

Applications of Natural Fibers in the Brazil Automotive Industry—Thermoforming and Injection-Molding Processes

Alcides L. Leão

Roger M. Rowell

Nilton Tavares

Abstract

Several natural fibers, such as sisal, jute, ramie, coir, curauá, wood, hemp, flax, and sugar cane bagasse, were used in the thermoforming process for automotive applications. The variables were the ratio of polypropylene to natural fibers, gramature, pressing temperature, pressing time, moisture content of the mats, denier of the polypropylene, melt flow index of the polypropylene, and the species of the fibers. The parameters evaluated were the modulus of rupture, modulus of elasticity, notched and un-

notched Izod impact resistance, dimensional stability, fire resistance, and creep resistance. The results were considered under the end-use perspective, with different properties for each part to be developed. Life-cycle assessment was used for evaluation of the best option under recycling and environmental impact, compared with man-made materials. The results showed that the main variable was the fiber type, with curauá resulting in the best composite, sisal and jute were next best, then ramie, followed by the others. This work will be continued with extrusion and injection methods, using natural fibers and plasma-treated raw materials.

Leão:

Professor, Dept. de Ciências Ambientais, São Paulo State Univ., Botucatu, São Paulo, Brazil

Rowell:

Project Leader, USDA Forest Serv., Forest Prod. Lab., Madison, Wisconsin

Tavares:

Manager, R&D, Toro Industria and Comércio Ltd., Diadema, São Paulo, Brazil

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.



Forest Products Society
2801 Marshall Court
Madison, WI 53705-2295
phone: 608-231-1361
fax: 608-231-2152
www.forestprod.org

The opinions expressed are those of the authors and do not necessarily represent those of the USDA Forest Service or the Forest Products Society.

Copyright © 1997 by the Forest Products Society.
Proceedings No. 7277
ISBN 0-935018-95-6

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without prior written permission of the copyright owner. Individual readers and nonprofit libraries are permitted to make fair use of this material such as to copy an article for use in teaching or research. To reproduce single or multiple copies of figures, tables, excerpts, or entire articles requires permission from the Forest Products Society and may require permission from one of the original authors.

Printed in the United States of America.

9711500