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STOPPING THE SLIDE—MARKET  
SHARE SHIFTS IN STRUCTURAL  
FLOORS  
**A TEACHING CASE STUDY**

by

Eric Hansen  
Robert Smith

COLLEGE  
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**CASE STUDY 3**



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### **The Authors**

Eric Hansen and Robert Smith are, respectively, Associate Professor–Extension Specialist in the Department of Forest Products, College of Forestry, Oregon State University, Corvallis, Oregon, and Associate Professor–Extension Specialist in the Department of Wood Science and Forest Products, College of Forestry, Virginia Tech, Blacksburg, Virginia.

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# STOPPING THE SLIDE—MARKET SHARE SHIFTS IN STRUCTURAL FLOORS A TEACHING CASE STUDY

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*In this case study, an Oregon softwood lumber company faces deteriorating market conditions and loss of market share for its 2 × 10 and 2 × 12 floor joists in the southern California market. The evolution of the marketplace and the growth in market share of wood I-joists are explained in the context of a consultant's report. Several factors are contributing to the company's loss of market share, including the superior performance of wood I-joists and problems with the quality of solid sawn lumber. Students are asked to develop a set of recommended actions for the case company.*

## INTRODUCTION

### BACKGROUND

The home construction market in southern California traditionally has used unseasoned (green) Douglas-fir for floor joists. During the boom in housing construction following World War II, the shortage of dry, seasoned lumber led to acceptance of unseasoned lumber to meet market demands. As green lumber dries, however, it can create several problems. For example, shrinkage of green floor joists as they dry in place frequently causes squeaky floors. Green lumber may also mold and discolor if not used soon after it is cut. This problem is mostly aesthetic, but the callbacks can be a nuisance to the contractor.

In recent years, the market share of wood I-joists has grown rapidly, primarily because of two factors: (1) inconsistent quality and performance of unseasoned Douglas-fir floor joists and (2) the lower installed cost of I-joists, with a perceived (or real) improved floor system.

A home contractor from Houston, Texas, stated, "Even when lumber prices are very low, as they have been in recent months, I can usually make the two floor systems pencil out about the same when I include my labor savings." He adds that, by working with

his design professional, he can also reduce costs by minimizing or eliminating bearing walls, joists, and columns. "I can easily convince a buyer to upgrade to wood I-joists when I explain the performance benefits of the engineered wood floor system" (Schumacher 1998).

## TRIED AND TRUE LUMBER, A PORTLAND COMPANY

Tried and True Lumber has operated in Portland, Oregon, for over 100 years. Alex Barnaby, sales manager for the company, saw the market for solid sawn floor joists shrinking in southern California. As a major producer of Douglas-fir 2 × 10s and 2 × 12s used in floor joists, he was concerned over the loss of market share and what it might mean for the future of his company.

Mr. Barnaby wondered if a new, improved solid wood joist would be more competitive in the marketplace. He envisioned a product manufactured to a standard readily accepted by the southern California building community. Deciding that he needed additional information directly from the marketplace, he hired S&H Forest Products Consulting to determine the potential for a new product and the best strategy for stopping the market share loss in southern California. The consultant's report follows.

## OVERVIEW OF THE WOOD I-JOIST SECTOR

### HISTORY OF I-JOIST USE

Wood I-joists (WIJs; Figure 1) were first introduced in the 1920s, but not fully developed until the 1940s. It wasn't until 1968 that Trus Joist Corporation [later Trus Joist International (TJI), then Trus Joist/

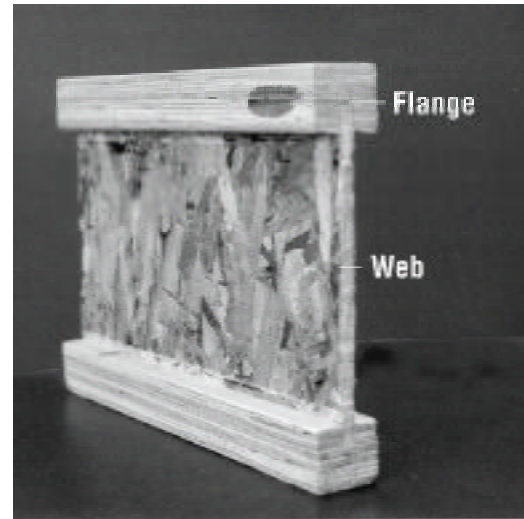


Figure 1. Wood I-joist section.

Macmillan (TJM), and most recently Trus Joist, A Weyerhaeuser Business] first produced WIJs commercially in Boise, Idaho (Nelson 1997). Many years passed before large forest products companies began to produce and market WIJs.

I-joists incorporating plywood webs have been used for over 30 years. However, oriented strand board (OSB) recently has replaced plywood in many web applications. The design of the wood I-joist allows positioning of materials so as to take advantage of their best properties. The combination of lumber or laminated veneer lumber (LVL) with plywood/OSB into an "I" formation provides high structural efficiency (Figure 1). The flanges are designed to provide all moment capacity where cross-sectional sizes are determined from simple bending theory. The webs are assumed to carry all shear forces. Most often, users of commercially produced I-joists refer to manufacturers' product catalogs to specify stock joists for their needs (Leichti et al. 1990).

Several large corporations are now producing WIJs, along with a suite of other engineered wood products. Today, Boise Cascade and Louisiana-Pacific each have

about 11% of the WIJ market. Trus Joist still dominates the market, however, with over 56% market share (Peter Drake & Associates 1998). With three corporations dominating over 78% of production, the market is extremely concentrated, although production capacity and the number of manufacturers both continue to grow. At present, Trus Joist, Boise Cascade, and Louisiana-Pacific have the largest production. Nascor, Trus Joist, and Louisiana-Pacific have the greatest number of plants. This growth is expected to continue (Table 1).

market boosted the growth rate. North American production of WIJs was approximately 397 million lineal feet in 1995, reached an estimated 760 million feet in 1998, and is predicted to be 1.3 billion lineal feet by 2002 (Figure 2) (Adair 1998).

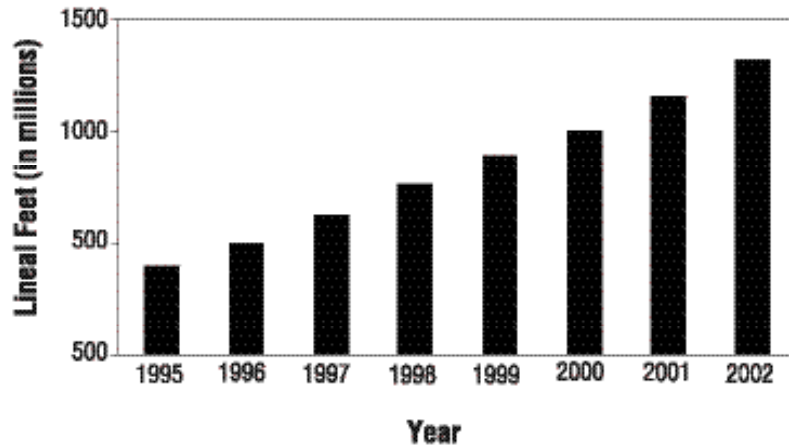


Figure 2. Historical and projected production of wood I-joists (Adair 1998).

Table 1. North American I-joist capacity by company in 1998.

Manufacturer	Maximum capacity		Number of plants	
	MM lin. ft	Percent	Number	Percent
TJM	623	56	6	17
Single Facilities	136	12	9	24
Boise Cascade	127	11	2	6
LP	124	11	4	11
Nascor	44	4	11	30
GP	34	3	2	6
Jager	30	3	2	6
Total	1,118	100	36	100

Source: Peter Drake and Associates (1998)

### PRODUCTION, MARKET SHARE DEVELOPMENT, AND EXPECTED TRENDS

Production of WIJs has grown considerably during the last decade. The entry of large forest product corporations into the

Several factors have contributed to the increased production of WIJs and other engineered wood products. Quality and price of softwood lumber have clearly had their impacts. The changing forest resource and the use of lower quality fiber have been significant factors. Construction of larger single-family homes in the United States has contributed, as has consumer preference for large, open spaces in the floor plan that require longer (open) spans. The average size of a single-family home grew from 1,645 square feet in 1975 to 2,095 in 1995 and 2,150 in 1997 (Mogelonsky 1997; Adair 1998).

The proportion of builders trying WIJs and other engineered wood products has increased. By 1998, nearly 90% of western builders had used WIJs (Fleishman et al. 1998). Nearly 87% of builders in the three Pacific Coast states used WIJs during 1997 (Fell 1998). Fell (1998) divided west coast builders into three categories, based on their level of innovativeness (tendency to try new

products), and found that early adopters first tried I-joists in mid-1987, whereas late adopters did not try the product until early 1994. A recent study sponsored by the Wood Products Promotion Council found that 1.9 billion board-feet of lumber was used in floor systems, with 2 × 10s making up nearly 70% of that volume. The quantity of WIJs in floor systems was estimated to be about 238 million lineal feet (NAHB 1996).

A recent development in the WIJ market has been the advent of local, small-scale production. Nascor, Inc., developed this system and supplies everything needed to produce and market the product. Some Nascor customers claim that they can produce I-joists for 30% less than buying from a traditional supplier. In total, Nascor has sold this concept to 20 wholesalers, sawmills, and roof truss manufacturers (TMM 1998). Continuation of this trend will provide further penetration into the marketplace for WIJs.

## **STRATEGIES OF THE ENGINEERED WOOD ASSOCIATION**

The 1996–2000 strategic marketing plan of the APA-The Engineered Wood Association originally included several initiatives to promote the use of I-joists. (This information was current as of 1996 and has probably changed, along with other recent changes at APA.) According to the APA's website (<http://www.apawood.org/>; see APA Services):

“The APA and APA EWS trademarks are the consumer's assurance that products which bear them have met specific manufacturing and product performance guidelines that are carefully delineated in specification guides available to architects, builders and engineers.”

One strategy involves building alliances with distributors and includes developing design software. Planning includes a variety of advertising and promotion activities, as well as a research project to compare installed

costs between I-joists and other products. Another major initiative was the development of a product standard for I-joists. APA recently created a performance-based standard for I-joists (PRI-400), which resulted in considerable controversy in the industry. The goals of APA were to make I-joists easier to buy, specify, and use. Opponents claimed that the standard would simply lower product quality and create marketplace confusion (TMM 1997).

As of April 1998, the standard had been accepted in some building codes, but was still under review in other jurisdictions. It is unclear exactly what impact this situation might have on the marketplace. APA expects that the standard will allow I-joists to maintain their current level of market penetration (Adair 1998). If widely accepted and used, the standard could move the production and marketing of I-joists further into the commodity realm, making them cheaper and more readily available.

## **PROMOTION STRATEGIES OF WIJ MANUFACTURERS**

Wood I-joist manufacturers have been quite sophisticated in their marketing. Several of the large WIJ manufacturers are also large manufacturers of softwood lumber, yet their promotional messages for WIJs have often been at the expense of solid wood products. For example, Willamette claims its WIJs require one-third less wood fiber than lumber; Boise Cascade stresses that WIJs eliminate twisting, shrinking, splitting, and checking; and Louisiana-Pacific states that WIJs are engineered to start straighter and stay straighter than solid sawn joists. As the major player and a producer of engineered wood products exclusively, Trus Joist focuses very specifically on this promotional strategy. The following comes from the Trus Joist website (<http://www.tjm.com/>):

“For anyone considering a new house, or planning a significant remodel of their existing home, Trus Joist’s Silent Floor® System is the answer to the question: what can I do about squeaky floors? TJI® joists are manufactured to resist swelling and shrinking, and feature an efficient shape that enables them to carry large loads over long spans without sagging or loosening their connection to the plywood and floor finish. The Silent Floor® System also uses considerably less wood—at least 50 percent less wood fiber than regular lumber.

“TJI® joists are a high-tech combination of Microllam® laminated veneer lumber (LVL) flanges made from Douglas fir or southern pine and a proprietary web material called Performance Plus®. TJI® joists were first invented in 1969 as a superior replacement for joists made from ordinary, solid-sawn lumber.”

Some of the attributes of WIJs that manufacturers stress in their promotional messages are:

- builder friendliness
- complete systems
- availability of trained technical support
- design software
- simplicity
- elimination of defects
- light weight
- labor reduction
- stiffness and strength
- fewer callbacks
- stable supply
- stable pricing
- guarantees/warranties

Trus Joist advertises its Silent Floor® Quality Guarantee as follows:

“We guarantee that the Trus Joist MacMillan products used in your home were manufactured to precise tolerances and are free from defects. In the unlikely event that your floor or roof system develops squeaks

or any other problem due to a defect in our products, we will promptly remedy that problem at no cost to you. In addition, if you call us with a problem that you believe may be caused by our products, our representative will contact you within one business day to evaluate the problem and help solve it. Guarantee. This guarantee is effective for the life of your home. 1-800-628-3997.”

All the manufacturers have attempted to give a brand name to their products, and Trus Joist has expended considerable resources targeting the final consumer with its “Silent Floor®” message. It is important to recognize the importance of these efforts in the recent success of engineered wood products.

## COMPARISONS OF SOFTWOOD LUMBER WITH ENGINEERED WOOD PRODUCTS

Lumber quality, especially the perception that it is declining, has been a problem for softwood lumber producers and has contributed to the substitution of engineered products in traditional lumber markets. The softwood lumber industry has tended to defend itself based on grading rules, their purpose, and the continued structural suitability of the product (Petow 1996). It is clear, however, that consumers often are not satisfied with lumber quality.

A 1993 study of lumber quality considered users in three market sectors: wood treaters, truss manufacturers, and home centers. Seven out of eight respondents providing feedback to open-ended questions mentioned the deterioration of lumber quality. Wane was an especially sensitive issue. Respondents felt that quality within grades had fallen over time and that mills typically were attempting to provide the absolute minimum qual-

ity product to meet grading requirements. One theme in the responses was the need for consistency. One respondent put it succinctly, “Consistency, good or bad, would be nice.” There was a feeling that quality changes on the basis of demand and price; when demand and price escalate, quality tends to fall. On a more positive note, respondents appeared to be much more satisfied with the services they were receiving from suppliers (Hansen 1994).

A study of builders of single-family homes concluded that they perceived solid sawn joists to be of lower quality than all categories of engineered wood products, including LVL, WIJs, parallel strand lumber (PSL), laminated strand lumber (LSL), and glue-laminated (glulam) products. Purchase cost of solid sawn joists was rated more positively than the cost of LVL and WIJs; however, installed cost ratings were exactly opposite, with LVL and WIJs rated more positively. Solid sawn joists were also rated significantly lower in product reliability than the engineered products. When asked if they had received adequate training and technical support for installing WIJs, 65% of 191 respondents responded affirmatively. When asked about their level of satisfaction with engi-

neered wood products, respondents were generally positive with respect to performance, but some were clearly concerned about the cost of the products (Hansen and Adair 1996).

Eastin et al. (1996), reporting on their 1995 study of softwood substitution in the residential construction industry, found that residential contractors expressed low satisfaction with various aspects of softwood lumber. Contractors were most satisfied with strength and availability and least satisfied with price stability, price, and lumber quality (Figure 3). Respondents indicated that WIJs had a lesser impact on the environment than did softwood lumber. Contractors considered strength characteristics, straightness, and available lengths as the most influential attributes in their decision to use substitutes for softwood lumber, and energy efficiency, familiarity of use, and consumer interest as least influential. Straightness was the most important attribute influencing the actual purchase decision, followed by strength, price, availability, lack of defects, and price stability (Figure 4). The study concluded that:

“...the softwood lumber industry is at a crossroads where changing end-user perceptions, aggressive marketing strategies by the producers of substitute materials, and adverse public policy decisions and economic trends have contributed to a rapidly changing competitive environment. . . . residential contractors perceive that softwood lumber quality is declining, softwood lumber prices are increasing and becoming unstable . . . (Eastin et al. 1996).”

Softwood lumber has developed a negative reputation within some market sectors that has contributed to market share loss. Counteracting this reputation will take a concerted, customer-focused effort.

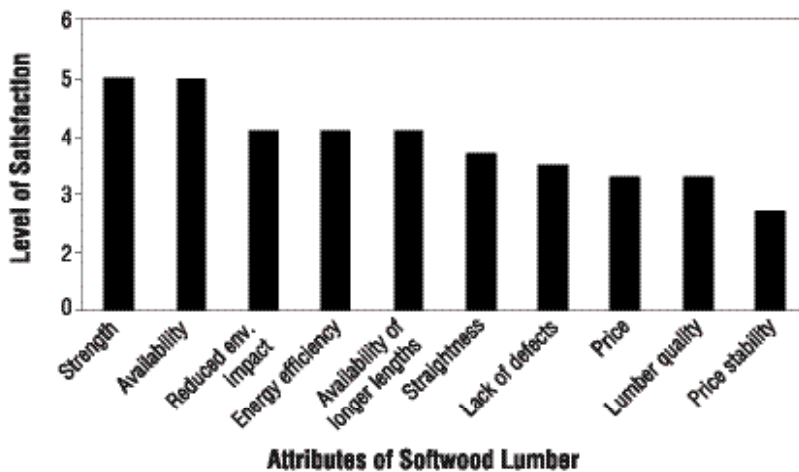


Figure 3. Mean satisfaction rating among contractors for softwood lumber attributes (1 = not satisfied; 7 = very satisfied; Eastin et al. 1996).

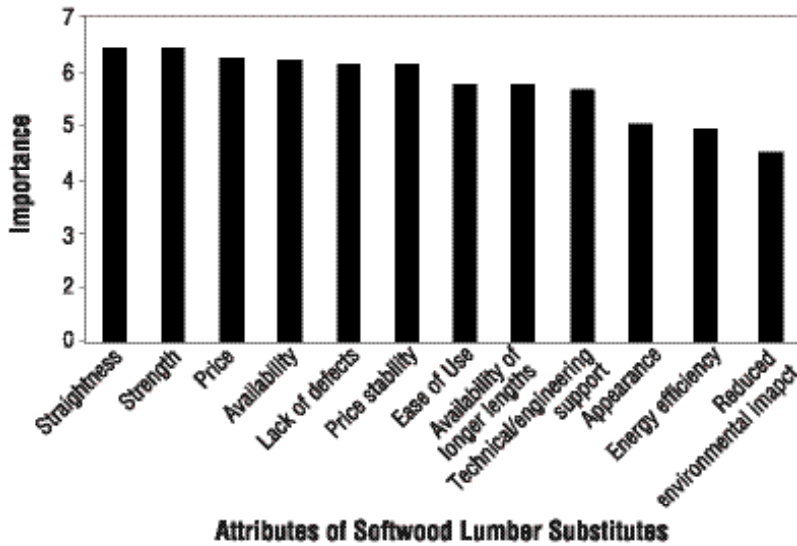


Figure 4. Attributes important in contractor decisions to purchase softwood lumber substitutes (1=not important; 7= very important; Eastin et al. 1996).

## CONSULTANT'S PRELIMINARY FINDINGS: CALIFORNIA PERSONAL INTERVIEWS

In March 1999, the consultant personally interviewed 10 professional engineers, 6 framers, and a manager from each of 4 contractor yards in the San Diego, California, region. The objective of the interviews was to learn more about why interviewees might choose to substitute WIJs for solid wood in joist applications.

Interview participants were told the purpose of the research and that the solid wood products industry was supporting it. All participants were asked if they were familiar with the changes occurring within the industry and if they were involved in either specification of or building with joist material. Every participant was aware of the changes and was involved in some fashion with joist use. Interviews ranged from 30 to 90 minutes.

## LOSS OF MARKET SHARE FOR SOLID WOOD

Interviewees initially were asked what they believed were the reasons for solid wood's

loss of market share in recent years. The most common response was the reduction in allowable stresses for lumber in the early 1990s: "If you give me solid wood that is twice as strong, I am a happy man and I might not use anything but [solid] wood ever again (engineer)."

Other common responses were:

- a decrease in the overall quality of solid wood: "Sawn wood has been falling in grade for some time—wood isn't what it used to be (engineer)." "We are now seeing old-growth product we haven't seen in years. If we knew we could get that quality, we would always buy it (lumber yard manager)."
- moisture-related problems resulting from the fact that southern California traditionally has been a green Douglas-fir market: "One reason we use WIJs is because of [a lack of] shrinkage (engineer)."
- shrinkage and the resulting floor squeaks and callbacks, mentioned by nearly everyone.

Other responses were that the floor system with WIJs is better and cost competitive, that the National Design Specification (NDS) for wood is complicated to use, and that the price of solid wood is not stable. Some participants said that the changes in house design toward more open spaces and the lack of longer lengths of solid wood that can carry equivalent loads have led to the use of more WIJs.

All the engineers who still specified solid wood expected their use of it to fall in the next 3 years in favor of WIJs. Framers and contractor yard managers were of a similar opinion. One engineer suggested, "It will be all WIJ products in 5 years." No interviewee strongly believed that solid wood joists could recapture a large portion of the market from

WIJs. Many stated that returning to solid wood would appear to be a step backward. Respondents believed that it has taken a lot of work and time for the market to accept WIJs and that a change back to solid wood will not occur unless it can offer a substantially better product at a competitive price.

### **PROMOTION BY THE WIJ INDUSTRY**

Interviewees clearly were aware of the aggressive and effective marketing programs of engineered wood manufacturers and had noted the lack of promotion on the part of the solid wood industry. As expected, Trus Joist's name came up consistently. One framer mentioned that a Trus Joist representative was in his office every week. Several respondents, however, referred to an increased presence by other WIJ manufacturers, especially a push by Boise Cascade. The increased efforts of other WIJ manufacturers have led Trus Joist to reduce prices to remain competitive. With the increase in production capacity for WIJs in North America, it is safe to expect increased price competition among WIJ manufacturers. One framer noted that Trus Joist currently was offering a \$200 rebate for floor systems to meet competitors' prices.

As one result of these marketing efforts, respondents generally perceived solid wood to have a greater environmental impact. In fact, some of the respondents' statements were almost quotes from the advertisements of Trus Joist and other WIJ manufacturers. Standard Structures, Inc., of Santa Rosa, California, recently announced that it would be offering third-party-certified (environmental or green certification) glulam, WIJs, and trusses (EBN 1999). This development could further enhance the environmental reputation of engineered wood products.

### **ATTRIBUTE RATINGS**

Participants were asked to rate the importance (on a scale of 1 to 5) of 25 product attributes in selecting a material for joist use. Table 2 summarizes these findings, based on two groups of respondents: engineers and framers/contractor yard managers. Engineers rated 'stable price' and 'overall quality' as the most important attributes, whereas framers/contractor yard managers rated 'straightness' as the single most important attribute, followed by 'uniformity' and 'strength'.

Table 2 also summarizes the direct comparison of satisfaction with solid wood and WIJs on these attributes (satisfaction with wood minus satisfaction with WIJs). Engineers perceived solid wood most negatively with respect to 'strength', 'available in long lengths', and 'low moisture content'. Framers and contractor yard managers rated things a bit differently, with solid wood being most negative in 'uniformity', 'low moisture content', and 'straightness'. Solid wood fared well only with respect to 'low price', 'familiarity with material', and 'fire code issues'. Solid wood is positive with respect to fire codes because it is currently the only economical option for multi-floor structures.

### **PRODUCT STANDARD ATTRIBUTE RATINGS**

Participants were asked to rate the importance of product attributes for a proposed technical standard for solid wood joists. These attributes for a new proposed standard were developed by interviews with solid wood joist manufacturers and reviewed by engineering faculty at major universities with wood engineering programs. Table 3 summarizes these findings. Engineers considered a 'maximum moisture content' to be the most important, followed by 'machine stress rated'.

Table 2. Importance and Satisfaction Difference for Product Attributes.

Attribute	Engineers		Framers/Contractor yards	
	Importance	Satisfaction <sup>1</sup>	Importance	Satisfaction <sup>1</sup>
Strength	4.5	-1.8	5.0	-1.4
Availability in long lengths	4.0	-1.5	4.5	-1.7
Lack of defects	4.3	-1.2	4.8	-3.0
Low moisture content	4.3	-1.2	3.9	-3.1
Straightness	3.8	-1.0	5.0	-3.0
Stiffness	4.1	-1.0	4.6	-1.4
Technical support	4.5	-0.8	4.8	-2.9
Overall quality	4.6	-0.8	4.5	-2.7
Custom orders	3.6	-0.8	2.9	-1.1
Stable price	4.6	-0.7	4.3	-1.3
Variety of lengths available	4.1	-0.7	4.6	-0.8
Span rating printed on joist	3.5	-0.7	2.8	-1.1
Software design support	3.8	-0.7	3.8	-2.9
Uniformity	4.2	-0.7	5.0	-3.6
Product guarantee	3.9	-0.7	4.8	-3.0
Supplier reputation	3.9	-0.5	4.8	-2.3
Low weight	3.6	-0.3	3.9	-2.7
Brand name	3.1	-0.3	3.1	-0.9
Low environmental impact	3.3	-0.2	3.5	-1.4
Easy to use	4.1	-0.1	4.6	-0.7
Species	2.8	-0.1	2.6	-0.3
Installed cost	4.5	-0.1	3.3	-1.7
Availability	4.2	0.0	4.6	-0.1
Appearance	2.3	0.0	3.3	-2.0
Fire code issues	3.3	0.2	4.1	1.7
Familiarity with material	4.3	0.5	4.3	0.6
Low price	3.8	0.7	4.9	0.7

<sup>1</sup>Difference in satisfaction between solid wood and WIJs (SW – WIJ); a negative number reflects a greater satisfaction with wood I-joists. Scale: 1–5

Table 3. Importance of Attributes for a Product Standard<sup>1</sup>.

	Engineers	Framers/ Contractor Yards
Maximum moisture content	4.6	4.2
Machine stress rated	4.4	3.8
Independent QC program	4.3	4.2
Product guarantee	4.3	3.9
Finger-jointed lumber allowed	4.1	3.2
Minimum depth tolerance	3.9	4.5
Certification of mills	3.8	3.8
Fire resistance rating	3.8	3.5
Long lengths	3.8	4.2
Minimum width tolerance	3.7	3.7
Limited skip	3.2	2.8
Specific length on joists	3.2	3.1
Maximum warp/twist allowed	2.6	4.7

<sup>1</sup>Scale: 1–5. 1 = not important; 5 = highly important.

Framers and contractor yard managers saw ‘maximum warp/twist allowed’ as most important and ‘minimum depth tolerance’ as second. In general, respondents indicated that a moisture content of 15% or lower and a minimum depth tolerance of  $\pm 1/8$  inch would be acceptable. Several respondents mentioned bad experiences related to the failure of joints in finger-jointed studs; respondents did not recognize the term ‘skip’; and many respondents questioned the real meaning of the attribute ‘product guarantee’.

When asked if they had concerns about the use of WIJs for structural use, 75% indicated they had no concerns. Those who did have concerns stated that diaphragm nailing is occasionally a problem and that they dislike working with a third party to get design calculations. One framer was concerned about the long-term performance of WIJs, especially when subjected to wet conditions. The same question was asked regarding the use of solid wood for joists. Over 70% indicated that they had concerns about

the use of solid wood. These concerns included grading, moisture content (shrinkage), possible decay, the impact on the environment, and the height-to-span ratios in the NDS.

## IMPACT OF A PRODUCT STANDARD

When asked what they would do if a product standard were developed that was cost competitive, over 70% of respondents said they would increase their use of solid wood for joists. “I don’t know if I would ever go back [to solid wood] . . . If I am saving \$500 per house [by using solid wood], then we are in business (contractor yard employee).”

However, many respondents found it hard to believe that the industry could deliver this type of material or if it would be price competitive. “I’m at a loss to try and imagine the solid wood manufacturers cooperating enough to promote a product; it would be remarkable (contractor yard manager).” Some were quite negative about solid wood and pointed out that a new solid wood product would have to be better (equal performance, lower price) than the engineered wood equivalent or it wouldn’t stand a chance. “In the end, it might not make a dent or a damn difference [referring to proposed product standard (engineer)].” “Equal would have worked earlier; now you have to be better. It has taken years to convince the builders [to use WIJs]; if we switched now we’d have egg on our face (framer).”

### PERCEPTIONS OF INSTALLED COSTS

Respondents were very consistent in their perceptions of installed costs. WIJ floors can be equal to solid wood floors in initial costs; typically, however, they are more expensive. “Price is the biggest thing solid wood has going for it. (framer).” There is the perception that the lack of callbacks for squeaky floors and other problems more than makes up for the higher initial cost of an engineered wood floor. Almost all the interviewees were convinced that engineered wood floors were cheaper in the long run. Most engineers said that when a home costs over a million dollars, a few more dollars for WIJs was no problem. Homebuilders are increasingly quality conscious and feel a WIJ floor is a better floor system.

### SUMMARY

The findings are less than encouraging for solid wood joists in the southern California

market. This market is clearly continuing to move away from the use of solid wood. Engineers, framers, and contractor yard managers all indicate that WIJs are a better material for a squeak-free floor. Some product changes for solid wood might slow the market decline. It is, however, unclear if a product standard, such as the one proposed, would improve the situation more than would simply producing and heavily marketing a high-quality, kiln dried, solid wood joist.

It appears that solid wood can retain market share in two areas. First, current fire code requirements for apartments and other multifloor projects make solid wood more economical than WIJs. One respondent said that if WIJs ever deal effectively with the fire code issue, he will switch to 100% WIJs. The second area comprises builders who are die-hard solid wood fans. One framer said, “We can make dimension lumber work if we go an extra mile.” Even with the difficulties he described to us in using solid wood, he was still willing to continue its use. Even though most people were concerned about moisture content, this same framer claimed that dried Douglas-fir splits too much and wasn’t enthusiastic about a kiln dried product.

Although respondents might use more solid wood if it were higher quality, it is also clear that they are unwilling to pay for that higher quality. Once the advantage of a low initial price is lost, most respondents select WIJs over solid wood.

### ASSIGNMENT

Given the information contained in the consultant’s report, what actions should Alex Barnaby undertake, if any, to maintain a viable market for the company’s wider dimensions of lumber?

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