

Experimental Investigation of Natural Frequency and Forced Vibration of Euler-Bernoulli Beam under Displacement of Concentrated Mass and Load

Authors : Aref Aasi, Sadegh Mehdi Aghaei, Balaji Panchapakesan

Abstract : This work aims to evaluate the free and forced vibration of a beam with two end joints subjected to a concentrated moving mass and a load using the Euler-Bernoulli method. The natural frequency is calculated for different locations of the concentrated mass and load on the beam. The analytical results are verified by the experimental data. The variations of natural frequency as a function of the location of the mass, the effect of the forced frequency on the vibrational amplitude, and the displacement amplitude versus time are investigated. It is discovered that as the concentrated mass moves toward the center of the beam, the natural frequency of the beam and the relative error between experimental and analytical data decreases. There is a close resemblance between analytical data and experimental observations.

Keywords : Euler-Bernoulli beam, natural frequency, forced vibration, experimental setup

Conference Title : ICAETMS 2022 : International Conference on Aeronautical Engineering, Technologies and Mechanical Structure

Conference Location : Miami, United States

Conference Dates : March 11-12, 2022