

THE SCALE OF EFFECTS IN EVALUATING VIBRATION DAMAGE POTENTIAL

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ABSTRACT

Ground vibrations associated with blasting are generally in a higher frequency range and of shorter duration than those generated by earthquakes, and the intensity scales for earthquakes cannot be applied directly to blasting vibrations without modification. Further, the profession does not need an intensity scale merely to estimate vibration intensity. If the blasting in question is not monitored instrumentally, it is a simple matter to estimate the range of intensities based on published prediction formulae or data from various sources such as Oriard (1), Nicholls et al (2), Hendron and Oriard (3), Siskind et al (4), and others. However, the profession has a serious need, for purposes of evaluating damage claims, to understand the relationships between vibration intensities and the levels of observed effects. The criteria for threshold damage do not apply to typical cases which usually involve structural damage. If the damage in question would have required ground vibration with a particle velocity of, say, 20-120 ips, damage is not verified by showing that the vibration merely approached a suggested limit to avoid threshold damage. That is not the question. This paper provides some guidelines for comparing severity of damage to intensity of vibration which would be required to cause such damage, much as is done when determining earthquake intensities. In addition, this paper includes a discussion of strain amplitudes induced by environmental forces, the predominant causes of damage to structures. Also, certain popular myths regarding blasting damage are discussed in the paper. Due to space limitations, the paper will not include a discussion of airblast effects.