PlasticsResource.com
Information on Plastics & the Environment

Recycled Plastic Lumber

Why use recycled plastic lumber for a deck, chair or even railroad ties? Why not just use wood? Plastic lumber has important advantages over traditional hardwood.

We all are familiar with the problems associated with traditional hardwood. Many of us dislike the idea of building a deck, for instance, simply because of its high maintenance costs. Those that do build decks for their homes are all too familiar with the problems of pressure-treated wood. Warping, splintering, rotting, cracking and degrading are all common characteristics of traditional hardwood. To protect their lumber, people resort to expensive and time-consuming repainting and resealing. Yet, this does not guarantee that the lumber is 100% protected and will certainly not prevenct the local insect population from making a brand new home of a new deck. The problems of traditional pressure treated lumber not only bring headaches to consumers but to businesses and industry as well.

Plastic Railroad Ties

For example, the railroad industry replaces approximately 14 million wooden ties a year out of the nearly 700 million ties used annually and this number is growing. It is estimated that replacement and installation of new wooden ties, which only last an average of seven years and as little as three, costs the railroad industry over a billion dollars a year. Since 1994, the Army Corps of Engineers, Rutgers University, Earth Care Products, Conrail and Norfolk Southern have been working on a project using recycled-content plastic railroad ties as an alternative to traditional wood ties. The railroad ties market is huge since each tie requires 200 pounds of plastic -- equaling 1,200 bottles! At Conrail's Altoona, PA train yard ten 100-percent recycled ties were intermingled with wood ties in October 1995. The plastic ties' performance so impressed the company that in 1996, they installed six more plastic railroad ties on the main line between Pittsburgh and Philadelphia.

Additionally, the Association of American Railroad's Transportation Technology Center located in Pueblo, Colo. tests trains almost 24 hours a day and now has 25 plastic railroad ties in place along the toughest part of the training loop with no signs of deterioration.

Internationally, the use of plastic lumber for railroad ties is not a new concept. Japan, for instance, uses composite ties made from virgin materials -- foamed polyurethane with a continuous glass reinforcement, which help the trains run quieter. The appeal for recycled-content plastic railroad ties is due to the fact that wooden railroad ties - like decks - need regular maintenance and eventually need replacing.

Plastic Lumber's Qualities

Other positive characteristics of plastic lumber are the facts that, unlike wood, it will not:

- rot,
- crack,
- warp,
- or splinter.

In fact, plastic lumber is:

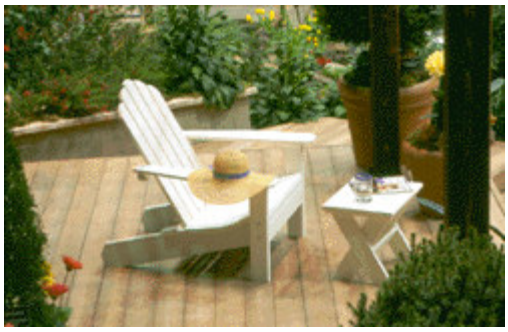
- denser than wood,
- virtually maintenance free,
- long lasting (50 years plus, depending on the application),
- stain resistant,
- graffiti-proof,
- waterproof,
- UV resistant,
- aesthetically pleasing (most plastic lumber has a wood-grained finish),
- impervious to insects,
- and is not affected by exposure to most substances.

Plastic lumber also:

- works with any deck fastener,
- requires no painting or sealing (plastic lumber is available in almost any color and some wood-composite plastic lumber can be painted as if it were wood),
- and provides a good shock-absorbing surface for pedestrian traffic, such as runners and hikers.

What Exactly is Plastic Lumber and What Does it Do?

There are a wide variety of different types of plastic lumber available. The base product is made of recycled plastic: 100% recycled High-Density Polyethylene (HDPE). HDPE is used to make anything from shampoo and detergent bottles, to milk jugs. Some plastic lumber is made entirely of HDPE, which comes in a variety of molded-in colors. For instance, the adirondack chair pictured below is made from 240 recycled plastic milk jugs. Other types of plastic lumber use composites, which consist of a mixture of recycled HDPE with wood fibers, rubber, fiberglass, or other plastics. Depending on the brand and the application, plastic lumber composites are available for those needing a stronger material, or for those wanting a long-lasting alternative to wood, but with the paintability of traditional hardwood lumber.



Plastic lumber can also hold nails approximately 90% better than wood and screws 50% better than wood. Engineers estimate that the workable life of plastic lumber is anywhere from 15-20 years in underwater marine applications and well over 50 years in construction applications such as decks for houses. The real edge plastic lumber has over traditional hardwood is that homeowners may never have to maintain or replace a deck again, while railroad engineers can drastically reduce their maintenance costs. Municipalities can also substantially reduce their costs by installing and building plastic lumber-based park benches, trash receptacles and boardwalks that will last decades, instead of a few years.

Environmental Benifits

Plastic lumber, made of recycled plastic, is a high quality product that is both an

environmentally friendly and economically viable alternative to traditional hardwood lumber, which is often times injected with chemicals to ward off impending insect attacks. Plastic lumber, on the other hand, contains no hazardous chemicals and cannot leak or contaminate the soil. Additionally, serious worries about deforestation and the role trees play in helping prevent global warming, are issues of concern for both the consumer and the building industry. Therefore, using plastic lumber rather than hardwood has remarkable practical advantages as well as these significant environmental advantages.

Uniform Design Guidelines

Although plastics lumber has not been approved yet for load-bearing applications, testing is under way (and it can, however, be used almost anywhere hardwood is). In fact, the American Society for Testing and Materials (ASTM) now has uniform design guidelines for the outdoor use of plastic lumber that give manufacturers more confidence in the lumber's performance properties. Before these standards were established, plastic lumber producers tested their products as they saw fit. Eventually, ASTM would like to set up a grading system that allows users to know the difference between lumber that can be used for decks and, for instance, lumber that has the strength to hold railroad ties together and carry the weight of a speeding locomotive. Beyond its obvious use in construction, plastic lumber can also be used in making:

- marine applications (it will not rot, is resistant to marine borers and does not need to be treated with preservatives),
- docks,
- boardwalks,
- flooring for containers (it is not affected by exposure to most substances),
- truck beds,
- all-weather furniture,
- fencing,
- and anything where plastics' numerous and beneficial characteristics can be applied.

The Growing Market

The annual market for pressure-treated lumber is extremely large indeed and will continue to grow. In the United States alone it is estimated at about $10 billion ($4 billion for decks in houses). Growth in the plastic lumber industry has accelerated rapidly in the last couple of years, both in terms of sales and in the stock value of companies that manufacture this exciting new product. A 1996 figure has the industry's annual growth rate at around 40% for years preceding 1996. Industry, government and consumers are finding plastic lumber to be a worry free, long-lasting alternative to traditional hardwood, a superior product and an ideal substitute that also benefits the environment. Overall, by giving new life to used plastics, plastic lumber can help extend the useful life of applications that traditionally have relied on wood as their main ingredient.