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Softwood Substitution in the US Residential Construction Industry

Ivan L. Eastin, Douglas D. Simon and Steven R. Shook. 1996

Executive Summary

Material substitution in the residential construction industry is driven by a variety of factors including product availability, product performance, price, price stability, and in-place costs. As competition between softwood lumber and substitute products increases, managers need to understand end-users' changing perceptions of softwood lumber and the competitive position of softwood lumber *vis a vis* substitute products. Despite the relative availability of product literature describing substitute building materials, the extent of substitute product diffusion remains unclear. Perhaps more importantly, virtually no information exists regarding the diffusion process for substitute products in the residential construction industry, including the impact of specific product attributes and end-user characteristics in promoting the diffusion process. This exploratory study was developed to the competitive relationship between softwood lumber and substitute products in structural end-use applications in the US residential construction industry. In particular, the study was designed to identify those product attributes that are perceived by residential contractors to be important in influencing the substitution process.

Empirical data for this exploratory study was obtained from a cross-sectional mail survey of 1,500 residential contractors in the United States. The sample frame for the study was derived from the membership of the National Association of Home Builders (NAHB). In order to obtain a uniform geographical representation, equal numbers of participants were randomly selected from the northeast, southeast, southwest, and northwest regions of the US. 176 usable questionnaires were returned, providing an effective response rate of 11.7%.

Over 90% of the respondents indicated that they had used at least one substitute product for softwood lumber in a structural end-use application. The use of specific substitute products varied considerable, with 72.2% of respondents reporting that they had used glulam beams while none of the respondents reported using plastic lumber. Only two products (glulam beams and wooden I-beams) were use by more than half of the respondents. Adoption/trial curves for several substitute products show a rapid increase in their use, particularly over the past five years. Despite this, respondents indicated that their use of structural softwood lumber is changing only moderately.

Respondents were asked to rate the importance of various product attributes in influencing their purchase decision regarding structural building materials. The analysis of the data indicates that product strength and straightness were rated the most important factors. Price and price stability were also rated highly, while environmental factors generally received the lowest importance ratings. A principal components factor analysis of the twelve product attributes indentified three underlying factors that influence the material substitution process: the physical characteristics of the product, the technical characteristics of the product, and economic/supply characteristics of the product.

When asked to rate their satisfaction with softwood lumber, respondents indicated that they were satisfied with only two product attributes: lumber strength and lumber availability. Of the remaining product attributes, respondents were neutral regarding three and were dissatisfied with the remaining five product attributes. Lumber attributes with which respondents expressed dissatisfaction included: lumber straightness, number of defects, overall lumber quality, price, and price stability.

To explore the impact of environmental issues on the substitution process, respondents were asked to compare the perceived environmental impact of substitute building materials with that of softwood lumber. Surprisingly, almost all of the substitute products were perceived to produce a lower environmental impact than softwood lumber. No product was perceived to have a greater environmental impact than softwood lumber and only two products, plastic lumber and plastic/fiber composite lumber, were perceived to have a similar environmental impact. Finally, a statistical analysis of the research data indicated little variation in the responses based on the geographic location of the firm or the size of the firm.

The residential construction industry is extremely fragmented and competitive and the results of this research indicate that residential contractors are quite willing to experiment with new substitute products. To counter the competitive threat posed by aggressively promoted substitutes, softwood lumber manufacturers must become market-oriented. Only by adopting a strong market orientation can they hope to place themselves in a position to understand the needs of residential contractors and develop marketing strategies to meet those needs, thereby increasing customer satisfaction. It is only by thoroughly understanding and responding to residential contractors needs that the softwood lumber industry can effectively reduce market penetration by the wide range of substitute products currently by offered in the marketplace.

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