Impact of Katrina on U.S. Housing Markets: Building Codes Change in Response to Catastrophic Risk

49th Annual Convention
Society of Wood Science and Technology

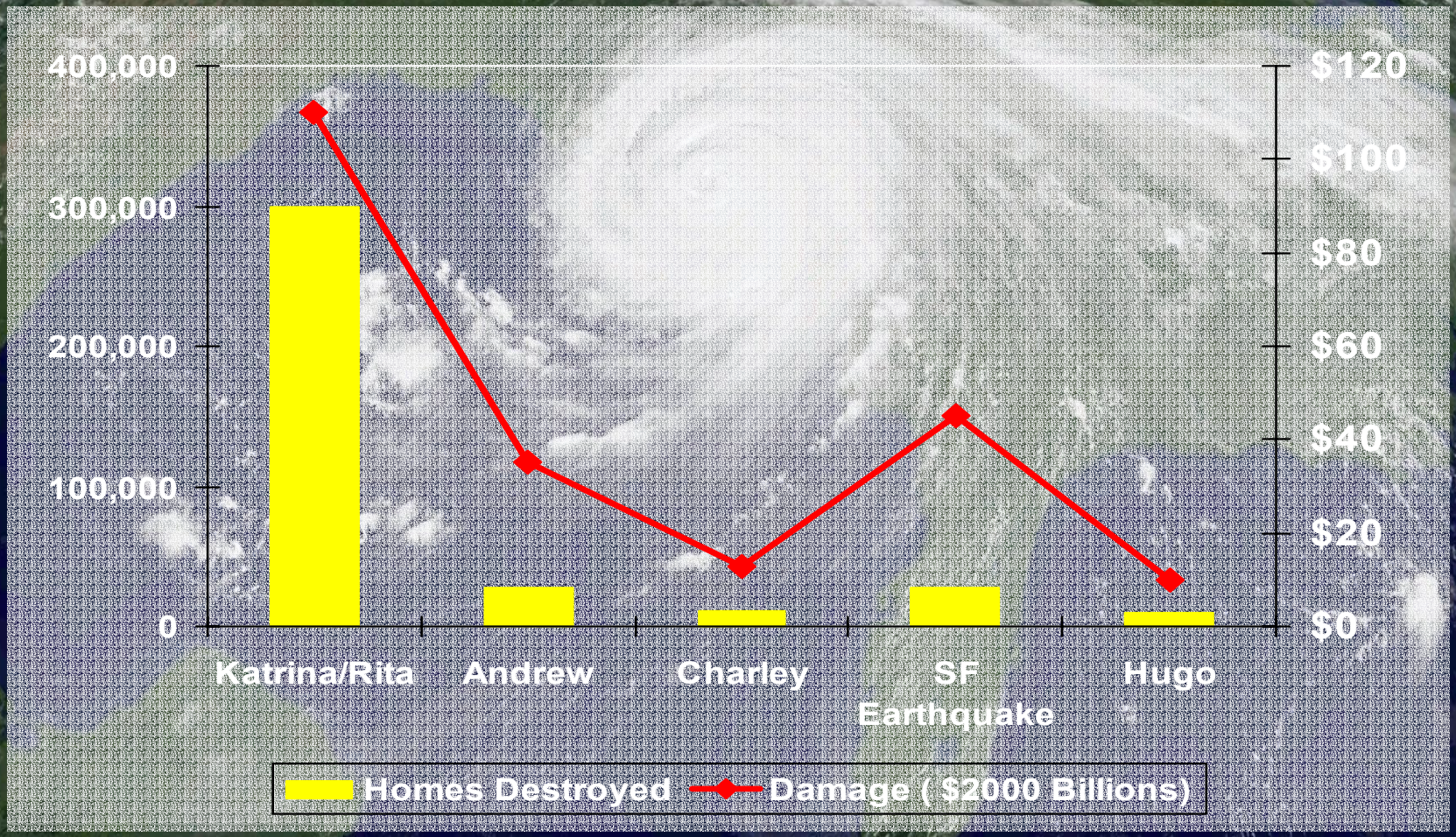
Delton Alderman
USDA Forest Service

Al Schuler
USDA Forest Service

Outline

- Building Code Changes: Opportunity for Wood?
- North America Statistics
- Offshore Observations
- Evolving Construction Techniques
- U.S. Home Construction Statistics
- Implications – Wood Products Industry
- Conclusion

Most Damaging Natural Disasters



Sources: APA, Red Cross, McGraw-Hill Construction

Building Codes

Code Background & Evolution:

Building codes & Federal law: States not required to follow "model" or "umbrella code"

Code employed – discrete state's prerogative & even counties within a state

Consequently, codes differ – confusing for builders & general public

Building Codes

Code Background & Evolution:

Changes have occurred: Why?

After "Andrew" (1992) Florida adopted & implemented tougher codes – S. FL

Hurricanes Katrina & Rita forced similar action by LA & Gulf Coast states

Building Codes

Codes consolidated in mid-1990's:

International Code Council formed: Combined BOCA, ICBO, & SBCCI into a model code with 2-parts:

IBC & International Residential Code

Simplified "code environment" – more effective for promoting better construction practices

→ can greatly reduce hurricane & earthquake damage

An opportunity for wood building materials?

Building Codes

Attention to code & code enforcement increased throughout U.S.

Improved Code Knowledge:

(1) FL's State Building Code – based on IBC & IRC;

(2) LA approved adopted IBC & IRC (12/05):

- Insure new homes built in the Gulf Coast can withstand winds of 130 to 150 mph
- Applies to buildings rebuilt after Katrina & Rita & all buildings built/rebuilt in LA in '07

Building Codes

(3) Significant – tougher standards for any state adopting the ICC code:

Areas where winds > 110-120 mph

- Building standards tougher: 19/32” sheathing vs. 3/8”
- Better tie downs: Roof to frame
- Bigger & more nails
- Impact resistant windows, etc.

FL – homes built to ICC code fared better than older homes (less demanding state code)

Building Codes & Katrina: The Aftermath

Homes with wood shear walls & bracing usually performed well

Fully sheathed homes performed better than partially sheathed homes

Most observers:

- Gulf Coast's older homes → poor construction contributed to severity of Katrina damage
- Newer homes built to ICC design codes performed well

Insurers Response to Increasing Claims

Allstate to drop quake coverage for 352,000

Updated 6/7/2006 2:20 AM ET

By Edward Iwata, USA TODAY

As the insurance industry debates how to handle billions of dollars in potential claims from natural disasters, Allstate is dropping earthquake coverage for 352,000 policyholders in most states to cut its risk of losses from catastrophes.

Allstate spokesman Mike Trevino said Tuesday that the Northbrook, Ill., insurer has 407,000 homeowners' policyholders with quake coverage, but not all will lose it.

That's because regulators in six states — Connecticut, Florida, New Hampshire, New York, Pennsylvania and Rhode Island — might require Allstate to renew the quake coverage for existing policyholders. Talks with the states are ongoing.

Allstate's move won't hurt its policyholders in earthquake-prone California, where 14% of homeowners have earthquake coverage through the California Earthquake Authority, a public-private entity funded by insurance companies.

Allstate's property-and-casualty operations lost money last year, with Allstate paying $5.7 billion in claims for all U.S. catastrophes in 2005, Trevino said. Most of the claims covered

EARTHQUAKE COVERAGE

Direct premiums written for earthquake property and casualty insurance in 2004 (in millions).
Allstate has said it won't renew coverage in the states in bold:

Alabama	**$6.1**
Alaska	**$12.9**
Arizona	**$5.1**
Arkansas	**$14.6**
California*	$722.3
Colorado	**$8.7**
Connecticut	$5.4
Delaware	**$1.2**
D.C.	**$1.4**
Florida	$20.0
Georgia	**$13.1**

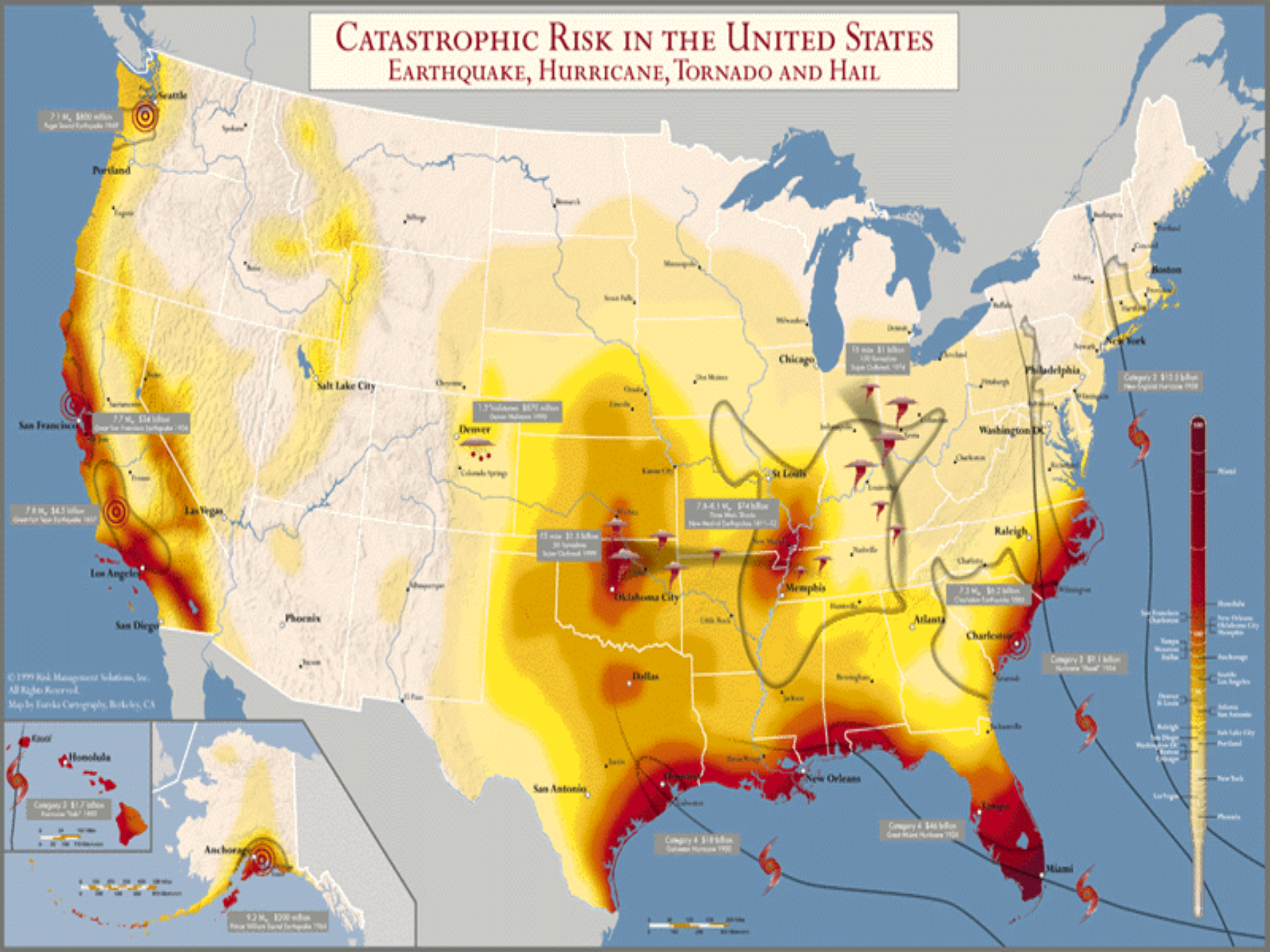
Seeking 70% (ave) Statewide Rate Increase

North America Statistics

- Hurricanes: More frequent & violent?
- Earthquakes: Steady?

Catastrophic Risk in the United States

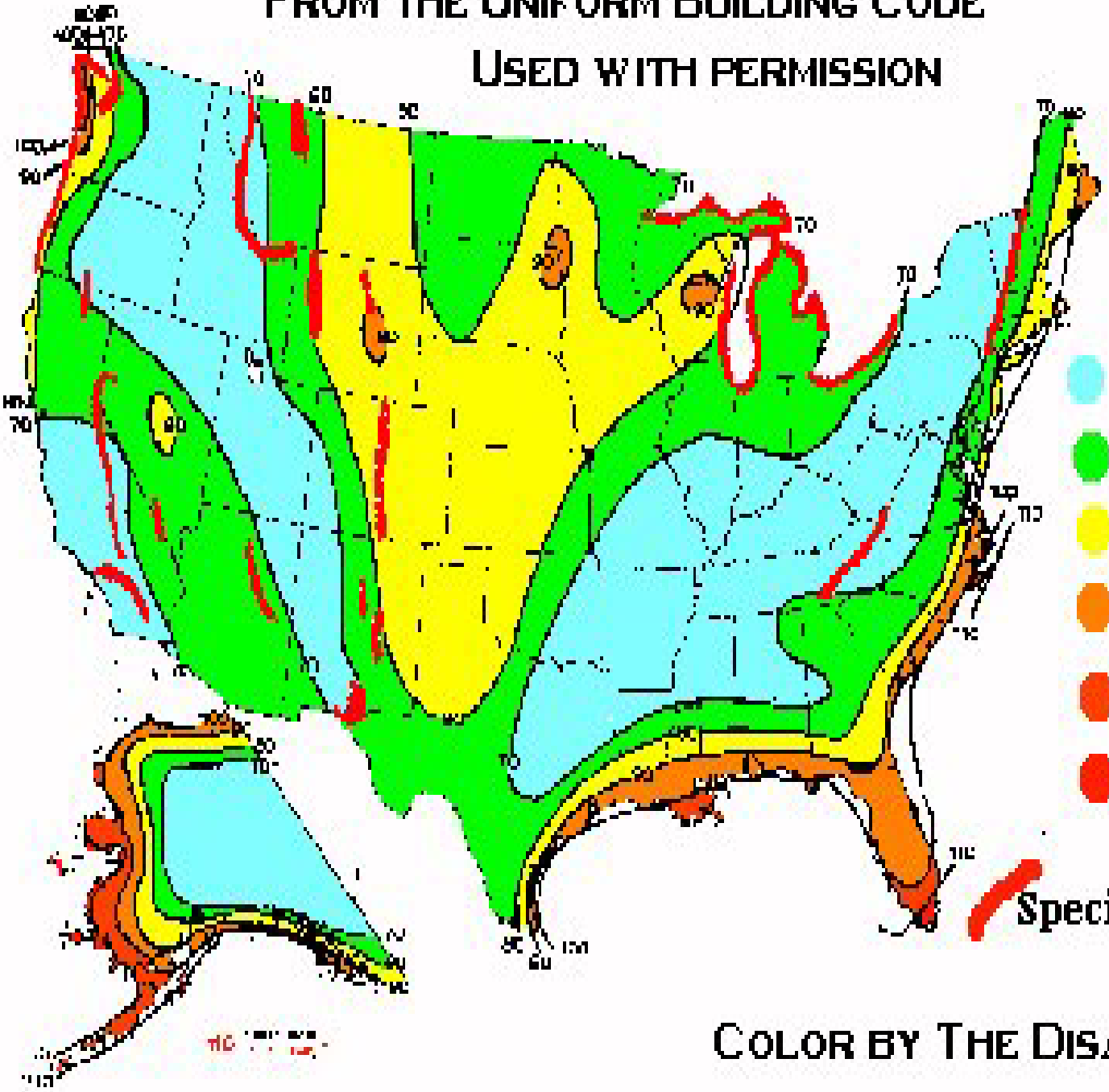
Earthquake, Hurricane, Tornado and Hail



Map by Eureka Cartography, Berkeley, CA

From the Uniform Building Code

Used with permission



70 Miles per hour

80 Miles per hour

90 Miles per hour

100 Miles per hour

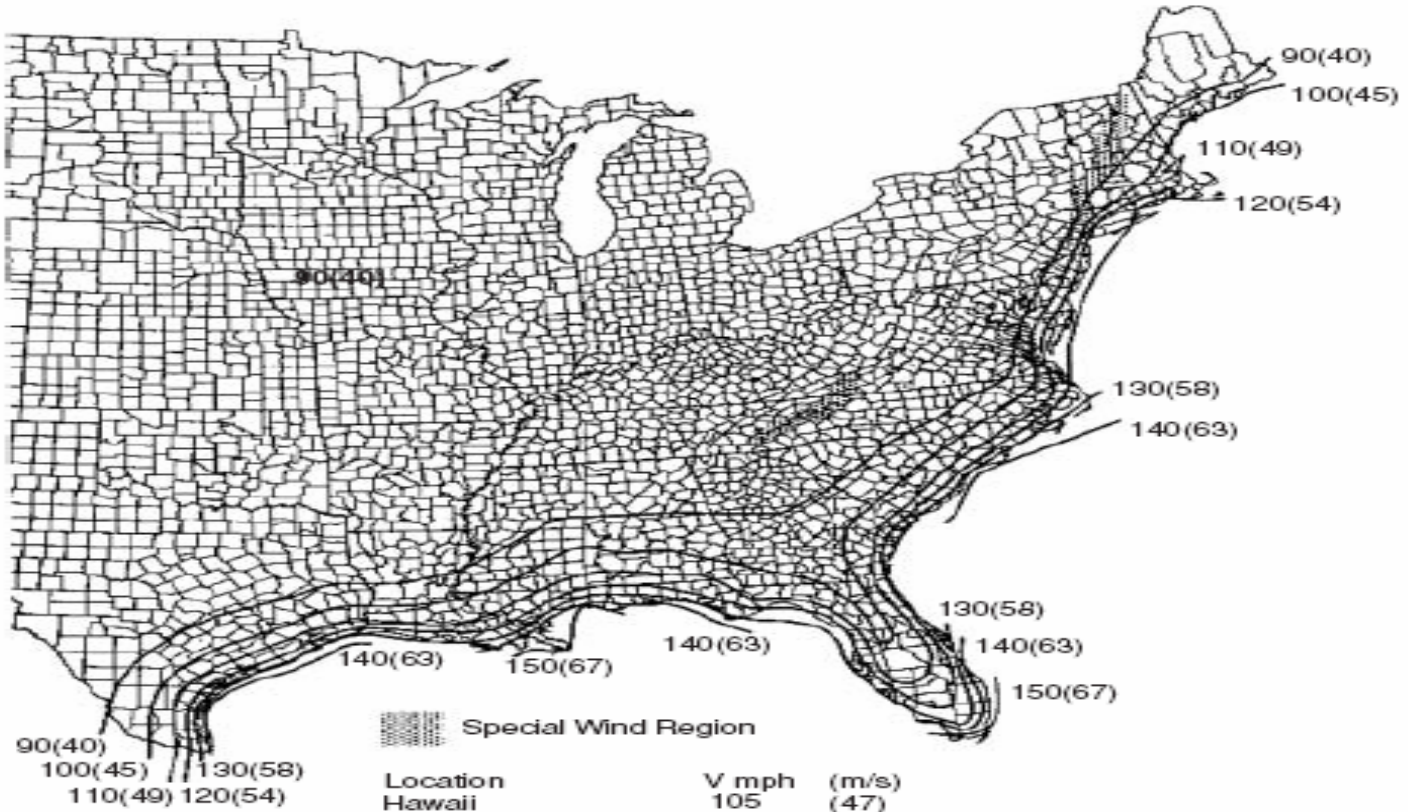
110 Miles per hour

120 Miles per hour

Special Wind Speed Zone

Color by The Disaster Center

Wind Speed Map – Eastern U.S.



Location	V mph	(m/s)
Hawaii	105	(47)
Puerto Rico	145	(65)
Guam	170	(76)
Virgin Islands	145	(65)
American Samoa	125	(56)

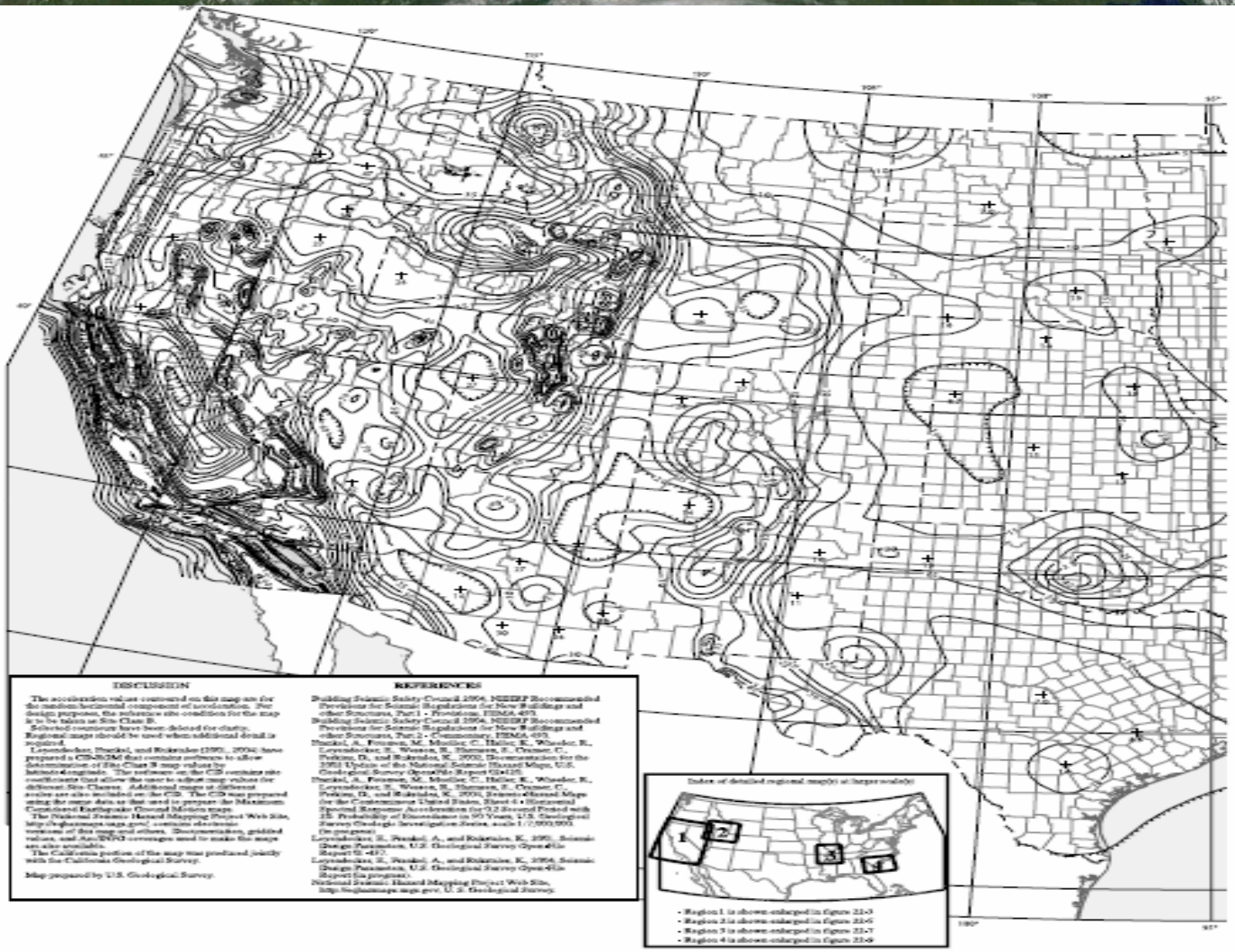
Notes:
1. Values are nominal design 3-second gust wind speeds in miles per hour (m/s) at 33 ft (10 m) above ground for Exposure C category.
2. Linear interpolation between wind contours is permitted.
3. Islands and coastal areas outside the last contour shall use the last wind speed contour of the coastal area.
4. Mountainous terrain, gorges, ocean promontories, and special wind regions shall be examined for unusual wind conditions.

FIGURE 6-1 continued
BASIC WIND SPEED

Housing Affected by Hurricanes: Wind Speeds (> 110 mph)

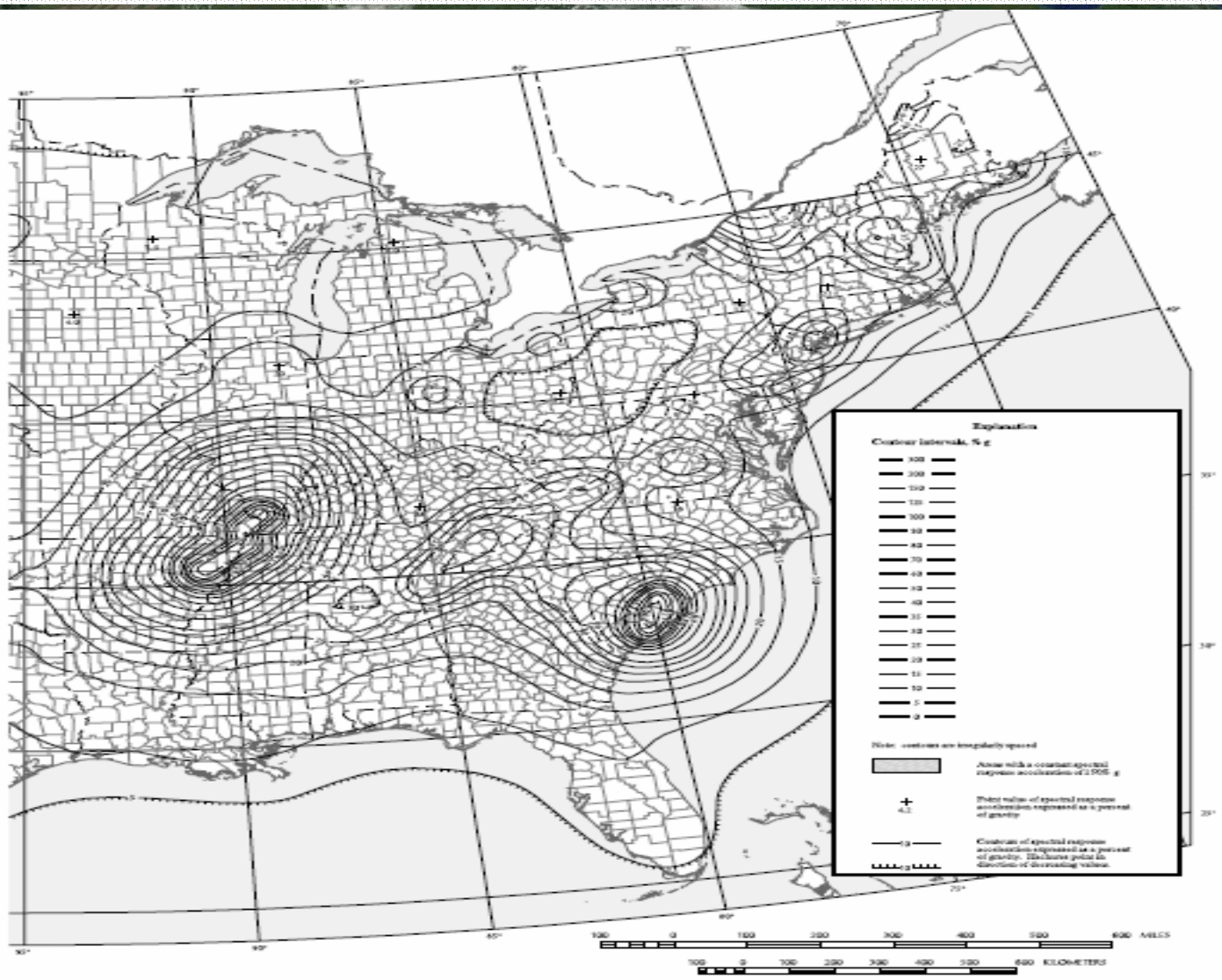
State, % of permits where winds > 110mph	2005 Permits	Affected Permits*
Florida – 50%	285,060	142,530
Texas – 20%	208,980	41,796
Louisiana – 35%	21,790	7,626
Mississippi – 20%	12,990	2,600
South Carolina – 20%	53,760	10,752
North Carolina – 20%	100,220	20,000
NY – 10%	59,310	5,931
PA – 10%	44,180	4,418
MA – 20%	23,840	4,768
RI – 25%	2,790	697
AL – 15%	30,270	4,540
CT – 15%	11,670	1,750
NJ – 20%	38,480	7,696
GA – 10%	104,360	10,430
VA – 10%	60,960	6,096
Sub-Totals	1,058,580	271,552
U.S. Permits	2,147,600	13% of U.S. permits

Problematic Seismic Areas: U.S. West



Source: ASCE, Minimum Design Loads for Buildings and Other Structures; ASCE 7-05

Problematic Seismic Areas: U.S. East



Source: ASCE, Minimum Design Loads for Buildings and Other Structures; ASCE 7-05

Housing Affected by Potential Seismic Activity

State and % of permits within earthquake zones

	2005 Permits	Affected Permits*
California – 35%	202,220	70,770
Washington – 30%	52,780	15,834
South Carolina – 20%	53,760	10,752
Colorado – 15%	46,260	6,939
Missouri – 15%	31,280	4,692
Sub-Totals	386,290	108,987
U.S. Permits	2,147,600	5% of U.S. permits

Housing Affected by Hurricanes & Earthquakes

State Permits*	2005 Permits	Affected
Hurricanes	1,058,580	271,552
Earthquakes	386,290	108,987
Totals	1,444,870	380,539
U.S. Permits	2,147,600	18%

Offshore Observations

Kobe earthquake – huge impact on Japanese residential construction

U.S. Housing Markets – Will wood & the wood industry capture the opportunity as in Japan?

What does the wood industry need to do?

Seismic Issues

Japan: Precut Homes Increasing

Drivers:

- Demographics
- New government building regulations
- Quality assurance law: 10-yr home warranty program
- Kobe earthquake

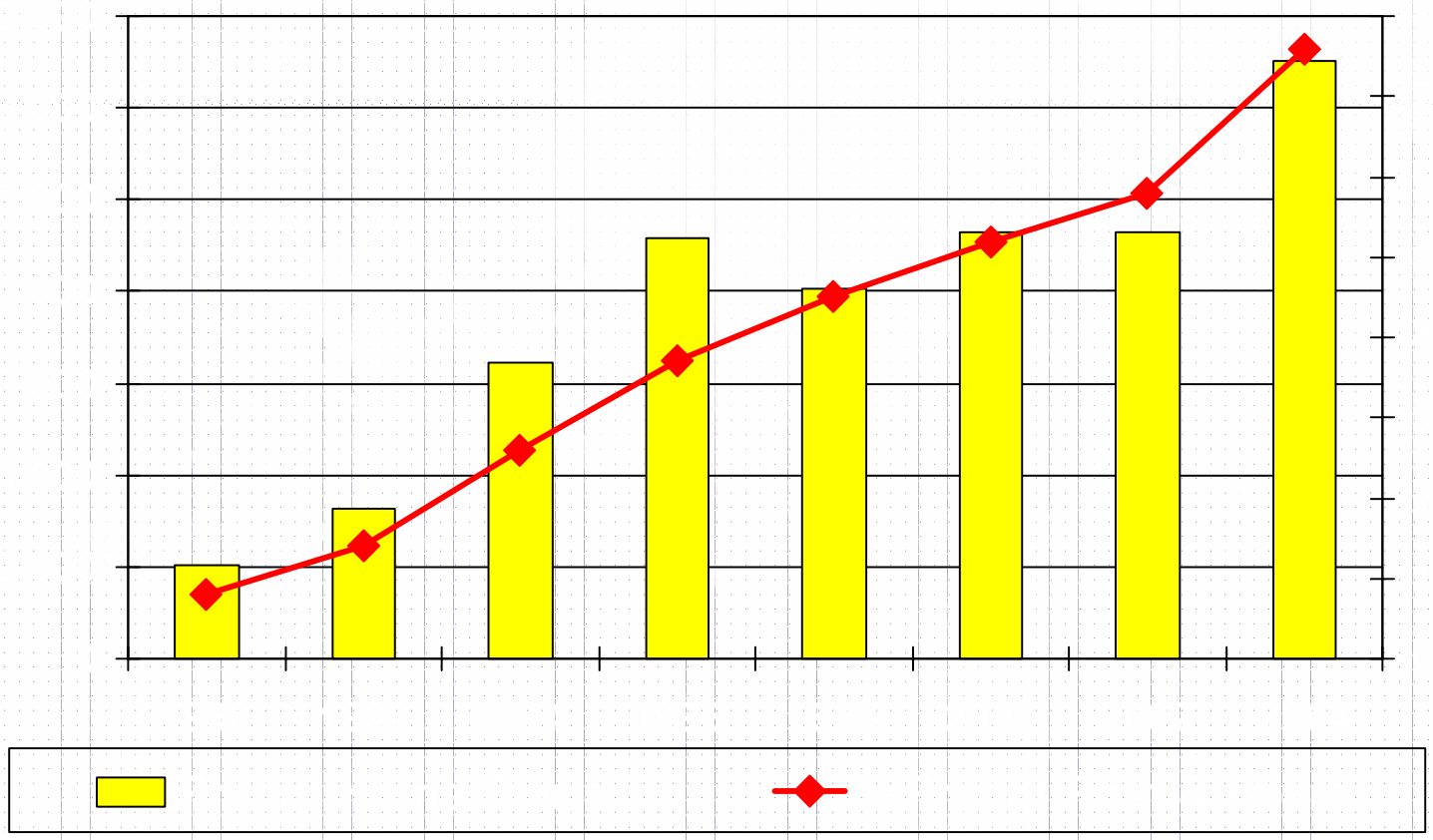
Post & Beam construction:

- Moving to factory components with CAD
- Cut to length
- Machine cut mortise & tenon components
- Numbered parts
- Using more glulam & engineered wood products

Japan: Precut Homes

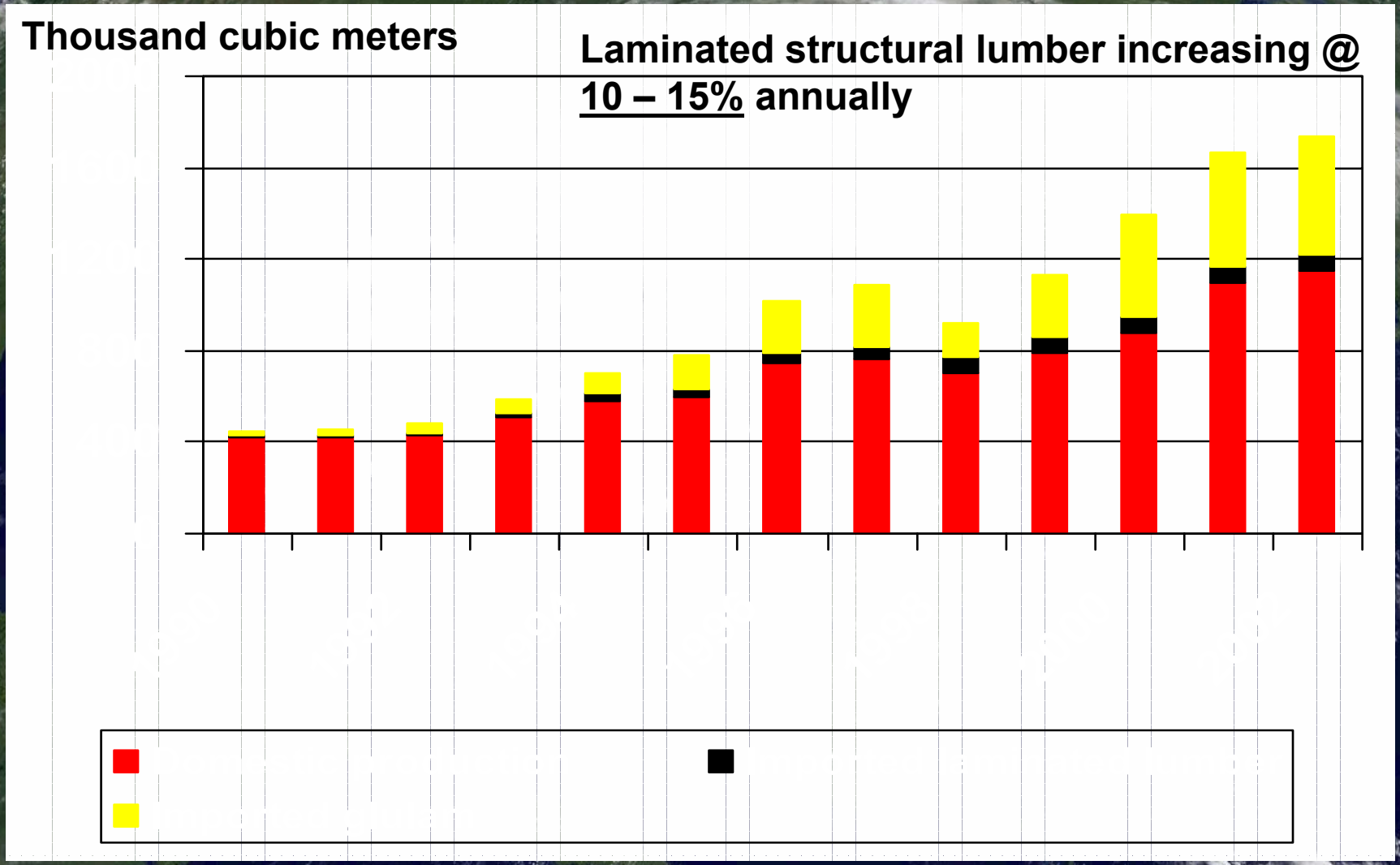
Precut Home Starts

% Post & Beam (Precut)

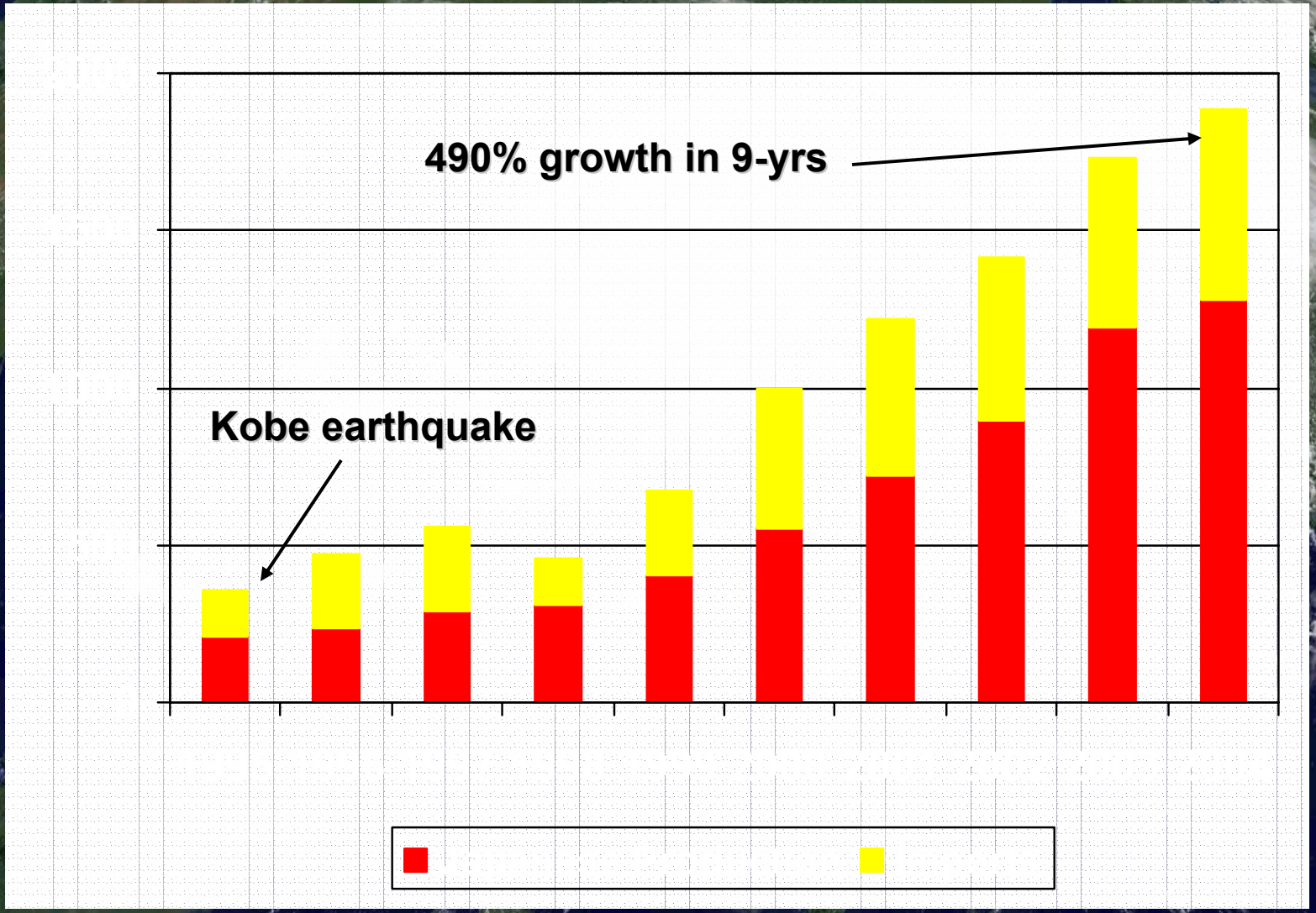


Source: APA (Japan Wood Housing, Precut Assoc.; *Daily Wood Products J.*)

Impact of Prefab Use in Japan: Drives Use of Glulam & Laminated Lbr



Glulam: Japanese Output & Imports



Source: APA

Glulam: Japanese Output & Imports

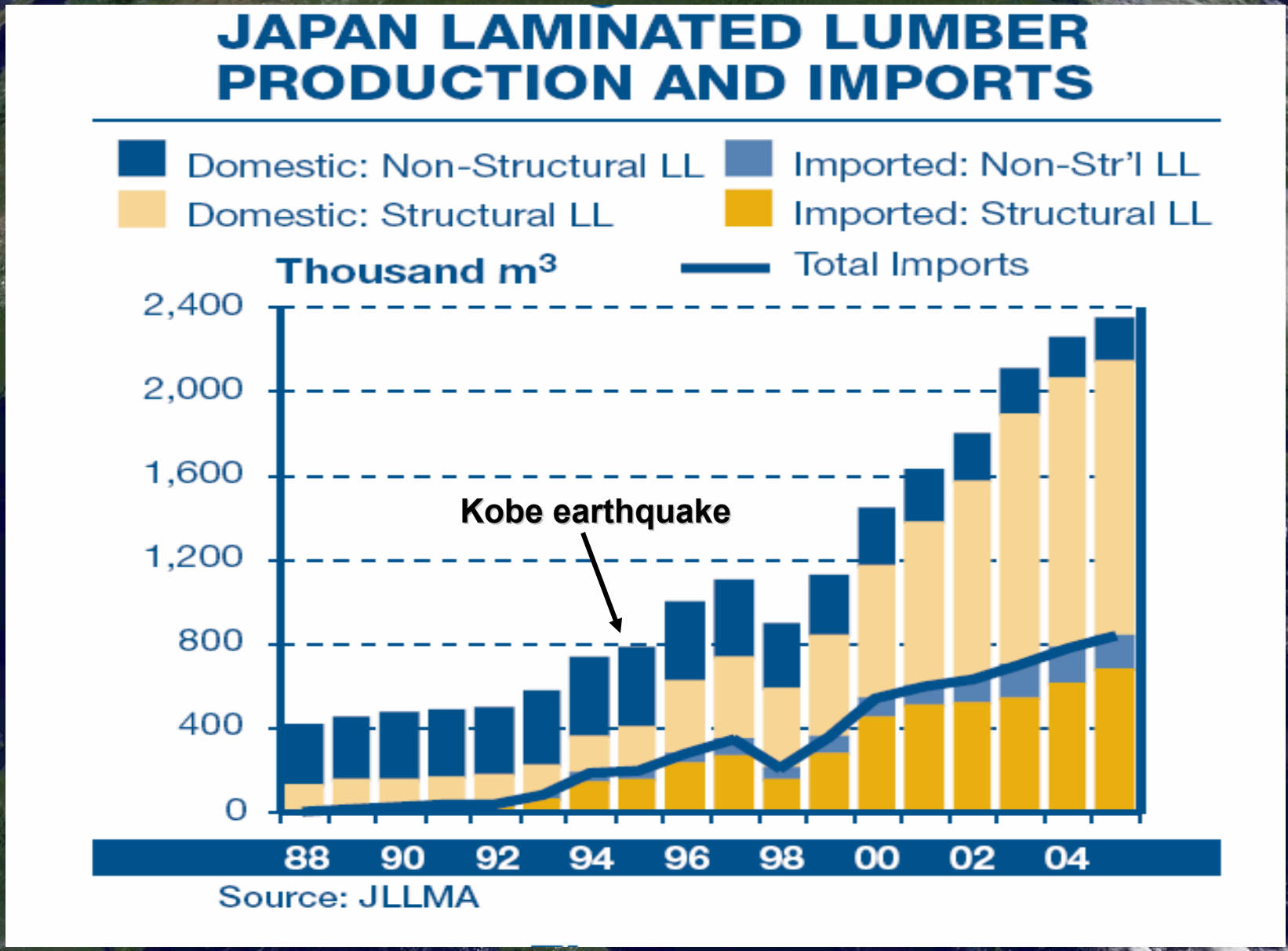
Drivers:

- Demographics (skilled labor shortages),
- Kobe earthquake: tougher building regulations (e.g., quality assurance law, 10-yr warranty)

End Result:

- Better materials in home construction
- More EWPs & factory built components & less conventional (e.g., green) Lbr products

Japanese LVL: Production & Imports



U.S. Home Construction Statistics

Building Material Trends: Concrete making significant inroads – South mostly (45% of starts)

Structural Floor Materials: New Housing

	1997	1998	1999	2000	2001	2002	2003	2004
Concrete	29%	29%	31%	35%	34%	36%	36%	38%
Steel	<1	<1	<1	<1	<1	<1	<1	<1
Lumber Joists	40	39	35	31	29	26	26	24
I-Joists	20	22	23	23	26	27	25	27
Open Web wood truss	10	9	10	9	10	10	12	12
Others	1	1	1	1	1	<1	<1	<1

Source: NAHB Research Center annual survey of home builders, published in Structural building components, December 2003 (www.sbcmag.info)

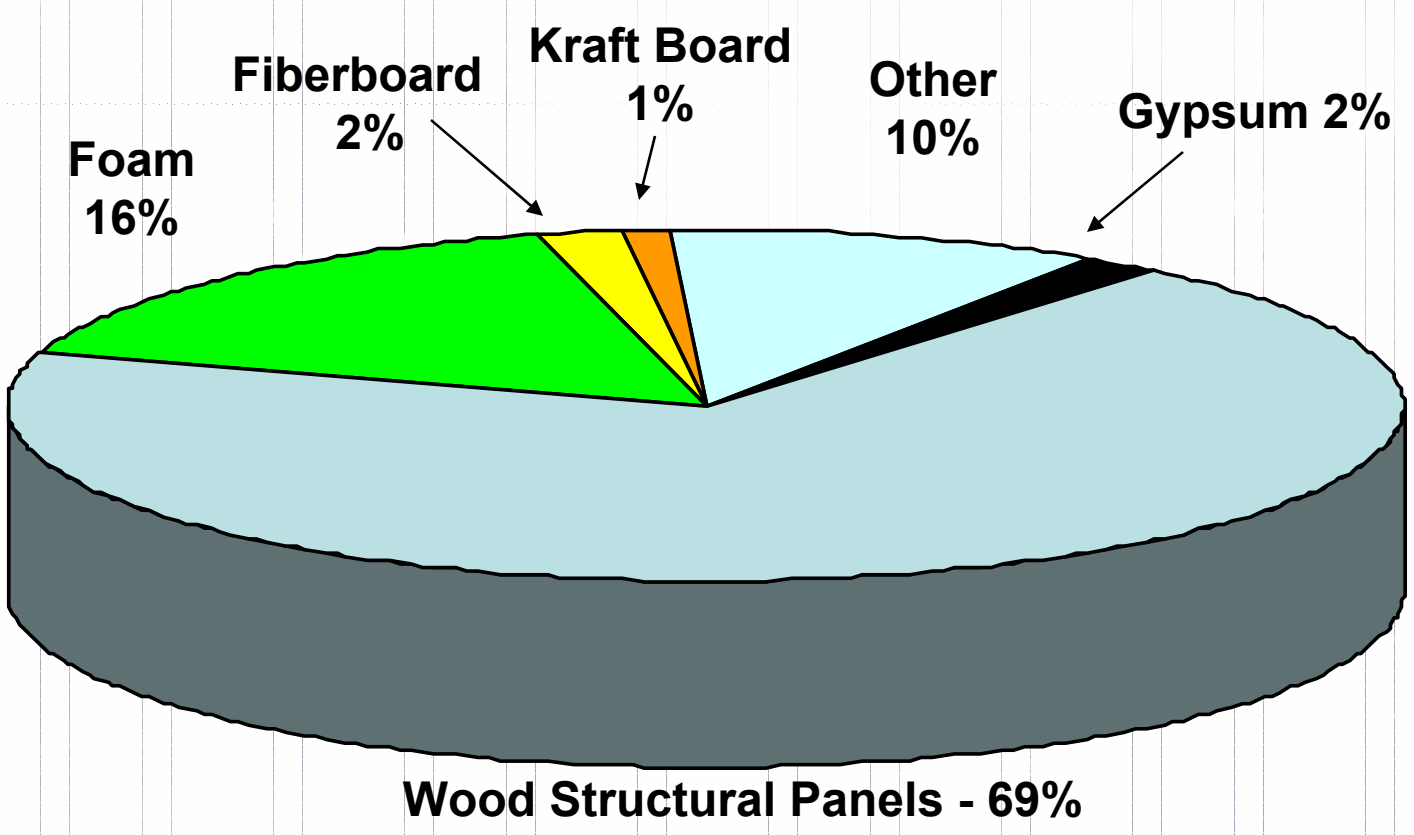
Wall Sheathing

- ***Critical*** **to structural performance in high winds & seismic events**
- **Wood products: Facing more competition**
- **Need to develop novel & improved wood products…**

  or *CONTINUE* to lose market share

Proper Sheathing – vital for damage reduction

Residential Wall Sheathing 2004 Market Share

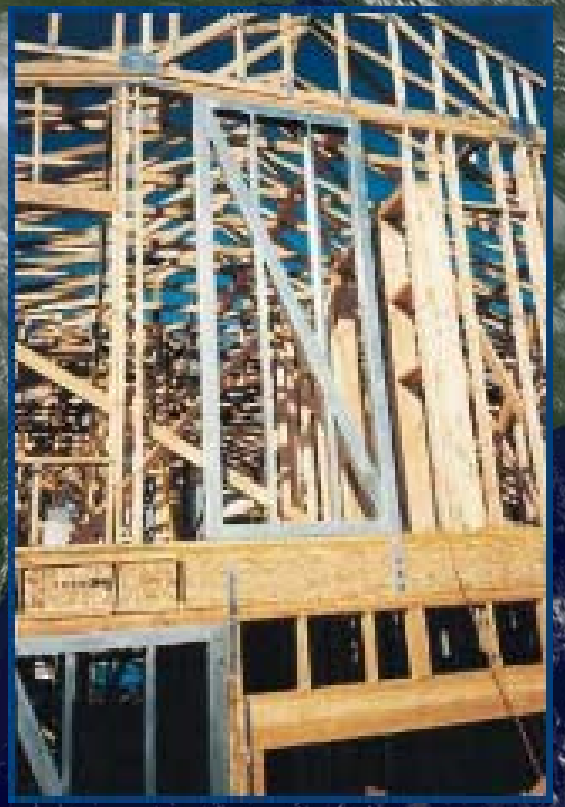


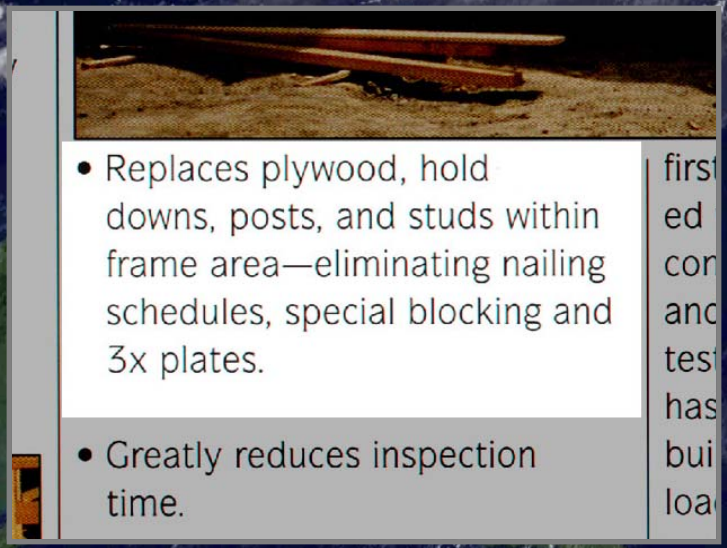
"Other" includes stucco walls without sheathing, plywood, or OSB siding directly to studs & structural insulated panels.

New Products: Wood-Wall Sheathing Potential Loss to Steel

AD:

"The principle benefits of the Strong-Wall Shearwall® are its consistency and strength… …this allows for more windows and doors in the house design because <u>you use 30-70% less shearwall than typically required.</u>"





Insulated Concrete Form:
< 1% of U.S. single family homes

Source: Oke Woodsmith Building Systems, Canada

ICF Basement

Insulating Concrete Form Assoc.

ICF Concrete House

Insulating Concrete Form Assoc.

Homebuilding Methods: Wall Structure Type Basis

1,000 units

	1997	2004	2005
Stick Built	1,146 - 78%	1,365 - 70%	1,455 - 70%
Panelized	115 - 8%	260-13%	270-13%
Masonry	145-10%	260-13%	270-13%
Modular	45 - 3%	43-2%	43-2%
Steel Frame	10 - 1%	9-0.5%	10-0.5%
SIPs	5-0.3%	9-0.5%	10-0.5%
Other	8-0.5%	10-0.5%	10-0.5%
Total	1,474-100%	1,956-100%	2,068-100%
Manufactured	354 -19%	130 - 6%	147- 7%
Grand Total	1,828-100%	2,086-100%	2,215-100%

Source: Estimates by APA-The Engineered Wood Association. Based on wall construction.

Evolving Construction Techniques

Favor wood or other building materials?

Outlook for wood building materials in new code environment:

Shear wall strength/racking strength is key for good performance in hurricanes

Full-wood sheathing is great – there are alternatives:

- **Simpson's Strongwall-Shearwall product**
- **Reinforced concrete – Steel**
- **ICF – insulated concrete form**

Evolving Construction Techniques

Building methods are evolving with code changes:

In response to:

Skilled labor shortages, site waste, competitive pressures (e.g., volatile building material prices)

Builders are consolidating & using more EWPs, more factory built components, installed sales, &

Substituting non-wood materials – steel & engineered concrete products

Implications for the Wood Products Industry

- Residential construction should remain strong for at least another decade
- Drivers: Positive demographics, demand for 2nd homes, & aging housing stock
- Work with your customers → builders & remodelers:

  Develop products & systems that help them solve problems

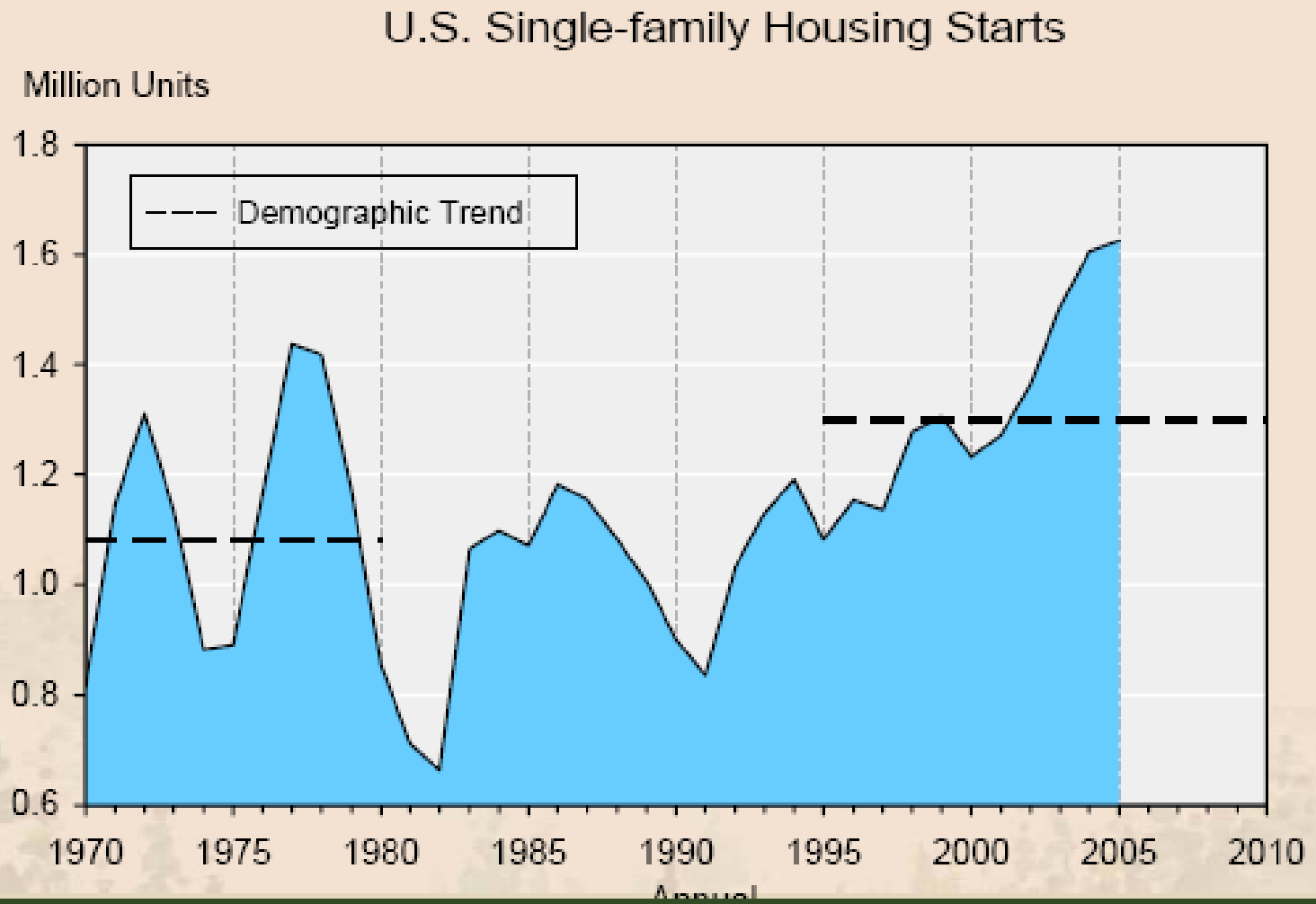
  Large, national builders lead by adopting new products/systems (e.g., EWPs)

Implications for the Wood Products Industry

- Building codes evolution will continue & force builders to build more durable homes utilizing the best materials
- Work with code officials to ensure wood materials are consistent with code changes
- Develop new products/systems that add value for the end-user

Can we stay ahead of the competition – steel, concrete, etc.?

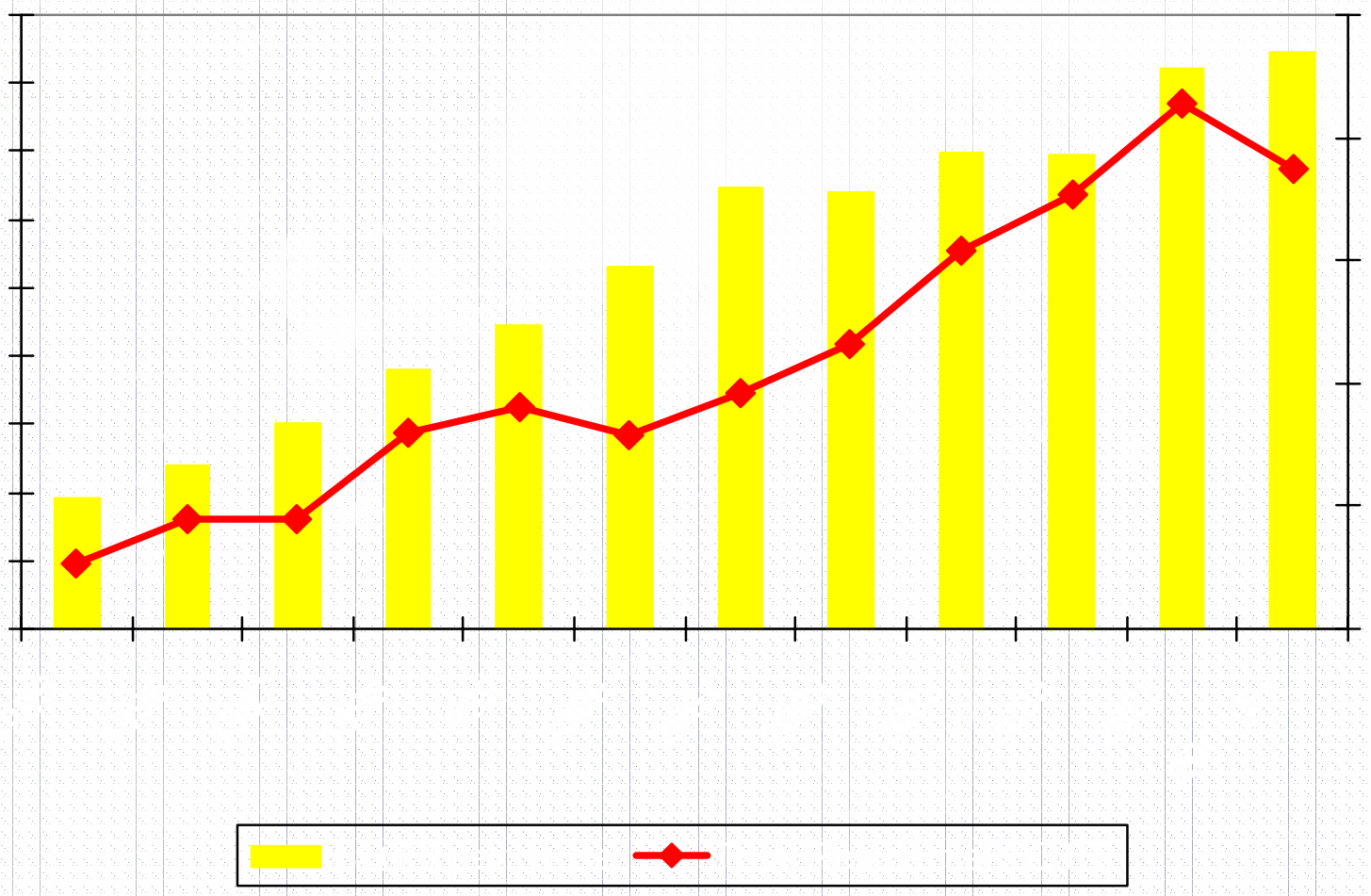
A Very Unique Period: Why?



U.S. Single Floor Space

SF / House

Total Single Family Floor (sq ft)

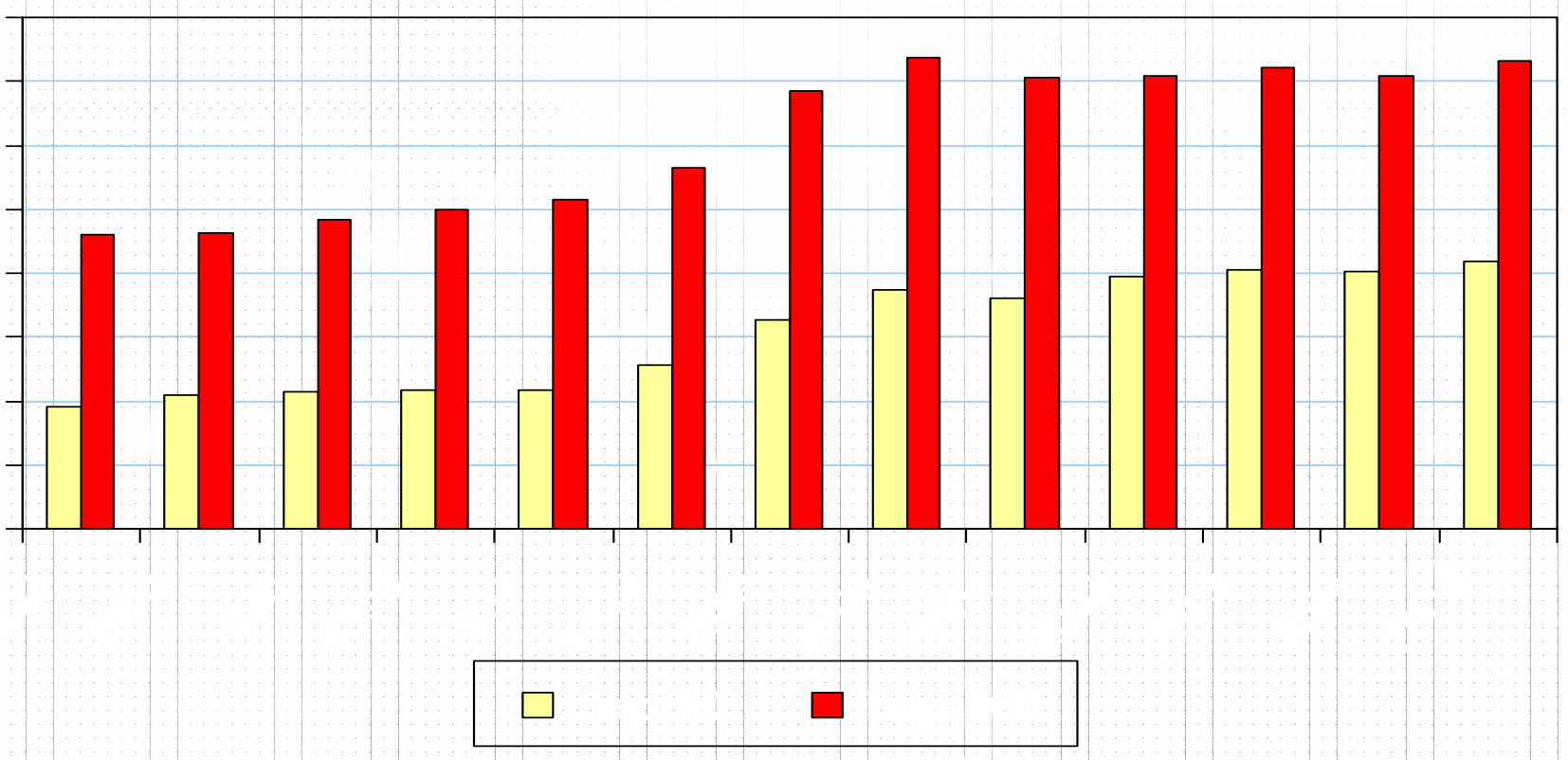


Source: U.S. Census Bureau & APA forecast

Consolidation in U.S. Homebuilding

Top 100 use an estimated 20% of all structural panels & about 30% of all EWP

Larger companies have $$$; streamlining delivery; building faster; increasing quality; & willing to try new technology



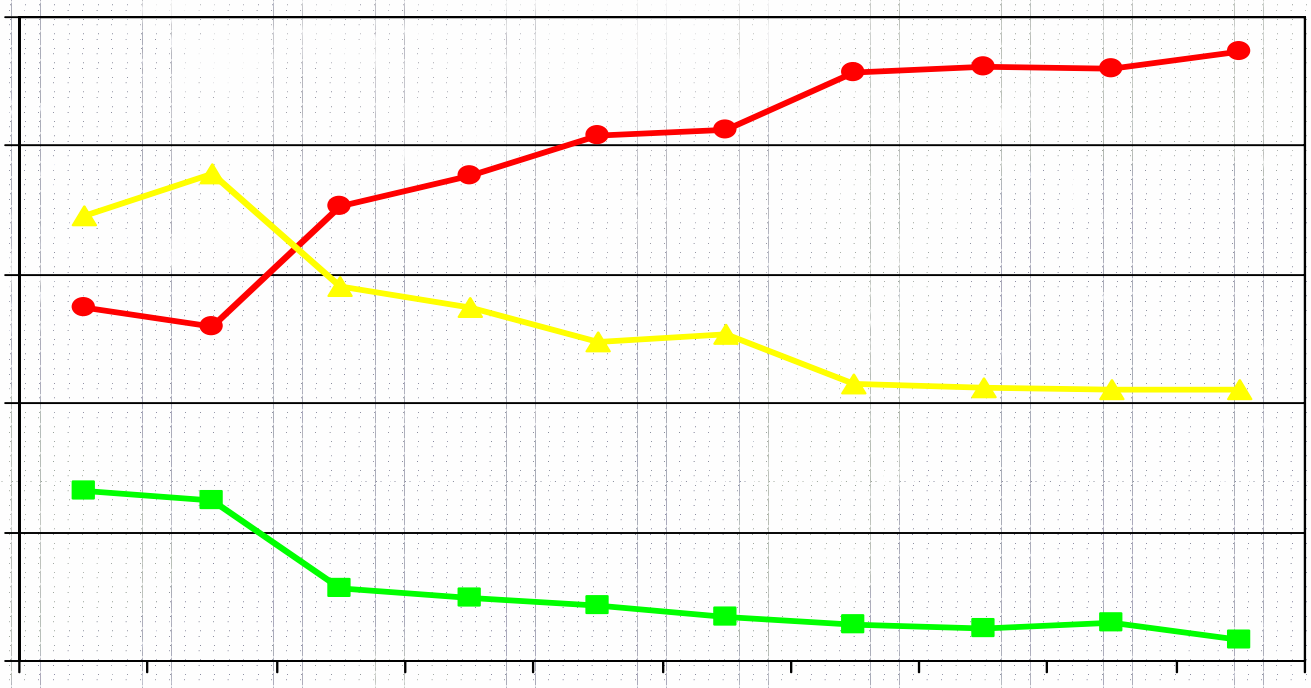
*** Homes closed by largest for-sale builders**

Source: Builder Magazine by Hanley Wood & Builder 100 annual survey

Building material manufacturers & suppliers – consolidation continues

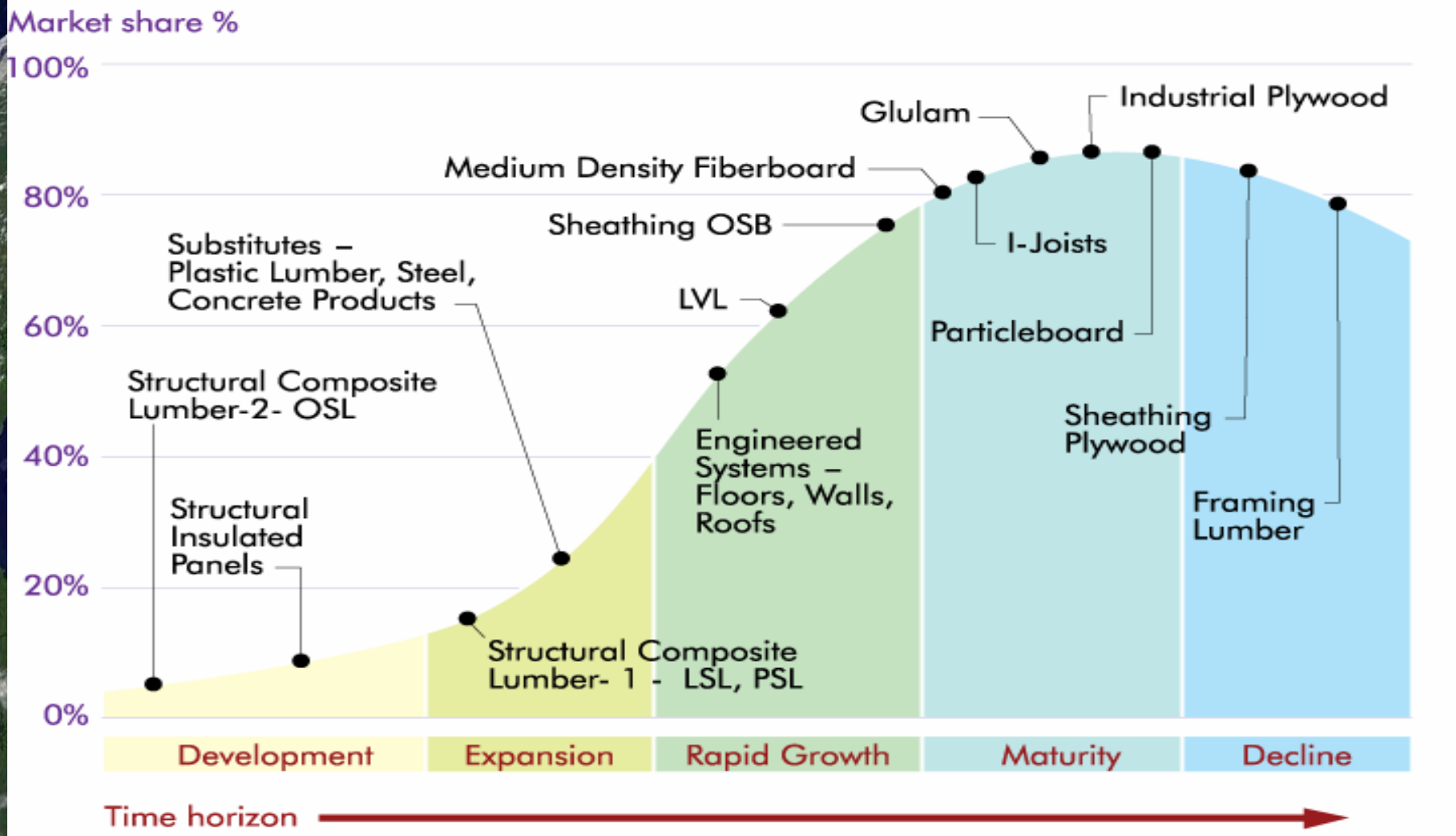
Big builders adopt new construction techniques (e.g., panelized walls) & new building materials faster than most smaller builders

Increasing efforts to build homes to withstand hurricanes & earthquakes



Wood Products Life Cycle

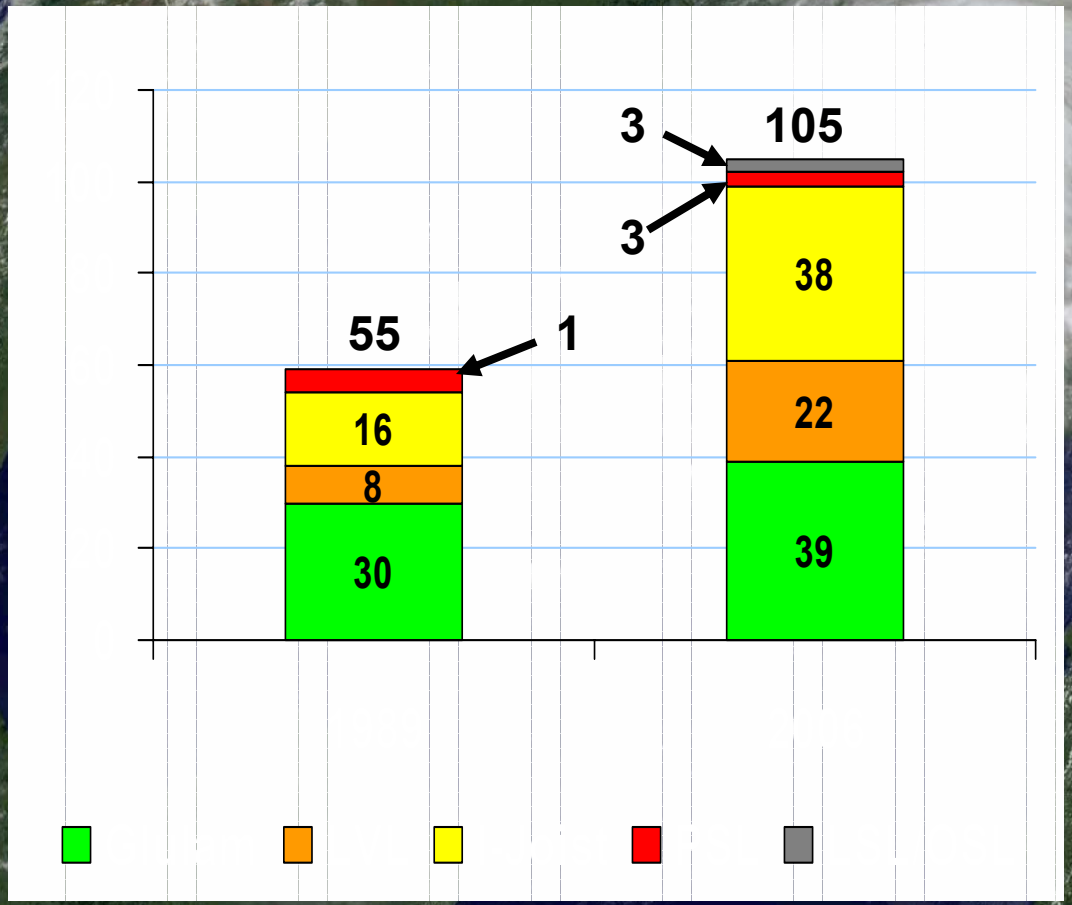
Many of our wood building materials are either mature or in decline
Susceptible to competition – industry needs to be innovative



Source: United States Forest Service

Efficiency, Cost, Quality, & Design Issues – Drive demand for new EWP products

… Engineered wood plants have doubled in past 15 yrs …



Growth:

- Environmental pressure
- Consistent quality
- Fewer callbacks
- More consistent price
- Less jobsite waste

Source: APA, March 2006

Conclusion

There is opportunity for wood products & the industry –

Will we meet it?