

HEATCON[®] Composite Systems

Industry Perspective on Past and Future Research

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Inverse/Optimal Thermal Repair of Composites

- 2004 Initial concept “Composite Repair Heating Methods” presented at November meeting.
- 2007 Project discussions on “Precise Control of Cure Processes During Repair” begin with UW.
- 2008 “Precise Control of Cure Processes During Repair” project plan presented for funding.
- 2008 Separate project “Pre-Repair Thermal Mapping and Leak Detection” funded by Washington Technology Center. Boeing, UW, & Heatcon
- 2009 “Inverse/Optimal Thermal Repair of Composites” presented at AMTAS meeting
- 2010 Research with UW continues



Research in Progress

Inverse/Optimal Thermal Repair of Composites

- Project Goals
 - Develop a software tool that can be used in the field to optimize the repair of composites by ensuring that temperature at the repair can be maintained at a specified level for the required duration.
 - Develop a method to estimate boundary conditions at time of repair from a diagnostic thermal analysis/test.
 - Produce a tool that will tell a repair technician where to place heating blankets and what the intensity of heating should be as a function of position.
- Put differently
 - Composites need to be heated evenly
 - Repair technicians need better tools



Benefits to HEATCON[®]

- Resources that are not available internally
- Shared research costs
- Learning what we don't know
 - Limits of heat blanket design
 - Challenges presented by thermally complex structures
- Better understanding of industry needs
 - Product
 - Consulting / Training



What is next?

- Can a tool be created that is simple enough for a field repair technician to use or does this problem require specialists?
- Should emphasis be shifted to control system design rather than heat blanket design? (i.e. multi zone control and heaters)

