MEASURING PAVER VIBRATOR FREQUENCY

SCOPE

This test procedure describes the method for manual determination of the vibration frequency of each individual internal vibrator on a slipform Portland Cement Concrete (PCC) paver.

PROCEDURE

A. Apparatus

A length of steel rod, 1/2 in. (12.5 mm) in diameter, with a small fork at the lower end to straddle the vibrator body or hydraulic line protector hose. The length of the rod depends upon the distance from about 3 ft. (0.91 m) above the paver operator expanded metal walkway down to the vibrators. The width limit of the fork depends upon the size of openings in the expanded metal walkway. A typical rod might be 1/2 in. (12.5 mm) in diameter by 4 ft. (1.21 m) to 7 ft. (2.13 m)-long with a 2 in. (50 mm) fork opening (Figure 1).

Tachometers: Vibra-Tak®, single wire reed type (Figure 3).
Standco®, vibrating reed type (Figure 4).

A Vibra-Tak®, single wire reed type tachometer, is sometimes preferred as it has a wide range of frequency, is low-cost, durable and gives readings with acceptable accuracy.

B. Recording Procedure

Take vibrator readings immediately after the start of paving and each 4 hours. Take readings also after any changes are made to the vibrator.

Record: Test location
Time of day
Vibrator frequency for each vibrator

Record vibrator data such that the position of the No. 1 vibrator is on the left side of the paver when facing the direction of paving. (See attached data form.)

C. Taking Readings

In most cases, the best readings can be obtained through contact with the hydraulic line protector hose just above the vibrator (position A, Figure 2). The second choice location would be position B (Figure 2). Taking readings directly from the vibrator body (position C, Figure 2) may be excessively harsh, hard to read, and could eventually damage the tachometer-testing apparatus.

Vibration transmission to the tachometer is obtained by placing the lower end of the forked rod on or near each vibrator (Figure 2) while reading the vibrations per minute (VPM) value from the tachometer at the top of the rod. (Caution, do not allow the metal rod to touch any other part of the paver, such as the metal walkway, while taking readings.)

Vibration readings are obtained by holding the nose of a wire type Vibra-Tak® against the top end of the rod, perpendicular to the rod axis. As the wire reed of the Vibra-Tak® is moved in or out of its holder, by moving the tuning slide, a maximum reed vibration will occur at a specific reed length. Read the VPM (x 1000) on the reed holder body adjacent to the top rim of the tuning slide (Figure 3). Standco® readings are taken directly from the tachometer face (Figure 4). (Be aware of Harmonics section in Standco® instructions sheet.)

D. Specifications (Refer to Article 2301.07.)

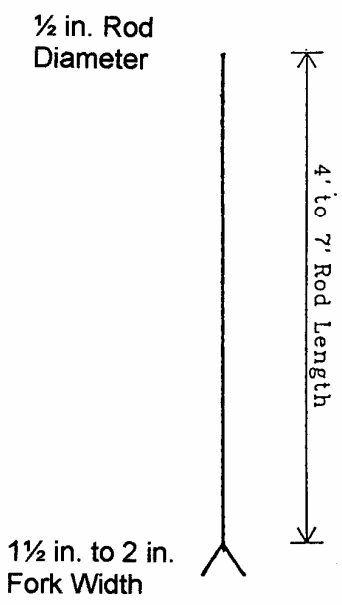


Figure 1

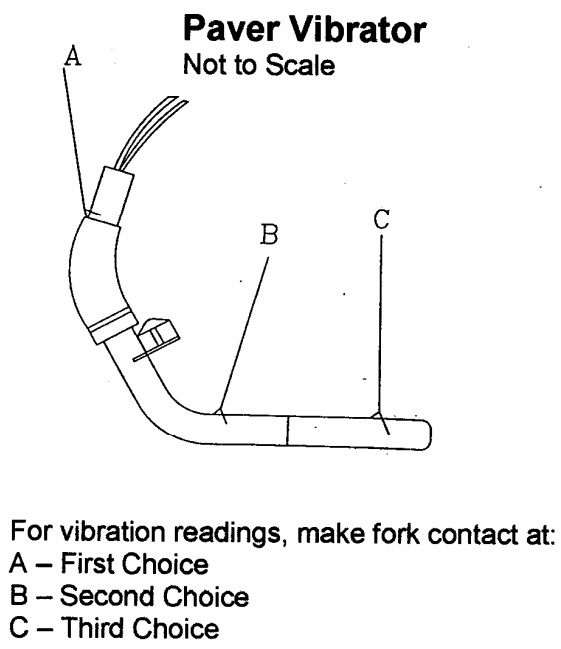
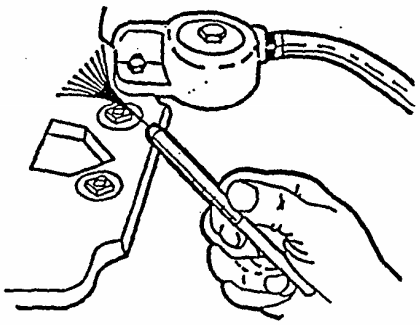


Figure 2

Figure 3

Check speed of vibration quickly, easily, and accurately



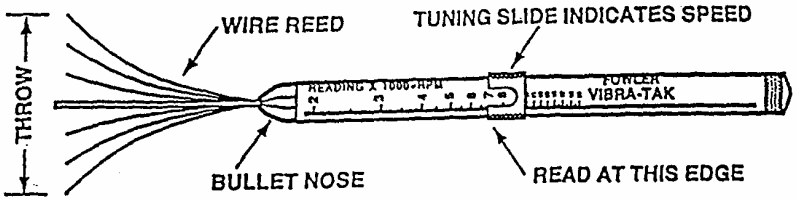
Indicates speed of vibration on match plate

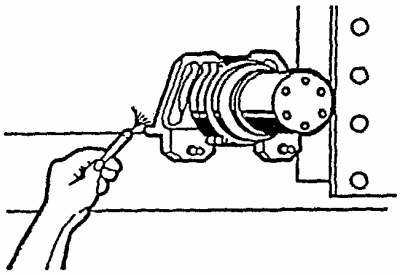
MARTIN® VIBRA-TAK™ Vibration Indicator

The "Slide Rule" that:

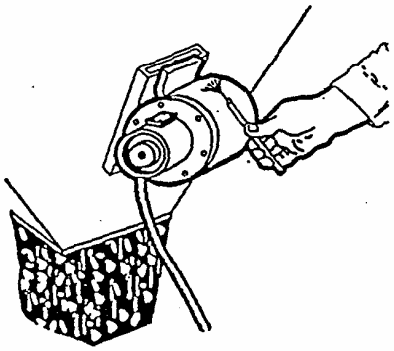
- Finds vibrations per minute
- Helps locate the source of unwanted vibration
- Finds "dead spots" on vibration equipment

This MARTIN® VIBRA-TAK™ vibration indicator is a simple, easy to use tool for accurately measuring the speed of a vibrating object.





Locate hopper car vibration rpm to help correct dangerous overspeed and inefficient underspeed.



Proper speed indicates good vibrator mounting.

How To Use:

1. Move tuning slide down scale until wire reed is fully extended outside of housing.
2. Press the bullet nose against the vibrating object.
3. Move tuning slide up scale until the wire reed reaches its maximum throw.
4. Multiply scale reading by 1,000 to find vibration cycles per minute, or shaft speed rpm.
5. The arc through which reed "throws" is in direct proportion to speed and stroke. Each 1/2" of "throw" equals .001" stroke.

Two Models Available

Low Speed - 200 to 2,000 rpm
P/N 14831
High Speed - 2,000 to 21,000 rpm P/N 14830.

(Higher speeds do register and can be closely estimated.)

MARTIN ENGINEERING
One Martin Place
Neponset, Illinois 61345-9766 USA
1-800-544-2947 or 309-594-2384
FAX: 309-594-2432

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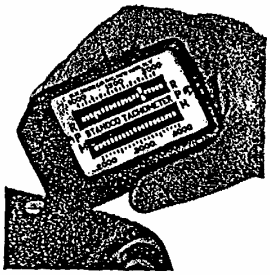
Figure 4

INSTRUCTIONS

"STANDCO" Vibrating Reed Tachometers

. . . . . Hand Type, for portable use



"Standco" Vibrating Reed Tachometers operate on the well-known and time-tested principle of resonance. They measure speed of rotating machinery by picking up the rate of vibration on accurately calibrated reeds. These reeds are set in motion by the slight vibration of the rotating element. The RPM or vibrations per minute are indicated on the scale of these instruments by the visual pattern formed by one or more reeds while vibrating. See attached Bulletin No. 770C.

REVOLUTIONS PER MINUTE . . . .

"Standco" Vibrating Reed Hand Tachometers do not require brackets or any other accessories. These instruments are ideal for checking speeds of totally enclosed electrical equipment. Just hold the tachometer against the motor, turbine, pump, vacuum cleaner, compressor, outboard motor, sewing machine, or other similar equipment *anywhere* and read the speed. Speeds can be measured from 600 RPM to 100,000 RPM (in different models).

If vibration is excessive, cushion the Tachometer by a pad of rubber or cotton or with the hand. If vibration is insufficient, try different parts of the machine until a perfect pickup is made. Usually pickup is best if the row of reeds is parallel to the axis of the machine.

VIBRATIONS PER MINUTE . . . .

Since the reeds reflect vibrations as well as RPM, the instruments can be used as vibration indicators.

EXCESSIVE VIBRATION . . . .

With pneumatic equipment or other equipment where vibrations are severe, it is not recommended to hold the instrument directly against vibrating metal parts but to apply it to air hoses or other parts of the equipment. If this vibration is still too severe place hand on machine or hose and hold instrument against forearm and the vibration will be transmitted to the instrument reeds.

HARMONICS . . . .

Since all Vibrating Reed Tachometers operate on the principle of resonance, it is frequently the case that if a machine is running at let us say 1800 RPM another reed tuned at 3600 RPM may also respond, but at less amplitude. When a machine is running at 3600 RPM, however, a reed tuned at 1800 is not likely to respond.

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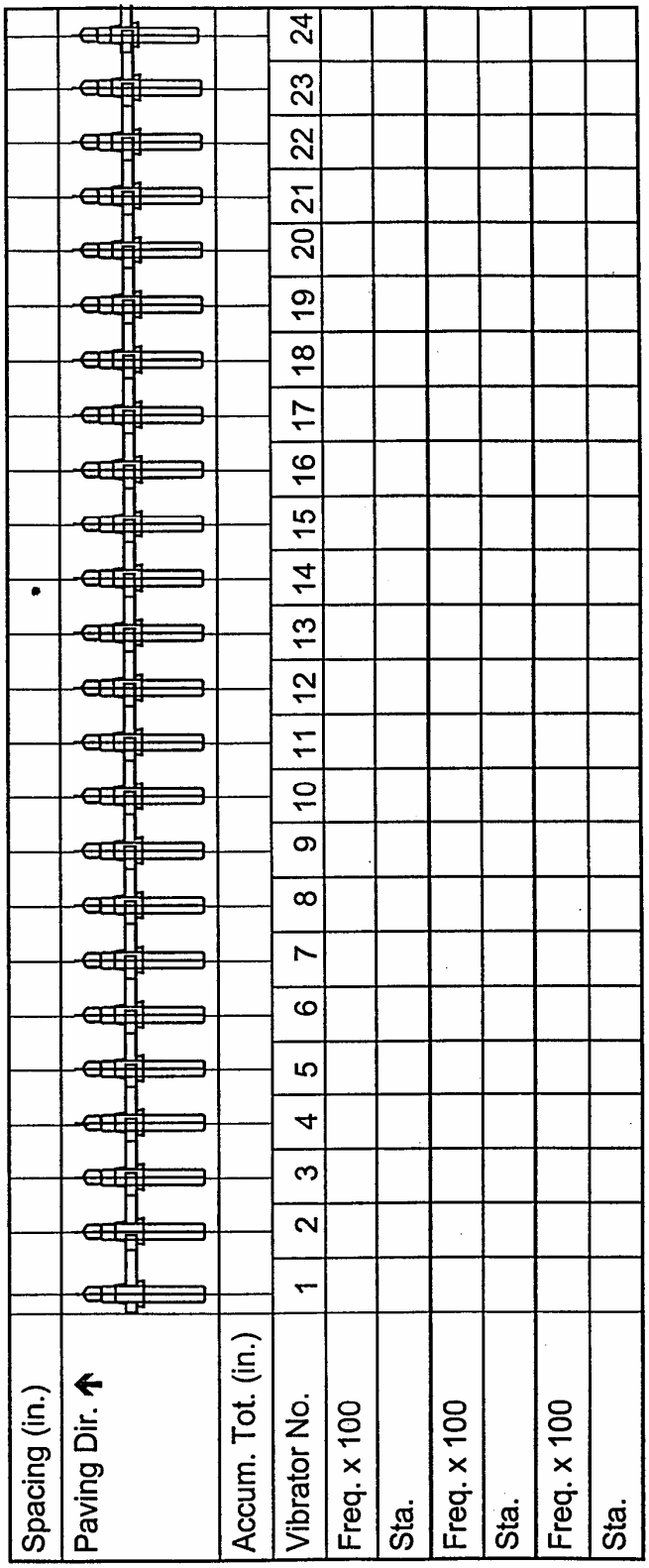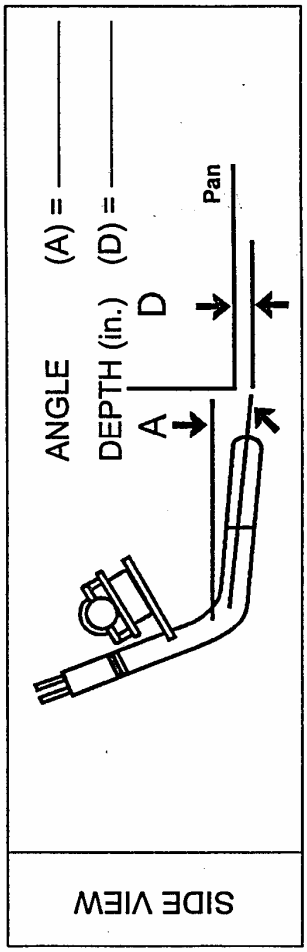
Paver Vibrator Data