

Fertilizer Industry

CASE STUDY

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Key Facts

Sector Fertilizer Industry

Category Failure Investigation of stem with plug of LRCV 1201

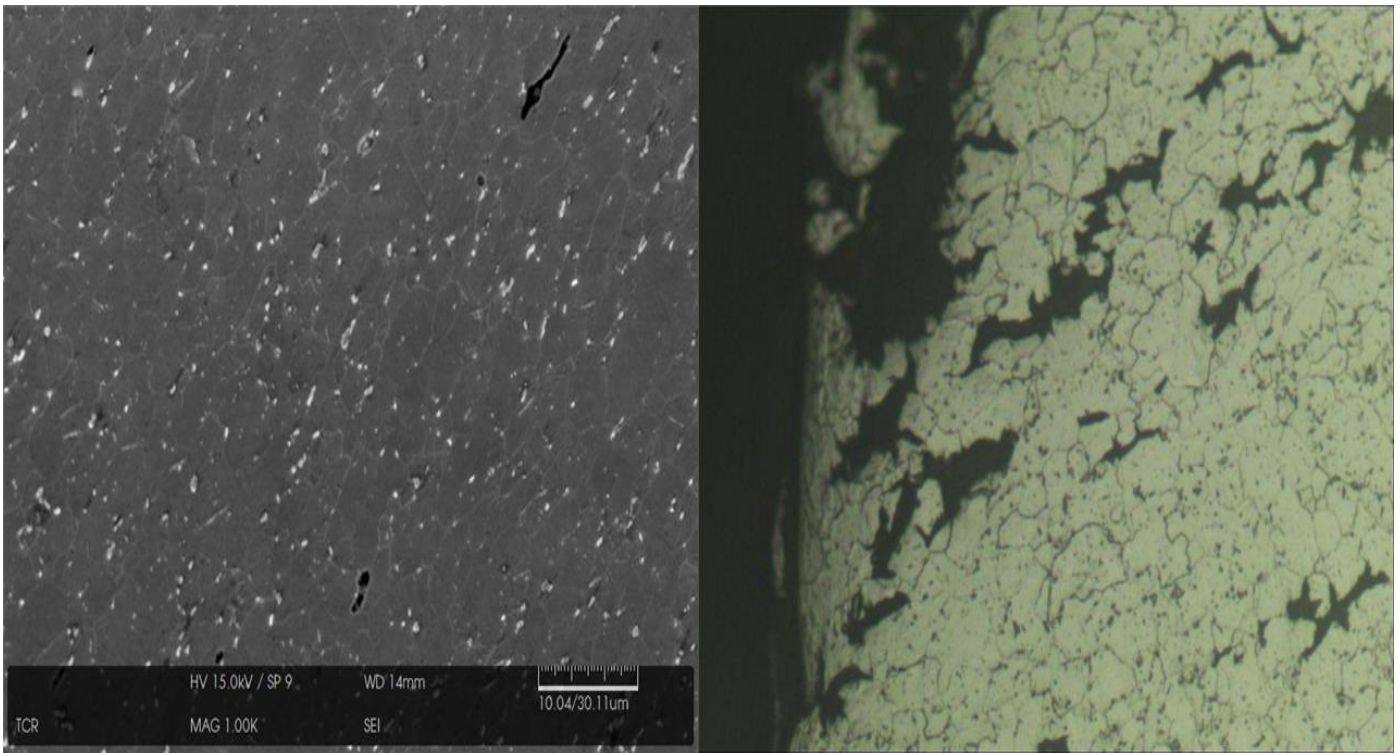
Problem

- A 4" angle level recording control valve-LRCV-1201 is located in the outlet line of H P Stripper (H-1201) in urea plant.
- The failure was noticed on 18th September, 2015 when the flow across the valve got stopped during operation.
- On inspection, we found that plug was separated from stem with fracture near radius at plug. The stem and plug are integral part.



Diagnosis

- The stem metallurgy is meeting with OEM specification.
- Change in MOC has not helped to solve the problem.
- Stem is exposed to erosion on carbamate facing side.
- The stem projection in carbamate flow path could be resulting in vibrations and hence cyclic stresses in stem would get exponentially aggravated with stress concentration area at radius zone having coarse machining marks and initiated cracking.
- The stem has fractured under mechanical fatigue mode and failed from vulnerable location.



Solution/Recommendations

- Design expert to be consulted for valve design review to overcome the possible failure modes explained in this report. Flow impingement of the stem needs to be eliminated with design improvements.
- The design expert to review if it would help by providing a chamfer on the valve seat which would convert the present line contact between plug and seat to a surface contact. OEM to be contacted.
- The design expert to review the flow direction for possibility of reversal; changing the flow direction from plug bottom that may aid in reducing vibrational loading and direct impingement of carbamate on stem.

Contact Us

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

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