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Instrument for rock bolt inspection by means of ultrasound

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Abstract:

In this paper we present a new digital ultrasonic instrument for nondestructive inspection of rock bolts using guided waves. The Rock Bolt Tester (RBT) instrument applies long-range ultrasound to investigate bolt's status, especially its grouting condition. RBT features an application tailored ultrasound probe that transmits high-energy, low frequency (below 100kHz) guided waves. It is also capable of receiving weak echoes reflected from the discontinuities at the bolt surface as well its end-echo, which have propagated back and forth in the range of up to 4 meters. The RBT is a portable instrument that consists of a specially designed analog electronics for generation and reception of guided waves and an embedded digital computer that performs for signal processing, operator communication and data storage. In the paper we will focus on advanced processing techniques applied to enhance tiny echo signals received by the probe.

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