



Riding Toward Victory – Giant Bicycles Streamlines Product Development With Additive Manufacturing

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Morder Yang

**X-Road Category Designer,
Cycling Innovation Center,
Giant Manufacturing Co., Ltd.**





Riding Toward Victory

Founded in Taiwan, Giant Manufacturing Co., Ltd. (Giant) has been one of the world's leading bike manufacturers for over 40 years. Launching its first affordable carbon-fiber bicycle in 1987, the brand quickly hit the Taiwan cycling market and soon spread across the globe, including Europe and North America. Apart from winning design distinctions such as the Eurobike Awards, Giant has also helped professional teams triumph in world tournaments, such as the Tour de France and other international grand tours.

Time is of essence on the racing circuit and the same rule applies to the production of racing bikes and gears if Giant is to launch new products frequently. However, producing

prototypes for design validation through outsourced vendors using traditional fabrication methods is expensive. This limited the creativity of designers at Giant's Cycling Innovation Center since any design iteration would incur high cost in addition to prototyping time.

Staying Competitive with 3D Printing

As one of the world's prestigious bike manufacturers that keeps pushing limits, Giant was looking for ways to further improve bike designs and progress in international tournaments. The company turned to 3D printing and purchased a Fortus 360mc™ 3D printer, bringing prototyping in-house to accelerate the R&D effort of their new bicycle frames.

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Using FDM® technology, the Fortus 3D printer creates three-dimensional models with ABS-M30™, an engineering-grade thermoplastic that possesses higher tensile, impact and flexural strength, and is up to 70 percent stronger than standard ABS. Models printed with ABS-M30 are able to withstand high-impact post-processes, such as sanding and drilling.

Before implementing 3D printing in its product development process, Giant outsourced its frame prototyping to vendors using traditional manufacturing methods, which took at least 7 to 10 days from sending out the CAD design file to receiving a prototype. However, with the increasingly competitive market, the need for accelerated product launch and more innovative designs, the team had to find a better solution to streamline their product development cycle.

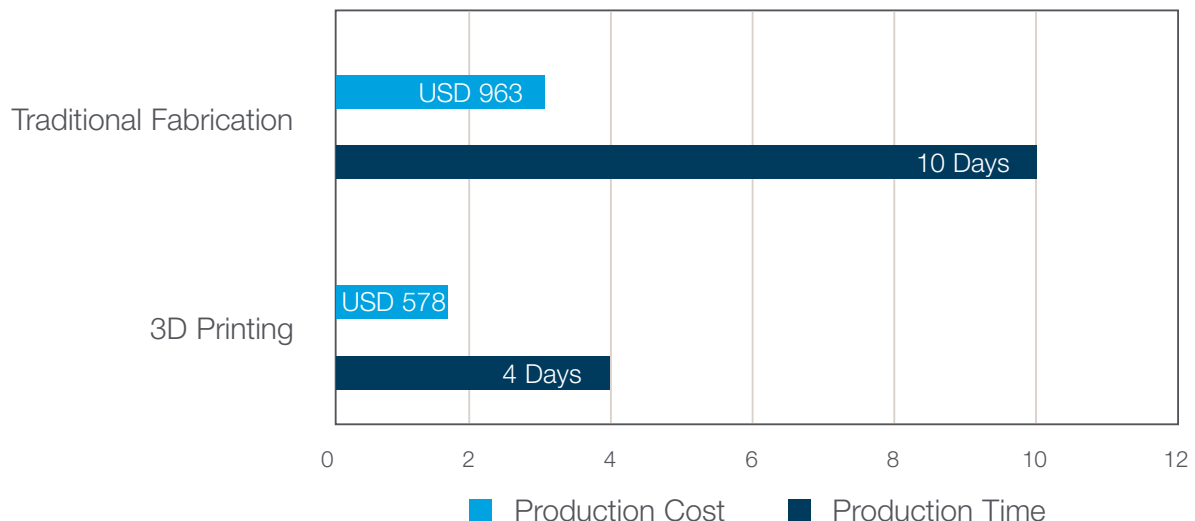
“Apart from the prolonged lead time, each prototype amounted to approximately \$1,000 USD. Also, every design iteration would cost the same even though only minor amendments were needed. We could only afford to modify the design twice at most, and occasionally had to compromise on quality,” said Morder Yang, X-Road Category Designer at Giant’s Cycling Innovation Center.

Streamlining Design Validation Process

In-house 3D printing has offered an answer to Giant’s R&D team’s concern over resources for design iteration. Instead of waiting for more than a week to receive a prototype of the bike frame design from the vendor, models could be 3D printed within the Cycling Innovation Center in four days. This cut the cost down to \$600 USD while reducing 60% of the time required in comparison to outsourcing, a 40% reduction over traditional manufacturing methods.

Frame Model Production

3D printing vs Traditional Fabrication



“The consumer market has always been competitive in every country with new products releasing from time to time to cater to the ever-changing market trend and different customer requirements. To stay ahead of the game, accelerated time-to-market and innovative designs are two key factors to win market share, and 3D printing can provide the solution to optimize both aspects,” Yang added.

Since the adoption of 3D printing into Giant’s Cycling Innovation Center, most of the company’s masterpieces are now designed, prototyped and finalized using the Fortus 3D printer, including the composite frame of the drop-bar bike AnyRoad CoMax 2015, which has been popular among adventure riders due to its light weight and smooth riding experience. With the cost and time concern eased by 3D printing, designers and engineers can implement more functional tests, reviews and modifications to perfect the design while keeping to the tight product launch schedule.

“The Fortus 3D printer has helped us turn concepts into highly accurate prototypes in actual sizes with minimized cost and time, facilitating internal communications, R&D evaluation on ergonomics and functions, thereby enabling us to gain competitive advantage and maximizing business potential in the worldwide bike manufacturing market,” concluded Yang.



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