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Offline Bottomhole Assembly Preparation Saves Time and Improves Safety Offshore Australia

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Abstract

The value of offline assembly of downhole equipment to save rig time has been understood for many years and is practiced worldwide. However many bottomhole assemblies (BHA) and odd tool sizes still require extensive time consuming manipulation and the use of manual tongs on the rig floor, resulting in lost time and added operational cost. This is because the individual BHA tools often require manual handling due to odd shapes, sizes and weights, and very few drilling rigs have iron roughnecks available that are capable of making up or breaking out these tools.

In a recent 12 well operation offshore Australia, using a third generation semi submersible drilling rig, a versatile mobile bucking unit (MBU) was installed to handle such BHAs outside the critical path, with a view to reducing the manual handling and manual tong usage on the rig floor, thereby improving rig safety and efficiency.

In this paper the authors will present details of the MBU that was used and present a case study wherein manual rig tong operations were reduced by some 90% by use of offline preparation and disassembly of complex downhole assemblies in a less stressful environment. The effective rig time saved by removing these operations from the critical path resulted in cost savings for the program in the order of \$3million.

Introduction

During well drilling and completion operations a considerable amount of time is consumed while employing manual rig tongs to make up or break out complex bottomhole assemblies because very few rigs have iron roughneck equipment available that is capable of handling them. Frequent variations in sub assembly lengths and diameters add the complexity of frequent slip changes and tong jaw adjustments at a time when also the total bottom hole string weight may be low, requiring the use of manual safety clamps in addition to slips. Low string weight may also compound issues related to the bending forces that occur during connection makeup or breakout with rig tongs. These BHA operations are very labor intensive and the rig crew really has to pay attention to details, especially to their safe hand- and body placement while manipulating rig tongs. The use of chain tongs by the floor hands to manually walk in the BHA components also exposes the floor hands to manual handling issues, including but not limited to slips, trips and falls and the very real threat of BHA components falling over due to the centre of gravity being to high.

Safety Statistics:

Recordable incidents related to BHA's and special drilling assemblies are not necessarily logged under the "Manual Tongs" equipment category since other equipment are involved in the operation; such as "Slips", "Pipes/Collars/Tubulars", "Cathead/Drawworks" and "Hand Tools (manual)". Thus the related incident number may be higher than the Manual Tongs equipment category indicates and it would require further research to find the actual number. The industry recordable incidents by operation category also does not provide a clear number as the related BHA and special drilling assembly incidents may be recorded under operation categories such as "Making connection", "Routine Drilling Operations", "Lay Down/Pick Up/Pipe/Tubulars", and "Trip in/out".

During the past decade, several initiatives and actions were implemented by the industry to improve manual tong safety, including such as color paint schemes to highlight safe hand placement, danger and pinch-point areas; introduction of new manual tong designs, addition of thumb guards, and focused training on correct rig tong usage. The increased number of iron roughneck installations on land rigs has also positively affected the overall industry tong safety statistics. All combined, the Total Industry Recordable Incidents by Equipment (Chart 10, IADC ASP) show that tong related incidents were reduced