

CRD-C 521-81

STANDARD TEST METHOD FOR FREQUENCY AND AMPLITUDE OF VIBRATORS FOR CONCRETE

1. Scope

1.1 This test method is intended for use in the field or in the laboratory. It may be used on form vibrators or internal vibrators, on electrically operated or air-driven vibrators.

1.2 Frequency is measured using a tachometer, amplitude using an optical wedge.

2. Applicable Documents

2.1 ACI Standard Recommended Practice for Consolidation of Concrete (ACI 309-72).

3. Apparatus

3.1 Tachometer. Two types of tachometer have been investigated. Both were found satisfactory. One (Note 1) is in the form of a box that rests on the vibrating object; the other (Note 1) is in the form of a pencil, one end of which is placed against the vibrating object.

Note 1.- The box-shaped tachometer studied was Frahm Model T-7H available from James G. Biddle Co., 1316 Arch Street, Philadelphia, Pa. 19107. It is 6-1/2 by 2-3/4 by 4 in. (165 by 70 by 100 mm) in size, it is more expensive but more accurate than the pencil-shaped tachometer. The pencil-shaped tachometer is available from Soiltest Inc., 2205 Lee Street, Evanston, Ill. 60202. They are illustrated in Fig. 1.

3.2 Optical Wedge. An optical wedge (Fig. 2) developed by the Missouri River Division,

Corps of Engineers, is recommended (Note 2).

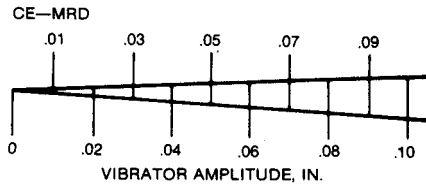


Fig. 2. Optical wedge

Note 2.- Optical wedges are available without charge in quantities up to 100 from the Waterways Experiment Station, ATTN: WESSC or the Missouri River Division, ATTN: MRDED-L.

4. Procedure

4.1 Frequency. The tachometer should be used in accordance with the directions provided by the manufacturer. Using the pencil-shaped tachometer the frequency of the vibrator is determined by holding the device against the vibrator; for an air vibrator holding the device against the hose is equally satisfactory. In the case of internal vibrators, this measurement should be taken just before the vibrator is withdrawn, and is always the fastest speed while it is operating in concrete.

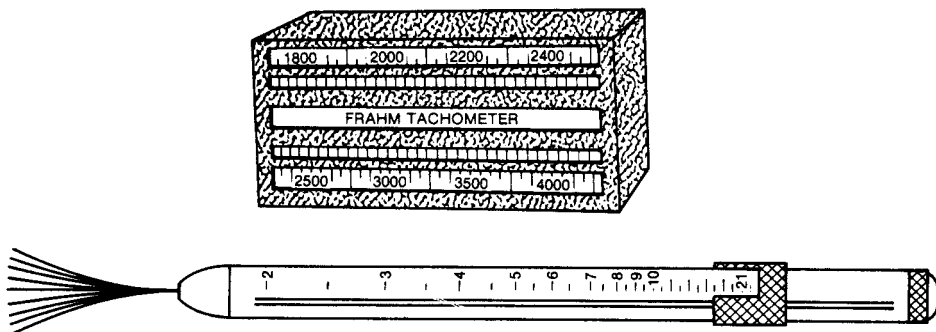
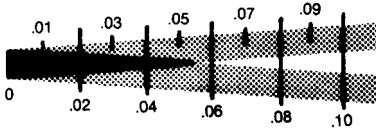


Fig. 1. Tachometers

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4.2 Amplitude. The optical wedge (Fig. 2) should be attached to the vibrator with the centerline of the "V" perpendicular to the direction in which it is desired to measure amplitude. In the case of an internal vibrator the centerline of the "V" should be oriented parallel to the axis of the vibrator. On such a vibrator two optical wedges should be attached, one near the tip and the other near the back end of the head. The amplitude is measured with the head vibrating in air and the value should be the average of those read from the two wedges. As the vibrator vibrates, a black triangle forms at the apex of the "V." The scale reading at the tip of the triangle is



INDICATING AN AMPLITUDE OF 0.055 IN. (1.4 MM)

Fig. 3. Optical wedge during vibration

the peak amplitude (half the peak-to-peak displacement). A hand reading glass (2 to 3X) improves the accuracy of the reading. With care, this device is capable of an accuracy of about 0.005 in. (0.13 mm). See Fig. 3.

5. Report

5.1 The report should give the following information:

5.1.1 Vibrator type, model, Serial No., manufacturer.

5.1.2 Date of test.

5.1.3 Frequency in air, VPM (Hz)

5.1.4 Frequency in use, VPM (Hz).

5.1.5 Amplitude, in (mm) at each point measured with locations identified.

5.1.6 Average amplitude, in. (mm).

5.1.7 Changes since preceding test (if applicable).

6. Precision and Accuracy

6.1 Data are not available to permit an appropriate estimate of precision or accuracy.