
Characterization of Rock Strength in Cretaceous Strata along the Stuart City Trend, Texas

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ABSTRACT

Rock strength has significant effect on the development of natural and hydraulicly-induced fractures in subsurface reservoirs. The correlation of rock strength to porosity, facies, pore-throat size, and rock fabric has not been comprehensively addressed because of the time and expense of analyzing samples. However, hand-held tools like mechanical dimplers or rebound hammers have been shown to give reliable and reproducible results when correlated to traditional, laboratory-derived, rock-strength measurements. Using handheld devices allows for more samples to be run and a smaller sample size to be used (less than 4 cm² [0.62 in²]) compared to traditional triaxial experiments. Micro-rebound hammers and mechanical dimplers were used in this study to characterize rock strength (unconfined compressive strength) in cores from the area of the Stuart City Trend (shelf margin) of the Texas Gulf Coast. We characterized rock strength values in this area for the Eagle Ford Shale, Austin Chalk, and Edwards and Glen Rose formations. These values range from 27-62 MPa for the Eagle Ford, 50-73 MPa for the Austin Chalk, 22-85 MPa for the Edwards Formation, and 14-86 MPa for the Glen Rose Formation. Characterization of rock strength in cores highlights the variability exerted by heterogeneous lithofacies and porosity development.