# DOWDING INDUSTRIES

Advancing Tomorrow's Innovations

Established in 1965

*Eaton Rapids, MI*
*Hiawatha, IA*

- Machining
- Stamping
- Fabrication

INTERTEK ISO 9001:2008

Certified WBE Women's Business Enterprise

Astraeus

Global leader in developing advanced innovations for the wind industry

MAG

One of the world's largest machine tool manufacturers, leading the market in composite aerospace manufacturing systems.

DOW

One of the world's largest advanced chemical and material producers

AKS

#1 Acrylic Fiber (precursor) Producer in the World

A

ornl

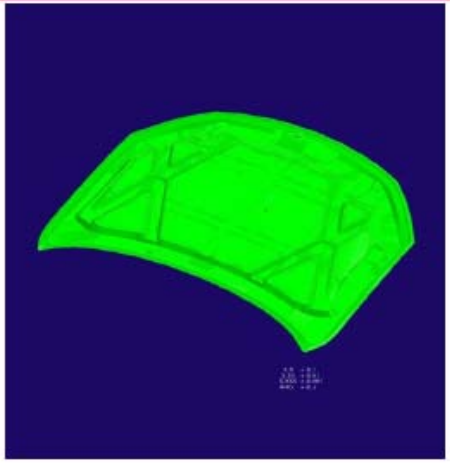
OAK RIDGE NATIONAL LABORATORY

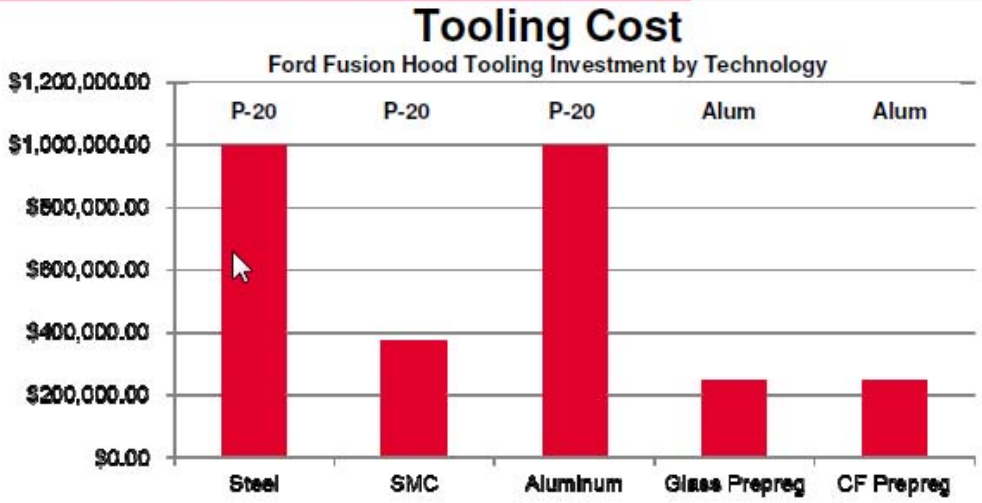
One of the nations leading chemical and material research and development laboratories

ERC

Innovative prototyping and advanced casting technology providing superior heavy industrial iron and steel castings

# Why continuous fiber composites?






## Continuous Fiber Composites Offer the Highest Level of Lightweighting!

Weight Savings by Material Technology

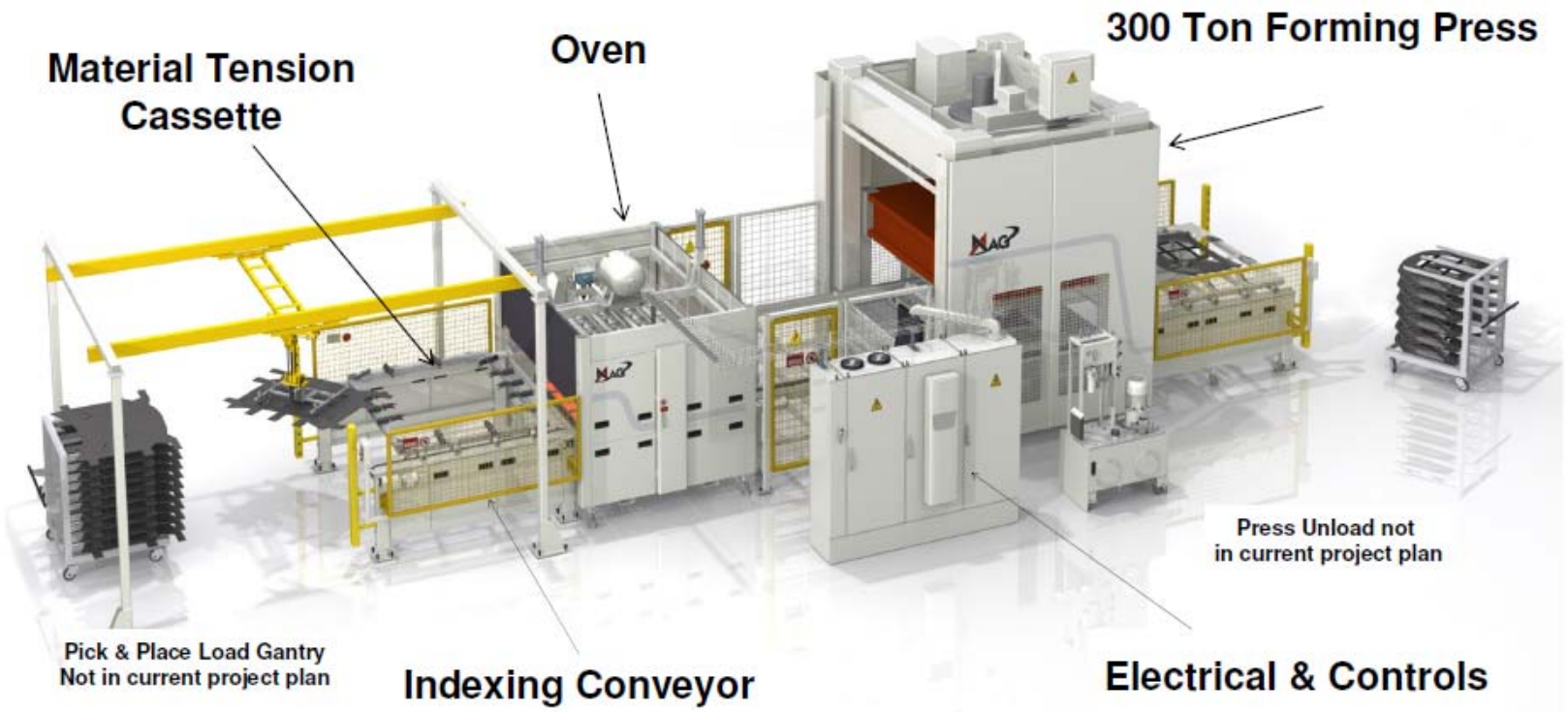
| | | | | | |
|---|---|---|---|---|---|
| Part Wgt (Lb.'s) | 36 | 27.7 | 21.6 | 17.0 | 10.8 |
| Weight Saving % | Baseline | 23% | 40% | 50+%* | up to 70%* |

* Estimated

| Material | Steel | SMC | Aluminum | Glass Prepreg | CF Prepreg |
|---|---|---|---|---|---|

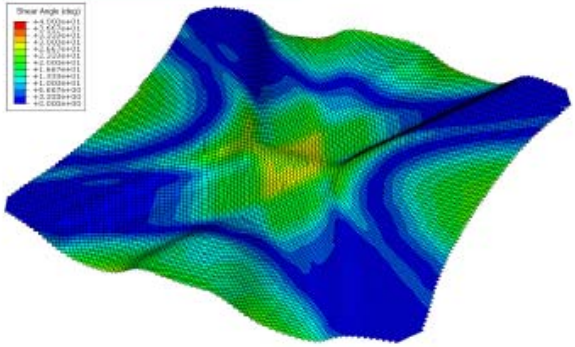
# Form and Cure Solutions

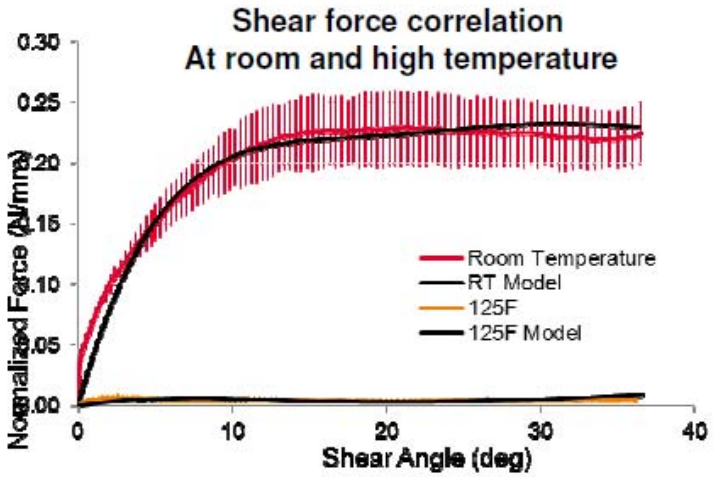
**CONTINUOUS FIBER COMPOSITE FORM & CURE**
**Load Station, Indexing Conveyor, Oven & Press**



# Forming process simulation software development

- **University of Mass, Lowell**
  - World Renown Plastics and Composites Curriculum
  - MAGPreg material characterization as it relates to forming processes
  - ACES software offering





# Viper® 7000 Concept

## Viper® 7000 Wind Blade Laminator – Glass or Carbon

- Spar
- Spar Caps
- Shear Webs
- Shell Skins

Generous material carrying capacity and high lay-up rates:
(32) ½" Spool Carrying Capacity 1376 lbs (625Kgs)
Lay-up rates for spar caps 600 - 1045 kgs/hr

- **Vertical six-axis gantry fiber placement capable of laminates 32 lanes of carbon or glass prepreg tows**
- **Laminates and cuts thicker (6mm), out of autoclave wind grade materials**

# Cross Pollination into other Industries




4 TON CAP.
4 TON CAP


PROTERRA
Transit