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Laser Ultrasonic Diagnostics and Acoustic Emission Technique for Examination of Rock Specimens under Uniaxial Compression

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Abstract : Laboratory studies of the stress-strain behavior of rocks specimens were conducted by using acoustic emission and laser-ultrasonic diagnostics. The sensitivity of the techniques allowed changes in the internal structure of the specimens under uniaxial compressive load to be examined at micro- and macro scales. It was shown that microcracks appear in geologic materials when the stress level reaches about 50% of breaking strength. Also, the characteristic stress of the main crack formation was registered in the process of single-stage compression of rocks. On the base of laser-ultrasonic echoscopy, 2D visualization of the internal structure of rocky soil specimens was realized, and the microcracks arising during uniaxial compression were registered.

Keywords : acoustic emission, geomaterial, laser ultrasound, uniaxial compression
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