

# Wire Harness Fixturing with SAF Technology

## Challenge

Wire harnesses, also called wire looms or cable assemblies, are specially designed systems of wires, cables, and connectors that transmit electrical power and signals between various components. These harnesses are essential for the functionality of modern electronic systems, ensuring organized and efficient electrical connections between components. Wire harnesses are ubiquitous in the global manufacturing landscape and can be found in a wide range of sectors including automotive, aerospace, electronics, and telecommunications. They range in size from a few inches for simple electronic devices to many feet for larger, more complex systems that can be found in vehicles, aircraft, and industrial machinery.

The process of constructing these harnesses is meticulous and labor intensive. Engineers create detailed schematics and wiring diagrams based on the specific requirements of the application. Then a team of people uses those guidelines to assemble all the components together and ensure the quality of the final product. This process requires a range of specific fixtures such as prongs for routing cables, clips to hold the components onto an assembly board, connector holders to keep the cable terminals in place, and much more. Many of these fixtures are small, complex parts that are machined, which is an expensive process with long lead times. Depending on the complexity of the assembly, tens to hundreds or even thousands of these pieces are needed. Some specific applications or custom wire harness designs require custom fixtures, which can add difficulty and increase lead times when they are manufactured in a traditional way.

## Application Solution

Using additive manufacturing instead of machining to make all of the required fixtures, wire harness manufacturers can lower costs, alleviate supply chain issues, and get their products to market faster. The H350® 3D printer, powered by SAF® technology, is particularly well suited to wire harness applications due to its ability to rapidly produce thousands of end use parts. By using SAF technology with the H350 printer, customers can save up to 70% of the cost of machining these parts and reduce lead times from days to hours. Parts can be printed on demand and in high quantities, and many different types of fixtures can be produced at the same time within a single H350 build.

The example build in Figure 1 contains 352 individual fixtures to support the production of 32 ignition coil wire harnesses but only takes 13 hours to print. Beyond the ability to easily produce the quantity of parts needed, additive manufacturing offers additional benefits. Each of these fixtures can be uniquely identified or serialized by adding a physical label to the part using the tools in GrabCAD Print Pro™, the print file preparation software used with the H350. And because the complexity of the assembly process can be error-prone, custom fixtures can help 'mistake-proof' the process. The example in Figure 5 contains a 3D printed custom clamshell mount that secures the five cables together and can be placed along with the harness into the vehicle as an end-use component.

While the whole portfolio of materials offered on the H350 platform could be suitable for wire harness fixturing applications, the low cost of Stratasys polypropylene combined with SAF technology's efficient material refresh rate offers the most enticing cost savings compared to traditional processes. Additionally, polypropylene's durability and chemical resistance properties make it a perfect fit for the application.

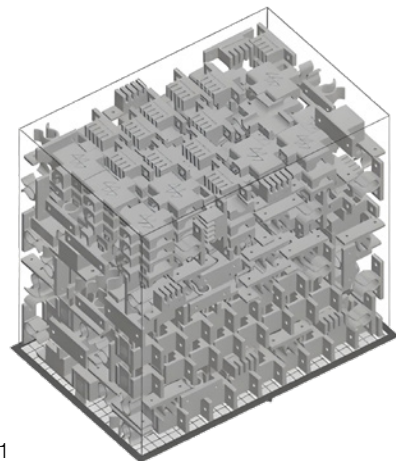


Figure 1

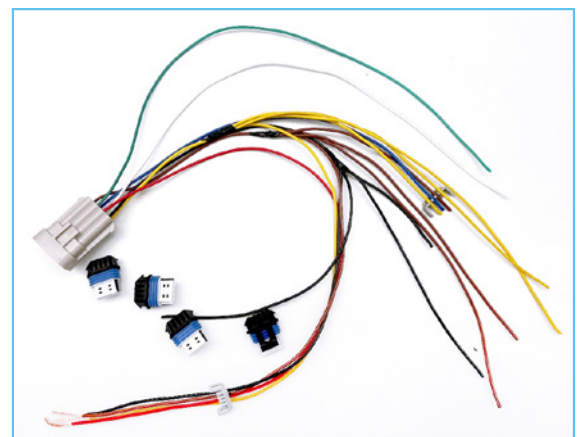


Figure 2

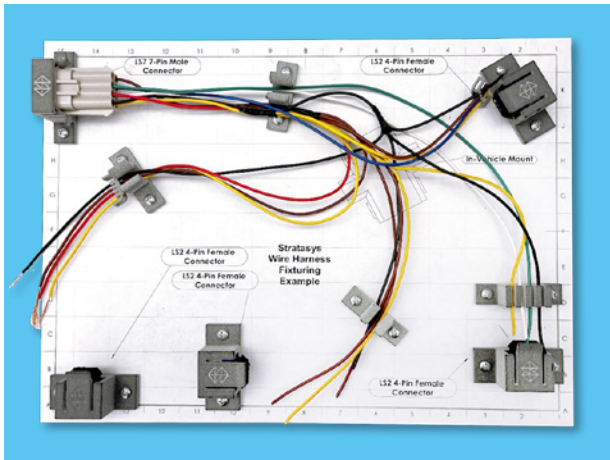


Figure 3



Figure 5

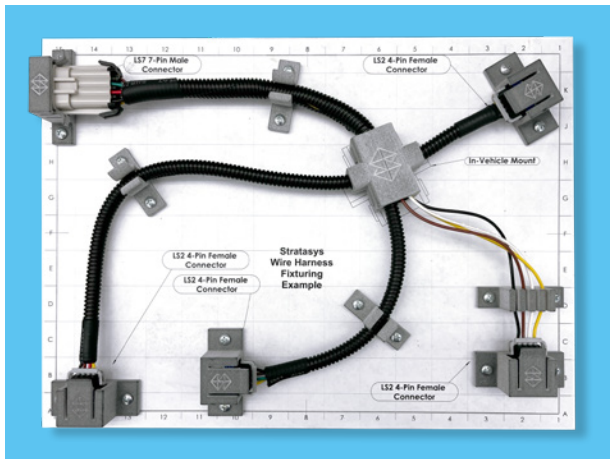


Figure 4

To learn more about this application or SAF 3D printing technology, [contact a Stratasys representative](#). Our team is ready to provide whatever assistance you need to leverage the capabilities of additive manufacturing.



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## APPLICATION BRIEF

### SAF

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