

EFFECTIVE UTILIZATION OF EXPERIMENTAL DATA TO IMPROVE THE PREDICTION ACCURACY OF YIELD COEFFICIENTS

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The anisotropic coefficients for yield criteria are generally determined from uniaxial tensile data along rolling, transverse and diagonal directions. The choice of experimental data however is not restricted to specific orientations and tensile data along different orientations can be used. It is shown that the shape of yield locus is greatly influenced by the choice of experimental data. The purpose of the present study is to discuss the issues related to the choice of experimental data for yield criterion. The accuracy of the coefficients can be improved if additional experimental data are used. In such cases, the number of experimental data exceeds the number of constants. The yield coefficients can then be optimized using a weighted error function which minimizes the error in yield strength and plastic strain ratio. The usage of weighted error function poses two additional difficulties, viz, (i) initial guess of the variables and (ii) weightage factor. The problems associated with the initial guess of yield coefficients and weight factors are discussed using Hill48 and Yld2000 yield criteria for low carbon steel grade. Guidelines and potential future work for effective utilization of experimental data to determine meaningful yield coefficients are proposed.