10.2.2 VISUAL

Nondestructive inspection by visual means is by far the oldest and most economical method. Consequently, visual inspection is performed routinely for damage assessment and at all stages of repair. In some instances visual aids such as microscopes, borescopes, magnifying glasses, and other optical devices are used to inspect areas for defects that are either inaccessible or cannot be seen with the unaided eye. See figure 10-5 for an example of visual inspection with the aid of a flashlight and the correct angle of vision.

10.2.3 TAPPING

Tapping inspection (fig. 10-6) is a nondestructive method for detection of voids or delamination in bonded areas. When tapping any area using a tapping hammer (fig. 10-7), coin, or other suitable object, a ringing sound is produced. The tapping rate is accomplished to produce a continuous sound so that any difference in sound tone can be detected by a trained ear. This inspection should be conducted in a relatively quiet area.

10.2.4 ULTRASONIC

Ultrasonic inspection has proven to be very useful for detecting internal delaminations, voids, and inconsistencies in bonded structure. The method uses sound waves with a frequency above the audible range. The waves are induced into the part by a piezoelectric transducer transmitter. This sonic energy travels through the part, and any marked change in acoustic properties of the material will affect the sound traveling to a receiving transducer.

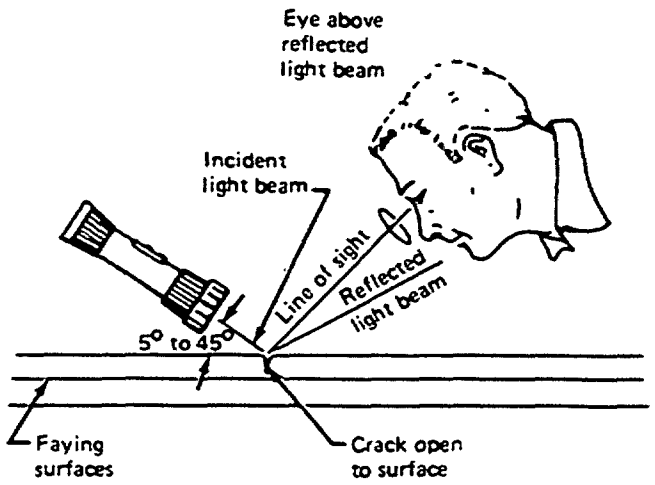


Figure 10-5. – Visual Inspection of Metal Surface

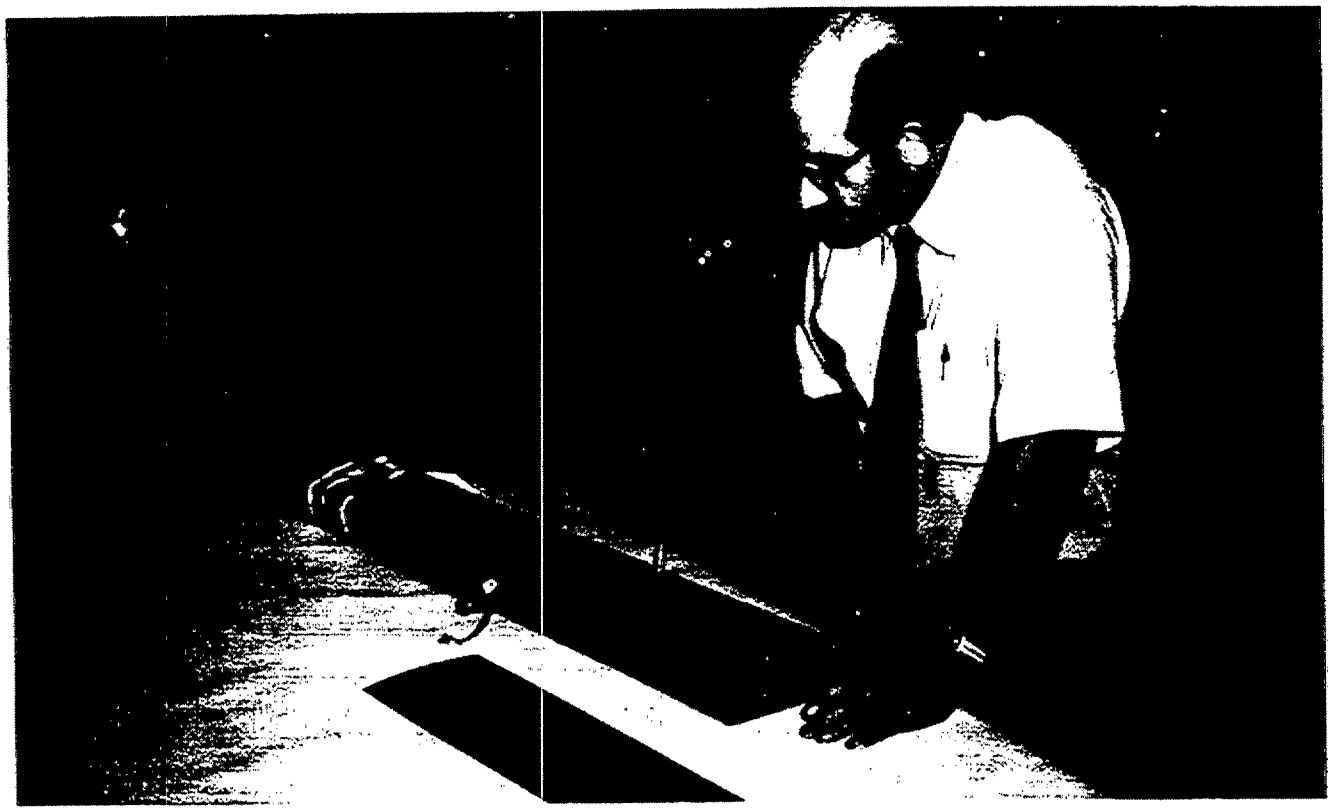
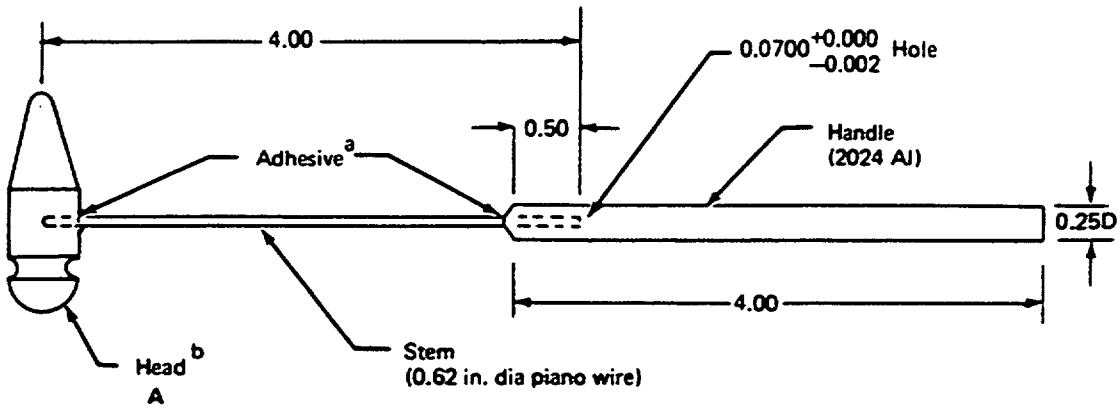


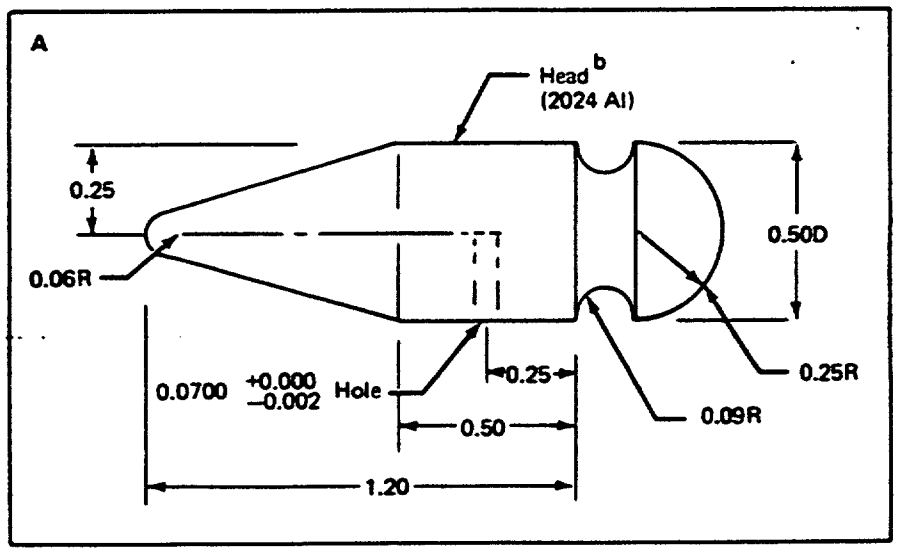
Figure 10-6.—Tap-Testing Honeycomb Panel

The information to the transducer may be displayed by a meter, or on an oscilloscope or chart. (Note: This use of induced sound waves is in contrast to the acoustic emission method described in sec. 10.2.9 in which the sound waves measured are those emitted by the part itself.)

There are basically three types of ultrasonic inspection instruments used for bond testing. These are as follows:

- High frequency (1 mHz to 5 mHz)
- Low frequency (15 kHz to 50 kHz)
- Resonance





All dimensions in inches

[a] Liquid/paste adhesive may be used if desired. Hole in handle/head may be reduced to provide an interference fit and preclude the need for the adhesive.

[b] 125√All machined surfaces, ref MIL-STD-10

Figure 10-7.—Inspection Tap-Hammer Details