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Material Substitution Trends in Residential Construction 1995, 1998, 2001 and 2004

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Executive Summary

The United States residential construction industry, traditionally the largest end-use market for softwood lumber, has been undergoing a period of change for more than a decade. Builders' acceptance of substitute materials and new innovations has increased, providing a unique challenge to softwood lumber producers. In such a situation, understanding the ways in which residential builders specify and use softwood lumber and lumber substitutes is essential to the success of any softwood lumber manufacturer. The Center for International Trade in Forest Products (CINTRAFOR) completed its first study on material substitution in 1995 (CINTRAFOR Working Paper No. 57), providing a benchmark for softwood lumber use in structural applications in residential construction. This was followed by surveys looking at material use in 1998 (CINTRAFOR Working Paper No. 73) and 2001 (CINTRAFOR Working Paper No. 93). The current study, undertaken in 2005, represents the fourth in this series and is intended to describe the trends in material use and substitution in the residential construction industry in 2004. The 2005 survey also explores builders' awareness, usage and perceptions of certified softwood lumber and sets a baseline for tracking certified lumber usage in residential construction.

In 2004, single family construction accounted for over three-quarters of construction firms' revenue. The larger firms reported a high proportion of new single family housing than their smaller counterparts. Additionally, there appears to be a negative relationship between firm size and the amount of revenue generated from repair and remodel activities. These findings are consistent with previous survey findings. The 2005 survey also reveals that the larger firms are more involved in non-residential construction. Builders in the southwest region of the US reported significantly less involvement in the repair and remodeling sector and significantly more involvement in the non-residential sector. The share of single family construction reported by builders was found to be consistent across all regions.

A longitudinal analysis (from 1998 to 2004) of substitute material usage revealed that the largest changes occurred in the usage of glulam beams, LVL, steel framing, wood I-joists, open-web trusses, and structural insulated panels, with wood I-joists, LVL, steel framing and glulam beams recording significant decreases between 2001 and 2004. In contrast, structural insulated panels, panelized wall systems and open-web trusses have experienced an increase in use since 2001. Survey respondents in the southeast and southwest regions of the country reported a steady increase in their usage of finger jointed lumber between 1998-2004. However, the usage of finger jointed lumber nationally was found to be constant over this period. The usage of glulam beams decreased substantially in the eastern US while remaining fairly constant in the western US. Nationally, glulam beams recorded the largest drop in reported use (12.6%). Use of wood I-joists declined across all regions, with the exception of the northwest, as solid wood joist prices moderated. In addition, use of Parallam TM remained relatively constant between 1998 and 2004, whereas the use of TimberStrand TM lumber increased in the western US while declining in the eastern US. The use of non-wood material substitutes (steel framing and reinforced concrete) generally declined in the southern regions and increased in the northeast.

An analysis of material usage within specific end-use applications revealed that softwood lumber use has either increased or remained relatively constant in all applications with the singular exception of load bearing walls. For headers, wall framing and roof framing applications, softwood lumber remained the dominant material with a market share of more than 70% in each application. For floor framing, the market is split between softwood lumber, wood I-joists and open-web trusses. However, it should be noted that for all structural applications, softwood lumber recorded the largest market share. The market share for softwood lumber increased in floor and

roof framing applications, remained constant in header and non-load bearing wall applications and declined in load bearing wall applications. In wall framing applications, none of the substitute materials had a market share of more than 6% whereas softwood lumber (both solid sawn and finger-jointed studs) enjoyed a market share of approximately 88.3% and 80.9% in non-load bearing and load bearing wall applications, respectively. The usage of softwood lumber in floor framing increased from 39% in 2001 to 43% in 2004, making softwood lumber the primary material for floor joists. Significantly, the market share for wood I-joists in flooring applications (its major market) declined by almost 12%. The use of wood trusses for roof framing has experienced a steady increase since 1995, rising from a market share of 46% in 1995 to 53% in 2004.

Builders rated strength, straightness, lack of defects and the availability of softwood lumber as the most important attributes of softwood lumber; a result that has been consistent over the course of the four surveys. The importance ratings for two attributes, price and price stability, have begun to decline in importance. On a positive note, home builders consistently expressed higher satisfaction levels with all of the softwood lumber attributes in the 2005 survey. A review of the data shows that the respondents consistently recorded higher satisfaction levels for all the softwood lumber material attributes between 2001 and 2004. The 2005 survey also marks the first time that builders indicated satisfaction with two important softwood lumber quality attributes: lumber straightness and lack of defects. In all of the previous surveys, builders had consistently indicated dissatisfaction with both of these attributes. The fact that straightness and lack of defects are ranked as two of the most important lumber attributes, combined with the large increase in the satisfaction ratings for both of these attributes, suggests that builders have begun to view softwood lumber as a much better value over the past several years.

It appears that builders are becoming more conscious of the environment and that this is beginning to influence the types of materials specified by some builders. Unfortunately, builders are receiving mixed messages about the environmental performance of non-wood materials. The results of this survey suggest that builders perceptions of the environmental performance of non-wood materials improved slightly between 2001 and 2004 whereas it decreased substantially for wood-based structural materials. With the exception of SIP's, all of the substitute materials are considered to be more enviromentally friendly than softwood lumber. This result sugggests that it is important that the forest products industry in general, and softwood lumber manufacturers in particular, continue to educate builders about the environmental benefits of using wood relative to non-wood materials.

A new section of the 2005 survey considered home builders awareness and use of certified lumber. The results of the survey showed that only 40% of homebuilders indicated that they were aware of certified wood. On average, only about 14% of homebuilders indicated that they have used certified wood. Among the users of certified lumber, the average percentage of homes framed with certified lumber was approximately 50%. Almost 15% of the builders who have used certified wood reported that they framed all of their houses with certified lumber. Further, in looking at certified wood awareness and use within individual states, it was noted that awareness of certified wood was much higher in the states along the west coast of the US relative to states in the central and eastern US. About 77% of builders surveyed on the west coast reported that they were aware of certified wood products. Similarly, among the builders who were aware of certified wood, the percentage of builders who actually used certified softwood lumber was also much higher for builders in the west coast states (70%) relative to builders in other parts of the country. Previous research has shown that the willingness of customers to pay higher prices for certified wood plays a major role in the usage of certified lumber. This research shows that only 17% of the respondents in the eastern states and 29% of the respondents in the central states believe that their customers would be willing to pay higher prices for homes built using certified wood products. The percentage for respondents in the west coast states was higher at 50%. These survey results suggest that the awareness and usage of environmentally certified wood among builders is much higher on the west coast relative to the rest of the country.

The survey results suggest that in the future large home builders may well lead the effort to increase the use of certified wood in building homes. This observation is based on the fact that 67% of large builders have heard of certified wood (this represents the largest segment for this question), 43% have used certified wood to build homes (this is the second largest segment for this question), 50% think that their customers would be willing to pay a premium for a home built from certified wood (this represents the largest segment for this question) and 75% expect that their use of certified wood will increase in the future (this represents the largest segment for this question). Further research is needed to understand home builders' motivation for using certified wood and to

explore the relationship between the use of certified wood and regulatory factors (such as green building codes and efforts to improve the energy efficiency of residential homes).

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