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Investigation of the hydrostatic and plastic zones of hardness measurement using finite element simulation

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Hardness test is one of the most fundamental types of mechanical testings. Hardness is determined by testing the resistance of a material to penetration, which takes several forms.

In the present paper, the hydrostatic and plastic zones, formed under the indenter ball, have been investigated in the case of the Brinell measurement, by using a finite element method to determine the displacement of all the nodes formed under a surface and the stress values whiches have been generated in them after final loading. The aim of this study is to define these zones more precisely and to compare them with analytical methods.

Keywords: Finite Element Method, FEA, Hardness, Simulation, Brinell Hardness