WE HAVE THE EXPERIENCE

Rock Mechanics & Explosives Research Center (RMERC) Rock/Aggregate Laboratory is fully equipped to test and evaluate Rock/aggregates and provides high-quality results that can be used in designing procedure. At RMERC, the staff takes the requested services to a higher level of care. You call, we listen, and we take action. Primarily our personnel understand the construction industry needs and will add shifts as necessary to accommodate expedited testing. Our laboratory is capable of testing and preparing the following materials:

- Rock Preparation and Testing
- Aggregate Preparation and Testing

OUR CAPABILITIES

RMERC facilities undertake Rock & Aggregate analysis for projects around the world and deliver the requested results through your selected method such as: (email, fax or even hardcopy). Key benefits of our laboratory testing services and additional Capabilities:

- 3 Load cells which capable of detecting the low and high profile loads up to 600K Lbs.
- LVDT transducer to monitor the deformation with accuracy up to 10 micrometers.
- Data a question system capable of collecting 500K s/s/ch.
- Strain gauges with accuracy up to 0.1% of the FS.
- Triaxial Hoek Cell with diameter 63 mm (2.5”) and confining pressure ≈ 15000 Psi.
- Highly-experienced engineers lead us.
- Prompt response for periodic, specialized testing.
- Quick turnaround on testing large volumes of samples.
- All tests procedures are meeting the ASTM standards.
- High precision results.
- Full professional deliverables (including before & After photographs of samples).
- Very competitive prices.
- Consultancy is available before the lab testing begins.
Figure 1: Point Load Testing apparatus.

Figure 2: Triaxial Hoek Cell 63 mm (2.5").
Figure 3: Load cells and the hydraulic actuator.
Figure 4.: TerraTek Testing machine controller
Evaluating the mechanical properties of a wide range of materials, our laboratory has the equipment to perform cyclic fatigue, tensile strength, compressive strength, flexural strength, hardness, strain measurements, pressure, and many other forms of physical testing. We have multiple load frames to accommodate a wide range of samples, sizes, and strengths. The RMERC laboratory is capable of performing high-end strength testing of rock (Unconfined Compression, Brazilian Tensile Strength, Elastic Moduli, Triaxial, etc.). When you need testing for new aggregate sources, evaluation of concrete aggregate or aggregate base testing, you can rely on RMERC to get the job done. Our technicians use specialty aggregate equipment to perform services ranging from sieve analysis to long-term soundness testing. RMERC is fully equipped to test and evaluate aggregates for use in asphalt concrete, Portland cement concrete, and other construction products. Here are project examples:

- **Mechanical Properties**
  - **Deformation**
    - Young’s, bulk, shear modulus.
    - Poisson’s Ratio
  - **Strength**
    - Unconfined Compressive Strength (UCS).
    - Brazilian Tensile Strength to measure the indirect tensile strength.
    - Point Load Strength Index to measure the indirect tensile strength.
    - Triaxial test to measure the shear strength, friction angle, and cohesion.
    - Point load test.
- **Rock physics testing:**
  - Unit weight.
  - Porosity.
  - Density.
  - Permeability.
  - Void ratio.
  - Moisture Content.
- **Classification / Index testing:**
  Classifying rock depending on their physical and mechanical characteristics.
Figure 5: Rock specimen customized preparation.

Figure 6: Rock strength and deformation analysis.
Figure 7: Rock core sample preparation for strain gauges installation.
Figure 8: Deformation monitoring using strain gauges.
Figure 9: Rock triaxial testing.
Figure 10: Rock specimen after the triaxial test.
Sample No. 1

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<th>Property</th>
<th>Value</th>
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<tr>
<td>Peak Stress (MPa)</td>
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<td>Test Duration (Sec)</td>
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<tr>
<td>Elastic modulus (Gpa)</td>
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<tr>
<td>Poisson’s ratio (%)</td>
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<td>Initial Diameter (mm)</td>
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<table>
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<td>Max Axial Strain (mm/mm)</td>
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<tr>
<td>Max Axial Displacement (mm)</td>
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<tr>
<td>Max Lateral Strain (mm/mm)</td>
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<td>Initial Length (mm)</td>
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<td>Initial Cross Sectional Area (mm²)</td>
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**Figure 11:** Analysis of the mechanical properties of rocks.
Mohr-Coulomb Criterion
cohesion = 0.77 MPa
friction angle = 60.824 deg
intrinsic strength = 0 MPa
uniaxial compressive strength = 5.96 MPa
\[\alpha = 86.13\,\text{deg}\]

Analysis of TRIAXIAL Lab Data
No. of lab data points = 4
Sum square of errors (residuals) = 303.900
Current strength model is LEVENBERG-MARQUARDT best-fit

Figure 12: Mohr circle graph and shear strength interpretation.
APPLICATIONS

The RMERC laboratory test rocks when the mechanical and physical properties of rock impact the structures or where the risk is a significant consideration. High-quality rock testing and interpretation are essential for a vast range of applications in the petroleum field, geothermal power production, candy soil production, hydraulic joint and fractures, reservoir properties, compaction, and soil collapse, sealing of faults, fractures, and discontinuities. Below are some Examples of applications:

- Shallow and deeps foundations.
- Earth structures such as dams.
- Structures of the coastal areas.
- Excavations of the Shallow and Deep sites.
- Pipelines and other buried structures
- Bridge foundations and abutments
- Rock Slope stability.
- Groundwater barriers.
- Geohazard assessments.
- Landslides.

CONTACT

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