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Material Substitution Trends in Residential Construction 1995, 1998 and 2001

John Garth, Ivan Eastin and Jane Edelson. 2004

Executive Summary

Understanding the ways in which residential builders perceive and use softwood lumber and substitute structural materials is essential to the success of any forest products manufacturer. CINTRAFOR completed its first study of material substitution in 1995 (CINTRAFOR Working Paper No. 57), providing a benchmark for softwood lumber use in structural applications in residential construction. In 1998, a second study by CINTRAFOR (CINTRAFOR Working Paper No. 73) found that softwood lumber was slowly losing market share to engineered wood products and non-wood substitutes. The 1998 CINTRAFOR study also provided a benchmark for wood and non-wood material usage in residential decking applications (CINTRAFOR Working Paper No. 78). This research represents the third in this longitudinal study and will describe the trends in material substitution in the residential construction industry in 2001. This study looks at material substitution in structural framing applications and provides a benchmark for structural panel usage in exterior wall sheathing, sub-flooring and sub-roofing applications.

The survey results suggest that firm size (based on annual revenues) within all segments of the industry has increased since 1998, most likely due to a combination of consolidation within the industry and growth of individual firms in response to the strong housing market. On a regional basis, small firms represented a higher proportion of the industry in the southeast (72%) while they displayed their lowest level in the northeast (49%).

Overall, single family construction represents approximately 53% of total firm revenues, although this was substantially higher in the southwest (63%) and somewhat lower in the northwest (46%). Small builders revenues were evenly split between single family construction and repair and remodel projects whereas the Top 100 builders focused almost exclusively on single family construction (providing over 90% of total revenue). In general, large builders had a strong focus on single family construction (70% of total revenue) but they also derived substantial revenues from multi-family construction (9% of total revenues), repair and remodel projects (8% of total revenue) and non-residential construction (12% of total revenue). The most dramatic change was observed in the Top 100 builders where the percentage of revenue derived from single family construction jumped from 58% in 1998 to 93% in 2001.

Almost 40% of respondents reported that their use of softwood lumber had not changed substantially over the past two years. More importantly, fewer respondents reported that their use of softwood lumber had decreased substantially in 2001 (4.5%) than was reported in the 1998 survey (11.8%). The percentage of respondents who reported that they had used a substitute material in place of softwood lumber in structural framing applications increased slightly from 98.9% in 1998 to 99.5% in 2001. The most commonly used substitute materials were wood I-joists, glue laminated beams, laminated veneer lumber and reinforced concrete. All of these materials exhibited an increase in reported use since 1998 with the exception of reinforced concrete which saw a slight decline in use. The largest increase in use was observed for finger-jointed lumber, despite the fact that less than 40% of respondents reported using it. Small decreases in use were reported for structural insulated panels, wood-steel open web floor joists and reinforced concrete. The largest decline in use was reported for Timberstrand™ lumber, where almost 20% of respondents indicated that their use of this product had declined in the past two years.

Softwood lumber use in wall and roof framing applications actually increased slightly in 2001 although it decreased substantially in floor framing applications. Softwood lumbers share in wall framing and roof

framing increased slightly to 83.4% and 40.9%, respectively, while it dropped to 38.6% in floor framing. In header applications (a new category in the 2001 survey), softwood lumber had a 71.9% share while laminated veneer lumber had a 20.4% share. The survey data also suggests that the share of steel in structural framing applications declined across all end-uses: to 6.6% in wall framing, to 1.7% in floor framing, and to 1.7% in roof framing. This data strongly suggests that the steel framing system was used in less than two percent of US housing starts in 2001.

Substitute materials were again perceived by survey respondents as being more environmentally friendly than softwood lumber, continuing a trend established in the 1995 and 1998 surveys. This continuing misperception on the part of residential builders is troubling.

Builders were asked to rate the importance that a broad range of structural softwood lumber attributes had on their material purchase decision. The average attribute importance ratings were virtually identical to those obtained in the previous CINTRAFOR, suggesting that the attitudes of builders toward the importance of specific lumber attributes have remained relatively constant since 1995. Builders were also asked to rate their satisfaction with each product attribute. Although the average satisfaction scores in 2001 were generally higher than in 1998. Straightness and lack of defects, the two of the most important lumber attributes, received the lowest satisfaction ratings. These low satisfaction ratings suggest that builders remain critical of the quality of softwood lumber. In contrast, the satisfaction ratings for price and price stability continue to increase as softwood lumber prices and price volatility continue to moderate.

A new section on structural panel use in wall, sub-floor and sub-roof sheathing applications was included in the 2001 survey. While plywood had just over a 50% market share in sub-floor applications, OSB dominated in wall and sub-roof applications. On a regional basis, plywood use was highest in the northwest and lowest in the southwest. With respect to firm size, the Top 100 builders reported the highest use of OSB while small builders reported the highest use of plywood. Interestingly, there was a substantial difference observed between the Top 100 builders and the large builders, with large builders using substantially more plywood than the 100 largest builders. Survey respondents reported that their use of plywood had decreased between 30-50% across the three end-use applications while their use of OSB increased between 40-47% across the three end-uses.

In considering a total of nineteen structural panel attributes, respondents indicated that plywood was generally perceived as having superior performance relative to OSB. In contrast, OSB was perceived as being superior to plywood in just four structural panel attributes: price, price stability, presence of panel voids, and resistance to delamination. Builders rated resistance to delamination, resistance to edge swelling and resistance to thickness swell as being the most important panel attributes.

The results of this research suggest that the pace of material substitution in the residential construction industry has moderated since 1998. To a large degree this might be attributed to lower lumber prices, less volatility in lumber prices, and the fact that builders have become more accepting of the decreased softwood lumber quality that has been attributed to the younger, faster grown plantation resource. The exception to this trend is in floor framing applications where wood I-joists continue to expand their market share at the expense of softwood lumber. The most troubling result is the continuing misperception among residential builders that softwood lumber is the least environmentally friendly material. This result could have serious implications for the forest products industry in the future as green building programs become more prevalent and home buyers become more assertive in demanding that environmentally friendly materials be used in building their homes. This misperception clearly shows that further research is required to determine the basis for this misperception and to identify strategies to ensure that information regarding the positive environmental benefits of using wood relative to non-wood substitutes is effectively communicated to home builders and home buyers.

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