

STABView™ Technical Features (Version 2.8)

Types of Wells

- Vertical, horizontal, or deviated wells
- Offshore or onshore wells
- Single or multiple zone analyses
- * Multi-branching wells

Drilling Instability

- Evaluate instability risks as function of ECD, EMW, BHP, SG, mud density, over- or underbalance pressure
- 3D linear elastic models
- 2D elastoplastic models
- 3D passive shear failure initiation (borehole ballooning)
- Swab and surge pressure effects
- Underbalanced drilling features
- Calculate a mud density, EMW, ECD or bottomhole pressure required to achieve a tolerable instability risk, e.g., hole enlargement
- Calculate wellbore instability risks for a specified mud density, ECD, EMW or bottomhole pressure
- Calculate and display the drilling "mud weight window"
- Thermo-elastic effects due to steady-state conductive heat transfer
- Export a predicted profile of enlarged hole sizes for hydraulics optimization

Lost Circulation and Fracturing

- 3D elastic tensile fracture criterion
- Penetrating fluids (water, selected drilling and completion fluids)
- Non-penetrating fluids (cement, some muds)
- Thermo-elastic effects on fracture breakdown due to steady-state conductive or convective heat transfer
- Analyze packer and sleeve induced fractures
- Fracture toughness-based breakdown criterion (after Morita)
- Specify a critical fracture plugging aperture
- * 3D fracture link-up pressure

Sand Production and Control

- 2D elastoplastic models
- 3D linear elastic models
- Extent of horizontal well collapse (rubble fill percentage)
- Near-wellbore skin can be used as an input parameter
- Perforated, openhole, slotted liner, screen and expandable completions can be analyzed
- Cylindrical or hemi-spherical perforation cavities
- Input pressure drop across liners, screens and expandables
- First-order estimate of isotropic loading on liners or screens
- First-order estimate of borehole wall deformations

In-situ Stresses

- Biaxial stress state (2D models)
- Triaxial stress state (3D models)
- Correct stresses for reservoir pressure depletion or injection effects
- * Rotated principal stresses, e.g. salt, thrust fault stress regimes
- * Future link to AGI stress prediction software: ROCKStress™

* *New feature in development*

Planes of Weakness, Faults and Natural Fractures

- Account for the effects of ubiquitous, weak discontinuities on the risk of borehole collapse
- Mohr-Coulomb failure criterion
- Shear failure and slip tendency analysis for weak bedding planes, faults, natural fractures, cleats
- Re-opening pressure analysis for weak bedding planes, faults, natural fractures, cleats

Pore Pressure and Capillarity

- Steady-state pore pressure conditions (inflow or outflow)
- Capillary threshold pressure for OBM and pseudo-OBM
- Apparent capillary strength for weak sands
- Filter cake efficiency model for permeable sandstones
- Wall coating efficiency model for shales
- Effect of an instantaneous BHP change
- Fluid viscosity and permeability effects
- Formation damage and skin effects
- Steady-state non-Darcy flow effects for high rate gas wells and perforations
- Compressible fluid effects in the near-wellbore area
- Skin damage option for underbalanced drilling

Rock Failure Models

2D Elastoplastic Model

- Strain-weakening Mohr-Coulomb

3D Elastic Models

- Mohr-Coulomb
- Modified Lade
- Non-linear Hoek-Brown
- Tensile fracture criteria
- Passive shear failure initiation

Other Options

- Biot or Terzaghi effective stress
- * Empirical hole size effects on effective rock strength
- * Time-dependent loss or gain of rock strength

Borehole Stresses and Pressures

(As a function of radial distance)

3D Elastic Models

- Principal stresses ($\sigma_1, \sigma_2, \sigma_3$)
- Normal stresses ($\sigma_\theta, \sigma_r, \sigma_z$)
- Shear stresses ($\tau_{r\theta}, \tau_{rz}, \tau_{\theta z}$)
- Pore pressure

2D Elastoplastic Models

- Pore pressure
- * Normal and shear stresses

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Borehole Deformations and Strains

2D Elastoplastic Model for Isotropic Stresses

- Total strains
- Plastic strains
- Total radial displacements

Chemical Effects

- Osmotic pressure model for clay inhibition effects based on shale and mud activities (API RP13 specification)
- Handles many common oil-based and water-based drilling fluids
- Database of published shale water activities and membrane efficiencies for a variety of shales and fluids
- Drilling fluid activity calculator

Thermal Effects

- Steady-state conductive or convective heat transfer effects on fracture breakdown pressure
- Steady-state conductive heat transfer effects on 3D elastic borehole collapse risk
- Time-dependent thawing and hydraulics model for permafrost

Integration with Other Software

- Export text or graphics files
- Seamless integration with Microsoft Word, Excel, PowerPoint
- Import well survey data
- Cut and paste annular pressure data from WELLFLO7 and other wellbore hydraulics software
- * Run interactively with casing design, pore pressure, hydraulics and other wellbore design software
- * Interactive data exchange capabilities

Databases

- STABView case history database (optional)
- * Links to ROCKSBank™, AGI's worldwide rock mechanical and petrophysical properties database
- * Links to ROCKStress™, AGI's in-situ stress database and calculator
- * Auto-populate multi-zone analyses from external databases, e.g., Peloton's WELLVIEW

Reports and Graphics

- Parameter sensitivity plots available for most stability models
- Scrollable "mud weight window" with re scaling and zoom
- Color polar contour plots for all 3D models
- Export graphics to BMP and EMF file formats
- Clipboard support for copying and pasting output graphics and text
- Print to any Windows-supported device
- Single or multi-zone input and output reports
- Print preview capability for text reports
- Well plan and profile plots with color-contoured BHP, mud density, drawdown pressure, or other risk parameters

- Customizable color selection for lithologies
- * New export file formats: PDF, JPG, GIF, RTF, XLS
- * 3D visualization capabilities

Calibration & Validation Options

- Fix an acceptable BHP, drawdown pressure or mud density based on the performance of an offset well
- User-defined borehole breakout angle criterion
- * Calibration options for borehole collapse and fracture breakdown
- * Automatic inversion of best-fit parameters from hole enlargement observed on caliper logs from offset wells

Units

- US oilfield and SI units
- High precision units for shallow wells and pipeline horizontal directional drilling (HDD)
- Customizable mixed units

Functionality

- Right-click drop-down menus on all screen output
- Solution algorithms optimized for rapid performance
- Designed for graphical sensitivity analyses
- Preferred user settings saved on exit
- Ability to cancel calculations in progress
- Run button to compute results as required

Operating Systems

- Windows NT/2000/XP/Server 2003

Network/Deployment Options

- Up to 3 PC installations for a single USB security key
- LAN version available with one or more concurrent seats
- Customized network configurations can be arranged

Internet Accessible Version

- * Available on *AGI Live!*, Advanced Geotechnology's ASP for short term trials, demonstrations, remote out-of-office access, course instruction and monthly leasing. Contact AGI for more information.

Help & Documentation

- Real-time input data validation
- Online Acrobat and hardcopy user manuals
- Example files for all problem types
- Comprehensive list of related publications
- STABView case history collection (optional)
- AGI website and email support
- AGI newsletter "Geotechnology Views"

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