

Case Study: Steel Mill Turns to UltraOx® to Fight Corrosion

By Josh Schofield, Materials and Process Engineer, Advanced Heat Treat Corp.

Advanced Heat Treat Corp. was recently approached by one of the premiere steel makers in the southeastern United States. The steel producer was having issues with corrosion in the hot working section of their mill. The high corrosion rate was attributed to two factors; heat and process water. Heat has been well documented as increasing corrosion in humid and/or wet environments. In the steel mill, the process water also contains other additives such as algaecides, fungicides, chlorine and various others. It is believed that these additives further increase the rate of corrosion. The combination of process water and heat creates a very harsh environment that requires constant maintenance to keep the facility running 24/7. Often maintenance outages are extended or production may have to be shut down to deal with failing parts due to corrosion.

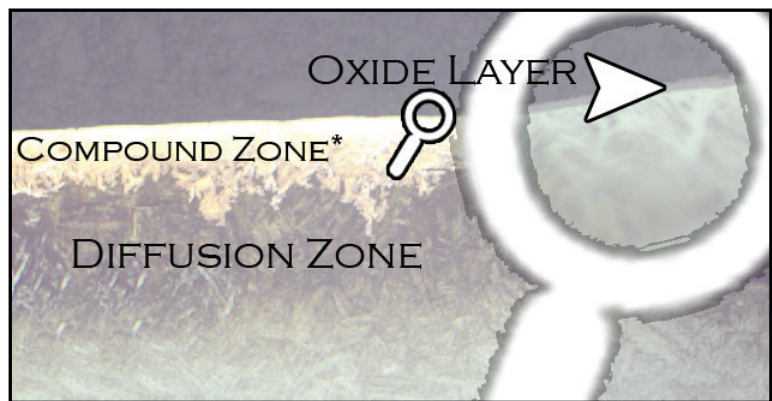
When the mill parts were tested after performing UltraOx®, there was a notable improvement in the corrosion resistance.

The gas nitriding step of the UltraOx® process created a nitrogen rich layer near the surface called the compound zone. This zone acts as a ceramic skin protecting the metal underneath from corrosion. UltraOx® then creates an oxide layer on top of the nitride layer to further protect the base metal from corrosion. Unlike some competitive processes, UltraOx® creates an incredibly thin layer of oxide on the part that is chemically bonded to the surface. The thin chemically bonded layer prevents chipping, as frequently seen with coatings or other surface treatments. Furthermore, because the layer is made of iron supplied from the part, there are negligible dimensional changes and the part can be placed directly into the production environment post-processing.



UltraOx® provides corrosion resistance for many applications

Over time, AHT expects that these processed parts will last longer and be less of a problem for the steel maker. If so, this will increase mill reliability, decrease maintenance downtime, and overall save the steelmaker both time and money. Projects are currently being examined for other sections of the mill including the melting, casting, and pickling areas as they all contain varying harsh, corrosive environments as well. For more information on UltraOx®, visit www.ahtweb.com.



The compound zone acts as a ceramic skin protecting the metal underneath from corrosion.

**Color enhanced for visibility.*

About the Author

Josh Schofield has been with Advanced Heat Treat Corp. since 2015 as the Materials and Process Engineer for the Cullman, Alabama facility. He leads the lab and quality assurance/continuous improvement efforts at the Alabama facility as well. Josh was a metallurgist for eight years at one of the nation's largest steel makers prior to joining the AHT team.



Josh Schofield



Advanced Heat Treat Corp.