

## **Theoretical modelling of a beam with attached spring-mass-damper system**

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MATEC Web of Conferences

2017, 90, 1030

Vibrations are always undesirable, wasting energy besides producing noise. In this case, beams which are prominent component in most engineering having no exemption from the vibration effect when imposed by dynamic loading. One of the approach to attenuate vibration of a structure is by having a spring-mass-damper (SMD) system or typically known as vibration neutralizer attached to the vibrating structure. This method is more promising as it does not contribute significant additional energy to the structure. The work presented in this paper describes the frequency response (FRF) of a simply supported beam with an attached SMD system. A mathematical model of a beam was at first developed in the study which was further derived to include the attachment of SMD system. In order to transform the derived equations into a form of graph that can be analysed, Matlab® software was used. The outcome from Matlab® shows that the attachment of SMD onto beam attenuates its vibration significantly. The result also displays a good resemblance FRF when compared with numerical finite element analysis of Ansys®. It is expected that the theoretical derivation demonstrated in this paper provide a helpful reference to future researchers who endeavour to find equations of a simply supported beam with an attached SMD system as well as for a vibration control study.