

CASE STUDY

RE:BUILD MANUFACTURING'S INNOVATIVE CFRTP TRUCK BED LINER

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INDUSTRY FIRST

This truck bed liner represents one of the automotive industry's first successful implementations of a large-format CFRTP component in a major structural application for a production vehicle. The innovation proves that advanced composite materials can achieve the production economics necessary for mainstream automotive manufacturing.

Challenge

The automotive industry has long struggled with the limitations of traditional truck bed construction. Steel components are heavy and prone to corrosion, denting, and scratching, which necessitates separate aftermarket bed liners for adequate protection. This two-component approach significantly increases vehicle weight while adding manufacturing complexity and cost for both OEMs and consumers.

Solution

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Innovation

The solution centers on two key innovations that work in tandem to create a viable production alternative to traditional steel construction:

Material Application:

The large-format truck bed liner utilizes a specifically formulated GFPP composite consisting of 63% glass fiber and 37% polypropylene resin. This material selection wasn't merely substitutional but intentionally chosen to address multiple performance requirements simultaneously. The continuous glass fiber reinforcement provides structural strength equivalent to steel while achieving approximately half

the weight. The polypropylene matrix delivers inherent resilience against impacts, scratches, chemicals, and hail. Perhaps most importantly, the material remains fully recyclable at the end of vehicle life, addressing growing sustainability concerns in automotive manufacturing.

Manufacturing Process:

Re:Build developed an entirely custom CFRTP production method that combines several advanced techniques into a cohesive manufacturing process. The system begins with Automated Tape Laying for precise fiber placement and orientation, critical for maintaining structural properties. This is followed by a Low-Temperature Hot Forming process analogous to automotive hot metal stamping but uniquely optimized for thermoplastic composites. The proprietary combination of heating methods and pressure

BY THE NUMBERS

- 50% weight reduction vs. steel construction
- 2-minute TAKT time per part
- 150k+ annual production capacity
- 62" x 42" large-format component
- 63% glass fiber, 37% polypropylene composition
- 2027 model year production launch



application represents years of development work to achieve both the required mechanical properties and surface finish quality.

What truly distinguishes this innovation is how these process elements come together to enable high-volume production economics. The system achieves a remarkable 2-minute TAKT time per part across two custom-built manufacturing cells, making CFRTP economically viable for mainstream automotive production volumes exceeding 150,000 units annually. The process delivers the final surface finish directly from the mold, eliminating the need for secondary finishing operations that would otherwise add cost and complexity.

Results

The innovative large-format truck bed liner delivers multiple benefits across performance, manufacturing, and sustainability dimensions:

The performance improvements begin with structural integrity matching traditional steel while providing superior damage resistance. The inherent material properties deliver impact and chemical resistance without requiring additional protective coatings. Unlike metal beds that rust and corrode over time, the composite construction remains structurally sound throughout the vehicle lifecycle, potentially increasing resale value and customer satisfaction.

From a production perspective, the system dramatically reduces manufacturing complexity by eliminating multiple conventional steps. The need for separate metal bed fabrication, corrosion treatments, painting systems, and liner installation is replaced by an integrated large-format component production process. Despite the premium material costs typically associated with composites, the total system cost is reduced through process elimination, part consolidation, and weight savings. The streamlined production approach with

automated finishing requires minimal manual labor, making domestic manufacturing more economically viable.

The environmental benefits are equally significant. The composite material is fully recyclable, addressing end-of-life concerns that often limit composite adoption. By eliminating paint booth operations and their associated volatile organic compound (VOC) emissions, the process significantly reduces environmental impact during manufacturing. The substantial weight reduction also contributes to improved vehicle efficiency throughout its operational life.

Implementation

This innovation is currently in active commercialization for an electric truck, with production targeted for the 2027 model year. The development represents a multi-site collaboration, with Re:Build utilizing seven of its 14 engineering and manufacturing facilities across the United States. This coordinated approach enabled the simultaneous development of both the product and the custom production equipment required for high-volume manufacturing.

Perhaps most significantly, the project established a short, U.S.-based supply chain for composite materials in partnership with Avient Corporation, which supplies the engineered GFPP composite material system. This domestic supply chain strategy reduces logistical complexity and transportation costs while increasing manufacturing resilience.

Industry Impact

This successful implementation demonstrates the viability of continuous fiber-reinforced thermoplastic composites in major structural automotive applications, potentially opening new markets for advanced materials in high-volume vehicle production. The case proves that innovative materials can be economically integrated into mainstream automotive manufacturing when supported by appropriate process innovations. As the industry continues to seek weight reduction opportunities for both conventional and electric vehicles, this application provides a proven template for replacing traditional metal components with composite alternatives without sacrificing performance or production economics.



INDUSTRY RECOGNITION

This groundbreaking truck bed liner was recognized with the “Most Innovative Production Part” Award for Process Innovation at the 2025 SPE Automotive Composites Conference & Exhibition (ACCE), validating Re:Build’s breakthrough approach to high-volume CFRTM manufacturing.