

ToughMet® Alloys

ToughMet Application: Extrusion Press Ways

H.C. Starck is a producer of a unique assortment of refractory metal powders including tungsten, molybdenum, tantalum, niobium, rhenium as well as their compounds (borides, carbides, nitrides, oxides, silicides, sulfides).

Reliable operations of an extrusion press are essential for a rod or tube mill.

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COMPANY OVERVIEW

H.C. Starck's Coldwater, Michigan location began manufacturing in 1958 and played an essential role in using the arc cast process. This process is still used to melt the highest quality molybdenum ingots. In the mid-70s, a 5,500-ton capacity horizontal extrusion press was installed for extruding arc cast molybdenum ingots. Through the years, the press has been expanded in scope to provide toll extrusion services for manufacturing a wide variety of shaped metal alloys.

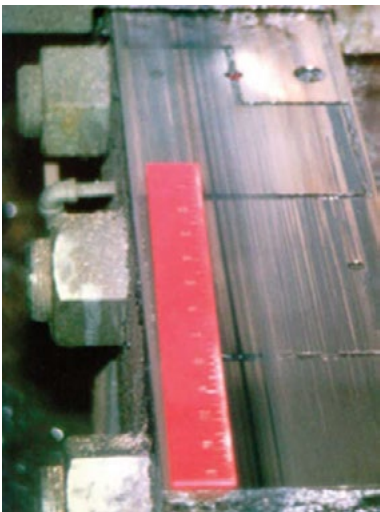
Today, H.C. Starck provides molybdenum powders, extrusion services and molybdenum wrought bars for the glass melting, medical diagnostic, vacuum furnace, electronic and aerospace markets.

CHALLENGE

In H.C. Starck's extrusion press, its 30,000-pound hardened steel container holds the billet against the die during the extrusion process and approximately 300 times per day, the container slides along the press ways, allowing operators to lubricate, clean and change the die between extrusions. The H.C. Starck team noticed that the press ways that support the container were frequently the short lifetime maintenance item in the machine. As a result, they began searching for a way to increase uptime by reducing wear and extending the life of the ways.

SOLUTION

To combat the wear problem, H.C. Starck replaced the C95400 container ways with ToughMet 2 CX90 alloy. Fifteen months after installation, no evidence of wear was found. ToughMet alloy lasts at least twice as long as C95400, saving about one day per year in lost production. "We've been using ToughMet alloy for about four years and have full confidence it is doubling our maintenance interval," said Jim Wodyka, Extrusion Process and Development Engineer for H.C. Starck. "ToughMet alloy has prevented the container ways from being the short lifetime maintenance item."



ToughMet® alloy ways provide better wear resistance & less friction as compared to aluminum bronze.

TOUGHMET®

"ToughMet's ability to perform in harsh environments has been extremely impressive"

Excessive erosion of wear pads can lead to misalignment of the press, resulting in further wear or tooling damage.



Adding to the already harsh environment in the H.C. Starck plant is the use of a high-temperature lubricant, such as graphite and powdered glass, which can fall and solidify as a particulate on the ways causing abrasive wear in softer materials. These extreme conditions have been no match for ToughMet alloy. "ToughMet alloy's ability to perform in harsh environments has been extremely impressive," adds Wodyka.

ToughMet alloy is a spinodally hardened copper-nickel-tin alloy that combines high strength, lubricity and wear resistance under severe loading conditions. In comparative sleeve bearing tests against a hardened steel shaft, ToughMet material shows unprecedented performance for a metallic bearing material.

TOUGHMET ALLOY REDUCES MAINTENANCE AT MATERION FACILITY

After documenting the success of ToughMet alloy on the extrusion press at H.C. Starck, it was installed on Materion's own extrusion press in Elmore, Ohio. The die slide is supported by wear pads, which push the slide back and forth during extrusion. These wear pads were originally made from C95900 (aluminum bronze) and would wear about 0.015" – 0.020" every six months, requiring that the die slide be raised to compensate for the wear. Since replacing the aluminum bronze with ToughMet alloy, the wear pads have already lasted at least twice as long (at the time of publication) and are still going strong. "A typical shutdown for preventative maintenance takes at least three days," said Jim Stein, Production Supervisor at Materion's Elmore plant. "We are essentially eliminating our six-month shutdown by analyzing the alignment once a year instead of twice and have increased our capacity by 180,000 pounds per year."



Rod and tube mills now use ToughMet® alloy in down stream components like formking rolls, guide bars and pivot bushings.

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