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State maxwell's reciprocal theorem

Join TheConstructor to ask questions, answer questions, write articles, and connect with other people. When you join you get additional benefits. Have an account? Log in Objective: To verify Clerk- Maxwell's Reciprocal Theorem and to assess the Young's modulus of beam arterial of the apparatus. Tools and Equipment Clerk-Maxwell's reciprocal' theorem apparatus Tire weight Dial gauge Theorem The Clerk-Maxwell's reciprocal theorem states that in case of a linearly elastic structure, the deflection may occur at any point. A. Because of load exerted at the other point 13 shall be equivalent to the deflection at B when the similar load is exerted at A. Apparatus Clerk-Maxwell's reciprocal theorem apparatus comprises of a robust and rigid frame and additionally a light beam. The beam is given with meek end holds over the inflexible frame in the shape of a hinge at one of the ends and a roller at the other end. tire rod assembly is positioned in order to load the beam utilizing the tire- weights (Weight of this assembly is made equilibrium to the one of the tire —weight). Additionally, there is also a traveling pedestal to retain the dial gauge for the measurement of deflections. Procedures Position the beam with great precision over the top of the supports. Now, mount the dial gauge on the top of the pedestal, position it below the beam precisely at mid- span and regulate it to decipher zero on the scale. Hung the tire rod assemblies precisely at quarter-span and mark the dial gauge readings. Now, position the tire weights taking one by one, marking the dial gauge, taking note every time a weight is positioned. Carry on the observations while at the same time unloading the beam as well. Carry on this process after switching the locations of the dial gauge and additionally the tire rod assembles as well. Observations Tabularize the observation Graph Plot a graph with deflection on X- axis and load on Y- axis for both the case. Calculations The deflection at quarter point because at the center is shown by; W- the load, L- the span, I — the moment or inertia of the section the beam and E- the Young's of the beam. Thus, E can be ascertained. Verification Make comparison between the deflection under various loads in case (1) with those in case (2). The result will found to be the same, hence verifying the theorem. 2. Superpose the plot of load Vs deflection or case (1) with that of case (2). They will accord with each other, thus, verifying the theorem once again. Result Verification of Clerk-Maxwell's reciprocal theorem Young's Modulus of the material of the beam= Questions Explain law of reciprocal theorem. State the type of supports given in the Clerk-Maxwell's apparatus? Explain why the depth of beam is less than the width in Maxwell's reciprocal apparatus. NPL101 (visitor) (OP) 15 Jul 02 16:44 According to Maxwell's reciprocal theorem the displacement at coordinate i due to a force at a coordinate j is equal to the displacement at coordinate j due to a force at a coordinate i.What if the displacement at coordinate i is a rotation and at j is a translation?How can a translation and a rotation be equated? Thank you for helping keep Eng-Tips Forums free from inappropriate posts.The Eng-Tips staff will check this out and take appropriate action. Page 2 Low-Volume Rapid Injection Molding With 3D Printed Molds Learn methods and guidelines for using stereolithography (SLA) 3D printed molds in the injection molding process to lower costs and lead time. Discover how this hybrid manufacturing process enables on-demand mold fabrication to quickly produce small batches of thermoplastic parts. 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