

THE DRILLING AND BLASTING-MECHANICS OF IMPACT AND EXPLOSION

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ABSTRACT

This paper is the first of a series in which evidence suggesting a quantum mechanical behavior of materials in blasting and high energy impact loading is presented. Such evidence relates the mechanical behavior of materials to their electro-magnetic behavior at successive stages in the development of the electric and magnetic fields as the disturbance proceeds outward from the borehole in blasting.

Impact loading and cratering tests provide a means of extending observations of the behavior of materials into high energy ranges not possible to observe in the laboratory.

Livingston Theory provides a means of correlating impact and explosion so as to identify ranges of similar mechanical behavior of materials and of relating the sequence in which they develop to the non-separable and interdependent fundamental quantities energy, mass and time.

The field evidence demonstrates that strength and elastic properties of materials of the earth's crust as conventionally measured in the laboratory are not directly related to the behavior of materials in blasting and impact loading.