

NATUREWORKS CASE STUDY

Crystal Court River Rock Seating Showcases Ingeo™ PLA's Performance in Large Format 3D Printing

Situation: Renovation of Twin Cities Landmark Requires Nature-Inspired, Flexible Seating

Take a trip to the IDS Center's Crystal Court in downtown Minneapolis and you'll see an exciting example of Ingeo in use. Last year, Minneapolis-based firms Perkins&Will and New History were tasked with renovating the heart of Minnesota's "social skyscraper," subtly reimagining the elements of light, trees, and water that have characterized the atrium gathering space for decades.

The task posed a few design challenges, one of which was updating the existing stationary white benches into communal, flexible seating unobstructive to both foot traffic and the visual calm of the nature setting. Sustainability was a factor as well, as the space deserved environmentally responsible and ethically sourced materials that aligned with the indoor natural oasis being created.



Photo courtesy of Dimensional Innovations

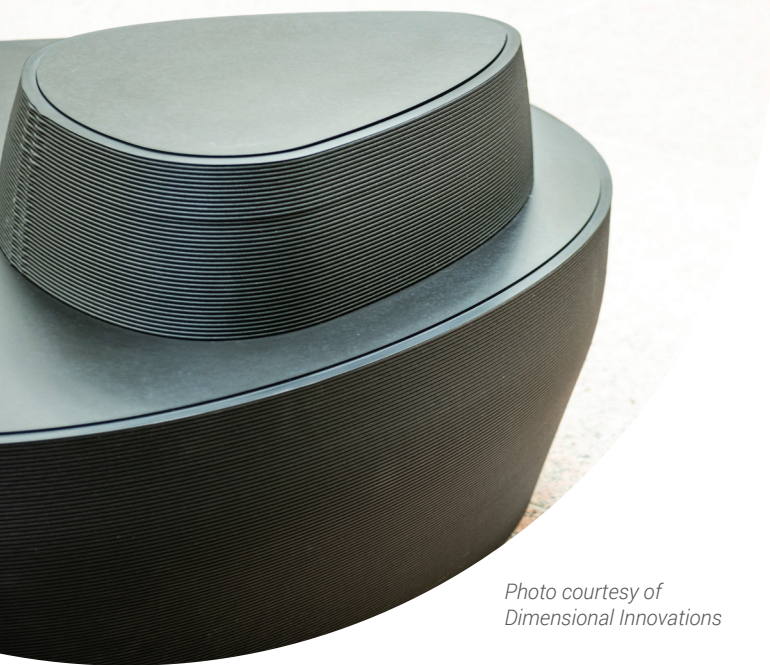


Photo courtesy of
Dimensional Innovations

Solution: 3D-Printed Furniture Offers Precision, Affordability, and Sustainability

According to Perkins&Will, 3D-printed furniture was settled on as a solution due its high customization ability and lightness, given the court is directly above an underground parking garage. They partnered with industrial designer Jonathan Olivares for the design of the benches and Kansas City design and tech firm, Dimensional Innovations, for the build. Using a custom computer program by Jürg Lehni to model the natural curve of Lake Superior rocks, Dimensional Innovations was able to print 20 unique rock shaped benches that expertly follow the gentle curves of water worn rocks from Minnesota's North Shore. Dimensional Innovations used a biobased composite of Ingeo and wood fiber to create the modular seating. They chose Ingeo originally for the cost efficiency, estimating it was about half the price of other materials they had used in large format printing in the past, but found several other performance benefits throughout the build process. They observed significant time efficiency in printing and noted the superior precision of the final prints, which were able to more accurately replicate the shape of natural stones than the original design had specified.

Beyond the technical performance, Ingeo also delivered in sustainability. Made from the plant sugars of locally abundant, annually renewable feedstocks, Ingeo has a carbon footprint 80% smaller than petrochemical-based plastics and needs 52% less

non-renewable energy to manufacture. These environmental benefits were important to the design team and crucial for the Ingeo 3D printed benches' harmonious integration into the remodel.

Outcome: Ingeo River Rock Benches Deliver Sustainability and Performance in Natural Harmony

The benches were thoughtfully designed with Crystal Court visitors in mind, offering built in outlets as well as surface-top Bluetooth charging for mobile phones. The modular benches are hollow, making each light enough for people to move, and some include raised surfaces functioning as back and arm rests and end tables. The benches arranged under the Ficus trees beside the water feature invite visitors into the seating area without obstructing the flow of traffic and give the feeling of walking in the Minnesota outdoors all year round.

The Ingeo Crystal Court benches are a technical and design success, demonstrating responsible material sourcing and innovative architecture, creating a model for how to socialize and engage with community.

Key Stakeholders

- [IDS Center](#)
- [Dimensional Innovations](#)
- [Perkins&Will](#)
- [NatureWorks](#)

Resources

Nelson, Rick. (March 28, 2022). Tasteful refresh breathes life into IDS Center courtyard in downtown Minneapolis. Star Tribune.

(March 14, 2022) Downtown Minneapolis' Living Room Gets a Makeover. Perkins&Will.

Boissonneault, Tess. (August 26, 2021). Dimensional Innovations 3D prints rock-inspired benches for IDS Center in Minneapolis. 3D Printing Media Network.

NatureWorks 3D Series for 3D Printing

¹Comparison between the eco-profile data for Ingeo (2014) and an average of ABS manufacturing data from US Producers (American Chemistry Council, 2011).



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