

Geomechanics Integration

Don't get stressed about strain

TRACS Training Master classes

Master classes are designed for people who want to update or refresh on specific topics without having to spend a week out of the office. The classes are led by experts in their respective fields and provide an opportunity for learning, inspiration, conversation and networking.

Designed for:

Geophysicists, geologists, petrophysicists, reservoir engineers and production engineers.

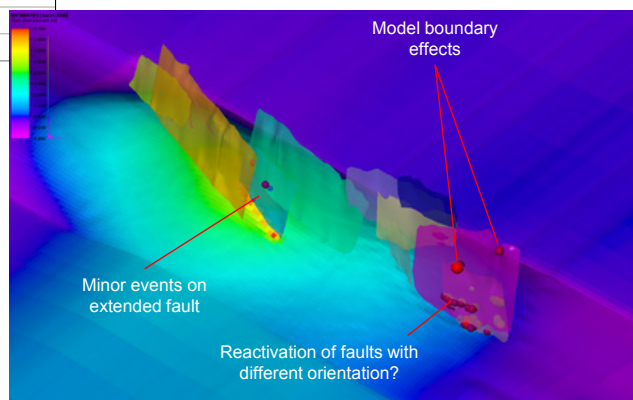
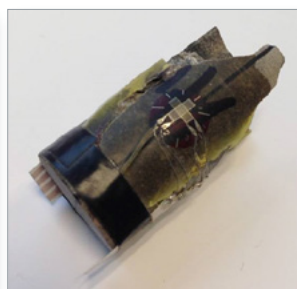
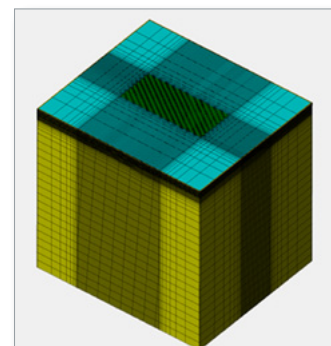
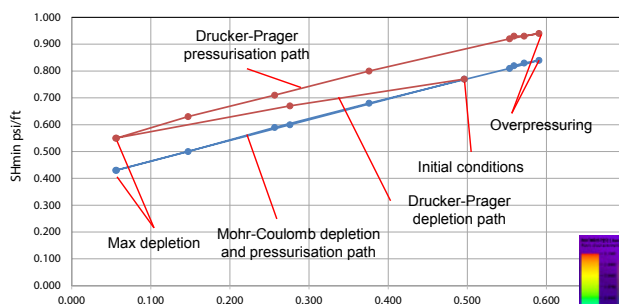
Duration:

3 Days

Reservoir geomechanics (or rock mechanics) can mean many things to many people and these different perceptions can lead to gaps in knowledge and misunderstanding between different disciplines. In this course we start with an introduction to basic geomechanics concepts and processes to provide a level playing field. We also provide a description of how to measure in-situ stresses and rock mechanics properties.

A key focus of the course is on how this geomechanics knowledge can be applied in the hydrocarbons industry to improve the integrated understanding and management of reservoirs. A brief overview is provided on geomechanics for drilling wells and designing completions and stimulations. More emphasis is given to the role of geomechanics in reservoir modelling and production / injection operations and how these processes relate to field exploration, appraisal and development.

Exercises are provided at various points to consolidate understanding of the key elements. These are varied depending on the course participant experience and learning requirements.



Geomechanics Integration continued

Course Content:

Theory

- Stress-Strain relationships
- Material Properties
- Mohr circles - Intact rock failure vs discontinuity reactivation
- Structural geology – natural geomechanics
- Elasticity theory
- Rock physics (acoustic wave propagation)
- Wellbore stress system

Measurement

- Stress tensor
- Pore pressure
- Elastic moduli (from well data and seismic)
- Rock strength (compressive and tensile)
- Friction angle
- Biot factor

Course Duration:

3 days

Drilling & Productivity

- Wellbore stresses & wellbore stability models (e.g. Mohr Coulomb, Modified Lade)
- Wellbore design examples (anisotropic failure, open natural fractures)
- Sand production prediction (empirical and numerical)
- Introduction to hydraulic fracture design (2D and pseudo 3D models, proppant schedules)

Reservoir Management

- 3D reservoir geomechanical model construction (well data, seismic inversion data)
- 3D Wellbore stability (trajectory screening & optimisation)
- Production effects (compaction, subsidence, fault reactivation, poroelasticity)
- Injection effects & trap integrity (caprock tensile failure, fault reactivation, poroelasticity)
- Naturally fractured reservoirs (fracture compressibility & reactivation, permeability changes)

Course Tutor



Tim Wynn PhD

Tim Wynn is a Principal Geologist and Geomechanics Specialist with over 25 years of experience in reservoir development and reserves evaluation studies, focusing on the geological and geomechanical aspects of reservoir characterisation and modelling. His recent advisory work has concentrated on Carbon Capture and Storage (CCS) in which he leverages his knowledge of geomechanics in the subsurface, consulting on several key projects which may well impact the future of the Climate Change initiative in the UK.

Tim has a PhD in structural geology gained at Imperial College, London, and is a member of the EAGE, SPE, Geological Society, London and PESGB. He has published a number of papers since 1995 on structural geology, naturally fractured reservoirs and geomechanics. He is also a technical paper peer reviewer for the EAGE and SPE.

Tim has recently been awarded roles as an industry partner in a high profile NERC: Natural Environment Research Council project related to geomechanics, and appointed to the Editorial board of the highly respected publication, Petroleum Geoscience.

Courses available from this series:

E&P Business in a Day
Uncertainty and Risk in Development
How to Make a Good Reservoir Model
Common Fallacies in Casing and Tubing Design
Reservoir Engineering Fundamentals
Field Development Planning
Geomechanics Integration
New Trends in Data Analysis
The Energy Transition in a Day
Carbon Capture and Storage (CCS)