Laser Cladding for the Drilling Industry

Task

The tools used in the oil and gas drilling industry suffer from severe abrasion and, because of this, have to be protected by welding wear resistant material onto the surface. Some stabilizers, used for measurement purposes, are built from non-magnetic steels, which are very difficult to weld due to the differences in elongation coefficients and resulting deformation.

Approach

The customer, Technogenia, has more than 30 years experience with anti-wear / hardfacing products and was looking for the most efficient laser cladding process to overcome the difficulties with conventional welding. The advantage of laser cladding compared to conventional hardfacing, like plasma transfer arc (PTA) welding is the reduction of heat input and reduction of the zone in which the base material and the hardfacing material are mixed. The deposition rate can be comparable and the cladding remains dense with excellent metallurgical adhesion to the base material in both techniques. However laser cladding is more precise than all other techniques.

Technogenia produces special tungsten carbide powders, Sphérotène ©. These spherical particles attain extreme hardness between 3000 HV and 4000 HV and are used in diode laser cladding by Technogenia for its customers in the oil drilling, mining, foundry, paper and other industries.

Result

Dense, 3 to 5 mm thick deposits are achieved on all weldable steels, as well as non-magnetic and stainless steels. Excellent adhesion, high precision, with an almost complete absence of porosity, limited cracking with high hardness and no deformation. The resulting surface does not require further machining in most cases.

Material: Spherical WC powders
Task: Wear Protection
Laser: LDF 4000-100 and others
Optics: Homogenous spot 3 to 6 mm, cladding nozzle
Result: Successful operation with diode lasers for more than 10 years
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