



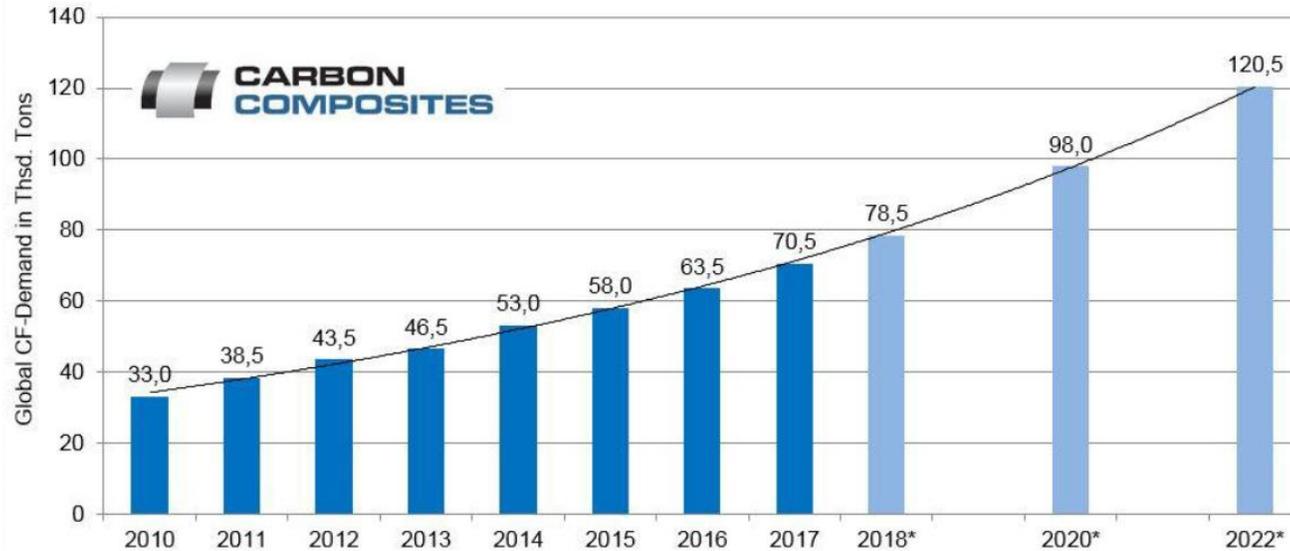
Nonwoven Carbon Fiber

**Providing turnkey solutions
for the advanced composites
industry**

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CURRENT COMPOSITE TECHNOLOGY IS WASTEFUL & EXPENSIVE



* According to AVK Composites Market Report 2018 and Freedonia group study 2019



70% YIELD TECHNOLOGY ~ \$972 MILLION ANNUAL LOSS

EXPENSIVE ~ \$50/LBS OR HIGHER

LFT AND INJECTION MOLDING ARE ENERGY INTENSIVE

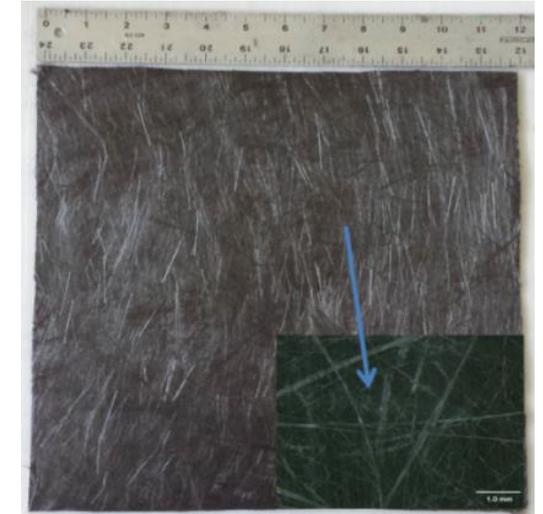
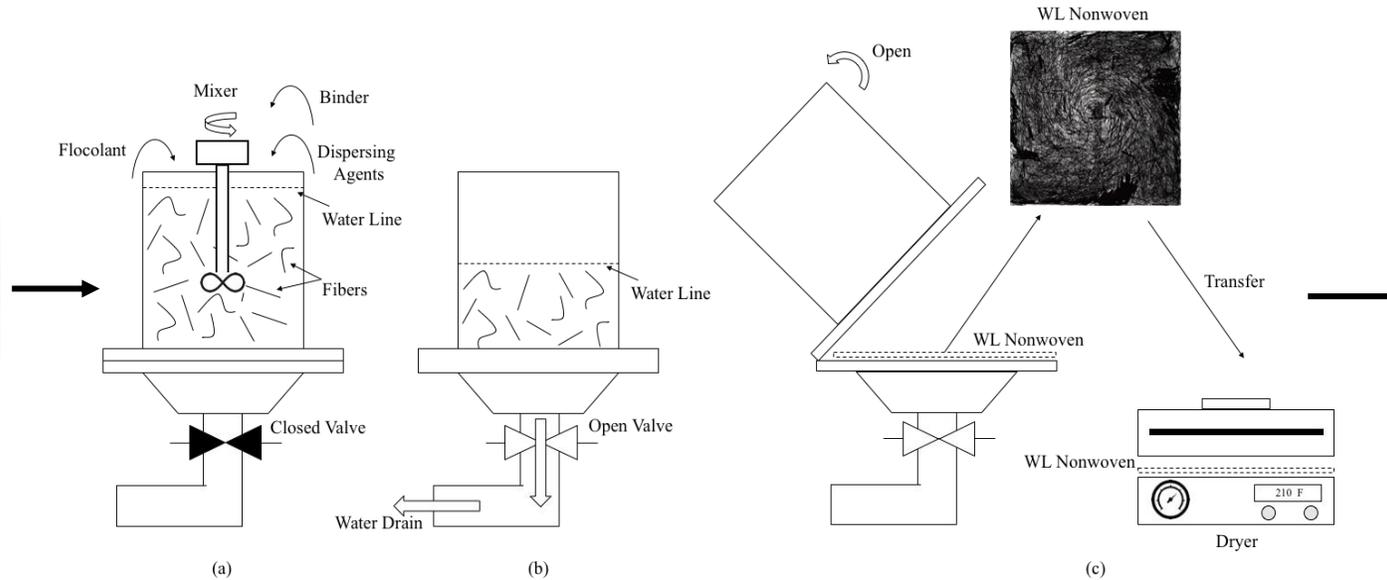
LIMITED MARKET & HINDERED GROWTH

WASTE REDUCTION: REPURPOSING OF WASTE INTO NONWOVEN

Defect free wet laid nonwoven preforms made with long chopped fiber “1 inch / 25.4 mm”



Chopped CF at 1”



WL Nonwoven CF

PATENT PENDING PROCESS TURNKEY PREFORMS

LONG FIBERS PROVIDES BETTER FORMING & HIGHER TARE RESISTANCE

HIGH OUTPUT (100 TO 300 FEET/MIN) & LOW-COST

\$8 BILLION IN ADDED VALUE PRODUCTS

ENDEAVOR COMPOSITES

HIGHLY AWARDED AND
VALIDATED
TECHNOLOGY



U.S. DEPARTMENT OF
ENERGY

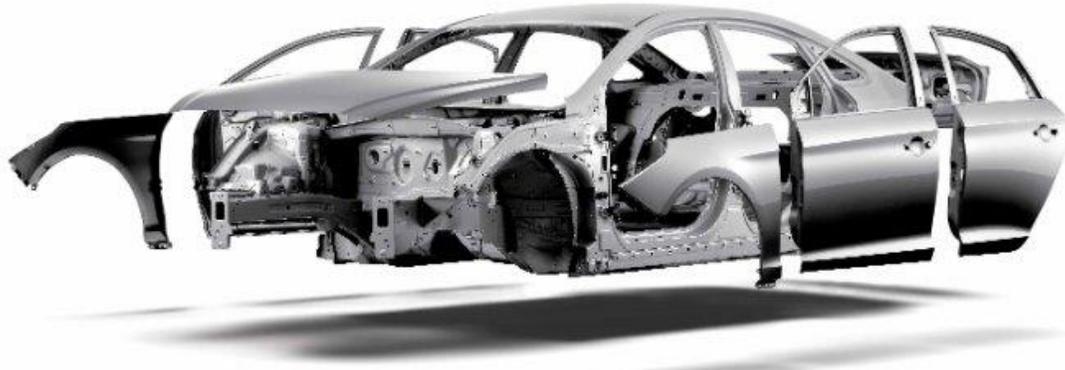


INNOVATION
CROSSROADS

OAK RIDGE NATIONAL LABORATORY

 **OAK RIDGE**
National Laboratory

POSSIBLE APPLICATION IN THOUSANDS OF CAR PARTS



 Current market at **\$1.8 Billion** (AJR Consultancy)

 Current parts cost ~ **\$40/lbs**

 **Wet laid preform** will offer significant **cost reduction** through:

 Increased output faster cycles reduction in design usage of existing facilities

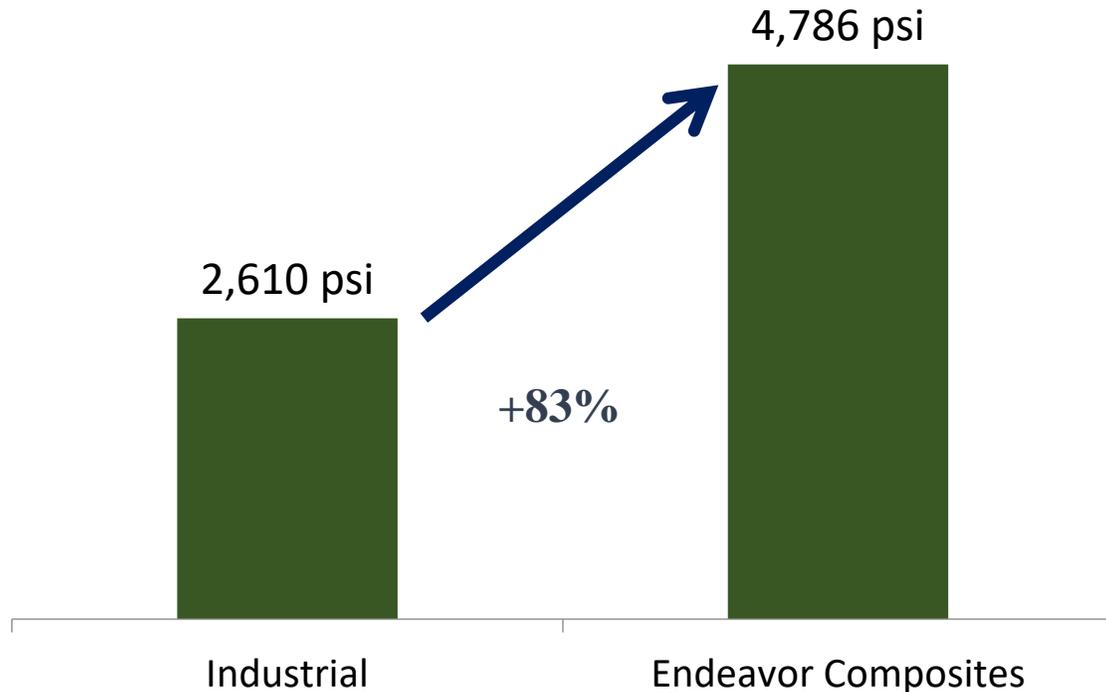


DEFECT FREE PREFORMS IMPROVES PROPERTIES

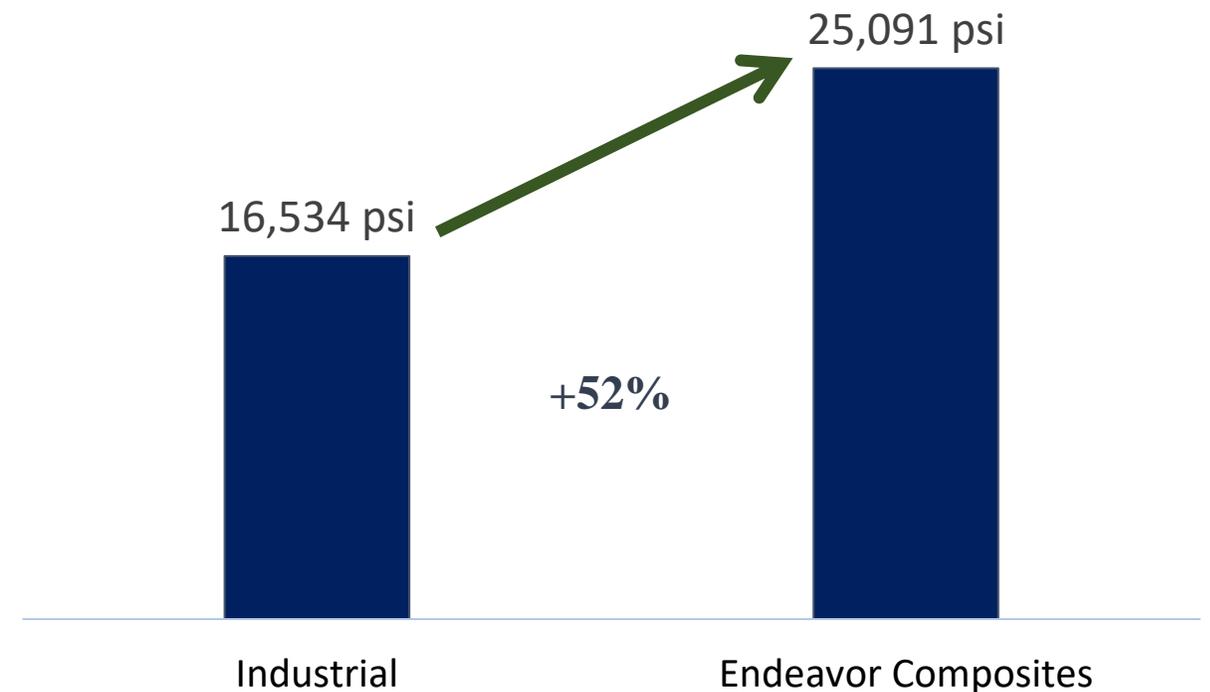
Normalized properties for CF/Epoxy composites:

33% weight ratio using 1.0-inch CF nonwoven preform

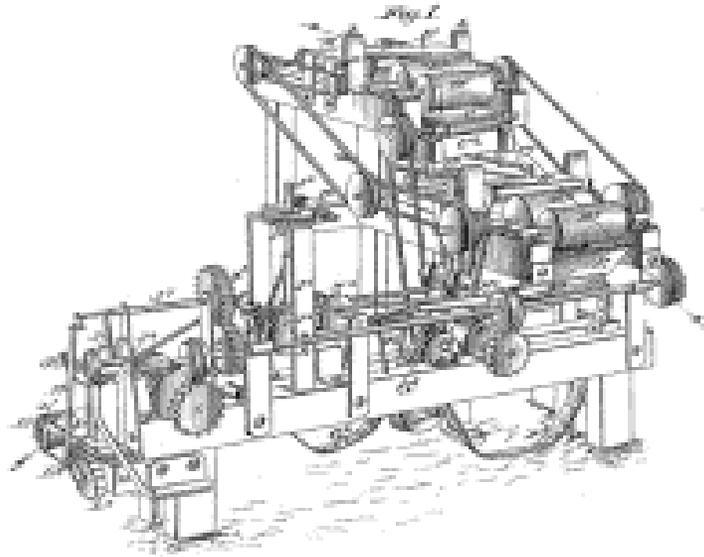
INTER LAMINAR SHEAR



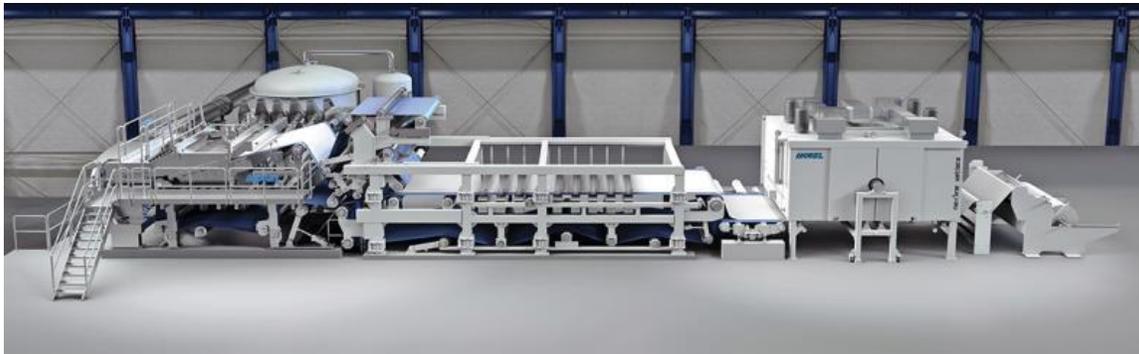
TENSILE STRENGTH



PILOT LINE GOES LIVE IN MARCH



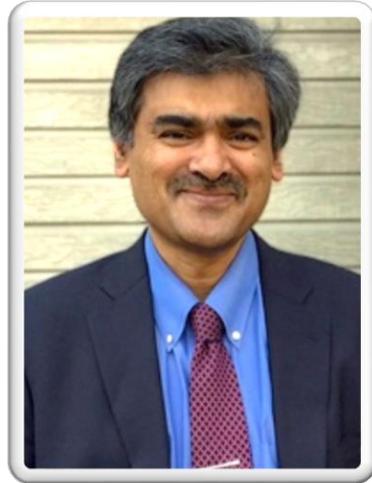
- **SCALED UP SEMI CONTINUOUS SYSTEM**
- **270 GALLONS CAPACITY**
- **3 TO 4 FEET PER BATCH**
- **10 TO 500 GSM FABRIC**
- **ALLOWS PROTOTYPE AND SMALL PARTS PRODUCTION**



NEXT STEP IS TO EXPAND INTO

- **ANDRITZ BUILT WET LAID LINE - MODIFIED WITH OUR PROCESS**
- **5 FEET WIDE CONTINUOUS PRODUCTION**
- **PRODUCTION SPEED FROM 100 FT/MIN TO 300 FT/MIN**

DEEP EXPERTISE IN TECHNOLOGY COMMERCIALISATION



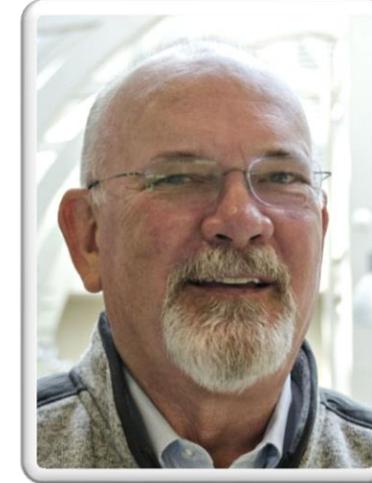
Uday Vaidya, Ph.D.

Advanced Composites
Manufacturing



Amit Naskar, Ph.D.

Carbon Fiber
commercialization



John Bruck

Business strategy &
development



SEEKING PARTNERSHIP & JOINING FORCE WITH INDUSTRY

Pathway to revenue

Strategic Partnership

- Setting a processing agreement
- Increase production Yield
- Expanding market reach

Licensing agreements

- Placing production lines at OEM facilities
- Partial or full licensing

ENDEAVOR

COMPOSITES

Excellence in Advance Composites
Manufacturing



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