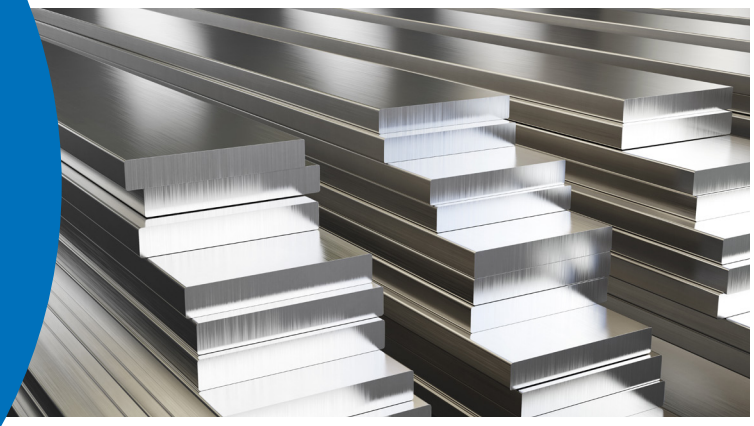
CASE STUDY

FROM ALUMINUM TO COMPOSITE

A Study in Cost Savings



Quality, service, innovation, attention to detail, reliability, dependability… these are key characteristics that ARaymond, a global provider of fastening and assembly solutions, practices on a daily basis. However, after more than 155 years in business, there's one quality that ARaymond places in highest regard. That's its ability to truly listen to its customers.

"Often the projects we work on are a result of casual conversations with our customers or an industry professional," shares Jason Reznar, Senior Development Engineer with ARaymond. "For example, a potential client might mention or show us a product that they offer and, after a brief discussion, we'll often learn about the parts that could use improvement."

This is exactly what happened with Nova USA Wood, an importer and distributor of high-quality hardwood decking, siding and industrial products.

"We saw a display of one of Nova's top products, a patent siding clip that's used to fasten wood panels to residential and commercial structures," adds Henry Wiggin, Business Development Manager – Building/Construction with ARaymond. "Then, we got into a discussion with one of the company's founders, Steve Getsiv, and realized that we could likely solve a few material challenges and design a more cost-effective product for Nova."

Turns out, Wiggin was correct and that's exactly what ARaymond accomplished.

THE SIDING CLIP

Nova designed its own patented Rainscreen Clip system, known as ExoClad QuickClip. "Rainscreen" refers to a wood siding style built for ventilation and airflow to eliminate moisture damage to structure siding. The company's ExoClad QuickClip was specially designed for quick and efficient installation of rainscreen siding.

What's critical here is that the fastening component offers an air gap between the siding material and the structure itself. (See image)

Nova's ExoClad QuickClip Installed

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THE PROCESS

THE SIDING CLIP

"Designing anything with wood means that you must account for the potential swelling or shrinkage in your design, especially when you expect that humidity levels will not be consistent over time," explains Nova co-founder, Steve Getsiv. "As is the case with exterior siding, the wood swells when exposed to high humidity levels — such as on a rainy or foggy day. Conversely, the wood will shrink during dry spring or summer weather."

Nova's ExoClad QuickClip provides this gap, allowing for the expansion and contraction of the wood while maintaining a secure attachment. However, the clip was originally made from extruded aluminum, which must be sourced externally and is costly.

"Aluminum extrusion requires aluminum mixers and a lot of processing, which adds to the costs," says Wiggin. "The material is extruded, then cut to size, and finally requires holes to be drilled for the screws. It's a bit of a complicated process."

For these reasons, the founders of Nova had considered switching to composites, which require no post-processing as the component is manufactured as one part. The conversation with the engineers at ARaymond led to further investigation.

"Nova was aware of some of ARaymond's steel-to-composite conversions for other projects, and was interested in our expertise in design and materials to cost down his current purchased part," adds Reznar. "So, we got to work."

THE CHALLENGE

The primary challenge in swapping aluminum for composite for Nova's Rainscreen Clip was that the overall shape, size, and structure of the component could not change. Essentially, there was zero flexibility in the design.

"From an engineering standpoint, we were limited on how much we could change in terms of the product packaging. So, we really had to get creative with our design because of the product constrains," Reznar says. "It was necessary to maintain the same footprint and configuration of the clip. For instance, we had to ensure the space between its wings so it not only fits into the grooves of a wood panel but also maintains the required gap without failing."

This meant ARaymond was limited in relation to strengthening the composite used to match the requirements of the aluminum. Like any good design, this took some trial and error.

"So, our first simulation proved that the material that we chose because of its low-cost quality was unable to withstand the necessary requirements," he says. But that was no deterrent for ARaymond. "For this project, we were able to rely on an internal procedure that's capable of accurate cost-analysis, which allowed us to approve and move forward with the composite design. We also have an expert simulations group that fully supported our efforts."

Utah-based Home Featuring Nova's Ipe Rainscreen Siding Stained with ExoShield in Dark Walnut


Nova's ExoClad QuickClip

There were two main product requirements. One was the necessary "squeezing load" of the clip. As mentioned, a wood board will expand or contract in the elements, depending on if it's absorbing moisture (such as from rain or humidity). However, the clip must reliably hold regardless of the condition of the wood.

The clip must also hold regardless of the siding of a building or structure. The second requirement was that of the air gap, which is necessary to meet the safety and international building standards for the secure attachment to any exterior cladding.

"In this case, we're dealing with the pull-off force related to high wind forces. So, we were pulling on the boards as part of the simulations that we were performing to ensure the composite used was able to meet this requirement, as well."

THE RESULT

After a few rounds of simulations with different composite choices, ARaymond found their match.

"It was really a matter grade…what grade of composite would reliably meet the product requirements without modifying the clip's structure," says Reznar. "We started with a low-grade composite just to get an idea of where we needed to go. Eventually, it became clear that we had to strengthen the material with an additive to reliably meet the load and force requirements — and we did."

From the initial conversation with Nova, ARaymond was able to work through design simulations, composite grades, cycle testing, and print a 3D prototype for fit and function, completing the final product in just under a year.

What's more is ARaymond was able to offer something that the original aluminum design was unable to: branding.

"We were able to brand the composite with Nova's logo, which is something that was not possible when they were buying aluminum from an outside source," says Wiggin. "It's an added touch that's special for Nova, ensuring their name is associated with each ExoClad QuickClip."

Overall, ARaymond was able to meet the stringent product requirements while offering the following benefits:

- Cut down the product cost (meeting the main goal for the customer)
- Lower the production and processing time as well as expenses (it's now a high-volume production run)
- Reduce the product weight (not only in piece price but also weight savings in terms of how the parts are delivered to Nova's installers)
- Customize the product with a logo

"We're extremely proud of our team's efforts in this project and fully confident in the siding clip and its reliability and longevity, thanks to the simulation and lifetime testing that we're capable of offering," says Reznar. "This project was a great success!"

"Working with ARaymond has been an outstanding experience for all of us at Nova," says Getsiv. "We collaborated effectively on this product, ultimately creating a better performing product at a competitive price."

ExoClad QuickClip from Nova

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