Stress Corrosion Cracking of Pipelines

Y. Frank Cheng

DESCRIPTION

Explains why pipeline stress corrosion cracking happens and how it can be prevented

Pipelines sit at the heart of the global economy. When they are in good working order, they deliver fuel to meet the ever-growing demand for energy around the world. When they fail due to stress corrosion cracking, they can wreak environmental havoc.

This book skillfully explains the fundamental science and engineering of pipeline stress corrosion cracking based on the latest research findings and actual case histories. The author explains how and why pipelines fall prey to stress corrosion cracking and then offers tested and proven strategies for preventing, detecting, and monitoring it in order to prevent pipeline failure.

*Stress Corrosion Cracking of Pipelines* begins with a brief introduction and then explores general principals of stress corrosion cracking, including two detailed case studies of pipeline failure. Next, the author covers:

- Near-neutral pH stress corrosion cracking of pipelines
- High pH stress corrosion cracking of pipelines
- Stress corrosion cracking of pipelines in acidic soil environments
- Stress corrosion cracking at pipeline welds
- Stress corrosion cracking of high-strength pipeline steels
The final chapter is dedicated to effective management and mitigation of pipeline stress corrosion cracking. Throughout the book, the author develops a number of theoretical models and concepts based on advanced microscopic electrochemical measurements to help readers better understand the occurrence of stress corrosion cracking.

By examining all aspects of pipeline stress corrosion cracking—the causes, mechanisms, and management strategies—this book enables engineers to construct better pipelines and then maintain and monitor them to ensure safe, reliable energy supplies for the world.

ABOUT THE AUTHOR

Y. FRANK CHENG, PhD, is Professor and Canada Research Chair in Pipeline Engineering at the University of Calgary. Dr. Cheng has published over 115 journal articles dedicated to corrosion, pipeline engineering, and materials science. He is a member of the U.S. National Academy of Sciences Committee for Pipeline Transportation of Diluted Bitumen; the Editorial Board of *Corrosion Engineering, Science and Technology*; and the Board of Directors of the Canadian Fracture Research Corporation. Dr. Cheng is also Theme Editor of Pipeline Engineering for the *Encyclopedia of Life Support Systems*, developed under the auspices of UNESCO.

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