12.20: Strength Parameter Determination Using Laboratory Measurements of Velocity in Mudrocks

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ABSTRACT

Vertical P-wave and S-wave velocity measurements are provided during uniaxial compression tests from 1 to 25 MPa on resedimented specimens of GoM-EI and BBC. GoM-EI results are compared to shallow log data. Log results are at lower densities. P-wave velocities are in general agreement (Fig 1) but log S-wave velocities are much higher. Velocity ratios are in good agreement and compare favorably with published correlations.

The combination of mechanical property correlations vs stress with velocity ratio vs stress makes it possible to estimate mechanical properties based on velocity ratios (Fig 2). These correlations are lithology specific and provide a means to develop depth profiles.

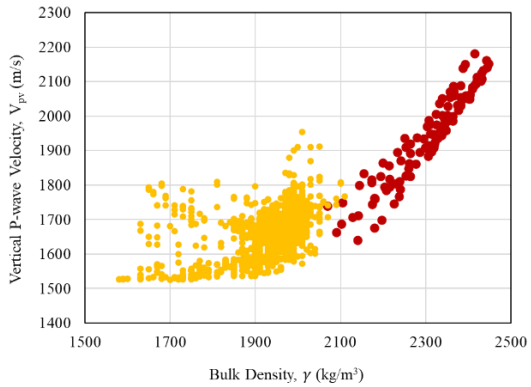

Fig 1: Comparison of P-wave velocity versus density based on in situ log measurements and uniaxially compressed resedimented GoM-EI specimens.

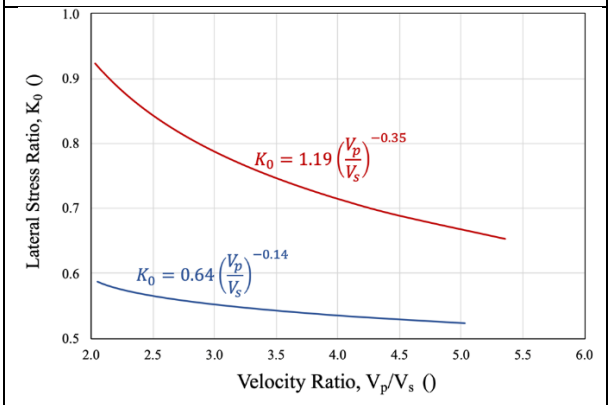

Fig 2: Empirical equation to compute lateral stress ratio from velocity ratio based on lithology. Equations are derived by combining velocity stress relations with lateral stress ratio vs stress relations.

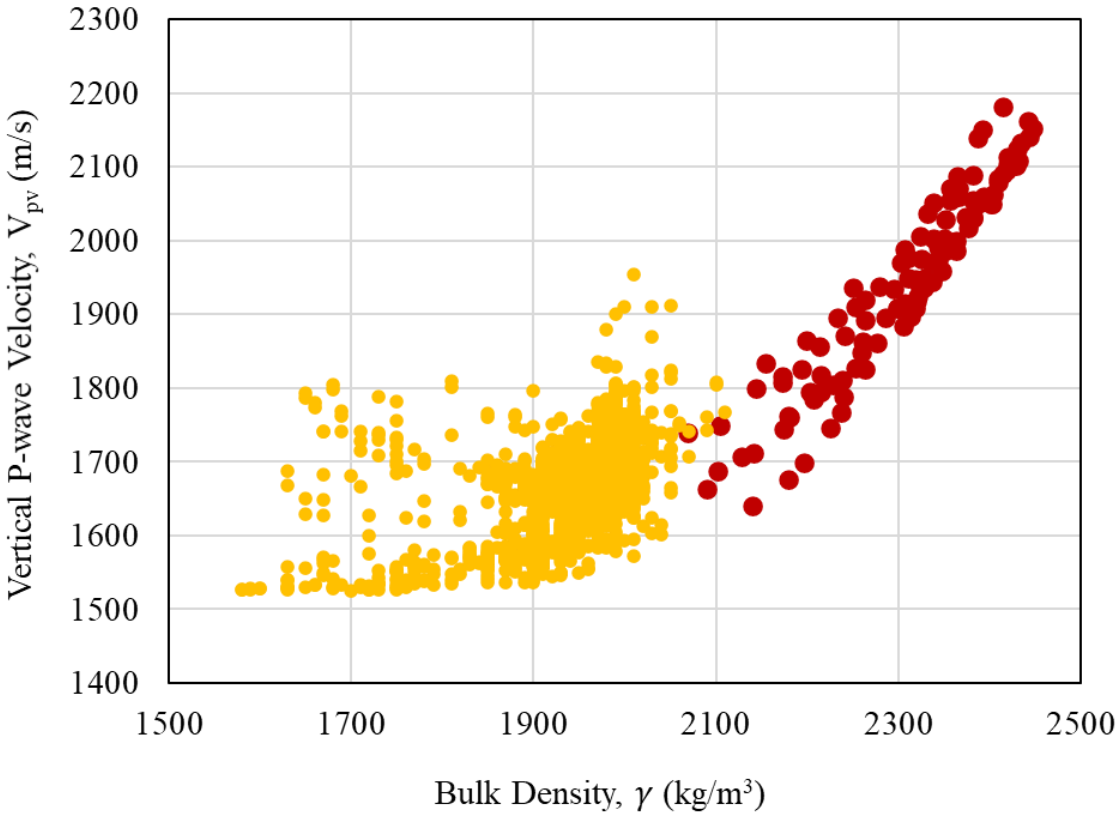

Fig. 1: Comparison of P-wave velocity versus density based on in situ log measurements and uniaxially compressed resedimented GoM-EI specimens.

Back

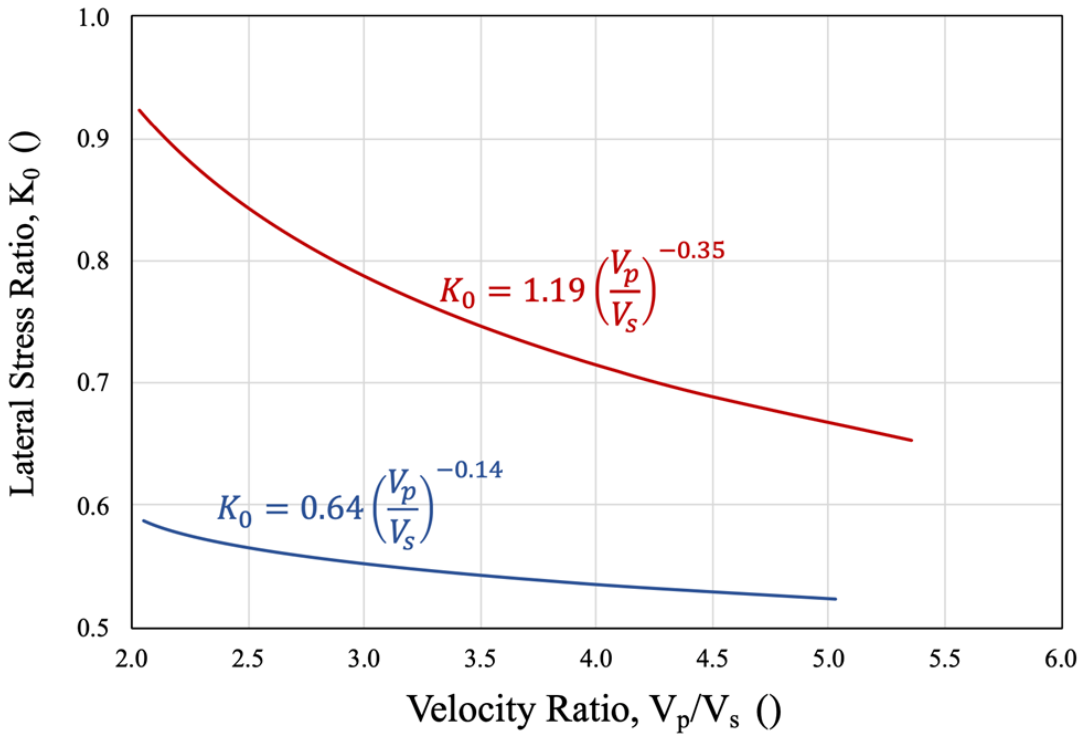

Fig. 2: **Empirical equation to compute lateral stress ratio from velocity ratio based on lithology. Equations are derived by combining velocity stress relations with lateral stress ratio vs stress relations.**

Back