

CHAPTER I

INTRODUCTION

Torque and drag (T&D) modeling, is regarded as helpful real-time drilling program because it keeps drillstring on track and prevents drilling problems that might occur during the drilling process. Even though T&D software has existed since the 1990s, some confusion still exists over the validity of the models that are used to characterize drilling operations, especially when length of modern horizontal wells are extended to a complication of 3D drilling,. This makes the old model of calculation showing a large number of deviations when it is used with new drilling planning well trajectory. Now it is the right time to reflect on the state of current models to identify the future requirements. A new model will help engineers identify feasible well designs and define drilling limitations for particular field development options. A reliable mathematical model is fundamental to a true understanding of the accuracy and applicability of T&D models. Software based on a more accurate T&D mathematical model for each particular well design will be highly useful in real-time processes, also help to find the confined compressive strength (CCS) from drilling parameters and will prevent the problems caused by T&D buckling.

It is fairly common to experience problems during drilling operations. Those problems may result in many delays and additional costs. Therefore, it would be interesting to find a methodology which could discover that downhole conditions are starting to deteriorate in order to take pre-emptive actions and avoid the subsequent occurrence of drilling incident (Cayeux *et al.*, 2012).

This research provides more accurate torque and drag models based on 3D calculations that will help alleviate helical buckling problems, since normally helical buckling causes lock-up and fatigue potential. This software research also prevents torque and drag problems while drilling by warning before torque and drag exceed critical value. Moreover, this research shows the relationship between real-time design and torque and drag calculations in 3D. This makes users easily visualize the well design while drilling and helps the users make decision in time.