

CIRCULAR ECONOMY CASE STUDY: NICO SPACECRAFT



Canada united in the achievement of zero waste, now and for future generations

GENERAL INFORMATION

- Designers and furniture/cabinetmakers founded in 1997
- Based in Roberts Creek, B.C. serving BC and the international market
- Two to five employees (varies based on need)
- www.nicospacecraft.com



EXECUTIVE SUMMARY

Nico Spacecraft designs and builds furniture, cabinetry and interiors for the residential market. Drawing from their global experience, the owners seek their inspiration in quality, good design and environmental principles. Plywood is a primary building material, so they sought out a plywood product in harmony with their environmental ethic: Purebond® by Columbia Forest Products.

Most plywood on the market is made with urea formaldehyde glues, create health problems for carpenters and building occupants.

Nico Spacecraft discovered PureBond®, a urea formaldehyde-free, moisture-resistant, cost-competitive plywood made by Columbia Forest Products, the largest manufacturer of hardwood plywood in North America. Its plywood is manufactured using an innovative adhesive inspired by the way mussels adhere to rocks.

Nico Spacecraft has found that the PureBond® plywood they now use in most of their projects satisfies their quality, design and environmental criteria. They also use reclaimed materials where they can. Through seeking out circular supplies for their small business, Nico Spacecraft has been able to successfully incorporate circular economy practices such as non-toxic materials, design for recycling and durability into their products.

Circular Supplies: Provide renewable energy, bio based - or fully recyclable input material to replace single-lifecycle inputs.¹

¹ Accenture. (2014) Circular Advantage: Innovative Business Models and Technologies to Create value in a World without Limits to Growth.

START-UP

In 1997, Nicolas Meyer, a Swiss trained fine furniture maker and designer and Jess Meyer, a fashion design, business and finance major, combined their talent for fashion, art, and design with their business experience and passion for the environment to create Nico Spacecraft.

Nico Spacecraft is an award winning “design and build” studio producing kitchens, furniture, interiors and architectural elements for the residential market. Its design principles include:

- Respect the forest as more than just a supplier.
- Value resources from storage to manufacture.
- Remember who has to deal with our mistakes after we are gone.
- Design and build things to last.

Their approach is not solely about the end product; it is about the entire process and the story behind it. Their belief that quality is a necessity, rather than luxury, steers against today’s ‘disposable product’ mentality. These principles infuse the company’s design choices, including their use of the innovative PureBond® formaldehyde-free plywood manufactured by Columbia Forest Products. Since plywood is a primary component of their business, their choice of plywood is an important design decision.

“Our main focus is making things that last.
We intend for our cabinets and furniture to have a long
lifetime.”

– Nicolas Meyers, Owner

Nico Spacecraft uses plywood as decorative interior veneers and panels in high-end cabinetry, fine furniture, and architectural millwork. Many cabinet manufacturers use 15 panels for the average size kitchen. Conventional engineered wood products for interior use are made out of wood chips held together with adhesives that contain urea-formaldehyde (UF) resins.



One of the top concerns with UF-based plywood is its impact on indoor air quality and its potential carcinogenic properties. When formaldehyde is present in the air at levels exceeding 0.1 ppm, some individuals experience adverse effects such as watery eyes; burning sensations in the eyes, nose, and throat; coughing; wheezing; nausea; and skin irritation. In 1987 the U.S. Environmental Protection Agency classified formaldehyde as a probable human carcinogen under conditions of unusually high or prolonged exposure.² It can off-gas for up ten years or more. By eliminating UF in its production, PureBond® creates benefits for employees, carpenters and final consumers who appreciate good indoor air quality.

A lesser known issue with manufactured and treated wood is the waste management problem it creates. Some of the main end markets for discarded wood are composting, fuel, landscaping products and animal bedding. However, because of the presence of chemicals, it is not possible to compost the manufactured wood. Burning it as fuel can be an expensive option as it requires air scrubbing equipment to meet air quality regulations. In Metro Vancouver and other regions, waste wood is a significant portion of the waste stream. By using chemical-free wood today, a wood waste problem can be avoided in the future.

Nico Spacecraft uses PureBond® primarily for its quality, local production and toxin-free benefits – and the story it can tell customers about its “inspired by nature” design (see text box). In its quest for a superior plywood product Nico Spacecraft tried a vast variety of comparable products – increasingly shifting its business to PureBond® once the innovative product had proved its quality and customer satisfaction performance.

² National Cancer Institute. (2011). Formaldehyde and Cancer Risk.



INSPIRED BY NATURE³

As the Pacific Ocean swirled around him, a question rushed into Dr. Kaichang Li's head: how do mussels keep their grip on rocks that are constantly pounded by waves? Dr. Li, a professor at Oregon State University's College of Forestry, found that mussels secrete proteins known as byssal threads, which provide superior strength and extraordinary flexibility. His curiosity led to groundbreaking research—funded by Columbia Forest Products and others—based in the principles of biomimicry, which studies nature and then imitates its designs and processes to solve human problems.

Li discovered that soy proteins can be modified to perform similarly to byssal threads. And not only did they deliver phenomenal adhesion, they also offered exceptional water resistance. This breakthrough led to the development of the PureBond product.

Since 2005 Columbia Forest Products has been manufacturing its hardwood plywood using a formaldehyde-free adhesive derived from food-grade soy flour and a wet strength resin used in printed currency and milk cartons. This proprietary assembly system is cost-competitive with urea formaldehyde based plywood products. There is no added formaldehyde in the lamination or core assembly processes.

To date over 50 million panels have been made and shipped with PureBond® technology. The plywood can also be specified using Forest Stewardship Council (FSC) materials. While green building products can often remain niche, PureBond® is readily available to retail customers through Home Depot.

In addition to PureBond®, Columbia Forest Products, an employee owned-company, provides a number of other building products with sustainability features including renewable and recycled content.

To encourage market acceptance, and to better understand its customers, Columbia Forest Products established a PureBond® Fabricator Network of cabinet shops and fabrication businesses that use PureBond® hardwood plywood in their cabinetry. Nico Spacecraft has not only been a member since its founding but also serves on its board of advisors. The small business provides feedback on the product and in return is marketed by Columbia Forest Products to prospective clients. There are now 850 PureBond® members (customers) across Canada and the U.S. listed in Columbia Forest Products' online directory. For Nico Spacecraft, the network feels like a mutual partnership – not a traditional distributor relationship.

In 2006 Jess and Nicolas Meyers moved from Vancouver to the Sunshine Coast of BC. There they designed and built their own shop and studio from predominantly reclaimed building materials, which won them a green design award. It was featured along with their story in blogs, books and magazines across North America, Australia, Spain and the UK.

“We have a vision for a future program where we can buy back our clients’ furniture, where wood maintains its value as a resource and may be continually reused.”

—Nicolas Meyers, Owner

Nico Spacecraft's circular economy commitments are demonstrated in these other wood reuse efforts:

- **Urban sourcing of local trees:** Every few years the company comes across an opportunity to salvage trees. If the species is right, they load, mill, stack and dry it. For example, a heritage white Oak tree had to be taken down for safety reasons. The wood was used for furniture and millwork for clients.
- **Recycled wood:** The company uses recycled wood for about 20% of its projects, sourced from professional salvage companies or directly from client homes. For example, first growth fir from old buildings such as a warehouse, school, shipyard and saw mill has been used to make furniture. In one unique case outdated heirloom furniture made of wood now on the endangered species list was taken apart, milled and re-glued into a contemporary look. In another case, clients were about to discard all their first growth Douglas Fir door frames. Nicospacecraft salvaged and stored them for the right project to come along.

³ Columbia Forest Products. (Accessed Feb, 2014); Columbia Forest Products. (2014) Purebond Formaldehyde-Free Hardwood Plywood

Aside from working with professional salvage companies, the company goes in ahead of the demolition crew to pull out reusable wood, but frequently they are engaged too late – finding that the contractor has already taken out the flooring, kitchen countertops and cabinetry. However, storage of salvaged building products is often a barrier for a small business. The company can only sell about 1 – 2% of the recovered wood to customers a year – and it costs money to salvage, store and reuse reclaimed wood.

The company has an ongoing quest to ensure its finished product is free of VOC's (volatile organic compounds). While the company uses oils, waxes and natural finishes whenever it can, it does use a high-end formaldehyde free lacquer to spray-finish its cabinetry. Commercially available water-based alternatives are just not yet satisfactory enough, as they do not produce as durable a finish to provide adequate quality. Unlike other lacquers, this one is self-priming, requiring fewer steps in production. Other finishes have lower longevity – simple use and cleaning result in faster wear and tear on plywood panels.

With the exception of plastic packaging and five to six gallons a year of lacquer thinner which are returned to local recycling facilities, the company has a closed loop production process. The company reuses as much of the plastic packaging as it can in its own processes.

Clients respond very positively to the company's approach. More customers seek a personal experience with their suppliers and like the stories that accompany Nico Spacecraft's design and build service. They are pleased with a quality product, which hasn't traveled long distances, is inspired by nature and doesn't off-gas. Customers are attracted by service above all, and then the company's expertise in quality and sustainable practices.

“When I buy a product I want to know what it is made of, where it comes from, who makes it, how it is shipped, and where the resources are from. I like to tell the customer this story and most are very interested.”

–Nicolas Meyers, Owner



GROWTH AND DEVELOPMENT

The company prefers to remain a small business and does not pursue volume as its growth strategy. The owners believe that quality and ability to maintain control over the environmental and quality aspects drop with volume and have turned down opportunities to move some of their operations to Asia. They measure their success on the degree to which their work is more challenging, demanding and diverse. They are not merely millworkers anymore, but also designers and consultants. Their approach continues to attract customers, including increasingly architects, and interior designers whose interest in quality sustainable design is growing. While originally their clients were mostly residential customers, now about 30% of their client base is architects and other design professionals.

Their desire to stay small while they grow their brand and reputation puts them in a position to select their preferred clients, whose values align with their own: quality, durability and sustainability. In this way the calibre of their work and overall portfolio grows, as does their international market. While most customers are in B.C., Nico Spacecraft sells to the U.S. and overseas. The company plans to increase its international reach through partnerships and collaborations (currently about 8 percent international sales).

The owners want to broaden their horizons – and their influence. They are professionally stimulated by their collaborations and hope to inspire others in their approach. For example, Nico Spacecraft developed the prototypes for Douglas Coupland’s new furniture collection for SwitzerCultCreative. As well, the company has collaborated with Columbia Forest Products, a partnership in which they designed furniture entirely made with PureBond®’s plywood which was then jointly featured at trade shows to showcase and connect the building material with a finished design. Nico Spacecraft has also developed its own engineered panel product – solid wood based three ply using non-toxic adhesives – which it would like to commercialize and scale through a joint venture partnership.

Their work has received international acclaim. Exhibitions have been featured at New York’s ICFF (a global showcase for contemporary design), the Cologne Furniture Fair (an international annual furniture trade show held in Germany), design shows in Japan and India as well as various galleries and showrooms in North America and Europe, receiving press coverage each time. Nico Spacecraft’s products are designed with passion, engineered to work and built to last – with a compelling environmental story increasingly valued by customers.



Developed by the National Zero Waste Council in collaboration with the Ministry of Environment.

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