

# Demands on Lumber Suppliers within the US Prodealers Channel

François Robichaud  
Patrick Lavoie  
Christopher Gaston

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## Abstract

Prodealers are building materials suppliers whose client base comes mostly from the homebuilding industry. Because they represent an important channel for wood products, a 2007 survey of US prodealers examined (1) lumber attributes demanded, (2) products and suppliers requirements, (3) trends in substitution between countries supplying lumber to the United States, and (4) trends toward prefabrication of structural components. Forty-six prodealers were surveyed; most answered for multiple stores. On average, respondents purchased 60 million board feet of lumber in 2007, and their overall consumption was estimated at 2.76 billion board feet. By far, the most common grade in the prodealer segment is dimension lumber (No. 2 and Better), and the most common type is the spruce-pine-fir species group (SPF). Within the sample, 5 percent of US lumber imports came from offshore. Canada supplied 51 percent of the lumber purchased by respondents, and the United States supplied 47 percent. Wane as well as warp and twist were consistently identified as the most challenging lumber attributes for prodealers. Product quality was identified as a primary reason for changing lumber suppliers. In characterizing properties of the dimension lumber imported from Europe to the United States, it was found that European lumber stands out mostly for visual appearance and low wane. For customer support and timely deliveries, respondents tended to favor US mills. The study suggests that customers are not fully satisfied with lumber, especially with regard to wane and straightness, and that lumber quality issues may be more important today than in the past.

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The prodealers channel is an increasingly important outlet for wood products. Prodealers can be defined as building materials suppliers whose client base comes mostly from the homebuilding industry. In previous research, homebuilders were found to rely heavily on this segment for wood products supplies and, increasingly, for structural components (Lefaix-Durand et al. 2006). Yet, very little research has been devoted to the characterization of this segment where significant changes have occurred. Among these changes, prodealers are adapting quickly to the consolidation of their own client base by consolidating themselves (Abernathy et al. 2004). Because prodealers are consolidating and becoming larger, lumber suppliers may eventually face a reduced number of larger customers, each representing a more important share of lumber purchases. Prodealers are also adding framing solutions and installation services to their product portfolio.

According to Abernathy et al. (2004), prodealers' revenues come mostly from homebuilders that build, at most, 25 homes per year. Another 20 percent of revenues can be attributed to larger firms building 500 or more homes per year. Increasingly, these builders are thought to use their leverage to push down prices via purchasing agreements that cover a broadening spectrum of products. This is

forcing prodealers to readjust their strategies in accordance with customers' needs. The manufacture of structural components and greater emphasis on the installation of the products they sell are two key elements of prodealers' strategies (Abernathy et al. 2004). Another potential impact for lumber suppliers is that prodealers' profit margins are higher on services as compared with products (Abernathy et al. 2004).

A change also may be occurring within the wood products portfolio carried by prodealers and home centers. Over the last decade, but especially before the recent slowdown in homebuilding activity, there has been a sharp increase in US imports of overseas lumber, most notably from Europe. While much of this substitution is thought to be happening in prodealer and home center yards, little is known about the impetus for substitution. Accordingly, the present study

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The authors are, respectively, Research Scientists, Forest Products Marketing, FPInnovations, Québec City, Québec, Canada (francois.robichaud@fpinnovations.ca, patrick.lavoie@fpinnovations.ca); and Group Leader, Markets and Economics, FPInnovations, Vancouver, British Columbia, Canada (chris.gaston@fpinnovations.ca). This paper was received for publication in June 2009. Article no. 10636. ©Forest Products Society 2009.

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aims at a better understanding of the evolving demands for primary wood products by the prodealers segment.

## Background and Objectives

An important study of prodealers and home centers was published by Harvard's Joint Center for Housing Studies (Abernathy et al. 2004). Among the significant results of that study, it was found that consolidation within the prodealer segment was more recent than in homebuilding or in home centers but that this process was gathering momentum. As a result of the consolidation that is well underway in the homebuilding industry, it was also found that prodealers were facing a customer shift toward larger homebuilders. At that time, prodealers made 50 percent of their sales to builders buying materials for at least 25 homes a year and 20 percent to builders buying materials for more than 500 homes a year (Abernathy et al. 2004).

Abernathy et al. (2004) also found that managing products and inventories was a growing concern for prodealers. Indeed, inventory turns (a ratio that reflects the number of times per year that the average inventory for a given product is turned over, as measured by annual sales of that product) were found to be rising even as more building products than ever were being carried, especially in the range of branded products. The Harvard study further concluded that prodealers are becoming more dependent on servicing by suppliers. Meanwhile, the supplier base is consolidating as well. For larger prodealers, this meant that 70 percent of sales in any product category came from the top three suppliers at the time of that study (Abernathy et al. 2004).

Faced with consolidation on both the supply side and the demand side of their businesses, prodealers were shown by the Harvard study to be facing pressure to shorten their distribution chains. In other words, larger builders require a reduced number of intermediaries between them and product suppliers. With their purchasing power, they have more negotiating power. Because of the resulting lower gross margins for prodealers, their focus has begun to shift toward service as a means of innovation and differentiation. In particular, there was a shift toward the installation of roof trusses and wall panels between 1997 and 2002, along with the development of framing services (Abernathy et al. 2004).

The move by prodealers toward the production and installation of structural components and complete framing systems is also in response to the evolving demands and business constraints of homebuilders (see, e.g., Robichaud and Fell 2002, Schuler and Adair 2003). Among these trends, chronic labor shortages, the need for shorter cycle time, requirements for straight structural products, and less on-site waste are probably the most significant. Of course, because they serve homebuilders as part of their day-to-day practice, prodealers are in a perfect position to diversify their products and services to meet the evolving needs of builders. Altogether, house design services, wall panels manufacturing, and framing services have claimed a greater share of prodealers turnover at the expense of products sales (Abernathy et al. 2004). In other words, design services and the manufacturing of structural components were instrumental in shifting from products to services.

Meanwhile, the past two decades have seen a tremendous increase in overseas import of softwood lumber to the United States. Offshore volume imports grew from zero in

1990 to almost 14 percent in 2005. In 2006, the share of non-Canadian US imports declined to 12 percent. This proportion reflects the strengthening of the euro against the US dollar. Most non-Canadian imports to the United States come from the Southern Hemisphere, Sweden, Germany, and Austria. While lumber supply from the Southern Hemisphere centers on markets for nonstructural uses, such as mouldings and millwork, imports from Europe and Sweden are graded according to the American Softwood Lumber Standard and are believed to find their way into structural applications.

In light of the importance of prodealers for the wood products industry, the objectives of the present research are to

- identify lumber attributes demanded as well as product and supplier requirements,
- describe lumber consumption by grade and species,
- characterize the evolution of homebuilders' specifications,
- identify product substitution between supplying countries to the United States,
- identify componentization and other emerging trends, and
- characterize inventory management issues.

## Methods

### Survey population

The biggest challenge in interviewing prodealers was to identify a list of potential respondents within that segment. Usual random survey techniques such as phone or mail were ruled out, because having the address of a prodealer is of little use unless the most relevant contact for filling out the survey is identified within each organization. This challenge was further confirmed by the authors of the Abernathy et al. (2004) study, who were contacted at the time the present study was in preparation. Response rates for business surveys are also likely to be low (Dillman 1999). In addition, there was the likelihood that more than a single respondent would be needed for answering the survey. As a result, a consulting firm renowned for having in-depth knowledge of the prodealers community was sought as a research partner. Surveys were implemented between the months of September 2007 and January 2008 through a mix of phone, mail, and in-person interviews. Some respondents answered the survey for their corporation as a whole, including several stores spread across the United States. For this reason, regional segmentation of results was not feasible. Although respondents were spread nationwide, their selection was not done at random, but rather was based on the network of the survey administrator. As such, results only apply to this sample; they cannot be generalized to the broader prodealers population. This methodology, therefore, is appropriately characterized as qualitative and exploratory in nature. Such methodology may be appropriate in new topic areas (Eisenhardt 1989) and to describe or explore situations of interest (Yin 2003).

### Survey instrument

The first section of the questionnaire looked at general background information, including the respondent's position in the company. A filtering question ensured that participants were involved in the purchase and quality assessment of lumber. The type of clients served by respondents was

also included to ensure that respondents were mostly involved in servicing homebuilders, thus qualifying as prodealers. Another background question identified whether respondents were answering for a single location, for numerous stores in a region, or for a company at the national level. The number of stores represented in respondent answers was determined for both regional and national respondents. The number of employees and the best estimate of lumber sales were asked at the same level (store, region, or nation).

The second section probed whether the store or an affiliate facility was involved in the manufacturing of structural components made from wood. The distribution of sales between wall panels, roof trusses, and floor trusses was asked. The approximate volume of lumber going into components manufacturing was also addressed, along with a question regarding installation services.

The third section dealt with lumber supply and included characterization of lumber purchased, country of origin, attributes demanded, preferred suppliers, satisfaction with lumber, and claims related to lumber. Questions on claims included lumber returns and price renegotiations as a result of quality issues. Claims were characterized both from prodealers to lumber suppliers and from homebuilders to prodealers. In the latter case, complaints that were not necessarily turned into claims or renegotiations were further characterized. The last section addressed challenges in the turnaround of lumber inventories.

## Results

### Profile of respondents

The present study included 46 participants. While 78 percent of them provided answers for their company at the national level, 11 percent did so for their region and 11 percent for their store location. Respondents at the regional or national level provided answers for all of their store locations. On average, responding firms hired 275 people and sold \$62 million (all values are in US dollars) of lumber in 2007. The maximum sales volume for a single respondent was \$330 million, and the minimum was \$1 million. The survey was mostly filled out by purchasing managers (45%), general managers (22%) or business owners (22%). Other respondents (11%) included lumber buyers, commodity buyers, and vice presidents of operations. All respondents were involved in the purchase and quality assessment of the lumber bought by their organizations.

Overall, 77 percent of respondents' revenue came from sales to homebuilders. The remaining revenue came largely from commercial and industrial sales. In particular, 34 percent of sales were made to custom home builders, 21 percent to small builders constructing 25 homes or fewer per year, 13 percent to local or regional production builders, and 9 percent to national production builders. While 74 percent of respondents described their primary market area as urban or suburban, 17 and 9 percent were doing business in small towns and rural areas, respectively.

### Lumber supply

On average, respondents each purchased 60 million board feet (MMBF) of lumber in 2007. Of the 46 respondents, 38 provided their supply volume. Applying the average consumption to the remaining eight respondents would translate into an overall consumption within the sample of

2.76 billion board feet in 2007. While the smallest respondent consumed 1 MMBF in 2007, the largest consumed 265 MMBF. Figure 1 presents the distribution of respondents according to annual lumber purchase volume for 2007.

Lumber supply can be further broken down by grade and types. The two most important grades were dimension lumber (58%) and studs (21%). User-prescribed grades, such as premium lumber, accounted for an additional 11 percent of lumber supply. Machine stress rated (MSR) lumber and economy grade followed at 5 percent each. The main species group of lumber consumed in the prodealer segment was spruce-pine-fir, accounting for 44 percent of the supply. Southern yellow pine (*Pinus elliotii*) and pressure-treated lumber each represented 12 percent of the annual lumber purchases by prodealers. Douglas fir (*Pseudotsuga menziesii*) accounted for 6 percent, followed by composite lumber (4%), finger-jointed lumber (3%), and others (9%).

Respondents were asked to indicate the reason that best explained their distribution of species for framing lumber. According to respondents, the choice of species is mostly customer driven. Indeed, 54 percent stated that their customers choose the species prodealers buy because customers prefer it over other species. Other rationales include lowest price (22% of respondents), easiest to acquire from suppliers (13%), and best quality (11%).

Within the sample, Canadian sawmills and wholesalers provided 51 percent of the supply to the prodealer respondents, and the United States provided 47 percent. Offshore imports amounted to 2 percent of total consumption. Almost three-quarters of respondents expected their source of supply (in terms of origin) to remain the same over the next 3 years. However, 19 percent of respondents felt they would rely more on US suppliers, and 6 percent indicated they expected to rely more on Canada, in 3 years time. Along the same line, 11 percent expected to rely less on US softwood lumber supplies, and 20 percent expected to rely less on Canadian lumber supplies.

To characterize the properties of lumber imported from offshore, respondents were asked to indicate the best suppliers for selected lumber attributes. More than one-quarter of respondents actually did not have an opinion on the issue. Some respondents likely did not have a strong and clear opinion on these questions before the survey was implemented.

Figure 2 shows that European lumber mostly stands out for visual appearance and low wane. Within the sample, 20 percent of respondents imported lumber from Europe (anywhere between 2% and 30% of their overall supply). In open questions, respondents praised European suppliers for best quality and squarer edges. Open-ended questions also provided insights on grading. Respondents felt that wane was a bigger issue over the last 2 years and that grading rules were pushed too much toward their limits. As a consequence, some respondents were specifying most favorable mills or at least considering doing so. For customer support and timely deliveries, respondents tended to favor US mills (Fig. 3).

Prodealers were asked to break down the proportion of sources for the framing lumber they purchased in 2007 as compared with 5 years earlier (Fig. 4). The data set shows no significant change in direct mill sourcing over the 5-year time frame. However, an evolution from wholesaler

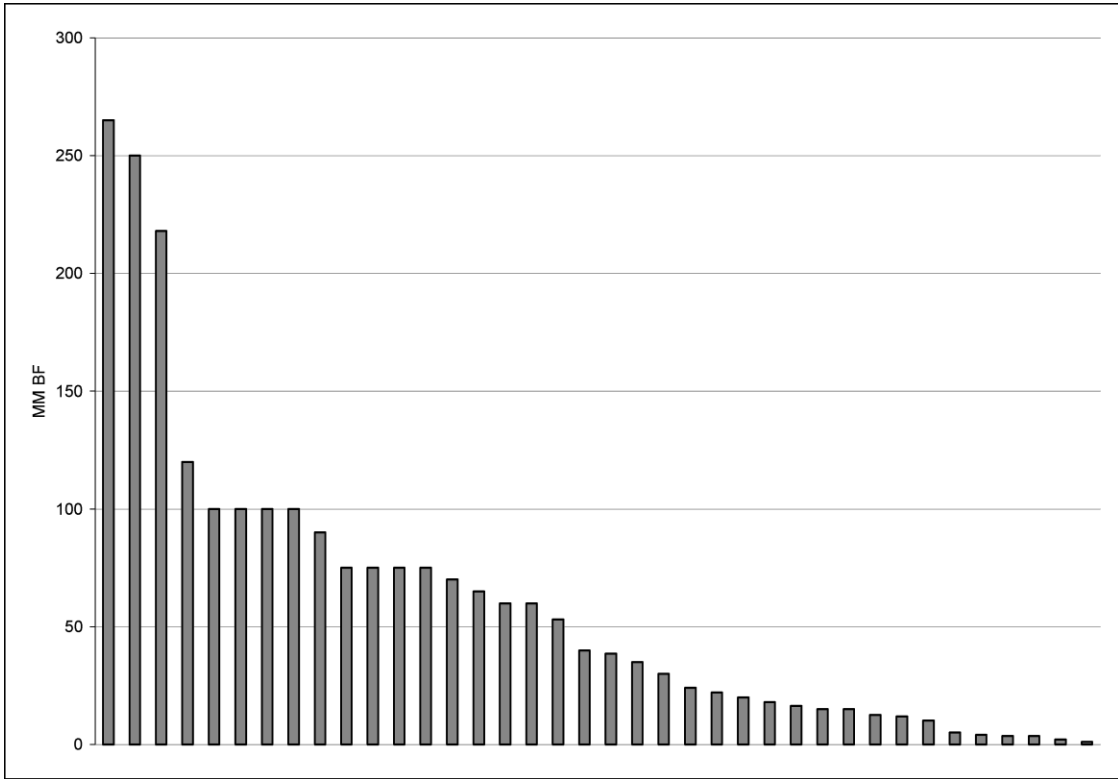


Figure 1.—Distribution of respondents by volume of lumber.

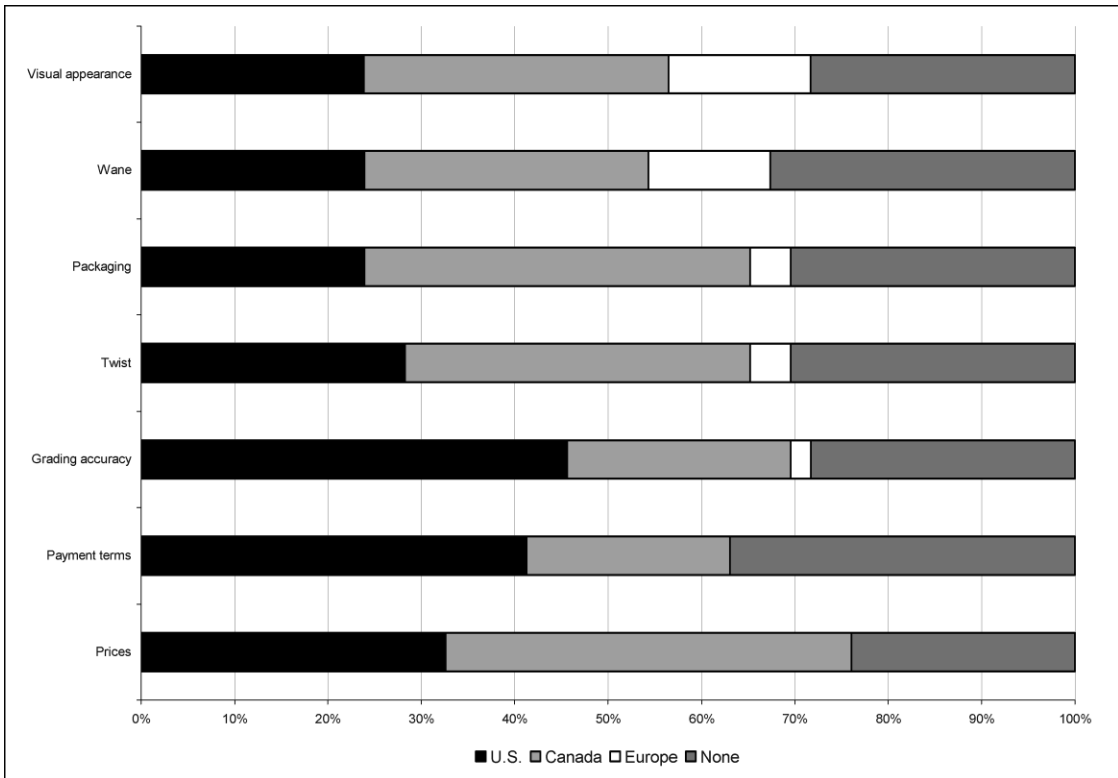


Figure 2.—Preferred origin for selected lumber attributes.

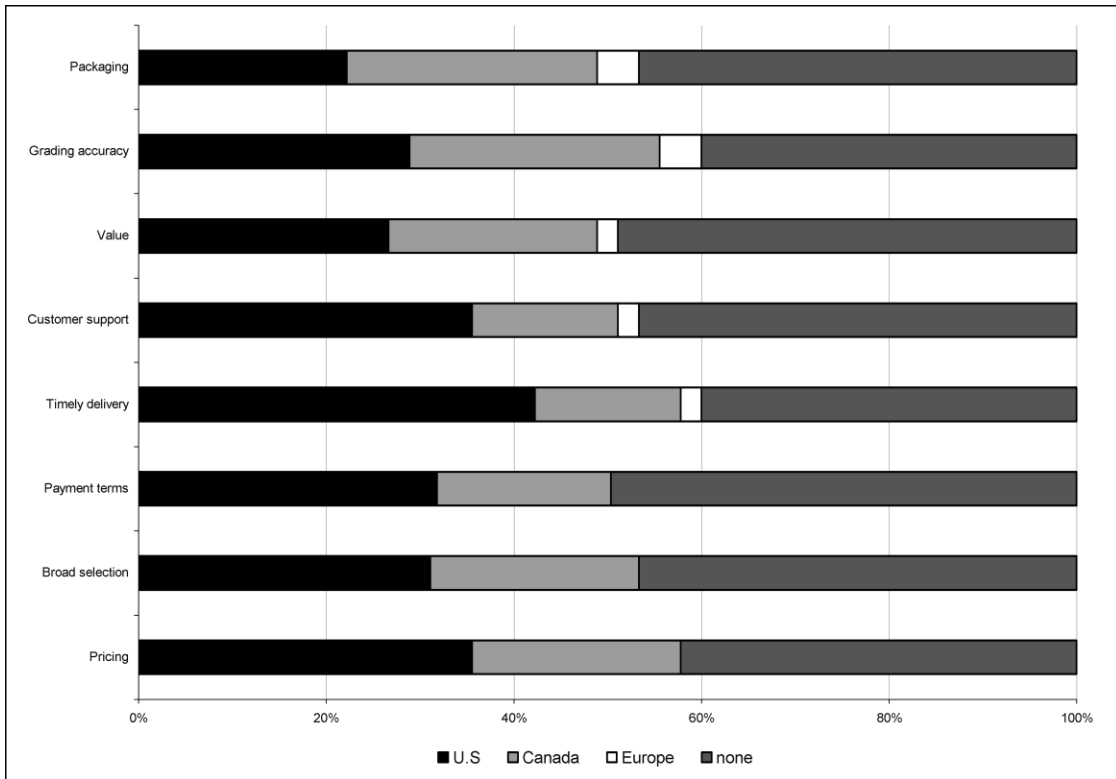


Figure 3.—Preferred origin for selected supplier attributes.

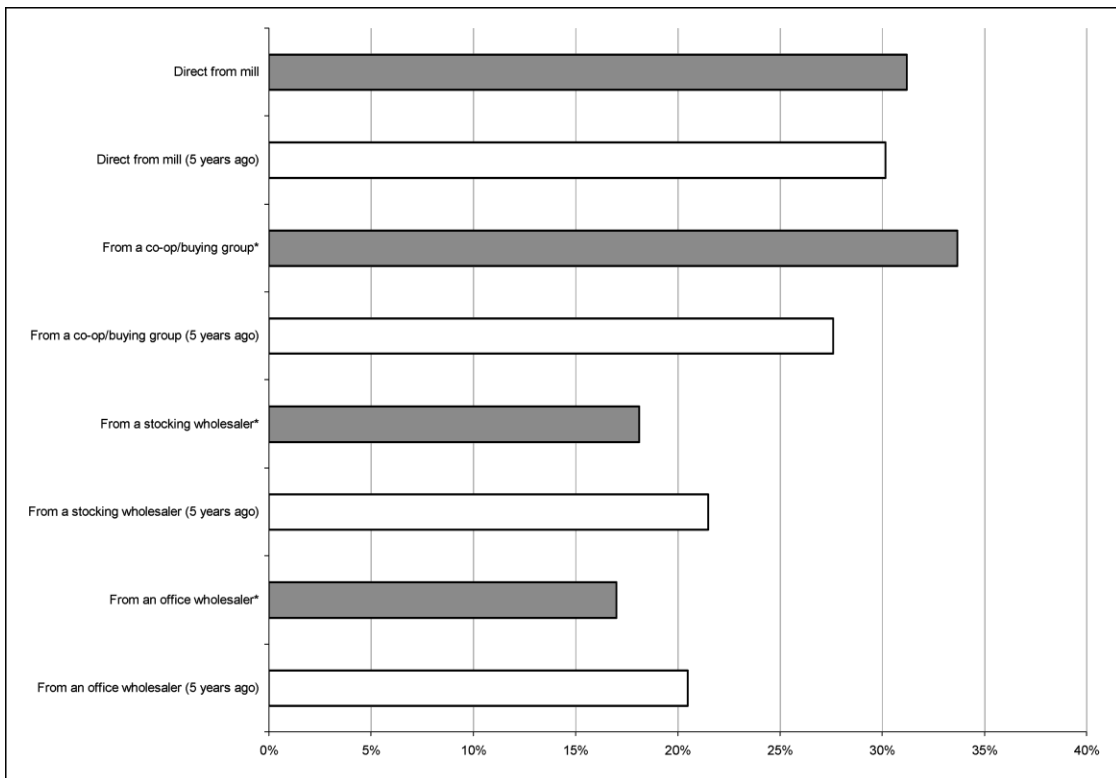


Figure 4.—Lumber sources in 2007 and 5 years earlier.

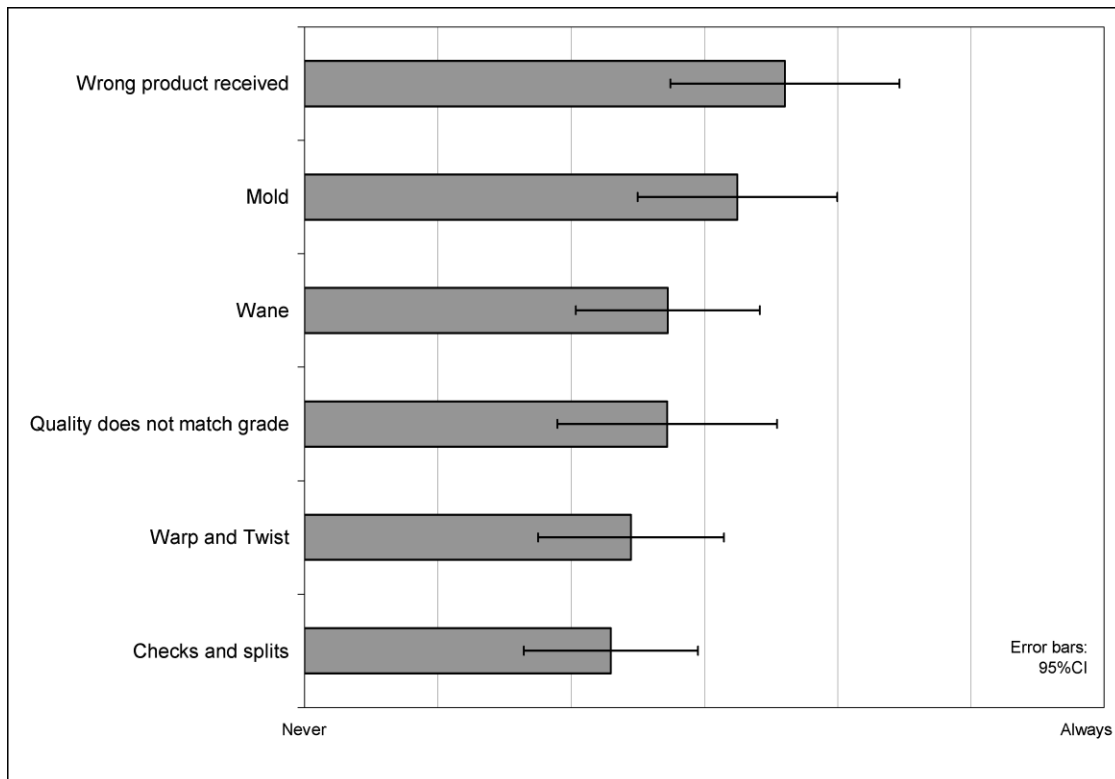


Figure 5.—Attributes used to justify claims to manufacturers by prodealers.

sourcing toward buying from a co-op or buying group was seen during that period.

### Lumber quality

Lumber quality was addressed several ways within the questionnaire, starting with two open-ended questions. The first was “What attributes or characteristics should lumber possess for you to sell more of it?” Every comment from each respondent was also recoded for statistical treatment. For instance, if a respondent indicated less wane, straightness, and better grading rules, all three attributes were given a frequency of one; there was no ranking of attributes. By far, less wane and straightness were the most frequently cited attributes that could help foster sales. Respondents were also asked “Which suppliers’ attributes or characteristics generally motivate your decision to change suppliers?” Again, open-ended answers were recoded to make some sense of the data set. Product quality and service/responsiveness were the attributes cited most often.

Respondents were also asked to rate to what extent warp and twist, checks and splits, and wane were important issues in their operations during 2007. On a scale from 1 (not an issue) to 5 (an extremely important issue), wane (with a mean score of 3.2) as well as warp and twist (mean score of 2.9) were statistically anchored as important issues, while checks and splits were perceived as somewhat less important issues (mean score of 2.6).

Respondents were also asked if they had to return lumber to their suppliers because of quality reasons in 2007 or if they had asked to renegotiate the price of some lumber deals for the same purpose. While 72 percent returned lumber for quality matters, 48 percent asked to renegotiate the price of a lumber deal. The most commonly contested grade was No.

2 and Better, accounting for 54 percent of claims made by prodealers to lumber suppliers, followed by studs (15%), premium (11%), No. 1 southern yellow pine (8%), and other grades (12%). This is consistent with the larger proportion of No. 2 and Better within prodealers’ consumption.

It was challenging for respondents to retrieve the best data to characterize the lumber claims they contested in 2007. While most could specify the grade involved, data for volume or value were not always on record. Nineteen respondents were able to provide the information on the lumber volume, with an average of 67 thousand board feet per claim. In value, 16 respondents provided information that averaged \$52,400 per claim. The most commonly retrieved data were the percentage of sales represented by contested claims (27 respondents), averaging 1.47 percent. A maximum of 30 respondents provided attributes they used to justify claims to manufacturers on a scale that ranged from 1 (never) to 7 (always) Among these attributes (Fig. 5), wrong product received was ranked the highest (4.7), followed by mold (4.3), wane (3.7), warp and twist (3.5), and checks and splits (3.3). Statistically, only checks and splits proved to be significantly lower than 4, the midpoint of the scale.

Prodealers were further asked if their customers had asked to return lumber to them because of quality issues or if they had been asked by their customers to renegotiate the price of lumber deals. While 67 percent were asked for lumber to be returned because of quality matters, 43 percent were asked to renegotiate the price of a lumber deal as a result of quality concerns. In line with prodealers’ claims to manufacturers, the most commonly contested grade by customers to prodealers was No. 2 and Better, which was involved in nearly one-half of the claims. A maximum of 27

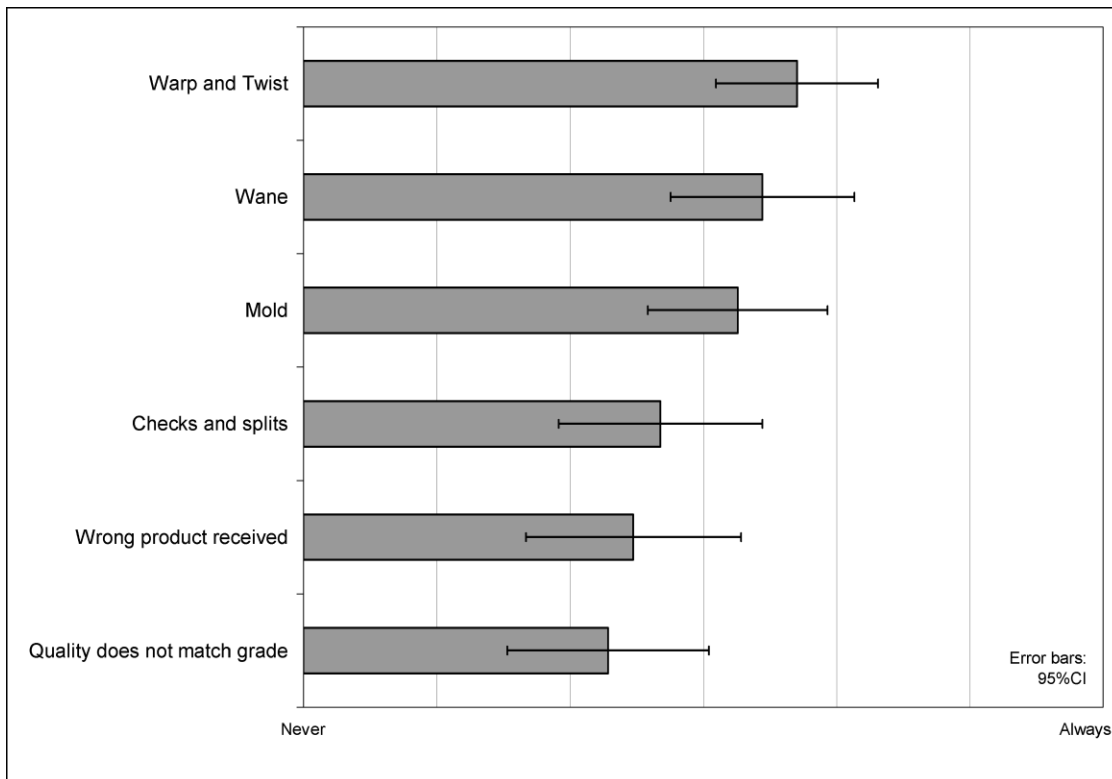


Figure 6.—Attributes used to justify claims to prodealers.

respondents provided attributes used by customers to justify claims to prodealers (Fig. 6). Among these attributes, warp and twist proved to be significantly different, and higher, from the midpoint of the scale, averaging 4.7 on the scale from 1 (never) to 7 (always). The mean response for the attribute wane was 4.4. Other attributes received mean scores that were somewhat lower; these attributes included mold (4.3), checks and splits (3.7), wrong product received (3.5), and quality does not match grade (3.3; Fig. 6). The average volume (14 respondents) was 44.5 thousand board feet per lumber claim. The average value (eight respondents) was estimated at \$18,630 per claim. The percentage of sales associated with these customer claims averaged 2.2 percent based on 20 respondents.

Because lumber quality can be an issue even when no claim is filed either by prodealers or by customers, prodealers were asked whether customers complained about the quality of lumber bought from them. Indeed, 78 percent of respondents heard complaints about lumber quality. The attributes justifying complaints by customers are shown at Figure 7. Wane, warp and twist, checks and splits, and mold were reported as having been the main sources of complaints from customers. Attributes such as quality does not match grade and wrong product received were not as important.

Respondents were also asked if they had faced any issues related to managing lumber turnaround (defined as the inventory management of lumber from reception to sale). Overall, 48 percent of respondents indicated they had faced turnaround issues. The market slowdown was the primary driver for turnaround challenges (cited by 55% of

respondents who had turnaround issues), followed by quality (30%) and delivery issues (15%).

Prodealers were also asked if they were left with poor quality when customers select their own lumber. Actually, 41 percent of respondents do not allow customers to select lumber. Two-thirds of the remaining respondents admitted to being left with lower quality. The proportion of sales affected by this problem was estimated at 4.93 percent. Lumber left on the shelf through customer selection was described to have either twist, wane, warp, or mold.

### Component manufacturing activities

Prodealers are likely to operate structural components facilities in addition to their building materials sales and distribution activities. Indeed, one-half of the survey respondents were involved in the manufacturing of roof trusses, and 46 percent manufactured floor trusses (Fig. 8). A smaller proportion (17%) produced wall panels. On average, lumber consumption in component plants was almost 8 MMBF, with a minimum of 500,000 board feet and a maximum of 26.5 MMBF. The survey also highlighted that some prodealers offer installation services for structural components while not being involved in the production of these components. In other words, these prodealers outsource the production of components while having their own installation crews. Figure 8 further shows that almost 20 percent of prodealers install either roof or floor trusses, while 17 percent install wall panels. For those respondents involved in structural components manufacturing, the sales are distributed between roof trusses (61%), floor trusses (28%), and wall panels (11%).

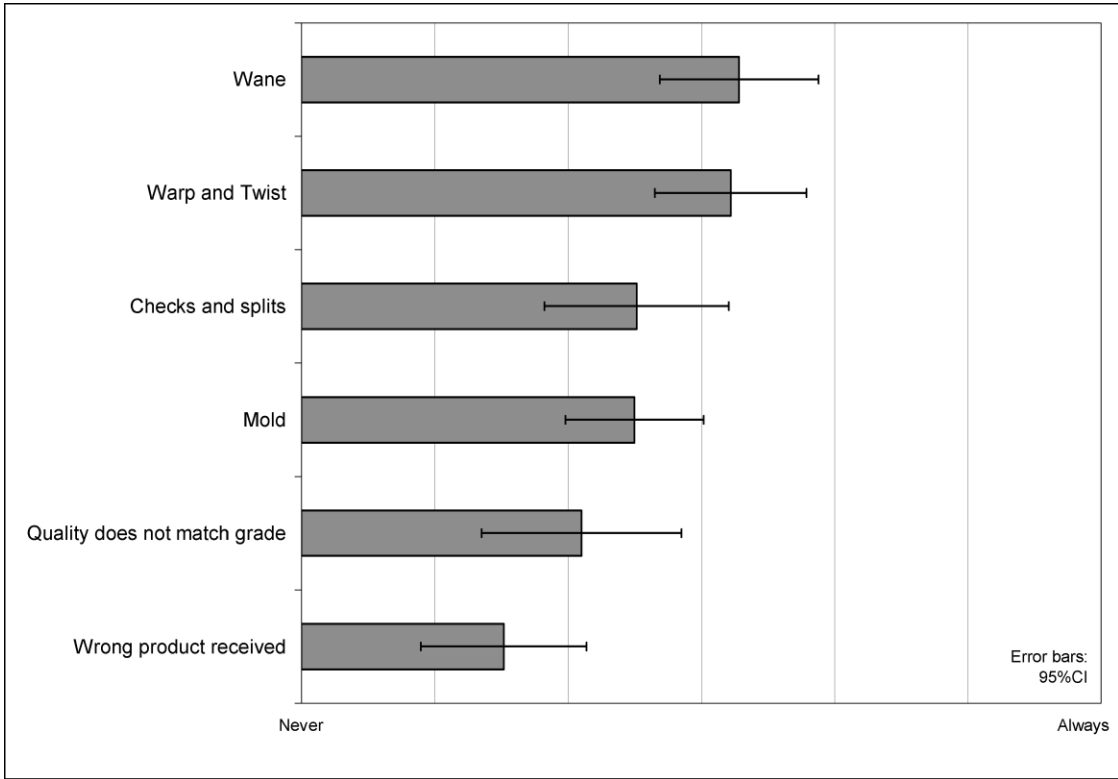


Figure 7.—Reasons for customers to complain about lumber quality to prodealers.

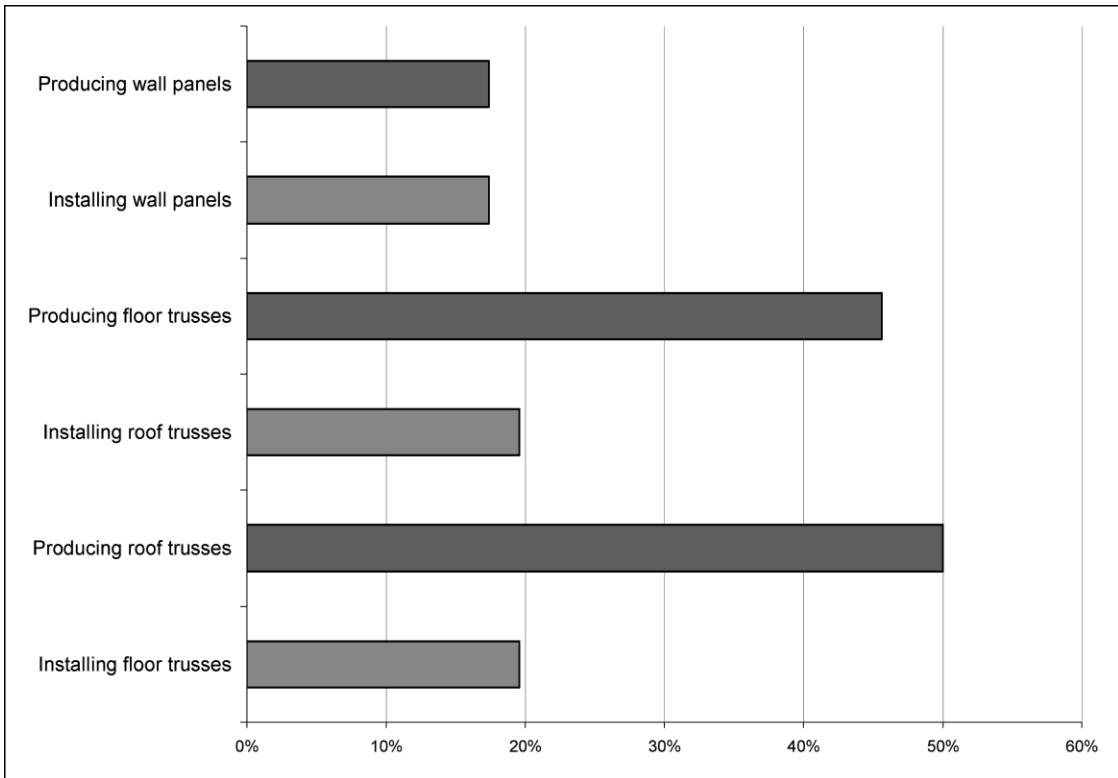


Figure 8.—Structural components manufacturing and installation by prodealers.



## Discussion

Much of this survey of prodealers dealt with quality issues. Wane as well as warp and twist were consistently identified as the most challenging lumber attributes for prodealers. Improving these attributes was seen by prodealers as a means to sell more lumber. Product quality was therefore the major rationale to justify a change in lumber suppliers. In characterizing the properties of the dimension lumber imported from Europe to the United States, it was found that European lumber stands out mostly for visual appearance and lesser amounts of wane. For customer support and timely deliveries, respondents tended to favor US suppliers over Canadian and European suppliers.

These results are in line with previous assessments of lumber quality. In past research, when buyers of softwood dimension lumber were asked to assess total product quality, the dimension representing physical product characteristics was rated as the most important (Hansen and Bush 1999). The most important aspect of quality has already been found to be lumber appearance, with the presence of wane being especially detrimental to the perception of quality (Hansen and Bush 1996). In 1999, Hansen and Bush suggested that, in the softwood lumber industry, customers perceived that the physical appearance of lumber had declined. Another survey of homebuilders also pointed out that the absence of splits, warp, and wane as well as dimensional stability were the most sought-after attributes for finger-jointed lumber (Robichaud 2003). In the structural components industry, appearance, straightness, and wane were also identified as being the least satisfactory lumber attributes (Robichaud and Fell 2002, Lavoie et al. 2008).

While the issue of wane can be related to grading rules, the issue of straightness can be related to lumber drying. Weinfurter and Hansen (1999) suggested that grading rules, originally installed to ensure a certain level of quality, might actually limit quality. While the quality and size of the timber supply can be an issue contributing to wane, the emergence of machine stress rated and premium grades that are sorted out from dimension lumber can also result in increasing wane in the remaining No. 2 and Better. The present study allows the hypothesis that customers are not fully satisfied with current grading rules. This could be investigated further to develop previous findings about satisfaction with the overall grading system and its impact on product quality (Weinfurter and Hansen 1999).

The present study also quantified quality concerns related to straightness, including bow, twist, and warp. The measured volumes of claims—either by prodealers or by customers—were based on small numbers of respondents. However, it is possible to hypothesize that between 1 percent and 5 percent of lumber in prodealer yards is affected by quality problems important enough to justify a decreased value, by lumber turnaround challenges, or by customer complaints. Indeed, more than three-quarters of respondents received complaints from their customers about quality in 2007. These findings raise the question of whether the gain in yield from including wane in dimension lumber is being negated by claims. In future research, it would be beneficial to quantify this trade-off.

As far as sourcing goes, a trend toward buying from a co-op or a buying group was identified. However, survey results do not allow specifying the rationale for such a trend. Lumber procurement direct from the mill remained steady

over the past 5 years. It is possible that the quality issues raised in the present study support a trend toward customers specifying the mill of origin for lumber.

It has long been held that the US homebuilding industry is undergoing a shift toward industrialization, as evidenced by a greater recourse to prefabricated systems (Schuler and Adair 2003). As such, manufacturing of structural components is thought to be more prevalent, especially in the prodealers segment. Within the sample, 20 percent of respondents were offering the installation of roof trusses. This is more than twice the proportion found by Abernathy et al. (2004) for the year 2002. Interestingly, the current sample did not show a strong increase in wall panel installation over 2002 when compared with the results from the Harvard study (Abernathy et al. 2004). While the proportion of prodealers installing wall panels is about the same in the two studies between 2002 and 2007, the present survey shows a smaller proportion of prodealers producing wall panels. That said, our results indicate that 100 percent wall panel fabricators provide wall installation services. These results suggest that further research on the activities of prodealers in the structural components business might shed better light on industrialization. With respect to quality, Robichaud and Fell (2002) suggested that the increasing automation in structural components plants should lead to more stringent quality requirements, because automated wall panel equipment is more sensitive to wane and dimensional stability.

Several limitations of the present study should be noted. The first relates to the sampling method, which was not random. While statistical inferences to the full population of prodealers thus cannot be made, it is thought that sound practical guidance can be found from these results. When computing the share of lumber that they sold to homebuilders, this respondent group is estimated to have supplied 11 percent of all lumber used in home building in the United States during 2007.

Another limitation comes from the fact that most respondents provided answers for multiple store locations. As such, some accuracy likely was lost when the data were collected in aggregate form. For instance, the data set does not allow segmenting the importance of quality issues by respondent's size. From the current data set, a working hypothesis that could be tested in the future is that European lumber may be more likely to be found in smaller yards. Having a limited number of respondents (46 in this case) tends to increase the confidence intervals on the measured statistics, which reduces the overall significance of observed results. As a result, statistics that were computed from subsamples, such as the proportion of lumber affected by claims, must be cautiously interpreted. Nevertheless, it is thought that these limitations do not hamper the relevance, both theoretically and managerially, of the present study for academics and forest products marketers alike.

## Conclusions

Results of the present survey related to lumber quality suggest that there remains room for supplier and product differentiation in the softwood lumber industry. They also suggest that quality issues appear to be more important today than in the past. In 2007, a total of 72 percent of respondents returned lumber to suppliers because of quality issues. As well, 67 percent of respondents were asked by their customers to accept returned lumber as a result of

quality concerns. More straightness and less wane were seen as attributes that would help foster sales. Indeed, product quality was identified as the major rationale to justify a change in lumber suppliers.

On the research side, further work could address the segmentation of prodealers by region, by size, and by preferred source of supply. This might lead to a better understanding of the impetus for product and supplier substitution. Quality requirements could also be investigated in a comparison of prodealers that are involved in components manufacturing with those who are not. Future research on the quality and lumber attributes demanded could be performed within the home centers segment as well.

On the managerial side, various strategies, such as branding or monitoring quality within the customer base, might be used to address the quality factor and create value in the prodealers segment. Proprietary grades based on appearance criteria, sometimes called premium or select structural, seem to be increasingly required by prodealers. This means that wood products suppliers have the opportunity to develop specific grades for specific clients. In this case, the question of willingness to pay for lumber quality will remain on top of the corporate/managerial and research agendas.

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