Blasting 1.8 million m³ Rock in One Shot: The Blast Design and Environmental Damage Control

Tianrui Xu, Bangqing Ding, Chaohong Liu,
Safety and Environmental Protection Research Institute, Wuhan 430081, China.

Abstract

The authors were responsible for a series of large scale multiple chamber charge blasts conducted in the granite mountain area for making construction space on the southeast sea coast in China during 1993-1996. This paper describes the blast design and damage control of one mountain blast 320m in length and 280m in width in the vicinity of two wharfs and a dam. In order to obtain better rock fragmentation and muckpile, the explosive charge should be well-distributed in the mountain. The charge pattern, therefore, was designed with mainly 5 rows of tunnel charge in regular terrain in combination with a chamber charge in irregular topography area and the maximum burden was limited to be less than 38m. In order to protect the dam and wharfs the firing sequence was carefully arranged in 29 intervals and the distance between different charges of the same delay to the dam or wharf was taken into account as an additional delay interval based on the difference of p-wave propagating times. The maximum charge fired in an interval was also limited to less than 34t explosives through dividing the larger charge by a stemming deck.

The blasting results were fairly good. The wharfs and dam were properly protected.