

SOFTWOOD SUBSTITUTION IN THE US RESIDENTIAL CONSTRUCTION INDUSTRY

Material substitution in the residential construction industry is driven by a variety of factors including product availability, product performance, complexity of use, price, price stability, and in-place labor costs. As competition between softwood lumber and substitute products increases, managers in the forest products industry need to understand residential contractors' changing perceptions of softwood lumber and the competitive position of softwood lumber vis à vis substitute products. This exploratory study was developed to assess the competitive relationship between softwood lumber and substitute products (both wood and non-wood) in structural end-use applications in the US residential construction industry. In particular, the study was designed to identify product attributes that are perceived by residential contractors to be important in influencing their decision to use substitute products.

The use of substitute products among survey respondents was quite high. Ninety-two percent indicated they had used at least one substitute product, while over two-thirds have used three or more substitute products in place of softwood lumber in a structural application. These results suggest that many residential contractors have experience evaluating and adopting substitute structural materials. The use of specific substitute products in structural end-use applications was found to vary considerably however. For example, while more than one-half of the respondents have used glulam beams and wooden I-beams, approximately 25 percent have used steel studs, and less than 20 percent have used finger-jointed studs.

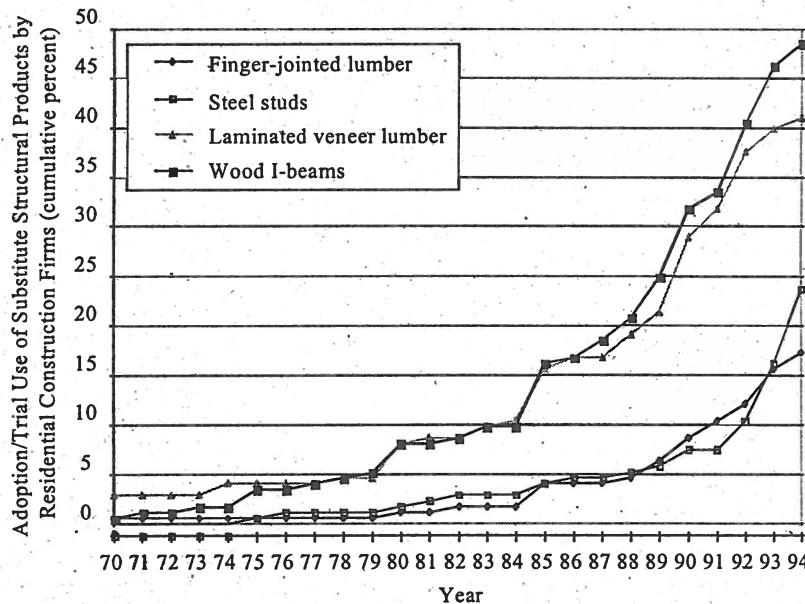


Figure 1. Adoption/trial curves for four substitute structural products.

While 24 percent of residential contractors reported using steel framing at least once (Figure 1), the survey results indicate that steel framing captured just 3 percent of the wall stud market in 1994, and negligible volumes of steel framing were used in other structural end-use applications. This finding implies that while many residential contractors have used steel framing, they do not regularly use steel framing materials in their residential construction projects. However, the experience that these contractors have using steel framing materials may put them in a position to switch from lumber to steel in the event that softwood lumber prices exhibit the same type of price instability that occurred in early 1993. A similar disparity between the adoption curve data (Figure 1) and actual material use was observed for finger-jointed lumber, although this may be explained by residential contractors preference for solid sawn lumber assuming relative price parity between the two products. Given the relationship between the 1996 price of Douglas-fir precision end-trimmed (PET) stud grade lumber (\$398/mbf) and PET finger-jointed studs (\$390/mbf), there appears to be little incentive for contractors to switch from solid lumber. This reluctance may also be influenced by residential contractors' perceptions of the relative quality and strength characteristics associated with each product.

While the use of substitute products in the residential construction industry has increased over the past decade, many industry analysts attributed this to rising softwood lumber prices and more frequent price fluctuations. However, the survey results indicate that price-related factors, while important, are not necessarily the primary factors driving material substitution in the residential construction industry. For example, survey respondents indicated that product attributes such as strength and straightness were equally important considerations in their purchasing decision, Table 1.

The results of this project clearly indicate that residential contractors perceive the quality of softwood lumber is declining. Survey respondents reported that they were dissatisfied with the straightness, number of defects, quality, price, and price stability of softwood lumber. Respondents indicated that they were satisfied with just two of the ten softwood lumber attributes (strength and availability).

Clearly, residential contractors have some misconceptions about softwood lumber as a structural material despite their almost daily use of the product. Promotional campaigns by manufacturers of substitute products, including steel lumber and engineered wood products, have had a substantial impact in shaping the perceptions (and misperceptions) of residential contractors regarding the benefits of softwood lumber. Few would disagree that softwood lumber is the best all-around product for structural end-use applications in residential construction, and its versatility as a construction

Table 1. Mean importance rating of product attributes with respect to their influence on their purchase decision.

Product Attribute	Mean Importance Rating	Mean Satisfaction Rating
Straightness	6.4	3.7
Strength	6.4	5.0
Price	6.2	3.3
Availability	6.2	5.0
Lack of defects	6.1	3.5
Price stability	6.1	2.7
Ease of use	5.7	N/A
Availability of longer lengths	5.7	4.1
Technical/Engineering support	5.6	N/A
Appearance	5.0	N/A
Energy efficiency	4.9	4.1
Reduced environmental impact	4.5	4.1
Lumber quality	N/A	3.3

Importance and satisfaction were measured using a Likert-like scale where a score of 1=not important or not satisfied, 4=somewhat important or neutral, and 7=very important or very satisfied.

material is unmatched by any other product. However, the results of this exploratory research indicate that softwood manufacturers must take note of the changing business environment in which they compete and develop competitive strategies based on the challenge being posed by substitute products. With the use of substitute building materials increasing, the softwood lumber industry must develop a competitive strategy to maintain its traditional dominance in this strategic industry.

The results of this exploratory research indicate that residential contractors perceive that softwood lumber quality is declining, softwood lumber prices are increasing and becoming unstable, and the use of substitute products (including steel and concrete) produces less of an impact on the environment than softwood lumber. If this trend continues, substitute products will continue to increase their share of the building materials market. Members of the softwood industry need to recognize and respond to the changing competitive landscape in the residential construction industry or risk losing further market share to substitute products in their single most important market.

The residential construction industry is extremely competitive, and this research has shown that residential contractors are quite willing to try new products in order to increase their profitability and/or product quality. Only by adopting a strong market orientation can building material producers place themselves in a position to determine the needs of residential contractors and develop a marketing strategy that will allow them to meet those needs and increase customer satisfaction.

The results of this project are presented in CINTRAFOR Working Paper No. 57