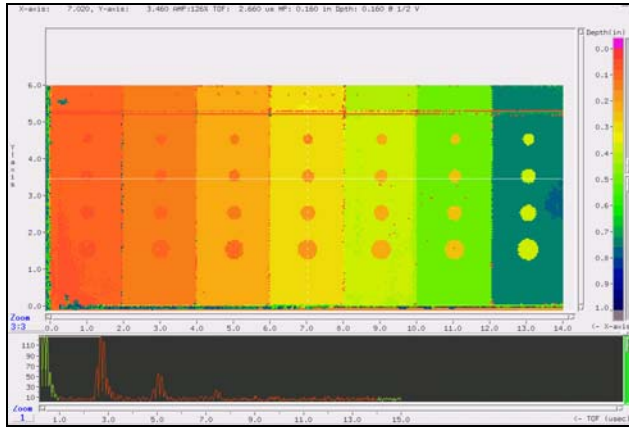


Composite Inspections



C-Scan and RF Signal of Graphite Epoxy Test Sample

Graphite Epoxy Inspection Capabilities

One example of what the MTC equipment is capable of is described below. A test block made of multiple layers of graphite epoxy sheets ranges from .080" to .750" thick. A total of 7 steps of material exist in the sample. Various sized flat bottom holes (FBH) were made into the material, each at approximately mid-wall of the respective step. Sizes of the FBH's ranged from .250" to .500" in diameter. The C-Scan (top view) image of the sample is shown in the adjacent image on the left. The UT RF signal is on the bottom of the image at the cursor cross hairs' location in the C-Scan (in yellow layer's second FBH). This data was collected via pulse echo using a 10 MHz probe in an immersion tank. Its data acquisition grid is .040" by .040".

Material Usage Overview

Ultrasonic testing (UT) has been routinely used for many decades to inspect the integrity of bonds in multi-layered metallic materials. So it was natural that when non-metallic materials began to be used via the buildup of many thin layers of material, that UT would again be called upon to detect bond variations.

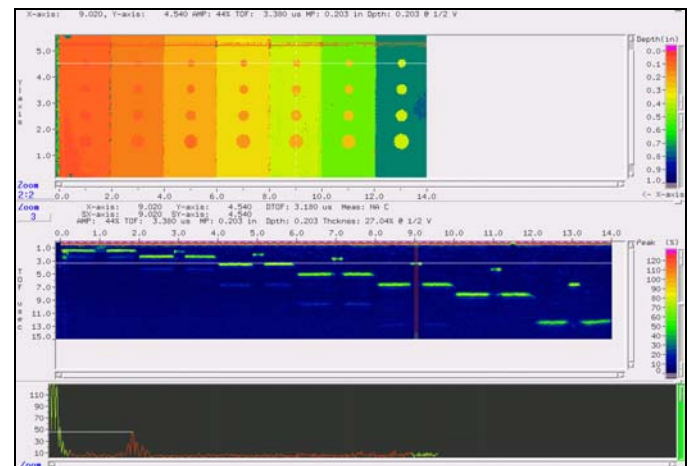
Very common non-metallic materials used in aerospace and defense industries are thin sheets of graphite epoxy or Kevlar. Various thickness of material is typically achieved by adding layers of the sheets to buildup to the desired end result. Such material buildups are being used in a commercial and military aircraft (such as the F22 and JSF) as well as in naval vessel applications.

Metals Testing Company (MTC) Capabilities

As our names implies, Metals Testing Company's history originated to serve metal related applications. In serving those markets, however, we have naturally accumulated state-of-the-art capabilities that can also be applied to non-metal applications.

One such hardware capability is our AMDATA IntraSpect™ C-Scan data acquisition imaging system. Its internal UT instrumentation is capable of testing down to 500 kHz as well as being able to handle beyond 20 MHz. Our C-Scan system can also be used with a third party UT instrument such as a Staveley Sonic-138 when desired. Given these tools, MTC is positioned and prepared to support composite applications involving either metals or non-metals.

In addition to the C-Scan and A-Scan (RF signal) views, the imaging system can also provide a cross sectional cut into the material, referred to as a B-Scan (see image below). An end view slice is also available, referred to as a B-Prime (B') view.



C-Scan, B-Scan, and A-Scan image of Graphite Epoxy Sample

The B-Scan view in the middle of the above image clearly shows the FBH's located at the mid-wall of each step as well as the backwall of each step (note the shadowed hole in each backwall).

Metal Honeycomb Core & Skin Inspections

In addition to performing UT immersion testing, MTC can also provide UT contact based testing. Such testing can be done at our facility or at a customer's plant or field location. For addition details of such testing please see our UT Imaging Application literature sheet entitled "Aircraft Skin to Honeycomb Assemblies".

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