

THEORETICAL ANALYSIS OF SEMI CIRCULAR CURVED BEAM SUBJECTED TO OUT-OF-PLANE LOAD

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ABSTRACT

Curved beams are used as machine or structural members in many applications. They can be classified into two categories based on application of load. Curved beams subjected to In-Plane loads are more familiar and are used for crane hooks, C-clamps etc. The other categories of curved beams are the ones that are subjected to out-of-plane loads. They find applications in automobile universal joints, raider arms and many civil structures etc. The formulations with respect to curved beams of second category are not found in literature. The results of this research on semicircular curved beam subjected to out-of-plane loads have revealed some interesting results. For semicircular curved beams subjected to out-of-plane loads, it is shown that every section is subjected to a combination of transverse shear force, bending moment and twisting moment. Maximum principal stress occurs at a section 120 degrees from the section containing the loading line. Moreover it is observed that fixed end of this curved beam is subjected to a state of pure shear.

KEYWORDS: Combined Torsion and Bending Stress, Curved Beams, Out-of-Plane Load, Stress Distribution