

During drilling operations, three type of vibrations can appear in the equipment of rotary drilling systems which are axial, torsional and lateral vibrations. Their influences, either simultaneously or separately, prevent the drilling rig from extracting oil and gas from the target reservoirs. Many researcher have indicated that the most damaging hazards in the borehole are those caused by Stick-slip phenomenon, it is the sever status of the torsional vibrations that happened most time along the tool string. It has been shown that one of the main re-generators of this phenomenon is non compatibility of drilling parameters with the type of the geological formations. Therefore, many studies have dedicated to find the appropriate choice of parameters during drilling but few of them have discussed the effect of their variation during the drilling process. The main objective of this study is to analyse the effects of variation of Drill pipes and BHA dimensions and drill mud viscosity on the severity of Stick-Slip vibrations. Moreover, the obtained results have allowed us to set the optimal values of these parameters in order to minimize torsional vibrations without reducing rate of penetration