Shell Eco-Marathon Car Body  
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UTD ASME  
Spring 2017

Project Motivation

• The ASME student chapter at UTD competes in Shell-Eco Marathon competitions.  
• A new car body is needed to meet sponsor specifications.  
• Streamline Solution contracted to design and manufacture new car body through UTDdesign.

Project Goals

• Achieve design constraints set by Shell and UTD ASME.  
• Design body that balances manufacturability, weight, and aerodynamics.  
• Manufacture a prototype car body exhibiting low weight, low coefficient of drag, and in compliance with all constraints.

Process

Design

• Designed to meet physical constraints set by Shell Eco-Marathon and UTD ASME, with manufacturability forefront in mind  
• Structural material selection:

<table>
<thead>
<tr>
<th>Fiberglass</th>
<th>Carbon Fiber</th>
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</thead>
<tbody>
<tr>
<td>White</td>
<td>Black</td>
</tr>
<tr>
<td>570 strength/weight</td>
<td>1000 strength/weight</td>
</tr>
<tr>
<td>2.7 g/cc density</td>
<td>1.5 g/cc density</td>
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<tr>
<td>Fiberglass cost to Carbon Fiber cost: 1:3.3</td>
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Tooling/Layup

• Made negative molds from high density foam, foam cut using 3-axis milling machine.  
• Sand and Buffed molds to smooth voids.  
• Coated molds with Duratec primer to make the mold surface smooth.  
• Used parting wax for easy release.  
• Laid up carbon fiber and foam composite in negative mold and vacuum bagged for 8-12 hours.  
• Released layup pieces for later joining.

Fabrication

• Used epoxy to join panels together.  
• Used epoxy-microballoon mixture as filler to smooth inconsistencies, iteratively sanding and re-applying.  
• Manufactured and installed flanges made from fiberglass for structural joins, or aluminum flanges with rivet nuts for removable segments.  
• Cut and installed Lexan windows with rubber gasket.  
• Mounted and wired electrical components for ASME electrical system.

Final Product

With the prototype Manufactured, UTD will have a superior car body that is:  
• Up to 50 % reduction in weight  
• Computationally lower in drag.  
• Aesthetically pleasing shape.  
• Production quality.  
• Ready to enter into the Shell Eco-Marathon UrbanDesign Competition occurring April 17-20, 2017.  
Additionally, complete CAD models and layup molds for future use will be provided.

Acknowledgements

The team would like to give a very special thank you to...  
• Jessie Lowery  
• Dr. Dani Fadda  
• Dr. Robert Hart  
• UTD ASME  
• Mark Calder  
• UTDesign  
• Gene Woten  
• Nancy Finch  
• Nancy Scroggins  
• DUNA-Group  
This project would not have been possible without your guidance and support throughout the year!