

**Petrographic and Engineering Assessment of Coarse Aggregates
from Thurly, Thore, and Khanbri Gravel Deposits along the
Indus River: Implications for Concrete Applications**

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This study investigates the alkali silica reaction (ASR) and alkali silicate reaction (AStR) potential of coarse aggregates sourced from Thurly, Thore, and Khanbri Gravel Deposits along the Indus River Terraces and Bed. Fifteen samples from each location were subjected to detailed examination of their engineering properties and chemical composition, in accordance with ASTM/BS/AASHTO standards for suitability in cement concrete. Petrographic analyses revealed promising physical and chemical properties consistent with international standards. However, Quick Mortar Bar Tests, as per ASTM C1260-01, produced conflicting results regarding ASR/AStR potential. While petrographic assessments and in-service behavior suggested potential reaction risks, the standard test indicated otherwise. Our findings challenge the adequacy of relying solely on ASTM C1260-94 for ASR/AStR assessment. Global studies echo this concern, highlighting limitations in strained quartz-bearing rocks and mylonites. Even materials like reconstituted microcrystalline acid to intermediate volcanics, and low-grade meta-argillites, and meta greywackes can yield misleading results. In conclusion, this research highlights the need for a comprehensive approach to ASR/AStR evaluation, considering both standard tests and petrographic insights to ensure accurate assessment of aggregate suitability for concrete applications.