



Detection of Bonding Defects in Honeycomb Structures

Ultrasonic Application Solutions

Application

Large aircraft components, consisting of Nomex honeycomb cores and carbon fibre reinforced plastic skins, have to be inspected in order to detect bonding defects and delaminations in the skin. For this reason, a squirter probe is used. GE supplies probes equipped with a water connection and detachable nozzles for this arrangement. When the nozzle is removed, the probes can be also used for normal immersion testing.

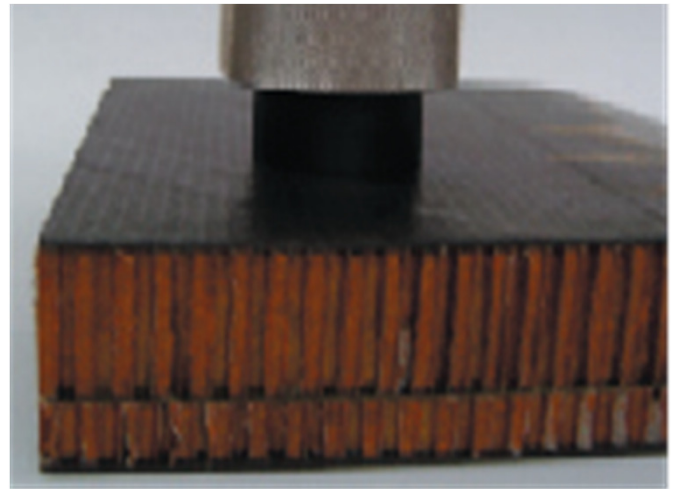


Figure 1: Nomex honeycomb with CFRP skins

Solution

The test arrangement using waterflow or squirter technique shown in the schematic is recommended for testing large-area components. The test is carried out according to the pulse-echo method using a squirter probe.

To minimize the amount of work and time required for testing, a wide-beam probe can be used. This enables an ultrasonic C-scan to be made having track widths $>25\text{mm}$. Although individual flaws are shown roughly rasterized along with the increasing

track width, the test sensitivity is not significantly reduced.

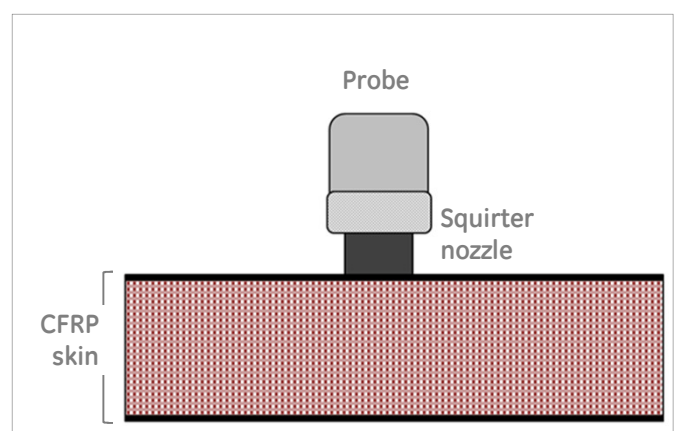


Figure 2: Testing situation

Results

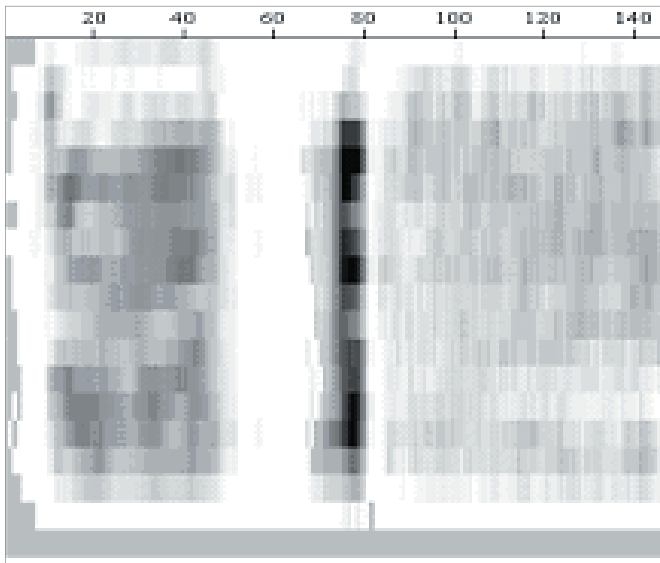


Figure 3: C-Scan image

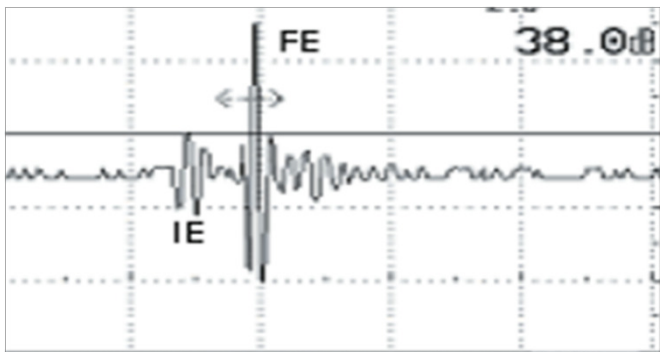


Figure 4: A-Scan, detection of flaw echo

To minimize the amount of work and time required for testing, a wide-beam probe can be used. This enables an ultrasonic C-scan to be made having track widths >25mm. Although individual flaws are shown roughly rasterized along with the increasing track width, the test sensitivity is not significantly reduced. The detections of a flaw echo and a backwall echo are shown in the A-Scans in figure 4 and 5.

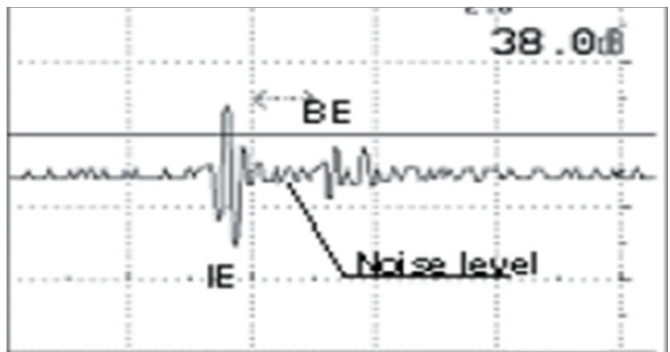


Figure 5: A-Scan, detection of backwall echo

General solution information

- Flaw Detector: USIP 40
- Probe: Z5G 6x30 E1
- Accessories: squirter nozzle 35 / 5.0 x 32
- Scanner with KScan software

Your benefits

- Ensure high quality
- Reduce field failures and potential liability
- Save money by eliminating destructive testing and by improving your process

Part numbers

USIP 40	0036535	Z5G 6x30 E1	0067450
Squirter nozzle	0067451	KScan	0037085



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