

# Impact of international phytosanitary standards on wood packaging material end users: Pre-implementation assessment

Sergio A. Molina-Murillo\*

Timothy M. Smith\*

Mike Reichenbach

Robert Smith\*

## Abstract

International standards for phytosanitary measures have been developed to reduce the spread of pests associated with wood packaging materials use in international trade. It has been suggested this may cause an increase in pallet prices and the substitution of solid wood packaging by other materials. Information from exporting companies was collected through a survey and secondary data. Results indicate that over 60 million wood pallets are used in exportation by U.S. companies. While results represent user attitudes prior to the implementation of new standards, respondents to the survey do not appear predisposed to the purchase of substitute materials.

To reduce the spread of pests, on March 15, 2002, the Interim Commission on Phytosanitary Measures, the governing body of the International Plant Protection Convention (IPPC), developed an international standard for phytosanitary measures called "Guidelines for Regulating Wood Packaging Material in International Trade" (ISPM 15). Implementation was suspended until mid 2003 because of copyright issues with the wood packaging mark; however, these standards are expected to be implemented by the 128 countries over the next several years. Implementation of the standards in the United

States began in early 2004 and the European Union began such implementation in March 2005. It has been speculated that these standards will negatively impact the U.S. wood pallet industry as manufacturers increase prices to offset increased wood treatment costs. Resulting demand shifts stand to impact not only pallet manufacturers, but larger lumber and stumpage markets as well. The pallet industry uses approximately 4.5 billion board feet (BBF) of hardwood lumber and 1.8 BBF of softwood lumber for the production of 400 to 500 million solid wood pallets annually.<sup>1,2,3</sup> In order to gain a better understanding of packaging buyers' needs and attitudes, we conducted a survey with the following objectives: 1) gain insight into the role of wood pallets in the international supply chain (i.e., the amount of wood packaging materials [WPM] used for export); 2) explore competition from alternative materials (e.g., plastic/metal) and channels (e.g., pallet management and/or leasing companies) potentially benefiting from ISPM 15; and 3) better understand customer requirements of WPM and the impact of ISPM 15 in their future business strategy.

## Methodology

A mail survey was developed and administered from September to November 2003 using as reference the Tailored De-

The authors are, respectively, PhD Candidate/Associate Researcher, Forest Products Management Development Institute (FPMDI), Associate Professor of Marketing/Director FPMDI, Univ. of Minnesota, Dept. of Biobased Products, St Paul, MN (sergiomolina@umn.edu; timsmith@umn.edu); Extension Educator/Associate Professor, Cloquet Forestry Center, Univ. of Minnesota, Cloquet, MN (reich027@umn.edu); and Associate Professor, Brooks Forest Products Center, Virginia Tech, Blacksburg, VA (rsmith4@vt.edu). This research was supported by funds provided by the USDA Forest Serv., Wood Education and Resource Center, and Limestone Bluffs RC&D, Inc. This paper was received for publication in August 2004. Article No. 9922.

\*Forest Products Society Member.

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<sup>1</sup> North Carolina Dept. of Environmental and Natural Resources. 2003. Wood: Wooden pallets commodity profile, markets assessment 1998. Div. of Pollution Prevention and Environmental Assistance. [www.p2pays.org/ref/02/0162238.pdf](http://www.p2pays.org/ref/02/0162238.pdf). Accessed August 13, 2003.

<sup>2</sup> Bush, R. and P. Araman. 1997. Use of new wood materials for pallet containers is stagnant to declining. *Pallet Enterprise* 17(8):34-38.

<sup>3</sup> USDA Animal and Plant Health Inspection Service. 2003. Regulatory impact analysis of the proposed rule to adopt the international standard on wood packing material in international trade. Docket No. 02-032-2. Revised April 21, 2003. USDA APHIS, Policy Analysis and Development, Policy and Program Development. [www.aphis.usda.gov/ppq/swp/SWPMRIA42103.PDF](http://www.aphis.usda.gov/ppq/swp/SWPMRIA42103.PDF).

sign Method.<sup>4</sup> A sample of U.S. exporters was developed from the 2002 Directory of U.S. Exporters, published by Commonwealth Business Media<sup>5</sup> and cross-referenced with the top 100 exporters listed by the U.S. Port Authority. The survey sample consisted of the top 600 exporters of Twenty-foot Equivalent Units (TEU) containers and a random sample of 600 small and medium export companies (SME) that shipped more than 20 containers per year, resulting in a total sample of 1200 companies. Two questionnaires and a postcard were mailed to all companies, phone calls were made to all nonrespondents, and the questionnaire was faxed to those who indicated they would respond. These various efforts resulted in a total adjusted sample frame of 770 companies, with a final adjusted response rate of 4.54 percent. Although significant results were found at a 95 percent confidence level, we suggest interpreting the results with caution due to low response rate—focusing greater attention on the directionality of findings as opposed to particular estimates.

## Results

### Profile of companies

The survey respondents represented a wide variety of industries: metal/glass/automotive (20%); agriculture (17.14%); food/grocery (17.14%); wood products (11.43%); chemicals (11.43%); clothing (5.71%); construction (5.71%); and other (11.43%). Respondents' reported total value of export shipments of \$1.161 billion for the top 600 exporters and \$112.9 million for small- to medium-sized exporters. The average number of employees reported was 2,638 for the top 600 exporters, and 501 for the small- and medium-sized exporters.

### Wood pallets and other packaging products

Pallets account for nearly 80 percent of all packaging used by both small and large exporters, and on average 90 percent of the pallets are made of solid wood. The top 600 companies purchase, on average, 87,226 wood pallets per year, of which 24,922 are used for exporting activities (28.6%). Small and medium exporters reported purchases of 31,739 pallets each year, on average, with only 11.9 percent (3,779) used for export. Only the large companies reported being engaged in leasing pallets, representing 2.3 percent of their total number of pallets used, and they utilize them only in domestic shipments.

### Estimation of U.S. wood pallets exported

We estimate wood pallets exported by examining container shipments (TEU) reported in the 2003 Directory of U.S. Exporters. Results are provided in **Table 1**. Adjusting for the percentage of containers not including pallets and for those pallets not made of solid wood, (based on survey measures

Table 1. — Estimation of U.S. total wood pallets for exporting activities.

	Top 600	SMEs <sup>a</sup>	Total
Total TEUs (containers) exported	2,295,262	71,693	2,366,955
Percent of containers with pallets (%)	89.6	77.8	--
TEUs (containers) containing pallets	2,056,096	55,820	2,111,916
Average number of pallets in each container	20.75	19.87	--
Total number of pallets used in export	42,663,992	1,109,143	43,773,135
Percent of pallet purchases that are wood (%)	93.0	87.0	--
Total wood pallets exported by SME sample (n = 600)	--	964,955	--
Average pallets exported per SME company (n = 600)	--	1,608	--
Total small- to medium-sized exporters	--	14,865	--
Total wood pallets exported - method 2	39,677,513	23,906,754	63,584,267

<sup>a</sup>SME = small and medium export companies.

and congruent with previous research [e.g. Bush and Araman 1997]), the estimate of total wood pallets used for export was 63.58 million. This amount is significant and highlights the impact of these new phytosanitary standards, particularly in light of the only other known estimate of 10 million wood pallets exported by the United States, which was reported by USDA APHIS (2003).

### Pallet characteristics and purchaser preferences

Respondents were asked to rate the importance of 18 attributes of pallets (**Table 2**). Statistically ( $p$ -value = 0.05), strength of the pallet was considered the most important attribute influencing purchase decisions, followed by pallet price, treatment to meet IPPC standards, and pallet material. Those considered least important, were ability to lease, ability to reuse, fire resistance, maintenance, and nestability for compact storage.

Respondents were also asked to rate the performance of wood pallets, in an export environment, on the same 18 attributes. Strength, price, and overall value were perceived significantly positive ( $p$ -value = 0.05) along with the height of the pallet, its style, and weight. Respondents indicated that wood pallets were not well suited for the following attributes: nestability, resistant to fire, and the ability to lease.

### Perceptions of the impact of the international standards

Statements regarding the possible impact of the new IPPC standards were also rated by respondents in this study. Respondents held no significant opinion of 6 of the 10 statements (mean values not significantly different from the neutral value of 4 on a 1 to 7 agreement scale, at 95 percent confidence level). Respondents significantly disagreed with statements related to the purchase of more nonwood pallets, seeking out new nonwood suppliers, leasing more packaging materials, or otherwise investigating the use of nonwood pallets.

### Discussion and conclusions

Results suggest that exporters were not inclined to change packaging material away from the use of wood. One of the strongest reasons was the low cost of solid wood to alternative materials. Further, exporters were not inclined to move to leasing and reuse of packaging materials. However, it is important to recognize that an inability on the part of WPM manufacturers to satisfy exporters can have a significant impact, given that over 60 million pallets (15% of the U.S. pallet

<sup>4</sup> Dillman, D. 1999. Mail and Internet Surveys: The Tailored Design Method. John Wiley and Sons, Inc., New York.

<sup>5</sup> Commonwealth Business Media. 2003. The Directory of United States Exporters. Commonwealth Business Media, East Windsor, NJ.

Table 2. — Importance and performance of export pallet attributes.

	Importance				Performance of wood pallets			
	<i>n</i>	Mean <sup>a</sup>	SD <sup>b</sup>	Sig. <sup>c</sup>	<i>n</i>	Mean <sup>d</sup>	SD	Sig. <sup>e</sup>
Strength	32	5.72	1.529	0.000	29	3.83	1.227	0.001
Price	32	5.13	2.225	0.008	29	3.62	1.237	0.012
Treated to meet IPPC	32	5.09	2.205	0.009	30	3.27	1.413	0.310
Pallet material	32	4.94	2.199	0.022	--	--	--	--
Style	30	4.27	2.303	0.531	29	3.45	1.021	0.025
Pallet height	32	4.22	1.963	0.533	28	3.54	1.071	0.013
Free of government regulations	32	4.19	2.070	0.612	29	3.00	0.964	1.000
Pallet weight	32	4.16	2.201	0.691	29	3.41	1.018	0.037
Impact of pallets on the environment	32	4.00	2.272	1.000	29	3.38	1.178	0.094
Stackability	31	3.94	2.366	0.880	30	3.27	1.202	0.234
Payment terms	32	3.59	2.212	0.307	29	3.00	1.165	1.000
Moisture resistant	32	3.56	1.933	0.210	28	2.64	1.062	0.086
Recyclability	32	3.44	2.271	0.171	29	3.21	1.398	0.432
Nestability for compact storage	32	3.22	2.166	0.050	29	2.48	1.243	0.033
Maintenance	32	3.09	2.131	0.022	29	3.24	1.023	0.214
Fire resistant	32	2.88	1.661	0.001	29	2.35	1.233	0.008
Reuse	32	2.81	2.250	0.005	30	3.10	1.213	0.655
Ability to lease	32	1.56	1.480	0.000	27	1.93	1.207	0.000
Overall value	--	--	--	--	29	3.59	0.946	0.002

<sup>a</sup>Respondents were asked to rate the importance of all attributes of pallets on a 7-point scale, where 1 = not important at all and 7 = very important.

<sup>b</sup>SD = standard deviation.

<sup>c</sup>All attributes with *p*-values of 0.05 or less received a score significantly different from the neutral value of 4 on the 7-point importance scale, using one sample t-test.

<sup>d</sup>Respondents were asked to rate the performance of wood pallets in all attributes on 5-point scale, where 1 = poor performance and 7 = excellent performance.

<sup>e</sup>All attributes with *p*-values of 0.05 or less received a score significantly different from the neutral value of 3 on the 5-point performance scale, using one sample t-test.

production) are thought to be used in exportation activities by American companies, a number six times higher than previously reported.

It is important to reiterate the limitations of this study, particularly given the small sample size analyzed. First, results should be interpreted more qualitatively, with focus placed on directional trends rather than the magnitude of the estimates. Second, we believe that the low response rate is the result of a lack of awareness of the standards at the time of the study and the fact that these are “low-involvement” purchases. It would

be premature to conclude that the attitudes reflected in this study will remain constant as WPM buyers’ awareness of the standards increase. However, we also note that previous wood packaging phytosanitary regulations, those adopted by China in 1998 and the European Union in 2001, have not created a significant shift to other packaging materials. This study provides a useful snapshot of pallet buyer attitudes prior to the widespread adoption of wood packaging treatment standards; further research is necessary to monitor the effects of these standards as global implementation continues.