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Recycled Plastic Composite Railroad Crossties

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RECYCLED PLASTIC COMPOSITE RAILROAD CROSSTIES

THE NEED

The U.S. Army Engineer Research and Development Center, Construction Engineering Research Laboratory (CERL) led a team that developed, demonstrated, and patented innovative recycled plastic composite material for use as railroad crossties to replace chemically-treated wood ties. The plastic composite ties can save millions of trees, reduce greenhouse gases, divert significant amounts of waste plastics from landfills, and reduce railroad track maintenance costs. Over 10 million crossties on U.S. railroads are replaced annually.

FIGURE 1 EXAMPLE RECYCLED PLASTIC COMPOSITE RAILROAD CROSSTIES

THE TECHNOLOGY

The Army maintains roughly 2,400 miles of railroad (RR) track, much of which is mission-critical, including 10,000-12,000 turnouts. Replacement of turnout ties is a major cost item because of the size and complexity of these components. Since the mid-1990s CERL has conducted research on composite RR ties made of recycled post-consumer waste plastics. Because these plastic composite ties are inherently resistant to moisture damage, rot, and insect attack, they require no chemical treatments as do wood ties. To demonstrate their performance in service, plastic RR ties were installed in a #10 turnout at the Naval Surface Warfare Center in Crane, IN.

THE BENEFITS

Plastic Composite RR Crossties are designed to bear the increased capacity of trains, which now carry up to 35,400 kilograms per axle compared to 32,650 kilograms per axle just a few years ago. These ties are stable against the exposure to diesel fuel and grease and very compatible with standard rail fastening hardware.

STATUS

The Army maintains roughly 2,400 miles of railroad (RR) track, much of which is mission-critical, including 10,000-12,000 turnouts. CERL can provide the following services related to plastic composite RR tie applications:

- Material specifications for plastic composite RR ties
- Fastener designs for rail-to-tie attachment
- Testing and evaluation of plastic composite RR tie materials for strength, stiffness, fastener pullout, etc.
- Coordination with cooperative evaluations being performed by the Class 1 railroads and urban mass transit districts

BARRIERS

Current products are more expensive than wood ties. If additional special hardware is needed, the price will be higher. CERL is currently conducting a study funded by the Federal Railroad Administration (FRA) to assess track safety issues concerning the use of plastic crossties. This study is focusing on performance properties of the different manufacturers' plastic ties.

POINTS OF CONTACT

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1. CERL Recycled-Plastic Composite Railroad Ties - FactSheet
2. CERF Charles Pankow Award for Innovation http://www.cerf.org/about/press/7_21_00A.htm

REVIEWERS

Peer reviewed as an emerging construction technology

DISCLAIMER

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