

**Reviewing of the existing rock engineering knowledge on the Moon rocks.** DeMoraes, Roberto and Gaspari, Giuseppe, AECOM, [Roberto.demoraes@aecom.com](mailto:Roberto.demoraes@aecom.com), AECOM, [Giuseppe.gaspari@aecom.com](mailto:Giuseppe.gaspari@aecom.com). ([Roberto.demoraes@aecom.com](mailto:Roberto.demoraes@aecom.com))

Between 1969 and 1972, six Apollo missions brought back 382 kilograms (842 pounds) of lunar rocks, core samples, pebbles, sand, and dust from the lunar surface. The six space flights returned 2200 separate samples from six different exploration sites on the Moon. In addition, three automated Soviet spacecraft returned necessary samples totaling 300 grams (approximately 3/4 pound) from three other lunar sites. The lunar sample building at Johnson Space Center is the principal repository for the Apollo samples. The lunar sample laboratory is where pristine lunar samples are prepared for shipment to scientists and educators. Nearly 400 samples are distributed each year for research and teaching projects. The study of rock and soil samples from the Moon yields valuable information about the early history of the Moon, the Earth, and the inner solar system. For example, we have learned that a crust formed on the Moon 4.4 billion years ago. This crust formation, the intense meteorite bombardment occurring afterward, and subsequent lava outpourings are recorded in the rocks. We review the data on the physical and mechanical properties of the lunar rocks such as basalt, anorthosite, and breccia acquired in the direct investigations on the lunar surface carried out in the human-crewed and robotic missions and in the laboratory examination of the lunar samples returned to the Earth. We consider all of the main physical and mechanical properties of the lunar soil, such as the composition, density and porosity, cohesion and adhesion, angle of internal friction, shear strength of loose soil, deformation characteristics (the deformation modulus and Poisson ratio), compressibility, and the bearing capacity, and show the change of some properties versus the depth. This review brings a new view on the Moon rock's mechanical properties, which are relevant to constructing effects on materials extraction, excavation, processing, and handling.

#### **References:**

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