Engineering Guide

INTRODUCTION

Forces and motions are the elements utilized by mechanical equipment to perform work. Unfortunately, these same elements can produce undesirable effects, even in the most carefully designed equipment. The adverse effects of vibration, shock and noise disturbances range from simple annoyances to shortened equipment life through failure of its components. They will affect comfort, safety or performance.

Vibration, shock and noise control components, properly applied, will improve your products. They will operate more smoothly and quietly, and they will be less disturbing to surrounding equipment and personnel, less susceptible to damage and less expensive to make. Bonded rubber mounts provide cost-effective solutions to problems involving vibration, shock and structural noise control.

The theory and concepts for bonded rubber mounts are relatively straightforward. A great many of the applications are uncomplicated, and the nonspecialist can handle them directly. However, some vibration and shock control problems are quite complex, making component selection and design complicated.

These applications require the involvement of specialists in order to arrive at suitable recommendations, and Lord has a technical staff available to assist you. In any event, the information presented in this catalog will prove useful in your independent application solutions, as well as at those times when technical assistance is necessary. See application selection guide (page 15).

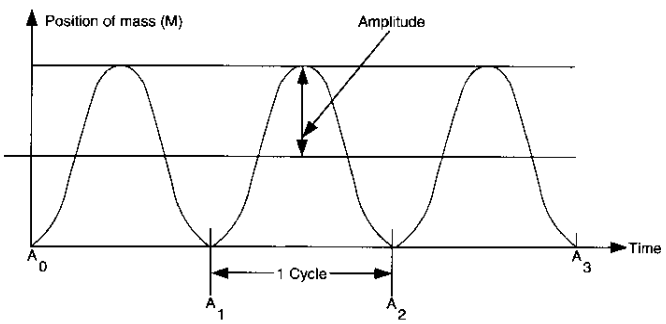
This catalog has been prepared to assist the individual who does not frequently deal with vibration and shock problems and to remind others of the versatility of bonded rubber mounts. It presents the important information needed to select and use bonded rubber mounts: terms and definitions, theory, sample problems and data on standard mounts.

TERMS AND DEFINITIONS

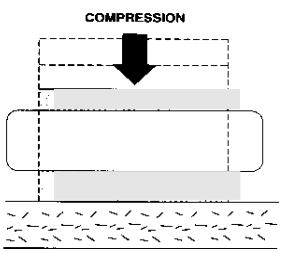
There are a number of terms which should be understood before entering into a discussion of vibration and shock theory. Some of these are quite basic and may be familiar to the users of this catalog. However, a common understanding should exist for maximum effectiveness.

Acceleration - rate of change of velocity with time. Usually along a specified axis, usually expressed in “g” or gravitational units. It may refer to angular motion.

Amplitude - the maximum displacement from its zero value position.



Compression- when specified as a direction for loading - a deformation caused by squeezing the layers of an object in a direction perpendicular to the layers.



Damping (c) - the mechanism in an isolation system which dissipates a significant amount of energy. This mechanism is important in controlling resonance in vibratory systems.

Disturbing frequency (f_d) - the number of oscillations per unit time of an external force or displacement applied to a vibrating system. f_d = disturbing frequency.

Durometer (hardness) - an arbitrary numerical value which measures the resistance to the penetration of the durometer meter indenter point; value may be taken immediately or after a very short specified time.

Fragility - is the highest vibration or shock level that can be withstood without equipment failure.

“G” level - an expression of the vibration shock acceleration level being imposed on a piece of equipment as a dimensionless factor times the acceleration due to gravity.

Isolation - the protection of equipment from vibration and/or shock. The degree (or percentage) of isolation necessary is a function of the fragility of the equipment.

Load deflection curve - the measured and recorded displacement of a mounting plotted versus an applied load.

Natural frequency (f_n) - the number of cycles (expressed