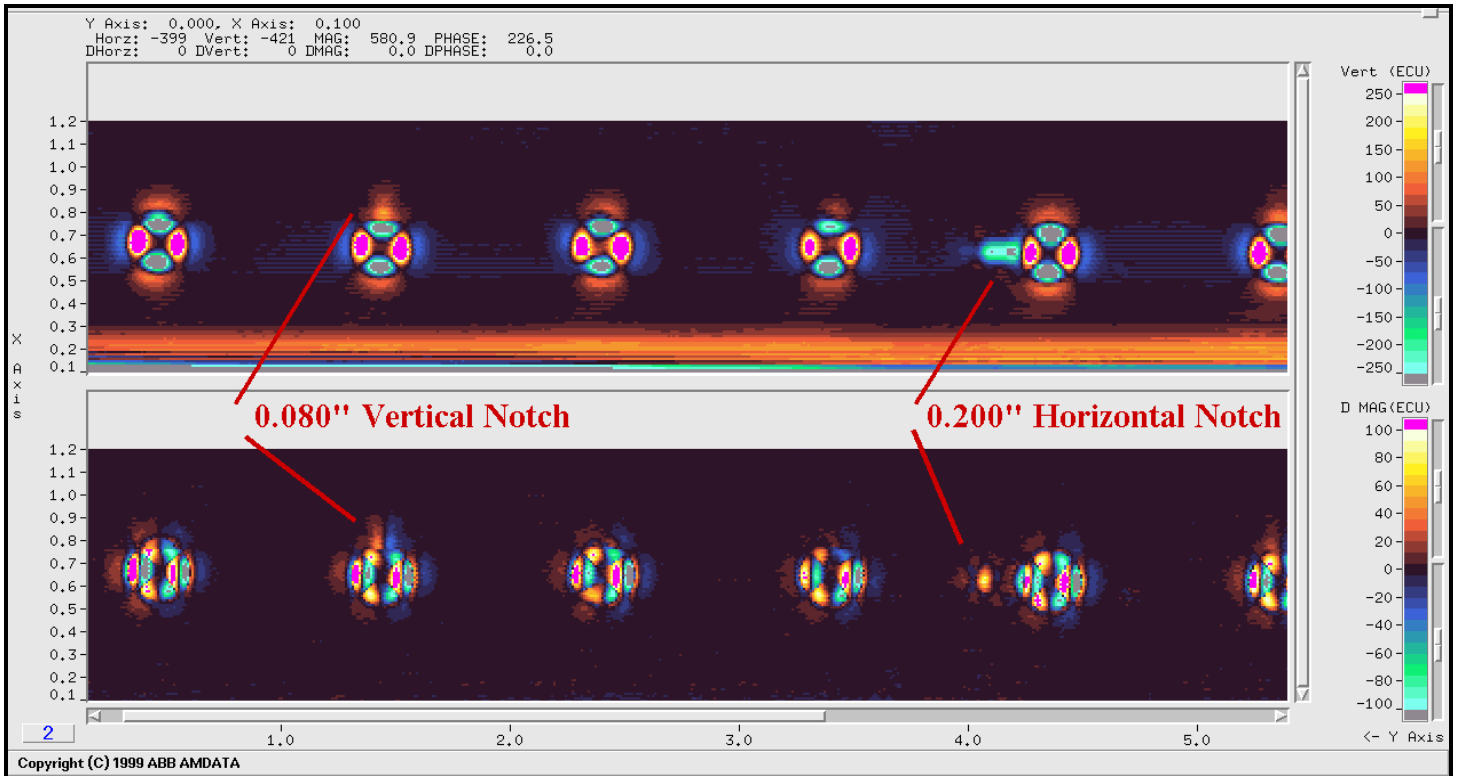


Eddy Current Imaging of Rivet Cracking on Aircraft

Wesdyne AMDATA IntraSpect? Imaging System Application



Eddy Current Image of simulated cracking obtained with Wesdyne AMDATA IntraSpect Eddy Current Imaging System

Sample Description

The sample fabricated for these tests consisted of an outer panel riveted to a stringer. EDM notches were placed in the panel radially oriented to some of the rivets.

Inspection Method

An Eddy Current technique using a custom designed driver-pickup probe was used.

One of the features of this probe is that the phase response of a signal is determined by the orientation of the defect being detected. Defects that are perpendicular will produce signals with a 180° phase shift.

For this application vertical oriented notches will provide a positive going response while horizontal notches will provide a negative going response.

Crack detection near rivets is complicated by the fact the rivet itself produces a signal that is very similar to one produced by a crack. Since cracks are perpendicular to the rivet, the response from a crack will be shifted by 180° from the rivet signal using this probe.

A Wesdyne AMDATA IntraSpect Eddy Current Imaging system was used for data acquisition and analysis.

Results

The results of this inspection are shown in the image above.

The upper C-scan is a plan view of the vertical amplitude of the Eddy Current data.

A rivet with out a crack appears as a four lobed grey/green and magenta indication. There also appears a small amplitude signal of the opposite polarity just outside the rivet signal.

The 0.200" long horizontal notch is clearly shown as the linear high amplitude negative polarity signal adjacent to the rivet.

The 0.080" long vertical notch appears as a linear extension of the small amplitude opposite polarity signal. This signal is clearly longer than the similar amplitude signals associated with the non-cracked rivets.

The lower C-scan shows the first spatial derivative of the vertical eddy current data. This patented feature shows the slope of the signal rather than its amplitude.

The tip of the 0.200" horizontal is clearly detected in this image.

This display shows 0.080" long vertical notch more clearly than the amplitude C-scan does. The blue and brown indication in this image clearly is of higher amplitude and extent than on the non-cracked rivets.



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