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These 3D-Printed Wooden Tables and Chairs Aim to Disrupt the Cycle of Furniture Waste

During this year's Art Basel Miami Beach, an inventive group of designers and artists debuted a collection of objects meant to show how the design industry can reduce its environmental footprint.



Furniture waste can seem like an insurmountable problem; Americans produce an estimated 12 million tons of it annually, with 80 percent going to landfills and the largest material category being wood. A recent exhibition from sustainable furniture design and manufacturing company Model No., PROWL design studio, fine artist Mike Han, and motion designer Natalie Liu put forth a shared goal to reduce the furniture industry's environmental footprint—and a plan to reimagine the afterlife of wood products.

Entitled *Endless Loop: From Waste to Wanted*, the collaboration, which debuted at the Solana Spaces in Miami's Wynwood district during this year's Art Basel and Design Miami, featured one-of-a-kind PROWL stools and tables, standing sculptures and pendant lighting by Model No., a towering monolith by Han, and an NFT collectible artwork by Liu, all made entirely from plant-based, ethically sourced materials such as FSC-certified salvaged hardwoods. Astonishingly, every piece was 3D-printed too.

For the innovative manufacturing process, Model No. created its own large-scale 3D printers that transform salvaged wood waste into a paste-like material used to fabricate each functional object. To make the paste-like material, biodegradable polyesters or plant-based resins are blended with fine wood dust, then compounded into tiny pellets and fed into the 3D printer. "When those pellets are heated up and ground together inside the 3D printer's extruder, they form into that 'paste-like' material that—once extruded under the right conditions—cools, solidifies, and bonds with the prior printed layers into a solid, durable object," says Model No. cofounder and chief technology officer Jeffrey McGrew, who designed and built the company's original industrial-scale 3D printers with mechanical design engineer Kevin Zumani.



Lauryn Menard and Baillie Mishler, founding designers of PROWL Studio, designed a salvaged hardwood table with a 3D-printed base and stools for the Endless Loop collaboration.

Courtesy of Model No.

Model No. custom produced each work for the collection using fallen ash wood, sawdust, and upcycled plant waste sourced near its micro-factory by Bay Area wood supplier Arborica. (Ash trees are commonly mulched or burnt when felled, so the pieces would typically go to waste.) "Ash was also chosen for its lovely appearance, strength, workability, commonality as a 'salvaged' tree, and the speed of its drying time," says McGrew. What resulted was a collection of modern furniture and decor that's on par aesthetically with much of what you'd find at CB2 or Ikea, but was manufactured to have a much less harmful impact on the environment.

Take the salvaged hardwood table with a 3D-printed base and stools designed by PROWL cofounders Lauryn Menard and Baillie Mishler, all with smooth, rounded forms. "At first glance, the soft shapes of the table and stools reference trunk-like pillars," says Mishler. "But, once you're up close and engaging with the pieces, you'll notice fluted details inspired by the ropey bark found on ash trees in their natural state that show off the nuanced and intricate capabilities of the machinery used to produce the set."



Fine artist Mike Han worked with Model No.'s digital designers to create the Endless Loop Monolith using 3D printing techniques and salvaged ash wood.

Courtesy of Model No.

Han's contribution also features decorative grooves; the team digitally cut the artist's brushstrokes into the face of the ash monolith. On the opposite side, the 3D printer added a convex mirror image of the brushstrokes using sawdust recaptured during the milling and digital cutting steps. "My line work is pushed and pulled through a two-dimensional plane using a subtractive and additive process," Han says, referencing the tactful use and redistribution of material the monolith exemplifies.

Compared to traditional methods of wood furniture production, Model No. says their 3D-printed furniture emits 80 percent less greenhouse gasses. What's more: The new wood furniture is biodegradable and can be composted or reused to 3D print future products.

In addition to reducing the furniture industry's carbon footprint and making the most of readily available materials without transporting them thousands of miles, Model No. chief executive officer Philip Raub thinks 3D-printing techniques can also address the furniture industry's long wait times: "On average, our lead times are half of what we are seeing in the market today," he says. "It's not a matter of whether it [3D printing] can be done, rather when others are going to start transitioning to better practices."

"It's far more compostable than anything in the industry today," Menard adds. "If the industry got behind this, we'd have a much healthier world in furniture."

Top photo courtesy of Model No.