

Geomechanics: Sand Production and Wellbore Stability

Aims

According to the Society of Petroleum Engineers, 70% of the world's oil and gas reserves are contained in reservoirs where sand production will become a problem at some point during the life of the field. Wellbore stability issues have been estimated to cost the industry US\$8 billion every year.

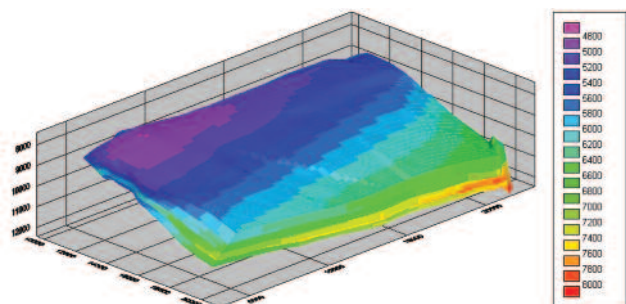
This course explains how geomechanics can help in assessing the risk of sand production and wellbore instability, through the practical integration of regional, core, well and drilling data from fields throughout the world.

Benefits

You will learn:

- how to determine reservoir and overburden stresses, their magnitudes and orientation
- how to determine rock strength on core and how strength can be predicted in the overburden and in uncored intervals
- what data are required to build and calibrate geomechanical models
- about sand failure and wellbore stability modelling

“The course exceeded my expectations. The material covered was detailed instead of the usual overview of general conceptual slide material that other training providers come up with.” Reservoir Engineer, Chevron.



Initial minimum horizontal stress distribution



Massive sand production in a field in Indonesia

Who should attend?

Drillers, production engineers, completion engineers, geoscientists and petrophysicists who wish to expand their knowledge in geomechanics and how it impacts on well construction and completion decisions.

Duration

- 2 days

Course Instructors

Lynne Morgan is Senergy's Geomechanics Manager, with over 15 years' experience in geomechanics, sand failure prediction and wellbore stability analysis.

Phil McCurdy is currently Global Technical Head for geomechanics in Senergy and has 15 years experience, specialising in sand production and control, production technology and wellbore stability.

Scott Reynolds is a Senior Geomechanics Engineer with extensive experience in geomechanical modelling, pore pressure, prediction, fault seal integrity and drilling optimisation from geomechanics.

The instructors have carried out many projects throughout the world where geomechanics have posed significant challenges in well construction and completion design. The workflows used in these projects – particularly the acquisition, analysis and quality control of geomechanics data - provide the framework for the principal course modules and field examples.

Course Description

Modules include:

Introduction to geomechanics

- what is sand failure and how does it lead to sand production?
- what is wellbore instability and how does it happen?

Basic concepts in geomechanics

- stress and strain
- rock failure mechanisms
- stress tensors

Data requirements

- stress and strength models

Rock mechanics tests

- avoiding core damage
- sidewall core issues
- UCS, TWC and triaxial tests
- Young's modulus and Poisson's ratio
- Mohr-Coulomb failure parameters
- quality control

Rock strength models

- log data sources for strength estimation
- dipole sonic logs
- core-log integration
- how you can estimate rock strength when you don't have core: generic strength models and their application

Stress regimes and stress orientation

- normal, strike-slip and reverse

Vertical stress

- density log integration

Borehole and perforation stresses

- tangential and radial stress solutions

Horizontal stresses: data sources and analyses

- LOT, XLOT, mini-frac and micro-frac
- image logs (breakouts and drilling fractures)
- sonic scanner applications
- borehole failure analysis to constrain stress
- strain relaxation tests on core

Pore pressure

- prediction methods
- effective stress concepts
- stress changes on depletion – stress path factor

Sand failure prediction

- impact of sand production on completion and facilities design
- approaches to sand failure modelling: methods and applications
- rock failure and sand production
- effects of water production on sand production
- sand management versus sand control: how geomechanics can help in formulating sand management strategies
- field examples

Wellbore stability

- stability models and their application
- how to use offset data to tune and verify stability models
- mud weight windows and what happens when you don't have them
- drilling practices for geomechanically sensitive formations
- field examples

To book this course, please contact **Sarah McPhee** - Training Co-ordinator

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