

Case study

Project: Automotive industry consultancy

Client: Major manufacturer of components for the automotive industry

Project objectives:

Understanding the phenomena that lead to cracking of stainless steel tubes alloyed with Titanium during hydroforming and finding ways to eliminate these non-conformities.

Initial situation:

The High losses both through the rejection of hydroformed tubes (up to 27% over various periods), through the destruction of molds but also through long downtimes before resuming production.



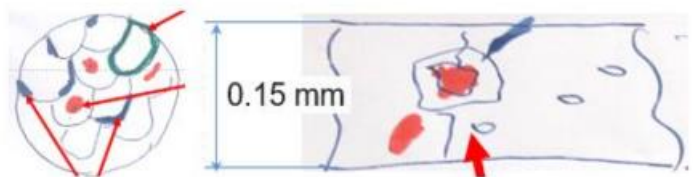
Main activities:

Analysis of manufacturing processes both in the production of tubes by hydroforming and at the supplier of raw material – cold rolled strip of stainless steel alloyed with Titanium.

Study of cracks that appeared due to causes other than those of the internal process (non-conforming welding, impacts, deformations).

Identification of potential causes that generated the situation using the Ishikawa Diagram. Metallurgical explanations regarding non-metallic inclusions in the continuous casting of slabs of steels with high Titanium content.

Study and explanation of the role of the constancy of the burr at the final strip in the welding of tubes for the hydroforming operation.



Identification of potential causes of non-uniform burr along the length of the strips of stainless steel alloyed with Titanium.

Study of the influence of straightness deviations along the strip length on the inconstancy of the longitudinal weld position of stainless steel pipes containing Titanium – the appearance of microcracks after welding and finally explosion during hydroforming.

Technical explanations for understanding the technological flow of cold rolling of stainless steels at the raw material supplier.

Results:

The causes that led to the cracking (explosion) of the tubes during the hydroforming operation were identified. The client understood the metallographic phenomena that occur in the structure of stainless steels containing Titanium.

Proposals were developed and the most effective corrective actions were found and implemented.

Following the implementation of the actions, the cracking of the tubes made of stainless steels alloyed with Titanium during hydroforming decreased considerably.