

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



## The Challenge

Advanced Heat Treat Corp. (AHT) was 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.

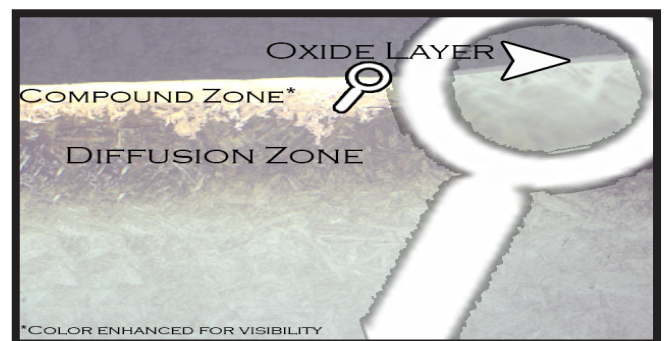
Heat has been well documented as increasing corrosion in humid and/or wet environments. In the steel mill, the process water also contains other additives such as algaecides, fungicides and chlorine. It is believed that these additives further increase the rate of corrosion. The combination of process 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.

## The Solution

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.

## The Results

AHT expects that these processed parts will last longer and be less of a problem for the steel maker. This will increase mill reliability, decrease maintenance downtime and overall save the steelmaker both time and money. Projects are 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.



The compound zone acts as a ceramic skin protecting the metal underneath from corrosion (Image color enhanced for visibility).

UltraOx® is offered in Iowa, Alabama and Michigan.  
Visit [www.ahtcorp.com](http://www.ahtcorp.com) or contact your  
AHT representative to learn more.