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# PROPAGATION MECHANISMS OF BLAST-INDUCED GROUND VIBRATION (BIGV) IN DIFFERENT GROUND CONDITIONS

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## ABSTRACT

Blasting operations are extensively practiced in mining activities, civil engineering projects, tunnelling and underground excavation works. Provided that blast-induced ground vibration BIGV is one of the most hazardous impacts generated by this rock fragmentation technique, a great attention has been drawn to its prediction and monitoring in different geotechnical contexts. Prior studies have extensively investigated the propagation behavior of BIGV in different rock masses based on the analysis of parameters such as Peak Particle Velocity PPV, the frequency and acceleration. However, little research has been conducted on the propagation behavior of BIGV in soil mediums such as sand and this subject has not been previously assessed using Peak Vector Sum PVS as the evaluation parameter. This paper investigates PVS levels generated by surface hard rock blasting activities located nearby sand mediums under loose dry, compacted and water-saturated conditions. For this purpose, laboratory-scale ground vibration monitoring experiments were conducted on 3 main physical models placed in a tank. A ball drop apparatus ensured the artificial simulation of BIGV. In the course of this experimental investigation, 105 ground vibration tests were carried out and 135 Peak Vector Sum PVS measurements were recorded. The paper provides an insight into the propagation mechanisms of BIGV at increased distances from the ground vibration source in loose dry sand and water-saturated sand and discusses the efficiency of water-saturation and densification processes on reducing PVS levels generated by hard rock blasting activities located nearby sand mediums.

**Key words:** Blasting impacts, Blast-induced Ground vibration, Peak Vector Sum, Sand.