EFFECTS OF SENSOR GEOMETRY IN TIME-DOMAIN REFLECTOMETRY METHOD FOR AUTOMATED MEASUREMENT OF CRACK PROPAGATION IN COMPOSITES

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INTRODUCTION – PREVIOUS WORK

- Time domain method was developed to measure the crack propagation in composites.
- Straight line geometry sensors were used.

SENSOR GEOMETRIES

- Insertion was made after every tow (1 indent weave)
- Ground Line
  - Feed Line

SENSOR & PANEL PREPARATION

- Copper wire with a small diameter was used as the sensor material.
- The geometry of the wire was varied by weaving it through the fabric.
- SMA connectors were soldered to the copper wires.
- Panels were infused using VARTM

TDR PROFILE - RESULT

Comparison Chart for 1 Indent Weave & d of 2 layers

DCB MODE I TEST

- Propagating crack during DCB test.
- TDR Oscilloscope monitoring the crack propagation.

REAL TIME CRACK PROPAGATION - RESULT

- Sample used had a d spacing of 2 layers and the sensor had a non-linear geometry – crack propagation could be clearly noticed.

CONCLUSION – FUTURE WORK

- The TDR profile was affected by d spacing
- TDR – DCB method can be used to calculate the crack length in composites with weaved sensor having non-linear geometry.
- The results obtained so far show that there is a good possibility of being able to incorporate sensors into the fabric and still be able to effectively measure the crack propagation.
- In future work, the geometry of the ground line would be varied and results will be analyzed.

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