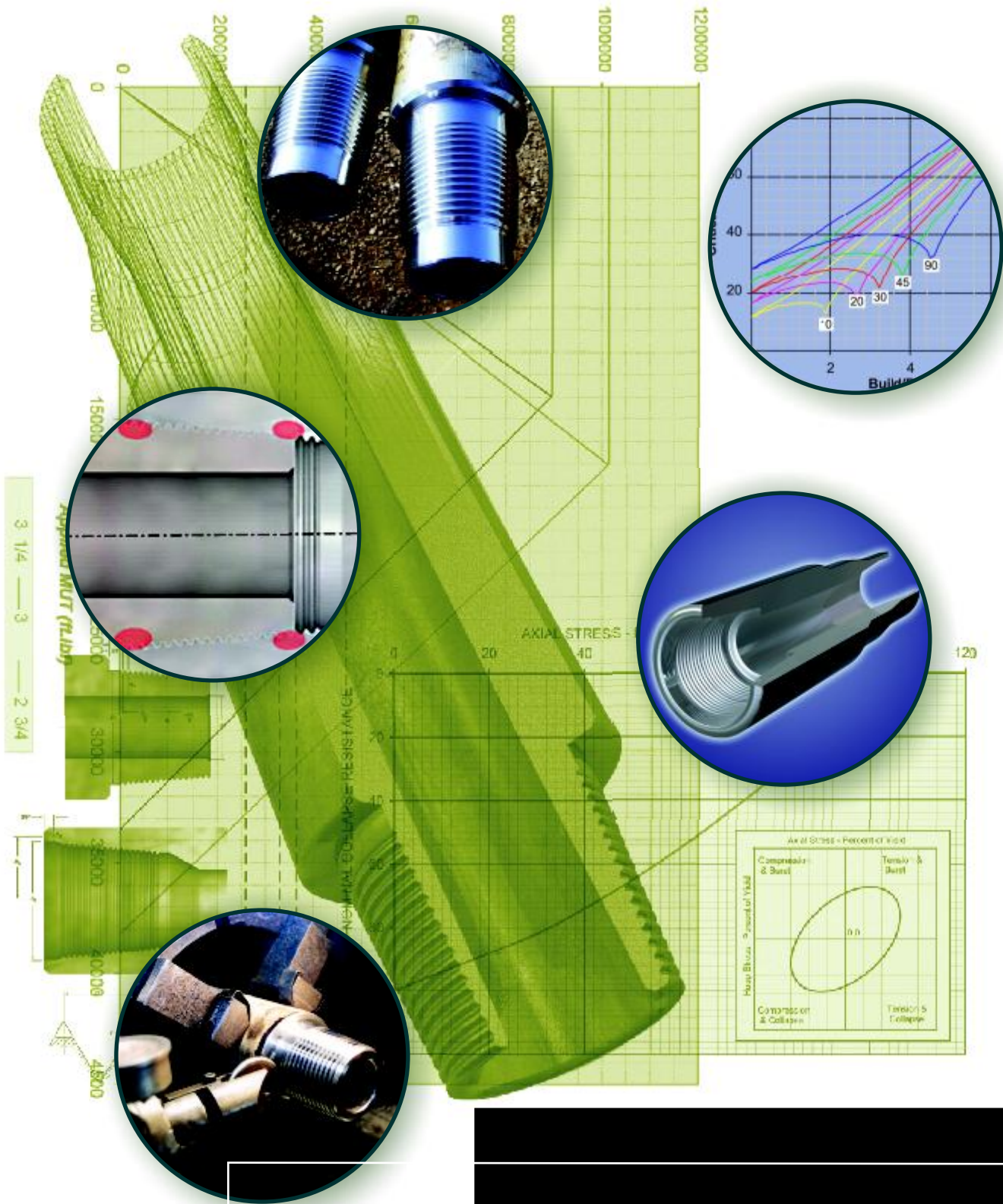


CERBERUS DRILL STRING DESIGN SOLUTIONS

The latest in drill string design software, incorporating many functions available from NOV CTES



Cerberus Drill String Design Solutions

One Company Unlimited Solutions



CERBERUS DRILL STRING DESIGN SOLUTIONS

Featuring Cerberus™ for Drilling Software — Incorporating NS-14™

Proven Software from NOV CTES

- Drill String Design
- Drill String Limits
- Connection Loading
- String Load Calculations
- Torque Drag Analysis
- Buckling Analysis
- Fatigue Life Model
- Stall TorQ™ Calculation
- Expandable Tubulars
- Hydraulics

Data Input

Drill String Design and Analysis

- Input your well, drill string and fluid
- Analyze torque and drag
- Analyze drill string design
 - Stiffness ratio
 - Bending strength ratios
 - Von Mises Analysis
 - Buckling Calculations
- Perform a detailed review of connection stresses, including seal area stress to prevent galling in drill string components
- Take into account bending and pressures in your string tension calculations
- Perform previously complicated and time consuming drill string design reviews in seconds
- Menu-based software hierarchy
- Graphical well data created automatically
- Layered software

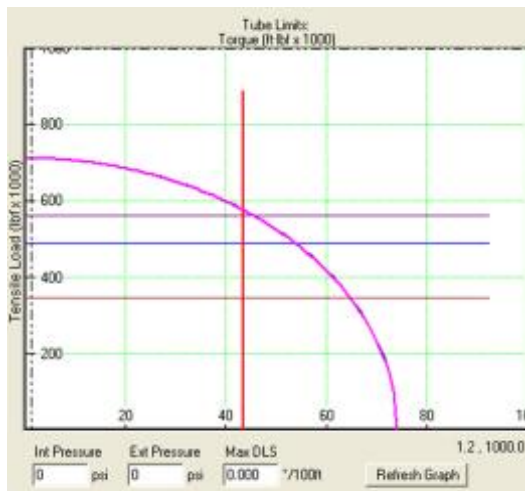
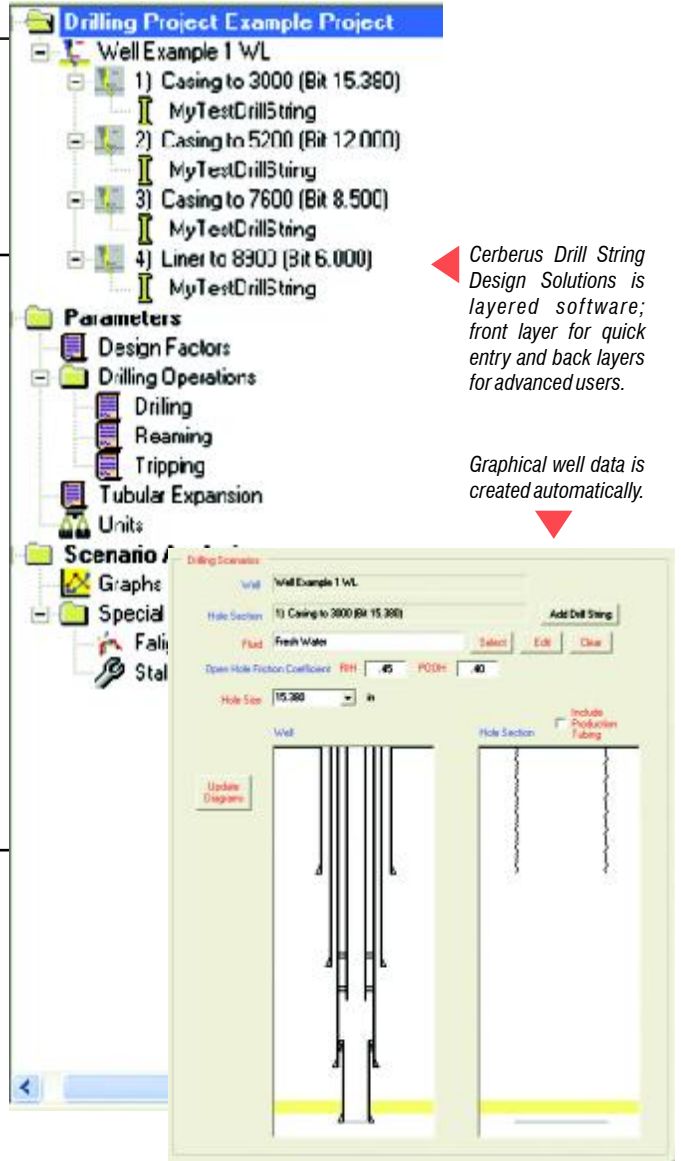
Drill String Design

Drill String Design Utility

- Analyze connection stresses that are usually ignored
- DP data sheets created automatically
- Tri-axial drill string design every time

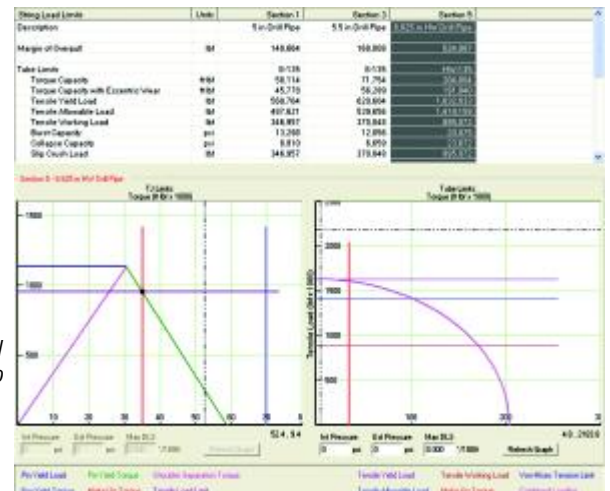
Individual graphs change, depending on dogleg severity and differential pressure.

Cerberus for Drilling features “Quick Look” design reviews in the drill string editor. This makes Cerberus for Drilling a very convenient package for use in “Quick Look” string design projects.



“Quick Look” Design:
Combined Loading of Drill String Components

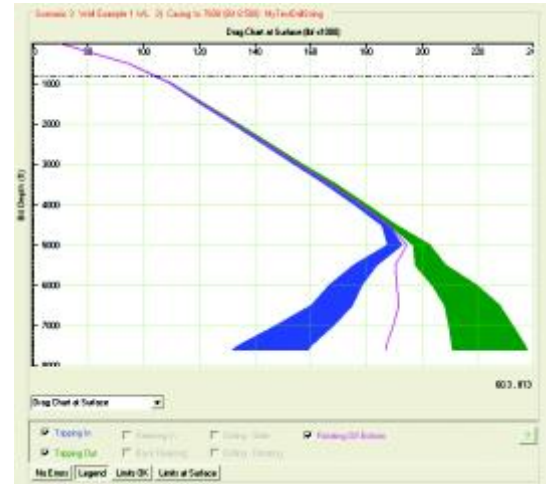
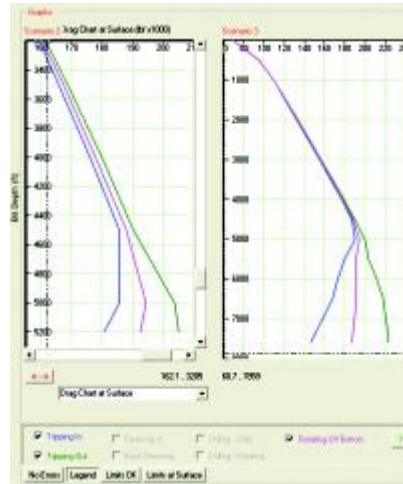
“Quick Look” Design:
Combined Loading of Tool Joint and Tube, taking into account dogleg severity and internal/external pressures



Torque and Drag

Simple or Sophisticated

- Basic analysis for simple “Quick Look” drag charts
- Advanced operations mode for detailed analysis of one drill string
- Capability to quickly compare two drill string options in same well — for optimization



Drill String Editor

Easily accommodates simple or complex equipment selection

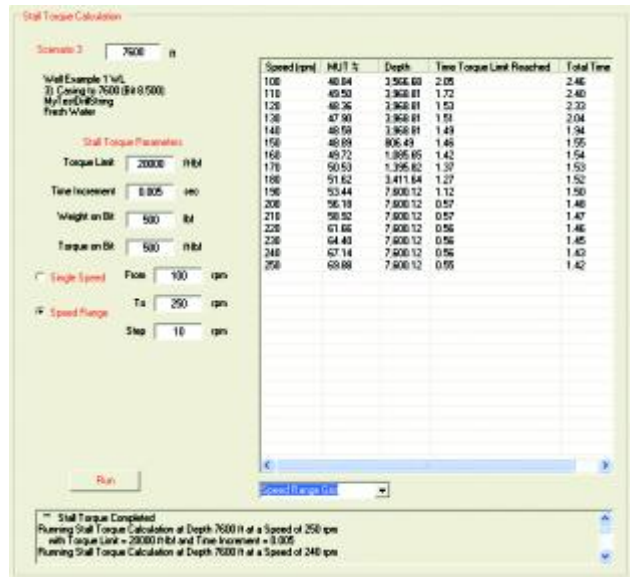
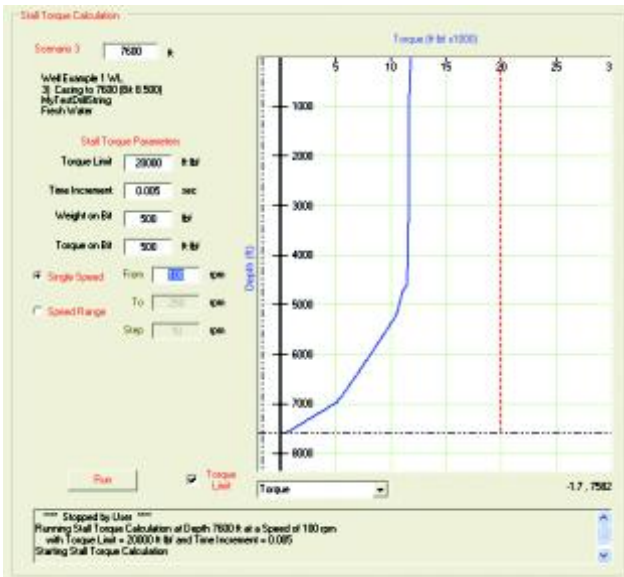
- Quickly choose a string of DP via three (3) drop boxes.
OR
- Enter advanced drill string and connection information to define your own specialty drill string component.

Section	Description	Length (ft)	Weight (lb)	OD (in)	ID (in)	Conn. Type
1	5 Drill Pipe	9000	21120	5.080	4.276	5.5 FH
2	Crossover	3				
3	5.5 Drill Pipe	3000	7950	5.580	4.776	5.5 FH
4	Crossover	3				
5	6.625 subDP	600	3400	6.625	5.080	6.625 FH

Unique: Stall TorQ™

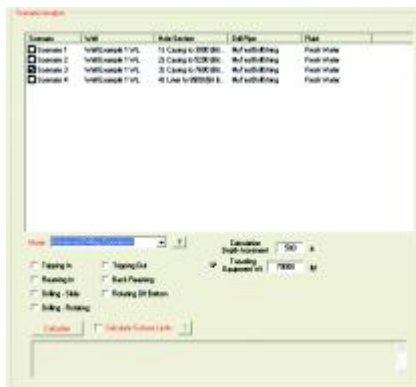
Stall TorQ is a unique method for preventing drill string twist-offs when performing rotational drilling or milling operations.

- Ever experienced a twist-off while drilling, or milling with a mixed size drill string?
- Stall TorQ allows you to design your operations to prevent twist-off.



Scenarios and Modes

- Create a well by setting up a series of drilling scenarios, i.e., hole selections or bit runs.
- Use Basic or Advanced Mode, depending on your work requirements.

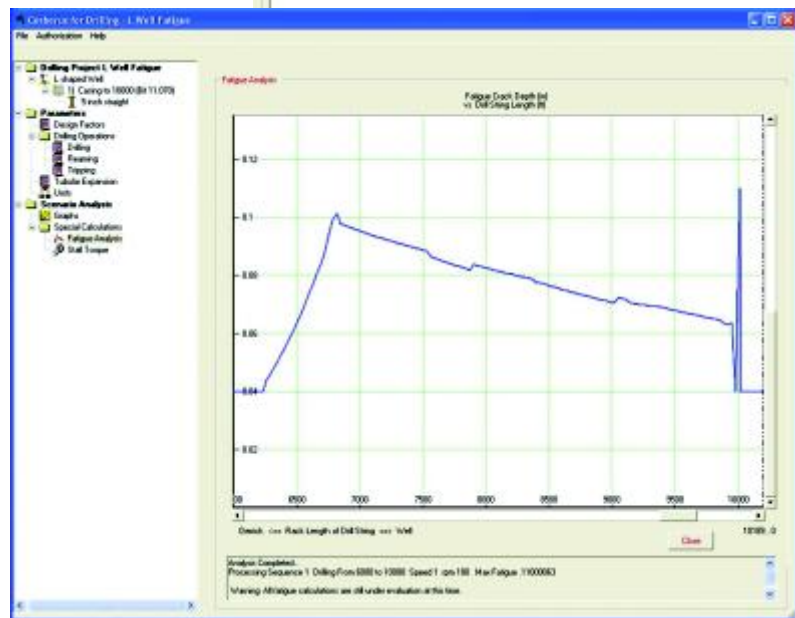
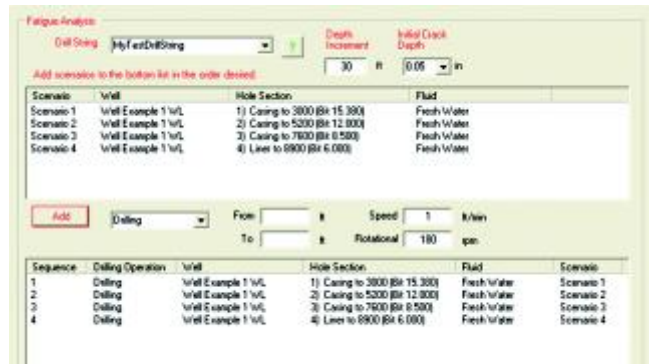


Fatigue Analysis

- Drill String Fatigue is a growing problem with the use of rotary steerable tools to replace motor drilling.

The basis of fatigue analysis is grounded in standard fracture mechanics, plus knowledge of inspection standards and years of experience.

The program utilizes current equipment inspection techniques when determining the starting point of any fatigue accumulation. This information is then added to the calculated fatigue build up during drilling and reaming of hole sections.



Drill pipe analysis can vary depending on hole and drilling parameters. For an example, refer to the graph shown here. ▶

Cerberus for Drilling Software – Incorporating NS-14™

Contact and Technical Support

Internet

Information regarding technical support and reporting software bugs may be accessed at the following web page:

<http://www.novctes.com/Software/support/Support.html>

Email

Information regarding technical support and training classes may be accessed by email:

NS14support@fearnleyprocter.co.uk

Phone

Current customers will have a local engineering contact phone number.

For general inquiries, call our USA phone numbers:

NOV CTES

Phone: +1 936 521 2200

Fearnley Procter Group

Phone: +1 713 595 6644



NS-14™

NS-14 was created as a drill string design manual to provide engineers with a set of simple tables to use when designing drill strings.

The manual includes the calculations upon which all of the tables are based. These calculations are based on API RP7G formulas, or common industry formulas, that were in use by operators at the time NS-14 was compiled.

Hard copies of the manual are still available. However, most calculations covered by NS-14 are now included in Cerberus for Drilling, and often in an enhanced format,

including calculations that are much more complicated than one would want to perform by hand. For example, calculating tensile loading in NS-14 is only axial, but in Cerberus for Drilling combined tension torsion loading on Drill Pipe Tubulars can be adjusted for dogleg severity and internal/external pressure variations.

Future versions of NS-14 may likely be focused data tables covering only the most common equipment types.

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Downhole Solutions

Drilling Solutions

Engineering and Project Management Solutions

Lifting and Handling Solutions

Production Solutions

Supply Chain Solutions

Tubular and Corrosion Control Solutions

Well Service and Completion Solutions