FNR-174-W

Forestry & Natural Resources

FURNITURE MANUFACTURING

Machine Usage in Manufacturing Value-Added Wood Products

By Rado Gazo and Richard P. Vlosky

Abstract

A study of equipment usage in the Louisiana secondary wood products industry was conducted in 1994. The objectives of this study were to determine types of machines used by the value-added industry sector and to identify commonalties of types of machines used between industry segments. For the purpose of this analysis, if a product was produced by more than 10 companies, it was considered a separate value-added wood industry. Five separate value-added industries were identified using this scheme: kitchen cabinets, millwork, household furniture, bathroom cabinets, and pallets. Differences between types of equipment used in companies of different sizes and between industry sectors were statistically analyzed. There are two main implications from identifying the most frequently used types of machines in and between industry segments. The first is in the area of developing secondary industry training and development programs. Specific machine center training can be aligned to targeted markets and products. Second, companies considering horizontal diversification can determine the degree of machine center commonalty between industry and product segments.

Introduction

The secondary, or value-added, woodworking industry produces a variety of products. These products can be grouped based on their function, types of materials and technologies used in their production. Examples of product groups are furniture, casework, and millwork. There are a number of studies that analyze these wood product groups based on material usage found (2, 5, 7, 8 - see page 3), but very little information is available that examines differences between these groups based on types of machines and equipment used in their manufacture.

The motive behind characterizing these groups based on types of machines and equipment used in their production is twofold. First, identification of specific machine centers can aid in developing secondary wood products industry training programs, and second, this information can provide a guide to the equipment necessary for companies that wish to diversify beyond existing product lines. Adding new machines can help diversify company operations horizontally, or just enable them to grow in size.

There are many examples in the trade literature of companies that managed to survive through difficult economic times or became successful through product diversification (see References on page 3). For example, a small custom commercial casework shop gained the edge over its competitors by diversifying into specialty millwork and became a popular choice among local contractors (6). In this case simply adding a new moulder allowed the shop to produce millwork. In another example, a successful furniture manufacturer identified an opportunity in the case goods market and expanded its operations by purchasing new moulders and double end tennoners (3). This move also resulted in fuller utilization of existing machinery and raw materials inventory. Two final examples include a furniture turnings manufacturer and a kitchen cabinet manufacturer. The turnings manufacturer diversified into making stair parts by adding a CNC router, an automatic lathe and a high-frequency glue dryer (1 - see page 3). The high-end custom kitchen cabinet manufacturer could not cost-effectively produce small batches of quality solid wood doors. To remedy this situation, he purchased a moulder and now manufactures doors not only for himself, but also for others, including his competitors (4).

Objectives

This study has two objectives. The first is to determine the types of machines used by the value-added industry sector. The second is to identify commonalties of types of machines used between industry segments and sales groups.

Methodology

The data came from a comprehensive study of the Louisiana secondary wood products industry conducted by the Louisiana Cooperative Extension Service and the Louisiana Forest Products Laboratory (8 - see page 3). Mail questionnaires were sent to 713 companies, the resulting response rate was 26 percent (187 companies).

The secondary woodworking industry sector was first grouped into individual industry segments. Then, the differences in types of machines and equipment used between different segments were analyzed. Because types of machines and equipment used can vary not only between different industry segments, but also within a segment between companies of different sizes, the companies were ranked based on their sales volume and divided into four sales groups based on these volume rankings. Differences between these groups within each industry segment were also analyzed.

For the purpose of this analysis, if a product was produced by more than 10 companies, it was considered a separate value-added wood industry segment. Companies in each industry segment were grouped into four groups based on their 1994 annual sales volume: over $5 million; $1 to $5 million; $150 thousand to $1 million and; under $150 thousand.

Next, for each industry segment and for each sales group within segments, the percentage of companies using a given type of machine was calculated. These usage percentages were averaged across all company sizes for given industry segment, ranked, and plotted in descending order by percentage. Analysis of machine type usage by various industry segments by company size was then conducted at the 0.05 significance level. Comparisons were made to discern differences in machine type usage between companies of different sizes for each industry segment. Comparisons of machine type usage for all company sizes across industry segments were also made.

Results

Respondent companies produced a total of 43 different products. Five separate value-added industry segments were identified (ranked by number of companies producing a given product as their primary or secondary product, namely, kitchen cabinets (61), millwork (30), household furniture (16), bathroom cabinets (12) and pallets (11). The next five highest-ranking industry segments not included in this analysis were replica furniture (7), signs (6), doors (6), custom furniture (5) and wood office furniture (4).

There were no significant differences in types of machines used for companies of different sizes

within industry segments kitchen cabinets (Figure 1), household furniture (Figure 3), and bath cabinets (Figure 4). In the millwork segment (Figure 2), large companies significantly differed from the three other company size categories in terms of types of machines used. The accompanying figure shows that the difference exists in specialized equipment that smaller companies typically cannot afford. There is no significant difference between the three smaller company size categories.

The pallet industry segment (Figure 5) did not have any companies in the largest company size category. A significant difference was found between the second and third largest company size categories.

Comparison of average percentage of machines used by type for all company size categories across all industry segments confirms previous results. The only significant difference in type of machines used is between the pallet and all other industry segments. Non-pallet industry segments are not significantly different in types of machines used.

A list of the top 30 most commonly used machines (Figure 6) was also compiled. This list ranks the machines by the total number of each machine used by survey respondents.

Implications

There are two main implications that can be derived from identifying the most frequently used types of machines in and between industry segments. The first is in the area of developing secondary industry training and development programs. Specific machine center training can be aligned to targeted markets and products. Second, companies considering horizontal diversification can determine the degree of machine center commonalty between industry and product segments.

References

1. Billions, D. 1995. High-end solution: Furniture parts manufacturer grows through diversification. Millwork Manufacturing. Feb. 1995, pp. 18-20.
2. Christoforo, J.C., Bush, R.J. and W.G. Luppold. 1994. A profile of the U.S. pallet and container industry. *Forest Prod. J.* 44(2):9-14.
3. Cohen, S. 1995. Flexibility works for Trendwood. *Furniture Design & Manufacturing*. July 1995, pp. 44-52.
4. Ehle, S. 1996. New niche nets new opportunities: Montana custom cabinet shop diversifies to reduce costs and enhance quality. *Wood Digest*. July 1996, pp. 30-33.
5. Forbes, L.C., Sinclair, S.A. and W.G. Luppold. 1993. Wood material use in the U.S. furniture industry: 1990 to 1992. *Forest Prod. J.* 43(7/8):59-65.
6. Hyland, J. 1995. Millwork completes the package. *Furniture Design & Manufacturing*. September 1995, pp. 42-50.
7. Vlosky, R.P. 1995. "The kitchen cabinet industry in the U.S. South." Working paper. Louisiana Forest Products Laboratory, Baton Rouge, LA, 18 p.
8. Vlosky, R.P., Chance, P.N. and Harding, O.V. 1994. "An overview of the Louisiana secondary wood products industry." Working paper. Louisiana Forest Products Laboratory, Baton Rouge, LA, 31 p.

Authors

Rado Gazo is an Assistant Professor, Department of Forestry and Natural Resources, Purdue University, West Lafayette, IN 47907-1200.

Richard P. Vlosky is an Associate Professor, Louisiana Forest Products Laboratory, Louisiana State University Agricultural Center, Room 227 Forestry, Wildlife and Fisheries Building, Baton Rouge, LA. 70803.

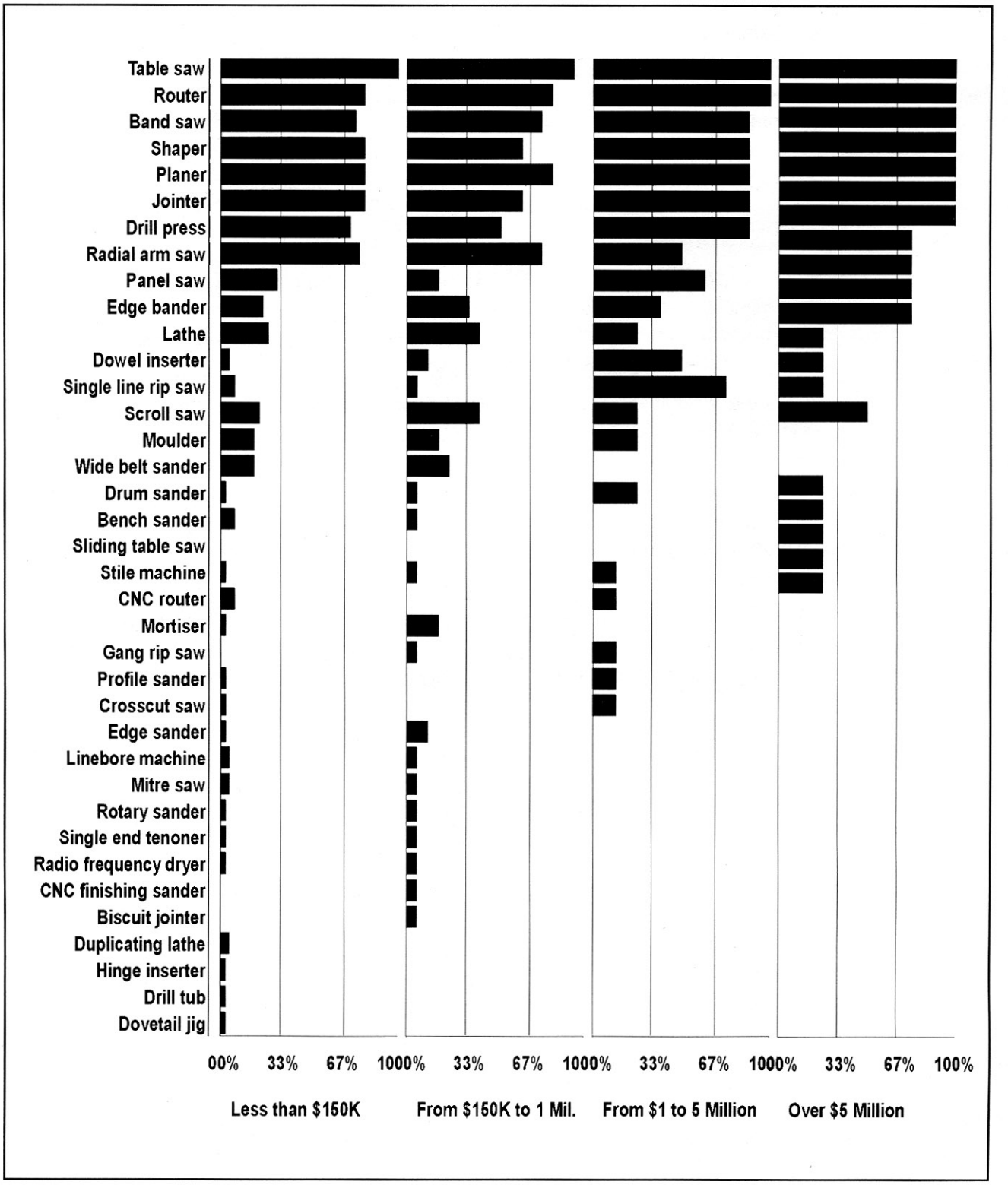

Figure 1. Average machine usage percentage in kitchen cabinet industry by machine type, by company size.

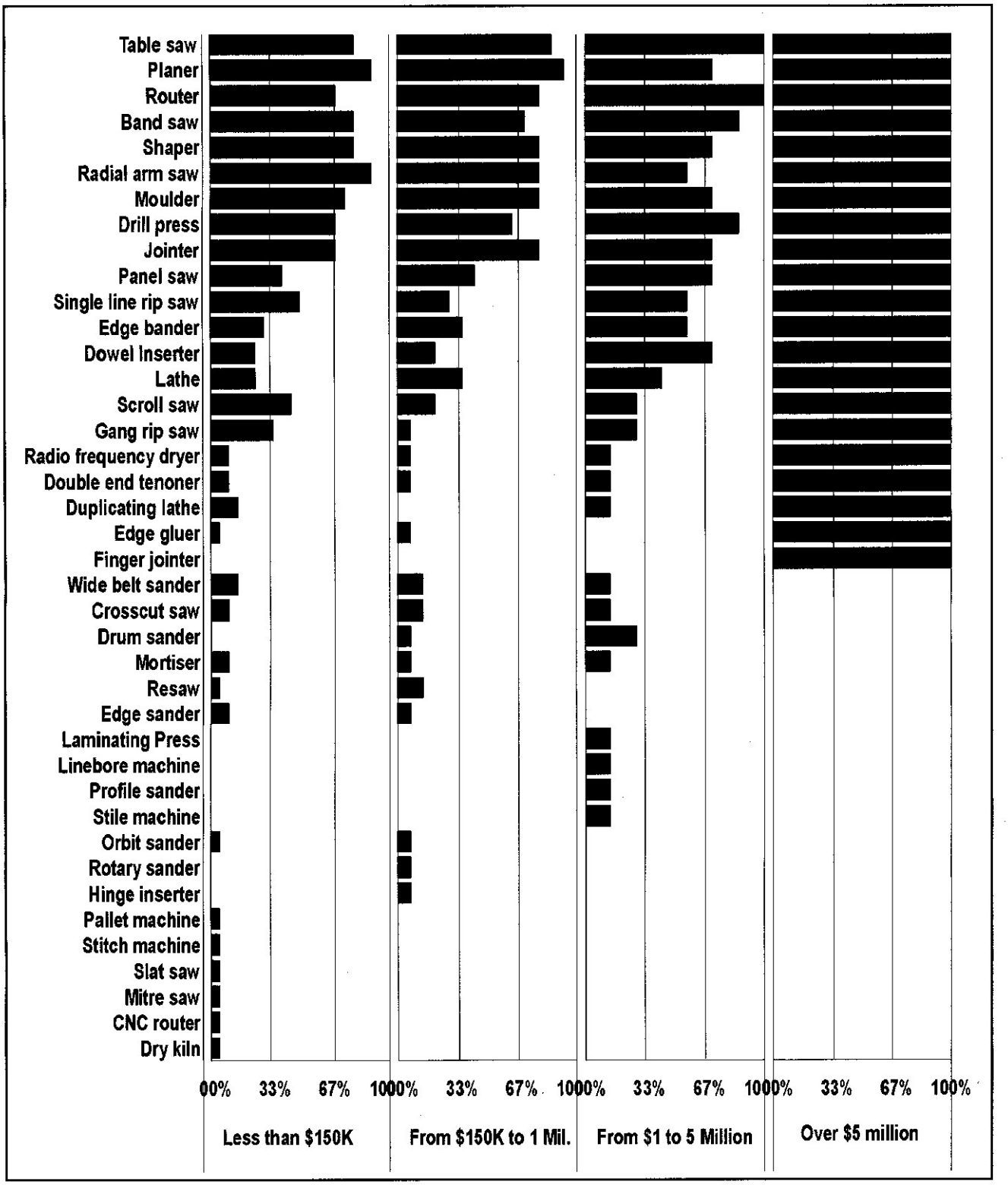

Figure 2. Average machine usage percentage in millwork industry by machine type, by company size.

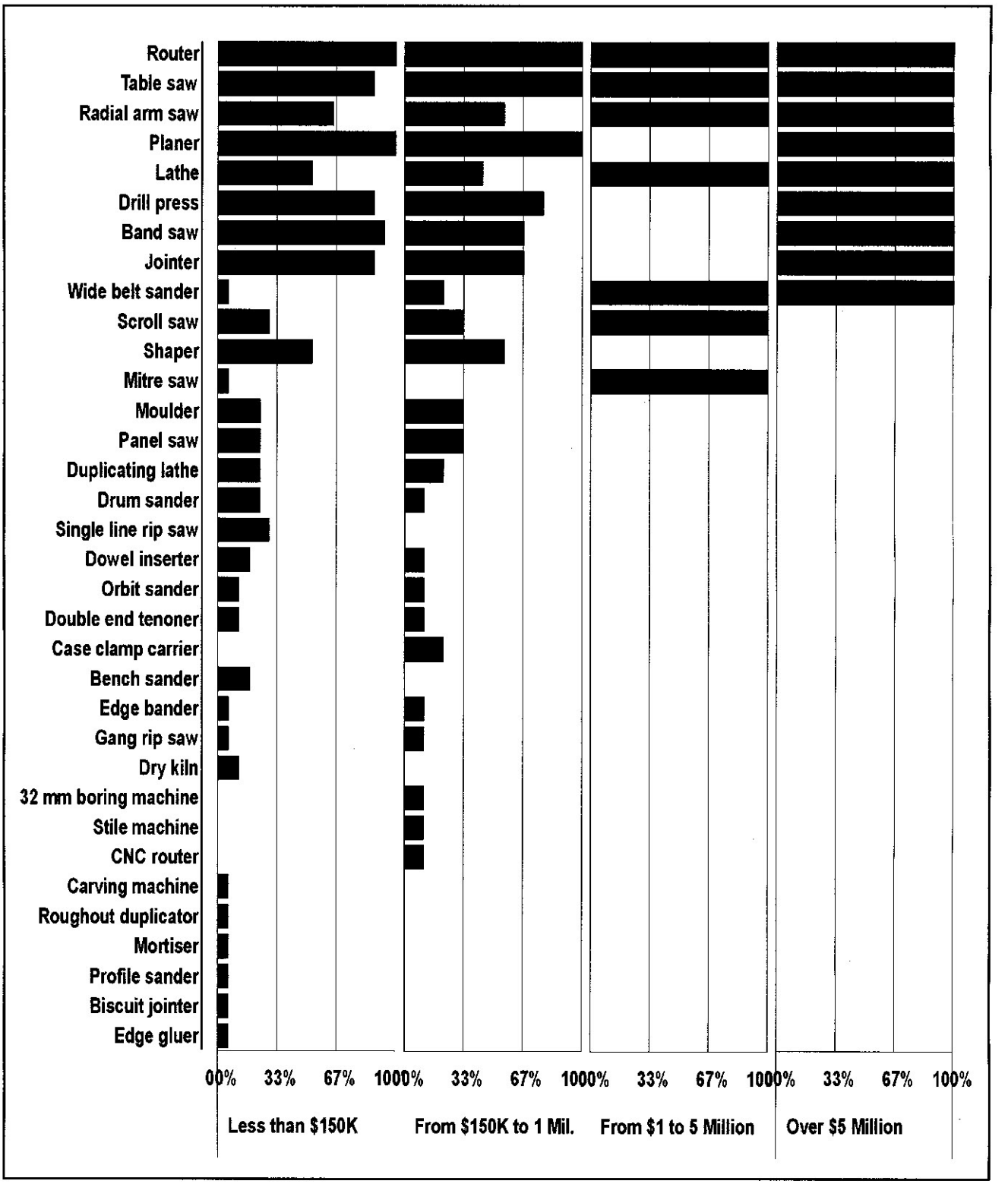

Figure 3. Average machine usage percentage in household furniture industry by machine type, by company size.

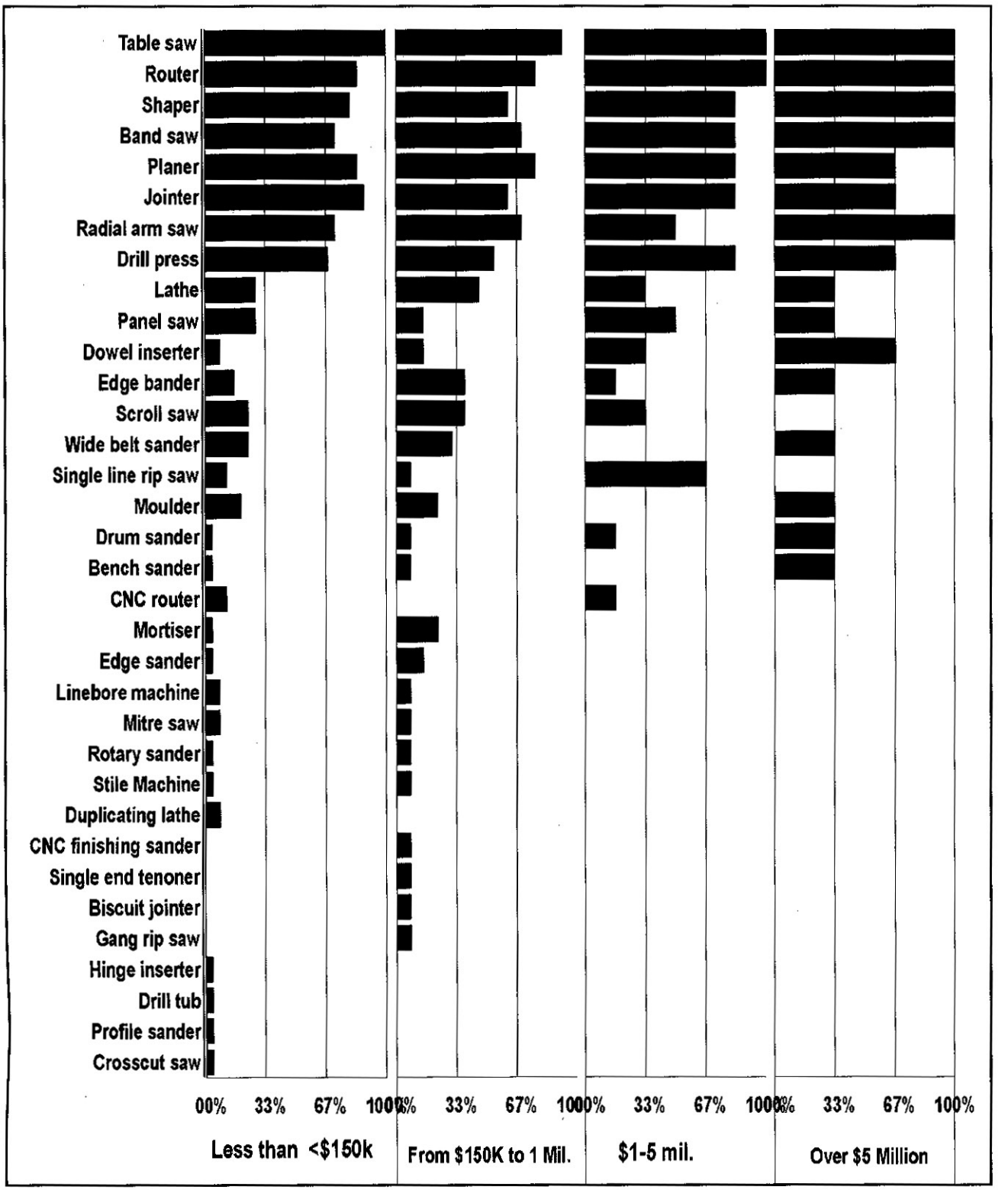

Figure 4. Average machine usage percentage in bathroom cabinet industry by machine type, by company size.

8/2000