

TECH NEWS

Top-Co's Fit-for-Purpose Proposal

February 2012 | Volume 3 Issue 1

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Discussion centers on Top-Co's Fit-For-Purpose Proposal.

The Fit-for-Purpose concept differentiates Top-Co from its competitors and is applicable to horizontal and extended reach well situations.



Based on the additional challenges of complex horizontal and extended reach wells being drilled today, Top-Co has developed a strategy that is now available as an added value service to our customers, and available through your regional sales manager. This strategy consists of a fit-for-purpose technical procedure to recommend Top-Co equipment, and has already begun to produce positive results. The initiative is based on Top-Co's fifty years of experience in casing running, cementing, and completions operations worldwide, as well as the services of our extended reach drilling consultants.

The investigation reports of the Gulf of Mexico tragedy, the recent oil spill in Australia, and other documented "close calls", all mention float equipment and casing centralizers as direct or indirect potential contributors. Even after these events, some engineers still perceive this equipment as "dumb iron" or a "commodity". The industry is finally coming to the conclusion that engineered selection of casing accessories can produce significant benefits.

The fit-for-purpose concept presents a shift in Top-Co's involvement, from equipment suppliers to solution providers by focusing our applications engineering, design engineering, research and development, and testing initiatives on contributing to three main drilling objectives:

- Reaching TD (in a safe and cost effective manner)
- Achieving zonal isolation
- Establishing long term wellbore integrity

Specifically, the fit-for-purpose concept consists of a procedure to better select and recommend our equipment. A typical approach involves evaluating all relevant downhole conditions AND drilling practices that have an impact in our recommendations. By evaluating these parameters we are able to identify specific drilling challenges

that our equipment can address, such as:

1. High levels of torque
2. High levels of drag
3. Buckling (sinusoidal and helical)
4. Running casing into a dirty hole
5. Differential pressure sticking
6. Tight annular clearances
7. Washout sections
8. Wellbore stability
9. Challenging trajectories
10. High temperature
11. High pressure
12. Gas migration
13. Unsteady fluid interfaces
14. Weak formations
15. Tight pore/fracture pressure windows
16. Other

Beginning with a wellbore schematic from the operator we define the general themes of the specific area where the drilling will occur. This includes bottom hole temperature, expected mud weights, planned tops of cement, potential depleted zones (which could cause differential pressure sticking issues), etc.

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Casing deflection and torque and drag simulations are run to identify any area with potentially large side forces, and to identify the risk of casing buckling. Using this data, we are able to recommend our equipment with a solid technical background. (Figure 1 and Figure 2)

Figure 2

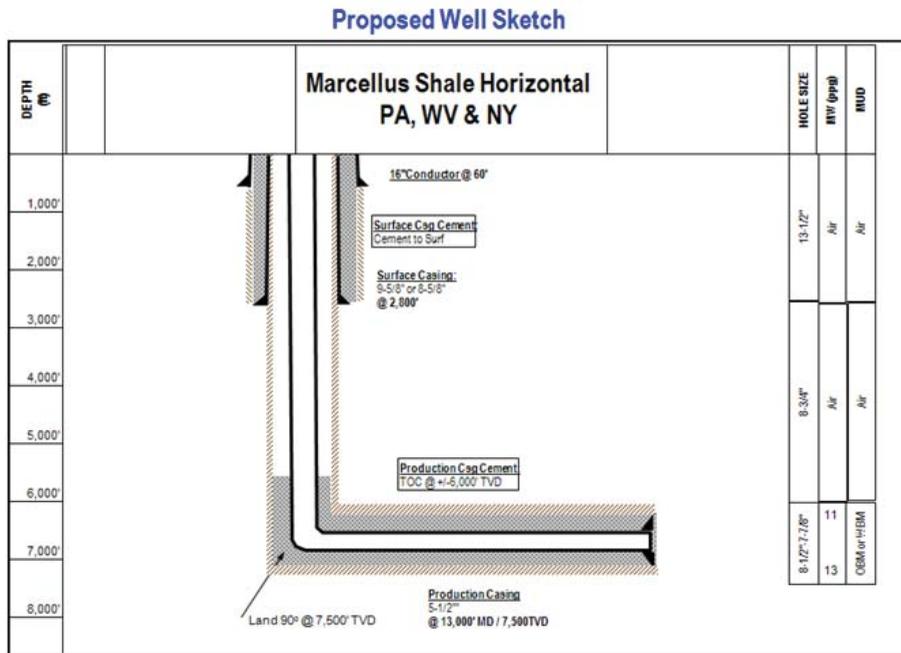
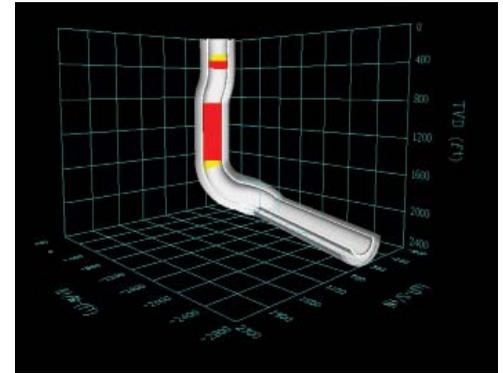


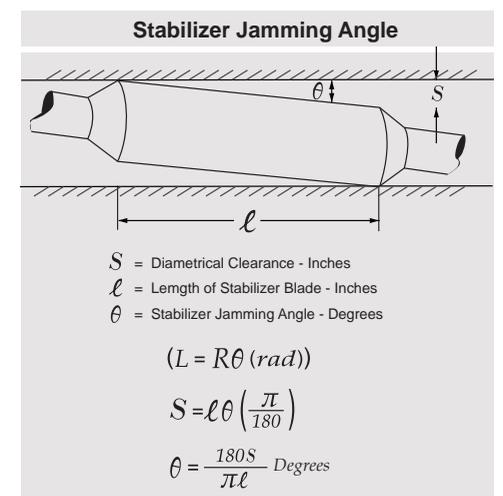
Figure 1



The evaluation of drilling practices is particularly important as it differentiates us from our competitors. It is a subject commonly overlooked even by drilling engineers. For example, we have implemented the jamming angle theory used by directional drillers to determine the combination of centralizer length and OD (under gauge) that would avoid risks of getting the casing stuck. This is done by evaluating the bend setting angle and stabilization of the bottom hole assembly, determining the corresponding dog leg severity capability, and then calculating the maximum centralizer dimensions (Figure 3)

Another example would be the selection of the float shoe nose based on the casing liner hanger installed. If the liner hanger will be a mandrel type hanger, requiring the casing to be set off bottom, then the type of nose will concentrate more on the hydraulics needed for the well. If the casing hanger will be a wedge type hanger, which means the casing can be set directly (or very close) on bottom, then a nose more suited for dealing with cuttings or debris on the bottom of the hole will be recommended.

Figure 3



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The potential for running casing into a dirty hole is a common issue. We have learned some of the industry's most strict recommendations for ensuring a clean hole while running casing. This includes pump rate, whether or not the driller back reamed out of the hole, and RPM, even the type of bottom hole assembly stabilizers that were used, can help us understand the condition of the hole. Armed with this knowledge, our recommendations based on the blade angle of the centralizers can change. If we know that the hole is clean, we can recommend an aggressively angled centralizer that focuses on fluid agitation, such as

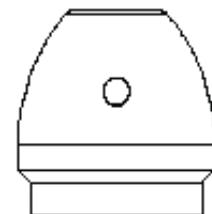
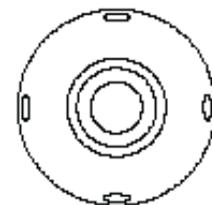
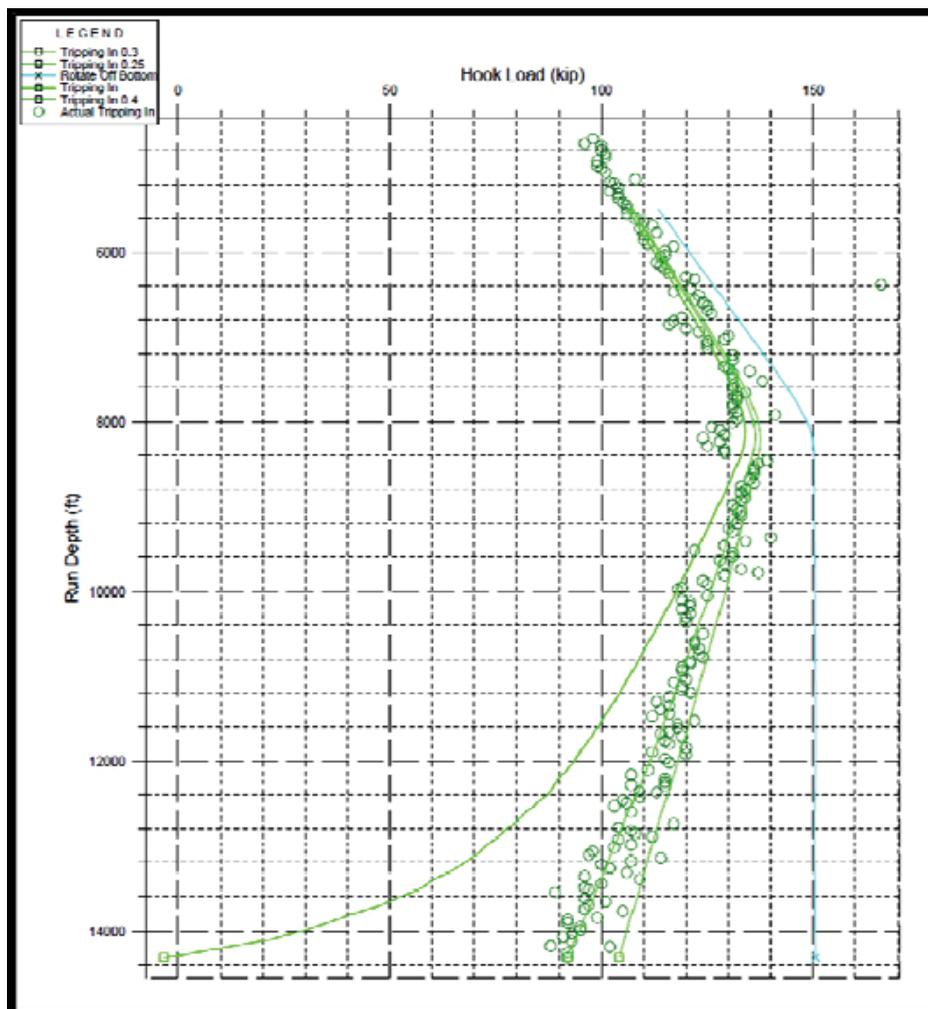
the Type 341 Stand Off Band. If there is a potential for debris, we will recommend something with a softer blade angle and no blade overlap, such as the Type 346 Top Reach Glider®.

The fit-for-purpose strategy is also focused on continuous improvement. For example, we commonly request access to our customers rig data acquisition system to monitor casing runs in real time and match up true casing running data against our simulations, as shown in the Figure 4.

This post-installation analysis is key for continuous improvement, particularly in

the absence of data from offset wells, such as at the start of a new drilling campaign. Once we have confirmed that the first objective (reaching TD) is attainable, we can focus our efforts on achieving zonal isolation by increasing the OD of the centralizers that we recommend, or changing the spacing. Top-Co's new proposal to our customers includes the development of field-specific standard operating procedures for casing float and centralization equipment based on the technical fit-for-purpose selection of the optimum equipment to achieve the above mentioned goals.

Figure 4



BULLET NOSE

• ALUMINUM
FEATURES 4 DOWN
JETS + CENTER POINT

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It is important to realize that the technical evaluation of all relevant parameters alone is not enough. If our ultimate objectives truly are to “reach TD, achieve zonal isolation, and establish long term wellbore integrity”, then the operational and commercial aspects should also be covered under the fit-for-purpose concepts as illustrated in the following diagram:



This concept is the essence of Top-Co's strategy for horizontal and extended reach wells and certainly a differentiating factor from our competitors. The value of this concept, paired with Top-Co's superior products, will continue to increase with the higher complexity of the new wells being drilled today.

For example, we cannot expect to contribute towards zonal isolation if the optimum centralizers do not make it to location on time because of logistical issues or improper distributor management. They will also be of no benefit if they are not selected by the operator due to lower competitor pricing. This commercial effort offered by our managing directors completes the strategy and allows Top-Co to approach the operator due to lower competitor pricing.

This commercial effort offered by our managing directors completes the strategy and allows Top-Co to approach the operator with something they have never seen before.