



UC Berkeley

Geosystems Engineering

Wednesday Lecture Series

Wednesday, 9 April 2025
1:10-2:00 PM
Lecture Room: 406 Davis

Analysis of Distributed Strain in Pipelines Subjected to Fault Movements

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Pipeline systems are critical for the transportation of energy and resources but are vulnerable to significant strain during geohazard events such as fault movements. Traditional pipeline design focuses on limiting peak strain to within acceptable limits. However, this approach has limitations, as pipeline failure mechanisms can evolve throughout the strain development process. This study examines the distributed strain in pipelines using analytical solutions, 2D finite element modeling, and 3D continuum finite element modeling to highlight the importance of transitioning to a distributed strain approach. Furthermore, advancements in modern monitoring technologies, such as fiber optic sensing, enable real-time field measurements of distributed strain. These data provide valuable insights into pipeline deformation and offer early warnings of potential failures, enhancing the reliability and safety of pipeline systems.