OVERVIEW

Internal wear of casing as a result of drilling and workover operations has been an ongoing concern in oil and gas field development. Accurate casing wear prediction is crucial for well integrity to reduce field development costs associated with casing, especially in deep and/or long, deviated or horizontal wells.

Reduced strength of casing, especially collapse strength, represents a safety hazard that can lead to well control problems and even blowouts. Operators may not realize the risk of casing wear until a catastrophe occurs. Additionally, the cost of repairing worn casing is usually high, exponentially so in the case of a well control situation.

CasingWear™ software, an innovative new Landmark application, provides a comprehensive solution to casing wear assessment. This application addresses industry needs regarding enhanced casing wear modeling techniques applied to actual drilling scenarios. A key component in this method is the stiff string model, which helps estimate drillstring contact position at any given casing depth and calculates more precise contact loads than previously achievable by accounting for bending stiffness of the drillstring. CasingWear improves the accuracy of casing wear prediction, making casing design more cost effective.

BENEFITS

Accurate casing wear prediction
CasingWear reduces uncertainties caused by inconsistent application of the casing wear model. Accurate wear prediction is crucial for well integrity to reduce field development cost associated with casing, especially when drilling and completing complex sidetracks, multi-laterals or long horizontal wells.

Simple user interface for better, faster interpretation
The user interface provides a simple approach to input data and powerful graphical visualization capabilities to interpret it faster and more accurately. The output driving input methodology identifies required data and provides hyperlinks to the appropriate input panel. Users simply click on hyperlinks and input the required data, and the application does the rest. The interactive wellbore schematic provides visual feedback throughout. Users can conduct fast and accurate analysis that helps make better decisions. New users can be trained quickly.
FEATURES

Well engineering integration
The application interacts with the entire Landmark suite of drilling applications for other specific drilling, casing and cost analysis throughout the Engineer’s Data Model™ (EDM™) platform, the industry’s most comprehensive and proven well data management solution. The applications can operate in a stand-alone or multi-user environment enabling users to scale from a single user to a corporate-wide system.

Interactive wellbore representation
Results are displayed graphically as part of an interactive wellbore representation making interpretation easy to visualize and understand. These results include a 3D visualization of drillstring position; casing contact points and wear intensity per drilling operation; a wellbore casing cross section of multi-groove distribution from 0° to 360° degrees; and a time-depth plot of wear percentage and multiple XY plots and tabular results.

Stiff string model
Apply WELLPLAN™, recognized torque and drag models, soft string for conventional casing wear analysis or the advanced stiff string model for more accurate contact loads, estimating contact position of the drillstring at any given casing depth. These contact points are used to model development of multiple wear groove locations at any casing depth cross-section by accounting for fluctuating contact positions as various operations are performed through casing. Estimation of multiple groove positions at each cross-section reduces the overestimation of casing wear as wear is now distributed across different grooves.
Drilling operations and casing wear risk awareness
Incremental or cumulative casing wear modeling of planned drilling events (including drilling, backreaming, rotating off bottom, sliding and reciprocation) applied to the analysis of time vs. wear percent and total revolutions can determine proximity of predefined wear limits during subsequent drilling operations or how many revolutions to reach the wear limit during well planning.

Single, multiple or DEA42 wear factors
Specify user-defined single- or multiple-wear factors along the casing or drillstring. Alternatively, select from DEA42 or a user-defined wear factor table to predict, using a linear casing wear model, the linear or non-linear wear factors, casing wear volume, wear percentage and corresponding casing groove depth, and remaining casing wall thickness.

Casing burst and collapse strength
Obtain remaining casing burst or collapse strength applying API or linear rating equations.

Casing wear mitigation
Apply stand-off devices (pipe protectors, hard-banding) and corresponding wear factors to manage casing contact point, side forces and casing wear in critical wellbore intervals, or apply sensitivity analysis of wear factor or other drilling parameters (including WOB, RPM, dogleg severity overrides) and drilling scenarios (riser offset or riserless offset) to investigate their impact on casing wear.
CasingWear™ software addresses industry needs for enhanced casing wear modeling techniques and reduced uncertainties of the casing wear model. An accurate wear prediction is crucial to lower costs associated with casing, especially with complex sidetracks, multi-laterals or long horizontal wells.

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