

Wood material use in the U.S. cabinet industry 1999 to 2001

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Abstract

Fax and mail questionnaires were used to estimate consumption of wood-based products by the U.S. cabinet industry and evaluate current management issues affecting the cabinet industry. Results indicated that the cabinet industry used an estimated 484 million board feet (MMBF) of hardwood lumber. Nearly 95 percent of the hardwood lumber purchases were grade No. 1 Common or Better. The most commonly used species were red oak (44%) and hard maple (24%). An estimated 58 MMBF of components and 68.3 million cabinet doors were also purchased by cabinet manufacturers in 1999. Softwood lumber use was estimated at 25 MMBF, consisting primarily of white (49%) and southern yellow (36%) pine. The most commonly used panel products were particleboard and hardwood plywood, at an estimated 1,044 million ft.² (1/2 in. basis) and 279 million ft.² (3/8 in. basis), respectively. Other panel products used by the industry were medium density fiberboard (MDF), hardboard, and softwood plywood. Approximately 156 million ft.² (any thickness) of veneer was used. Companies from both groups reported producing certified (green) products. The majority of companies purchased some parts from outside sources (outsourced). For companies that reported looking at the use of wood substitutes, strawboard, urban waste MDF, and plastic mouldings were most frequently mentioned. Concerns rated highest by cabinet companies were finding qualified employees, increasing raw material prices, keeping qualified employees, wood quality, and air quality regulations.

The U.S. secondary wood products industry is a major consumer of both solid and panel wood-based products. It was estimated in 1997 that the eight largest wood products markets consumed over 90 percent of hardwood lumber, i.e., more than 13 billion board feet (6). Firms involved in the production of wood kitchen and bath cabinets accounted for an estimated 1.2 billion board feet (9.2%) including the contribution of wood component parts that are consumed by the cabinet industry. In addition to hardwood lumber and components, the cabinet industry utilizes a number of other wood-based products. These include softwood lumber, both hardwood and softwood plywood, particleboard, medium density fiberboard (MDF), hardboard, and veneer.

In addition to using large quantities of wood-based raw materials, the cabinet industry is a major employer. Population estimates were extrapolated using The U.S. Department of Labor (17) stock cabinet industry employment that averaged 93,800 persons in 1999. Punches (15) found that stock cabinet firms accounted for approximately 75 percent of

total employment in the cabinet industry. Using these estimates, we estimated that the cabinet industry's employment is approximately 125,000 persons for 1999.

Over the past decade, the wood cabinet industry has flourished with the resurgence of the U.S. economy. Both the

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gross domestic product and total U.S. housing starts increased more than 50 percent from 1991 to 1999 (4). This economic prosperity helped fuel over a 70 percent increase in cabinet demand during the same period (9).

The last in-depth wood material utilization study for the cabinet industry was conducted in 1993 (7). Given the high degree of growth since 1993 and the absence of recent data estimating overall wood use, it is useful to update material utilization figures for the cabinet sector. Detailed information concerning wood consumption estimates is important. Not only will this information assist current manufacturers, but it will benefit manufacturers who supply the industry as well. Sawmills and other primary processors supplying the cabinet industry with raw materials need all available information concerning trends and changes in the use of those materials in order to adjust business strategy.

Research objectives

This study 1) estimated the total volumes of wood and wood based materials used by the U.S. cabinet industry by species, grade, type, and region of manufacture; and 2) evaluated perceptions of current management issues affecting the cabinet industry.

Methodology

Sample development

The population of interest in this study was stock and custom cabinet manufacturers (SIC 2434 and SIC 571202). Due to the large number of firms producing cabinets, over 12,000 (15), the population was stratified into two groups and sampled accordingly. The two grouping parameters were 1) manufacturers with sales dollars over \$20 million; and 2) all remaining cabinet producers with over 10 employees.

The population was selected and stratified because it is believed that these segments account for the majority of wood material use and exhibit similar production characteristics. The mailing/contact list was compiled from the Kitchen Cabinet Manufacturers Association membership list, a commercially available list of American businesses, and various industry publications (1,2,10,11).

Data collection

A questionnaire was developed based on the study objectives. It was pre-tested with companies from both Groups 1 and 2. The questionnaire was finalized based on respondent comments and designated questionnaire 1. A shorter, one page, questionnaire was excerpted from the original questionnaire for use with one-half of the Group 2 sample to help improve response rates. This was designated questionnaire 2.

Questionnaire 1 was faxed to all of Group 1 (55 companies) in an attempt to get a census. A random sample of 1,034 companies was selected from Group 2. Of the selected Group 2 firms, one-half were sent questionnaire 1 (three pages) and one-half were sent questionnaire 2 (one page).

Data analysis

Material use estimates. — Overall material consumption estimates were calculated based on material use per employee that was determined separately for both Group 1 and Group 2 respondents. These estimates were then extrapolated for each group based on their respective employment estimates. The estimates for wood use for both groups were then summed to arrive at an estimate for the industry. An example calculation is shown below:

- Total industry employment is estimated at 125,000 persons
- Group 1 employment is estimated at 43,000 persons
- Hardwood lumber per employee for Group 1 = 1,000 board feet
- Hardwood lumber per employee for Group 2 = 500 board feet

Group 1 total = $[(43,000) \times (1,000 \text{ board feet/employee})] = 43 \text{ million board feet (MMBF)}$

Group 2 total = $[(125,000 - 43,000) \times (500 \text{ board feet/employee})] = 41 \text{ MMBF}$

Overall industry total = $[(43 \text{ MMBF}) + (41 \text{ MMBF})] = 84 \text{ MMBF}$

Species use and lumber grade estimations. — Species use estimations were calculated by applying each responding firm's percent use to its total lumber use. The board footage for each specie was then totaled and divided by the total lumber consumed. Again this was done individually for each group and then summed to arrive at an industry total. A sample calculation is shown below:

- It is determined that Group 1 consumed 500 MMBF of hardwood lumber
- 250 MMBF of the hardwood lumber consumed by Group 1 is red oak
- It is determined that Group 2 consumed 400 MMBF of hardwood lumber
- 150 MMBF of the hardwood lumber consumed by Group 2 is red oak

Group 1 red oak % =

$$[(250 \text{ MMBF}) / (500 \text{ MMBF})] = 0.5 \text{ or } 50\%$$

Group 2 red oak % =

$$[(150 \text{ MMBF}) / (400 \text{ MMBF})] = 0.375 \text{ or } 37.5\%$$

Overall industry red oak % =

$$[(250 \text{ MMBF}) + (150 \text{ MMBF})] / [(500 \text{ MMBF}) + (400 \text{ MMBF})] = .444 \text{ or } 44.4\%$$

The same procedure was repeated to determine the grade breakdowns of hardwood lumber purchases.

Managerial issues. — Questions relating to management issues were analyzed using frequency tables. For the question that asks companies to rate their concern on different issues using a Likert-type scale, means were computed (5). Within-group differences were checked using analysis of variance (ANOVA). Between-group differences were analyzed using the Mann-Whitney rank sum test (8). The statistical software package SPSS (16) was used to analyze the data.

Non-response bias. — Non-response bias was checked by contacting firms that did not return the questionnaire. Thirty non-responding firms participated in follow-up calls and were questioned about hardwood lumber, particleboard, hardwood plywood, and employment. This allowed for an average material use per employee to be calculated for non-respondents. These estimates were compared to respondent data using the t-test of independent means to determine if there were any statistical differences between respondents and non-respondents (3,13).

The t-test showed that there was a statistical difference at the $\alpha = .05$ level between respondents and non-respondents for hardwood plywood per employee. Respondents reported less consumption of hardwood plywood than did non-respondents. The possibility exists that this consumption was underestimated. It also is possible that due to the

large degree of variation in material use by cabinet producers, the small population of non-respondents may have used uncharacteristically high volumes of hardwood plywood. The high degree of variation is shown by the standard deviations, which in all cases were larger than the means.

Another way to test for non-response bias is to compare early respondents to late respondents (3). It is based on the premise that if non-response bias is present, it can be detected between these early and late respondents. Again a t-test of independent means was performed on hardwood lumber, particleboard, and hardwood plywood use per employee. This test was done on the first 30 and last 30 respondents for Group 2 as a whole, as well as the first 30 and last 30 respondents sent questionnaire 2. In both cases, no significant differences were detected between these respondents. The first 20 and last 20 questionnaire 1 respondents were also analyzed using a t-test of independent means. This test was done on three randomly selected rating issues taken from question 17, i.e., finding qualified employees, increasing raw material prices, and the economy. The only instance where a significant difference was detected was the issue of finding qualified employees. This difference may be attributed to the inherent high variability that accompanies these types of rating questions. Based on the results of the non-response tests, non-response bias was not viewed to be an issue in this study.

Results

Respondent profile

A total of 17 companies from Group 1 responded to the fax questionnaire. Two additional respondents from the Group 2 mailing reported over \$20 million in sales and were subsequently placed into Group 1. Among these 19 companies there were 6 stock, 6 custom, and 7 semi-custom cabinet manufacturers. Regionally, five companies were located in the West, five in the Midwest, three in the South, three in the Northeast, two in multiple regions, and one company failed to indicate its geographic location.

The average employment of Group 1 companies was 1,108. Total employment for Group 1 respondents was 21,045. This represented nearly one-half of the estimated total employment for

companies meeting Group 1 criteria (over \$20 million in sales). This estimation was based on Furniture Design and Manufacture's Year 2000 Top 300 Companies (2). The average sales of Group 1 respondents were \$125.8 million. They accounted for more than \$2.1 billion in total sales (this figure is actually higher as some companies did not report sales dollars). It should be noted that some Group 1 companies had multiple facilities. The averages shown represent company-wide figures, not individual facility figures.

A total of 217 usable questionnaires were received from the Group 2 mailings, which equated to an adjusted response rate of 24 percent. As indicated, two of the respondent companies were placed into Group 1 based on annual sales of over \$20 million dollars. Of the remaining 215 companies, 6 were stock manufacturers, 185 were custom, 23 were semi-custom, and 1 was other. The respondents appear to be biased towards custom manufacturers. However, many of the respondents that replied as custom manufacturers were listed in the original database as being stock manufacturers. It is believed that these firms responded as such due to the increase in customization that is being offered by smaller manufacturers. Increased customization is the only way they can compete effectively and create a niche separate from the larger, more efficient stock manufacturers. This has led to small- and medium-size companies classifying themselves as custom manufacturers. Regionally, of the 215 companies, 25 percent were in the West, 25 percent in the Midwest, 15 percent in the Northeast, and 35 percent in the South.

The average employment for Group 2 respondents was 27, with total employment of 5,679. The average sales for Group 2 companies were \$2.3 million, with total sales of \$428 million.

Material use

Hardwood lumber. — This study estimated total hardwood lumber consumption for the cabinet industry to be approximately 484 MMBF in 1999. Group 1 and Group 2 companies contributed equally to this total, 49.8 and 51.2 percent, respectively. Overall, hardwood lumber use was predicted to increase 16 percent to 562.7 MMBF by 2001. Respondents were also asked to estimate their predicted percentage material in-

crease for 2001. **Table 1** shows hardwood lumber use for 1999, predicted use for 2001, and the percent change from 1999 to 2001.

The South used the largest amount of hardwood lumber at approximately 185.2 MMBF followed by the Midwest (155.8), West (83.1), and the Northeast (61.4). The South and Midwest regions accounted for roughly 70 percent of hardwood lumber use. This would be expected since the majority of firms and employment are located in these regions.

Of the hardwood lumber purchased in 1999, 33 percent was FAS and Selects, 62 percent was No.1 Common, 5 percent was No. 2 Common, and less than 1 percent was below No. 2 Common. Differences in grade use by groups were clear. Group 1 companies used predominately No. 1 Common lumber (76.5%). Group 2 companies used slightly more FAS and Selects (51.9%) than No. 1 Common (47.4%). The difference in grade use between groups is most likely due to differences in production characteristics. Small- to medium-size companies are typically more customized than larger manufacturers and require greater flexibility afforded by the higher-grade material.

Red oak was the most heavily used species, accounting for 44 percent of all hardwood lumber purchases. It was followed by hard maple, cherry, soft maple, ash, hickory, poplar, white oak, alder, birch, and other miscellaneous hardwood species. This breakdown is illustrated in **Figure 1**. Other than red and white oak, there were no major changes in hardwood species mix predicted for 2001. Most of the change would result from a dramatic shift in species use predicted by one large manufacturer.

Group 1 and Group 2 companies showed slightly different species mixes. Group 1 companies used predominately red oak and hard maple, accounting for over 80 percent of hardwood lumber purchases in that group. Wood use for Group 2 companies was more dispersed among other species, with red oak, hard maple, cherry, and ash accounting for around 77 percent of purchases in that group. This again would be expected as smaller manufacturers generally are more likely to offer customized products, and thus use a larger range of species.

Red oak was the most predominately used hardwood species in all regions

and hard maple was second. The South used the largest volumes of red oak, ash, cherry, and poplar. The only major species the South did not have the highest volume in was hard maple, in which case the Midwest used the most.

Parts and components. — In 1999, an estimated 68.3 million cabinet doors, 26.3 MMBF of edge-glued panels and cut-to-size blanks, and 31.8 MMBF of other cabinet parts were used by the wood cabinet industry. The use of these materials was predicted to increase 14, 13, and 12 percent, respectively in 2001. **Table 1** shows estimated use for 1999, predicted use by 2001, and a breakdown of use by group.

The majority of components purchased by manufacturers were hardwoods. By summing the board footage of these components with hardwood lumber use it is possible to arrive at an estimate of the total hardwood lumber equivalent accounted for by the wood cabinet industry (both directly through lumber, and indirectly through components). Since use of cabinet doors is measured in thousands of units, this number must be converted to board feet. Based on an average unit size of 33 to 36 inches (addressed later in results), it could be estimated that on average each door is approximately 16 inches wide (2 doors per unit). Assuming (conservatively) the average height of a door is 24 inches and made using 4/4 lumber, each door would contain approximately 2.7 board feet of lumber. A 1998 kitchen trends survey showed that 79 percent of doors were solid wood and 10 percent were a mix of painted MDF and solid wood substrates (14). Assuming that approximately 85 percent of doors purchased by firms were solid wood this would be equivalent to 156.8 MMBF of lumber consumed in cabinet door production. When this is summed with edge-glued-panels and cut-to-size blanks and other cabinet parts, the total comes to roughly 215 MMBF of component parts used by the cabinet industry in 1999. Assuming component manufacturers typically get about 60 percent yield (12) from rough lumber, this would mean that approximately 358 MMBF feet of hardwood lumber was used to produce the 215 MMBF of components used by the industry. When adding this number to the amount of hardwood lumber used it can be estimated

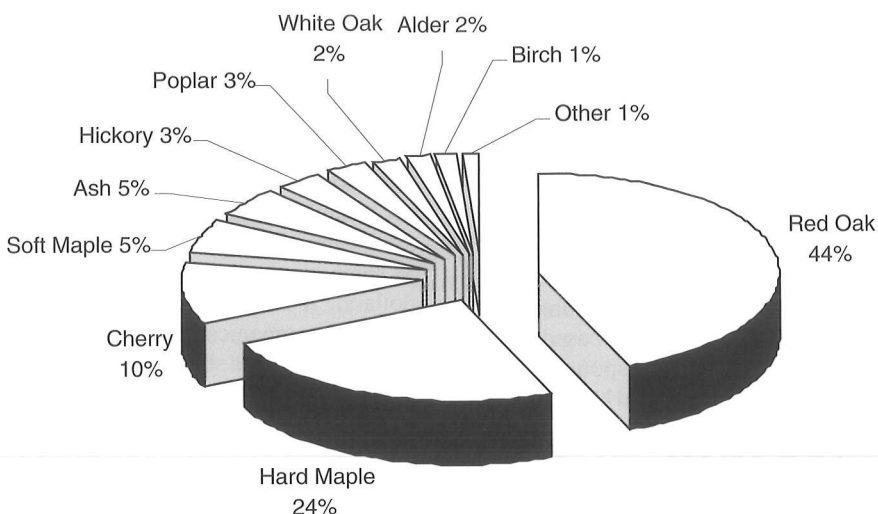


Figure 1. — Hardwood lumber species breakdown.

(under the preceding assumptions) that the cabinet industry used approximately 843 MMBF of hardwood lumber in 1999.

The South and West accounted for the majority of the component use, accounting for 70 percent of cabinet doors, 69 percent of edge-glued panels and cut-to-size blanks, and 89 percent of other cabinet parts.

Softwood lumber. — In 1999, the cabinet industry consumed an estimated 24.7 MMBF of softwood lumber. This is relatively small (5%) when compared to hardwood use, but still deserves consideration. An increase of 11 percent was predicted for 2001. Group 2 companies used the vast majority of this lumber, accounting for 97 percent. **Table 1** shows estimated softwood lumber use for 1999, predicted use for 2001, and a breakdown of this use by Groups 1 and 2 companies.

The South consumed the largest volume of softwood lumber at 28 percent. Overall, however, softwood lumber use was relatively evenly dispersed between regions. The South and the West showed the greatest predicted increases in softwood use at 13 and 11 percent, respectively.

White pine was the most commonly used species by cabinet producers, constituting 40 percent of use. Southern yellow pine was second at 36 percent. The remaining softwood lumber use consisted of a mix of spruce, fir, ponderosa pine, and imported softwoods. There was no significant change in species mix predicted for 2001.

Different species mixes were present between Groups 1 and 2. Group 1 used predominately white pine and some southern yellow pine. Group 2 companies used white and southern yellow pine in approximately equal volumes to make up over 75 percent of respective use. The remainder of use was split between the other softwood species previously mentioned.

Regionally, the West and Midwest used primarily white pine. The Northeast used predominately southern yellow pine, while the South was divided almost evenly between white pine and southern yellow pine. Other softwoods had relatively significant use in all regions except the Northeast. Imported softwoods use was minimal in all regions.

Panel products and veneer. — Cabinet producers used large volumes of panel products in 1999. Most commonly used was particleboard (1,044 million ft.², 1/2 in. basis). Other panel products used by the industry were hardwood plywood, MDF, hardboard, and softwood plywood. Very little oriented strandboard was purchased. Additionally, 156 million ft.² of veneer was used. Consumption was expected to increase for all materials except oriented strandboard in 2001. Estimated panel product and veneer use for 1999, predicted purchases for 2001, and breakdowns by group are shown in **Table 1**.

Regionally, the South used the largest volumes of all materials except veneer and oriented strandboard. The Midwest consumed the largest volume of veneer.

Table 1. — Estimated material use in 1999 and predicted use for 2001.

Material	Group	Estimated use in 1999	Predicted use in 2001	Percent change
				(%)
Hardwood lumber (MMBF)	1	241.1 (n = 18)	290.9 (n = 12)	+20.65
	2	243.2 (n = 180)	271.8 (n = 54)	+11.76
	Total	484.3	562.7	+16.18
Softwood lumber (MMBF)	1	.7 (n = 16)	.8 (n = 11)	+14.29
	2	24.0 (n = 179)	26.5 (n = 52)	+10.42
	Total	24.7	27.3	+10.53
Cabinet doors (thousands)	1	31,070 (n = 16)	37,719 (n = 11)	+21.40
	2	37,274 (n = 180)	40,077 (n = 53)	+7.52
	Total	68,344	77,791	+13.82
Edge-glued panels or cut-to-size blanks (MMBF)	1	7.0 (n = 16)	9.4 (n = 11)	+34.29
	2	19.3 (n = 180)	20.4 (n = 53)	+5.70
	Total	26.3	29.8	+13.31
Other cabinet parts (MMBF)	1	10.8 (n = 16)	13.1 (n = 11)	+21.30
	2	21.0 (n = 180)	22.5 (n = 53)	+7.14
	Total	31.8	35.6	+11.95
Particleboard (million ft. ² , 1/2 in.)	1	724.3 (n = 16)	833.4 (n = 11)	+15.06
	2	320.1 (n = 180)	351.6 (n = 53)	+9.84
	Total	1,044.4	1,185.0	+13.46
Medium density fiberboard (million ft. ² , 1/2 in.)	1	56.2 (n = 16)	64.2 (n = 11)	+14.23
	2	60.2 (n = 180)	60.6 (n = 53)	+0.66
	Total	116.4	124.8	+7.22
Hardboard (million ft. ² , 1/8 in.)	1	34.9 (n = 16)	42.9 (n = 11)	+22.92
	2	71.7 (n = 180)	93.7 (n = 53)	+30.68
	Total	106.6	136.6	+28.14
Oriented strandboard (million ft. ² , 1/2 in.)	1	.3 (n = 16)	.3 (n = 11)	+0.00
	2	1.0 (n = 180)	1.0 (n = 53)	+0.00
	Total	1.3	1.3	+0.00
Hardwood plywood (million ft. ² , 3/8 in.)	1	63.7 (n = 16)	74.9 (n = 11)	+17.58
	2	215.6 (n = 180)	240.1 (n = 53)	+11.36
	Total	279.3	315.0	+12.78
Softwood plywood (million ft. ² , 3/8 in.)	1	1.3 (n = 16)	1.4 (n = 11)	+7.69
	2	45.0 (n = 180)	48.3 (n = 53)	+7.33
	Total	46.3	49.7	+7.34
Veneer (million ft. ² , any thickness)	1	120.9 (n = 17)	145.2 (n = 11)	+20.10
	2	34.7 (n = 180)	38.9 (n = 53)	+12.10
	Total	155.6	184.1	+18.32

Strong growth was predicted for all materials except oriented strandboard in all regions, and MDF in the South only.

Material purchases. — Group 1 and 2 respondents showed different purchasing patterns for lumber. Group 1 companies purchased the majority of their material directly from the manufacturer. Group 2 companies purchased most of their lumber (53%) from wholesalers/distributors. Group 1 companies generally buy in larger quantities than

Group 2 companies, and in some cases, dry their own lumber as well.

Panel purchases followed a similar trend to lumber purchases. The largest percentage of Group 1 purchases were direct from manufacturers. The majority of Group 2 purchases were again from wholesalers/distributors.

Sales

Group 1 companies sold their product primarily through factory sales people and manufacturer representatives, who

accounted for 54 and 44 percent of sales, respectively. Group 2 companies used predominately factory sales people to move their product, representing 77 percent of sales. In many Group 2 companies, the factory sales person is the owner and/or manager.

Group 1 company sales were distributed through several major channels. Home improvement and building supply centers had the largest percentage. Dealers, independent distributors, and discount mass merchants followed in that order. Group 2 companies used a different sales channel mix compared to Group 1 companies: 62 percent of sales were to builders and remodelers, as compared to 9 percent for Group 1 companies. This is expected since Group 2 manufacturers are usually more custom oriented than Group 1. Other channels used by Group 2 companies were dealers and direct to homeowner sales.

The majority (74%) of Group 1 cabinet sales were face-frame. Bath cabinets were next, followed by frameless kitchen and other room cabinets. Group 2 company sales were not as skewed to face-frame kitchen cabinets, but they still represented the largest proportion at 38 percent. Frameless kitchen cabinets also held a sizable share (26%). Respondents that reported producing "other cabinets" were usually involved in commercial casework. Sales by cabinet type for 2001 was predicted to remain virtually the same.

Respondents were asked to give a breakdown of cabinet unit (individual boxes) widths produced by their company in 1999. Results showed that 29- to 39-inch-wide cabinets were the most commonly produced sizes for both groups. The distribution of other widths around this 29- to 39-inch category was fairly even and normal for both groups.

Management issues

Certified products. — Firms receiving questionnaire 1 were asked if they produced any certified cabinet products (e.g., products that are produced using wood materials that are certified as being grown and harvested in a sustainable and environmentally friendly manner). Of 13 Group 1 companies responding to this question, 4 (31%) said they did produce certified products. Two of the nine companies that indicated they didn't produce certified products said they an-

anticipated producing certified products in the future. Of the 69 Group 2 companies responding to this question, 7 (10%) said they produce certified products. Nine of the 62 companies that didn't produce certified products said they might do so.

For both groups, the relative percentage of companies producing certified products was higher than expected. The authors believe it is possible that some respondents did not read the question carefully and thought it dealt with product quality certification (i.e., Kitchen Cabinet Manufacturer Association certified products). It would be expected, however, that Group 1 companies would have a higher percentage of companies producing certified products, which was the case.

Distribution channels may have had some effect on certification as well. Group 1 companies distribute an estimated 37 percent of their products through home improvement and building centers. There is a push by some members of this channel, particularly The Home Depot and Lowes, to increase selection of certified wood products in all product categories. There has been a large increase in these types of stores in the past decade with the growth of the repair and remodeling market. Group 1 companies that begin positioning themselves now to meet the demand of these large building supply/home improvement chains may have an advantage in gaining more of their business in the future. There is much less motivation for Group 2 companies to produce certified products. Most of their sales (71%) are through builders and remodelers and direct to homeowners, where currently the willingness to pay for this type of product does not exist.

Wood substitutes. — Respondents were asked if they have looked at using alternative materials to substitute for wood. Of 13 Group 1 companies, 5 (39%) replied yes. Companies responding yes were asked to list possible substitutes. The list for these Group 1 companies included strawboard, urban waste MDF, plastic mouldings, and vinyl-wrapped mouldings. Of 71 responding Group 2 companies, 20 (28%) replied yes. Substitute products they listed included strawboard, foam rubber trim, and plastic mouldings. A number of Group 2 companies listed plywood,

particleboard, and MDF. This indicates that these companies consider these wood composites as solid wood substitutes.

It would be expected that a higher percentage of Group 1 companies have looked at wood substitutes. Their production characteristics and higher capital resources allow them to develop the use of new substitute products. Wood product substitution will continue to get attention as the price of traditional wood products increases. As markets become more price competitive, it becomes increasingly difficult for manufacturers to pass higher raw material prices on to the consumer.

Outsourcing. — Respondents were asked to indicate what percentage of parts they purchased from outside sources. Twelve of the Group 1 respondents said they purchased from outside sources. Two of these companies indicated they purchased 100 percent of their parts from outside sources and six said they would increase their purchases in the future. Of the 68 Group 2 respondents that provided answers, 48 (70%) said they purchase some percentage of parts from outside sources and 21 of these said they plan to increase purchases in the future.

Outsourcing is a trend that will continue in the cabinet industry. It facilitates greater production flexibility and allows for increased variety in product offerings without the cost of increased inventory and expensive capital investment for new machinery by large and small companies alike.

Issues facing the cabinet industry. — Respondents were asked to rate their concern from 1 to 7 (1 = not concerned, 4 = some concern, 7 = very concerned) on a number of management issues facing the cabinet industry, including air quality regulations, finding qualified employees, keeping qualified employees, employee benefits (workmen's compensation, health), price cutting by competitors, foreign competition, industry consolidation, wood supply, wood quality, increasing raw material prices, the economy, and the certified wood products movement. The mean rating on each issue from groups 1 and 2 is shown in **Figure 2**. Group 1 had at least some concern for all issues except price cutting by competitors, certified wood products movement, industry consolida-

tion, and foreign competition. Group 2 had at least some concern for all issues except certified wood products movement, industry consolidation, and foreign competition.

Because of the small sample size ($n = 14$) from Group 1, the non-parametric Mann-Whitney rank sum test was used to detect significant differences on mean rating of issues between groups. The only difference detected was for air quality regulations at $\alpha = 0.026$. Group 1 companies are notably more concerned with air quality regulations than Group 2 companies.

ANOVA was run on each group to test for differences within groups on mean ratings of issues. For both groups it showed there were differences present. Tukey's Honestly Significant Difference post hoc test (8) was run to differentiate between homogeneous subsets within each group. It showed the top concerns of Group 1 companies to be finding qualified employees, increasing raw material prices, air quality regulations, keeping qualified employees, wood quality, and wood supply. The top concerns of Group 2 companies were finding and keeping qualified employees, followed by increasing raw material prices, wood quality, employee benefits, and the economy.

Conclusions

Fueled by recent economic prosperity, cabinet production was nearly 80 million units in 1999. The materials purchased most often for the production of cabinets were hardwood lumber, particleboard, and hardwood plywood. Other materials used in large quantities by the industry were veneer, MDF, and hardboard. Additionally, large volumes of components (doors, edge-glue-panels, cut-to-size blanks, and other cabinet parts) were purchased in 1999. The majority of the hardwood lumber used was grade No. 1 Common or Better and the most common used species was red oak. Other species used in considerable quantities were hard maple and cherry. Most companies showed optimism towards the future. Purchases of all materials previously mentioned, except for MDF, were predicted to increase by at least 10 percent for 2001.

Groups 1 and 2 exhibited interesting, but not surprising, differences in the following areas: material use, material sources, sales channels, and cabinet production type.

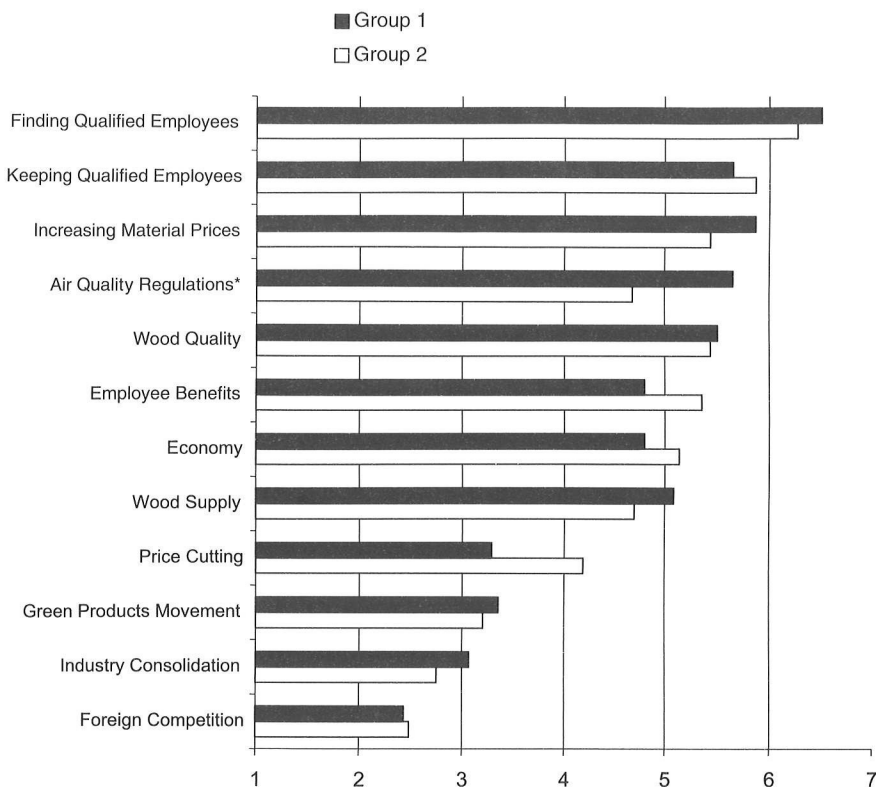


Figure 2. — Mean rating of concern on issues facing cabinet industry. An asterisk indicates there is a significant difference between groups.

Both groups used approximately the same volume of hardwood lumber, but not the same grades and species. Group 2 companies used primarily FAS and Selects; Group 1 companies used mostly No. 1 Common. Group 2 companies used a wider range of species than did Group 1. Much of this may be attributed to differing production characteristics. Group 2 companies in general offered a more customized product than Group 1 companies. A higher grade of lumber yields them more flexibility in meeting customized orders. The higher variation in species mix results from more varied consumer preferences when purchasing custom cabinets. Generally, when consumers want a highly customized set of kitchen cabinets, they tend to purchase from the small- and medium-size shops (Group 2 companies). With regard to other material use, Group 1 companies appeared to use larger volumes of particleboard and veneer. Group 2 companies appeared to use higher volumes of hardwood plywood, softwood plywood, MDF, hardboard, and components.

Major concerns of cabinet producers included finding and keeping qualified em-

ployees, increasing raw material prices, air quality regulations, wood quality and supply, employee benefits, and the economy. These are shared by both Group 1 and 2 companies. It appeared that Group 1 companies were more concerned with air quality regulations than Group 2 companies. This is probably because they are more abreast of the possibility of new and future regulations that could affect their company. Employment problems were rated high by both groups. This is attributable in part to the recent economic prosperity, which has increased wages and decreased unemployment, making it difficult to find labor. Also, as companies are incorporating more technology-driven equipment (i.e., programmable CNC routers), it is difficult to find employees who possess the necessary skill level to operate this machinery efficiently. Wood supply and quality are concerns shared by any manufacturer that works with higher grades of lumber, as is the case with the cabinet industry.

The cabinet industry remains a large user of hardwood lumber and other wood products. This research indicates that this use will likely remain in the near future. There

are a number of important management issues that are facing the industry that each firm will need to address to stay competitive in the marketplace. This research was conducted to provide information to help the owners and managers make those important decisions.

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