

# ON LARGE DEFLECTIONS CALCULATION FOR CURVED COMPOSITE BEAMS WITH VARIABLE BENDING STIFFNESS.

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## Abstract.

The non-linear bending of curved composite beams with variable bending stiffness and undergoing large displacements is discussed. This model is based on the Bernoulli-Euler equation, which states that the curvature variation of the elastic axis of an initially curved beam subjected to a bending moment is proportional to the applied load. Assuming that the elastic axis can be approximated with a finite number of circular arcs tangent one to another, this concept is extended to curved beams with non-uniform geometric and/or material characteristics along the elastic axis. An original, light and fast numerical calculation procedure is proposed. Analytical, numerical and experimental results are presented. When a closed form exact solution is possible, numerical and analytical results are in good agreement. When a closed form solution is not possible, numerical results are directly compared with experimental ones. In addition, the proposed procedure is applied to design a light aircraft composite landing gear.

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