



FORD'S IN-HOUSE FACTORY TOOLING

3D PRINTED JIGS & FIXTURES WITH BIGREP'S INDUSTRIAL AM SYSTEMS



Ford Motor Company is no stranger to industrial 3D printing. The US-based automotive giant purchased its first 3D printer – the third SLA 3D printer ever to hit the market, in fact – in 1986.

The company's only research facility outside the United States, Ford Research & Advanced Engineering Europe, opened in 1995, is dedicated to advancing the next generations of Ford's vehicles and their manufacturing processes with additive manufacturing technology. As the company that pioneered the automotive assembly line, forward thinking is in Ford's DNA.



PROBLEM

Despite their long relationship with additive manufacturing technologies Ford's jigs and fixtures were, until recently, still produced with traditional processes. Manual machining from metal made tooling production expensive, with long lead times that were bottlenecking production.

The company regularly needs new welding fixtures with no potential for reuse. One new prototype requires about 190 fixtures that previously required lead times as long as 3 weeks. Hand jigs were created in a similarly intensive manual process with an 8-to-10-week lead time and many iterations.

Traditional workflows were:

- Highly manual, occupying skilled workers.
- Energy intensive, requiring off-site metal recycling.
- Exceptionally high cost.



Ford's industrial 3D printing materials:

PLA	PA6/66	TPU
For mockups of original components	For strong jigs & fixtures	For protection parts

SOLUTION

After investing in a BigRep large-format 3D printer, Ford's tooling processes changed. Because additive manufacturing is a hands-free process, Ford can now print their jigs and fixtures overnight in a lights-out manufacturing setting to have in use the next morning. This new, efficient process frees Ford's skilled workers for more demanding tasks throughout the day and the production is a fraction of the previous costs; both in terms of labor and material.

Ford's new workflow:

- Reduced lead times by 94%.
- Enabled hands-free production.
- Returned costs in one application.
- Enabled in-house part shredding and recycling.

Ford's welding fixture workflow changed from:

TRADITIONAL	TO	ADDITIVE
<ol style="list-style-type: none"> 1. Plot clamp 2. Design fixtures 3. Manually machine fixtures 		<ol style="list-style-type: none"> 1. Design fixtures 2. Print hands free 3. Mount fixtures
<ol style="list-style-type: none"> 4. Layout fixtures 5. Mount clamps 6. Align modular ends 		

RESULT

In a telling result, Ford's first project with their additive manufacturing system – welding fixtures – saw a complete return on their investment. With the printer's value returned so quickly in its first application, the team was able to consider more uses for additional value.

Ford's modernized welding fixture workflow was reduced by 50%, and lead times for both fixtures and hand jigs by an astounding 94%. Ford now produces hand jigs in just 2-3 days while fixtures are printed overnight. The change is helping Ford to innovate faster with increased flexibility for their creative production team.



SENSOR FIXTURE

Designed by:	Ford Motor Company
Dimensions:	890 x 1010 x 110 mm
Nozzle:	1 mm
Layer Height:	0.6 mm
Part Weight:	4.1 kg
Filament:	PRO HT
Printing time:	51 hours