General Magnaplate Corp.

CASE STUDY

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Spyraflo Triples Life of Crimping Tool with Magnagold Coating

By Corey Wesnitzer, General Magnaplate Corp.

Understanding the consequences of machinery failure is a given for Spyraflo,a bearings manufacturer based out of Atlanta, GA, that develops custom bearing solutions designed to deliver maintenance-free, high-performance products for all industries.

Established over 45 years ago, Spyraflo produces self-clinching and self-aligning bearing solutions designed to enable design engineers to quickly and easily solve the bearing mounting and alignment challenges that are often found with more conventional bearing products. Their self-aligning nature reduces manufacturing and assembly costs, and prevents binding in the shaft -- a mode of failure familiar to many engineers.

Spyraflo's own manufacturing facility, however, was not immune to the issues of machine failure -- in particular tooling used to crimp a retainer onto the bearings which holds the assembly together. This crimping process is a central part of Spyraflo's self-clinching products, and on average the machine tooling was failing every 200,000 pieces.

Made from hardened tool steel, the machine tooling would show signs of extreme wear and excess build-up of steel and aluminum. Alan Guthrie, Project Engineerat Spyraflo, and his team, had tried a number of coating processes -- from aluminum and titanium nitride to hard chrome and electroless nickel -- without any luck.

"We had come to the point, "reports Guthrie, "that the best solution was polishing the tool parts when they were first purchased. This would help them last for about 200,000 crimp cycles, and then after refurbishment, we would get another 100,000 or so crimps before another failure. Eventually the part would have to be replaced, which would take up to two weeks so we had to keep expensive spares in our plant to avoid a two-week downtime."

"We have multiple machines in our facility and this failure was costing us thousands of dollars for every failure."

"I'll admit that when General Magnaplate approached me with a solution that I had become cynical that coating the parts would be the answer. After all, we had already been through three or four other coating processes with other vendors, without any success."

Darin Chase of General Magnaplate Corporation reports that the Company's technical applications team was familiar with this type of failure on hardened tool steel, and the recommendation was to coat a sample part with Magnagold®.

Says Chase, "Magnagold is an enhanced Titanium Nitride (TiN) Physical Vapor Deposition (PVD) coating that was developed to provide superior properties when compared to other common industry coatings such as titanium nitride, PVD or vacuum deposition. It resists wear and abrasion up to 20 times better than stainless steel -- up to the equivalent of Rc85 - to extend operating life and improve performance of all "heavy-wear" parts and tools. This made it the ideal coating solution for Spyraflo's production tooling."

With a thickness 1 to 3 microns and a uniform deposition, parts of virtually any configuration can be coated with Magnagold with a dimensional accuracy of +/-.000015". Unlike conventional Chemical Vapor Deposition (CVD) coatings, which require temperatures high enough to anneal steel (which can produce distortion) the Magnagold process employs heat as low as 400F. This permits the coating of a wide variety of materials without loss of hardness or distortion.

"The first part coated with Magnagold has crimped over 500,000 assemblies so far and we have not had to service the tool once - we haven't even polishedit," reports Spyraflo's Guthrie. "And now we intend to coat all of our crimping tools with Magnagold."

"Just like Spyraflo, it's not just technology that separates General Magnaplate, it's their application expertise too. Their technical applications team had experienced this type of failure before and they knew exactly which coating to apply to prevent further failure."