

# NEW EQUATION FOR GROUND VIBRATION CAUSED BY ROCK EXCAVATION THROUGH BLASTING

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Several equations have been proposed by a number of investigators from estimating Peak Particle Velocity (PPV) of ground vibration caused by blasting. Almost all of them use horizontal distance components (D) between blasting and monitoring location. This paper embodies numerous analyses of vertical distance component (h) between blasting and monitoring location, finding a new modified formula for ground vibration. In this case, attempt is made to establish mutual relationship between total maximum equivalent charge per delay, horizontal and different vertical distance between blasting and monitoring location.

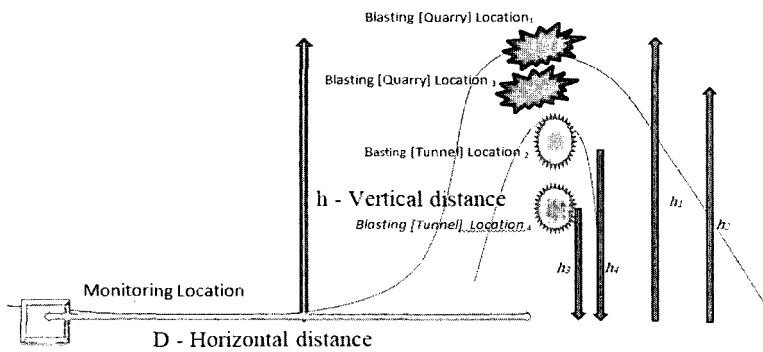


Figure 1: Diagrammatic illustration of blast point orientation reference to the same horizontal distance subjected to the variation of different vertical distances.

$$V = k \left( \frac{D}{\sqrt{W}} \right)^{-\beta} \left( \frac{h}{\sqrt{W}} \right)^{-\beta'} = k (\text{SRSD [HD]})^{-\beta} (\text{SRSD [VD]})^{-\beta'}, \quad h \neq 0$$

**Where:** V- Maximum Peak Particle Velocity

Square Root Scaled Distance of Horizontal distance (SRSD [HD]) =  $D / (W)^{1/2}$

Square Root Scaled Distance of Vertical distance (SRSD [VD]) =  $h / (W)^{1/2}$

With the aid of above finding there will be an opening of avenues in order to estimate the Peak Particle Velocity in the directions of Longitudinal, Transverse and Vertical. It will lead to better prediction and prevention of structural damage by blasting.

**Keywords:** Maximum Peak Particle Velocity, Square Root Scaled Distance [SRSD], k- Site specific ground transmission coefficient,  $\beta$  - Site specific horizontal geological constant,  $\beta'$ - Site specific vertical geological constant.

