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STATISTICAL STRENGTH ANALYSIS AND STEEL COLUMNS

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ABSTRACT

Strength theories and test data represent the two most important sources of information available to the designer of structural members. A method for combining any particular theory, available member tests, and auxiliary data on material and geometrical properties is discussed in the paper. Its application is illustrated using the tangent modulus theory of inelastic buckling, European column test data, and associated material information. The procedure is consistent with the type of information needed to implement second-moment code formats. For the theory and data considered in the illustration, the column strength uncertainty (as measured by the variance) due to imperfect theories and due to imperfect information about the internal residual stress distribution outweighs that column strength uncertainty due to the yield strength of the material.

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