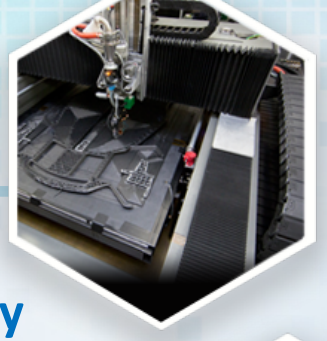
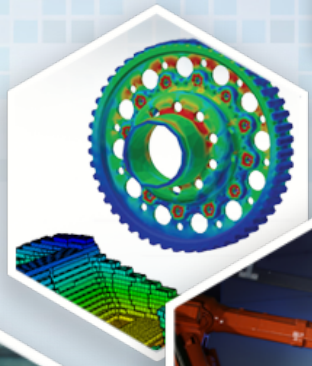




Project 3.2 –

Highlights from the Scale-Up Research Facility (SURF) in Corktown:

Enabling High Volume Manufacturing of Lightweight Automotive Composites

Dave Bank
Dow Automotive
on behalf of the 3.2 Team

January 17, 2018

THE COMPOSITES iacmi INSTITUTE

Project 3.2

- **Development Challenge:**
  - Invention of novel carbon fiber intermediates, production methods, simulation tools.
- **Impact**:
  - Deploy carbon composites on 100k+/yr vehicle platforms to stimulate mass adoption
- **Approach:**
  - OEM / Material Supplier / Tier 1 Supplier / Academic & National labs to develop:
    - Novel carbon fiber epoxy composite intermediates
    - Methods for molding / automation / recycle of in plant scrap
    - Simulation tools required to close gap between metals and composites for implementation in auto market.
- **Innovation (BP3 & BP4):**
  - Aligned Intermediates:
    - Demonstrate technology in Ford GT
  - Random Fiber Intermediates:
    - Invent novel intermediate
    - Demonstrate technology (production and molding) at scale

Collaboration, a Key to Task 3.2 Success

Public/Private Partnership Dives Innovation:

- Industrial Partners:
  - Ford - Application/Part Design/Molding Process
  - Dow - Resins/Intermediates/Production Process
  - DowAksa - Carbon Fiber & Intermediates
- Academic Partners:
  - Design, Modeling & Simulation
    - Purdue - Process & performance modeling
    - ORNL - Cost modeling
- Composite Materials & Process
  - MSU/SUF - Intermediate production & molding
  - MSU - Interfacial science
  - UTK - Morphological mapping

Project Team

Ford, Dow, Purdue University, DowAksa, UT, Oak Ridge National Laboratory, IACMI The Composites Institute, Michigan State University

2011 Ford/Dow Early Discussions

2012 Ford / Dow Enter JDA for Light Weight Materials

2013 DowAksa Formed as Carbon Fiber Supplier

2014 IACMI Forms ORNL joins team

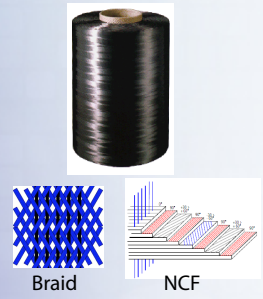
2015 Ford/DowAksa Sign JDA for Low Cost CF Dow files critical patents for VORAFUSE™ P6300

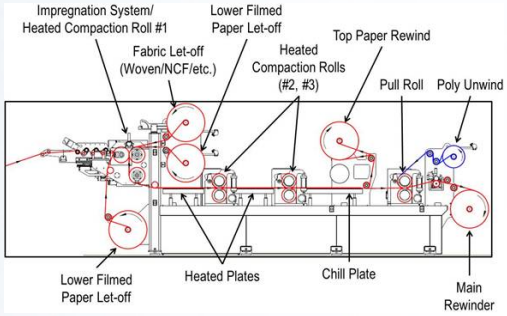
2016 Purdue, UTK and MSU join team VORAFUSE™ P6300 achieves Ford <AR> Ford GT Job 1 Achieved

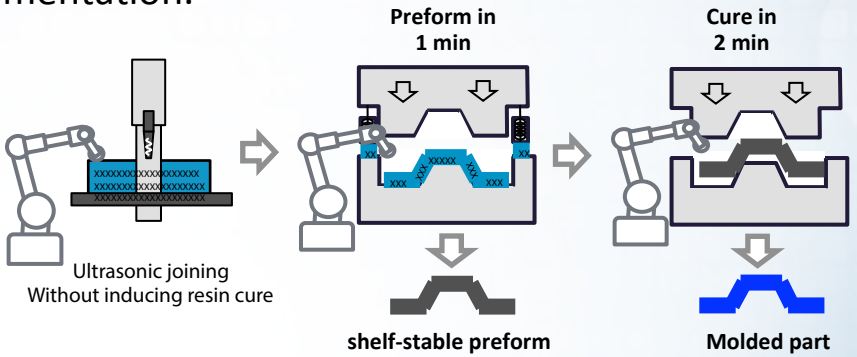
2017 IACMI-SUF in Corktown implements prepreg line and large part compression molding

Achievements: (BP1-BP3)

- **Target:** Components replacing metal in primary body structure via align carbon fiber intermediates
- **Progress to date:** Invented novel intermediates & chemistry, devised automated processing technology, achieved OEM spec & demonstrated viability (B-pillar)
- **Delivery:** Novel product/process developed, specified and implemented (Ford GT)
  - ➢ Ford reviewing opportunities for broad implementation.



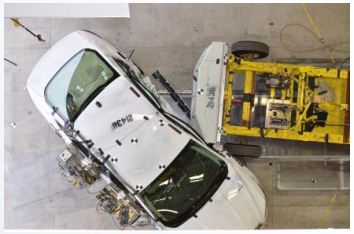




1. Carbon Fiber
- ✓ DowAksa A42

2. Prepreg manufacturing
- ✓ Room temp shelf stable
- ✓ Tack Free

3. Automated fast ply cutting, lay-up, preforming & molding
- ✓ Shelf stable preforms and ultra fast cure (<2 min)
- ✓ In-plant recycle of trim scrap



4. Vehicle level engineering
- ✓ ~6Kg mass save/vehicle

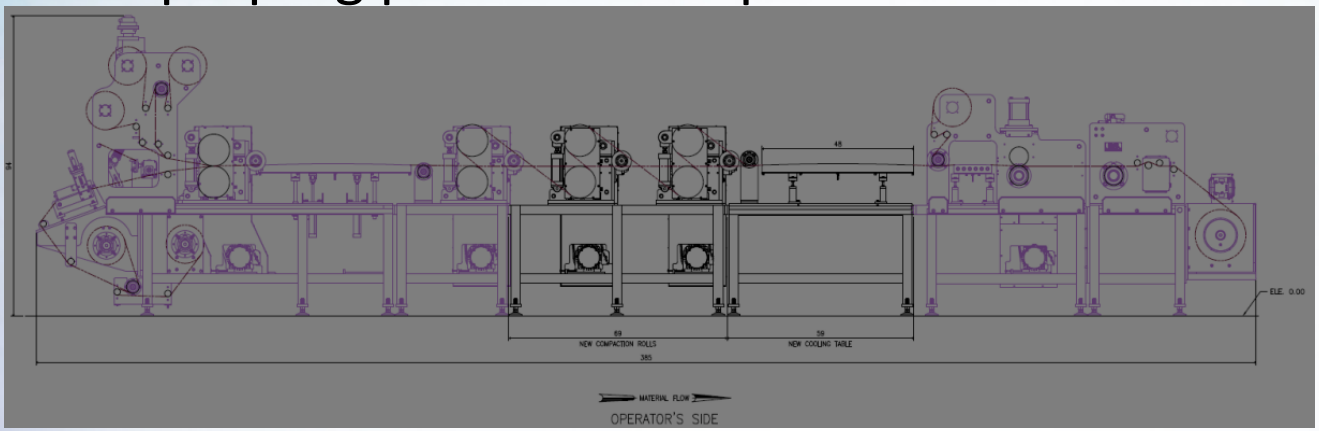
5. Validation testing

6. Material specification

7. Technology demonstrator
Ford GT header & nose bottom
- ✓ (current production)

MSU SuRF… an enabler for the composites industry

✓ Novel prepreg production capabilities:

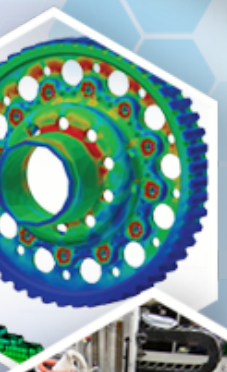


Scale-up

✓ Novel large part compression molding capabilities:

Reduction To Practice

➢IACMI Task 3.2 2018 SOPO fully reliant on the MSU-SuRF for Scale-up



Thank you!