

Composites from Recycled Plastics and Agricultural Fibers

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Abstract

The objective of this study was to demonstrate the potential of recycled plastics and Illinois agricultural fibers in producing composite construction materials. The supply of wood material in the United States

for use in the composition board industry is rapidly depleting and becoming expensive. It is projected that by the year 2030 the composition board industry will require three to four times the current demand

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level. Board producers will then be forced to seek alternative materials to meet the increasing raw material requirements in the future. At present, the most viable substitute materials are nonwood plant fibers and other recycled materials such as plastic. The result of this project can have a significant economic and environmental impact in many rural communities in Illinois due to the abundance of agricultural fibers in the area. To make the comparison to commercially derived fillers, both virgin polypropylene and recycled low-density polyethylene were used. The low-density polyethylene selected came from

mixed post-consumer film waste, such as grocery bags and shrink wrap. The corn stalks and corn cobs were hammermilled and screened to a size that is equivalent to a common grade of commercial wood-flour fillers. All compounded materials were pelletized and dried before being injection-molded. The standard ASTM test specimens were made for various kinds of evaluation and tests. The corn residues can be used as a filler in a high-flow polypropylene to yield impact properties similar to those found in systems filled with pine and demolition wood.

Fourth International Conference on Woodfiber-Plastic Composites

May 12-14, 1997

The Madison Concourse Hotel

Madison, Wisconsin

Sponsored by the USDA Forest Service in cooperation with the American Plastics Council, the University of Wisconsin, the University of Toronto, the Cellulose, Paper, and Textile Division of the American Chemical Society, and the Forest Products Society,



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Proceedings No. 7277
ISBN 0-935018-95-6

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Printed in the United States of America.

9711500