



Bangalore Chapter

ASM International Bengaluru Chapter

Cordially invite you to ASM Online Technical Talk

Titled

“Failure Analysis of AISI 440C Strand Dies used in Twin Screw Extruders during Polymer Compounding”.

BY

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*Date & Time: 27.11.2021, Saturday at 5:00 pm IST
On-Line Tech Talk on: RingCentral Platform*

RING CENTRAL ONLINE MEETING LINK

<https://meetings.ringcentral.com/j/1490142803>

More Info about RingCentral Meeting Online Platform Contact: Nataraj J R @ 09901150505

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ABSTRACT

Failure Analysis of AISI 440C Strand Dies used in Twin Screw Extruders during Polymer Compounding

In view of excellent wear and corrosion resistance, AISI 440C Martensitic Stainless steel finds wide use as Dies in Twin Screw Extruders in Polymer, Food and Pharma applications, especially when either additives, which could be corrosive, are added to aid compounding of polymers or moisture and/or free radicals are present in the processing material. Two AISI 440C Die Plates part of Strand Die Assembly in a $\phi 40$ mm size Twin Screw Extruder abruptly cracked during operation in succession disrupting regular production with the second failure occurring after about two years of the Extruder in service. While visual examination of the failed Die Plates showed presence of surface / sub-surface cracks and marks of corrosion, the sectioned Die Plate revealed multiple internal cracks. The hardness survey on the failed Die Plates confirmed values between 30 and 36 HRC, which are about 20-25 HRC lower than the hardness measured in as-supplied condition. Macro-examination of the sectioned Die Plate revealed multiple micro-crack origin locations together with strong evidence of corrosion. The microstructural examination showed carbide network along grain boundaries in a matrix consisting of tempered martensite and revealed intergranular fracture. Fractographic observations using Scanning Electron Microscopy on the cracked Die Plate clearly revealed segregation of fine carbides along crack boundaries. Based on detailed analyses, which included site data collection and investigation, the failure of Die Plates was attributed to Stress Corrosion Cracking. Finally, recommendations were proposed to prevent recurrence of such failures in service.

About the Speaker

Mr. Vijay Srinivas is an Engineering & Management professional with over 35 years of experience in the fields of Power Generation, Aerospace and Automotive Engineering in Manufacturing, Technology Development, Global Sourcing, Engineering Services and Materials Science. His core competencies include Strategic Planning, Acquisition Integration, Six Sigma, New Product Development, Enterprise Risk Management, Global Sourcing, Change Management, Materials Science and Total Quality Management. He is currently working as Director – Materials Development & Business Excellence, STEER Engg, Bangalore since Dec'18 and prior to STEER Engg. he was the Vice President – Quality & Business Excellence, QuEST Global Engg. Pvt. Ltd. He had also worked in GE Energy as the Technical Leader & Six Sigma BB during Nov' 98 – Oct'04.

Vijay's Professional Qualifications include Certified Six Sigma Black Belt in DMAIC & DFSS by General Electric and Certified Lead Assessor for ISO 9001 Quality Management Systems. He has undergone Professional training on Assessment for Business Excellence based on EFQM Excellence Model and Strategic Planning both conducted by CII, Program for Quality Management (PQM) conducted by Association of Overseas Technical Scholarship (AOTS), Tokyo and Design For Six Sigma (DFSS) - Black Belt Program conducted by Jack Welsh Tech Center, GE and Advanced Leadership Performance [ALP] conducted, GE Crotonville, U.S.A. He has a Master's degree in Metallurgical & Materials Engineering, from University of Texas, El Paso, U.S.A. and a Bachelor's degree in Metallurgical Engineering from IIT, Madras.

Time	Program Outline
4.40-4.45 pm	Login in Through RingCentral application
4.45-5.00 pm	Networking with participants and speaker
5.00-5.02 pm	Welcome Speech by Chairman
5.02-5.04 pm	Introduction of the Speaker by Secretary
5.04-6.10 pm	Talk by Speaker
6.10-6.20 pm	Q & A
6.20-6.25 pm	Vote of Thanks by Secretary and Log off