



Helping a Wheelchair Mobility Startup Move Beyond the Prototype Phase

An early-stage startup came to GSE with a promising prototype — a device designed to convert a standard wheelchair into a motorized system. The concept addressed a meaningful mobility need, but the path from prototype to production-ready product required the right engineering partner.



The Challenge

The students had made impressive progress on their own, developing and fabricating several components in a garage-based environment. While that effort allowed them to validate the concept, some of the fabricated components proved to be weak points in the product's real-world application.

Their biggest challenge was moving beyond the prototype phase and understanding how the market could support both development and manufacturing of the parts and components needed for a production-ready product. They needed a solution that would improve durability and function without forcing them into costly, complex manufacturing methods that were out of reach for an early-stage venture.

Garage-Built Prototype

Fabricated components in a limited environment validated the concept but introduced weak points in real-world application

Durability Gaps

Certain components were not strong enough for the demands of the final product application

Manufacturing Constraints

Conventional fabrication methods were too costly and complex for an early-stage startup to pursue independently



Proof of Concept & The Solution

"Solving product challenges is not always about the most traditional method — it is about finding the right method for the design, the application, and the stage of the business."

GSE took their initial designs and worked through them with our engineering team to identify affordable, practical ways to improve the problem areas. It became clear that one of the application challenges required a stainless material to minimize wear — but fabricating that component conventionally would have been extremely difficult and expensive.

To solve the issue, GSE used 3D-printed 17-4 stainless steel components to replace the weaker parts in the original design.

1

Design Review

Assessed the original prototype designs to identify weak points and prioritize affordable, practical improvements

2

Material Selection

Identified 17-4 stainless steel as the right material to address wear in critical components

3

3D Metal Printing

Used 3D-printed stainless steel to eliminate the need for costly conventional fabrication and secondary machining

4

Production-Ready Parts

Delivered finished components that could be installed directly into the product without additional processing

The Results

17-4 SS

Stainless steel selected for wear-critical components

0 Secondary Ops

No secondary machining required after printing

3D Printed

Metal components produced without conventional fabrication

1 Startup

Moved from garage prototype to production-ready solution

What We Delivered

- Supported an early-stage product designed to motorize a standard wheelchair
- Helped move the product beyond the prototype phase
- Identified and corrected weak points in the original design
- Selected 17-4 stainless steel to reduce wear in critical components
- Used 3D-printed metal components to avoid costly conventional fabrication
- Eliminated the need for secondary machining
- Delivered a more durable, production-ready component solution

Business Impact

This project demonstrated how engineering support can help innovators bridge the gap between a promising prototype and a viable product. By combining design review, material selection, and advanced manufacturing methods, GSE helped transform a garage-built concept into a stronger, more refined solution without pushing the team toward unaffordable processes.



The Outcome

By rethinking the manufacturing approach instead of forcing the startup into unaffordable processes, GSE delivered a stronger, more durable, and more production-ready solution. The result was a 3D-printed 17-4 stainless steel component that addressed the critical wear problem, eliminated secondary machining, and gave the team a realistic path toward scaling their product.

At GSE, we help customers find practical engineering answers to difficult product challenges — whether they are established manufacturers or early-stage innovators. In this case, that meant taking a promising idea, applying the right materials and manufacturing methods, and helping create a stronger path toward a real-world solution.