



Reply to H.G. Denkhaus 'Brittleness and drillability'

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by R Altindag

A large number of brittleness concepts have been used in very different studies in the literature. One of them is the B1 brittleness concept. In this study, the objective is to criticize the B1 brittleness concept on rotary blast hole drills.

The B1 brittleness concept, the ratio of uniaxial compressive strength (σ_c) to tensile strength (σ_T), are widely used as a rock brittleness concept in the literature (Inyang and Pitt, 1990; Verhoef, P.N.W. 1993; Neil, D.M. *et al.* 1994; Becker, *et al.* 1984; Evans and Pomeroy, 1966; Göktaş, R.M. 1992; Kahraman, S. 2001; Yamaguchi, U. 1970; Verhoef, P.N.W. *et al.* 1996; Bilgin, 1982; Howarth and Rowlands, 1987; Howarth, D.F. *et al.* 1986). So, it was used as a rock brittleness concept in this article. The value of the B1 brittleness concept is equal to the tangent of β angle in the following graph. It was seen that more meaningful relationships could be obtained with the B2 brittleness, the under 'Area' ($= \frac{1}{2}(\sigma_c \times \sigma_T) = B2$) under the curve, instead of tangent β , ($=B1$), of the curve.

Inyang and Pitt (1990) stated that the ratio of the compressive strength is directly proportional to brittleness.

The usability of the under Area the curve as a brittleness concept (B2) was considered instead of the B1 brittleness concept (tangent β). The phenomena was investigated and compared with the B1 brittleness concept in this article. The relationship between B2 brittleness and drillability index with rock properties was obtained more reliably than the B1 brittleness index (Figures 2–4 in the article). The description of the B2 brittleness concept was defined in detail in Altindag (2000a, 2000b).

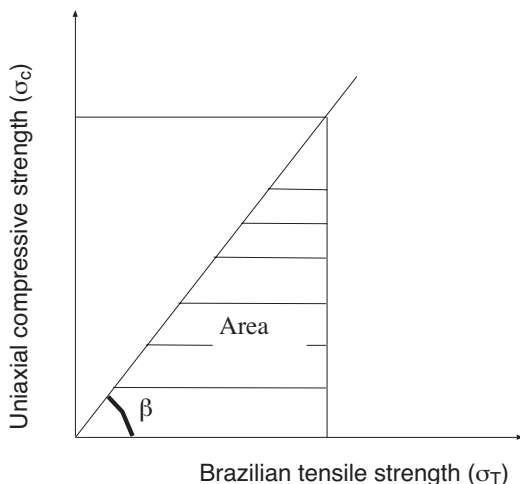
Also in the percussive drillings, more reliable relationships between penetration rate and B2 brittleness

concept were obtained than the B1 brittleness concept (Altindag, 2000a 2000b, 2002).

Finally, it was seen that more meaningful relationships between the B2 brittleness concept and drillability index with rock properties can be obtained than by using B1 brittleness concept.

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