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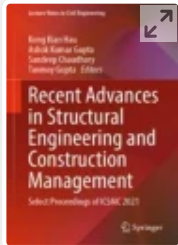
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Bending Deflection Solutions of Thick Beams Using a Third-Order Simple Single Variable Beam Theory

[Rajesh A. Shetty](#) , [S. A. Deepak](#), [K. Sudheer Kini](#) & [G. L. Dushyanthkumar](#)

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Abstract

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transverse/lateral loads. The single variable beam theory used herein contains only one differential equation involving a single displacement variable. The governing equation of the theory has strong similarity to that of Euler–Bernoulli beam theory. Hence, beam problems can be solved in the similar lines as in case of Euler–Bernoulli beam theory. In this manuscript, along with the single variable beam theory transverse/lateral deflection expressions, the expressions for transverse deflections given by two-dimensional theory of elasticity approach, Euler–Bernoulli beam theory, Timoshenko beam theory, and Levinson beam theory also have been presented. The expressions for transverse/lateral deflections are written herein in such way a that one can easily differentiate between the contributions of bending deformation and the shear deformation in the transverse/lateral deflection of a beam. By referring to these deflection expressions, one can clearly understand why Euler–Bernoulli theory leads to inaccurate deflections in case of thick/shear deformable beams. Even though the beam transverse deflection

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Keywords

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Transverse load **Boundary conditions**

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