International Journal of Civil, Structural,
Environmental and Infrastructure Engineering
Research and Development (IJCSEIERD)
ISSN(P): 2249-6866; ISSN(E): 2249-7978
Vol. 5, Issue 4, Aug 2015, 107-118

CONTROLLED DEFLECTION OF STRUCTURAL ELEMENTS USING PVDF MATERIAL AS COMPOSITE MATERIAL IN SMART STRUCTURES

M. PAVAN KUMAR[1] & T. CHIRANJEEVI MANIKANTA KUMAR[2]

[1]Assistant Professor, Department of Structural Engineering, SVP Engineering College, Visakhapatnam, Andhra Pradesh, India

[2]Student, Department of Structural Engineering, SVP Engineering College, Visakhapatnam, Andhra Pradesh, India

ABSTRACT

This paper deals with the Deflection control of beam and frame like structures with distributed piezoelectric (PVDF) actuator layers bonded on top and bottom surfaces of the beam. The patches are located at the different positions on the frame to determine the better control effect. The study is demonstrated through simulation in MATLAB for various voltage controllers. The entire structure is modeled using the concept of piezoelectric theory, Finite Element Method (FEM) using lumped mass approach. The numerical simulation shows that the sufficient deflection control can be achieved by the proposed method.

KEYWORDS: Smart Structure, Piezoelectric Material, PVDF Patch, FEM, Deflection Control, Bimorph Beam, Portal Frame