International Testing of Formaldehyde

Steve Zylkowski
Lisa Bailey
Kurt Bigbee

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APA Perspective

Certifies products made with water resistant adhesives

PF, PRF, MDI

All are very low emitters of formaldehyde

APA Perspective

Structural wood products are certified for strength and bond performance

There are no U.S. formaldehyde regs for Structural Wood Products

Overview

- Japanese requirements for structural panels
- Global flow of wood panels
- APA test results on imported plywood

U.S. Structural Wood Products Made for Japanese Market

2002 Japanese Healthy House Law

JAS standards

F Star Rating (eg, F ****)
rating determines if/where/how panels can be used in a home

Applies to glulam, plywood, OSB

JAS Formaldehyde Rating

F **** (or F 4 star) is the best rating and permits unlimited use of wood material in the house

F **** has become the dominant material of choice

JAS Formaldehyde Method

9 – 11 liter desiccator

Prescribed number/size of specimens

Distilled water

JAS Formaldehyde Test

The test is a passive test

Unlike ASTM E1333 or dynamic chamber methods

Desiccator maintained at 20 C for 24 hours

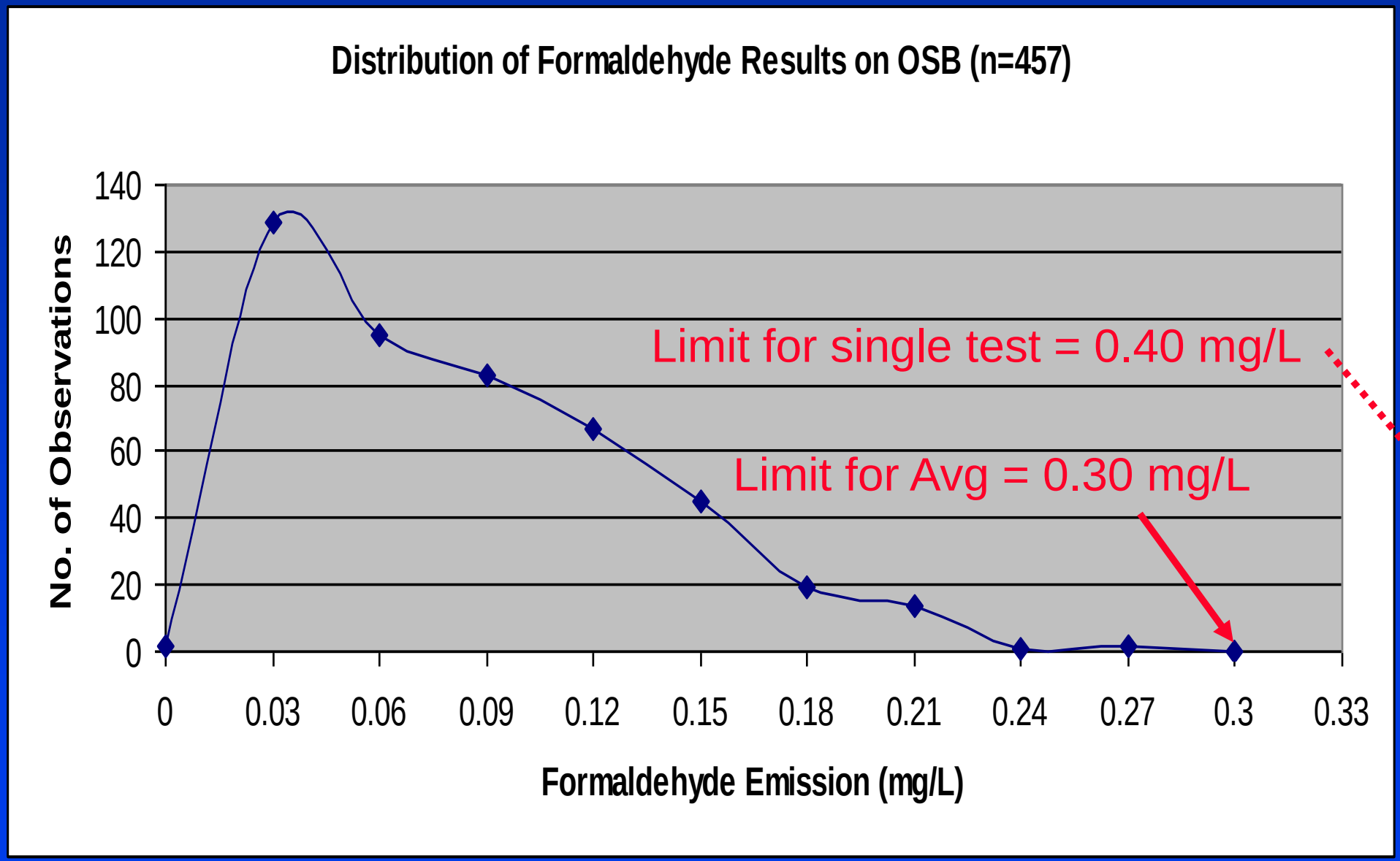
JAS Formaldehyde Test

Water absorbs released formaldehyde

Water is reacted with acetylacetone

Resultant color is related to formaldehyde concentration

JAS Formaldehyde Results - OSB



JAS Formaldehyde Results

OSB (n=457)

Average: 0.070 mg/L

Range: 0 to 0.268 mg/L

F **** permits up to 0.40 mg/L with average up to 0.30 mg/L

JAS Formaldehyde Results

Plywood (n=11)

Average: 0.084 mg/L

Range: 0 to 0.281 mg/L

F **** permits up to 0.40 mg/L with average up to 0.30 mg/L

JAS Formaldehyde Results

Glulam (n=29)

Average: 0.217 mg/L

Range: 0.114 to 0.301 mg/L

F **** permits up to 0.40 mg/L with average up to 0.30 mg/L

JAS Certification

- Japanese building law requires structural wood products to be certified.
- Certification is administered through the Ministry of Agriculture, Forestry and Fisheries (MAFF).
- They accredit “Registered Offshore Certification Bodies” (ROCB) using process of ISO Guide 65.

Japanese Regulations for Wood Products

System is well established:

- Recognized Test Method
- Established Limits
- Certification required with accreditation of CBs through MAFF

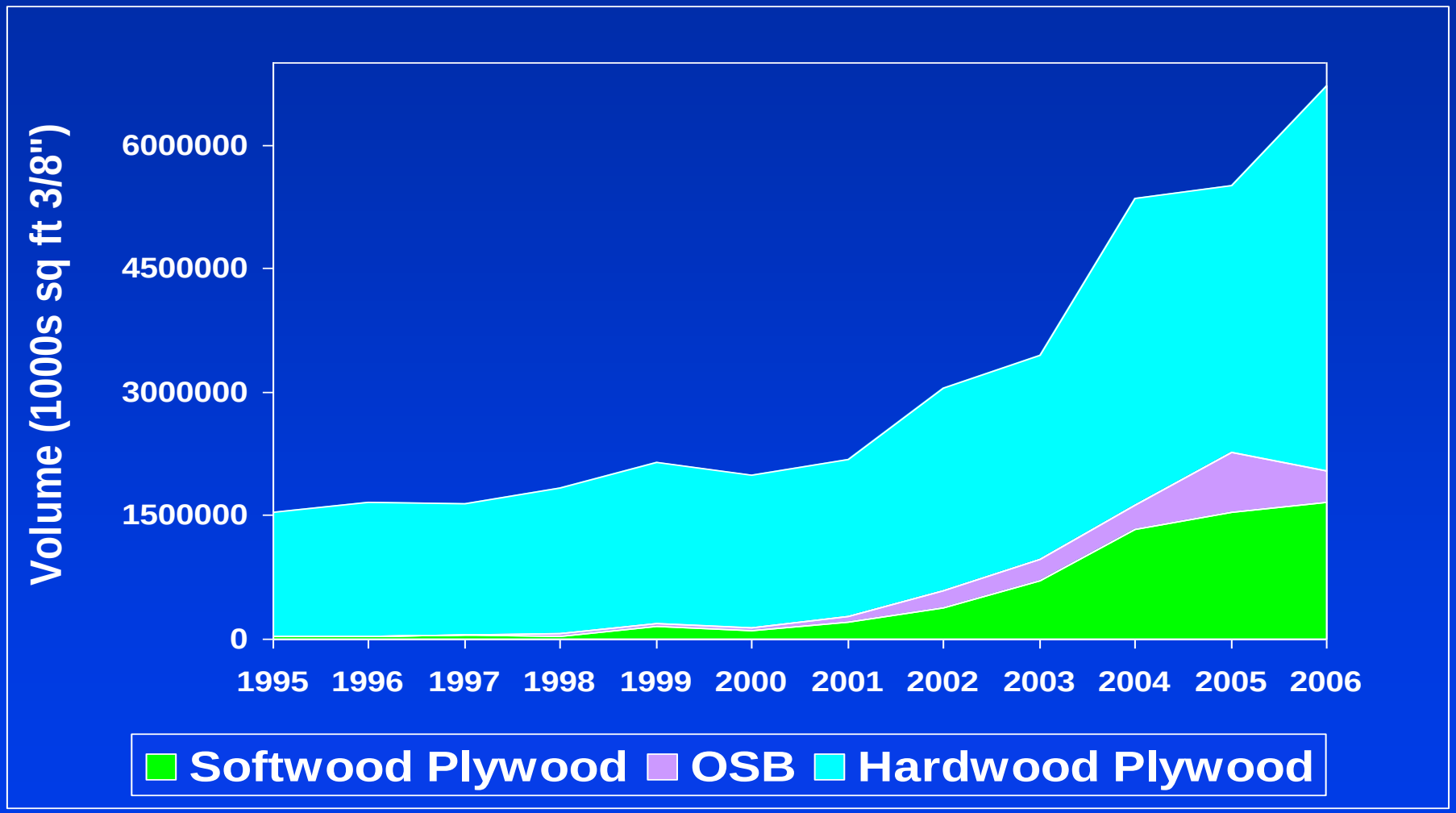
Global Flow of Wood Panels

The Structural Panel Markets

U.S. & Canada

	(BSF) 2006
Residential	24.2
Remodeling	8.8
Nonresidential	3.9
Industrial	7.5
International	.5
Total	44.9

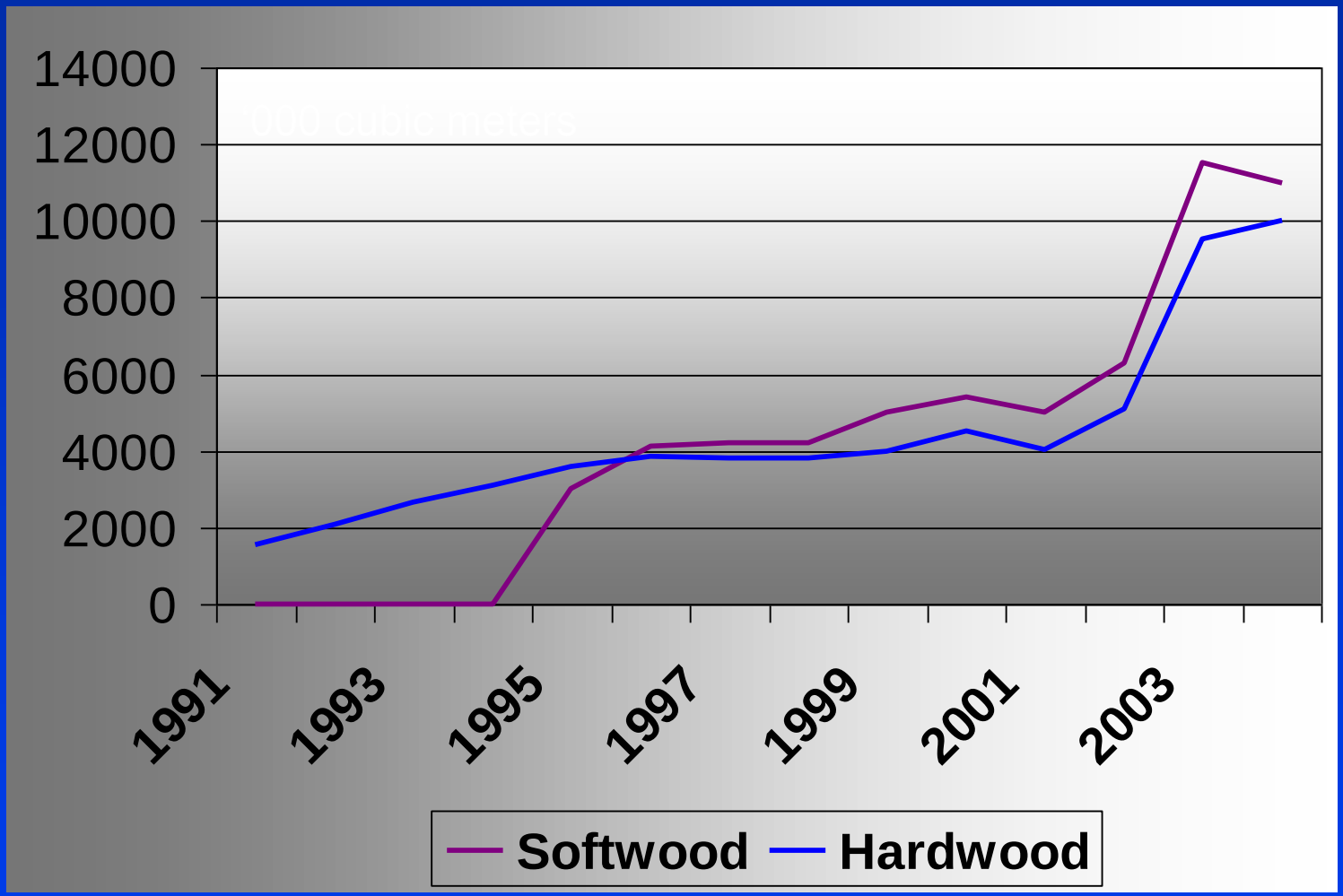
PANEL IMPORT TRENDS – USA
(EXCLUDING CANADA)



SOURCE: Global Trade Atlas 2006

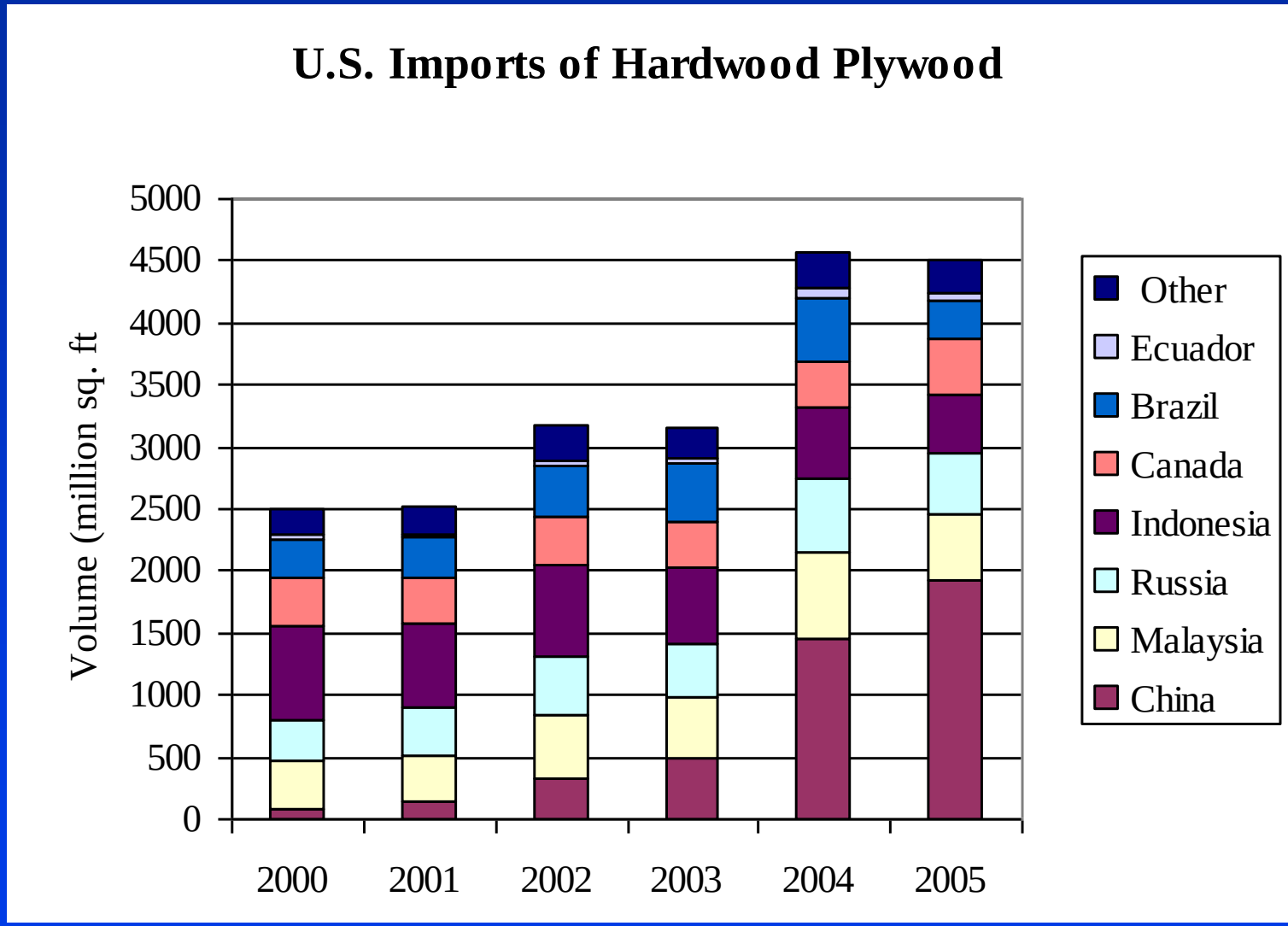
CHINESE PLYWOOD PRODUCTION TRENDS

Million sf-3/8”



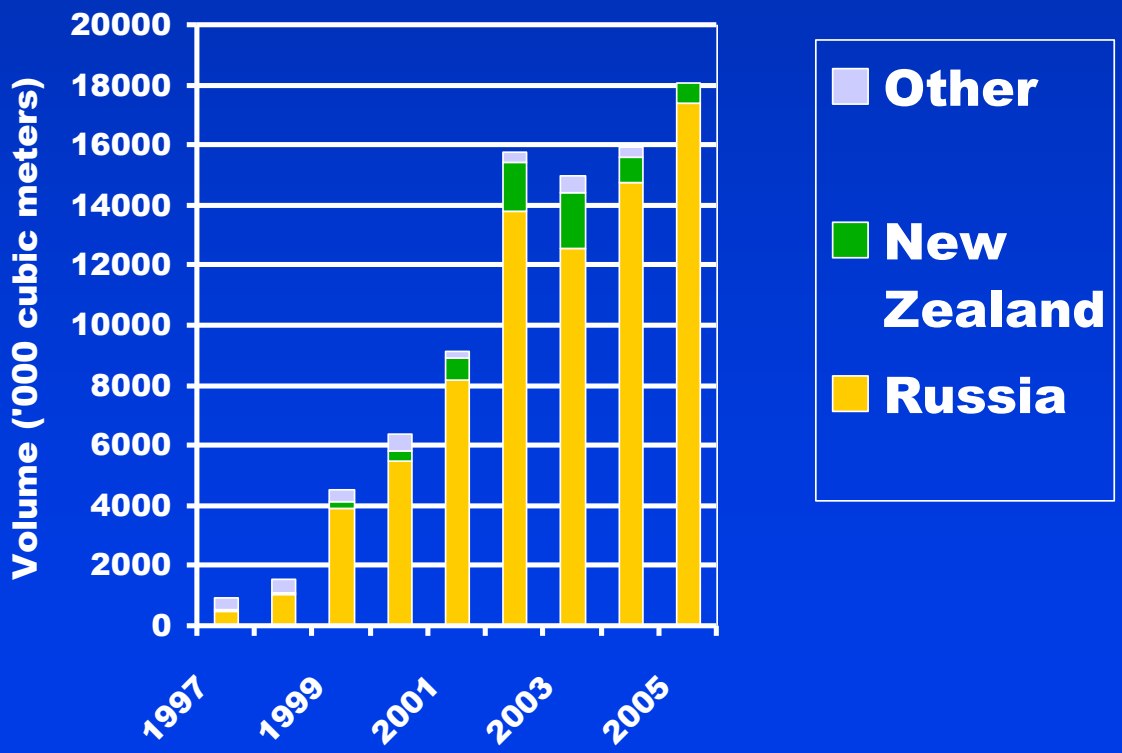
SOURCE: FAO, 2004

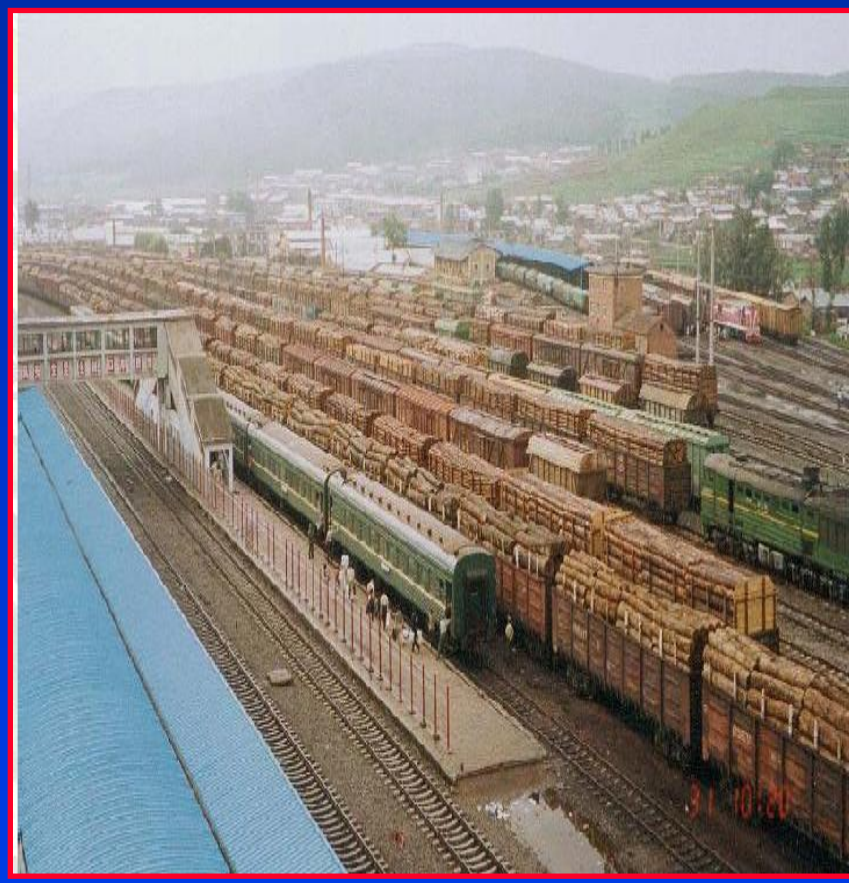
US HARDWOOD PLYWOOD IMPORTS



SOURCE: Global Trade Atlas 2006

CHINESE LOG IMPORT TRENDS





SOURCE: Global Trade Atlas 2005

Performance of Imported Plywood

APA recently completed two studies of imported plywood

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- First study: Concrete form (6 sources)
- Second study: Industrial plywood (12 sources)

Performance of Imported Plywood

The plywood:

1) All of it was uncertified. No grademarks; No referenced standards
2) All of the plywood was obtained from distributors
3) Sample size was small – typically 2 panels per batch

Concrete Form Test Program

Background

- Demanding Application
- Field failures have been reported with Chinese Hardwood Plywood
- Dry and wet bending and shear properties were tested
- PS 1 bond tests and JAS formaldehyde tests were conducted

Industrial Plywood Test Program

Background

- Diverse Applications
- Imported Hardwood plywood has displaced domestic plywood
- Dry bending properties were tested
- Dry screw holding properties were tested
- PS 1 bond tests and JAS formaldehyde tests were conducted

APA IMPORTED PLYWOOD TESTS

Flexure Tests

- Dry
- Wet – Following a Vacuum Pressure Soak Cycle

APA IMPORTED PLYWOOD TESTS

Adhesive shear tests

- Wet – following a vacuum pressure soak cycle
- Wet – following a boil cycle

Conclusions: Concrete Form

4 of 6 batches failed to meet the PS 1 bond requirements

Conclusions: Concrete Form

3 of 6 batches met F**

The other three batches varied widely (0.80 to 9.97 mg/L)

Conclusions: Industrial Plywood

Bending properties were 12 to 45% lower for the imported plywood

Screw holding properties were 19 to 22% lower

Conclusions: Industrial Plywood

All imported hardwood plywood failed PS 1 boil test

All but two batches failed the PS 1 vacuum soak test

Conclusions: Industrial Plywood

All imported hardwood plywood rated at either F* or failed to meet this most lenient level

Three batches had emission levels greater than 10 mg/L

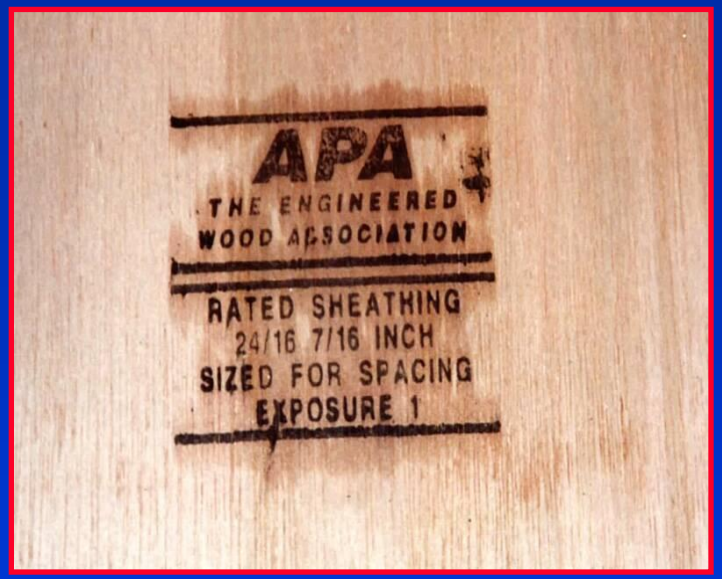
In Conclusion.....

Certification of wood panels conveys that the panels will perform at a specified level.

Uncertified panels may result in unexpected performance.

OTHER ISSUES……

- Be aware of the illegal use of trademarks and trade names.
- Be aware of the potential illegal reference to US Product Standard PS 1 or PS 2 notations.



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