

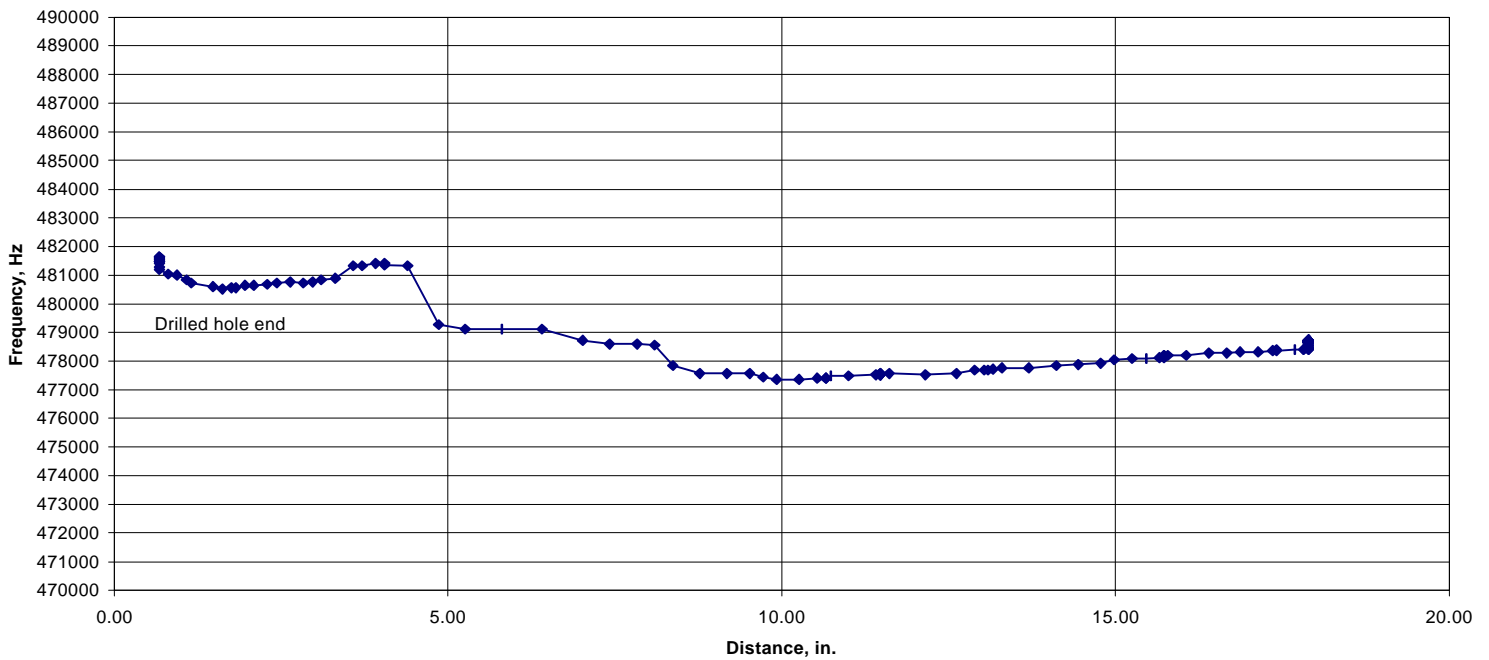
Case Study: Subsurface Defect Analysis of Small Diameter Copper Rod

Two samples of solid copper rod of approximately .30" diameter were tested in a 3 wavelength (N: 3) resonance mode EMAT (RM-EMAT). Transducer ID was .410" nominal. One of the samples has had a .040" hole end drilled approximately 1.25" deep. This sample was tested on an ARIS lab unit hand fed through a variable diameter transducer mount. The resonant frequency was calculated for a copper rod of this diameter and verified by test.

The first chart depicts the surface resonance of the "unflawed" surface of the end-drilled rod.

File Name: Copper Rod N=3

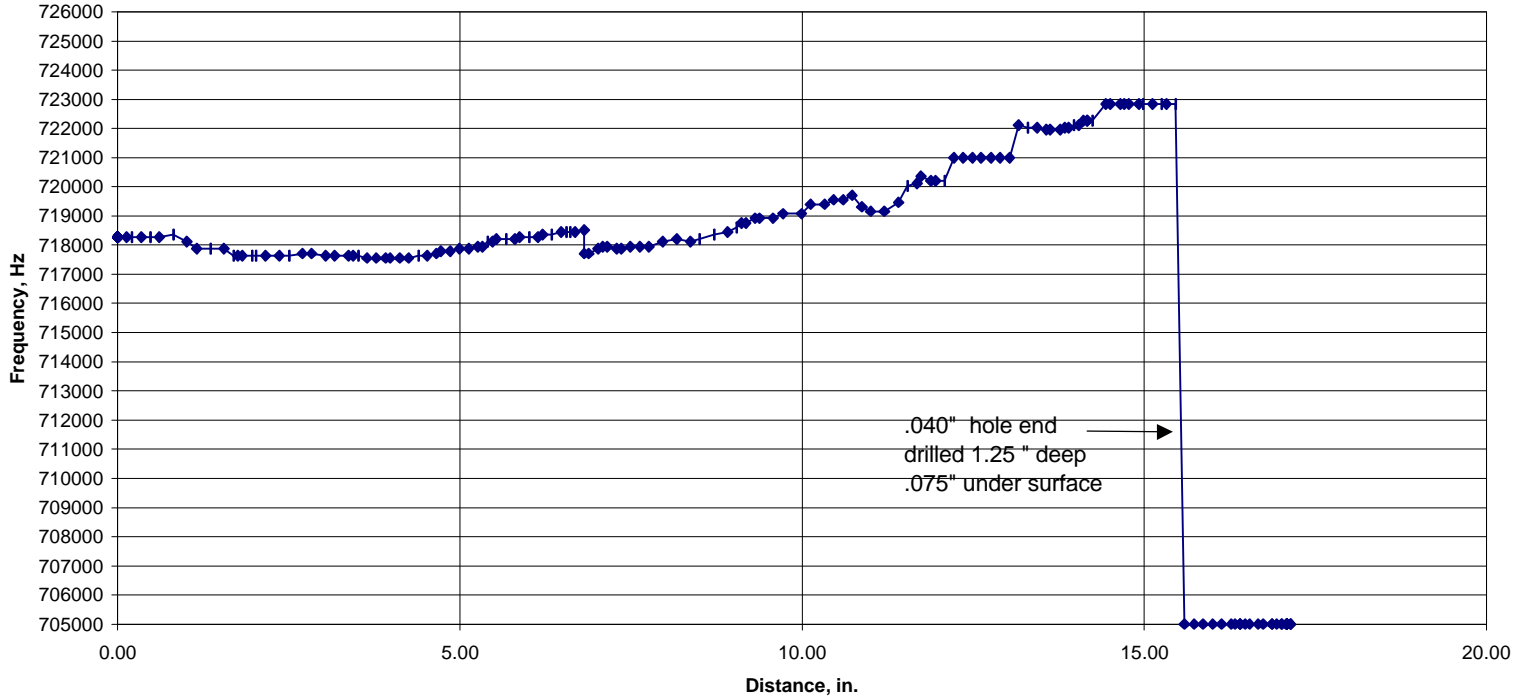
Bandwidth: 20KHz Data Points: 250 Step Size: 12 Threshold: 50 Dwell: Med



The Second chart depicts the second order resonance of this same rod. The end-drilled hole causes a complete loss of resonant activity in the sample approaching and over the location of the hole.

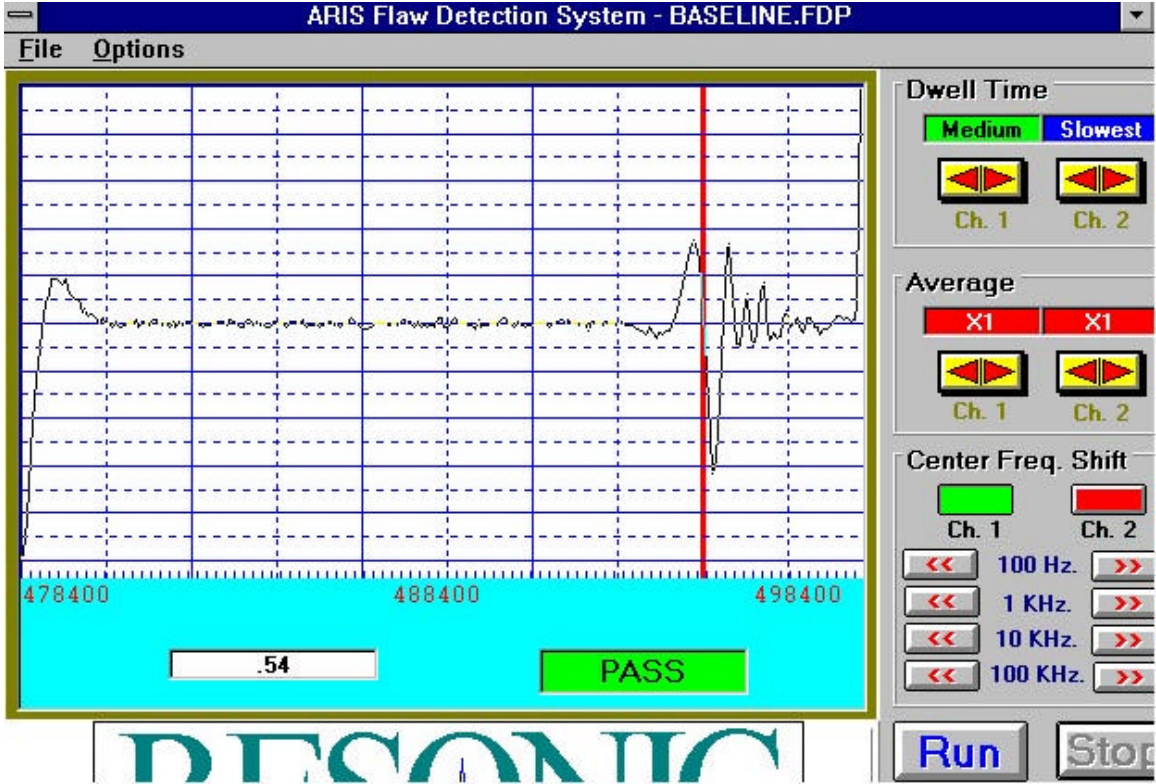
File Name: Copper Rod - Unflawed N:3 Transducer 2nd Order resonance

Bandwidth: 20KHz Data Points: 250 Step Size: 12 Threshold: 50 Dwell: Med



Two Screen plots of the ARIS unit were taken of the resonant signals of a separate .3" dia. rod with indicator holes approximately .042" dia. x .1" deep drilled transversely into the rod

The first graphic is of normal resonance in an unflawed region



The second graphic depicts the decay or loss of resonance over one of these holes.

