

Eco- Friendly Furniture Made from Reclaimed Pallet Wood

The idea behind this initiative is to use recycled wood pallets from the transportation and warehouse sectors to create high-quality, customizable furniture through significant engineering process, supporting sustainable practices, satisfying consumer desire for environmentally friendly goods and scalability in furniture industry.

Increasing living standards and population growth have boosted up demand for wood products worldwide [1]. As an important part of the global manufacturing industry, China alone produces about sixty million tons (eighty-five million cubic meters) of discarded wood products, mainly used furniture, every year [2]. Again, over eighteen million tons of wood garbage were produced in the United States in 2018, and approximately one-sixth of that was recycled [3]. These wood waste generally are incinerated or end up as landfill, causing both greenhouse gas emissions and severe environmental pollution. There is a lot of potential for the wood industry as reclaimed wood is one of the most sustainable materials, and it is typically more sustainable than virgin wood [4]. According to Hawaii's waste composition analysis, wood pallet waste is still one of the more appropriate and common waste streams to manage [5] .

According to research [4] it is proven that using reclaimed wood that has several environmental benefits such as minimizing wood waste, shortening material transportation routes, produces minimal greenhouse gas emissions, reduce global warming potential and increases the lifespan and carbon storage of previously used wood. Reclaiming wood can also reduce deforestation since it requires fewer resources than planting and harvesting wild trees for wood [4]. Moreover, energy requirements and greenhouse gas emissions of reclaimed wood are lower than new timber as the reclaimed wood has already undergone through harvesting, processing [4]. Socially this project supports local people by creating new jobs in collecting, processing of waste wood recycling [4].

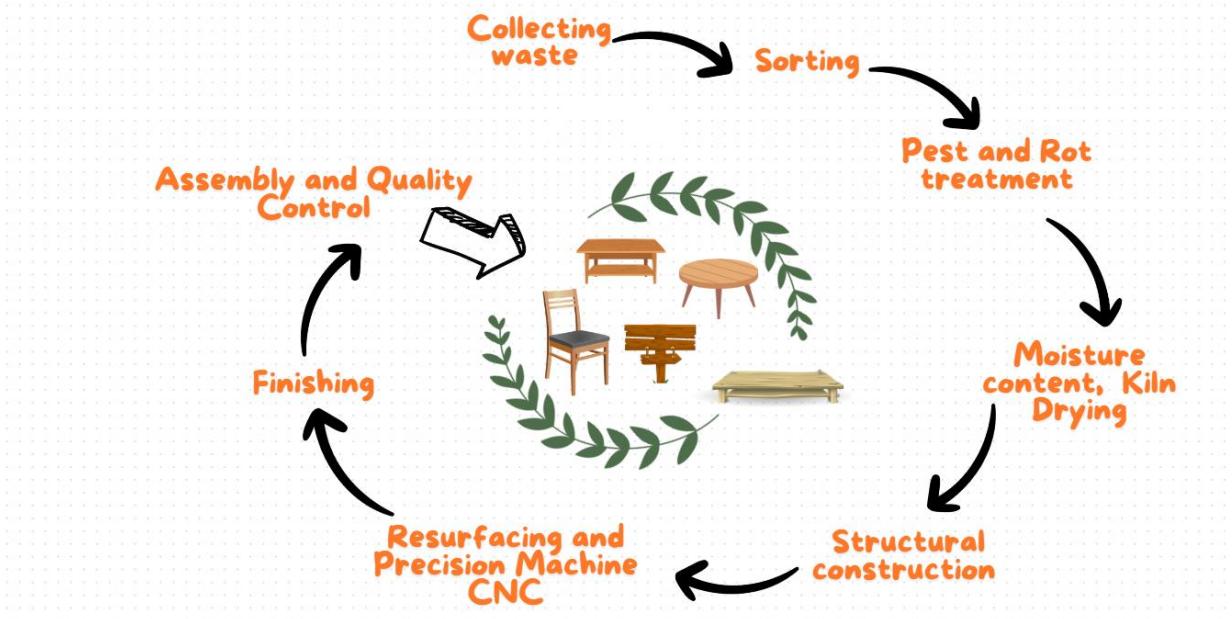


Figure 1 : process of reclaimed wood turning into sustainable furniture

Now the question is how do we get our desired furniture from reclaimed wood pallet? what steps are involved in the processing that product? In Figure 1, the process starts with collecting and inspecting the wooden pallets. Next, the wood is mechanically repaired via lamination, in which broken or thin parts are joined together to create stronger, more stable components [6]. After that, Kiln drying is used for effectively managing the moisture content, preventing warping and ensuring long-term durability. To give it a smooth, functional surface, the wood's rough surfaces are then planed and polished to eliminate defects [6]. Precision machining using CNC (Computer Numerical Machine) technology ensures that each component is accurately dimensioned for consistent assembly, and eco-friendly coatings protect and improve the wood's quality, resulting in long-lasting and attractive furniture [5], [6]. What if the reclaimed wooden pallets are not suitable for the furniture production due to damage or structural weakness? Well, additional steps must be included in order to fix unfitted wooden pallets. Gaps and holes are filled with wood fillers to restore the framework, and pest and rot treatments are used to eradicate diseases or oxidation [6]. It is possible to laminate severely damaged wood with other parts to create stronger, thicker materials. Damaged layers are removed during polishing using cutting and cleaning. Moreover, chemical treatment makes the wood more durable to change in the environment.

The furniture can be effectively mass-produced because to the project's scalability design. The production of standard part is made possible by CNC machining which guarantees every component fulfills the same level of quality, without sacrificing quality at all [5], [6].

Although recovered wood has been utilized to make furniture, this project focuses on unfitted wood. The project shows damaged wood can be turn into valuable products which help furniture business promote environmentally friendly methods [3].

To summarize, the project converts wooden waste into customizable furniture using combination of mechanical, chemical, and physical transformations, ensuring the requirements for functionality and durability [5], [6]. This also growing consumer demand for environmentally friendly and sustainable products[7]. Increasing ecological awareness and a trend toward sustainable living have supported the rapid growth of the eco-friendly furniture sector worldwide[8].

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