

Study of a Simply-Supported Beam with Attached Multiple Vibration Absorbers by Using Finite Element Analysis

Syaiful Azmirul Mohd Rozlan, Izzuddin Zaman, Shiau Wei Chan, Bukhari Manshoor, Amir
Khalid, Mohd Shahrir Mohd Sani

Advanced Science Letters

2017, 23, 3951-3954

Vibrations are well known as the source of problem in the damage and loss of control of equipment which can reduce the efficiency of a machine. Few methods can be done to control the vibration and one of it is by adding absorbers. In this study, the concept of attached multiple vibration absorbers to a simply-supported beam was applied to reduce the structural vibration amplitude. The method employed in this research was finite element simulation of ANSYS® APDL. The frequency range of the study was set between 5 to 1000 Hz in which capture up to four modes shapes of the beam. Further study was conducted by positioning the absorber at three different locations which resulted the vibration reduction of 33% when positioning at middle of the beam. The experiment was continued in depth by adding multiple vibration absorbers from two to ten absorbers. The overall vibration reduction achieved for multiple absorbers was 89% (with attached four and eight absorbers) compared to a single absorber which only achieved 33% reduction. It can be concluded that adding multiple absorbers produce better vibration reduction compared to single absorber. However, adding more vibration absorbers need to be considered thoroughly since excessive weight will result in less fuel efficiency towards vehicles, aerospace, automotive and machine systems.