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Assessing the Market Potential of Roundwood Recreational Buildings

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Abstract

Fire- and disease-prone forests arise from overabundant stands of small-diameter timber. A means of restoring forest health is to thin these dense stands, but the resulting small-diameter roundwood (SDR) harvest is perceived as having marginal value and use. To better understand this perception, we explored the market potential of using SDR in the recreational buildings market. Our primary goal was to estimate the market potential for recreational buildings constructed from SDR on National and State forests and parks. A questionnaire designed to determine the current and potential market size of public recreational buildings and the extent to which architects and builders would consider using SDR as a recreational building material was distributed to architects and building designers representing both Federal and State organizations. The results indicate that (1) the number of recreational buildings on National and State forests, parks, and recreational areas could increase by 5,150 to 51,500 buildings; (2) wood has been used in 57% of existing recreational buildings and its use could increase by 13%; (3) 58% of the building professionals surveyed said they would consider using SDR in future recreational buildings; (4) the market potential arising from SDR substitution, even for a near-substitute like lumber, is substantial; (5) cabins, pay stations, picnic shelters, concession stands, and information centers would be the best markets to target for SDR use; (6) roundwood is perceived as superior to all other building materials in terms of being an attractive and “green” building material; and (7) SDR market potential will grow to the extent that durability increases and maintenance and construction complexity decrease.

Keywords: small-diameter roundwood, small-diameter timber, roundwood, recreational buildings

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Introduction

It is commonly believed that an overabundance of small-diameter roundwood (SDR) results in fire- and disease-prone forests. The extraction and use of SDR is one means by which to restore forest health. However, SDR suffers from the perception of having low or marginal market value, and the demand for this resource falls far short of its ample supply. One reason for the perception of poor value is that SDR is not commonly used in construction, perhaps due to a lack of knowledge of and confidence in its building properties and attributes.

The work reported here is part of a continued research effort by the USDA Forest Service Forest Products Laboratory and the University of Washington to explore, create, and increase new and existing value-enhanced markets for SDR (LeVan-Green and Livingston 2001, Paun and Jackson 2000, Paun and Wright 2001, Wolfe 2000, Wolfe and Moseley 2000). The focus of this study is the recreational buildings market because it represents an attractive potential for using SDR as a building material.

The primary goal of the research reported here was to estimate the market potential for recreational buildings constructed from SDR on National and State forests and parks. The future market for a product is often estimated through growth projections, but a deeper understanding of its potential is gained from exploring the user/buyer interface. A secondary goal was to investigate the attitudes and opinions of government building professionals, who are key decision makers in the design of building materials, in terms of their awareness and potential interest in using SDR in recreational buildings. Third, we explored the potential for SDR to substitute for five primary building materials: roundwood logs, lumber, post and beam, metal, and rock/masonry/concrete. As the perceived attributes of a set of products become increasingly similar, the capacity of a building material to substitute for other materials increases (Walters 1991). Thus, another dimension of market potential can be observed.

The importance of assessing the potential market size for SDR, capacity of SDR to substitute for other building materials, and acceptance of SDR as a structural material by building professionals is that it increases our understanding of when, where, and how to best stimulate and foster interest in, demand for, and use of SDR in recreational buildings.

Methodology

Questionnaire

A four-page questionnaire, primarily using seven-point Likert-like scales, was designed to determine the current and potential market size of public recreational buildings and the extent to which architects and building professionals would consider using SDR as a recreational building material. The questionnaire was extensively pretested for clarity and comprehensiveness by building professionals, government researchers, and members of academia.

The first page of the questionnaire addressed the current number of recreational buildings and estimated number of new and replacement recreational buildings. Two additional questions assessed to what extent new and replacement buildings would be built from wood, compared with other building materials such as brick or metal, and the likelihood that SDR would be used. The second page investigated the type of building materials (e.g., lumber, roundwood logs, squarewood post and beam, metal, rock/masonry/concrete) used in existing recreational buildings. A follow-up question explored attributes (e.g., appearance (aesthetics), ease of construction, maintenance requirements, durability, value, environmental impact) associated with these building materials. The third page explored factors associated with using or accepting SDR as a building material. Respondents were also asked about their knowledge of SDR prior to completing the questionnaire. The fourth page gathered demographic and other background information about the respondents. Respondents were asked about their type of building experience, years of experience in their particular government organization, and regional U.S. location.

Sample

The sample was composed of government building professionals involved in the selection and design processes for construction materials for recreational buildings. Architects and building designers represented both Federal (Forest Service, National Park Service, Bureau of Land Management) and State (Departments of Parks and Transportation) organizations. Of the 390 questionnaires sent, 130 were received and usable, for an effective response rate of 33%.

Results

Current Number of Recreational Buildings

To gain a better understanding of the market potential for SDR-based recreational buildings in National and State parks and forests, we sought to estimate the total number of existing public recreational buildings, including gatehouses, pay stations, information centers, cabins, picnic shelters, restrooms, ranger stations, pavilions, concession stands, and bathhouses.

The five agencies surveyed estimated that a total of 103,000 recreational buildings currently exist (Table 1). Most likely, this is a fairly conservative estimate. Conversations with agency representatives suggest that centralized building inventories have been conducted only recently. In addition, our study focused only on new construction, so market potential will be increased to the extent that SDR is used in repairs, upgrades, and retrofit of existing recreational buildings. The greatest number of recreational buildings was reported by State parks, 43,000 or 42% of the total. Next, the Forest Service estimated that it has 36,000 recreational buildings (35%), the National Park Service reported 20,000 (19%), and the Bureau of Land Management reported 4,000 (4%).

Market Potential for SDR in Recreational Buildings

Respondents were asked to estimate the number of new and replacement recreational buildings that would be constructed in the future. However, data generated from this question proved problematic and were deemed unusable. First, responses within each agency varied widely, so much so as to suggest that respondents had insufficient access to planning information and reported their opinion of what could, should, or might happen. Second, respondents who could indeed qualify their forecast for the potential market size of recreational buildings, said that despite recreation user needs and associated planning intentions, all future construction was dependent on government funding. Given the continued economic recession, government funding for new construction might not be received to the extent expected or desired.

Since the current estimate of recreational buildings was considered fairly conservative, an alternative method to estimate the potential market for new and replacement recreational buildings was to forecast varying growth scenarios, ranging from very conservative to optimistic, yet feasible. If a 5% increase is assumed, then 5,150 recreational buildings will be constructed (Table 1). If there is a 50% increase for new and replacement buildings, which interviews with government planners revealed as the optimal amount needed for the next 10 years given increasing recreational uses of public lands and the fact that many buildings are approaching replacement age, then it is expected that almost 51,500 recreational buildings will be built. In summary, the market potential for recreational buildings appears attractive. It was estimated that between 5,150 and 51,500 recreational buildings will be constructed in the near future.

Information on current and potential market size alone cannot be used to predict what building types and materials will be used. Thus, respondents were asked two related questions: What types of building materials are currently used in recreational buildings? What types of building materials are likely to be used in the future?

Table 1—Current size and market potential for recreational buildings in Federal and State forests and parks

Government agency	Current number of recreational buildings (%)	Projected market growth			
		5%	10%	25%	50%
State Parks	43,000 (42%)	2,150	4,300	10,750	21,500
Forest Service	36,000 (35%)	1,800	3,600	9,000	18,000
National Park Service	20,000 (19%)	1,000	2,000	5,000	10,000
Bureau of Land Management	4,000 (4%)	200	400	1,000	2,000
Total buildings	103,000 (100%)	5,150	10,300	25,750	51,500
Potential for SDR buildings (70%)	—	3,605	7,210	18,025	36,050

Table 2—Building materials used in recreational buildings

Building type	Building materials used ^a (%)				
	Roundwood	Lumber	Squarewood post and beam	Metal	Rock/masonry/concrete
Cabin	24	37	15	11	13
Pay station	14	32	19	15	20
Picnic shelter	14	32	19	16	19
Concession stand	10	35	10	16	29
Information center	9	36	11	17	27
Ranger station	8	38	12	14	28
Gatehouse	7	41	10	17	25
Bath house	6	32	11	16	35
Pavilion	5	35	8	28	24
Restroom	4	35	9	16	36
Average	10	35	12	17	26

^a High values shown in boldfaced italics.

As Table 2 shows, wood (i.e., lumber, roundwood, squarewood) is the most commonly used building material in 57% (10% + 35% + 12%) of all recreational buildings. In terms of new and replacement buildings, respondents replied, on average, that 70% of future recreational buildings will be constructed from wood, either completely or partially (e.g., roofs, walls). Using this estimate, and assuming that SDR is or can be substituted for lumber, then the market potential for SDR recreational buildings could range from 3,605 to 36,050 buildings at Bureau of Land Management, Forest Service, National Park Service, and State Parks. This suggests that there could potentially be a 13% growth in wood building materials for recreational building (70% future estimate; 57% current). Lastly, 58% of the respondents said they would use SDR if testing guidelines and construction specifications were available.

Current and Future Materials for Recreational Buildings

The previous paragraphs provide insight into the number of current and future recreational buildings on Federal and State forests. However, a more complete portrait of SDR market potential requires an understanding of how and the extent to which substitute building materials (e.g., wood, metal, rock/ masonry/concrete) compete for use in recreational buildings.

Respondents were asked about the extent (i.e., percentage) to which the five building material types were used in existing

recreational buildings, including gatehouses, pay stations, information centers, cabins, picnic shelters, restrooms, ranger stations, pavilions, concession stands, and bathhouses. Study findings are reported in Table 2. Overall, wood (lumber, roundwood, squarewood) is the most commonly used building material in 57% of all recreational buildings. This offers encouragement for SDR sellers because, compared with other building materials (metal and masonry), lumber, roundwood, and squarewood are fairly close substitutes for each other. The challenge of an SDR seller is to educate builders how SDR as a wood substitute can be as convenient to use, as structurally sound, and as readily available as lumber. Note that lumber is the most used building material (35%) and roundwood the least used (10%). Thus, the market potential from SDR substitution for lumber alone is substantial or could increase by as much as 350%.

The most prevalent building material used for cabins, pay stations, picnic shelters, concession stands, information centers, ranger stations, gatehouses, and pavilions, is lumber (Table 2). These types of recreational buildings should be targeted for SDR for lumber substitution. Although roundwood is not the predominant material in any type of recreational building, it is currently most used for cabins, pay stations, picnic shelters, concessions, and information centers—the best markets to target because of current building practices and perceptions of feasible substitution.

Table 3—Attributes associated with various building materials as perceived by builders

Perceived attribute	Rating of various building materials compared with SDR ^a				
	Roundwood ^b	Lumber	Squarewood post and beam	Metal	Rock/masonry/concrete
Attractive	6.0 (1)	4.6	5.7	3.2	5.2
Environmentally friendly	4.9 (2)	4.5	4.6	3.7	4.7
Very durable	4.4 (3)	3.8	4.2	5.8	6.3
Good value	4.4 (4)	4.9	4.3	4.9	4.9
Easy to build with	3.9 (5)	5.7	4.9	4.9	4.0
Low maintenance	3.9 (6)	3.9	4.0	5.5	6.0
Mean	4.6	4.6	4.6	4.7	5.2

^a Attributes rated on scale of 1 (“not an attribute”) to 7 (“important attribute”). High ratings shown in boldfaced italics.

^b Numbers in parentheses indicate rank.

Attributes Associated With Various Building Materials

Respondents were asked the extent to which they associate various attributes with each building material. This information provides a framework with which to position and promote SDR as a substitute building material.

Table 3 presents attributes for the five building material types, based on a scale of 1 (“not an attribute”) to 7 (“important attribute”). Rock/masonry/concrete received the highest overall mean value (5.2), and the other four building materials were ranked essentially the same (mean 4.6 or 4.7).

Roundwood was perceived as superior to all other building materials in terms of appearance (aesthetics) and environmental impact. Thus, these two attributes should be prominently promoted to optimize the market potential of SDR in recreational buildings. These data are consistent with the high usage of roundwood for cabins, pay stations, picnic shelters, concessions, and information centers (Table 2). All such buildings are highly visible where aesthetics may be more valued than functionality, compared with restrooms and bathhouses.

These findings suggest that future research and technological advances that address the perceived weaknesses of SDR should focus on reducing maintenance requirements and construction complexity. For greater market acceptance, SDR must require less maintenance than is currently perceived. Compared with perceived maintenance requirements for rock/masonry/concrete (6.0) and metal (5.5), the perceived maintenance requirement for roundwood is poor (3.9). Improvements in the maintenance requirements of

SDR might be technological; for example, modifications that make SDR easier to use, less expensive or toxic, and more durable. From a marketing perspective, SDR sellers could reduce perceived maintenance concerns by providing clear and detailed information on wood treatments. Alternatively, SDR could be promoted for applications that inherently require less maintenance, such as applications in mild climates and areas of low susceptibility to insect infestation. The issue of maintenance could be circumvented to a great extent by positioning SDR for interior use while wood preservative treatments are being improved.

Roundwood is perceived as being about as difficult to work with as rock/masonry/concrete. However, rock/masonry/concrete is perceived as requiring substantially less maintenance than does roundwood. These perceptions dampen the market potential of SDR in recreational buildings. Barriers to using roundwood in construction need to be further reduced. Then, the benefits of using roundwood need to be communicated effectively and widely. Continued research by the USDA Forest Service, Forest Products Laboratory (Wolfe 2000) on improved technology for using SDR in construction and information on connection properties and standards for SDR are critical if SDR is to compete effectively with substitute building materials.

One last observation is that roundwood is thought to be more expensive and of lower quality than lumber. Although SDR sellers might not be able to fully compete on price with lumber, marketing communications should promote the “value added” aspect of roundwood; for example, its attractive appearance and low impact on the environment.

Table 4—Attributes needed to increase builders’ use or acceptance of SDR in recreational buildings

Attribute	Needed or desired attribute for SDR		Perceived attribute; importance rank ^b	Gap between need and perception
	Mean rating ^a	Importance rank		
Very durable	6.3	1	3	Yes
Low maintenance	6.3	2	5	Yes
Attractive	6.2	3	1	No
Good value	6.1	4	4	No
Easy to build with	5.8	5	6	Yes
Environmentally friendly	5.3	6	2	No

^aAttributes rated on scale of 1 (“not needed”) to 7 (“important”) in terms of increasing SDR use.

^bFrom Table 3.

Attributes That Would Increase Use of SDR in Recreational Buildings

Having commented on their perceptions of attributes associated with the five building materials, respondents were then asked about what might influence their acceptance or use of SDR in recreational buildings. This question provides interesting information as it indicated which attributes are most important for increasing the market potential for SDR.

“Needed” or “desired” attributes for SDR are presented in Table 4. The highest mean rating was given to durability and maintenance (6.3), followed by aesthetics (6.2) and good value (6.1). Rated of less importance were ease of construction (5.8) and environmental impact (5.3).

The ranking of SDR attributes from Table 3 is included in Table 4. This ranking represents builders’ perceptions of attributes already associated with various building materials. Growth of the SDR market potential depends on closing the gap between needed or desired attributes for SDR relative to existing perceived attributes. The market potential of SDR will grow to the extent that concerns about durability, maintenance, and ease of construction are addressed and mitigated. It is easy to understand the emphasis on attribute functionality as Federal and State governments face budgetary and employee restraints in the maintenance of public facilities. Finally, our analysis indicates that the aesthetic and environmental attributes of SDR surpass what is needed by builders.

Characteristics of Respondents

Respondents have had a variety of experience with recreational buildings, including designing (86%), building (70%), general contracting (68%), and remodeling (68%). They have worked for their current government employer, on average, for 19 years, suggesting they have considerable

work experience, are mid-career, and are loyal to their employers. All regions in the United States were represented: Intermountain (26%), Southeast (19%), West Coast (17%), Midwest (17%), Northeast (15%), and Southwest (6%).

Concluding Remarks

This study provides interesting findings about the potential of SDR for use in recreational buildings on Federal and State forests, parks, and recreational areas. Those selling SDR and SDR recreational building products should keep in mind the following:

- About 103,000 recreational buildings (conservative estimate) exist in National and State forests and parks.
- In the future, the number of recreational buildings will increase, from 5,150 (conservative estimate) to 51,500 (liberal estimate) buildings.
- Wood has been used in 57% of existing recreational buildings, and the use of wood building materials is expected to increase, perhaps by 13% to 70% of all new buildings.
- 58% of the builders said they would use SDR in recreational buildings if testing guidelines and construction specifications were available.
- The potential of SDR as a building material substitute is impressive. Lumber (35%) is the most used building material, followed by rock/masonry/concrete (26%), metal (17%), squarewood post and beam (17%), and roundwood logs (10%). Given that roundwood is the least used, the market potential from SDR substitution, even for a near-substitute like lumber, is substantial.

- Cabins, pay stations, picnic shelters, concessions, and information centers may be the best markets to target for SDR use.
- Roundwood is viewed as superior to all other building materials in terms of its appearance and environmental impact.
- SDR market potential will increase to the extent that SDR durability increases and maintenance and construction complexity decrease.

Given the encouraging findings generated by this study, future research efforts might focus on exploring the substantially larger county and city forest and parks market for recreational buildings. Another means of expanding this research might be to explore the commercial market, such as agricultural buildings, wineries, golf clubs, and marinas, where the aesthetics of SDR would be appreciated and valued.

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