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Study of ultrasonic vibration mechanism of rock fragmentation

Zihang Sun[1,2], Dajun Zhao[1,2], Guobing Zhai[1,2], Shulei Zhang[1,2]

[1] College of Construction Engineering, Jilin University, Changchun 130026 China

[2] Laboratory of Open Research on Complex Conditions Drilling,Jilin University, Changchun 130026, China

Email address：sunzihang1988@163.com

Ultrasonic vibration of rock fragmentation is a new rock breaking technology, It enhances the hard rock crushing efficiency has great advantage and potential. We loaded ultrasonic vibration by ultrasonic transducer directly on the rocks, observation of rock compressive strength before and after the vibration and the change of porosity, and explore the mechanism of ultrasonic vibration crushed rock. For ultrasonic vibration crushed rock technology lays the foundation in the field of geological core drilling. We use ANSYS/ls-dyna software simulation analysis when ultrasonic vibration internal stress changes of rock, found that rock unit for the tensile and compressive stress alternately the stress state of change, led to the emergence and development inside rock fracture easily. To verify the accuracy of the numerical simulation, we conducted laboratory tests. The results show that the rock is loaded after ultrasonic vibration, the rock compressive strength was reduced by 15.5% on average, rock porosity increased by 23.8%. The simulation results accord with the experiment results.