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Economic Environment

Industrialization in Housing – Implications for Building Material Suppliers by Al Schuler

The housing industry is facing competitive pressures from many sources. Globalization, demographics and technology are forcing all industries, particularly the labor intensive ones, to embrace new business paradigms that are more consistent with 21st century threats and opportunities. Other important influences include more knowledgeable homeowners who increasingly demand better quality and more durable housing; the move toward worldwide adoption of performance-based building codes, which regulate the acceptance and uniform application of new product approvals; and new legislation in some countries which forces builders to provide more consistent, higher-quality construction. Each of these factors reinforces worldwide trends in residential construction toward the increased use of factory-manufactured components and systems to remain competitive and profitable. The purpose of this column is to assess these trends; describe where the industry may be in ten years; and draw some implications for building material suppliers.

Demographic studies predict labor shortages over the next decade, particularly in the 18 to 34 year old age group, the group with the most carpenters and framers. However, demographics are not the only cause of labor shortages. The decline in availability and quality of skilled carpenters is partly due to a lack of attractiveness as a profession to young people. The seasonality of the work and better paying jobs elsewhere are also contributing factors. Furthermore, historically, there is a direct correlation between a country's standard of living and its labor supply. The higher the standard of living, the higher the wage costs, including fringe benefits. In response to these circumstances and the need to increase productivity at the construction site, builders have been forced to use more factory-built components, and embrace labor-saving, engineered, factory-built housing technology such as panelized, modular and precut building systems.

INDUSTRIALIZATION

The North American housing industry is undergoing an industrialization process, not unlike many other industries in the manufacturing sector. Faced with increasing competitive pressures, including more demanding and knowledgeable customers, industries like automotive manufacturing, food processing and electronics have adopted various organizational strategies such as Just In Time (JIT) supply management, and design for manufacture and assembly to reduce costs while simultaneously improving productivity and quality.

These strategies, made economically feasible by developments in computer-based communications and information technology, are part of a larger trend called clustering or “centers of excellence.”¹

Most of the advances in the housing industry have not been in new home building methods, but in material substitution, such as factory-built components like roof and floor trusses, and more recently engineered lumber products, wall panels, steel studs and concrete wall systems. Home construction, however, has changed little in the past 150 years, with site-built/stick-building technology still representing about 78 percent of conventional starts (see Table 1). The major loser in material substitution has been conventional softwood lumber, and most analysts expect these losses to continue. Engineered wood I-Joists now hold 40 percent of the wood floor joist market, up from 20 percent in 1995. The dollar value of shipments of lumber components such as roof and open web floor trusses, wall panels and engineered floor systems has doubled in the past ten years as well ([WOODWORDS, August 2001](#)). Systems like autoclaved concrete walls and steel framing will continue to capture market share.

Wood-based systems face growing competition in the residential market. This is important because housing accounts for 70 percent of the structural panels and softwood lumber consumed in North America. The move to performance based building codes makes it easier for new engineered wood products to gain market share and removes barriers to nonwood systems in the tradition steeped residential construction industry. Russ Taylor (Wood Markets Monthly, August 2001), suggests that nonwood systems (steel, concrete and others) may reach a 15 percent share of this market within five years (see Figure 1).

What needs to be done to industrialize the residential construction jobsite? Here are some suggestions summarized from an article by Steve Weiss (Engineered Wood Journal, Fall 2000).

- Basic material suppliers (lumber, steel and concrete) must supply the highest quality products/systems. The commodity mentality that exists has to recognize the need by the housing industry to embrace new technology, automate and reduce waste at the jobsite.
- The clustering/centers of excellence trend, mentioned above, indicates that we need stronger partnerships between material suppliers, the components industry (e.g. WTCA), and the home building industry. However, building partnerships won't be easy due to the fragmentation that exists on both the builder and material supplier sides. For example, there are over 80,000 homebuilders in the U.S., and thousands of remodelers. Nobody knows how many sawmills exist, but there are thousands. Builders, component manufacturers and where possible basic

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U.S. Housing Starts by Building Method - 2000

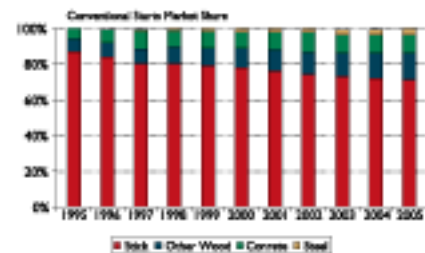
Source: APA

	Single Family	Multi-Family	Total	Share
Stick Built Wood ¹	994	205	1,249	78%
Concrete ²	134	45	169	11%
Panelized Wood ³	180	18	198	7%
Modular ⁴	28	2	30	1%
Steel frame ⁵	4	9	15	<1%
GF ⁶	11	1	12	<1%
Logs	5	-	5	<1%
Post & Beam	3	-	3	<1%
Other	1	-	1	<1%
Total U.S. Starts	1,364	330	1,594	100%

¹ stick built walls and floor with pre fab roof trusses, ² block or poured concrete walls, ³ panelized wood walls built in factory, ⁴ factory built modular (not HUD), ⁵ steel framing used for at least exterior walls, ⁶ structural insulated panels (floor core with structural panels)

TABLE 1: U.S. HOUSING STARTS BY BUILDING METHOD - 2000

Housing Starts by Building Method



Source: Russ Taylor's Wood Markets Monthly (1995), August 2001

FIGURE 1: HOUSINGS STARTS BY BUILDING METHOD

material suppliers must team up on performance issues due to the proliferation of problems that occur when innovative building products and advanced construction methods are introduced. In essence, "The time has come for the development and implementation of a coordinated, cooperative program between builders and component manufacturers, designed to minimize product and application performance complaints."

- Component manufacturers must work with their customers to define quality, and to effectively implement JIT manufacturing, supply chain management, material resource planning and design for assembly techniques. In other words, the same things accomplished by the automotive, electronics and food processing industries, to name a few.

IMPLICATIONS FOR BUILDING MATERIAL SUPPLIERS

The bottom line is that the housing industry will partner with those material suppliers that understand their need to automate, cut costs, reduce waste and shorten the cycle time at jobsites. Builders, and their associations like the NAHB, have indicated that engineered component systems will be a big part of the housing industry of the future. The winning system will be the one that makes the transition for the housing industry as painless as possible. That means, at the least, standardized products with uniform performance standards, prescriptive methods like relevant span tables, design/CAD software, cost estimating software, and the availability of efficient manufacturing equipment, processes, supply systems (cluster theme again) and the like.

Componentization in residential construction is also happening outside North America. Scandinavia adopted factory-built techniques long ago due to the high labor costs emanating from demographics and a high standard of living, which discouraged entry into the carpentry trades. Further, the incredibly short building season made site-built construction impractical. In the U.K., where timber frame construction represents about ten percent of the housing market, industrialization is well advanced (Robichaud, Forintek Canada Corporation study). Prefabricated components such as floors and roofs, and open or closed wall panels are the norm. Often, large builders get involved, operating their own prefabrication facilities. Japan, with a demographic profile resembling Florida, the retirement state, increasingly uses components in "2X4" housing, and more importantly, in traditional post and beam housing. They are substituting factory-built engineered components like LVL for traditional labor intensive parts because of a severe shortage of carpenters. They are in short supply, not just due to demographics, but, also Japan's high standard of living, which discourages young people from entering low paying professions when there is so much competition for people in higher paying and more prestigious jobs in the automotive and electronics industries. Furthermore, the Japanese government recently passed legislation called the Quality Assurance Act to ensure more consistent and higher quality construction, and increased accountability by the homebuilder through a mandatory ten-year warranty program.

THERE IS A LOT AT STAKE

- The housing industry has to change the way homes are built if they are to remain profitable while continuing to supply Americans with quality homes at attractive prices. This will be particularly challenging in the next decade when shelter requirements will reach record highs.
- Housing, including remodeling, represents more than 20 percent of the U.S. economy when

direct and indirect impacts are included.

- The housing industry needs the support and cooperation of a healthy, innovative and forward-looking basic building material and component manufacturing supplying industry, or industrialization won't happen.

¹M. Porter, On Competition; Jaakko Poyry, numerous studies. In a future installment of "Economic Environment," we will discuss the important role of the components industry in developing clusters/centers of excellence needed to support a globally competitive and profitable housing industry.

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