

## CORROSION IN REFINERY INDUSTRY FAILURE ATLAS

**CASE HISTORY**    n° 2        Date    April 2012

**Process: Hydrodesulfurisation  
Equipment: H<sub>2</sub>S Stripping tower**

**DATE OF INCIDENT AND/OR INFORMATION:** January 2010

**NATURE OF THE INCIDENT :**

Cracking initiated in HAZ of the top plate: its length is 1.5 m.  
This equipment that originally was in carbon steel, was replaced in 2007 by a superduplex stainless steel grade due to the severe corrosion encountered.

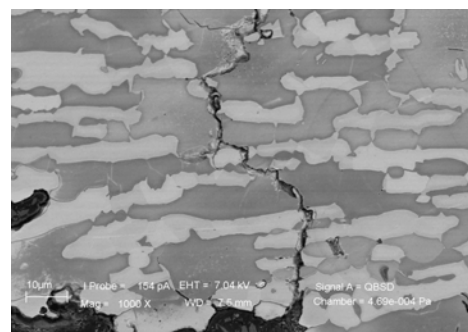
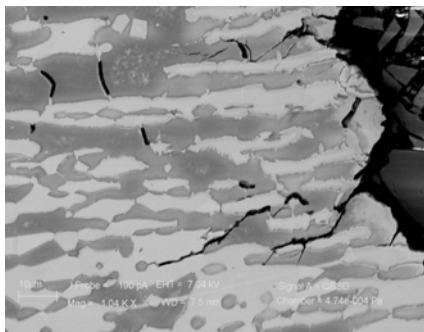
**CONSEQUENCES :**

Hydrocarbon leak outward – Stop of the equipment

**MATERIAL COMPOSITION and REFERENCES**

25-07 super duplex stainless steel (S32750)

**PICTURES AND SCHEMES :**



**ASPECT :**

cracks

**MEDIA AND OPERATING CONDITIONS:**

Condensation / stripping of cold reflux (50 ° C - 10 to 20 ppm chloride) arriving in an area at 190 ° C.  
Chloride concentration leading to stress corrosion started in the weld HAZ of the upper plate.  
Other aggravating cause mentioned: thermal fatigue due to condensation / repeated stripping.

**TIME TO DETERIORATION :**

3 years



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ANSWER

**TYPE OF CORROSION :** Chloride stress corrosion cracking  
**API 571 CLASSIFICATION:** 4.5.1

**CAUSES :**

Chloride stress corrosion cracking

**REMEDY :**

Improved separation of water in the top.

Partial replacement of equipment.

Superduplex stainless steels should be avoided for this type of service. Alloys with high nickel content (eg Incoloy 625) should be preferred.

**PUBLICATION - TECHNICAL REPORT:**

**BIBLIOGRAPHIC REFERENCES :**