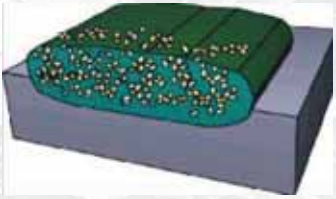
Hardbanding Process

The process of “hardbanding” drill pipe started almost 60 years ago. Hardbanding, as it was originally designed, was essentially a welding process where tungsten carbide particles were dropped into a molten weld puddle made from mild steel. The mild steel welding wire acted as a matrix to hold the tungsten carbide particles. It was an easy choice since it was readily available. The tungsten carbide used was from used tool bits that were crushed to the various sizes required.

Diagram of Hardbanding Process



Cross section of final hardband wire

However, as good as tungsten carbide is in protecting the pipe from wear, the weak link is the soft mild steel matrix welding wire (12-14 HRC). As the mild steel matrix wire wears away during the drilling process, the tungsten carbide particles fall out. For this reason, improved wires have been manufactured that are harder (55-60 HRC) and will retain the tungsten carbide particles for a longer period of time, thus the “Hardband” lasts longer when in service.

For the most part, back then all drilling was open hole or straight, and casing wear was rarely a problem. This type of hardbanding is still in use today where the Drilling Contractor is not concerned with a “Casing Friendly” wire.

Casing Friendly Hardbanding Wires;

As drilling became more complex in the late 1980’s and directional drilling became more common, new problems were encountered. The traditional tungsten carbide hardbanding still protected the drill pipe, but as the tungsten carbide particles became exposed they rubbed on the casing much like sandpaper against wood, causing premature wear of the casing. The solution to this problem led to a new grouping of wires that are called “Casing Friendly” hardbanding wires. These hardbanding wires are less damaging to the casing, while still protecting the drill pipe.