CHAPTER 1

INTRODUCTION

1.1 BACKGROUND STUDY

It is undeniably that the problems of the vibration control in almost flexible structures have been considered as a vital design in the mechanical as well as aerospace engineering. Several of modern advanced application such as those in jet plane, automobiles and also spacecraft, definitely need and require structures that are absolutely good in strength, lightweight and have high structural damping property. Consequently, there is need to develop structures that are well equipped with suitable vibration control particularly damping. In order to solve this vary problem, so many complex system has been proposed. In present work, magnet-coil system is used in order to minimize the vibration.

By the way, damping can be obtained by the electromagnetic force which is generated by the movement of a conducting material through stationary magnet or the movement of a magnet through a stationary conducting material. This causes ‘‘eddy’’ currents to flow in the conductor. The use of eddy currents for damping of dynamic systems has been known worldwide and its application to lateral vibration control of rotating machinery has been thoroughly investigated.

Furthermore, The magnet-coil was used for a passive eddy current damper and an electromagnetic actuator to suppress the vibration of cantilever beams. The magnet-coil system consists of a copper coil attached to the aluminum beam and a permanent

magnet installed below the coil, and this conductive coil can be used passively and actively as a damper and an actuator. The effect of the coil shapes including a cylindrical tube, a square tube and a circular sheet was investigated to find an efficient magnet-coil system for the vibration suppression of the cantilever beams.

1.2 PROBLEM STATEMENT

In this case, the ability of the eddy currents generated by magnetic fields to suppress the vibration on particular structures is being studied. Oftenly, excessive vibration is usually undesirable, wasting energy, creating noise and should be avoided. Here eddy current damper is being introduced which acting as an effective vibration reduction mechanism so that the unwanted vibration can be suppressed and hopely removed as well.

1.3 OBJECTIVES

The objectives of this thesis are stated as follows:

(a) To investigate the maximum ability of eddy currents dampers which is generated by magnetic field in order to suppress the vibration of flexible beams.
(b) To investigate the vibration and damping characteristic of the flexible beams itself with the different kind of inductor coils.

1.4 SCOPES OF RESEARCH

The scopes of research of this thesis are stated as follows:

(a) Research on recent technology of eddy current damper application.
(b) Design an experiment in order to prove the ability of eddy current damper
(c) Determine which conducting coils is the most efficient in vibration reduction.