

CHARACTERIZATION OF BRAZILIAN TENSILE STRENGTH OF SCHISTOSE ROCKS

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EXTENDED ABSTRACT

A number of studies focused on Brazilian tensile strength characterization of anisotropic rocks. These studies investigated tensile strength variations of anisotropic rocks mainly with reference to angle between traces of weakness planes on the core end face and loading direction (β') when weakness planes were parallel to the core axis (i.e. $\beta = 0^\circ$) while exploring the influence of β on Brazilian tensile strength does not seem to have gained much attention. It should be noted that even if two Brazilian test specimens (from same anisotropic rock) equivalent in mineralogy and microstructure are tested with same β' , their tensile strengths could differ provided β for the specimens are dissimilar. The present investigation mainly emphasizes this issue.

Schistose cores collected from the uranium mine, Jaduguda (Jharkhand, India) were used in the present study. A total of 59 disc specimens were prepared from 10 schist core pieces (numbered randomly as 1 to 10) where 5 discs from sample 6 and 6 discs from each of the other core pieces/samples could be obtained. For a particular β , Brazilian tests were carried out on the discs taking 6 different β' s (0° , 15° , 30° , 45° , 60° , 90°) into account. Although the tensile strength variation over $\beta' = 0^\circ$ to 90° for particular β s did not strictly depict consistent patterns, tendency of occurrence of minimum tensile strength at $\beta' = 30^\circ$ or 45° became apparent. When tensile strengths of the schist specimens were plotted against available β s (15° to 50°) at particular β' s, perfectly crescent shaped (convex downward) distributions of tensile strength data points at all plots emerged and curvatures of these distributions appeared to alter with the change in β' . As overall composition and fabric of these schistose rocks (geologically from the Singhbhum Shear Zone) are broadly equivalent, it can be said that the said results clearly depict the influence of both β and β' on tensile behavior of the rocks under Brazilian test. Dependence of failure modes of the schistose rock on both β and β' also became apparent.