1116-VM-2087 **Austin States*** (statesar17@mail.vmi.edu), 1340 Windsor Road, Red Lion, PA 17356, **Bradley Lipscomb** (lipscombbs16@mail.vmi.edu), 1185 County Home Road, Blanch, NC 27212, and **Dimplekumar Chalishajar**. *On Applications of Generalized Functions in the Discontinuous Beam Bending Differential Equations.* Preliminary report.

Abstract:

This paper discusses the mathematical modeling for the mechanics of solid using the distribution theory of Schwarz to the beam bending differential equations. This problem is solved by the use of generalized functions, among which the well known Dirac delta function. The governing differential equation is Euler-Bernoulli beams with jump discontinuities on displacements and rotations. Also, the governing differential equations of a Timoshenko beam with jump discontinuities in slope, deflection, flexural stiffness, and shear stiffness are obtained in the space of generalized functions. The operator of one of the governing differential equations changes so that for both equations the Divac delta function and its first distributional derivative appear in the new force terms as we present the same in an Euler-Bernoulli beam. Examples are provided to illustrate the abstract theory. This research is useful to Mechanical Engineering, Ocean Engineering, Civil Engineering, and Aerospace Engineering.

Key words: Mechanics of solids, Discontinuities in a beam bending differential equations, Generalised functions, Jump discontinuities (Received September 21, 2015)