

The 8 Millisecond "Criterion": Have We Delayed Too Long in Questioning It?

*Douglas A. Anderson
Vibra-Tech Engineers
Hazleton, PA 18201*

Abstract

The simplest method used to predict ground vibration from blasting is scaled distance -the distance from a blast divided by the square root of the Pound e delay. Pounds per delay is defined as the number of pounds of explosive detonated within an 8 millisecond (ms) interval. Based upon this definition, regression plots of peak particle velocity vs. scaled distance have been used to determine likely values of peak particle velocity.

The scatter in such plots can be enormous. One reason is that the definition of scaled distance is inadequate. Why an 8 ms separation? This interval is supposed to separate charges so that the vibration from one charge will not add to that from another. In practice, an 8 ms separation between charges is neither meaningful nor effective, because the vibration from each hole at distances of concern lasts longer than the time separation between charges. The criterion was developed for single-row shots. Now many blasters use decked and multi-row shots for which this criterion, as we shall show, is inappropriate.

Adherence to the criterion has resulted in many blast designs which are awkward and unproductive, while not solving the vibration problem. We recommend that scaled distance based upon an 8 ms separation be used only as a very conservative criterion to indicate worst case vibration levels. It is not a predictor for expected vibration levels. To control vibration, we recommend that methods based upon single-hole testing and destructive interference (such as Vibra-Map®) should be used. In this case, the 8 ms criterion should not be applied because it is inappropriate, and only serves to hinder effective design of blasts. Reasons for these recommendations, and discussion about implementation are given in the paper.