Background

• Chassis is the framework of a vehicle
• It keeps all of the elements and parts together
• It keeps drivers safe and prevents severe injuries

Questions

• In what ways can we improve efficiency and safety within the modern vehicles?
• What is carbon fiber?
• What advantages and disadvantages does it come with?

Related Work and State of Practice

Steel Monocoque Chassis:
• Integrates the body into the frame
• Low cost
• Heavy and stiff

Aluminum Chassis:
• Lighter than other chassis frames
• Fuel efficient
• Expensive for mass production

Technical Approach and Results

SOLUTION: Implementing Carbon Fiber Chassis

• Extremely thin strands of the element carbon
• Very strong and stiff
• Made from organic polymers
• Created by a Polyacrylonitrile (PAN) process
• Several other ways to produce carbon fiber

Advantages and Disadvantages

Advantages:
• Less weight
• Fuel efficient
• Better acceleration and quick speeds
• Will not break/crack easily
• Takes less material to build compared to a steel chassis

Disadvantages:
• Materials are expensive
• Design software and machines play into cost
• Time consuming
• Not able to weld or straighten
• No repairs

Making Carbon Fiber

1) Spinning: PAN is mixed with other ingredients and spun into fibers.
2) Stabilizing: Chemical change to keep the bonding stabilized.
3) Carbonizing: Stabilized fibers are heated to extreme high temperatures.
4) Treating the Surface: Fibers’ surface are oxidized to improve bonding properties.
5) Sizing: Fibers are coated then loaded into machines to create them in any shape(s) desired.

Commercialization Plan and Partners

• Propose this implementation to popular car manufacturers such as General Motors (GM), Chrysler, and Ford.
• Working with BMW will be efficient since they have started to implement carbon fiber chassis in their new BMW i3 model.

References

• Johnson, Todd. "How Is Carbon Fiber Made?" About.com
• "Basic Car Features and Technologies - Why High End." Basic Car Features and Technologies - Why High End.

Team Composition

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