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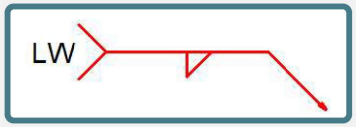


Laser Welding

Cladding, Recargue, Overlay

LASER CLADDING

LASER CLADDING TECHNOLOGY

Laser cladding technology is a surface strengthening method that rapidly heats and melts the alloy powder or ceramic powder and the substrate surface under the action of laser beam, and cools after the beam is removed to form a surface coating with very low dilution rate and metallurgical combination with the substrate material, so as to significantly improve the wear resistance, corrosion resistance, heat resistance, oxidation resistance and electrical characteristics of the substrate surface. As a green processing technology, laser cladding is a new technology with high economic benefits. It can prepare high-performance alloy surfaces on cheap metal substrates without affecting the properties of the substrate, reduce costs and save precious and rare metal materials. Its application covers the whole machinery manufacturing industry, including mining machinery, petrochemical industry, electric power, railway, automobile, shipbuilding and metallurgy, aviation, power, mold and other industries.

About SENFENG and ARC-TECH

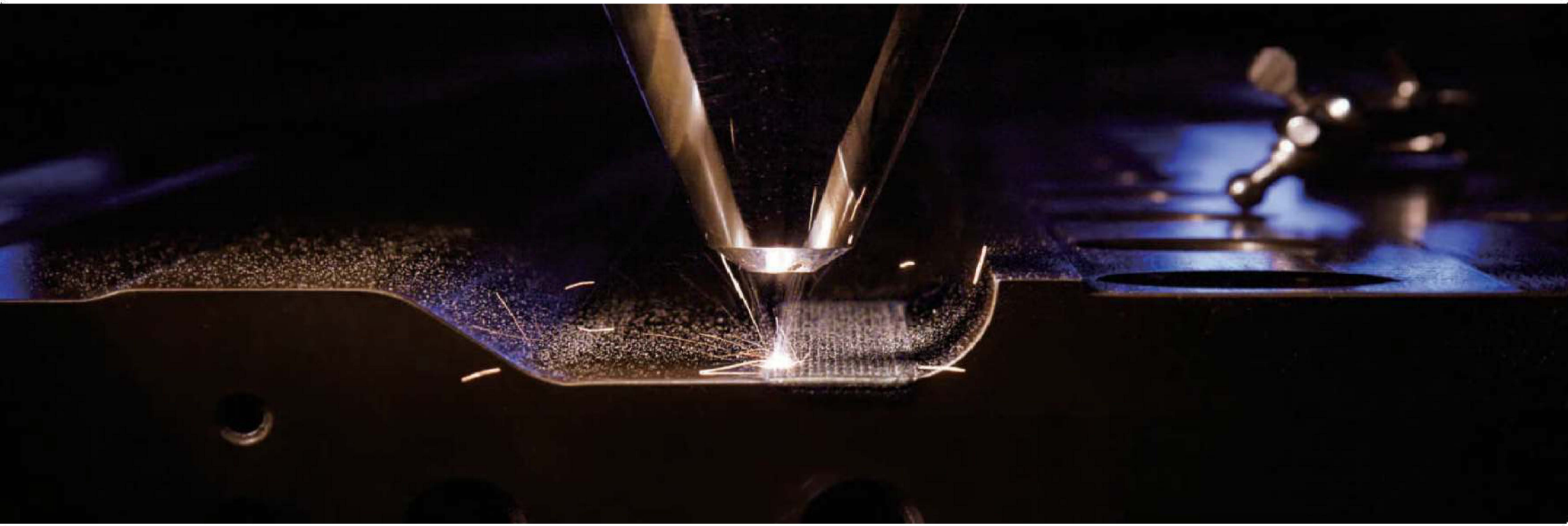
Senfeng Laser, as a leading integrated manufacturer of fiber laser machines for cutting, welding, cleaning, cladding as well as electric bending machines, provides various solutions in the field of fabricating machinery with cutting-edge technology.

To build the industrial world of tomorrow, we have set up subsidiaries in Paderborn, Germany and Los Angeles, the US and several service centers in major cities of India, Pakistan,Serbia. After years of persistent probe in the field of laser technology, we are equipped with a great pool of core tech to drive automa-tion process of modern machinery industry.

Arc-Tech is a laser equipment leading company in Spain who has introduced laser welding technology and made it applicable and affordable for general industry and purposes.

Laser welding brings solutions and optimize results on many applications where traditional processes, as TIG or MIG, and in the case of Cladding or Hardfacing, SAW, give limited results or need important re-work related to excess of penetration, deformation and productivity.

Senfeng has set up a laser cladding technology R & D center and a production and processing center. Based on the application needs of a large number of customers at home and abroad, customize the development process and core equipment, and have the ability to provide customers with industrialized application technology services, including powder material selection, equipment configuration, process control, technical support and upgrading services.



Testing Equipment

The company has professional testing equipment, excellent production technology, good service support platform and strong technical R & D team. We have the strength to provide high-quality laser equipment for new and old customers.

Metallographic sample preparation equipment

Metallographic sample preparation equipment includes metallographic sample cutting machine, inlay prototype, metallographic grinding and polishing machine, etc.

Micro Vickers hardness tester

It is used for hardness test of laser cladding coating and cladding interface, as well as hardness test of thinner coating.

Leica optical microscope

It is used to observe the micro morphology of various laser cladding coatings and substrates, non-metallic inclusions, micro measurement, phase area content determination, powder particle size analysis and coating grain size rating.

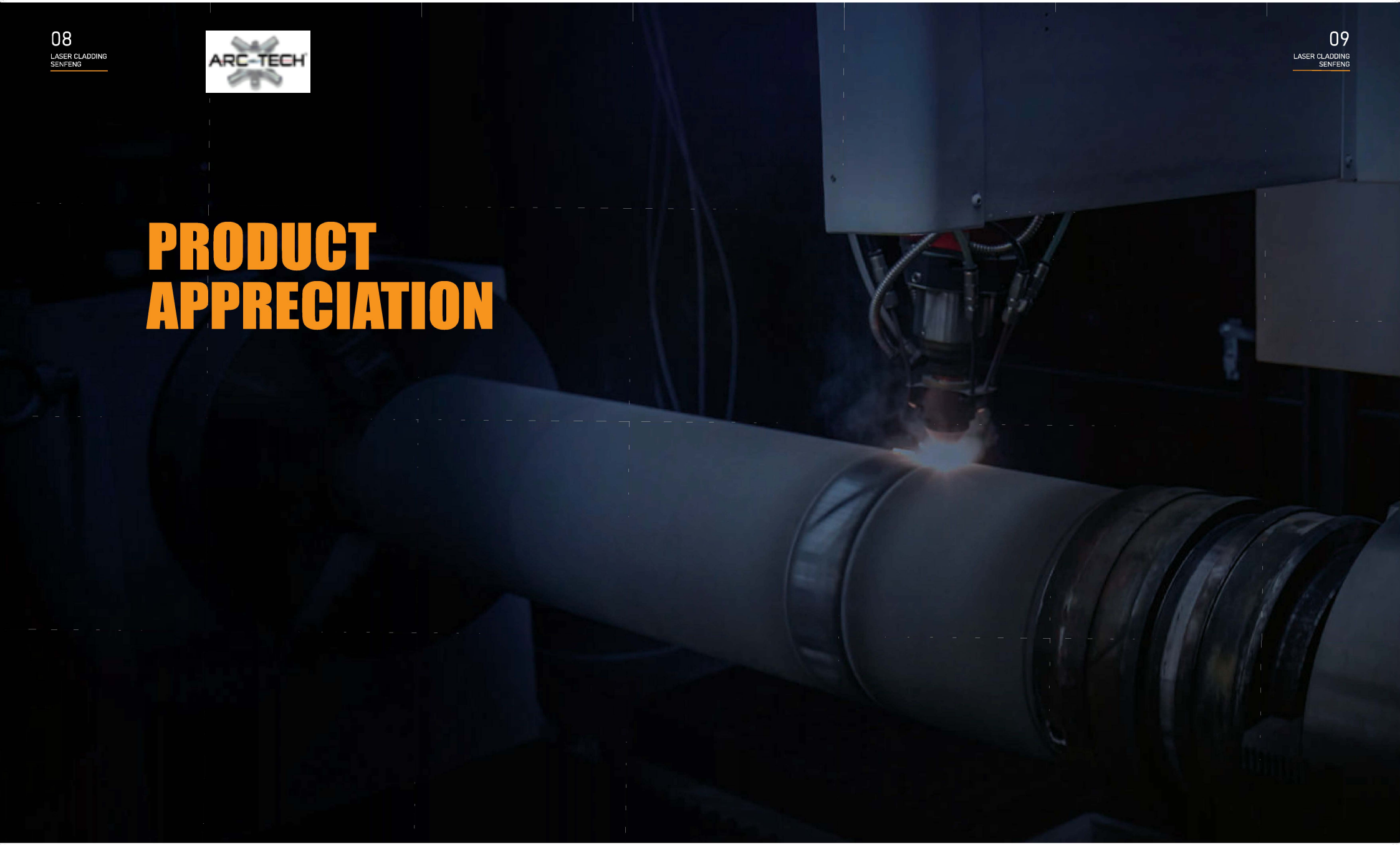
Salt spray test chamber

It is used to test the corrosion of different substrates and laser cladding coatings in neutral salt spray environment. Combined with micro analysis, the corrosion resistance of different cladding powders is determined.

Friction and wear tester

The wear resistance of different substrates and laser cladding coatings were tested, and the wear resistance of different cladding powders was determined combined with micro analysis to improve the service life of cladding coatings.

PRODUCT APPRECIATION



Laser Cladding Head

Modular design

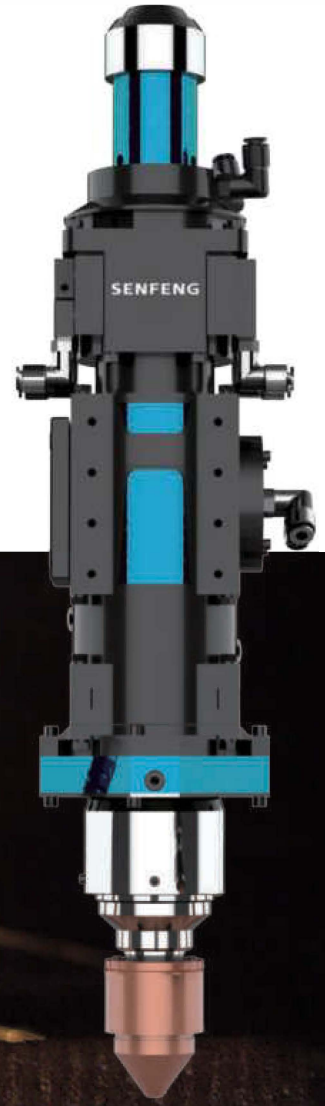
Laser grade optical modular design can be assembled into direct light path or bending light path according to application requirements.

Ultra high transmittance

Laser energy transmittance ≥ 99.5%

Higher free adaptation

According to the cladding requirements, different optical lenses and modules can be equipped to output circular light spots with different light spot diameters (0.5mm-5.0mm) and the maximum output of strip light spots (16mmx3mm)



Continuous-Wave Fiber Laser

Separation design of photoelectric module

The optical path and circuit module do not interfere with each other and work stably; The photoelectric module can be directly replaced, upgraded and maintained at the client.

Return light protection technology

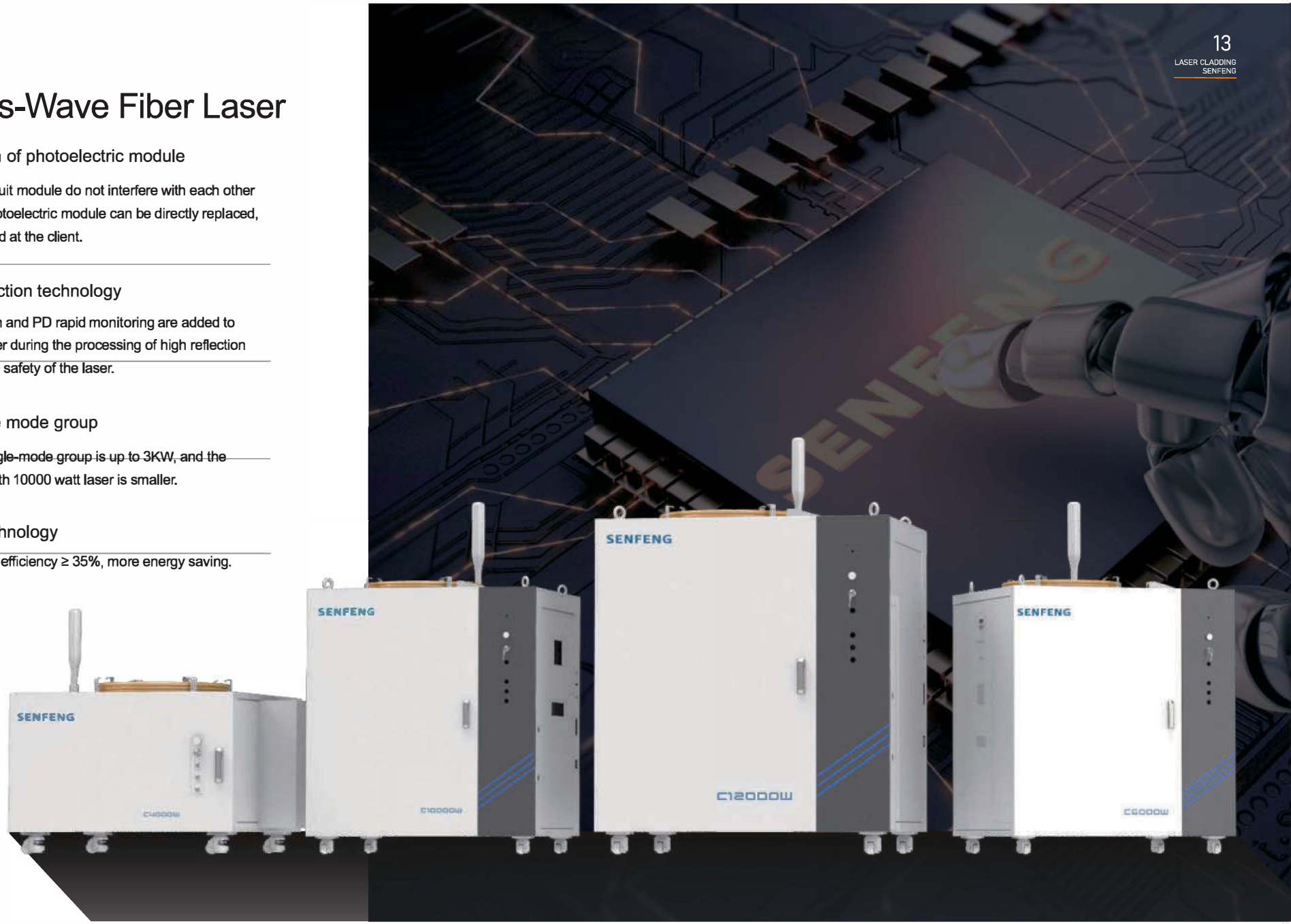
Level 3 Return protection and PD rapid monitoring are added to avoid damage to the laser during the processing of high reflection materials and ensure the safety of the laser.

High power single mode group

The output power of single-mode group is up to 3KW, and the equipment integrated with 10000 watt laser is smaller.

Efficient laser technology

Electro optic conversion efficiency ≥ 35%, more energy saving.



Ultra High Speed Laser Cladding Equipment

The SFHS series of ultra-high-speed laser cladding machine tools are ultra-high-speed laser remanufacturing equipment inde-pendently developed by Senfeng Laser. This machine tool can meet the coating manufacturing and rapid repair application require-ments of various shaft parts with features such as high efficiency, low cost, green and environmental friendly etc. It can prepare a strengthened layer with extremely low dilution rate and much higher bonding strength than electroplating. It is mainly used in coal mining, machinery manufacturing, printing industry, food industry and other fields.

The machine tool is mainly composed of a base part, a rotating spindle head, a tailstock, a column part, a beam part, a laser, a powder feeder, a high-speed cladding head, and a control system. The servo bus control system is adopted, and the worktable is made of high-strength and high-quality cast iron materials to ensure the stability and precision maintenance of the machine tool. The high-speed rotating headstock adopts stepless speed change design, which is simple and quick to operate. With a follow-up disc design, it is convenient for the powder to be collected quickly. Self-developed high-power fiber laser equipped with high-speed cladding head and high-speed laser cladding nozzle can achieve high-efficiency and high-precision cladding processing of workpiec-es.

SFHS3050

TECHNICAL PARAMETER

laser source power	6000w(optional)
powder feeder	double barrel pneumatic powder feeder
laser cladding head	with Four-point nozzle + powder divider、High-speed ring nozzle + powder divider
single layer thickness	0.1-1.5mm
laser cladding efficiency	0.3-0.6㎡/h
Substrate dilution rate	＜5%
Powder utilization	＜90%
control system	KND
driving system	KND
Effective itinerary (support customized)	X-500mm Y-500mm Z-3000mm C-360° continuous rotating
diameter of the chucks	φ500mm(Three-jaw self-centering)
Chuck clamping range	φ25-φ500mm
max turning diameter of the workpiece	φ800mm
max length of workpiece	3m
max loading	3t
Spindle speed	200r/min(Infinitely variable speed)
Adjustable angle of cladding head A axis (manual)	±30°
powder collecting device	Follow-up powder receiving tray
voltage	AC380V/50HZ
whole machine weight	about 7.5t

Rectangular spot laser cladding equipment

The SFH3050L series rectangular spot laser cladding machine is a laser re-manufacturing equipment independently developed by Senfeng Laser. The machine can meet the coating manufacturing and rapid repair application requirements of shaft parts of various specifications. It has high efficiency, low cost, and environmental protection. Features: It can prepare a strengthened layer with extremely low dilution rate and much higher bonding strength than electroplating. It is mainly used in coal mining, machinery manufac-turing, printing industry, food industry and other fields.

The machine system is mainly composed of a worktable base, a rotating spindle head, a tail-stock, a column part, beam, laser system, gravity powder feeder, rectangular spot cladding head, and professional CNC system. The servo bus control system is adopted, and the worktable is made of high-strength and high-quality cast iron materials to ensure the stability and accuracy of the machine. The high-speed rotating head-stock adopts CVT system, which is simple and quick to operate. It has a follow-up powder collection tray design, which is convenient for quick powder collection. High-power fiber laser equipped with rectangular spot laser cladding head and gravity powder feeder can achieve high-efficiency and high-precision cladding processing of work-pieces.

SFHS3050L

TECHNICAL PARAMETER

laser source power		6kw (optional)
Powder feeder		Gravity powder feeder
Cladding head		Copper mirror rectangular cladding head
Single layer thickness		0.2-2mm
Deposition efficiency		0.3-0.6㎡/h
Control system		KND
Driving system		KND
Effective stroke(customizable)		X-500mm Y-500mm Z-3000mm C-360° continuous rotating
Headstock(customizable)	Chuck diameter	φ500mm(three claw self centering)
	Chuck clamping range	Φ25-φ500mm
	Maximum rotation diameter of workpiece	Φ800mm
	Maximum length of workpiece	3m
	maximum payload	3t
	Maximum spindle speed	40r/min(Infinitely variable speed)
Powder collection device		Follow up powder tray
Supply voltage		AC380V/50Hz
Machine weight		About 7.5t

High speed laser cladding equipment

The SFH series of ultra-high-speed laser cladding machine tools are ultra-high-speed laser remanufacturing equipment independently developed by Senfeng Laser. This machine tool can meet the coating manufacturing and rapid repair application requirements of various shaft parts with features such as high efficiency, low cost, green and environmental friendly etc. It can prepare a strengthened layer with extremely low dilution rate and much higher bonding strength than electroplating. It is mainly used in coal mining, machinery manufacturing, printing industry, food industry and other fields.

The machine tool is mainly composed of a base part, a rotating spindle head, a tailstock, a column part, a beam part, a laser, a powder feeder, a high-speed cladding head, and a control system. The servo bus control system is adopted, and the worktable is made of high-strength and high-quality cast iron materials to ensure the stability and precision maintenance of the machine tool. The high-speed rotating headstock adopts stepless speed change design, which is simple and quick to operate. With a follow-up disc design, it is convenient for the powder to be collected quickly. Self-developed high-power fiber laser equipped with high-speed cladding head and high-speed laser cladding nozzle can achieve high-efficiency and high-precision cladding processing of workpieces.

SFH3050

TECHNICAL PARAMETER

laser source power	6000w(optional)
powder feeder	double barrel pneumatic powder feeder
laser cladding head	with Four-point nozzle + powder divider、High-speed ring nozzle + powder divider
single layer thickness	0.1-1.5mm
laser cladding efficiency	0.3-0.6㎡/h
Substrate dilution rate	＜5%
Powder utilization	＜90%
control system	KND
driving system	KND
Effective itinerary (support customized)	X-500mm Y-500mm Z-3000mm C-360° continuous rotating
diameter of the chucks	φ500mm(Three-jaw self-centering)
Chuck clamping range	φ25-φ500mm
max turning diameter of the workpiece	φ800mm
max length of workpiece	3m
max loading	3t
Spindle speed	200r/min(Infinitely variable speed)
Adjustable angle of cladding head A axis (manual)	±30°
powder collecting device	Follow-up powder receiving tray
voltage	AC380V/50HZ
whole machine weight	about 6.5t

Rectangular spot laser cladding equipment

The SFH3050L series rectangular spot laser cladding machine is a laser re-manufacturing equipment independently developed by Senfeng Laser. The machine can meet the coating manufacturing and rapid repair application requirements of shaft parts of various specifications. It has high efficiency, low cost, and environmental protection. Features: It can prepare a strengthened layer with extremely low dilution rate and much higher bonding strength than electroplating. It is mainly used in coal mining, machinery manufac-turing, printing industry, food industry and other fields.

The machine system is mainly composed of a worktable base, a rotating spindle head, a tail-stock, a column part, beam, laser system, gravity powder feeder, rectangular spot cladding head, and professional CNC system. The servo bus control system is adopted, and the worktable is made of high-strength and high-quality cast iron materials to ensure the stability and accuracy of the machine. The high-speed rotating head-stock adopts CVT system, which is simple and quick to operate. It has a follow-up powder collection tray design, which is convenient for quick powder collection. High-power fiber laser equipped with rectangular spot laser cladding head and gravity powder feeder can achieve high-efficiency and high-precision cladding processing of work-pieces.

SFH3050L

TECHNICAL PARAMETER

laser source power		6kw (optional)
Powder feeder		Gravity powder feeder
Cladding head		Copper mirror rectangular cladding head
Single layer thickness		0.2-2mm
Deposition efficiency		0.3-0.6㎡/h
Control system		KND
Driving system		KND
Effective stroke(customizable)		X-500mm Y-500mm Z-3000mm C-360° continuous rotating
Headstock(customizable)	Chuck diameter	φ500mm(three claw self centering)
	Chuck clamping range	Φ25-φ500mm
	Maximum rotation diameter of workpiece	Φ800mm
	Maximum length of workpiece	3m
	maximum payload	3t
	Maximum spindle speed	40r/min(Infinitely variable speed)
Powder collection device		Follow up powder tray
Supply voltage		AC380V/50Hz
Machine weight		About 6.5t

Robot laser cladding workstation

The robot laser cladding workstation is a large-scale laser remanufacturing equipment independently developed by Senfeng Laser based on industrial six-axis robots. The equipment is mainly composed of six-axis industrial robots, horizontal rotary table, two-axis positioner, robot walking axis, laser source,powder feeder, laser claddding head and man-machine interface control system. Up to 20000w fiber laser can be equipped. The whole machine system is stable, simple to operate, easy to maintain, and can be used for multiple purposes in one machine, and can realize the cladding of shaft surfaces, curved surfaces, and special-shaped parts.

SFR6063

TECHNICAL PARAMETER

laser source power	6kw(optional)	
robot	model	M-20iD/25
	arm span	1831mm
	load	25kg
	repeat positioning precision	±0.02mm
	travel of robot walking axis	4000mm
horizontal rotary table	max loading (with rollers)	15t
	max diameter of workpiece	1500mm
	Maximum weight of workpieces that can be loaded (without roller)	3t
	spindle speed	150 RPM
	max workpiece length	5000mm
two-axis positioner	load	500kg
	a-axis max rotating speed	24 RPM
	c-axis max rotating speed	37 RPM
	Deflection angle	≤±120°
	Four-jaw single-action chuck	Φ500mm
powder feeder	double barrel pneumatic powder feeder	
laser cladding head	Four-point nozzle + powder divider、High-speed ring nozzle + powder divider	

Mobile robot laser cladding machine

SFMR02

Based on the six axis industrial robots, SENFENG independently developed the SFMR02 series of laser cladding work station. This whole working station system is highly integrated with robot, powder feeder and control units in a compact layout, which makes it easy to move away, superb at offering filed repair solutions. It can greatly reduce the machine downtime and make the repair fast and efficient. The system is simple to operate, which can be used for multiple purposes and realize the laser cladding for normal shaft rollers, flat work-pieces, curved face and other special-shaped parts.

TECHNICAL PARAMETER

laser source power		6kw (optional)
Powder feeder		Double cylinder pneumatic powder feeder
Cladding head		High speed laser cladding head
Robot	Model	M-10iD/12 (M-20iD/25)
	Arm Span	1441mm (1831mm)
	Max Loading	12kgs
	Repeated Positioning Accuracy	+/- 0.02mm

INDUSTRY APPLICATION

Coal Industry

Metallurgy

Petrochemistry

Electric Power

Mould Industry

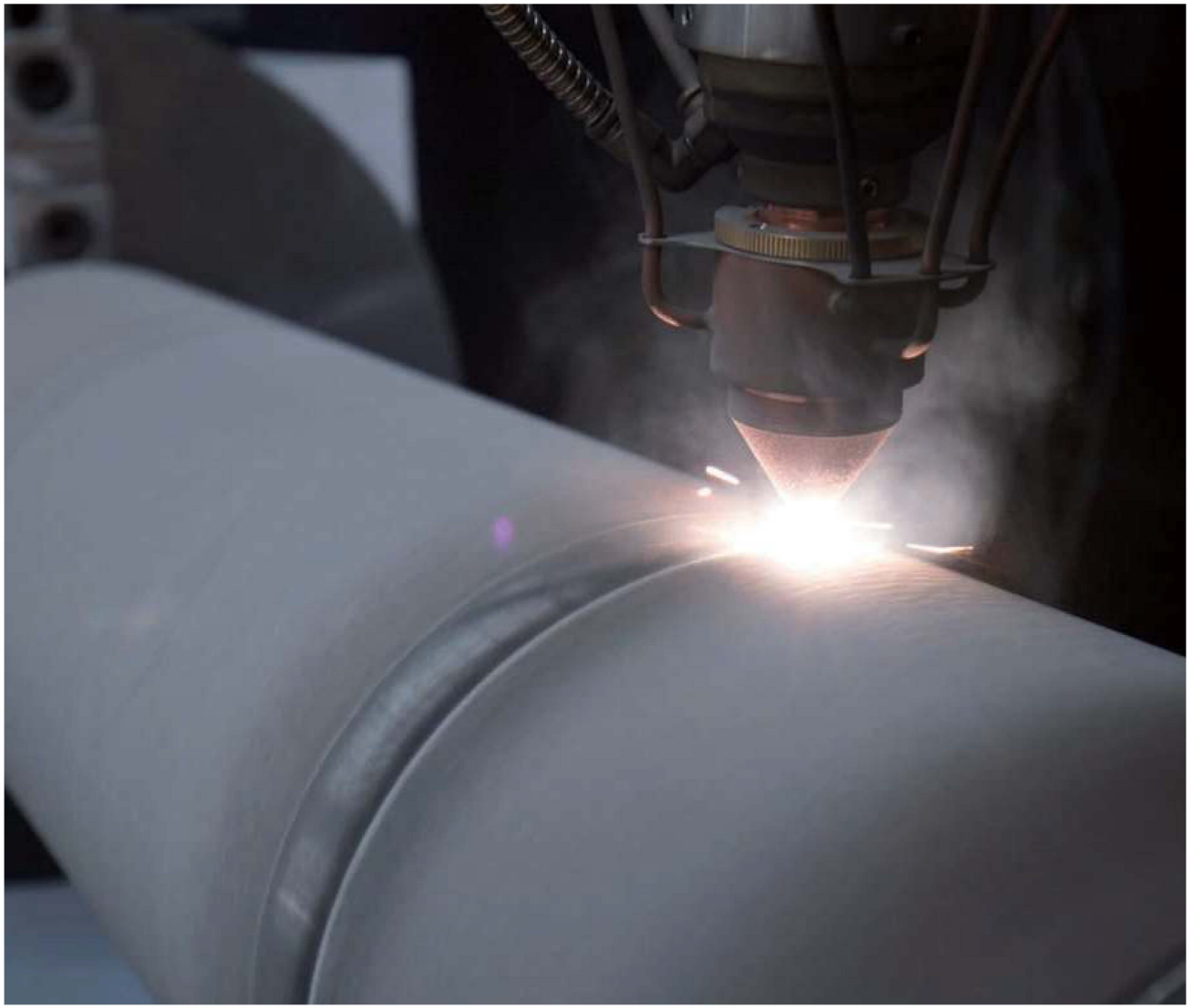
Construction Machinery

Rail Transit

Shipping Equipment

Aerospace

Coal Industry



Technology Applications

Laser surface treatment and remanufacturing technology is widely used in the coal industry. It can realize the repairing and remanufacturing of hydraulic support cylinders, scraper grooves, picks, worn shafts, seal sleeves of roadheaders, high-speed shafts of coal mining machines and gears .

Laser cladding can also be used for laser strengthening of various shafts such as gears, ring gears, hammer seats and cranks.

Coal machine Column

Reduction Gear

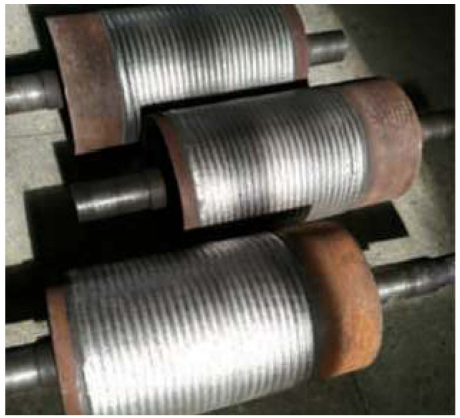
Metallurgy

Technology Applications

Applications of laser cladding in the metallurgical industry: repairing and strengthening

- Roll repairing and strengthening;
- Repairing of wear, shingling and cracks of various shaft parts like Conveyor Roller;
- Repairing and strengthening of various high value-added large, medium and small gear parts in the metallurgical industry;
- Repairing of high-pressure and high-speed fan blades.

Laser cladding pinch roller

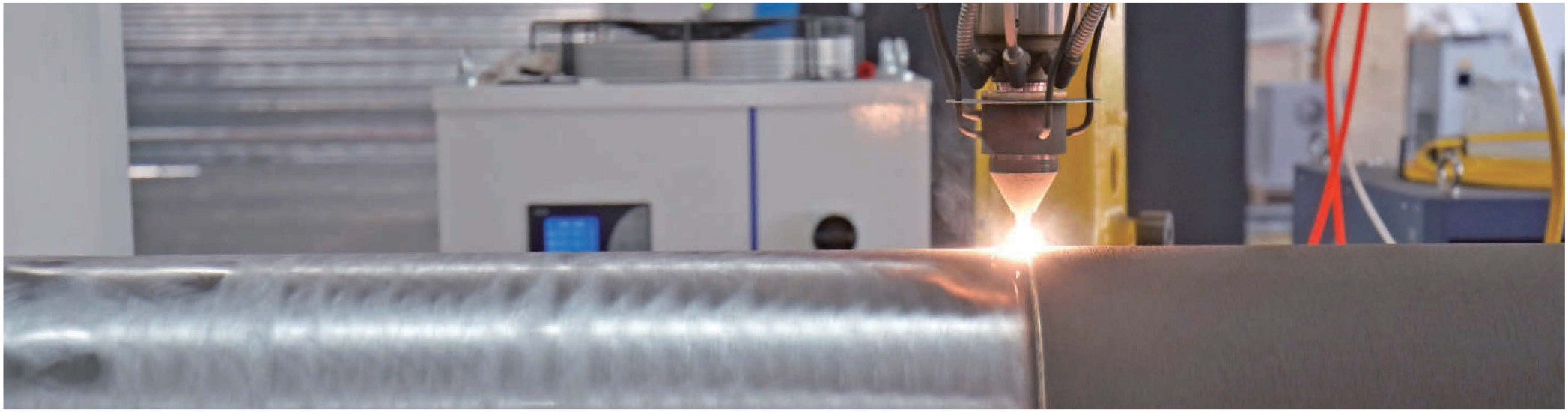


Compared with traditional surfacing repair, the steel volume of parts after laser cladding repair has been increased from 15,000 tons to 200,000 tons

In traditional arc welding, the coating life is short and cracks are easy to appear;
After laser cladding, the coating is resistant to high temperature, abrasion and corrosion, and its life is extended to several times.

Examples of laser cladding repair of various parts

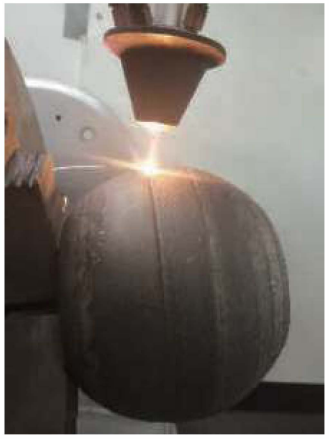
Petrochemistry



Technology Applications

Surface treatment of drilling tools, pumps, valves, and ball valves improves wear resistance, corrosion resistance, and peel resistance.

Globe Valve

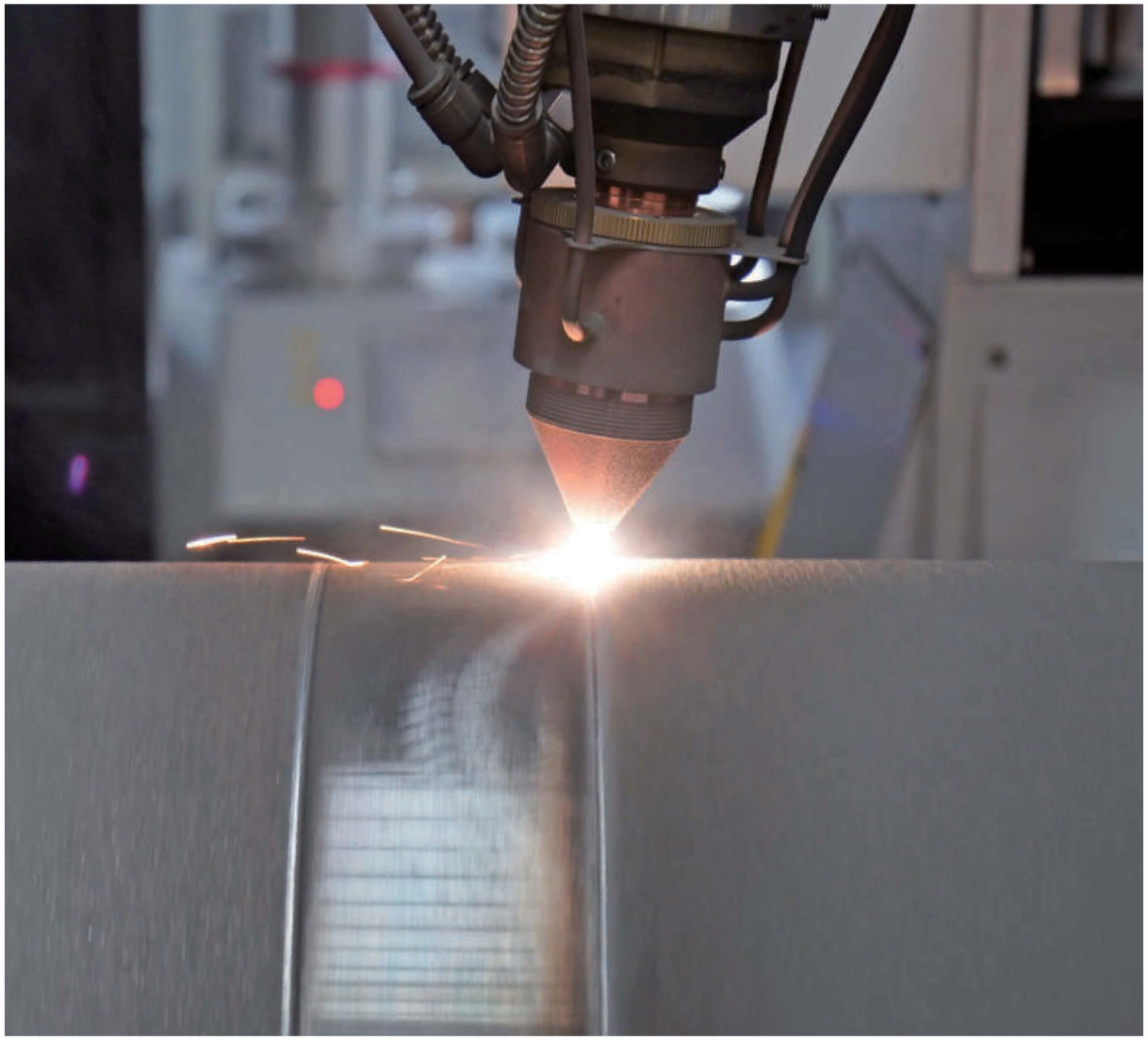


Non-magnetic Collar

Connecting Shaft Of Oil Drilling Rig

High Pressure Valve


Electric
Power



Technology Applications

Compressor Rotor

Gear Shaft

Boiler Tube

Turbine Rotor

Fan Rotor

Compressor Screw

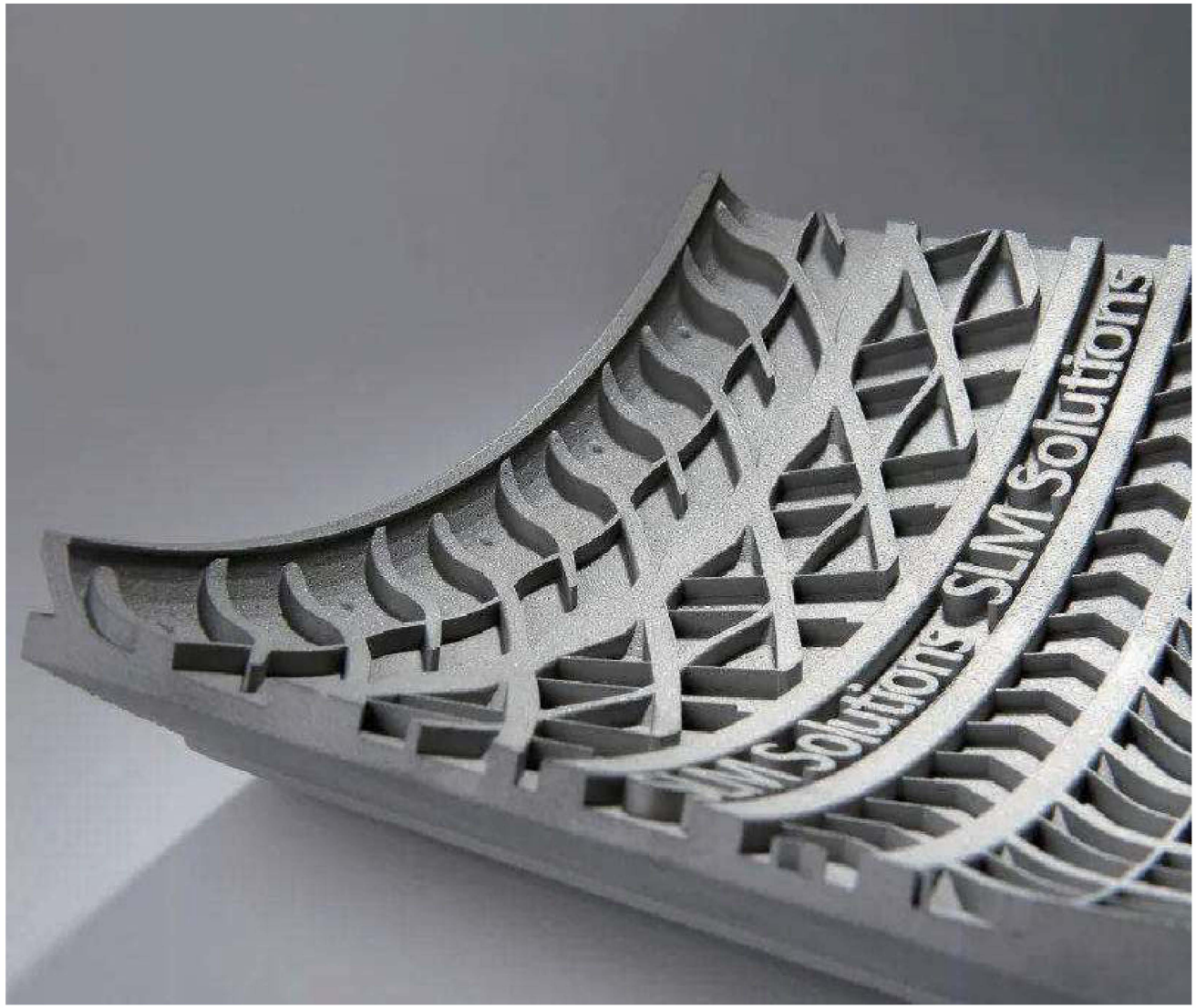
Mould Industry

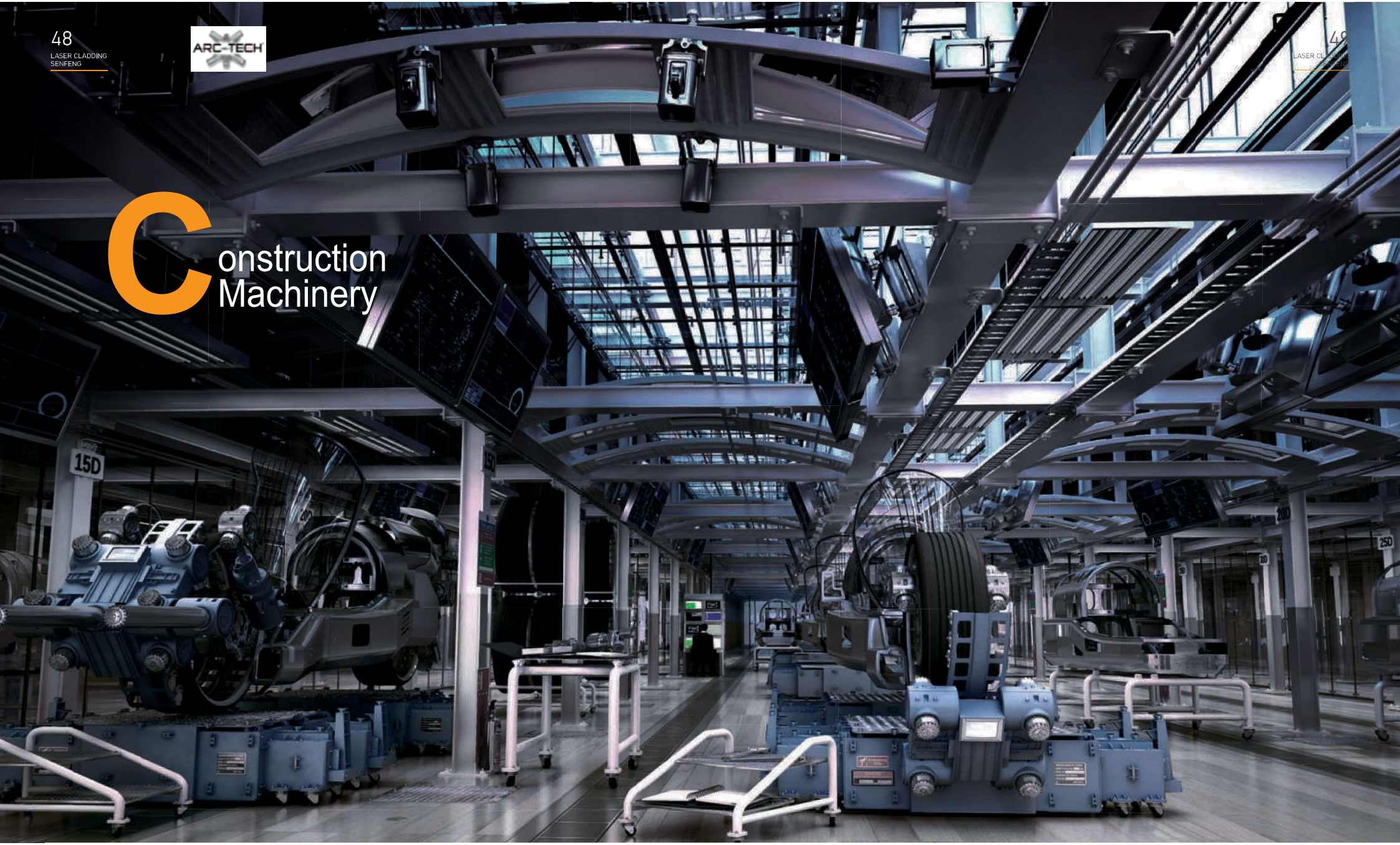
Technology Applications

Injection Mould

Stamping Die

Glass Mould

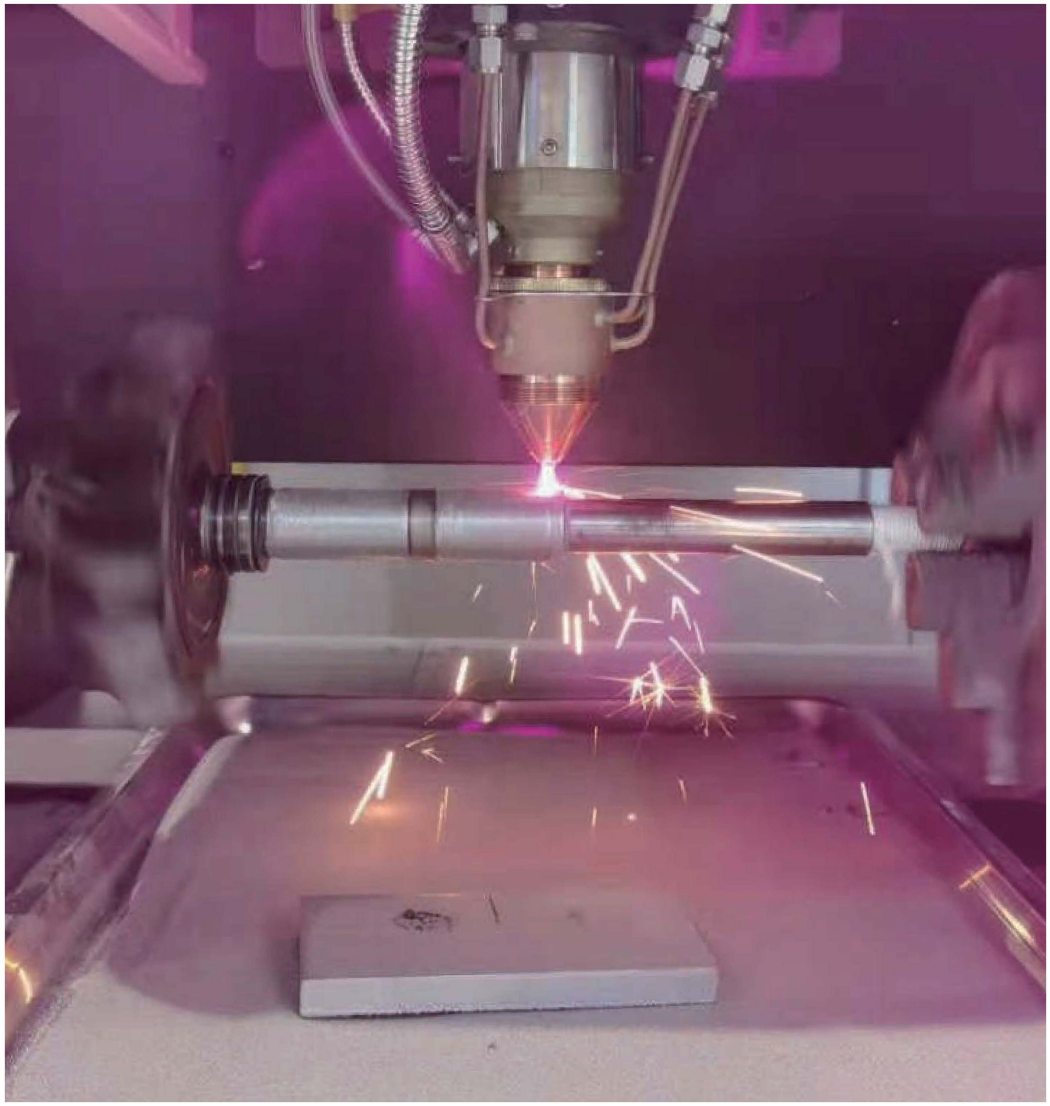




Construction Machinery

Technology Applications

Diesel Engine

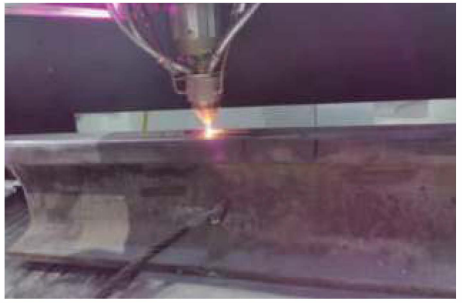


Rail Transit

Technology Applications

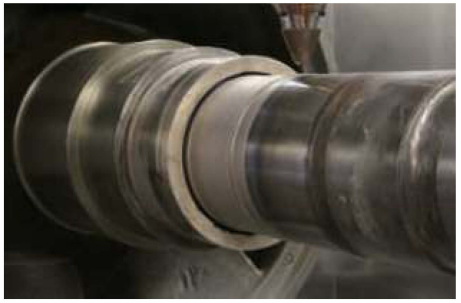
Metro Motor End Cover

Turnout Core



Railway Track Surface

Rotor shaft Of Smart Rail Motor



Shipping Equipment

Technology Applications

Cylinder Head

Plunger

Engine Crankshaft

Inner Bladder

Valve

Anchor Shaft

Aerospace

Technology Applications

Blisk

The blisk of an aero engine is a key component of an aircraft. It is easy to wear after being successfully used, and it is also prone to cracks and failures at both ends, leading to scrap. The use of laser cladding additive manufacturing technology can well control deformation and achieve repair accuracy that cannot be achieved by traditional surfacing welding methods. In addition, it can achieve direct molding in a short time, saving costs and improving production efficiency in large procedures.

Serrated Crown

In order to improve the service life of the turbine blades, the contact surface is surface-enhanced, and laser cladding is used to increase the wear-resistant layer. Compared with traditional repair and strengthening methods, laser cladding has the advantages of concentrated energy density, small heat-affected area, small deformation, precise controllability, and easy automation. Therefore, laser cladding can be used to strengthen the surface of new turbine blade crowns and repair failed blades. It's the preferred option.

Casing

Aircraft engine casings often cause huge economic losses due to material defects or damage during use, as well as process-ing scrap during traditional repairs. The casing materials include titanium alloy, nickel-based superalloy, precipitation hardening stainless steel, etc. The laser cladding can use the same material powder as the matrix.

Single Crystal Blade

With the development of single crystal materials to make blades, this poses certain challenges to traditional manufactur-ing processes. How to use laser cladding technology to achieve single crystal repair and direct molding has become a research hotspot in the field of high-end manufacturing. Laser cladding can ensure the properties of single crystals and avoid the formation of miscellaneous crystals during the repair and molding process.

High Vortex Blade

The use of laser cladding additive manufacturing can accurate-ly repair turbine blade wear and fatigue. At present, in the international aviation industry, laser cladding is gradually taken as the industry standard for repairing important components, and laser cladding occupies an absolute advantage in perfor-mance and efficiency.

Compressor Blade

Airplane engine compressor blades are high-temperature, high-pressure, and high-speed rotating parts. The working conditions are relatively harsh. The blade tip part is prone to cavitation. If wear exceeds a certain amount, it will fail, reduce the compression ratio, and shorten its service life. Part repair requires no excessive heat input and no large-area deforma-tion. As a repair method of this part, laser cladding has an irreplaceable position.

LASER QUENCHING

Laser surface heat treatment is also called laser quenching. It refers to the application of laser to heat the metal surface above the phase transition point. As the material cools, austenite turns into martensite, which hardens the surface of the material, while the corresponding pressure remains in the hardened layer, thereby increasing the surface fatigue strength.

Laser hardening technology can harden the surface of various guide rails, large gears, cylinder inner walls, molds, shock absorbers, rolls and other parts. Suitable for medium carbon steel, high carbon steel and cast iron.

3D PRINTING

Our company's large-scale powder feeding laser 3D printing equipment uses core components with independent intellectual property rights (such as laser heads, powder feeders, process control software, etc.). The results have been widely used in automobiles, ships, molds and other industries. Of end users have provided hundreds of sets of metal laser additive manufacturing equipment. Senfeng Laser has become the core supplier of laser additive manufacturing equipment in China.

Aumentar Productividad ... REDUCIR COSTES DE PRODUCCION