

# NASA TECH BRIEF



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## Packaging Criteria for Transportation and Handling Shock and Vibration

The shock and vibration environment encountered by items and equipment during shipment can be severe enough to cause damage. This, of course, depends upon the input motions resulting from the shipping environment and the fragility levels of the item or equipment. Packaging and design engineers, faced with the problem of shipping a product or piece of equipment must have detailed information concerning the environment (and the fragility levels of the equipment or product) in determining if an item requires protection. If protection is required, the information is used for designing protective packaging or isolation systems.

A very useful tool would be provided if all available data concerning the shipping shock and vibration environment were available in condensed form in one source. To this end, a comprehensive literature survey and search was conducted for data and information applicable to the cargo handling environment. Approximately 150 reports and articles were reviewed and over 50 agencies or organizations concerned with problems of this nature were contacted. The information compiled is summarized to show the distribution of drop heights for particular packages,

distribution systems, and handling operations. Other information on the handling environment such as the number of drops received per package per trip, the distribution of the drops over the faces, edges, and corners, the effect of package size and weight, the effect of the distribution system and the effect of labels and handholds are also presented. A case history for paper sacks is presented which describes the complete drop height history from manufacturer to customer. Applications of the data to typical package design problems are discussed. Results of recent measurement programs of the transportation shock and vibration environment are also presented.

### Note:

Copies of the complete report "Transportation and Handling Shock and Vibration Design Criteria Manual MR1262," by Fred E. Ostrem and M. L. Rumerman, April 1967, are available from the Clearinghouse for Federal Scientific and Technical Information, Springfield, Virginia 22151.

### Patent status:

No patent action is contemplated by NASA.

Source: (MFS-13007)

Category 05