Dossier: Vibration Testing

Packed goods encounter a lot of vibration during transportation which can cause damage to the product.

To test if a packaging type gives enough protection to its packed goods, a range of standardized vibration tests can be used.

**Constant vibration (Loose load vibration/Bounce test)**

At a given frequency (specific to the tested object), the packaging itself comes loose from the vibration platform. These impacts will be repeated for a certain test time.

A typical characteristic to perform this type of vibration is the low frequency which will be maintained during the whole testing time. Testing can be executed with vertical motion, as well as rotational movement of the vibration table, where the displacement (amplitude) remains constant.

If this test is part of a transport simulation, the impacts simulate the movement of a package when it comes loose from the load platform, due to the fact that a load is not decently lashed on the load platform or when driving on a road in poor condition. Think for example about boxes which move freely in a delivery truck.

This kind of vibration testing is often used to test the integrity of the packaging during the development or optimisation phase, where the object will be subjected to, for example, 14,200 impacts.

**Random vibration**

Random vibration testing is standard in a complete transport simulation according to ISTA, ASTM, ISO.....

These tests simulate the vibrations that occur during transport with truck, train, plane and other modes of transportation. For each type of transportation, worldwide recognized, standardized vibration profiles, are programmed into the vibration equipment.

There is also the possibility to program a specific vibration profile that has resulted from logging different transports in reality by means of a data recorder.

During a random vibration test, a combination of frequencies and intensities, that are constantly repeated, are created to simulate the desired transport. The broad range of the frequency spectrum is typical for a random vibration which simulates the varying situations during a certain mode of transport.
**Sine vibration**

The Sine Sweep test determines the resonances (natural modes of vibration) of a product. This kind of vibration test is executed in a predefined frequency range with a specific amplitude and/or velocity. Sensors, attached to the product, can be used to determine the resonances and are helpful for the analysis of the test.

Sine Sweep Vibration Testing traverses or sweeps between a low and high frequency.

Afterwards, a Sine Dwell test can be performed for a certain test time at a critical frequency, to detect the damage that can occur to the packaged goods, products or packaging.

Resonances during transport can create damage to the product, such as scuffing and stress on materials which can lead to fatigue. To avoid this kind of damages, the packaging itself must be designed in such a way that it neutralizes the vibrations of the goods at various frequencies.

**Data recorder**

It is possible to record a transport journey “on the field” with a data recorder and program the data afterwards into the vibration equipment. The vehicle motion will be recorded when the data recorder is attached to the pallet or to the truck itself, or packed into the packaging. It registers vibrations, impacts and shocks as a function of time during the whole journey. To obtain a good overview of the events during a specific journey, a transport can be logged once or several times.

These logs will be, after analysis and processing, transferred to a specific profile which will control the vibration table.

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Lansmont Vibration Tester
(up to 300Hz)

Vibration table – rotational/vertical
(up to 5 Hz)

Data recorder

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Info and test requests: visit our [website](#)
Contact: An Van Geite