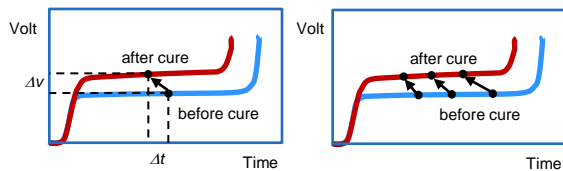


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MULTI-POINT SENSING WITH SINGLE TRANSMISSION LINE

Cure of Composites → Property Change (Mechanical, Physical and Electrical)



Voltage change and Response time change

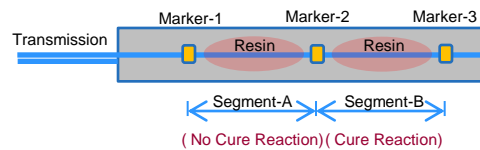
Multi-point sensing With single T/L → Effective

Sensing points in single T/L by impedance change

Making impedance changes by shunt capacitance

SEGMENTED CURING EXPERIMENT

Resins on Transmission Line Embedded Plate



- Transmission line is embedded in composite plate.

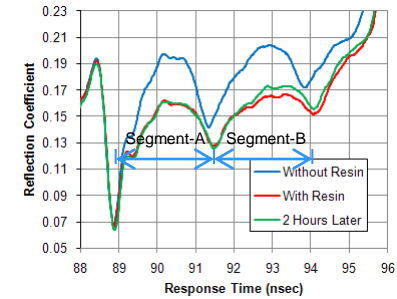
- Setting marker positions by using conductive materials.

- No curing agent is added to segment-A resin.



CURING EXPERIMENT RESULTS

Check the response time (Δt) at each segment



RT increase during the wetting: 0.092 ~ 0.121

RT decrease during the curing: 0.006 (very small)

No cure on segment-A, but Δt slightly decreased.

METHODS TO IMPROVE HIGH SENSITIVITY

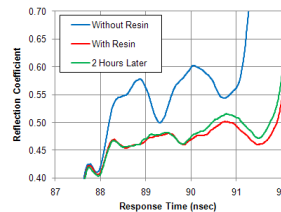
Indirect contact between T/L and resin → Small change of response time



Direct contact between T/L and resin → Increasing the sensitivity

RESULTS: Derakane 510A-40

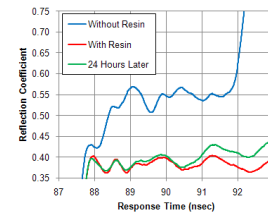
Sensor: Bare Copper Wire
Curing Time: 2 Hours



T-0324	seg-A	seg-B
wet	0.507	0.253
cure	0.003	-0.029

RESULTS: SC-15 EPOXY

Sensor: Bare Copper Wire
Curing Time: 24 Hours



T-0329	seg-A	seg-B
wet	0.645	0.474
cure	-0.014	-0.070

CONCLUSIONS

Results: Cure reaction can be checked by change of the response time. Cure of each segment can be simultaneously detected by the data from single transmission line. SC-15 epoxy resin shows larger difference than Derakane 510A-40 vinyl ester resin.

Future Works: Get quantitative relationship between cure reactions and response time changes

ACKNOWLEDGEMENTS

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