

# Calculating the drilling mud weight window and geomechanical properties of Darian limestone formation in Reshadat oil field

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## Abstract

In the oil province of southern Iran like other hydrocarbon zones, thorough understanding and risk management resulting from the rock mass deformation, can be of great help in executing operational processes such as the stabilization of the borehole wall, controlling the sand production in the borehole and hydraulic fracture. In oil well excavation operations, determining maximum and minimum horizontal stresses helps in designing the excavation route in the minimum stress direction so that collapsing of the borehole wall and drilling tube blockage against the rocks is avoided. The aim of this study was removing the main excavation problems especially of the diversion wells through exact geomechanical calculations in the Darian lime formation depth range in the understudy field. In order to develop the geomechanical model, first the bulk, the shear and the Young's modules, the Poisson coefficient and  $V_p/V_s$  ratio were calculated using the visual log data integrated with the geomechanical parameters, and the strength parameters like uniaxial compressive strength, internal friction coefficient and tensile strengths and static modulus of elasticity were determined and then the determination of direction and min/max horizontal stresses alongside the formation thickness were studied. In the end by the assessment of the geomechanical model and calculating the mud weight during drilling of the understudy well, and using the STAB View software output, the mud weight window of 80-120 PCF and the drilling Azimuth range of  $30^\circ$ -  $45^\circ$  was recommended for the prevention of borehole wall collapse for Darian formation.

**Keywords:** Darian formation, drilling azimuth. Reshadat oil field