A REVIEW OF ADAPTIVE VIBRATION ABSORBERS

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ABSTRACT

The vibration absorbers are frequently used to control and to minimize excess vibration in structural systems. To reduce the vibration of the main system or machine, the frequency of absorber should be equal to the excitation frequency. This result in subcomponent of total structure adding large input impedance to the primary structure, thus 'absorbing' the internal energy transferred to form primary structure.

The vibration absorbers are frequently used to control and to minimize excess vibration in structural systems. The Dynamic vibration absorbers are used to reduce the undesirable vibrations in many applications such as electrical transmission lines, pumps, machine tools, gas turbines, engine, bridges, structures etc. To reduce the vibration of the main system or machine, the frequency of absorber should be equal to the excitation frequency. This result in subcomponent of total structure adding large input impedance to the primary structure, thus 'absorbing' the internal energy transferred to form primary structure.

The aim of this review work is to study various types of dynamic vibration absorber with variable stiffness mechanism for tuning and to study design of the tunable vibration absorber for vibration control of primary system (beam structure) using finite element method through an Ansys. Its stiffness can be varied to adapt the changes in excitation frequencies. Traditional means of vibration control have involved the use of passive and active methods. This study involves the design and implementation of control system to make absorber tunable by incorporating the use of ball screw for varying the stiffness of secondary system. The objective of this review work is to introduce methods of vibration control and describe practical methods for their application. Several scenarios and case studies will be presented, with emphasis on pragmatic solutions to industrial vibration problems

DESIGN AND ANALYSIS OF COMPOSITE POLY-ACETYLENE EPICYCLIC GEAR

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ABSTRACT

Gears are the very useful components in mechanical power transmission system and industrial rotating machinery. Gear drive plays vital role in power transmission industries. Gears are usually subjected to fluctuating loads. Due to these loads bending and compressive stresses will be developed in the gears. While designing the gear it is very important to analyze the stresses for safety operation, and weight reduction of gear is also one of the design criteria.

Gears are generally made from metallic materials but recently advanced polymers were developed which have sufficient strength and properties similar to the metallic materials so they can easily replace the metallic gears if some care will be taken. It is required to operate gears under oil less condition in many modern types of machinery. This work is concerned with the replacement of existing metallic gear with composite material gear in order to make it lighter and increasing the efficiency of mechanical machines Nylon, polycarbonate, polyacetal and delrin are the structure polymer materials used in printing and robotics mechanism with good functionality but polymers gears are not used in heavy loading type application. Especially polymer gear gives extra benefits compared to metallic gears like less noise-vibration, low requirement of maintenance-lubrication, low cost and easy manufacturing.