Introduction
- Composites used in armor for ground vehicles, as structural backing plate
- Subjected to wide range of temperatures

Background:
- First investigated SC-15 epoxy resin with interlayer UAF472
- Improved residual stiffness post-impact
- Decreased delamination area due to impact
- Poor performance at elevated temperatures, stiffness loss due to TPU properties

Objectives:
- Improve residual stiffness after impact
- Maintain performance across temperature range of -55°C to 76°C

Problem Specification
- Investigate composite panels made with RDL-RDC resin
- Effect of different TPU interlayers
- Effect of temperature

Methodology
- Stiffness plotted against temperature
- Compare pre-impact and post-impact stiffnesses of all specimens

Stiffness:
- Baseline RDL-RDC panels had a consistent performance across the temperature range
- RDL-RDC with UAF415 interlayer panels had consistent post-impact stiffness
- It had a 53% change in stiffness at -55°C due to impact damage
- RDL-RDC with UAF472 interlayer performed poorly at elevated temperatures even before impact
- 70% decrease in stiffness compared to baseline at room temperature
- Similar performance to SC-15 panel with UAF472 interlayer.

Results and Discussion
LVI:
- Impacts were comparable across the specimens

Delamination Area:
- Backlit optical images and c-scan images of the test panels
- View the delamination due to impact

Summary and Conclusion
- RDL-RDC resin composite had smaller delamination areas across the temperature range compared to the SC-15 TPU interlayers reducing delamination areas the reduction in stiffness due to impact damage
- UAF472 interlayer performs poorly at high temperatures: 70% reduction in stiffness compared to baseline at room temperature
- UAF415 interlayer had a 53% change in stiffness due to impact damage and 3700 mm² delamination area at -55°C

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