

SECTION 8. TAP TESTING

5-105. GENERAL. Tap testing is widely used for a quick evaluation of any accessible aircraft surface to detect the presence of delamination or debonding.

a. The tap testing procedure consists of lightly tapping the surface of the part with a coin, light special hammer with a maximum of 2 ounces (see figure 5-22), or any other suitable object. The acoustic response is compared with that of a known good area.

b. A “flat” or “dead” response is considered unacceptable. The acoustic response of a good part can vary dramatically with

changes in geometry, in which case a standard of some sort is required. The entire area of interest must be tapped. The surface should be dry and free of oil, grease, and dirt. Tap testing is limited to finding relatively shallow defects in skins with a thickness less than .080 inch. In a honeycomb structure, for example, the far side bondline cannot be evaluated, requiring two-side access for a complete inspection. This method is portable, but no records are produced. The accuracy of this test depends on the inspector’s subjective interpretation of the test response; therefore, only qualified personnel should perform this test.

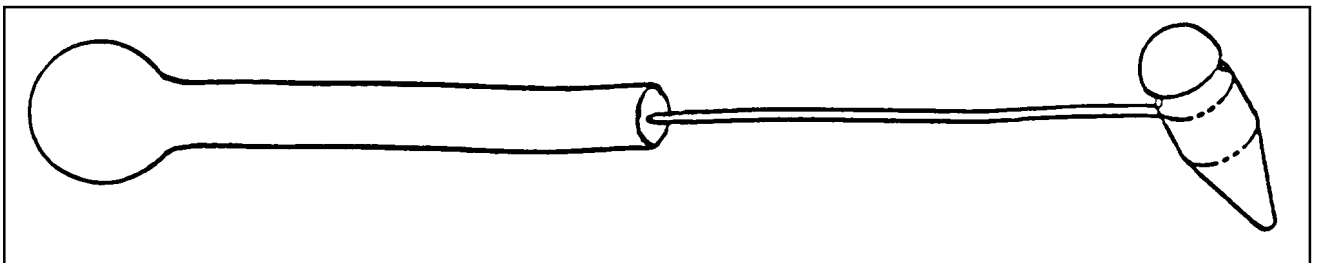


FIGURE 5-22. Sample of special tap hammer.

5-106.—5-111. [RESERVED.]

SECTION 9. ACOUSTIC-EMISSION

5-112. GENERAL. Acoustic-Emission is an NDI technique that involves the placing of acoustical-emission sensors at various locations on the aircraft structure and then applying a load or stress. The level of stress applied need not reach general yielding, nor does the stress generally need to be of a specific type. Bending stress can be applied to beamed structures, torsional stress can be applied to rotary shafts, thermal stresses can be applied with heat lamps or blankets, and pressure-induced stress can be applied to pressure-containment systems such as the aircraft fuselage. The materials emit sound and stress waves that take the form of ultrasonic pulses

that can be picked up by sensors. Cracks and areas of corrosion in the stressed airframe structure emit sound waves (different frequencies for different size defects) which are registered by the sensors. These acoustic-emission bursts can be used both to locate flaws and to evaluate their rate of growth as a function of applied stress. Acoustic-emission testing has an advantage over other NDI methods in that it can detect and locate all of the activated flaws in a structure in one test. Acoustic-emission testing does not now provide the capability to size flaws, but it can greatly reduce the area required to be scanned by other NDI methods.