Investigation of the Bending Rigidity of Double Braided Ropes

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Abstract

This work presents an investigation about the bending rigidity of double braided ropes. The braid structure is subjected to bending condition by fixing one end and leaving the other end to hang freely and bend under its own weight to a set deflection limit and its length is measured. The length and deflection are then used to calculate the bending stiffness and bending moment using the beam deflection equation. The bending behavior of single braided and double braided tubular ropes is also studied and compared. Highest bending rigidity was obtained with double braided tubular ropes compared to single braided tubular ropes. It is observed that, braided structures are very weak under transverse loading, their strength are improved when more structural layers are braided together. High braiding angle of braid structures is observed to improve bending stiffness and bending moment.

Keywords

Double braiding Bending stiffness Area moment Boundary condition