



Fiber Reinforced Thermoplastic Materials

Importance of Our Work

Pacific Northwest scientists develop cost-effective manufacturing technology for fiber reinforced thermoplastic sheet materials in transportation applications.

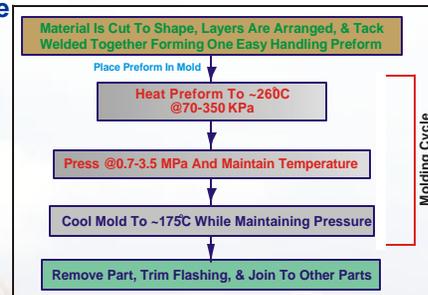
Benefits

- Reduced weight for high fuel efficiency
- Improved structural performance
- High corrosion resistance
- Recycle advantage versus thermosets
- Low-cost tooling
- Potential for insitu film molding for Class A finish
- Potential for economical cored (sandwich) sheet structures

Project Participants

- Industry – Delphi Saginaw Steering Systems
Geoffery M. Wood Consulting
- National Lab – Pacific Northwest National Laboratory

Thermoplastic Stamping

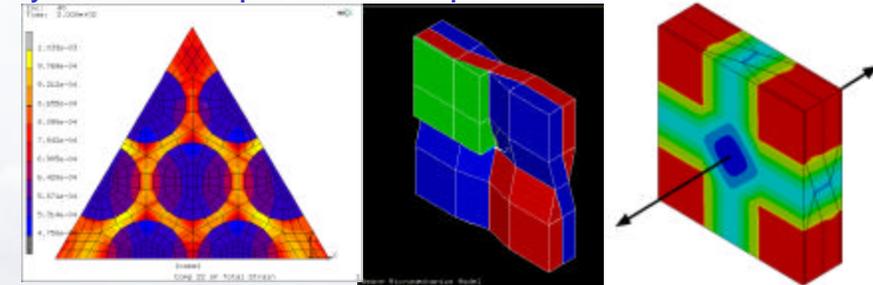


NATT / DOE-OTT Lightweight PU/SUV Frame Program



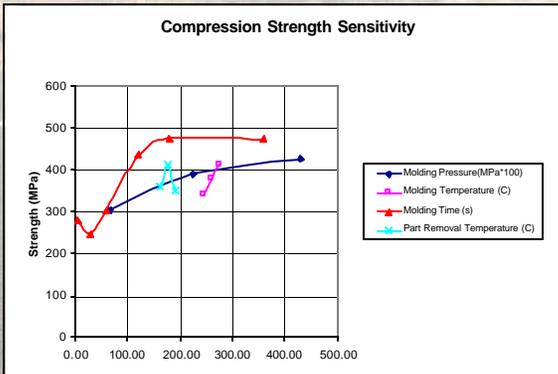
Numerical Modeling

The approach uses micro- and mini-mechanics models to relate composite architecture to material behavior. Macro models predict process performance and ultimately assist the design of forming systems for thermoplastic matrix composites.



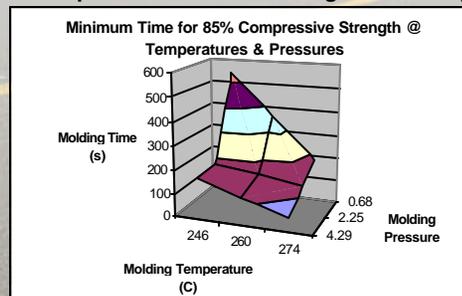
FE Micromechanics

Plain weave model



Parametric sensitivity studies have given insight how to most effectively achieve desired product performance.

Flat plate mold w/fluid cooling and heated platens



Process envelope for achieving 85% of full strength



Generic cone-shaped heated and cooled mold for formability and process envelope studies

