Rock Mechanics Laboratory 206-13993 – 2 credits
Dr. Vyacheslav Palchik

Syllabus

1. Point Load Strength. Practical significance. Correlation between point load strength and other mechanical properties of rocks.
2. Indirect tensile strength by the Brazilian test. Theoretical distribution of stresses in loaded sample.
3. Stress-strain modeling in engineering practice.
4. Direct determination of grain volume by using helium porosimeter PHI-220. Calculation of pore volume and porosity. Dependence between porosity and mechanical properties of rocks.
5. Laboratory measurement of ultrasonic elastic constants of rock. Theoretical background.
6. Laboratory testing of rocks under uniaxial and triaxial compression: Operation of Rock mechanics test systems (components and servocontrol; testing procedure) for triaxial compression. Stress description: axial stress, confining pressure, principal stress difference and hydrostatic pressure. Strain parameters (axial strain, radial strain and volumetric strain) and their calculation. Elastic modulus and Poisson's ratio. Calculation of these elastic constants by using linear regression. " Characteristic rock deformation under deviator loading (crack closure, elastic region, stable crack growth, unstable cracking, peak stress, post peak region, plastic deformations). Definition of crack initiation stress and stress at onset of dilatancy. Drawing Coulomb-Mohr envelopes using maximum shear stress and mean normal stress at failure. Determination of internal friction angle and cohesion. Griffith crack theory, Bieniawski and Hoek & Brown failure criteria.

Bibliography

Course reading materials are places by the instructor on the course Web page during term time.

Course Requirements

Prerequisites: Introduction To Geomechanics
4 hr lab