# Face Velocity Measurements using a Microwave Radar Technique

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## Abstract

High speed cinematography of surface blasting operations is used for diagnosing various aspects of blast performance. Several quantitative features may be derived including confirmation of the hole initiation sequence, time to first movement, evidence of stemming ejection and measurements of face velocity. Face velocity measurements using high speed cinematography have the following disadvantages: firstly, for accurate measurements placement of targets on the face and surveying of them is necessary; secondly, the analysis requires experience and time and can only be done after the film has been developed.

A novel technique for measuring face velocities based on microwave technology has been developed. The face velocity radar illuminates all or part of the rock face of interest and the reflected signal is detected continuously by the radar unit. The initiation of the blast is followed by rock movement which results in a Doppler shift in the detected signal. This