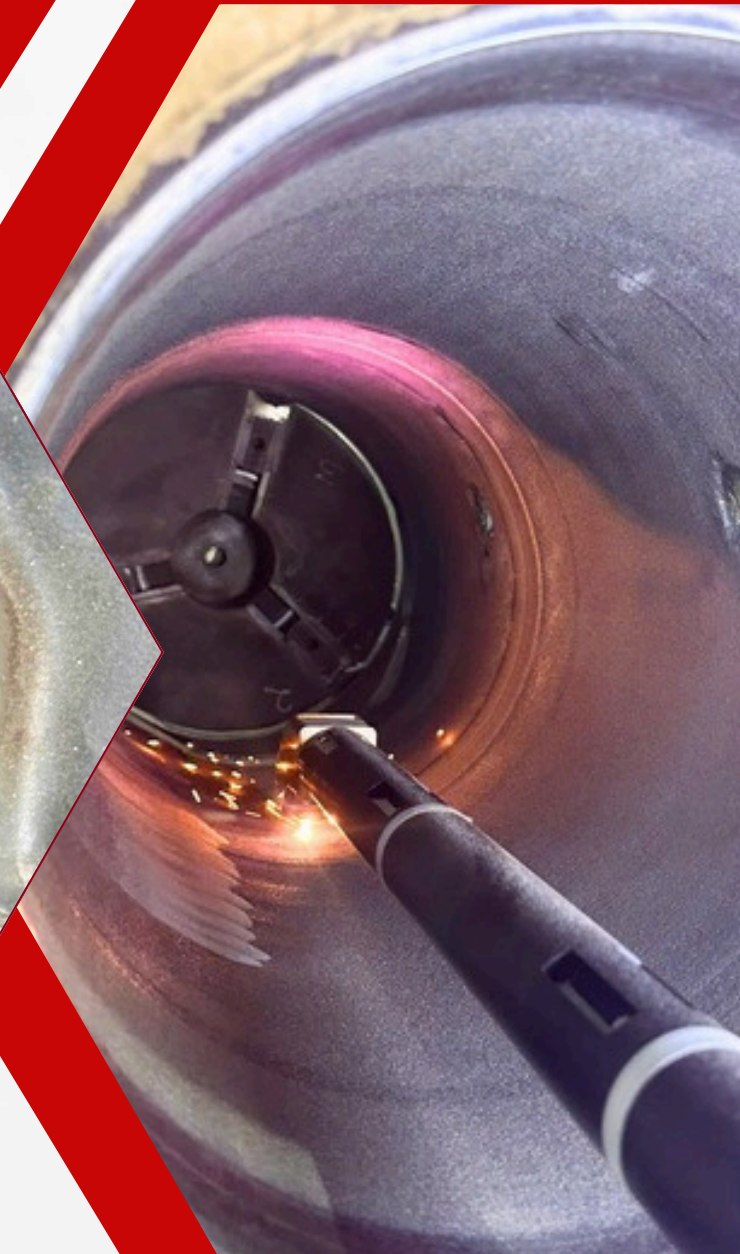
APPLICATIONS OF LASER CLADDING

1. Surface restoration and repair of damaged components.
2. Wear- and corrosion-resistant coatings.
3. Coatings for high-temperature applications.
4. Enhancement of surface properties such as hardness and reduced friction.
5. Creation of complex geometries and material structures.
6. Additive manufacturing and metal 3D printing of components.



ADVANTAGES

1. Precise coating with strong metallurgical bonding.
2. Excellent control of coating composition and microstructure, with very low porosity.
3. Enhanced surface properties such as wear resistance, corrosion resistance, and thermal performance.
4. Reduced material waste and improved cost efficiency.
5. Wide range of metals and alloys available for coating applications.

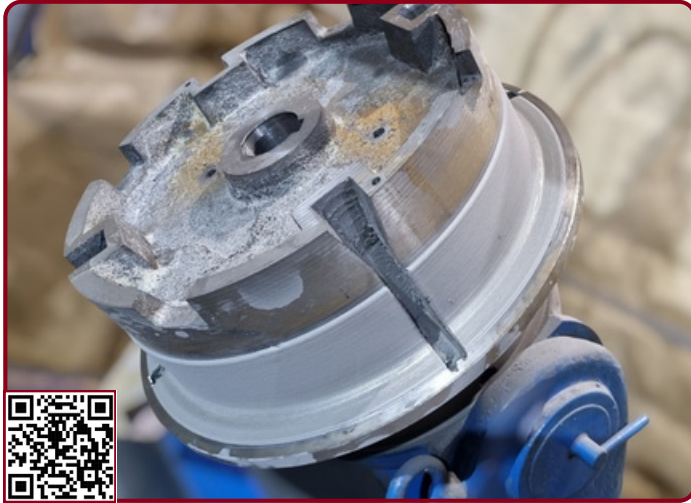


DISADVANTAGES

1. High initial equipment investment cost.
2. Limited deposition rate compared to other welding processes.
3. Thermal stresses and potential distortion of the substrate.
4. High laser power requires dedicated, specialized equipment and does not allow handheld operation.
5. Skilled operators and specialized training are required.



A. Steel Industry



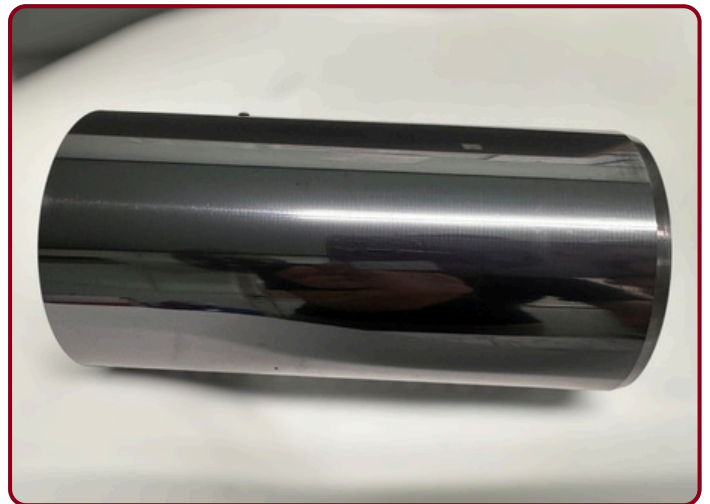
Wire Drawing Drum



Wire Drawing Pulley



Guide Roll



High-Pressure Pump Bushing

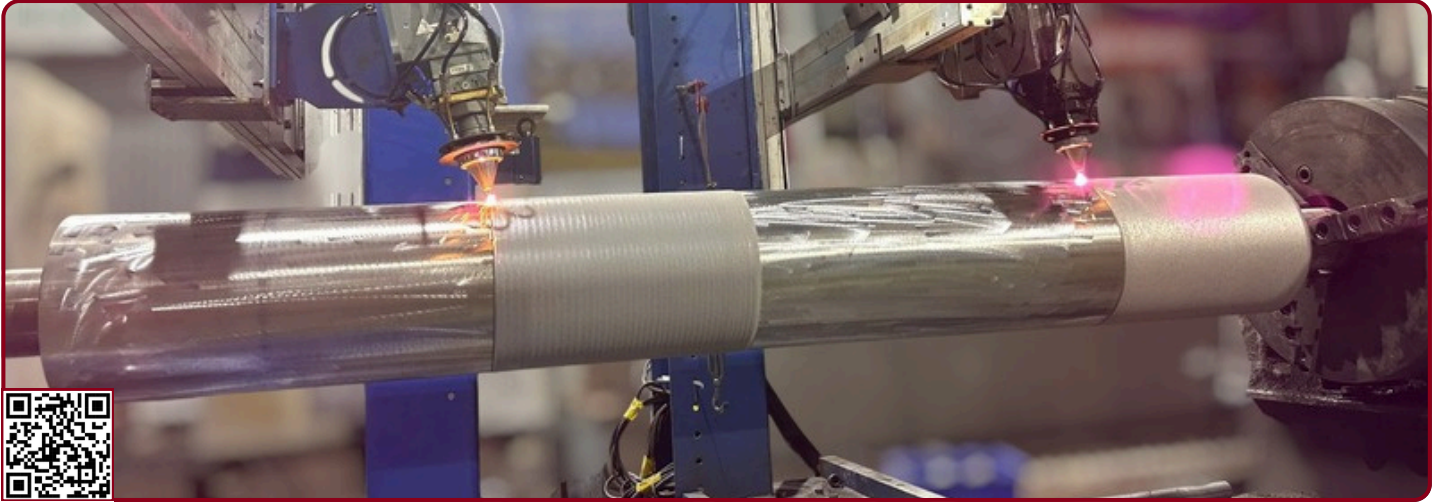


Wheel

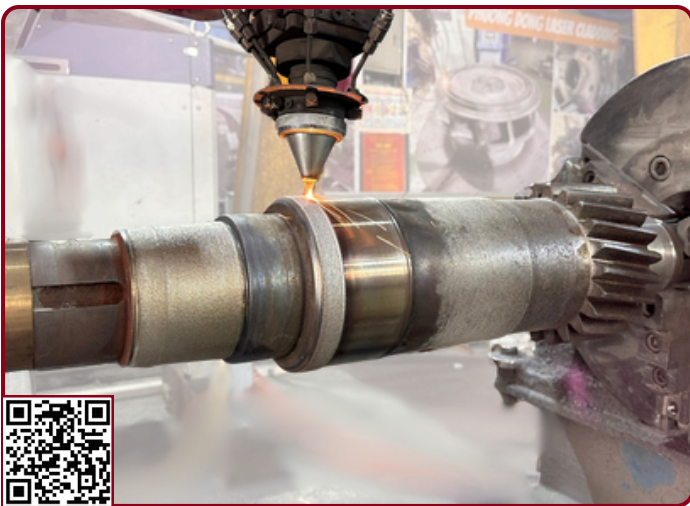


Zinc Bath Dross Skimmer Blade

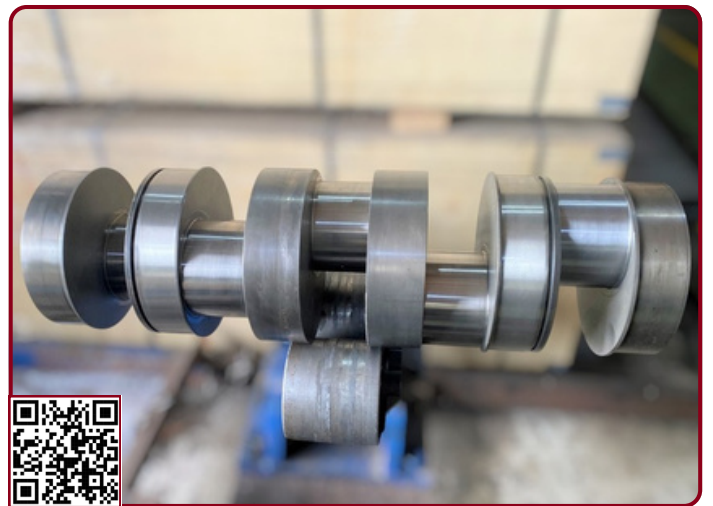
A. Steel Industry



Looper Roller



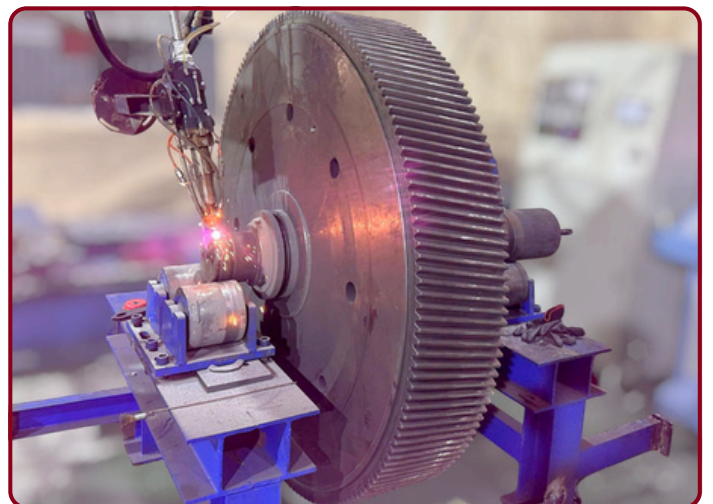
Mandrel Shaft



Crankshaft



Rolling Mill Shaft



Gear Shaft

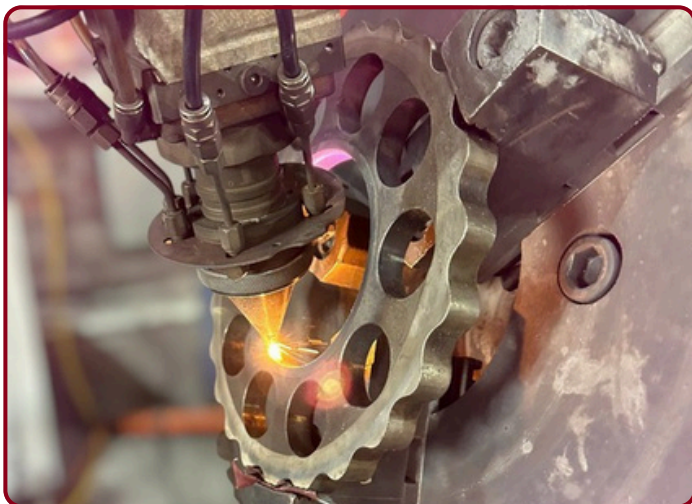
A. Steel Industry



Steel Plant Pump Shaft



Air Compressor Turbine



Gear



Gear

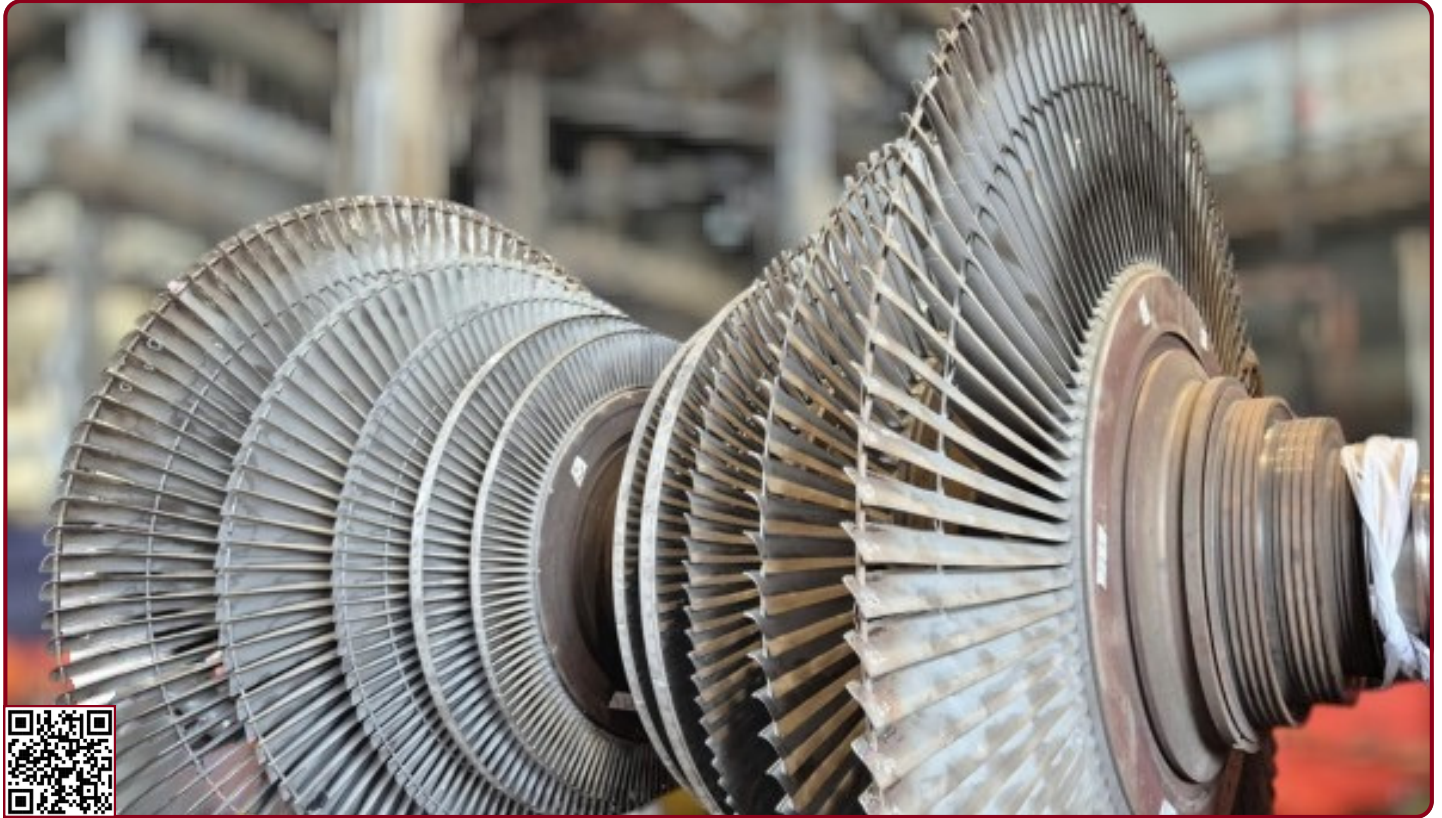


Gear



Bearing Housing D440x360

B. Thermal Power Plants



Power Plant Turbine Blade



Before

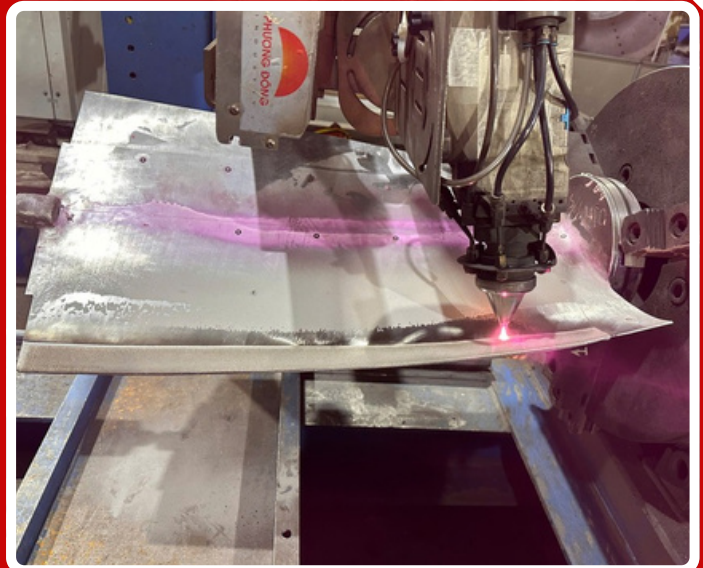


After

B. Thermal Power Plants



ID Fan (Static Blade)



ID Fan (Rotating Blade)

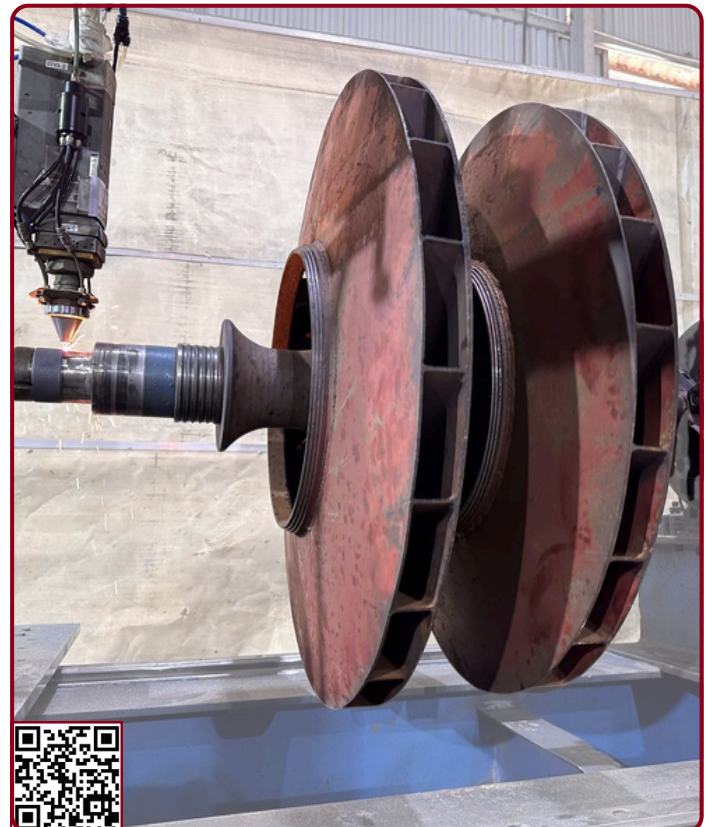
B. Thermal Power Plants



Power Plant Feedwater Pump

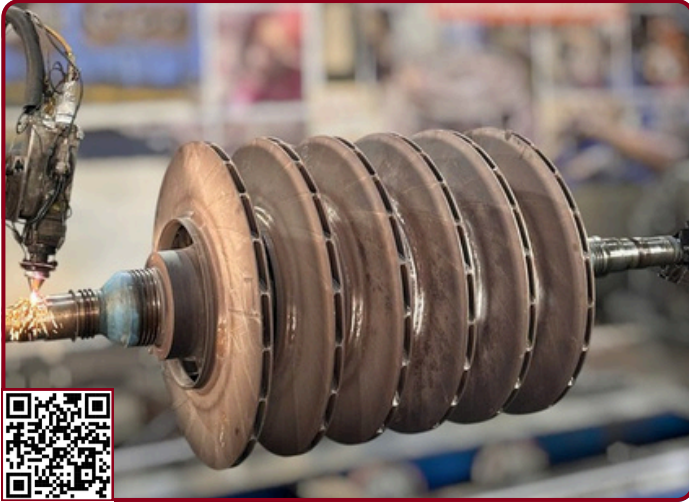


Impeller Shaft



Impeller Shaft

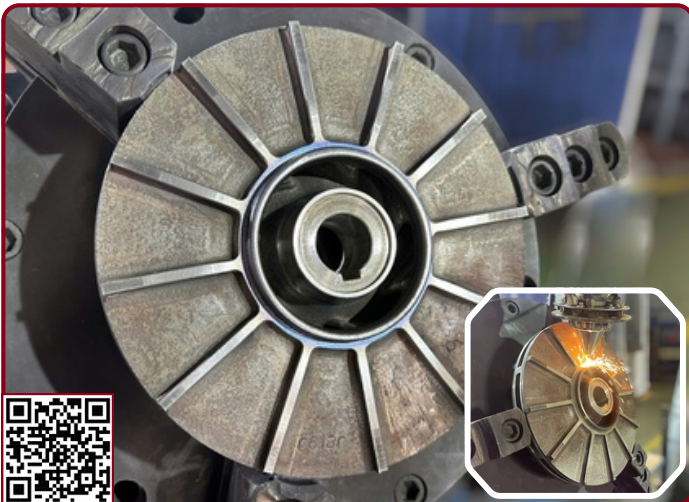
B. Thermal Power Plants



Impeller Shaft



Impeller



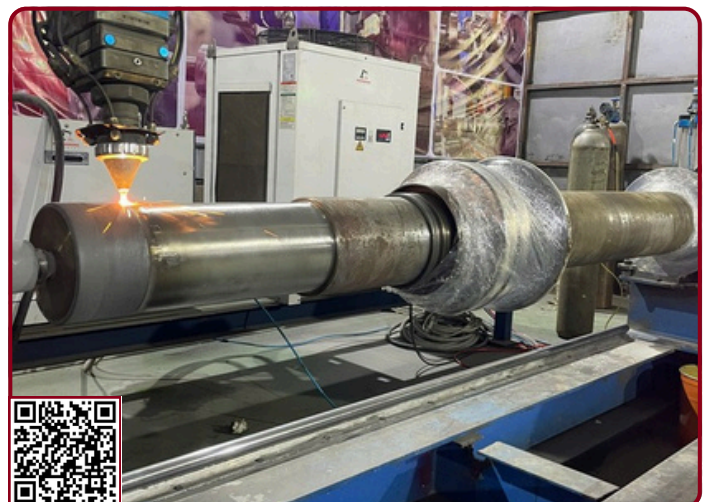
Pump Impeller



Gear



Fan Shaft



Fan Shaft

B. Thermal Power Plants



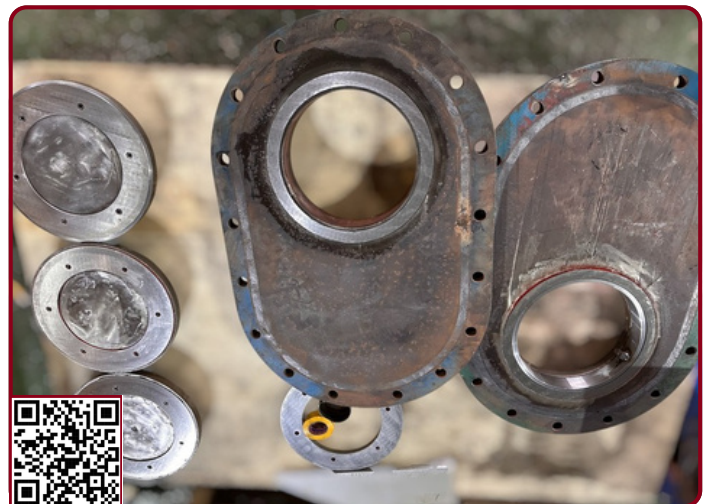
Screw Pump



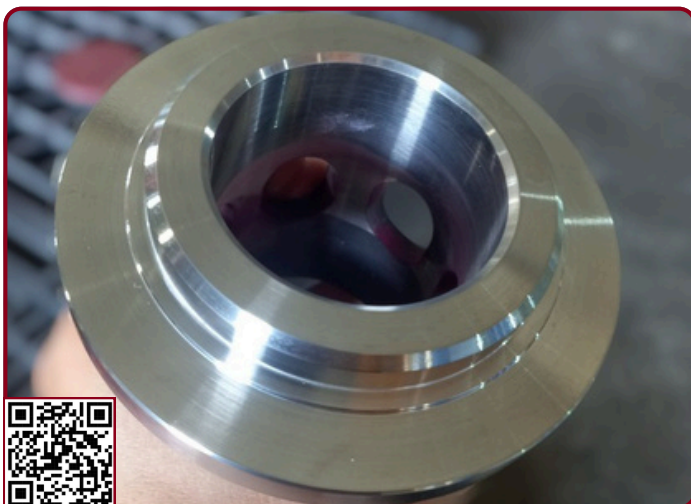
Valve Disc



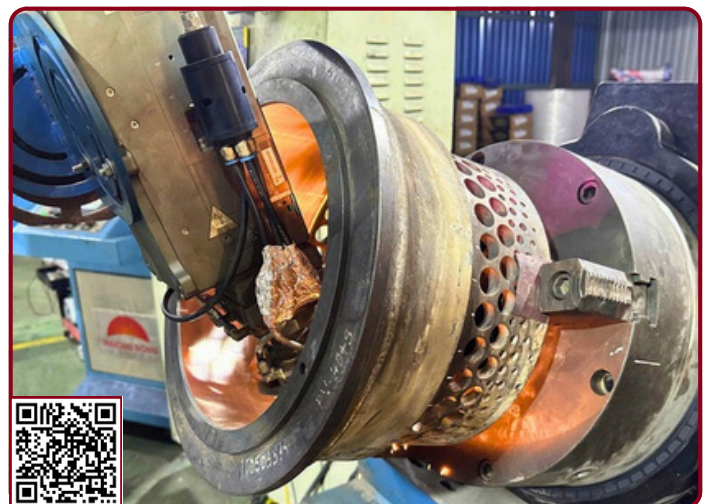
Seal



Discharge Valve



Water Recirculation Valve



Guide Valve

B. Thermal Power Plants



Control Valve



Safety Valve



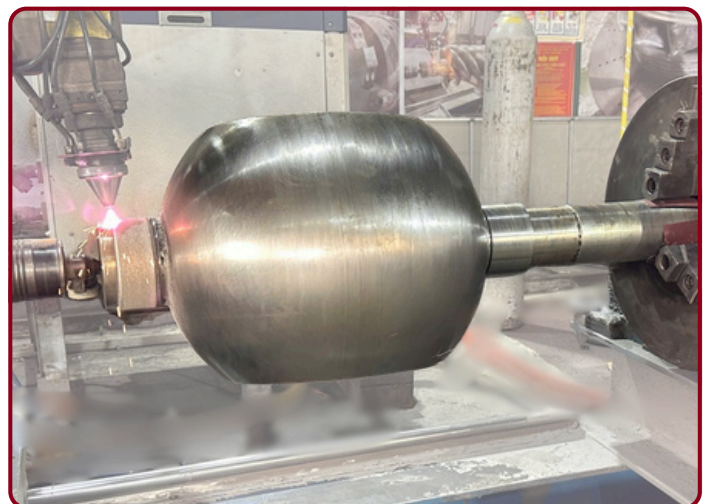
Bypass Valve



Dome Valve

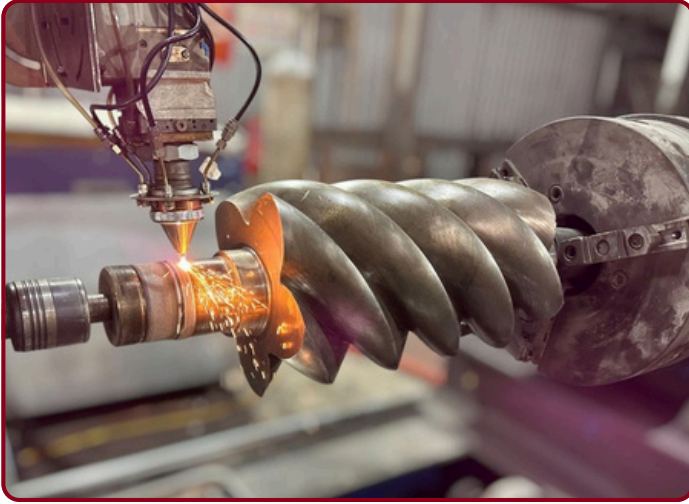


Ball valve

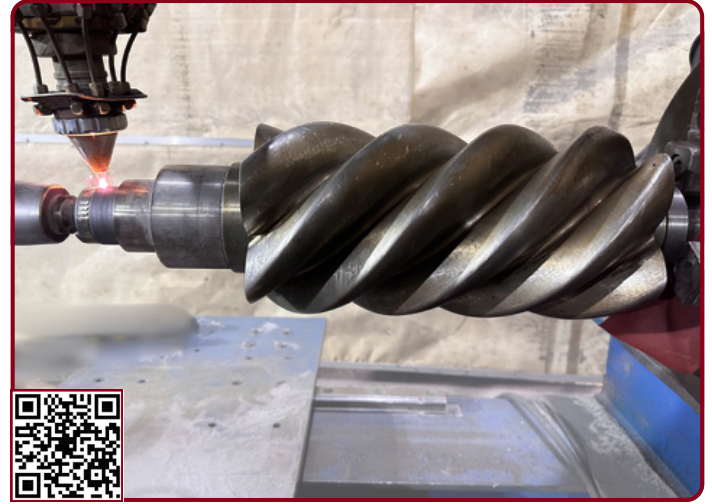


Ball valve

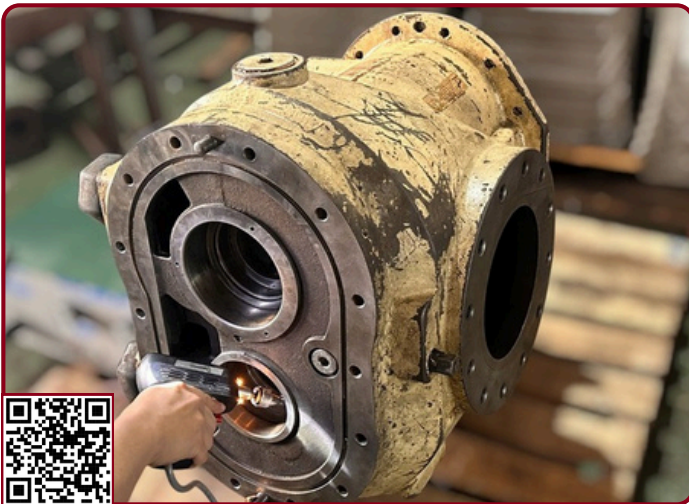
B. Thermal Power Plants



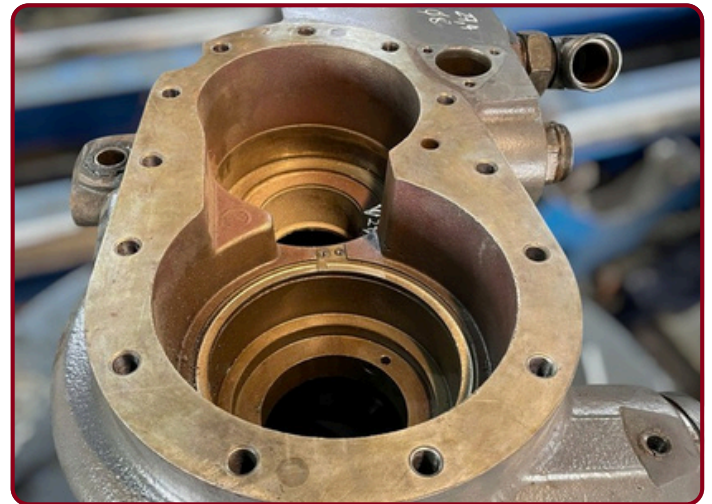
Air Compressor Screw Shaft



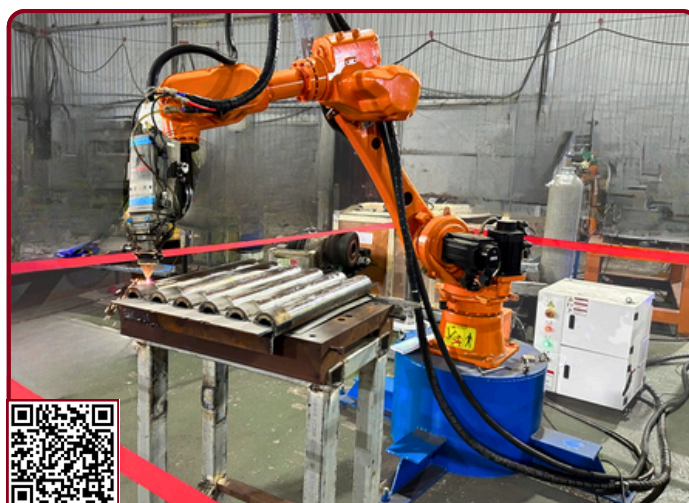
Air Compressor Screw Shaft



Air Compressor Housing



Air Compressor Housing

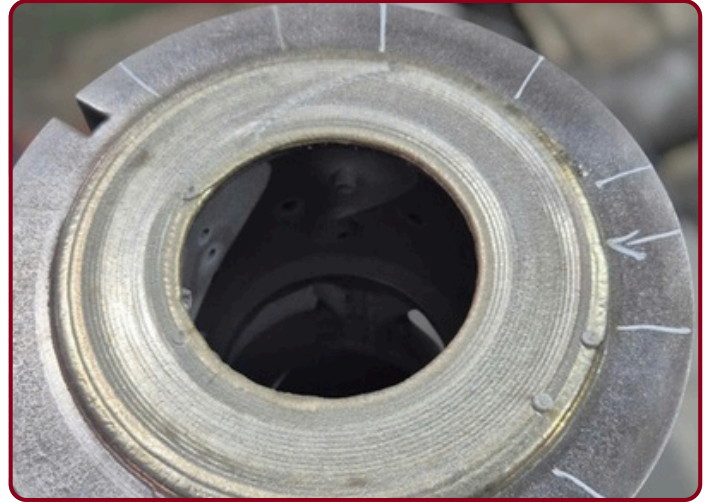


Boiler Waterwall Panel

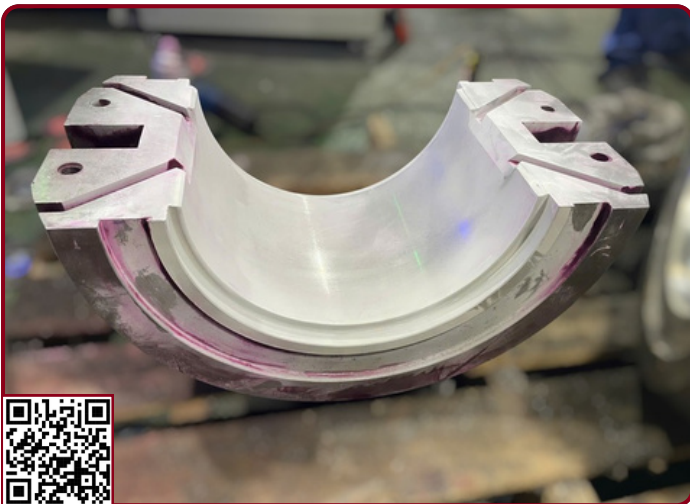
B. Thermal Power Plants



Babbitt



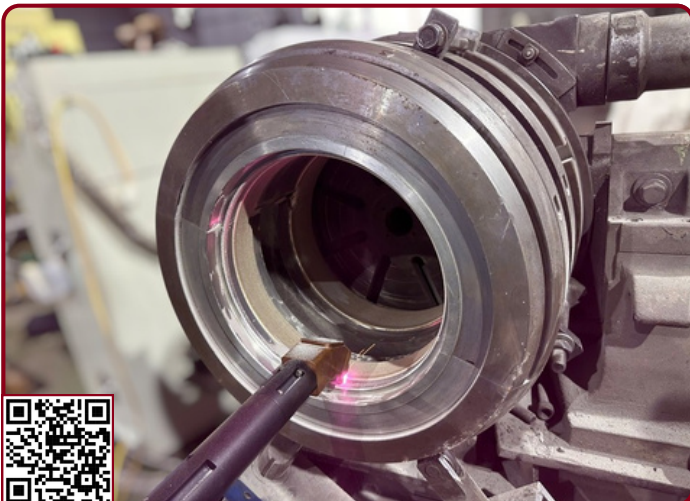
Babbitt



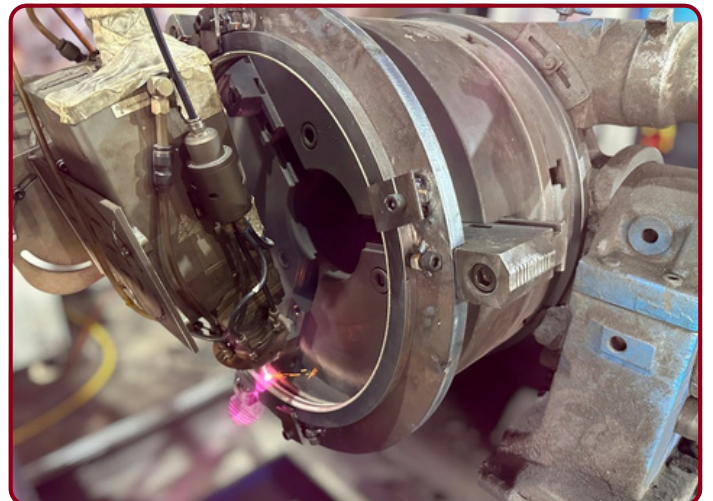
Babbitt Bearing PT Inspection



Babbitt



Babbitt



Babbitt

C. Hydropower Plants



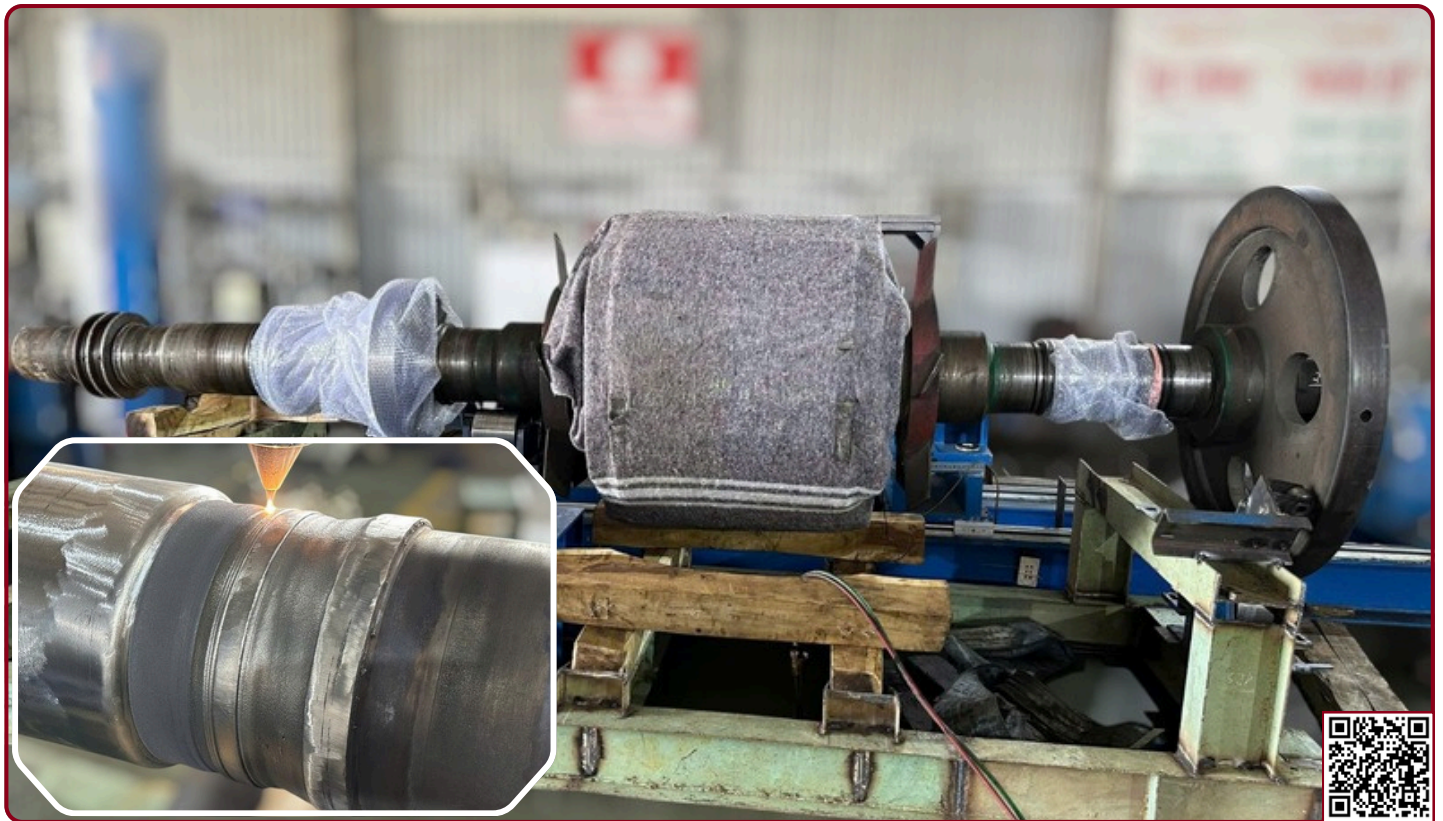
Before



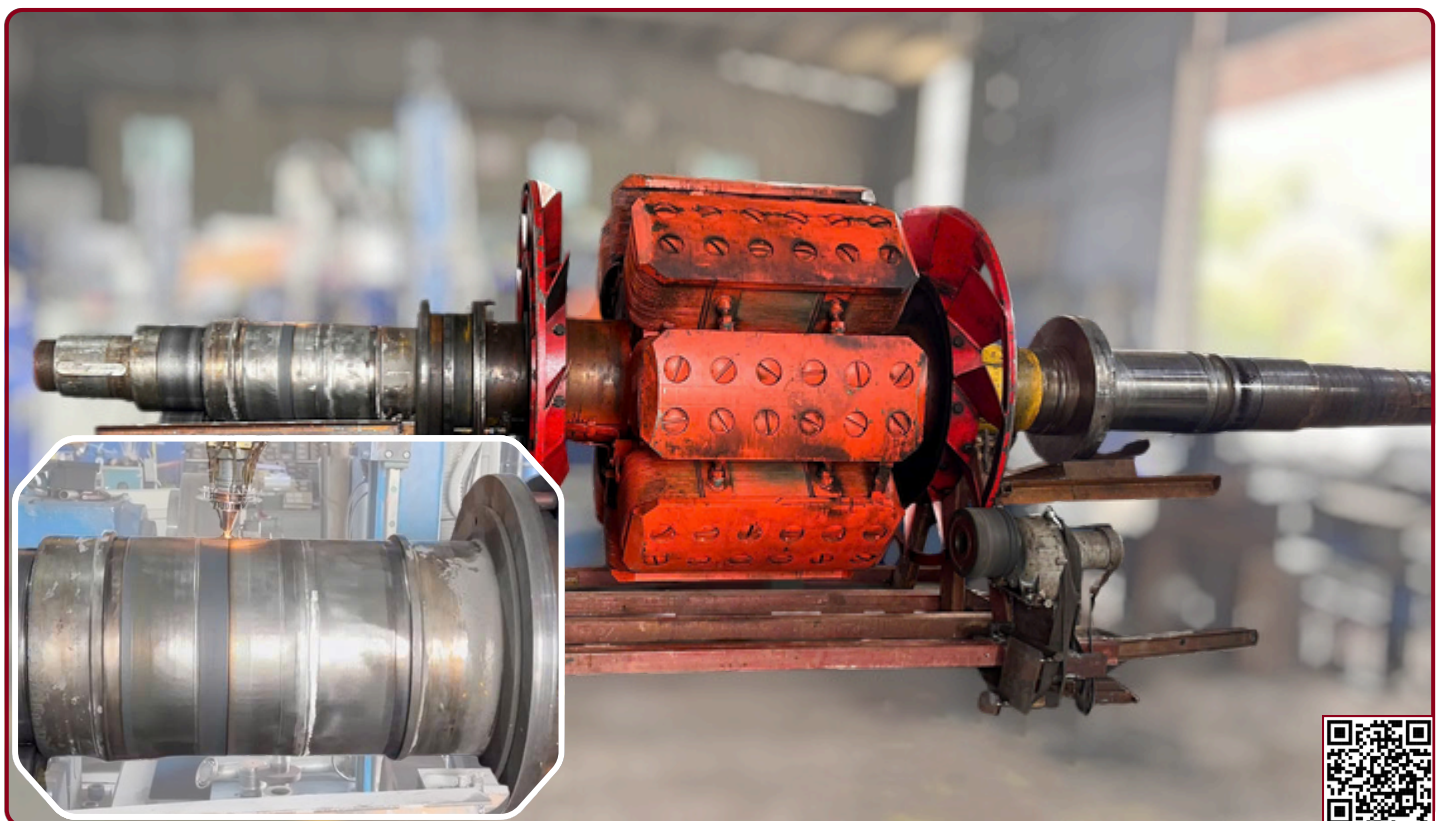
After

Ba Thuoc Hydropower Plant Turbine 1

C. Hydropower Plants



Generator Rotor – Nam Ho Hydropower

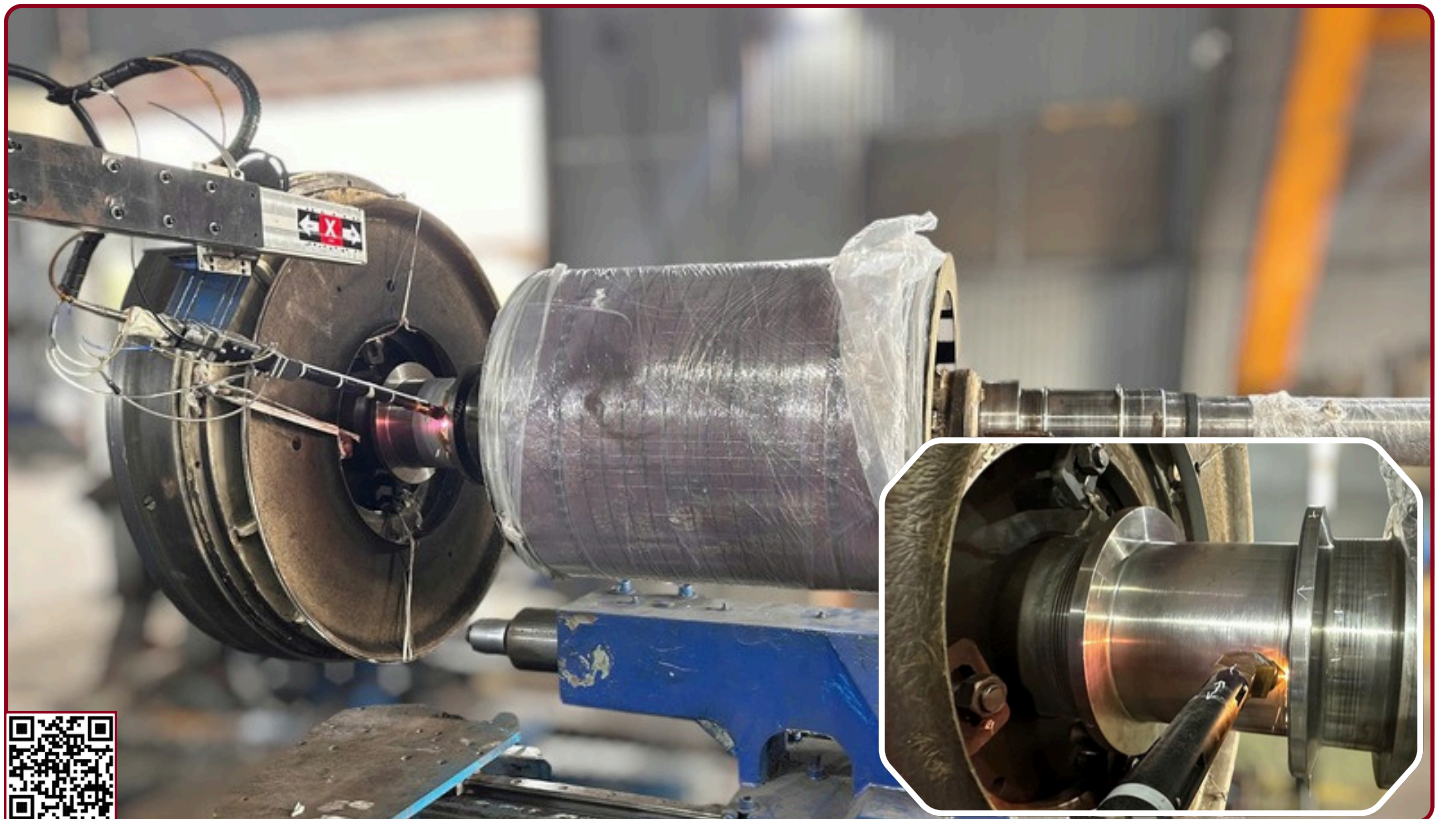


Generator Rotor

C. Hydropower Plants

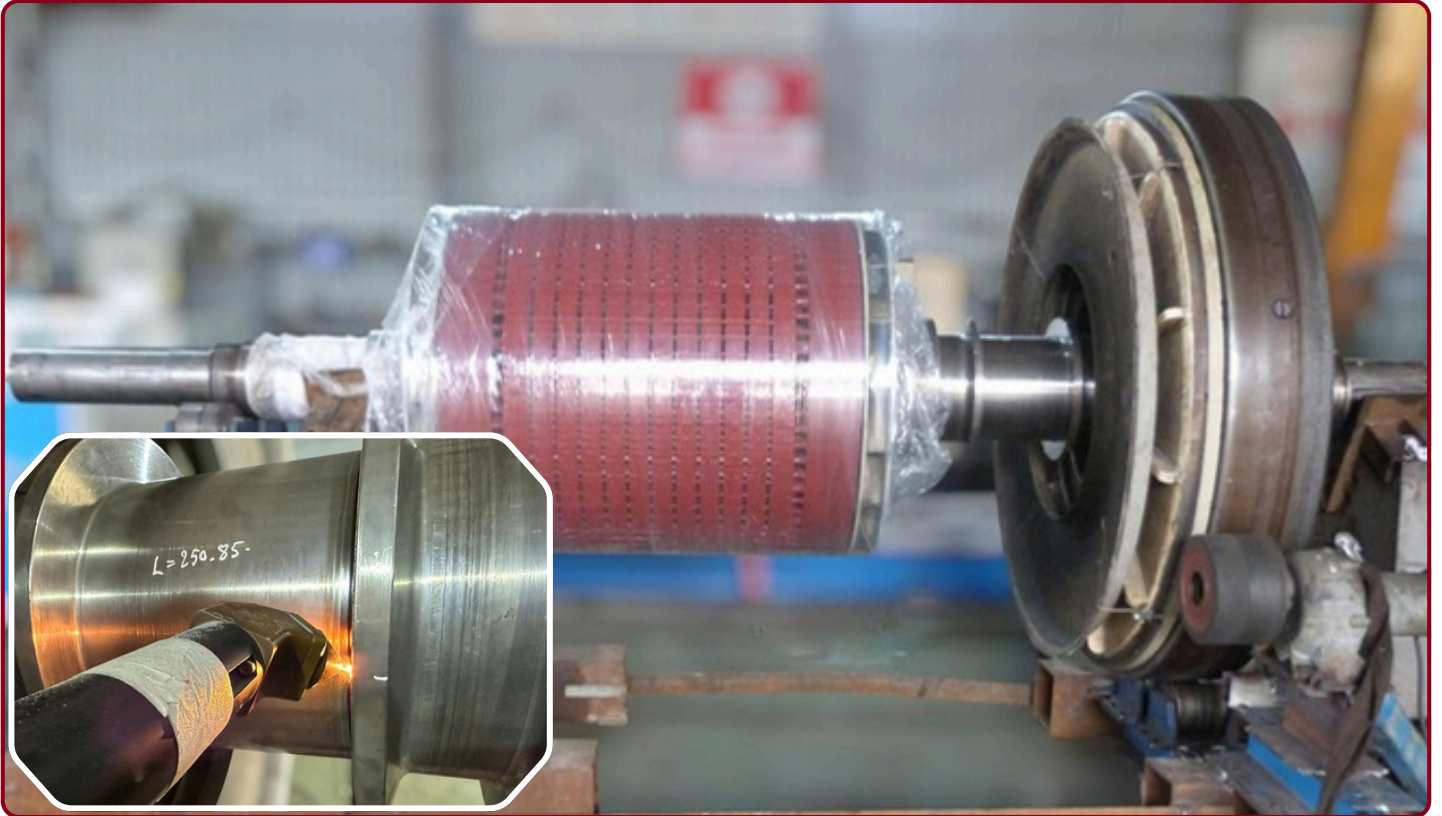


Generator Rotor

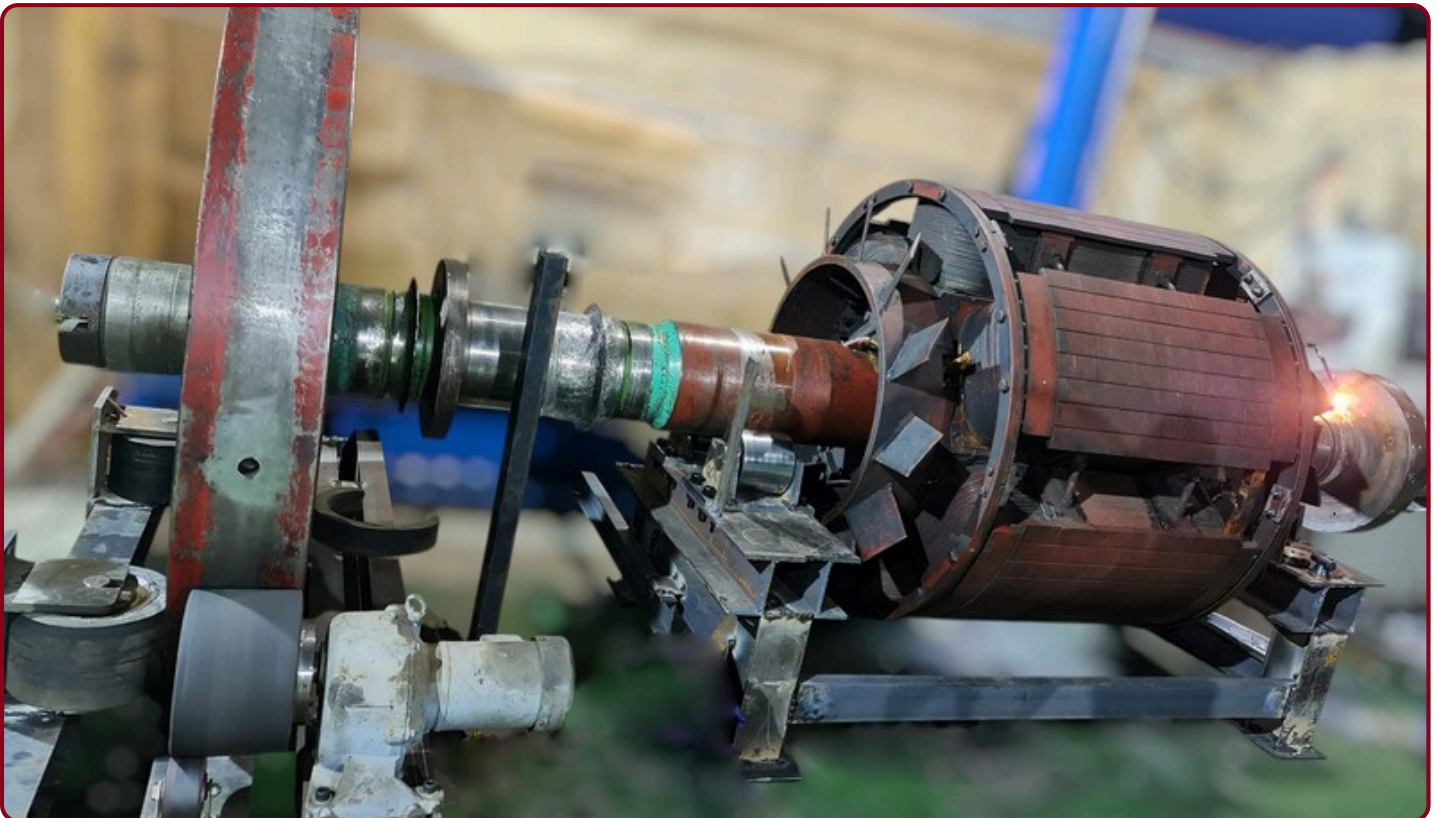


Generator Rotor

C. Hydropower Plants

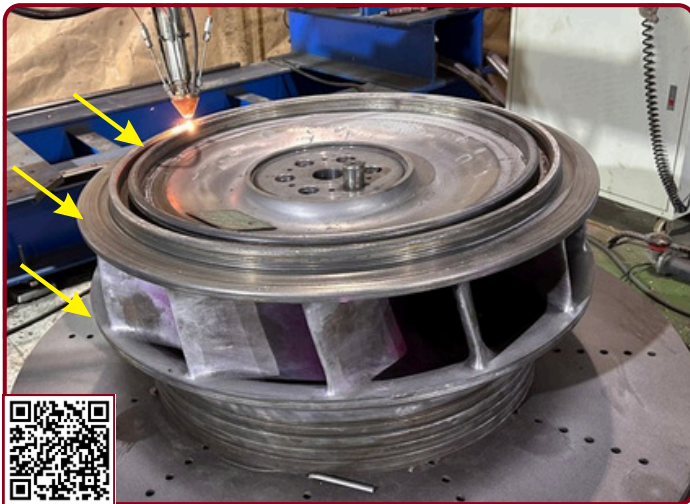


Generator Rotor Mirror Surface Restoration



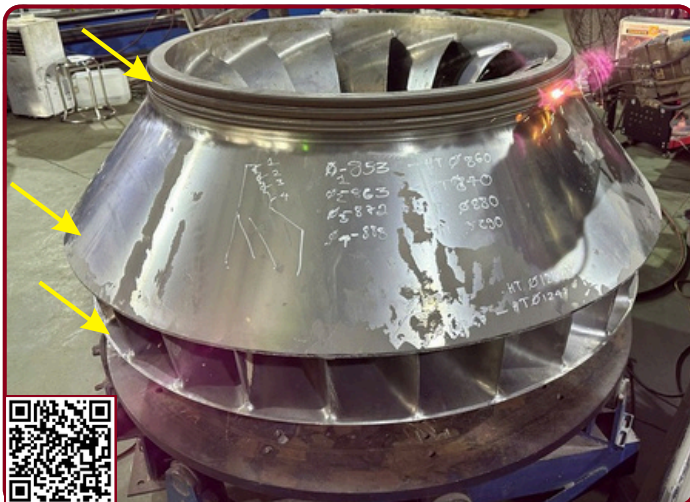
Generator Rotor

C. Hydropower Plants



4 MW Turbine Runner

Restoration: Wear Ring Contact Surface, Upper Wearing Ring, Lower Wearing Ring



7.5 MW Turbine Runner – Chi Lu Hydropower

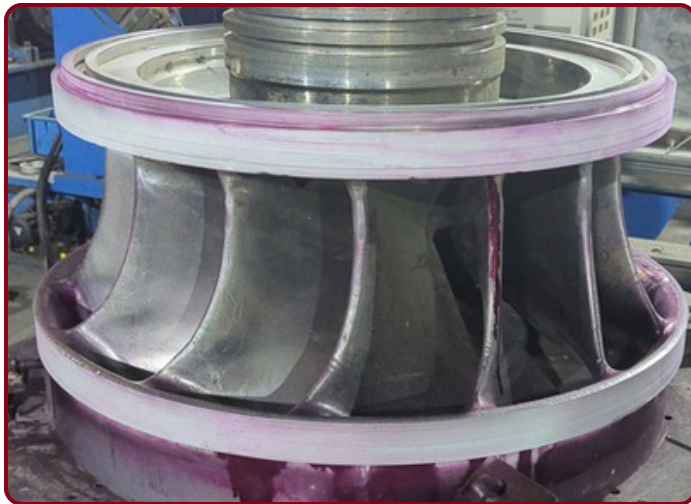
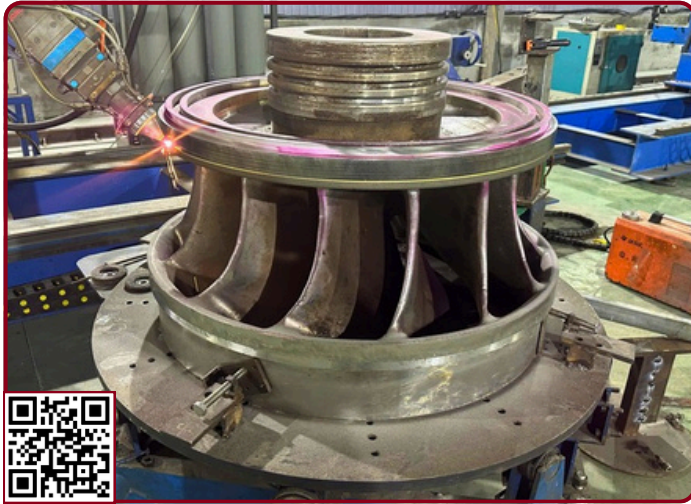
Restoration: Wear Ring Contact Surface, Upper Wearing Ring, Lower Wearing Ring



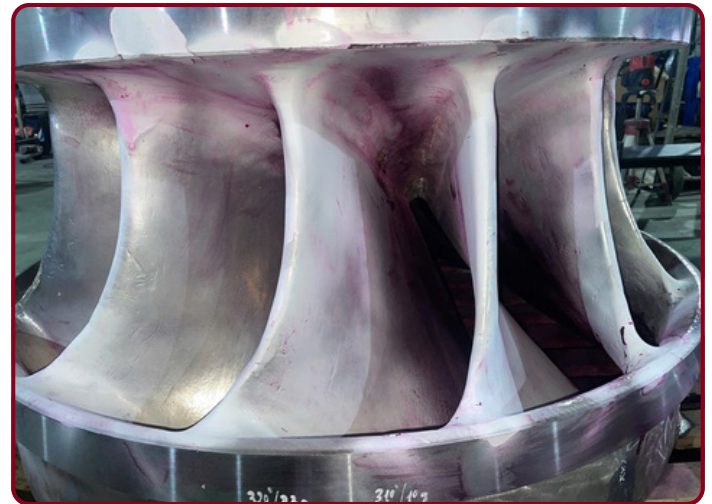
Turbine Runner – Nam Vao Hydropower

Restoration: Blade Root Erosion, Cavitation Damage, Dynamic Balancing

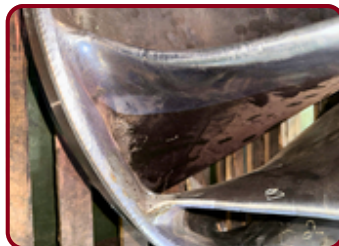
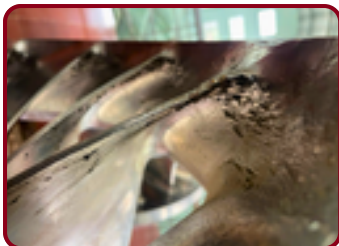
C. Hydropower Plants



PT Inspection After Restoration



PT Inspection After Restoration



Before & After Restoration



Dynamic Balancing

Turbine Runner – Nam Soi Hydropower

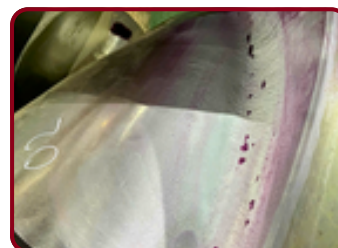
Restoration: Wear Ring, Blade Root Erosion, Cavitation Damage, Dynamic Balancing

C. Hydropower Plants



Before & After Restoration

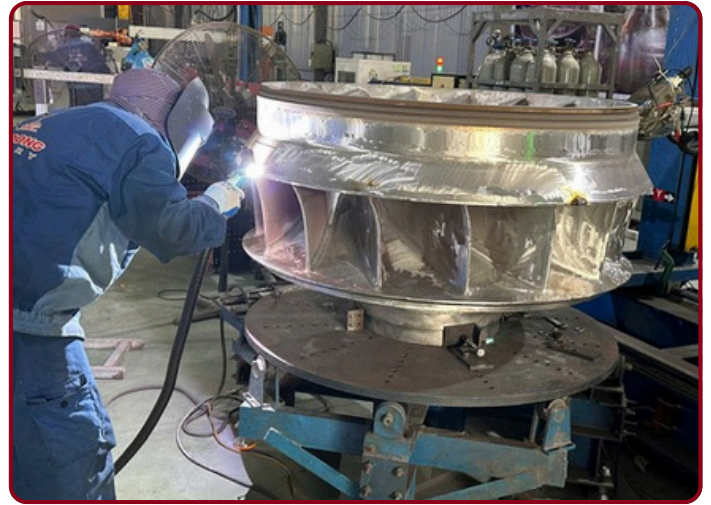
Turbine Runner – Nam Ho Hydropower
Restoration: Cracks on the Blades and Runner Body



PT Inspection Before & After Restoration

Turbine Runner – Nam Cong Hydropower
Restoration: Blade Root Erosion, Cavitation Damage, Dynamic Balancing

C. Hydropower Plants



Before Restoration

Before Restoration



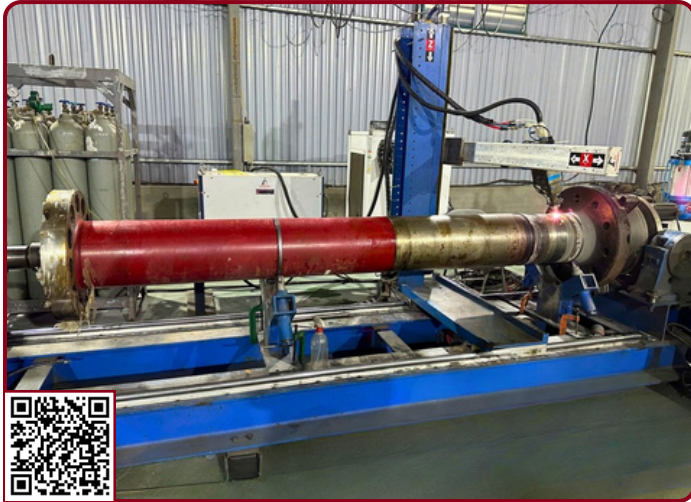
Before Restoration



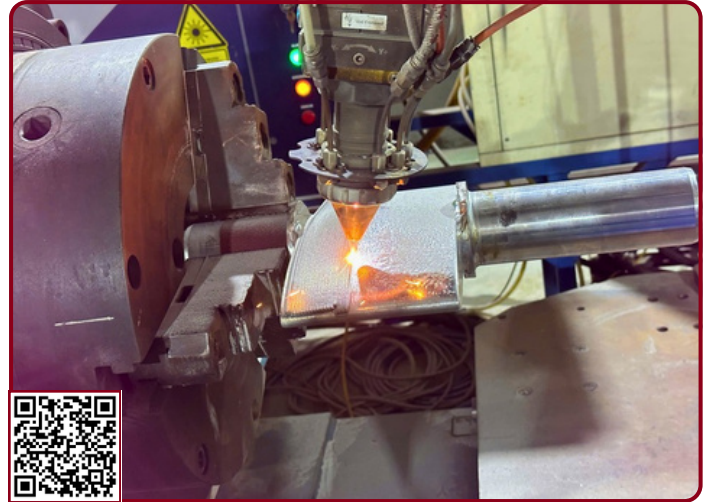
Before Restoration

Turbine Runner – Alin B2 Hydropower
Restoration: Wear Ring Contact Surface, Upper Wearing Ring, Lower Wearing Ring

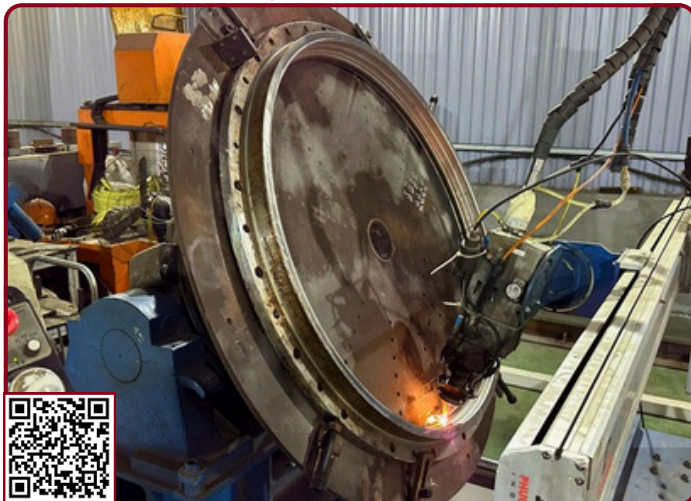
C. Hydropower Plants



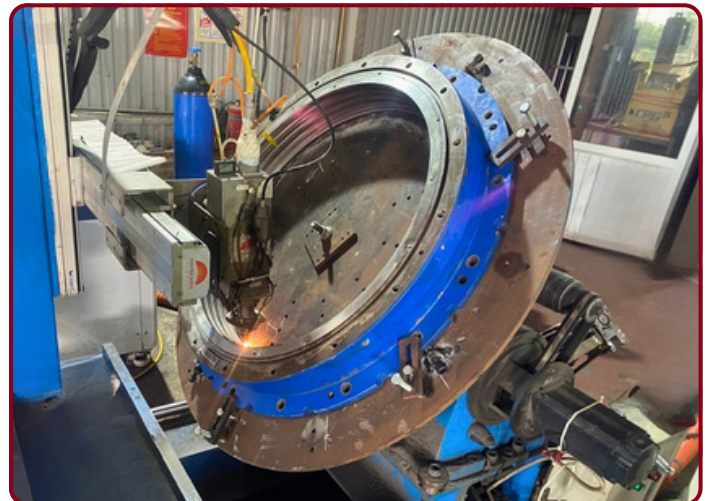
Turbine Runner Shaft – Nam Soi Hydropower



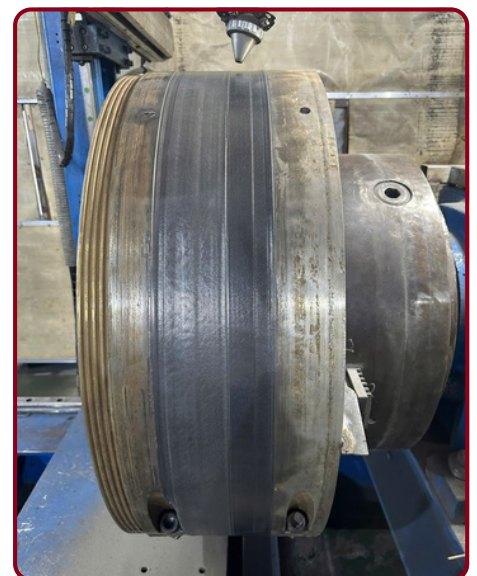
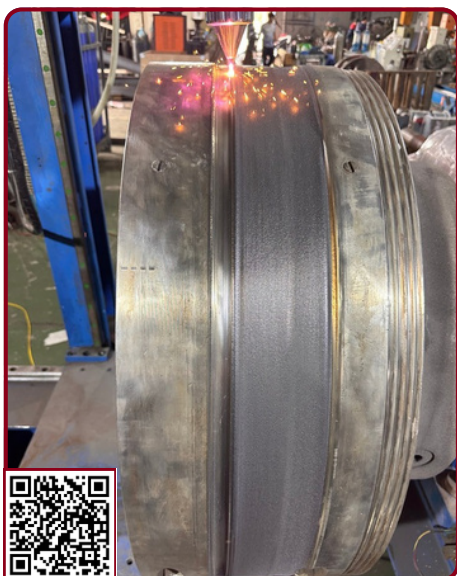
Guide Vane – Chi Lu Hydropower



Wear Ring – Chi Lu Hydropower

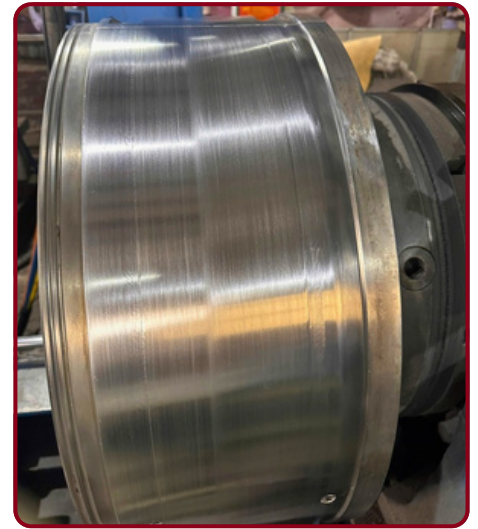


Wear Ring

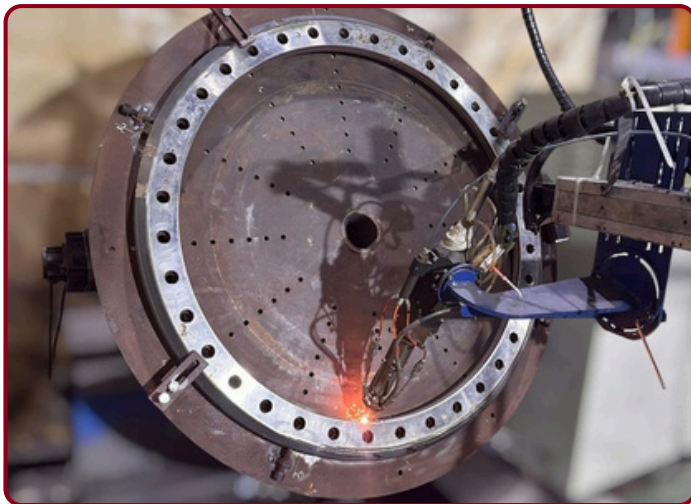


Shaft Seal Ring – Ba Thuoc 1 & 2 Hydropower

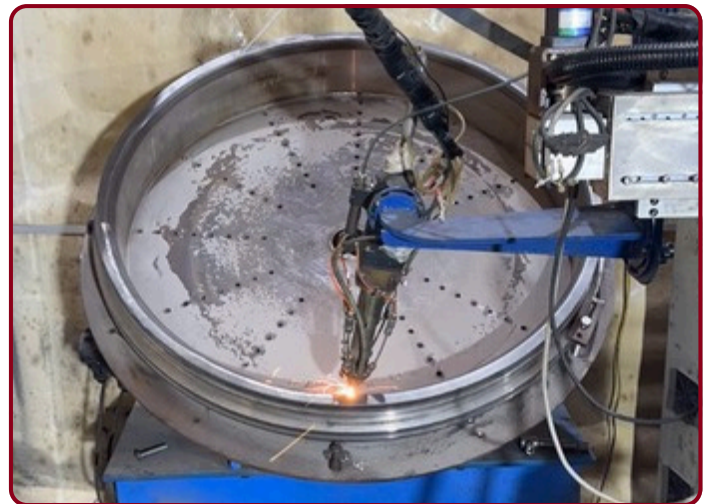
C. Hydropower Plants



Shaft Seal Ring – Before & After Restoration – Nam Luc Hydropower



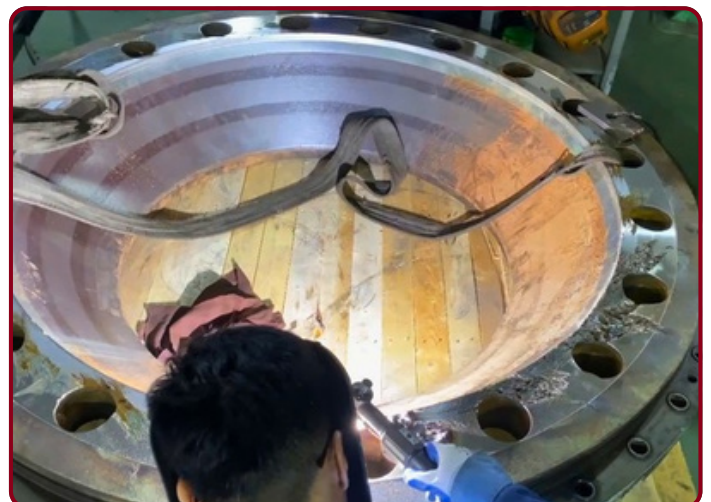
Hydropower Gate Valve Assembly



Hydropower Gate Valve Assembly



Upper Wearing Ring – Chi Lu Hydropower



Lower Wearing Ring – Chi Lu Hydropower

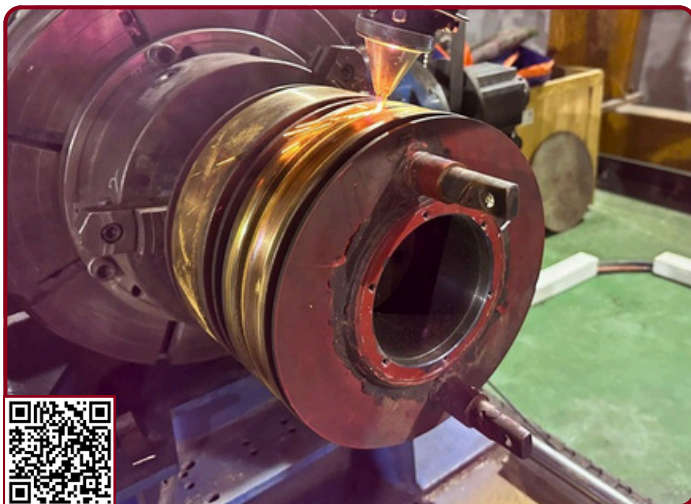
C. Hydropower Plants



Slip Ring – Khao Mang Hydropower



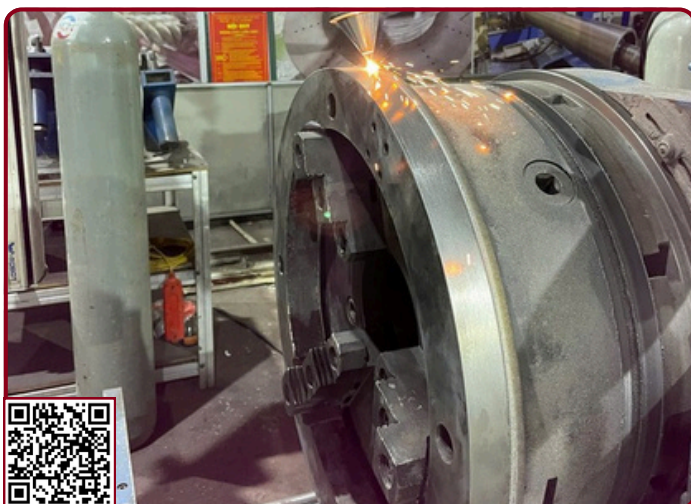
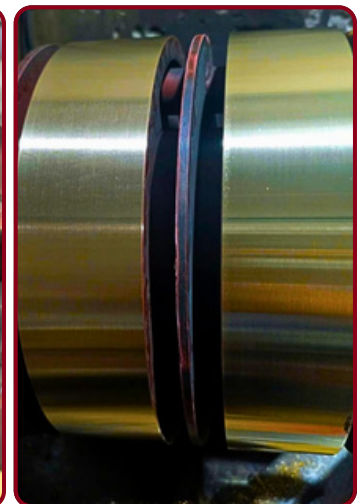
Surface After Machining



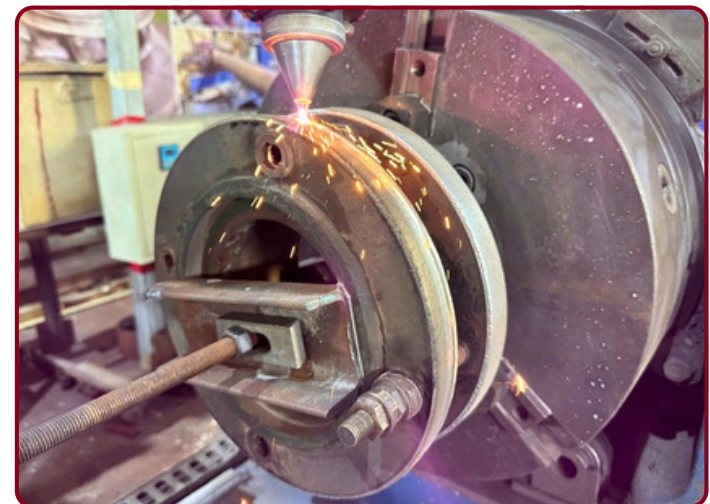
Copper Slip Ring – Nam Tha Hydropower



Before & After Restoration

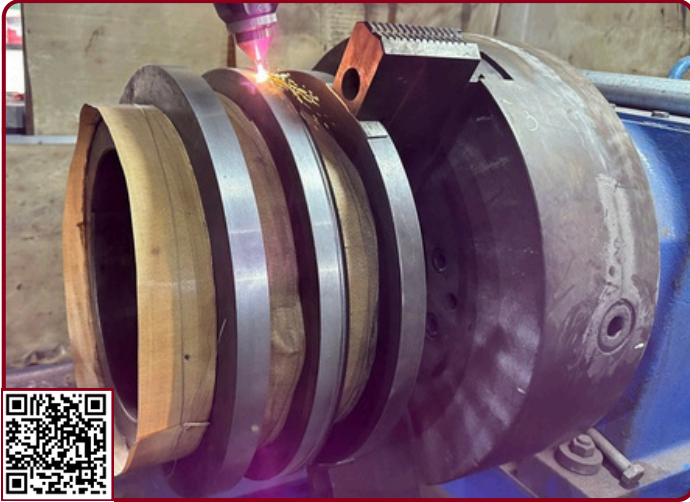


Slip Ring – Huong Son Hydropower



D320 Slip Ring – Nam Ho Hydropower

C. Hydropower Plants



D500 Slip Ring – Van Chan Hydropower



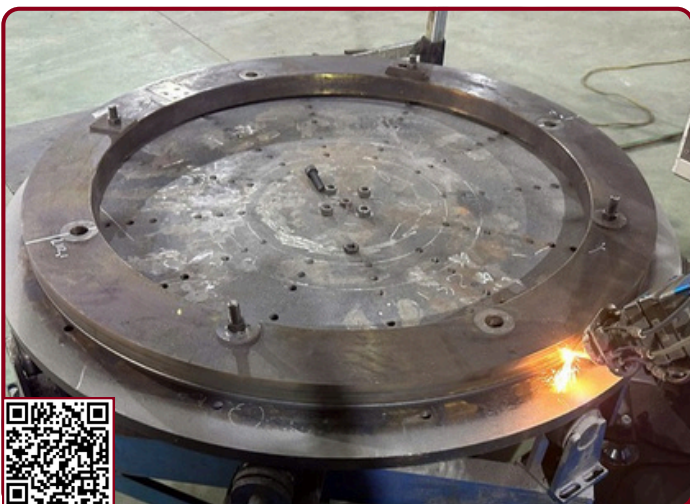
Surface After Laser Cladding



D580 Slip Ring – Van Chan Hydropower



Surface After Laser Cladding



Slip Ring – Nho Que Hydropower



Surface After Cladding

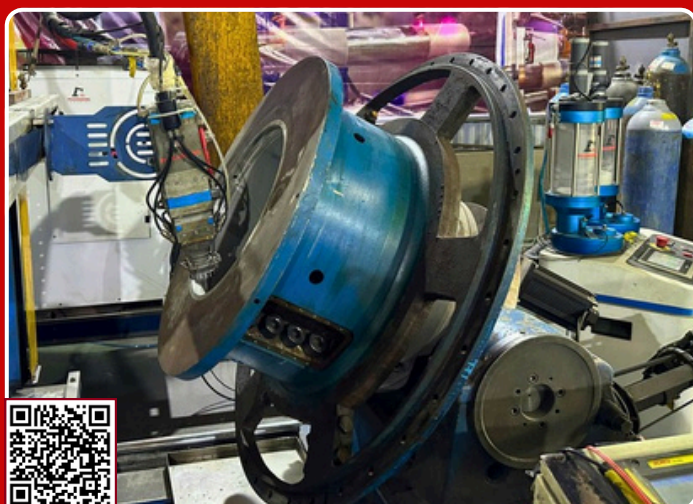
C. Hydropower Plants



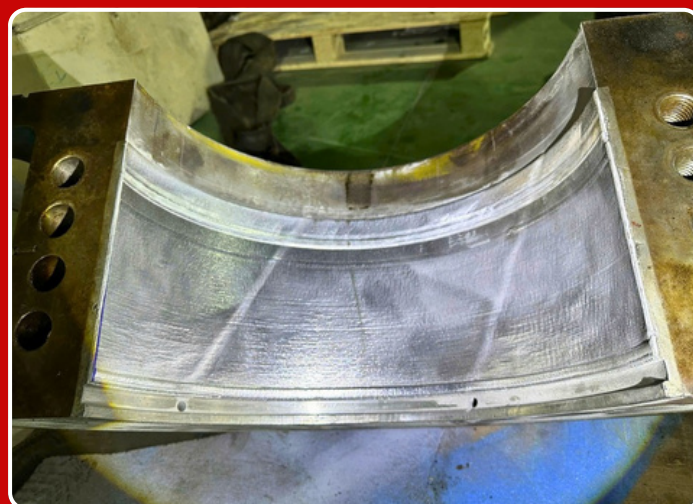
D1130 Slip Ring – Nam Muc Hydropower



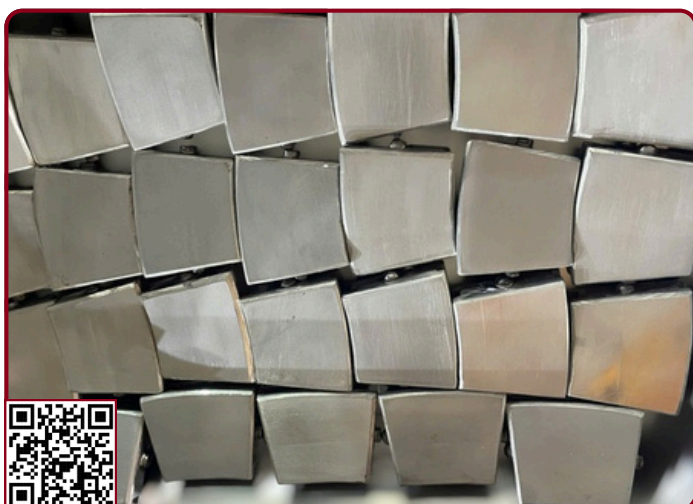
Surface Before & After Restoration



Babbitt Turbine Bearing Housing – Song Chung Hydropower



Surface After Laser Cladding



Babbitt



Babbitt

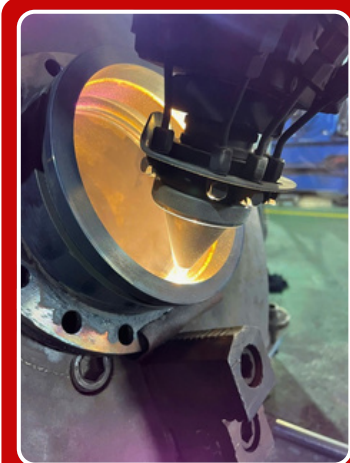
C. Hydropower Plants



Turbine Bearing Babbitt Bush – Bao Nhai 1 Hydropower



Turbine Cover Seal Ring – Ho Bon Hydropower



Copper Bush – Nho Que 3 Hydropower



Oil Tank – Song Chung Hydropower



Before & After Restoration

Bulb Turbine Runner Blade – Song Lo 4 Hydropower

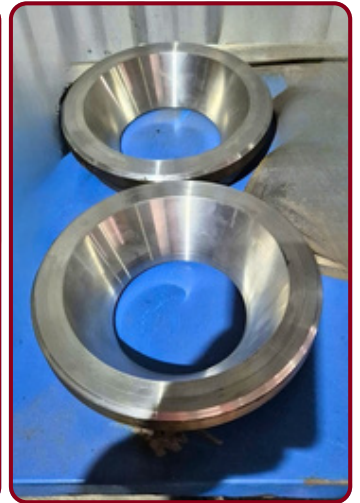
C. Hydropower Plants



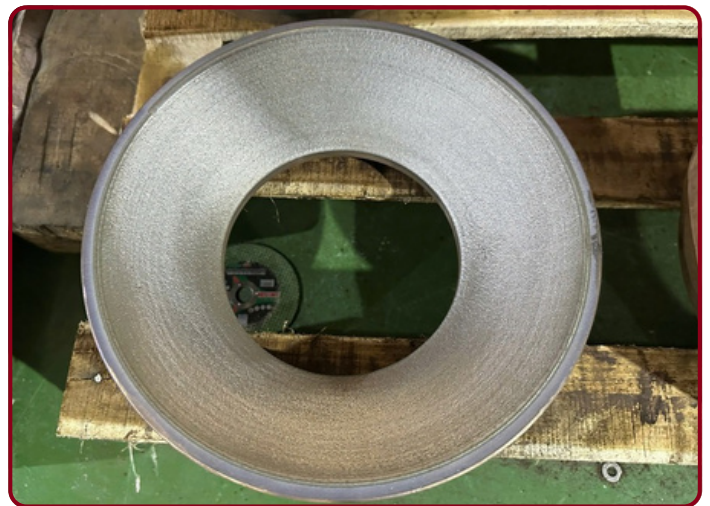
Injection Nozzle & Wear Ring



After Restoration



Wear Ring – Huong Son Hydropower



Wear Ring – Huong Son Hydropower

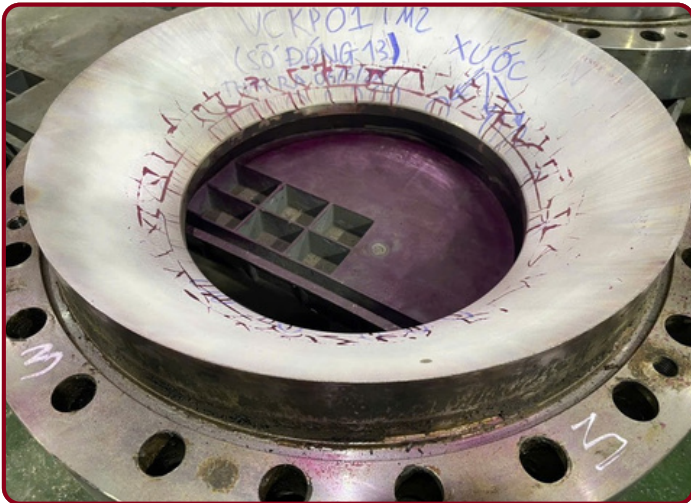


Injection Nozzle

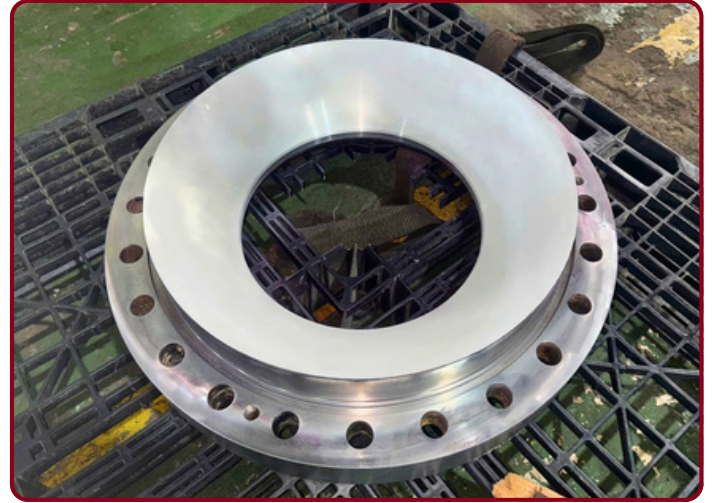


Injection Nozzle – Huong Son Hydropower

C. Hydropower Plants



PT Inspection Before Restoration



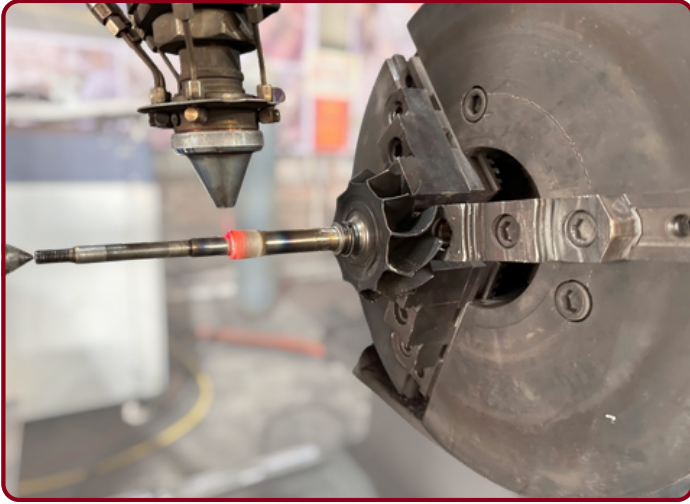
PT Inspection After Restoration



Laser Cladding – Inspection After Restoration

Needle Nozzle & Wear Ring – A Luoi Hydropower

D. Automotive Industry



Turbine Shaft



Camshaft



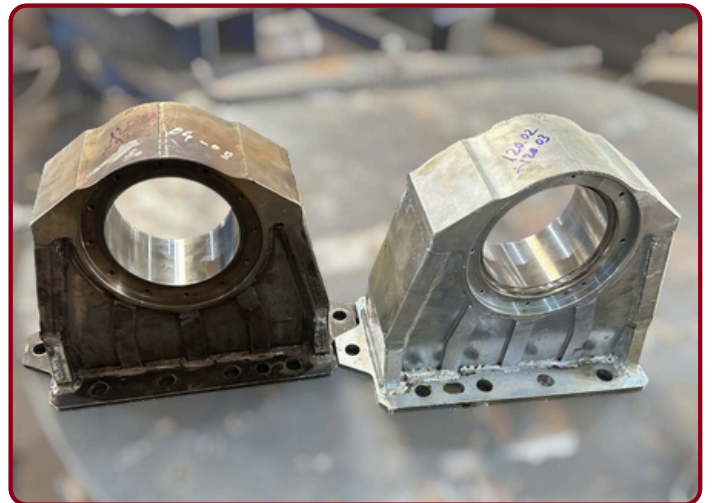
Engine Balance Shaft



Brake Disc

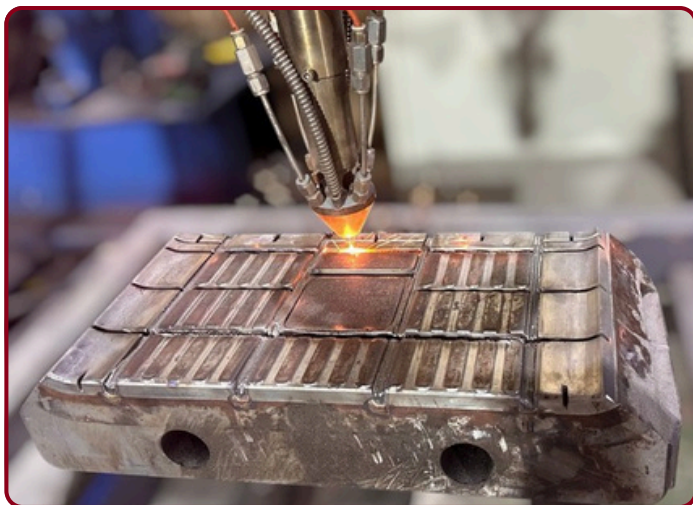


Cam

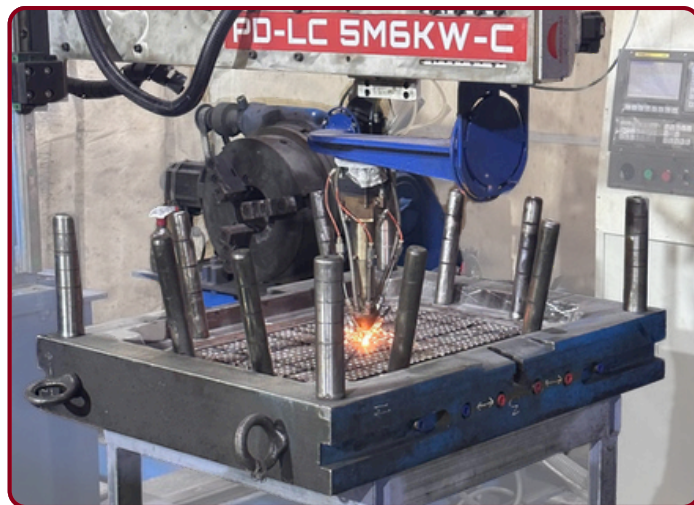


Bearing

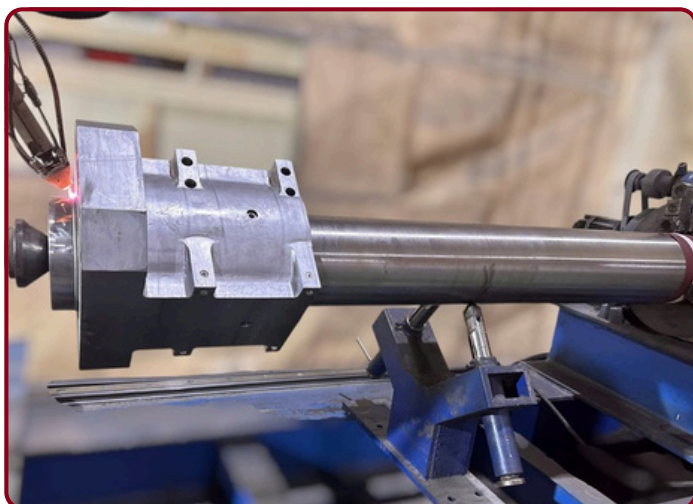
E. Plastic Injection Industry



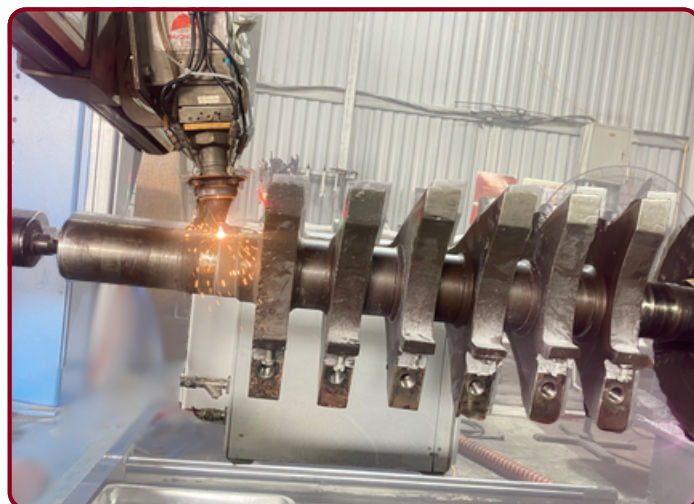
Plastic Basket Mold



Plastic Basket Mold



Plastic Injection Machine Cylinder



Plastic Shredder Shaft

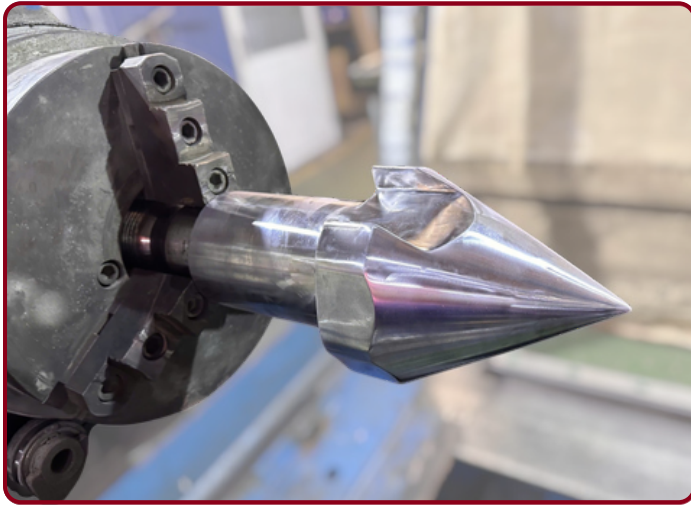


Plastic Injection Machine Connecting Rod



Plastic Injection Machine Connecting Rod

E. Plastic Injection Industry



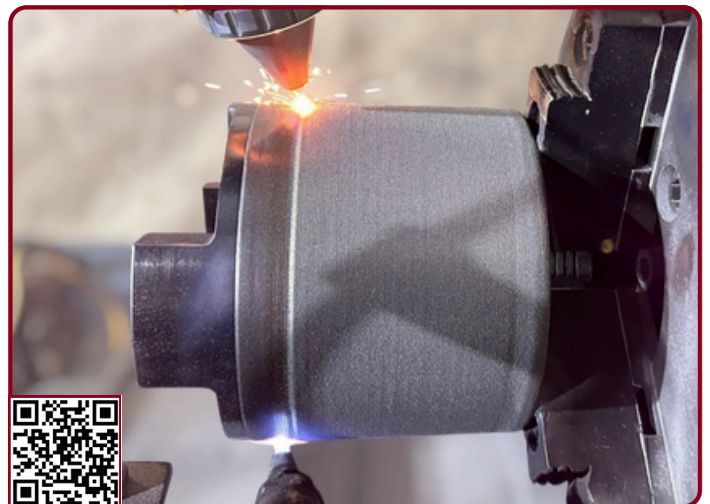
Plastic Injection Screw Tip



Plastic Injection Screw Tip



Plastic Injection Screw Tip



Check Ring



Check Ring

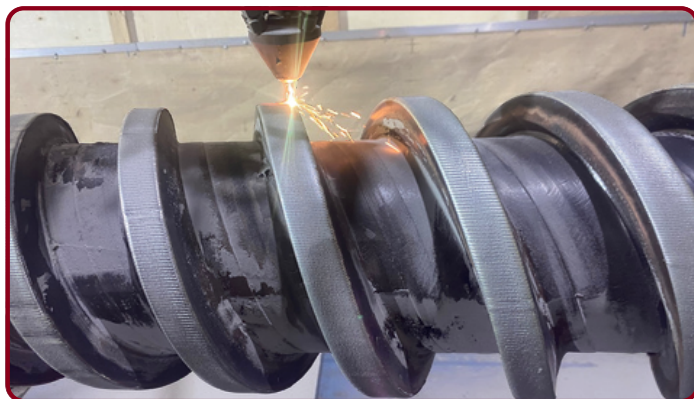


Check Ring

E. Plastic Injection Industry



Screw Shaft



Screw Shaft



Screw Shaft



Screw Shaft



Screw Shaft



Screw Shaft



Screw Shaft



Screw Shaft

F. Oil & Gas, Mining



Ball-End Drill Bit



Ball-End Drill Bit



Drill chuck



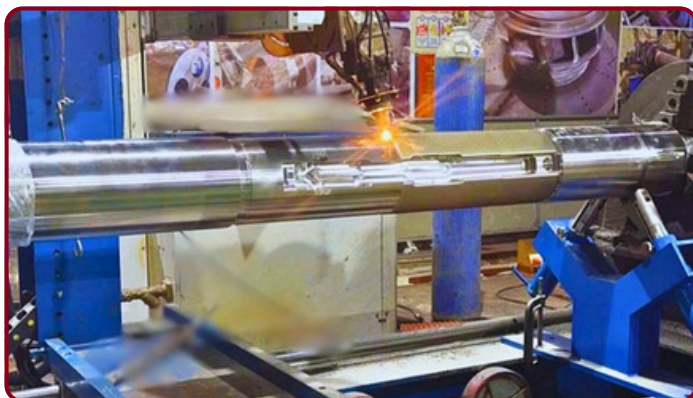
Drill bit



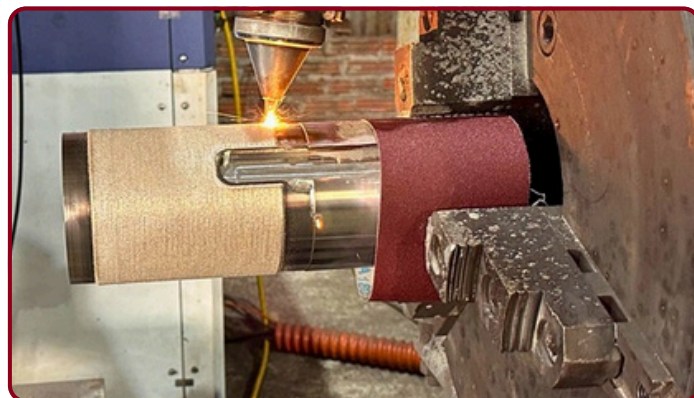
Top hammer



Coal shearer carbide head



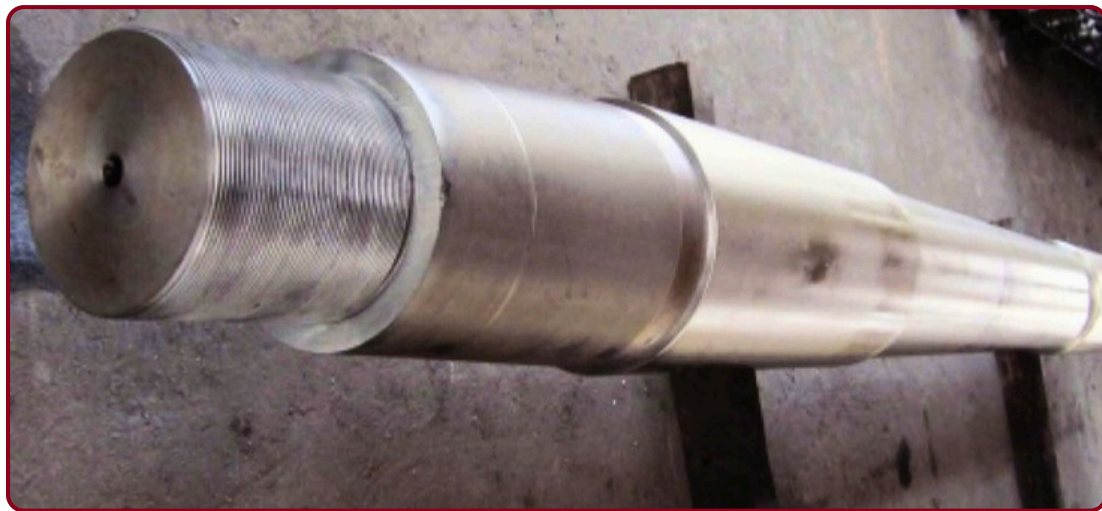
Oil and gas drill pipe



G. Marine Industry



Pump shaft



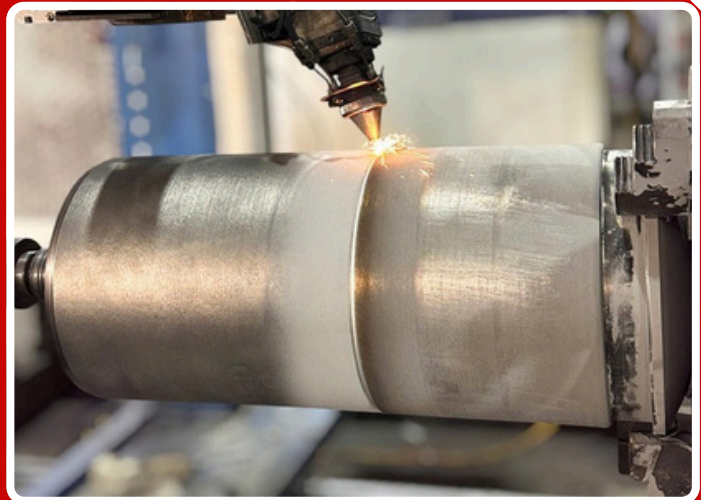
Transmission shaft

H. Hydraulic Cylinders

Laser Cladding is an advanced restoration technology for pistons and cylinders, extending service life, minimizing thermal deformation, improving durability in harsh environments, and providing an eco-friendly repair solution.

Comparison of Piston & Cylinder Restoration Methods

Criteria	Laser Cladding	HVOF	Chrome Plating	PTA	Replacement
Wear Resistance	★★★★★	★★★★★	★★★★☆	★★★★☆	★★★☆☆
Corrosion Resistance	★★★★★	★★★★★	★★★☆☆	★★★★☆	★★★☆☆
Bonding with Base Material	Metallurgical Bonding	Mechanical Bonding	Mechanical Bonding	Metallurgical Bonding	-
Thermal Distortion	★★★★★	★★★★★	★★★★★	★★★☆☆	★★★★★
Service Life	★★★★★	★★★★☆	★★★☆☆	★★★★☆	★★★★★
Cost	Medium	High	Low	Medium	Highest



Hydraulic piston



Grinding cylinder piston rod



Truck shock absorber piston

H. Hydraulic Cylinders



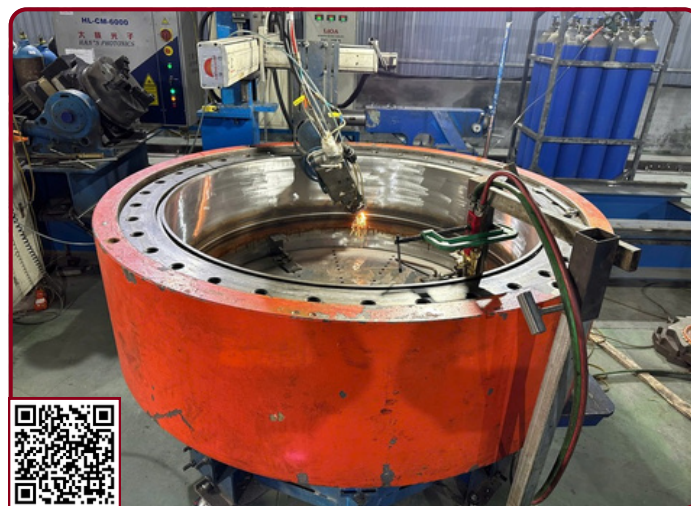
Hydraulic Piston



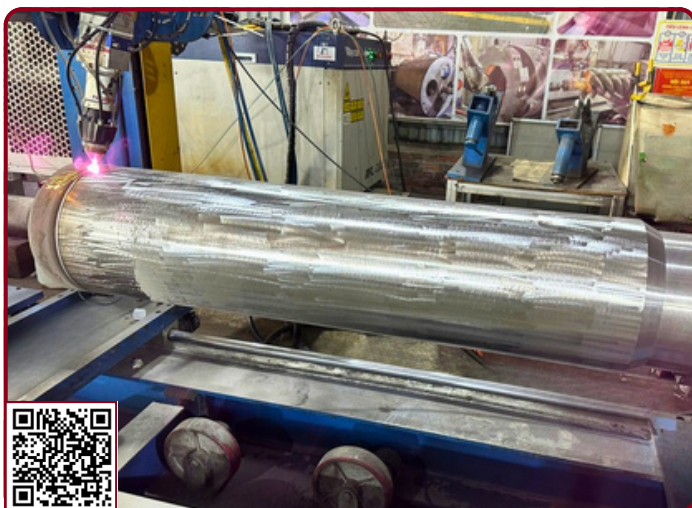
Cylinder



Piston D860



Cylinder D1200

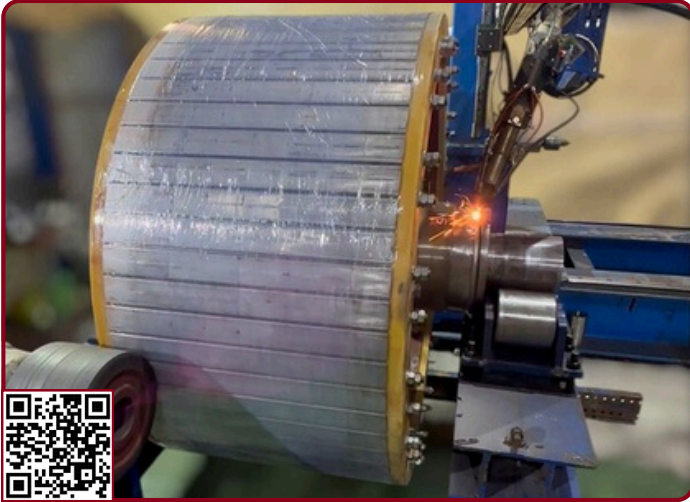


Piston

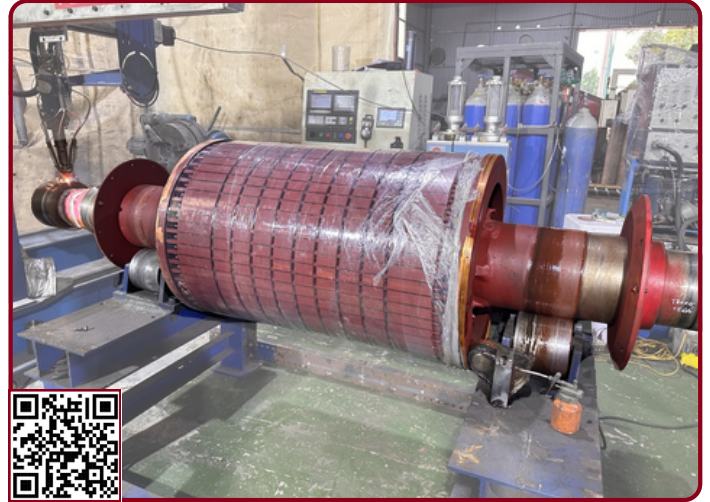


Hydraulic cylinder rod

I. Engines & Gearboxes



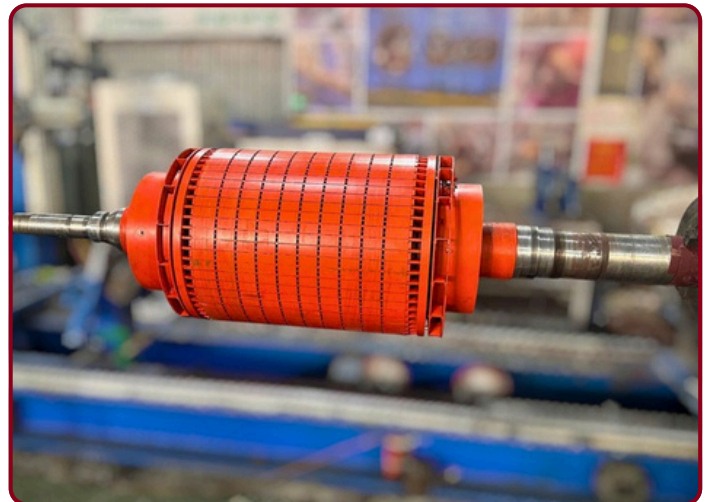
Magnetic rotor shaft



Motor rotor shaft



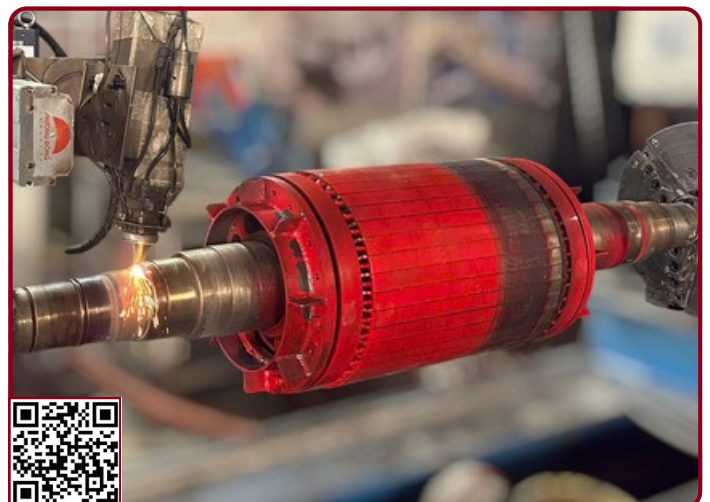
Motor rotor shaft



Motor rotor shaft



Motor rotor shaft

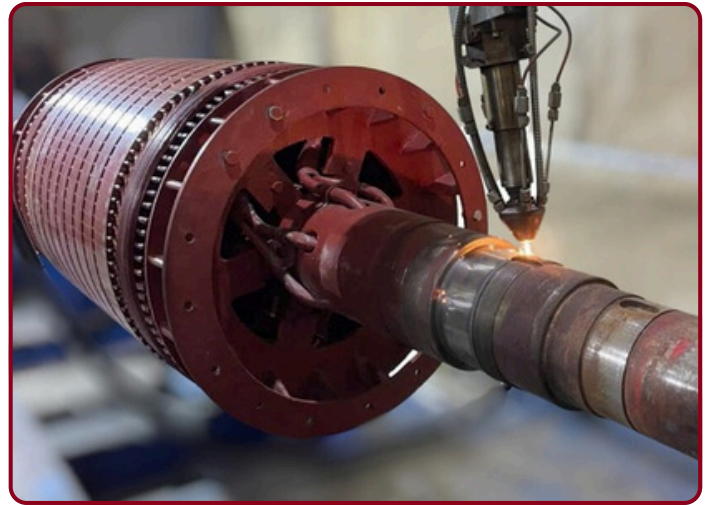


Motor rotor shaft

I. Engines & Gearboxes



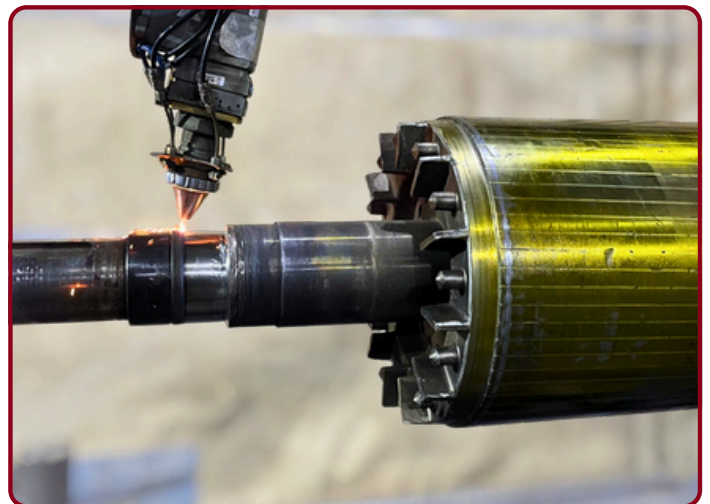
Motor rotor shaft



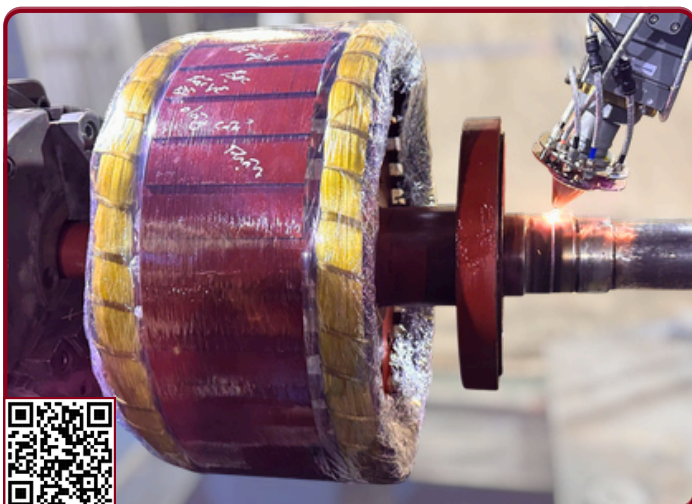
Motor rotor shaft



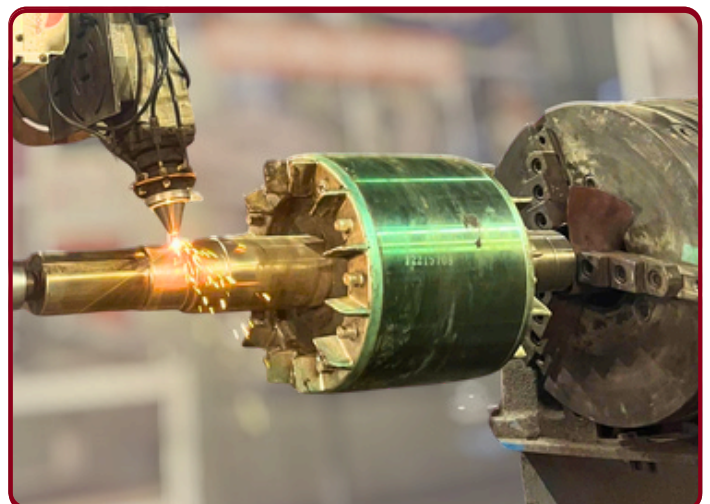
Motor rotor shaft



Motor rotor shaft



Motor rotor shaft



Motor rotor shaft

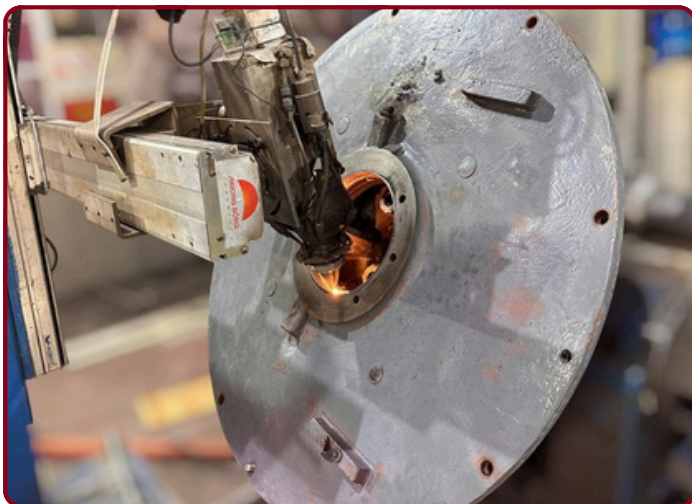
I. Engines & Gearboxes



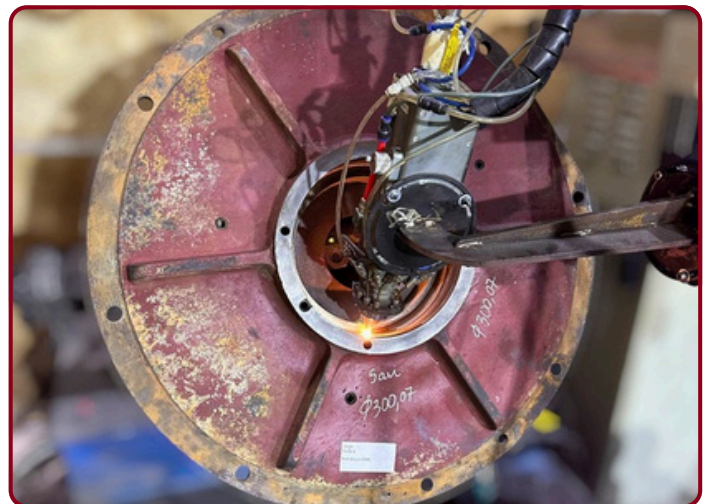
Motor flange



Motor flange



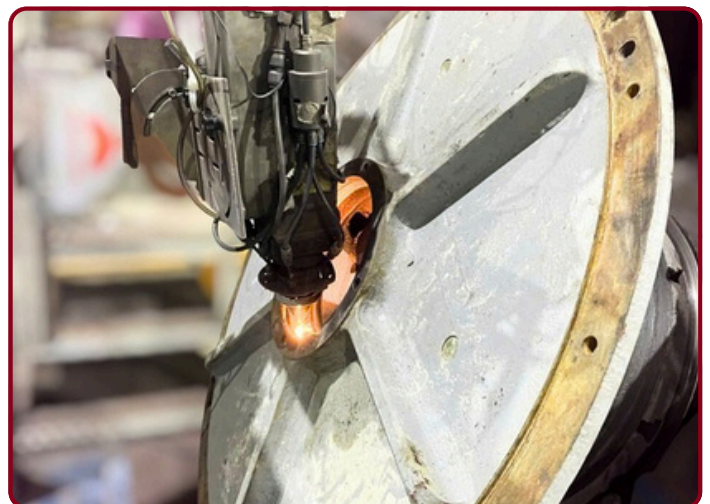
Motor flange



Motor flange

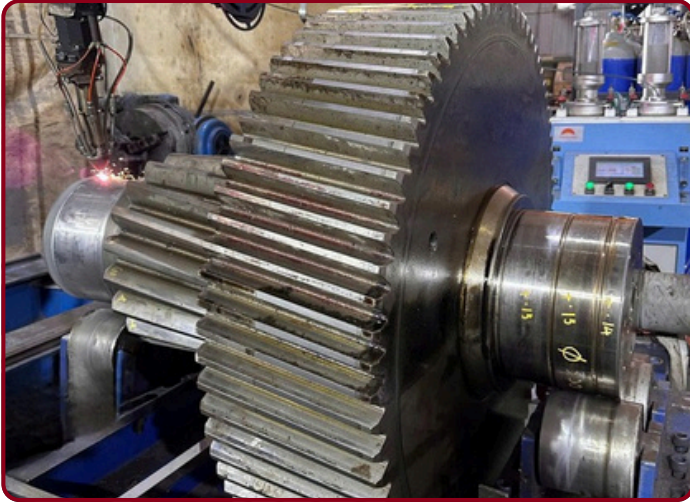


Motor flange



Motor flange

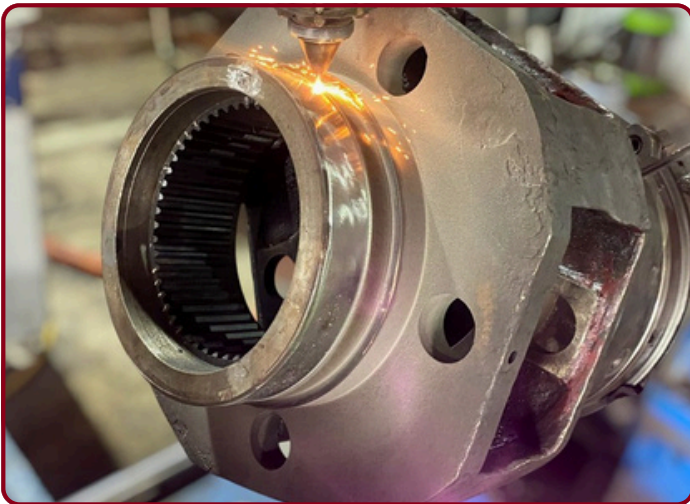
I. Engines & Gearboxes



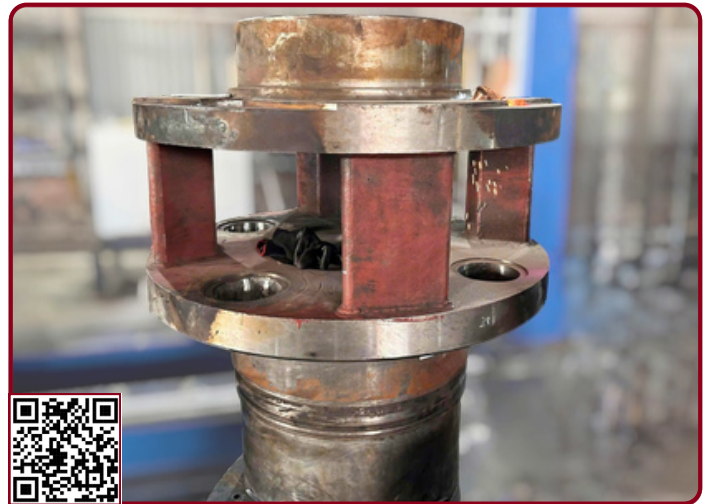
Cement mill gearbox output shaft



Gearbox output shaft



Planetary gearbox



Planetary gearbox



Flender gearbox housing



Pellet mill gearbox

I. Engines & Gearboxes



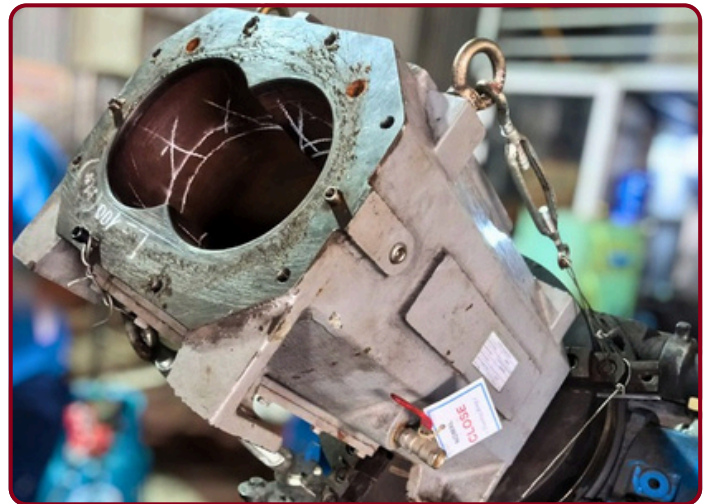
Gearbox housing



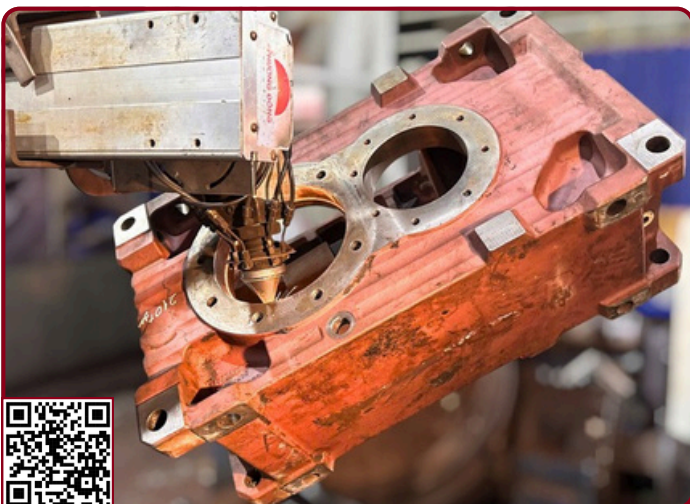
Gearbox housing



Compressor housing



Compressor housing



Gearbox housing

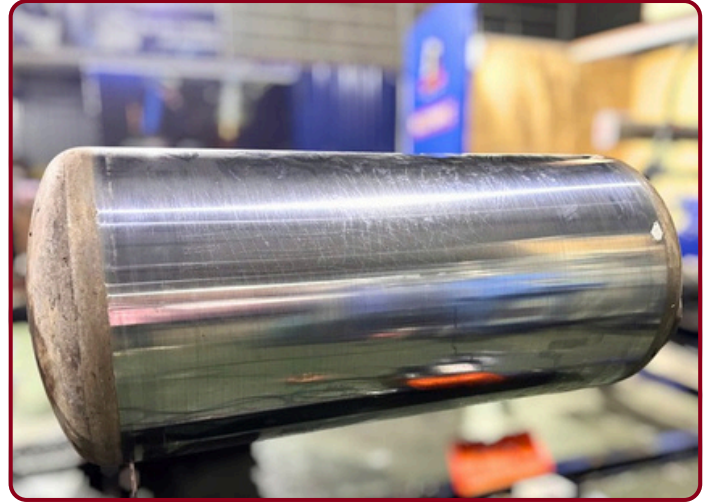


Gearbox housing

K. Other Industrial Sectors



Flange for paper mill roller



Paper mill roller



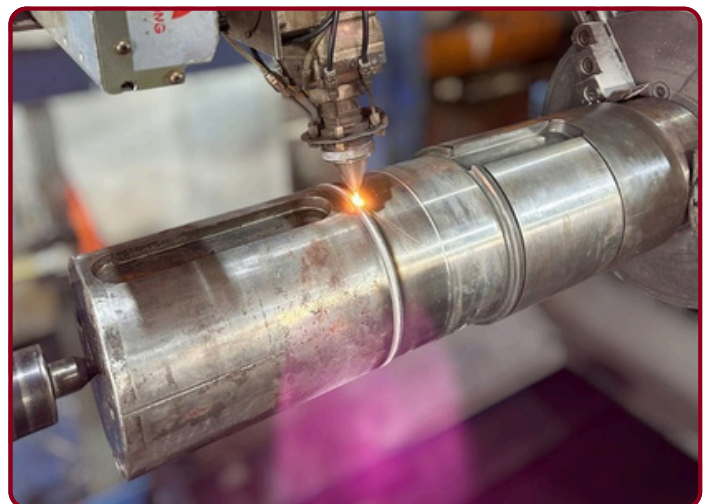
Pineapple pressing roller



Rubber roller, Stainless steel roller

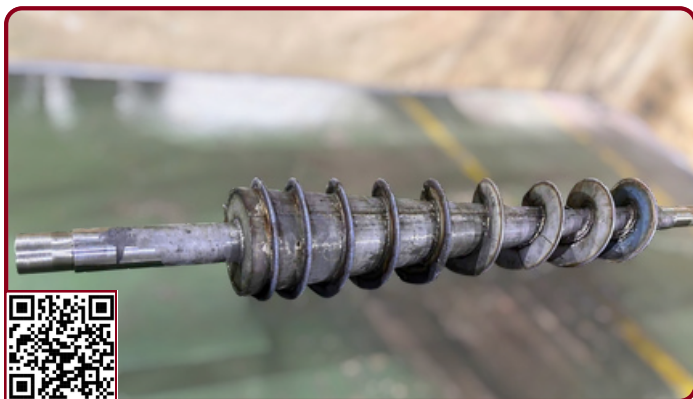


Packaging industry roller



Centerless grinder shaft

K. Other Industrial Sectors



Pineapple press screw shaft



Wood press screw shaft



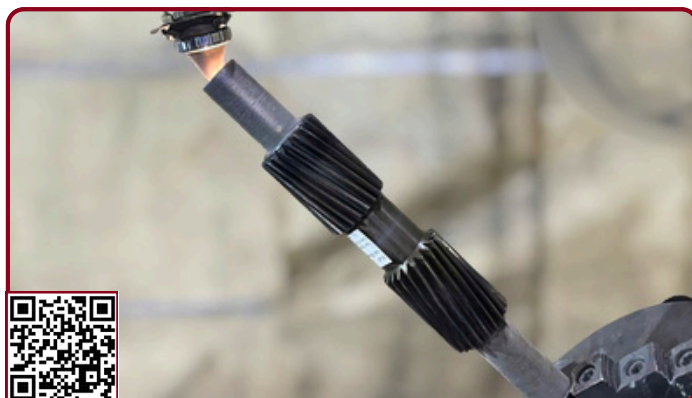
Concrete screw shaft



Concrete form tube



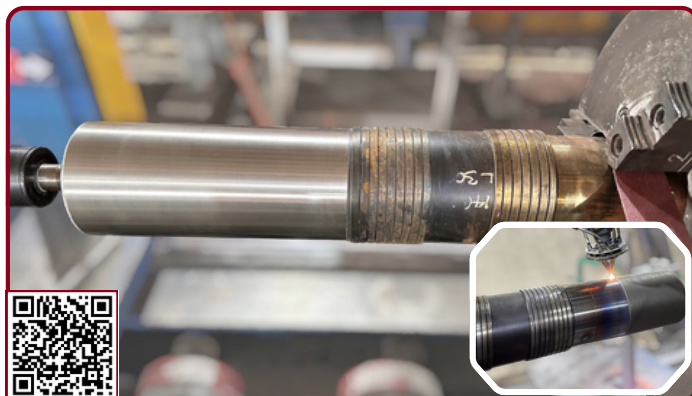
Gear shaft



Gear shaft



Pump bushing

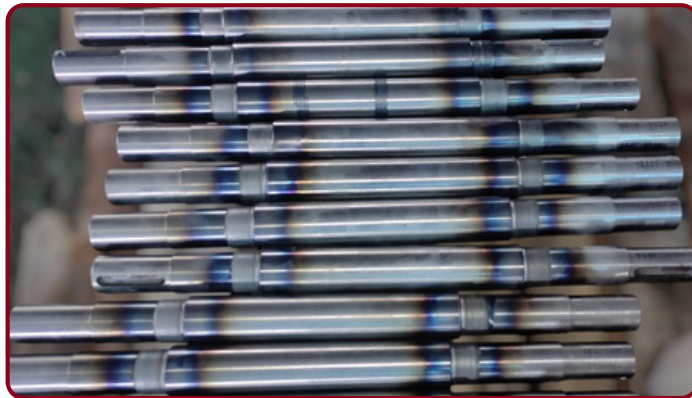


Hydraulic hammer

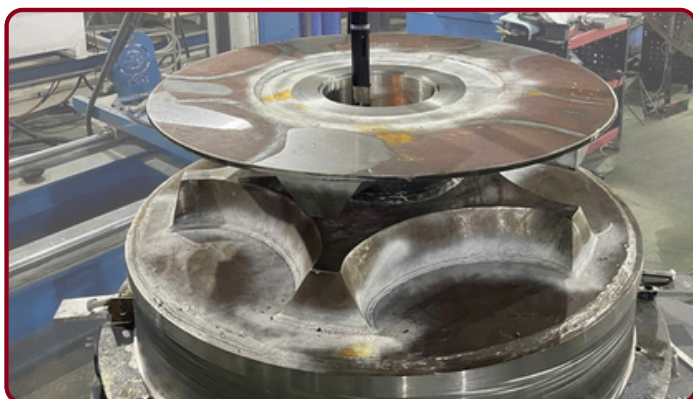
K. Other Industrial Sectors



Cement mill gearbox shaft



Roller



Chain winch



CNC milling machine spindle



Gear shaft



Shredder rotor shaft



Swing hammer crusher rotor shaft

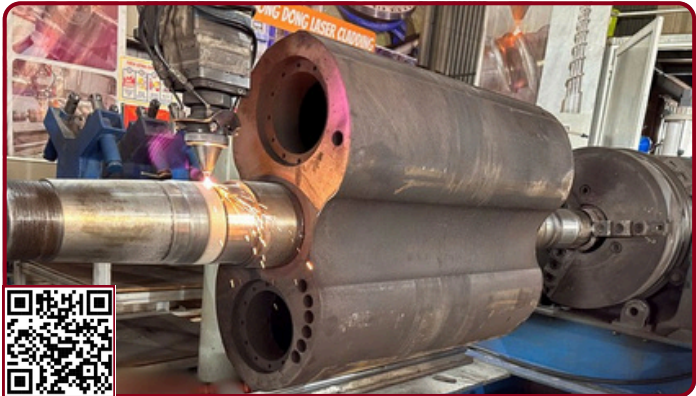


Gear bore D110

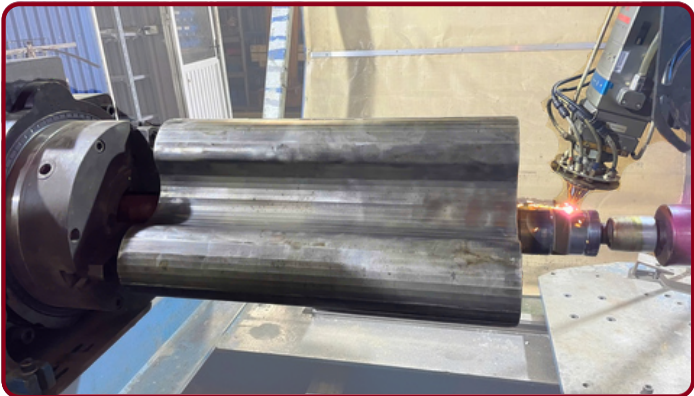
K. Other Industrial Sectors



Roots Blower Rotor



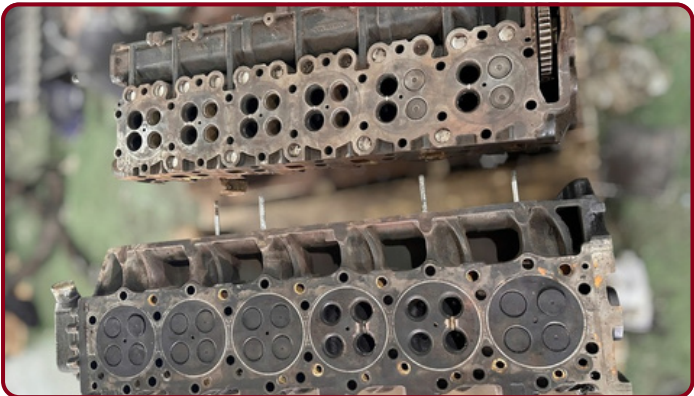
Roots Blower Rotor



Roots Blower Rotor



Roots Blower Rotor



Diesel engine



Bearing housing of the booster fan

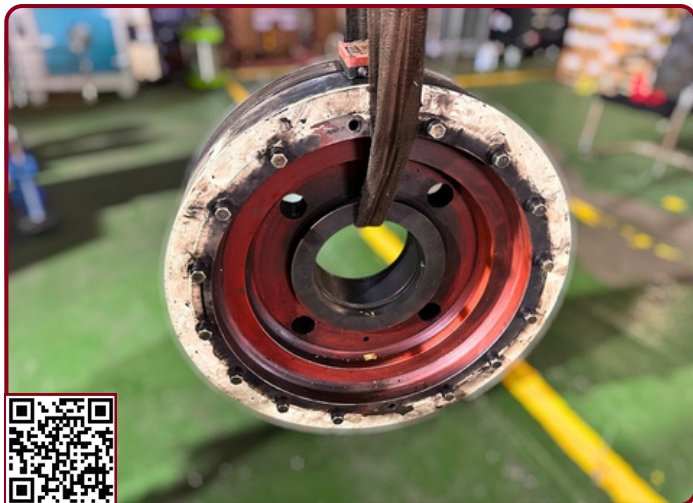


ECU thread



ECU thread

K. Other Industrial Sectors



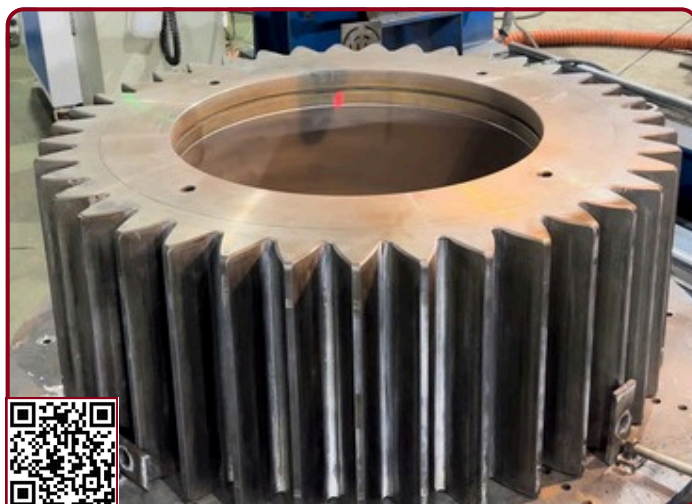
Flywheel



Flywheel



**High-pressure air compressor
impeller**



Gearbox gear OD 1040

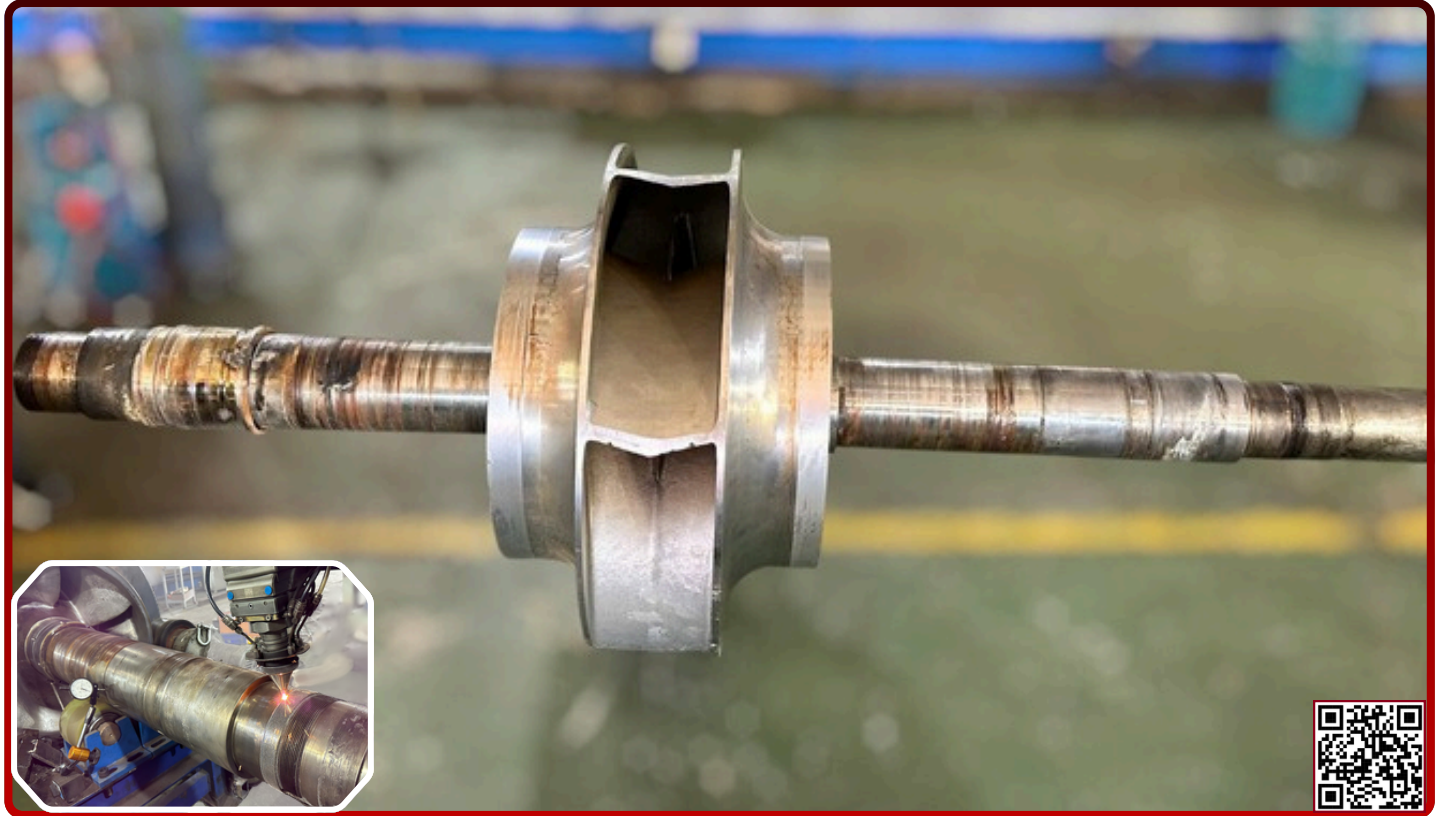


Construction machinery spare parts



Hub bore D140

K. Other Industrial Sectors



Water supply pump

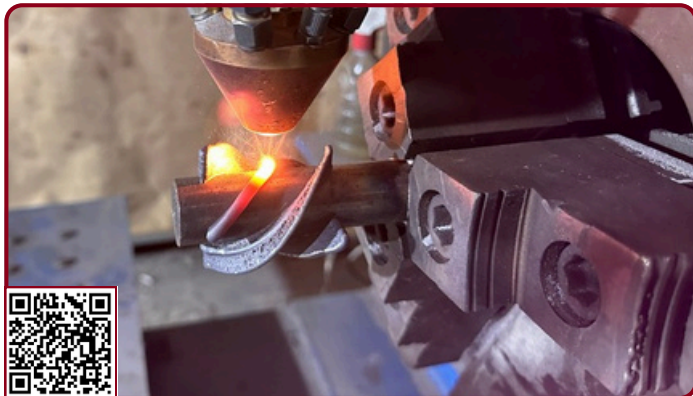


Impeller



Pump casing cover

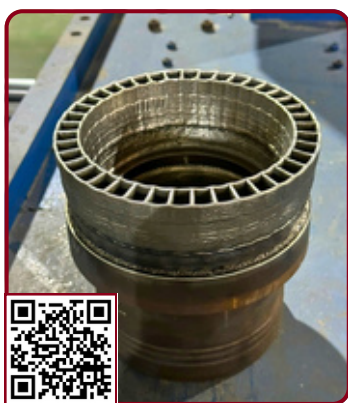
M. Metal 3D Printing



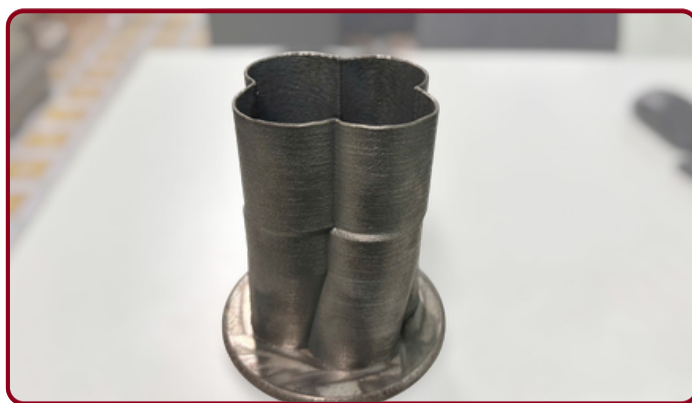
Metal 3D printing



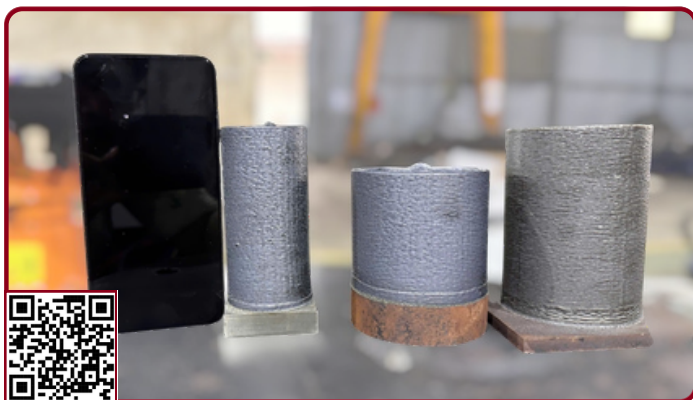
Metal 3D printing



Metal 3D printing



Metal 3D printing



Metal 3D printing



Metal 3D printing



Metal 3D printing



Metal 3D printing

LASER HARDENING



Automotive mold

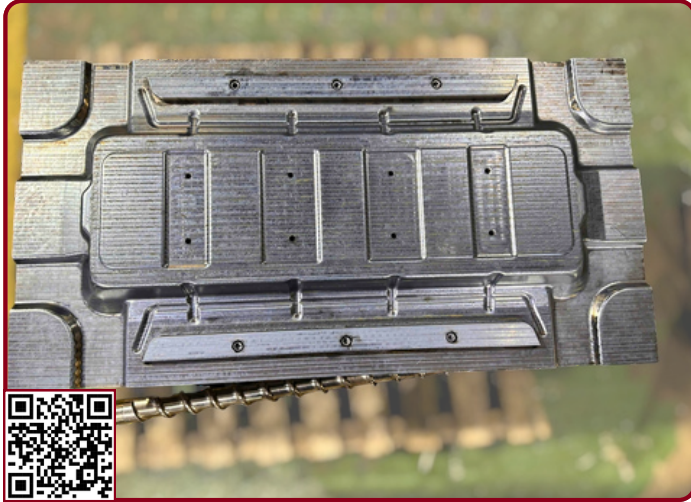


Mold

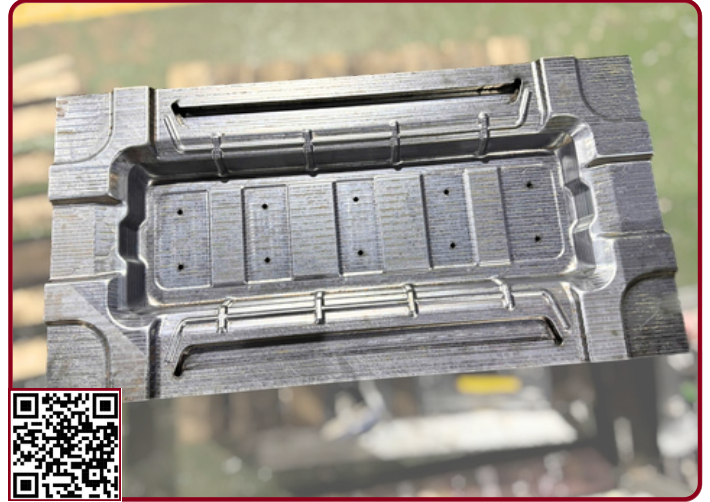


Mold

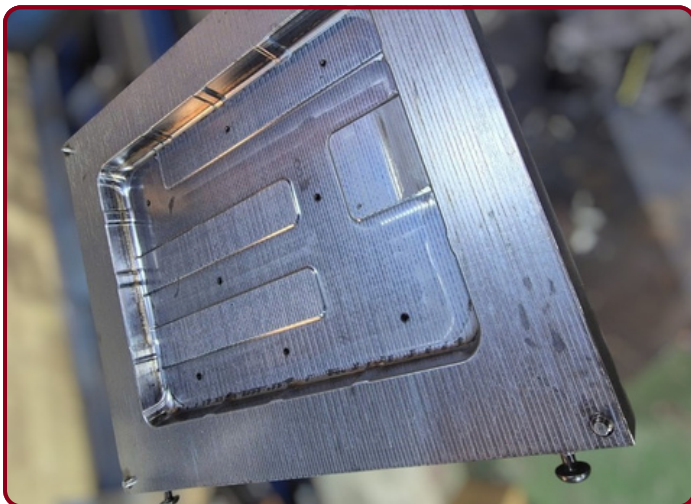
LASER HARDENING



Upper mold



Lower mold



Mold



Mold

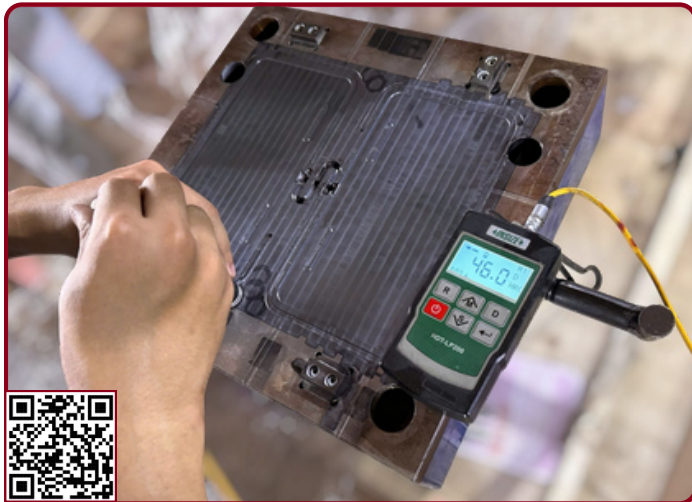


Mold

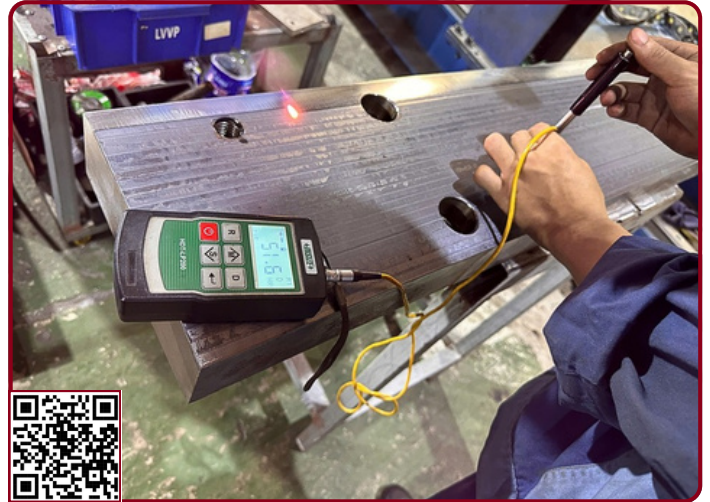


Mold

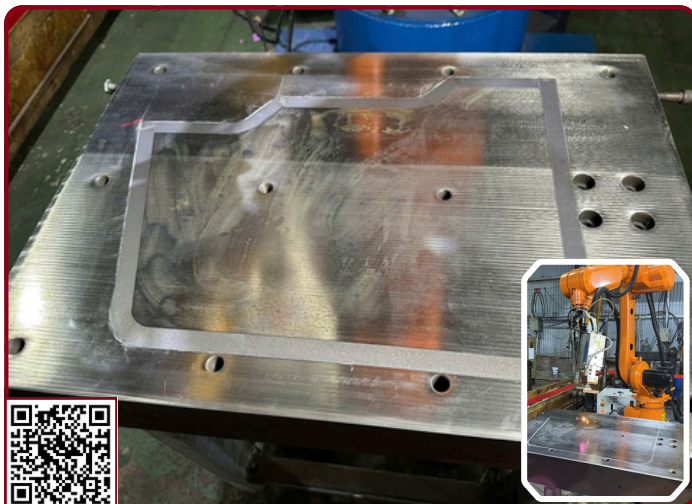
LASER HARDENING



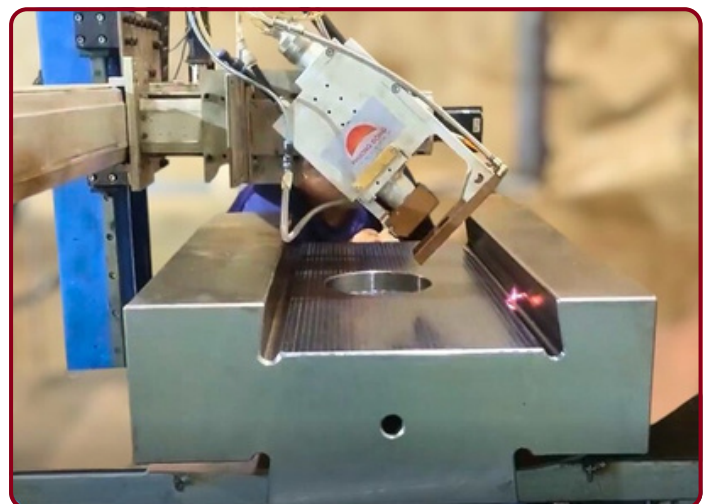
Mold



Slide bar



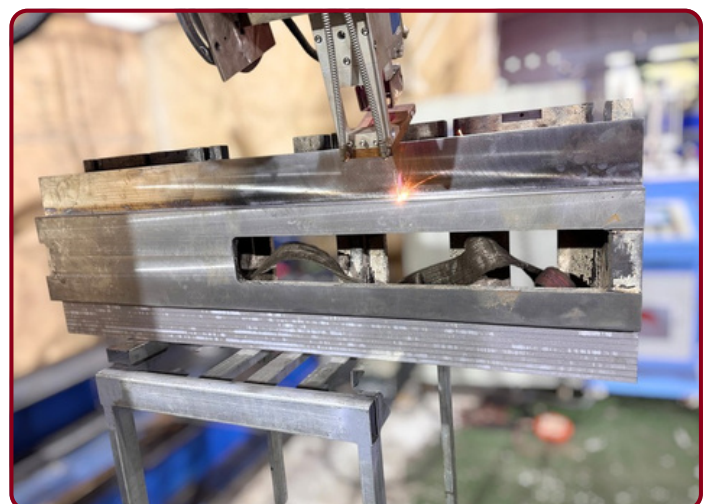
Laser Hardening



Mold clamp plate

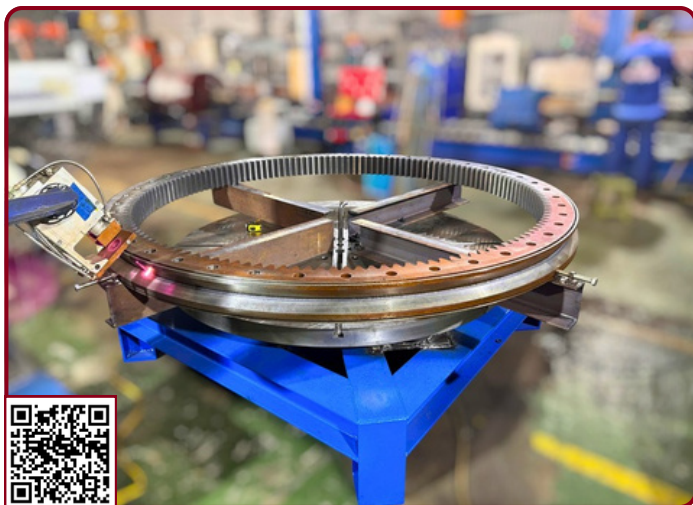


Moving guideway of the boring machine bed

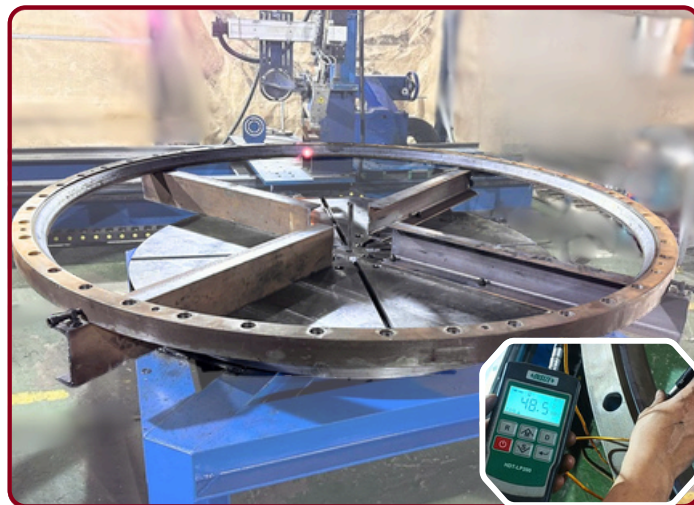


Fixed guideway of the boring machine bed

LASER HARDENING



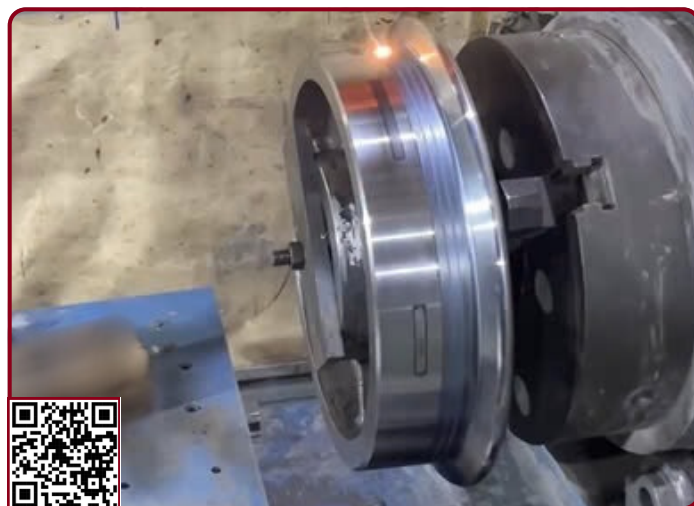
Slewing ring



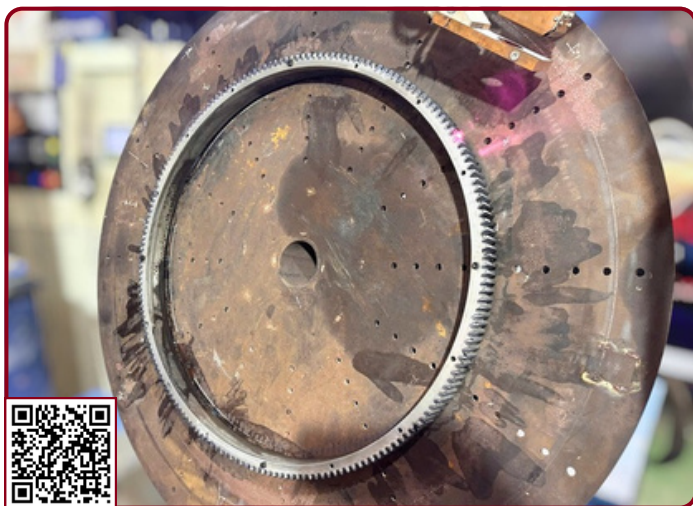
Slewing ring



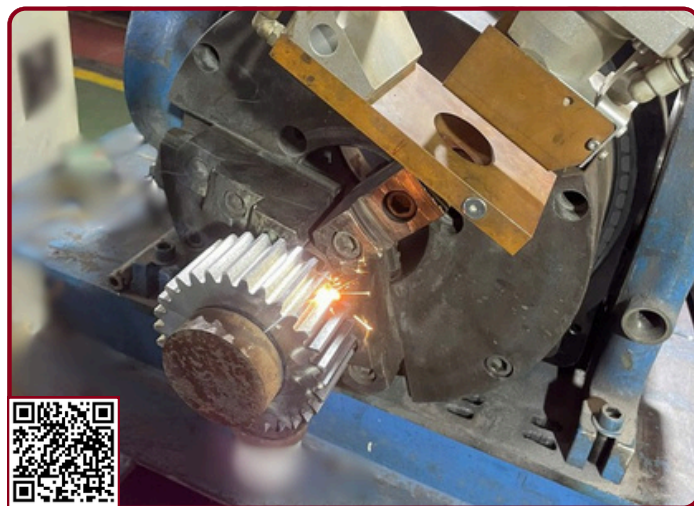
Slewing ring



Wheel

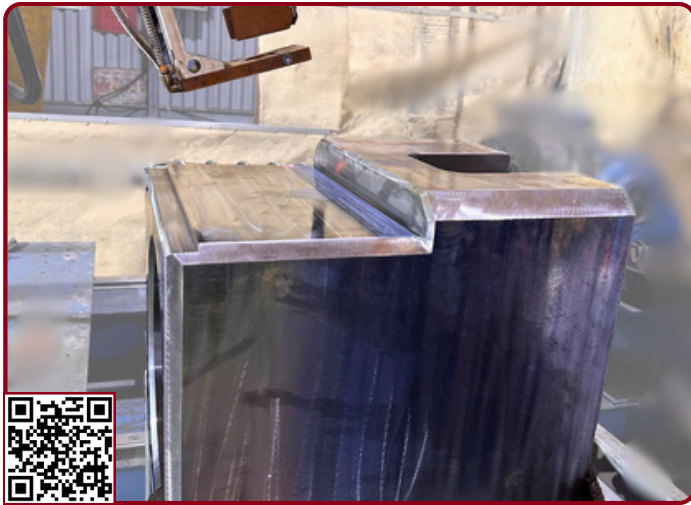


Gear



Gear

LASER HARDENING



Bearing slide block



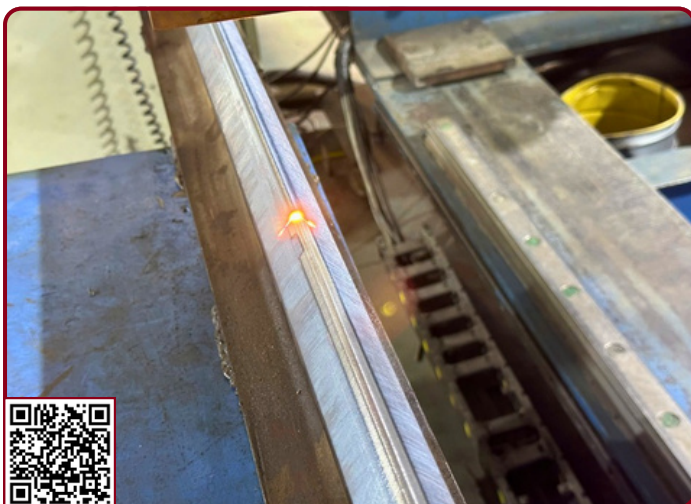
**Hardness testing
after Laser Hardening**



Shaft



Roller

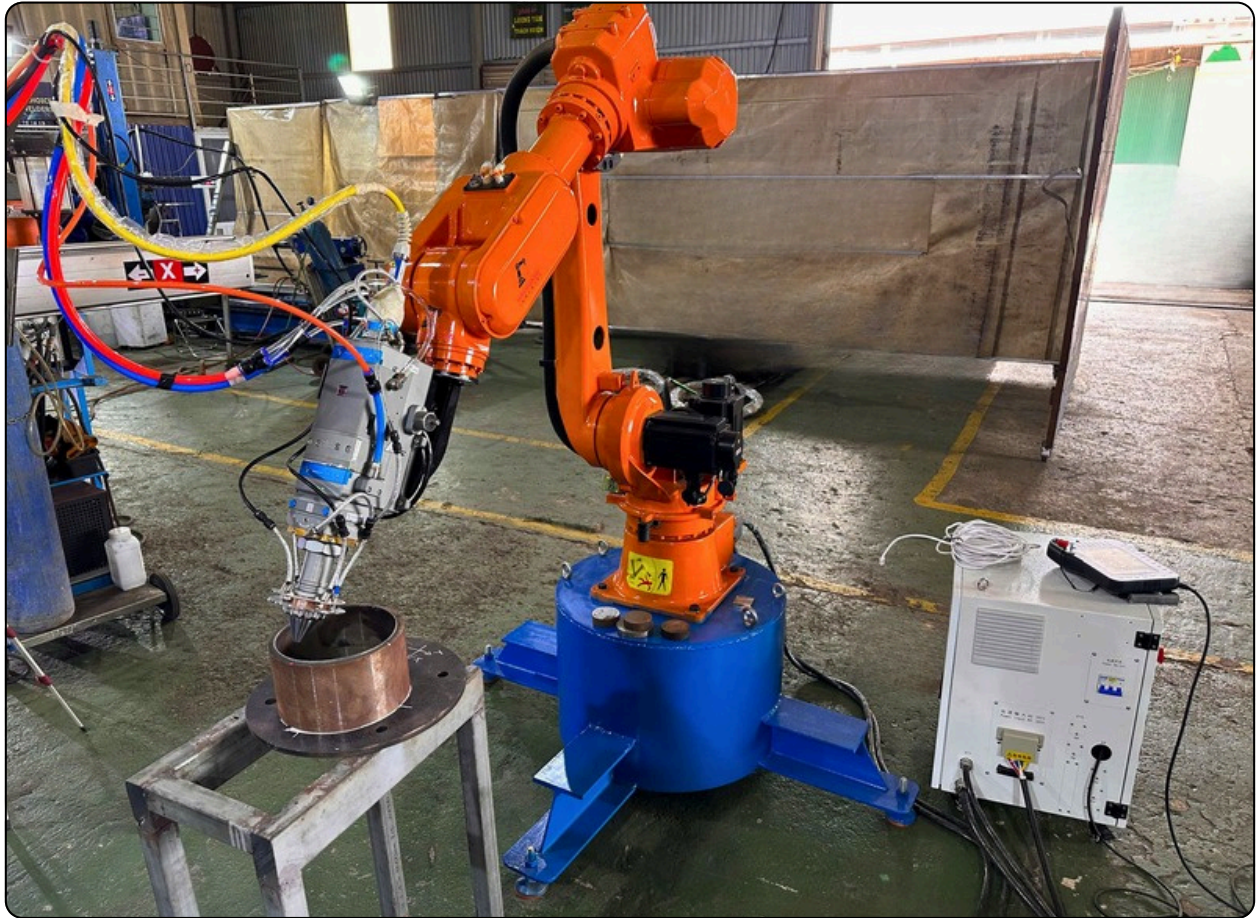


Press brake die

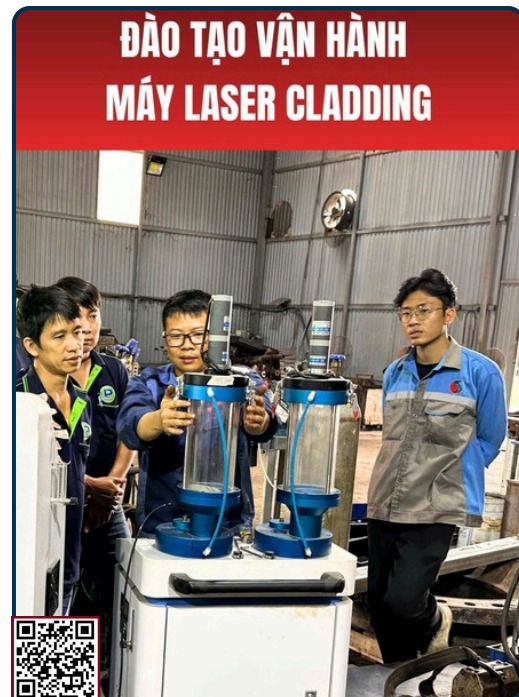
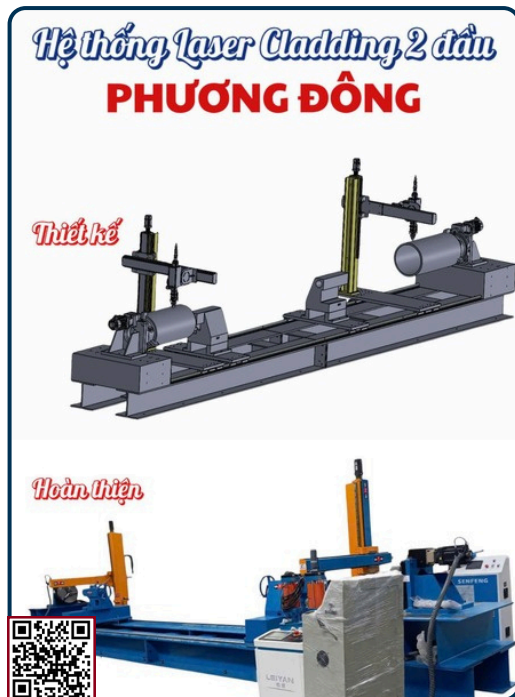


Molds

MACHINE MANUFACTURING & TECHNOLOGY TRANSFER



MACHINE MANUFACTURING & TECHNOLOGY TRANSFER



TRAINING & TECHNOLOGY TRANSFER

1. Installation and System Commissioning

- Equipment inspection
- Installation of Laser Cladding machine and robot
- Connection of electrical, pneumatic, and shielding gas systems
- Safety inspection and system trial operation



2. Equipment Operation Training

- Start-up and shut-down operation of the Laser Cladding system.
- Operation of CNC controller and industrial robot.
- Setting and optimizing process parameters.
- Running and monitoring the cladding/welding programs.



MACHINE MANUFACTURING & TECHNOLOGY

TRANSFER

3. CNC / Robot Programming

- CNC: Writing, saving, and running programs.
- Robot: Set tool, set coordinate system, teaching.

4. Laser Cladding Technology

- Setting welding parameters.
- Adjusting Laser power.
- Adjusting powder feeding rate.
- Welding speed.
- Shielding gas.
- Laser Cladding process on actual products.

5. Practice

- Welding on actual components with different types of welding powders.
- Programming practice.
- Handling common situations.
- Result evaluation.

6. Safety and Maintenance

- Laser safety.
- Robot safety.
- Equipment inspection before operation.
- Periodic maintenance.
- Basic troubleshooting.



LASER CLADDING POWDERS

STAINLESS STEEL POWDER

No.	Grade	Hardness HRC	Main Composition	Typical Application
1	316L		Cr 16-18, Ni: 10-14, Mo 2-3, Si ≤ 1 , Mn ≤ 2 , C ≤ 0.03 , P ≤ 0.045 , Fe: Bal	Stainless steel, suitable for valve bodies, valve seats, and marine components Restoration of stainless steel parts in chemical environments
2	17-4PH		Cr: 15.0 – 17.5, Ni: 3.0 – 5.0, Cu: 3.0 – 5.0, Nb: 0.15 – 0.45, Mn: ≤ 1.0 , Si: ≤ 1.0 , C: ≤ 0.07 , P: ≤ 0.04 , S: ≤ 0.03 , Fe: Bal	Stainless steel, suitable for shaft repair and restoration of steam turbine components Cladding for molds, rotating shafts, and parts requiring high hardness and corrosion resistance
3	2209		Cr 22–23, Ni 8–9, Mo 3–3.5, N ~ 0.2 , Fe: Bal	Duplex stainless steel alloy powder – widely used for protective cladding against corrosion, wear, and mechanical stress, especially in harsh environments such as chemical, oil & gas, and marine industries.
4	410NiMo		C: 0.02 – 0.05, Cr: 18 – 23, Ni: 4.5 – 5.5, Mo: 0.4 – 0.7, Mn: ≤ 1.5 , Si: ≤ 0.6 , Fe: Còn lại	Restorative welding and wear-resistant cladding for pump shafts, turbine shafts, bearing housings, bearings, and industrial valves. Widely used in the oil & gas, hydropower, cement, steel, and marine industries.
5	420		Cr 12–14, C 0.3–0.4, Fe: Bal	Restoration of blades, molds, and cutting tools High wear resistance in manufacturing industry

NICKEL BASE ALLOY POWDER

No.	Grade	Hardness HRC	Main Composition	Typical Application
1	Ni625	20-25	Fe: 5; Mo: 9; P: 0.015; S: 0.015; Cr: 21.5; Nb: 3.62; Mn: 0.5; Cu: 0.07; Al: 0.4; Ti: 0.4; Si: 0.5; Co:1; Al: 0.4; Cu: 0.07; Ni: Bal	High corrosion resistance and excellent heat resistance – used in petrochemical and highly corrosive environments
2	Ni718	20-25	Fe: 14; Mo: 3.05; P: 0.015; S: 0.015; Cr: 19; Nb: 5.12; Mn: 0.35; Cu: 0.3; Al: 0.5; Ti: 0.9; Si: 0.35; B: 0.006; Co:1; Mg: 0.01; C: 0.08; Ni: Bal	High mechanical strength and heat resistance – used in aerospace, gas turbines, and high-temperature molds

LASER CLADDING POWDERS

COBALT BASED ALLOY POWDER

No.	Grade	Hardness HRC	Main Composition	Typical Application
1	Stellite 6	38-44	Co Bal, Cr 27.0–32.0, W 4.5–6.0, C 0.9–1.4, Ni ≤ 3.0, Fe ≤ 3.0, Si ≤ 2.0, Mn ≤ 1.0	Most common type – resistant to wear, corrosion, and heat up to ~800°C. Used for valve blades, sliding surfaces, and hammers
2	Stellite 12	42-48	C 1.8–2.5, Cr 28–32, W 7–9, Ni ≤ 3.0, Fe ≤ 3.0, Si ≤ 1.2, Mn ≤ 1.0, Co Bal	Higher hardness than Co6 – suitable for cutting edges, rotating shafts, and cutting tools in high-temperature environments

ALUMINUM BASE ALLOY POWDER

No.	Grade	Độ cứng HRC	Main Composition	Typical Application
1	AlSi10	~5–10	Al ~89.5, Si 10, Fe 0.5	Cladding aluminum parts with complex geometries (housings, casings, impellers) – Creating anti-corrosion and oxidation-resistant coatings for mechanical, shipbuilding, and plastic mold industries
2	AlSi10Mg	~10–13	Al ~88.5, Si 10, Mg 0.3–0.5, Fe 0.4	Metal 3D printing (SLM/DMLS) for aerospace, automotive, and racing industries – Cladding and repairing lightweight structures requiring high precision – Manufacturing lightweight load-bearing parts with good fatigue strength
3	Al6061	~8–10	Al ~97.9, Mg 1.0, Si 0.6, Cu 0.28, Cr 0.2	Cladding or restoring aluminum mechanical parts (robotic arms, CNC machine frames) – Combined CNC machining or 3D printing – Used in automation, defense, and sports bicycle industries

BABBITT POWDER

STT	Grade	Hardness	Main Composition	Typical Application
1	SnSb11Cu6	24–30 HB	Sn 83, Sb 11–15, Cu 2–4.5, Pb < 0.35, Fe < 0.08, As < 0.10, Bi < 0.10, Al < 0.002	Sliding bearings in hydro turbines, generators, large motors, compressors, industrial pumps, rolling mills. Ideal for restoring worn components in medium to high-load rotating equipment. Suitable for mechanical repair, marine, mining, and machinery manufacturing industries requiring strong adhesion to steel or copper, low friction, and good wear resistance.

LASER CLADDING POWDERS

HARD FACING POWDER

No.	Grade	Hardness HRC	Main Composition	Typical Application
1	LYF 11	40-45	C 0.43, Cr17.23, Si1.01, Ni4.12, Mo0.83, Fe Bal	Suitable for repairing hydraulic support shafts and similar applications
2	LYF 20	50-55	C 0.25; Cr16.16; Si0.89; Ni3.39; Mn0.46; Mo1.18; B0.74; Fe rest	Suitable for repairing hydraulic support shafts and similar applications
3	Fe35	34-36	Ni: 6; Cr: 17.3; Mn: 0.62; Si:1.85; B:1.12; V:0.12; C:0.32; Fe: Bal	Cladding for shafts, rolls, gears, and bushings. Mechanical parts with low chemical corrosion. Working environments with mechanical friction but not overly harsh
4	Fe45	44-46	C: 0.6, Si: 3; B: 2; Cr: 12; Ni: 20; W: 3; Fe Bal	Industrial rollers, cutting tools, pump shafts Components operating in high-wear and mildly corrosive environments Applicable in cement, mining, and metallurgy industries
5	Fe50	48-52	Fe: ~65, Cr: ~18-22, B: 3-4, C: 2.5-3	Grinding blades, drive shafts, agitator blades in high-wear environments
6	Fe5z-3	52-53	C: 0.16, Mo: 1.02, Cr: 16.20, Ni: 2.21, Si: 1.08, Mn: 0.33, B: 0.96 S: 0.01, Fe: Balance	Restorative welding for components exposed to high temperatures, wear, and corrosion. Applicable to bearings, bearing housings, rotating shafts, and outer surface layers of parts used in heavy industry, oil & gas, and high-load machinery.
7	Fe55	54-56	C: 1.2, Si: 3.5; B: 2.6; Cr: 22; Ni: 15; W: 3; Fe Bal	Surface cladding for components under extreme wear. Wear-resistant pipes, grinding shafts, and screw conveyors in cement and mining industries. Dry working environments with minimal impact
8	Fe60	58-62	Ni<2.0; Cr 13-18; Mn<1; Si: 1-4; B: 1-3; W≤ 2; Mo<0.8; O<0.2; C<1; Fe: Bal	Ultra wear-resistant for mining equipment and crusher blades
9	WC		WC	When mixed in a Ni- or Co-based alloy matrix, it forms Ni-WC or Co-WC composite materials, which significantly enhance wear and erosion resistance in harsh operating environments.
10	Dura Metal 5060	60	50%WC +50% NiCrBSi	It offers very high wear resistance, with excellent erosion, corrosion, and oxidation resistance.
11	TiC	280 - 3200HV	TiC	By incorporating TiC into a Ni-, Co-, or Fe-based matrix, the coating achieves both extremely high hardness (for wear resistance) and a certain degree of toughness.

COOPERATION & DEVELOPMENT



Seminar on “Welding Technologies for Industry 4.0 and 5.0”



Speaker Hoàng Văn Cường: Applications of Laser Cladding Technology in Modern Industrial Manufacturing

COOPERATION & DEVELOPMENT



15th Vietnam Welding Club Workshop – Hanoi University of Science and Technology

Speaker: Hoang Van Cuong: Application of Laser Hardening Technology in Automotive Manufacturing Processes



School of Mechanical Engineering – HUST

COOPERATION & DEVELOPMENT



Hoa Phat Dung Quat



Thyssenkrupp Group



Tomeco An Khang



Pha Lai Thermal Power Plant



Handover of the Laser Cladding System PD-10M-2CNC - LÊ PHÚC

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- Hoa Phat Metal Sheet
- Hoa Phat Dung Quat
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- Hoa Phat Steel Pipe
- Dong A Metal Sheet

THERMAL POWER INDUSTRY

- Thai Binh 2 Thermal Power Plant
- Mong Duong AES Thermal Power Plant
- Vung Ang Thermal Power Plant
- Uong Bi Thermal Power Plant
- Nghi Son Thermal Power Plant
- Northern Thermal Power Service & Maintenance JSC – Pha Lai Thermal Power Plant

CEMENT INDUSTRY

- Vinh Son Cement Co., Ltd.
- Branch of Northern Cement Trading JSC in Lai Chau

BRICK AND TILE INDUSTRY

- Dat Viet Ceramics
- Vicenza
- Hoang Tien Fine Ceramics
- Cotto Quang Ninh
- Viglacera Ha Long
- Bac My Tunnel Brick

DEFENSE INDUSTRY

- One Member Limited Liability Company 95 (Factory Z195)
- One Member Limited Liability Company of Mechanical and Chemical Engineering 13 (Factory Z113)

OIL, GAS & CHEMICAL INDUSTRY

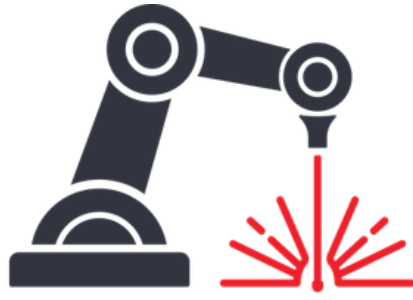
- Vietnam Yellow Phosphorus
- Son Ha SSP Vietnam
- Vietnam Boiler
- Tam Long Pharmaceutical
- Le Phuc Production – Trading – Service Co., Ltd.

HYDROPOWER INDUSTRY

- Southeast Asia Energy Development JSC - Nam Ho Hydropower
- Song Lo 4 Hydropower JSC
- Nho Que 3 Hydropower One Member LLC
- Huong Son Hydropower JSC
- SEA Nam Luc Hydropower JSC
- Ba Thuoc 1 & 2 Hydropower
- Khao Mang Hydropower Plant
- Nam Muc Hydropower JSC
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