Research on expansion process of blasting stress waves causing cracks in rocks with filled joints

YANBING WANG[1], Jianlei Chen[2], Keqin Lu[2], Houwei Wu[2], and Dongchen Wang[2]

[1] School of Mechanics and Architecture Engineering
[2]Affiliation not available

May 5, 2020

Abstract

Joints in medium has a significant influence on transmission of blasting stress waves and expansion of blast-caused cracks. This paper first carries out an experiment on crack expansion in PMMA medium with vertically filled joints under blasting load by using the Digital Laser Dynamic Caustics testing system (DLDC), makes an analysis on beginning, expanding and ending of wing cracks, studies variation of dynamic stress intensity factor and crack expansion velocity on crack tip. Then it makes an effective inversion to stress wave transmission and crack expansion in the test by using the Distinct Lattice Spring Model(DLSM), makes a comparison on stress variation at center points on wave heading side, back side and endpoints of the joint, makes an analysis on characteristics of stress wave impact. Finally it compares and analyzes expansion velocity/acceleration difference of wing cracks with different joint characteristics(filled, open, closed, bedding).

Hosted file

`manuscript_24Feb20.doc` available at https://authorea.com/users/299911/articles/429485-research-on-expansion-process-of-blasting-stress-waves-causing-cracks-in-rocks-with-filled-joints

Hosted file

`figure.doc` available at https://authorea.com/users/299911/articles/429485-research-on-expansion-process-of-blasting-stress-waves-causing-cracks-in-rocks-with-filled-joints