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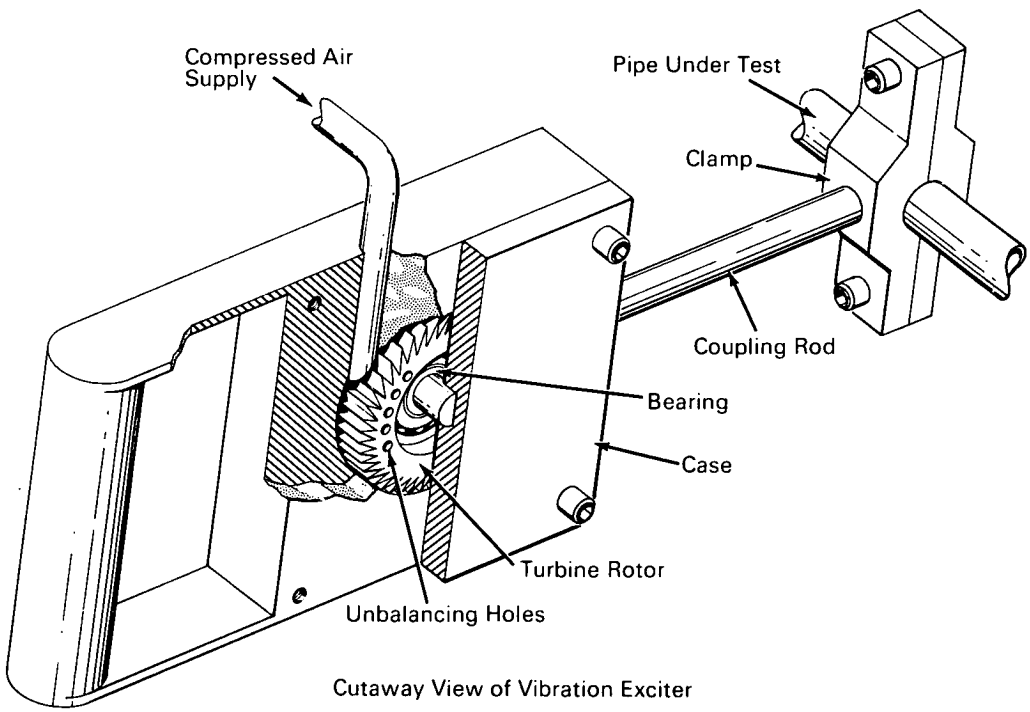
# NASA TECH BRIEF



## Portable Vibration Exciter




Cutaway View of Vibration Exciter

### The problem:

To provide a portable source of sinusoidal vibrations for vibration integrity testing of fluid system components or connectors.

The need for this device is created by the lack of an agreed method of verifying the vibration-failure confidence level of certain fluid system mechanical connectors. The principal technique employed until now has been to subject the entire system to vibration and/or to test it under a high static pressure level. The major problems in this technique have been the magnitude of the static pressure applied and the questionable validity of applying a high static pressure test to give a high vibration-failure confidence level.

### The solution:

The gas-driven vibration exciter illustrated above produces a sinusoidal excitation function controllable in frequency and in amplitude. This device allows direct vibration testing of components under normal loads, removing the possibility that high static pressure may damage other components in the system.

### How it's done:

The exciter consists of an unbalanced turbine rotor straddle mounted on bearings in a stainless steel body and driven by a tangentially directed air jet. The sinusoidal vibrations produced by the spinning rotor are transmitted through the case and coupled to the

(continued overleaf)

test object by a steel rod. The rod may be attached to the object in a variety of ways. Here the apparatus is attached by means of a pipe clamp; other types of clamps, providing area or point contact, may be used.

In use, frequencies up to 1100 Hz have been achieved, with a maximum amplitude of 0.015 in. at resonance. The frequency is controlled by the delta pressure across the turbine, and the amplitude is increased by increasing the amount of turbine unbalance. Maximum amplitude is experienced at resonance of the test item.

## Notes:

1. This device is superior to all known comparable methods in compactness, portability, cost, and safety. Being gas driven, it may be used in hazardous environments where electrical equipment is forbidden.
2. Requests for further information may be directed to:

   Technology Utilization Officer
   Kennedy Space Center
   Kennedy Space Center, Florida 32899
   Reference: B70-10339

## Patent status:

No patent action is contemplated by NASA.

Source: F.T. Williams of NASA, and L.C. Beecher of The Bendix Corporation under contract to Kennedy Space Center (KSC-10069)