

Fabrication Industry

CASE STUDY

www.tcradvanced.com

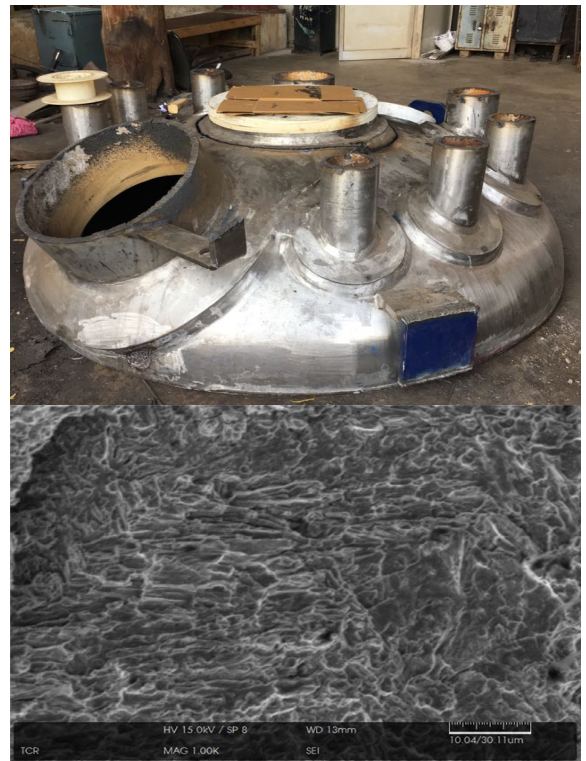
Key Facts

Sector Fabrication Industry

Category Investigation of Top Dished End

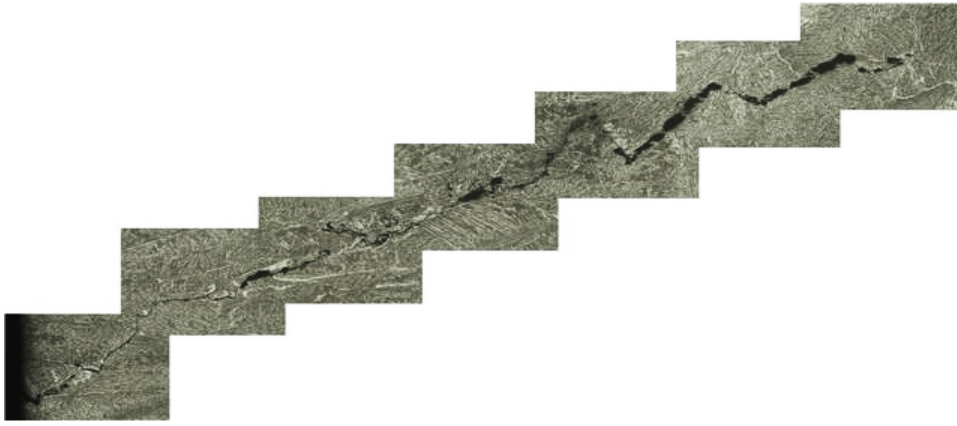
Problem

- Duplex stainless-steel top dish end#180249 of the pressure vessel was found to develop crack during hydro test.
- Initially 40- and 20-mm thick plate material was received for equipment. Top and bottom dished ends were welded with 2 long seams under approved PQR without solution annealing.
- The welds were found internally sound by hot pressing. Wrinkles were noticed in bottom dish near long seam. But it cracked during cold pressing when repair was attempted.



Diagnosis

- The dish end failure from the weld joint is because of the high level hydrogen introduced during the welding.
- The hydrogen into the subject weld joint is found to be 38 ppm and is considered to be very high.



	Hydrogen (ppm)	Oxygen (ppm)
R F pad weld	5.5 ± 0.6	15.5 ± 3
Dish end seam weld	36.5 ± 1	475 ± 2p

Solution/Recommendations

- The metallurgical condition of parent metal and all the weld joints is found to be normal. The only exception is the long seam weld joint whose impact values at -40°C are lower.
- Crack initiation is in brittle mode occurring into the long seam weld joint on dish end.
- The reasons for hydrogen build up in long seam weld joint on dish end requires to be looked into based on welding process parameters and consumables used.
- Similar welding done on other components needs evaluation and concern.

Contact Us

If you are interested to learn more about TCR Advanced, please send an email to: sohel@tcradvanced.com

Mr. Sohel Vaidya

Business Development Manager