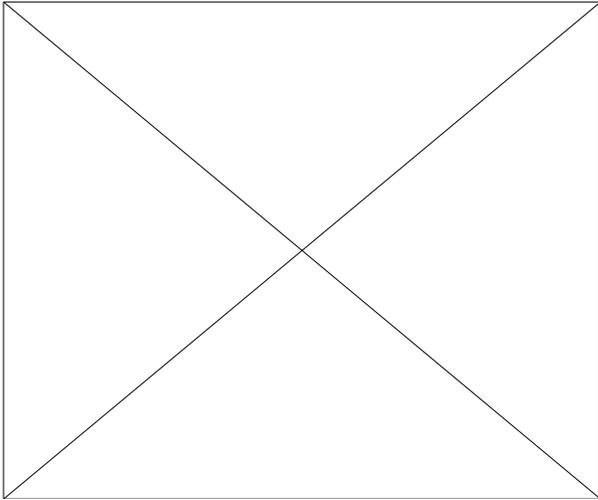


Plastic possibility

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Recycling plastic for large-scale industrial use could become big business for the travel industry as a British company has found a way to replace steel, wood and concrete with a polymer alternative.

We spoke to Deepak Aggarwal from Wallmax Enterprises (the father company of the inventors Micron) about the possibilities of this new innovation.

As part of a company that manufactures low cost ‘polymer composite’ products, waste materials such as plastic bags, industrial plastic waste and other products can be recycled into make polymer lumber, a popular alternative to many wood and steel products. “[It is sourced from] various local authorities,” said Aggarwal, “[It is made up of] pretty much anything plastic.”

The most high-profile use of the polymer product is for railway sleepers. This tough, durable and eco-friendly substitute is superior to the current wooden sleepers. While reusing stray waste plastics (and tidying up in the process) the technology also ensures less destruction to forests.

“One benefit is to help the environment,” commented Aggarwal, “and secondly, it is a much friendlier material than wood and we anticipate that they can last 50 years longer and be recycled more times. Also, the plastic is not affected by weather conditions. If you take a country like the UK where it rains a lot, wood and concrete doesn’t last very long.”

As the durability of the recycled plastics make a polymer composite suitable for many wood and steel based products, the Micron invention has already been used by the US military to make incredibly sturdy bridges.

Plastic bag to sleeper

Sleepers manufactured out of waste plastic could be appearing on UK railways soon. Micron has already been approached by Network Rail and London Underground to trial this new alternative, according to [Chemistry & Industry](#) magazine.

“Yes, they are just starting to take interest now. The cost was prohibitive about three or four years ago due to the price [of plastic] going up, but now issues about the environment and not being able to source wood anymore are actually helping the plastic business” said Aggarwal.

One of the benefits Micron’s sleepers have is that the reconstituted plastic has a longer shelf life than traditional wood. It could in fact last for centuries as opposed to wood and concrete which needs constant attention and replacement, which leads to more weekend [engineering](#) works.

Aggarwal explained how the new technology could benefit workers: “If you are moving sleepers, plastic not only lasts much longer, but you don’t need specialist equipment to move or replace them - you can, in fact, shift them by hand.

“On the underground, people carry concrete sleepers by hand and the productivity is very low. They can only take 10 down within the four hour space that they have. With the plastic, the turnaround is much faster.”

Stress tests have also proved that plastic sleepers are as strong as concrete ones, and can prove more cost effective for an old system that sees its maintenance costs spiralling. They could also help Network Rail achieve its target of using 23 per cent of recycled material by 2013.

London Underground has showed an interest in using plastic sleepers but introducing them to coexist with old materials and technologies was thought to be a fire hazard. But, with the company developing the new sleepers with a high-tech fire retardant created to protect ammunition boxes for the US army, the sleepers are now safe enough to be rolled out for the underground.

“If London Underground has a fire, then the rubber and plastic would release poisonous gases. With our product, it protects against this, and can actually protect this material against fire – even a torch can’t get through that” Aggarwal explained.

Helping the defence industries with plastic bridges

Far from being an extra for plastic soldiers, bridges made from Micron’s fibre-reinforced polymer (FRP) composites is a plastic construction material with a difference.

Conventional materials used for bridges across harsh environments where water is an extreme obstacle costs the US military over one billion dollars annually due to the deterioration of wood, concrete and steel materials used.

FRP composites represent an alternative construction material without many of the performance disadvantages of traditional materials such as deterioration and the subsequent replacement cycle.

Aggarwal explained what made Micron answer the call of the US Army and manufacture the plastic bridges: “The original requirement was from the US Army and they wanted a process that they could move bridges around and then reuse them. There were problems for the US where, for example, they wanted to find a

replacement for the wooden bridges. Like on a lot of seafronts, steel and wood don't last very long. The weight of concrete also pushed the weight on the bridge down.”

Micron proposed a composite piling system to replace current systems as part of the US Army Corps of Engineers' Construction Productivity Advancement Research (CPAR) programme, which developed, tested, and demonstrated a high-performance polymer composite fender, load-bearing and sheet pile (bulkheads) systems for marine/waterfront civil [engineering](#) applications.

As the products met the army's requirements, the FRP composites were installed in the field.

Rolling out around the world

The time is ripe for an environmentally friendly alternative to wood, steel and concrete products. Global warming is one problem but in a hazardous environment, as faced by rail companies and the army alike, sturdy material with longevity is crucial.

The uptake of the product has been promising with many companies from different countries around the world looking towards Micron's products. As Aggarwall explains: “It has been used in US the longest but it has been approved in India, approved in Italy, and Greece now, Canada, Argentina and were seeing demand for other applications – people are keen to build the bridges.”

The future could be, indeed, plastic.

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