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# **Composites Recycling Conference 2020 | Online**

**May 19 – 21, 2020**



# **Scout Boats**

## **Sustainability in Boat Manufacturing**

Matt Moore

# Scout Boats

Scout Boats was founded by Steve Potts in 1987.

Located in Summerville, SC

Employees 400+

Steve began by making small 14' boats and has grown the company to making luxury yachts up to 53' and becoming a leader in center console/outboard market.



530 LXF

# Manufacturing Process

Our manufacturing process consists of 5 departments.

These denote the stage of the build from start to finish

- Stage 1-Lamination/Infusion
- Stage 2-Clamp Up
- Stage 3-Finishing
- Stage 4-Rigging
- Stage 5- Final Assembly and Detail



Vacuum Infusion



380 LXF Deck Clamping



530 LXF on Water Test before 2020 Miami Boat Show



Finisher spraying a patch



530 LXF in Rigging



# Recycling at Scout

Although not a primary focus, we do recycle a few items here at Scout

- Acetone
- 55 Gallon Drums

We recycle virgin acetone used in all Stage 2-5 (Clamp up through Final Assembly). This acetone is placed in our acetone cooker which then makes it usable for our Stage 1 functions, lamination/infusion.

We use a considerable amount of 55 gallon metal drums. Scout has invested in drum crushers. After the drums are completely empty, they are crushed and placed in a metal dumpster for recycling.



Acetone Cookers



Drum Crusher

# Sustainability at Scout

Sustainability, specifically **reuse and reduce** is a large part of the production process at Scout.

The 3 most important tenants in production are

- 1) Safety
- 2) Quality
- 3) Manufacturing Efficiency

$$\text{Manufacturing Efficiency (\%)} = \frac{\text{Total Hours Earned}}{\text{Total Hours Worked}}$$

By reducing and reusing we naturally improve upon these tenants.

# Active Sustainable Initiatives at Scout

Efforts in Sustainability include:

- Solar Panels on the Plant D Roof.
- Motion Activated LED Lighting in Plant D.
- Epoxy Curing Boiler System.
- Initiator Collection Stations.
- Fiberglass Material Kitting.
- Vacuum Bag Patterning.





# Material Kitting

The practice of material kitting has drastically reduced our consumption of fiberglass and core materials.

The original way in Scouts composite manufacturing was to hand cut in fiberglass to the pattern of the boat from 60" rolls and 48"x48" sheets of core material.

A major goal of Scout has been to "remove the scissors from the laminators"

Scout has made major investments in an Eastman cutting table for glass materials as well as a C&C router for core.

Scout also outsources large pattern kits to Mahogany in New Jersey.

This process has created reduction and reuse advantages by again improving on 2 of the 3 tenants.

1. Quality is far superior as we have the exact same material in the exact same location on every build. This consistency reduces potential failure and rework.
2. The manufacturing efficiency is greatly improved allowing laminators to load parts in less than have the time. Increasing hours earned in the less time
  - This has been one of the best improvements we have made in our composites sector

\*You can also say we made an improvement in removing the scissors!

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Eastman Cutting Table



Core Kits



Material Kits



C&C Core Cutting Table





# Vacuum Bag Patterning

The standard process of installing the vacuum bag begins with lining the outside of the mold with tacky tape.

Once the material and core is loaded onto the mold the vacuum bag is pulled out from a standard 60" roll and laid over the part.

The tucking of the corners and pleating is then at the discretion of each employee.



Tacky Tape on 380 LXF Hull



Employee judging bag size for 380 LXF Hull

# Vacuum Bag Patterning

## Advantage of this process

Reduce of vacuum bag waste.

- Bag reduction of ~30%

Increased and consistent quality

- Less time looking for leaks

Increased Manufacturing Efficiency

- I have been able to prove a 90% savings in labor man hours

Multiple bags can be made at once and stored for use as needed



Standard bag install

Pre-patterned bag install

# Thank you

## Contact Information

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# LATEST DEVELOPMENTS AND MATERIALS FOR BOAT RECYCLING TECHNIQUES

- End-of-life of FRP materials: developing industry, a business worth millions of Euros
- At what point is the competence of the marine sector's technicians in the field of materials and craft construction techniques? What do they want from the composites industry?

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## ITALY AND FRANCE

- Pleasure boats flotilla has grown continuously
- Italy last survey (2011) around 700.000
- Close to the million units today (France)
- Due to their age, a number of boats are now out of use. France is the first country in the world to have a long-term deconstruction sector for end-of-life units and, above all, to finance it.
- Logistics of the deconstruction operation were entirely the responsibility of the last owner
- The cost of an average deconstruction of a GFRP boat of about 7 m and whose market value is zero, exceeds € 1,300 on average
- The fleet of new boats in 2017 stood at only 12,585 units (25,391 in 2007), the entire fleet being estimated at around 980,000 units. The lifespan of a boat is in the order of 50 years or more.

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# DISMANTLING

## European Waste Framework Directive or EPR (Extended Producer Responsibility)

- From January 1, 2019, producers must now participate in the financing of the end of life of the products subject to the registration obligation that they place on the market.
- France FIN (*Fédération des Industries Nautiques*) in 2009 raised the APER (Association for Pleasure Eco-Responsible) is to date the only eco-organization in the sector to be able to meet the specifications. It already brings together 80 to 85% of marketers, manufacturers and importers, including the current world leader, the American group Brunswick.

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# RECYCLING

- Treatment of composites, concerns many industries (energy, building, transport...) is still immature
- Techniques: grinding, incineration and pyrolysis, inert, landfills (officially forbidden)
- Not fully environmentally satisfactory solutions
- European Commission has already created a working group specially dedicated to the issue of Inoperable Pleasure Boats
- Main objective develop the sector in the member states
- Main problem costs & controls
- European Waste Framework Directive (2008/98/EC)
  - Basic concepts and definitions related to waste management
  - Prevention, Re-use, Recycling, Recovery, Disposal.
  - Current cost and lack of a viable recycling route are barriers to CFRP uptake



# Composites recycling is still in its infancy

- Options for recycling of glass fibre composites limited by the low value of glass fibre
- High value of carbon fibre has resulted in a number of recycling companies starting up around the world
- Landfill, is banned in nearly all Europe



# RECYCLING OF FRP BOATS: WHERE INDUSTRY MEETS RESEARCH (Italy)

Attainment of balance between costs and advantages  
Real objective of all forward-looking research.

Challenge: preparing technologies and management systems

UCINA-Confindustria Nautica is committed since many years in monitoring research activities and in the study

Recently presented (Mets 2019) new technology, called Emulsified Technology Engineering (ETE)





# THANK YOU FOR YOUR ATTENTION

—  
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# The Growing U.S. “Legacy Fleet”

- Between 2006 – 2019, **approximately 3 million** recreational boats reached “end-of-life” status in the United States (2% annual retirement rate)
- Growth in recreational boat manufacturing during 1980’s—90’s indicates upward trajectory in national retirement rate
- Coastal Communities are sensitive to the interconnected economic and environmental challenges associated with end-of-life boat populations
- Natural disasters, increasing landfill costs underline need for enhanced lifecycle management

# Cement Kiln Co-Processing: Rhode Island Pilot Project

- Following turbine blade precedent, RIMTA established collaborative research effort with Geocycle / LafargeHolcim in 2016
- Preliminary analysis prompted interest in pre-processing and kiln performance trials
- RIMTA developed statewide partnership network to evaluate and document recycling process



# Initial Technical & Logistic Findings



- C&D recycling equipment application  
Pre-processed to – 2” consistency  
(40-50% FRP)
- Dust suppression tactics
- Classified as “Non-Hazardous Solid”  
LHV-HHV (7,168 – 8,844 Btu/lb.)
- Energy value vs. Material Replacement value
- Limited risk for chlorine, fluorine, lead, etc.

# Challenges & Opportunities

1. Material separation requirements are significant (metals, construction variation)
2. Kiln infrastructure dictates pre-processing standards
3. Higher volumes have the potential to reduce costs

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1. U.S. cement industry interest in composites is growing
  2. Many coastal states are subsidizing boat disposal efforts
  3. Inclusion of manufacturing waste can boost volume and energy value





Options for Sustainable Boat Recycling

# Marine Industry Engagement



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