PROGRAM OVERVIEW

- Improved System Design
  - New Tooling Design
- Candidate parts for repair
  - HMMWV hatch door
  - Aircraft Parts
- Develop repair strategies
  - Develop repair procedures
  - Carry out and prove out repair on candidate parts
- Technology transitions
  - Transition expertise to Nevada Schools
  - Army and Navy programs
  - Joint publication on repair approaches

RECONFIGURABLE TOOLING OVERVIEW

This is a reconfigurable tooling that allows rapid creation of complex geometry molds used in prototyping and manufacturing of composites.

TOOLING CONCEPT

- Original Part
- Scan
  - Flat Pattern creation
- Point cloud processing result in the CATIA surface mode

INFUSION SIMULATION - LIMS

Fundamental Problem Data

- Preform: carbon fibers, Kxx=1.99 x 10^-11 m^2, Kyy=1.83 x 10^-12 m^2, Vf=50%.
- Distribution media: Roxford, K=7 x 10^-9 m^2, h=1.3 mm, Vf=10%.
- Resin viscosity is 0.35 Pa.s.
- Injection pressure of 100 kPa.

INFUSION AND RESULTS

- Layup and Infusion
  - Infusion time = 25 min
- Final Part
  - Stiffness of part is critical for replication
  - Results show good dimensional fit between original and composite part

CANDIDATE PARTS FOR REPLACEMENT

- Aircraft Cowling Cover
  - New design tool to make large parts like HMMWV Hatch Door
- HMMWV Hatch Door
  - Stiffness of part is critical for replication
  - Results show good dimensional fit between original and composite part

SUMMARY

Conclusion

- The tool is cost efficient for repair, prototyping because the same mold can be reused for multiple shapes, saves space, time and money.

Future Work

- Include other variations of the infusion scheme in LIMS
- Transition of technology to Army depots

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