DURMAT – NIFD
Hard-facing mud motor stabilizer sleeves.

An oxyacetylene process to overlay a composite material of Tungsten Carbide enclosed in a nickel matrix is generally used to repair the stabilizer and centralizer sleeves used in directional drilling. DURMAT - NIFD wire from DURUM offers an alternative process for new and repaired tools. Not only does it solve most of the technical problems linked with the conventional method, but is also a cost-effective solution.

Conventional method: Oxyacetylene
The best materials used for repair are most often made of fused tungsten carbide in a Nickel Chromium matrix. The concentration of tungsten carbides for an optimum abrasion resistance is between 55 and 65% by weight. DURMAT - B / BK or DURMAT - NIA is successfully used in the oil field on regular type stabilizers in very abrasive formations. Several problems can occur when the oxyacetylene process is used to repair the sleeve type stabilizers.

- The oxyacetylene application requires a preheating of the entire part at 600° F. Then the overlay process itself adds heat input. This high heat input on a thin sleeve can warp the part, which then affects the threaded connection and renders the sleeve useless.

- The problem is aggravated by the low rate of deposit of those types of materials. A welder in a good working environment can apply 3 - 5 lbs. of material per hour.

- The manual application leaves a wavy type deposit that needs to be OD grinded. Sometimes after grinding, the blades show a lack of material which needs to be replaced.

Alternative method: MIG process using DURMAT - NIFD wire.

The DURMAT - NIFD wire is made of a Nickel strip formed and closed into a hollow wire. That envelope is filled with fused tungsten carbide (FTC) grains before being closed. The result is a Flux-Cored Wire for MIG application. Since it can be welded on itself crack-free, this product can be used for overlays or repairs. The deposit shows a homogeneous dispersion of fused tungsten carbide metallurgically bonded to the Nickel matrix. The major advantages of DURMAT - NIFD and the MIG process are:

- The overlay can be done with just enough preheating to take the chill and humidity out of the metal base.

- The DURMAT - NIFD Nickel strip melts at approximately 1750° F. This low melting point, together with the MIG process enables you to control the heat input in the stabilizer blades and avoid distortion of the part or the connection threads.

- Because of the low heat input, no post-heat treatment is necessary after welding.

- The rate of deposit by hand increases to 10 - 15 lbs. per hour, depending on the size of the part.

DURUM VERSCHLEISS-SCHUTZ GMBH • LINSELLESSTRASSE 125 • 47877 WILLICH / GERMANY
PHONE: +49-2154-48370 FAX: +49-2154-483778 E-Mail: info@durum.de www.durmat.com

- The repair can be fully automated at a low cost, as the setup for a straight-blades stabilizer is very easy and can be done with common equipment. Deposition rate can increase up-to 25 lbs per hour.

- The overlay thickness is more uniform than with an oxyacetylene application and the deposit thickness can be controlled (especially with an automatic setup). A more accurate estimate of the thickness can be made and less time is spent on the grinder.

EXAMPLE: New sleeve with 4 straight blades 16" x 2"; final deposit should be 1/16"per blade

OXYACETYLENE:

Density of material: 0.39 lbs./cu.in. average buildup per blade = 1/4"
Quantity of material used: 12.5 lbs.
Time for preparation,
preheating and welding: 4.5 to 5.5 hours
Estimated grinding time: 1 hour

DURMAT NIFD with MIG:

Density of material: 0.39 lbs./cu.in. average buildup per blade = 1/8"
Quantity of material used: 6.25 lbs.
Time for preparation,
preheating and welding: 1 to 1.5 hours
Estimated grinding time: ½ hour

Data may vary from one welder to another and depends on the type of tool hard-faced, but the above figures reflect an average overlay done by a workshop experienced with the applications and products.

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