Vulnerability of newly sprayed shotcrete on hard rock during blasting operations.

A. Ansell  
*KTH Royal Institute of Technology, Stockholm, Sweden.*

L. Ahmed  
*KTH Royal Institute of Technology, Stockholm, Sweden.*

ABSTRACT: Blasting operations during tunnelling through hard rock causes propagating vibrations that can damage rock support systems and installations. The effect from vibrations on young and recently applied shotcrete (sprayed concrete) has been studied through finite element modelling and testing, in situ and also in laboratory. The study aims at an establishment of recommendations and guidelines for practical use during shotcreting work with the goal of a safe and time-efficient construction process. Examples of preliminary recommendations for practical use are given and it is demonstrated how the developed models and suggested analytical techniques can be used. It has been observed that for bonding shotcrete without rock bolts and mesh reinforcement the expected failure mode is either tensile or bond failure. Previous work and results from earlier and ongoing projects at KTH are summarized. Examples of preliminary recommendations for practical use are given.