

ABSTRACT

A laboratory investigation of the variation of the inertial coefficient with liquid saturation was undertaken. This work was directed towards unconsolidated Trinidad sandstones as no information in this area existed. A laboratory model was set up using cores pressed to varying degrees of compaction through which nitrogen was flowed. The liquid saturation was systematically varied from bone dry sand (0%) to 50% pore volume.

It was found that for cores pressed to 8832 psia ($\approx 60,900$ kPa) a six fold increase in the inertial coefficient occurred for a change in liquid saturation from 0% to 50%. A similar change in liquid saturation caused a five fold increase in the inertial coefficient for cores pressed to 17,664 psia ($\approx 121,800$ kPa).

Model studies carried out on the data acquired from this study, as well as on field and published data, have shown that the equations, correlating the petrophysical properties of porosity and permeability with the inertial coefficient, published to date, are inapplicable to Trinidad reservoirs. An

equation that adequately correlates these parameters has been formulated and can be used to predict values of the inertial coefficient for Trinidad sandstones.

A secondary observation was that the current industry-accepted method of sealing plug cores in wax for permeability measurements is not gas tight. Permeabilities measured in this manner would therefore be high. It is recommended that the superior method of sealing cores developed in this work also be field tested for applicability and repeatability.

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