

High Performance Windows in Solid Wood

By Daniel Ship



Everyone in India knows that in our hot, humid climate, wood is not a very durable material. While carpenter-made wooden windows are quite common in homes across the country, they are highly susceptible to termite and fungus attack after just one or two years, even if the wood has been treated with preservative chemicals. Moreover, common wooden windows are almost always of a basic construction, with no consideration given to performance issues like insulation and noise prevention.

On the high end of the market, most modern buildings have opted for steel, aluminium or PVC windows. These are generally much more durable and provide varying degrees of insulation from noise and air leakage. Though often ignored, air leakage in any air conditioned room does have real energy costs; therefore the windows should ideally be sealed with an airtight gasket.

Generally, PVC windows are the first choice in India today as they offer the best price-performance ratio and are also very durable. However, there is no substitute for the look and feel of real wood. PVC windows are also not the most environmentally friendly choice. In Europe, where the weather is much colder, wooden windows are the norm and they have developed the most advanced hardware systems in the world to make their windows not only pleasant to look at, but also highly functional. In particular, Germany and Austria are known for their cutting-edge window technology.

Now, one Mumbai-based company has found a way to bring long-lasting, European quality wooden windows to India. Ritikaa, headed by Mr. Anuj Divanji, explained, "After 25 years in the construction materials business, I realised that while the industry and the economy as a whole were growing, there was a very poor quality of windows available here in India."





The outer surface of acetylated lumber is caramelised to a darker colour to a depth of 3-10 mm.

Though his business in uPVC windows was very successful, Divanji decided to drop all that and focus on only using wood. He told Wood News, "I was always fascinated by wood. I knew what the market wanted in terms of the product but I had two main concerns: One is long term sustainability of the raw materials and the other is the durability of the products. I found one company in the Netherlands, with an office in the U.K., which has the solution. The company is called Accsys Technologies and their product is called Accoya."

What is Accoya?

Accoya is solid FSC-certified radiata pine which has been treated by a process called acetylation. This process uses natural chemicals already found in the wood to improve durability, stability and service life. Although wood scientists have known about the benefits of acetylation since the 1920's, the process is very expensive and Accsys Technologies is the first company in the world to figure out how to make it commercially viable.

Radiata pine is one of the fastest growing plantation timbers in the world, reaching maturity in just 25-30 years. This has made it one of the most widely planted sustainable plantation timbers in the world. See Wood News May-June 2008 for more information about this species.

What is Acetylation?

Acetylation is a chemical process that changes the free hydroxyls within wood into acetyl groups. This is done by reacting the wood with acetic anhydride, which comes from acetic acid (the main component of vinegar). When the free hydroxyl groups in the wood are transformed into acetyl groups, the ability of the wood to absorb water is almost completely reduced, rendering the wood more dimensionally stable. Because it can no longer be digested by termites, fungus or other living things,

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it is also extremely durable. Accoya comes with a guarantee of 50 years (above ground) and 25 years (below ground) and the longest continuous in ground trial so far has been for 18 years in Sweden – with no sign of rot!

The process is irreversible and it penetrates through the entire timber, not just on the surface like chemical preservatives. There is no need of further chemical preservative, making it completely non toxic and environmentally friendly.

The acetylation process does discolour the outer surface of the wood, darkening it to a depth of 3 to 10 mm, but after this portion is removed, the inner wood retains its natural colour. More importantly, because acetylation works right through the core of the wood, the cut surfaces retain the same durability. The only real downside of Accoya is the cost, which according to Divanji, is about the same as high grade teak. He





(L to R) Anuj Divanji - Managing Director, Navinbhai Vadodaria - Sr. Carpenter Craftsman, Rajendra Kakade - Head - Finishing, Yogesh Mandlik - Production Supervisor, Pankaj Patil - Production Manager and Nilesh Patil - Sr. Machine Operator.

Production

After receiving an order, the wood is selected based on the optimised cutting list provided by the software and checked for defects.

The lumber is then square planed to size, at the same time removing the discoloured portion.



Profiling is done with an automatic planer/moulder.



The wooden components are sanded.



Cutting to size with a sliding table saw.



Dowelling and drilling is done with a multi boring machine.



The components are painted in the paint shop. The paint shop has been equipped with a 5 micron air filter and all coatings are water-based.



Then tenoning is done using a spindle moulder.



Assembly is then checked to make sure all components fit together correctly and any necessary changes are made.



After drying, the windows are completely assembled and checked before shipping to the site where they are to be installed.





Ritikaa's exterior cladding comes in ready-to-assemble panels which fit tightly together.



Sliding doors are a particularly attractive option which can provide excellent temperature and sound insulation when closed and maximum airflow when opened.

Ritikaa's windows, which are quite expensive and are being marketed mainly to high end customers, feature double paned glass, premium coatings and advanced German hardware. They also manufacture other products like sliding doors, decking and exterior claddings, all made from Accoya, but Divanji's main focus is definitely on the windows. Having started commercial production this year, they are still in a somewhat nascent stage and are seeking partners in architecture, construction and interior design fields. However, they have already executed a number of successful projects, enough to keep the factory going 12 hours a day. "We are hoping to expand to two 12-hour shifts soon and are also looking at investing in new machines to make production faster and more efficient", said Divanji.

The windows are made at the company's factory in Nashik by a staff of 20 to 25 workers, with engineers and skilled carpenters supervising. The machines are all German and Austrian. "We have also engaged a German consultant", said Divanji, "As you can imagine, this is quite expensive but without him we would have made a lot of mistakes.