Understanding Price Volatility in Construction Materials: Wood, Steel, Aggregate

Blake Hoskisson, President, Sunsteel

Dallin Brooks, Executive Director, Western Wood Preservers Institute

??? Aggregate Guy ???



Can't We All Just Get Along?

Wood

Steel

Concrete

Plastic



Maybe We Can

Wood Guy

Steel Guy

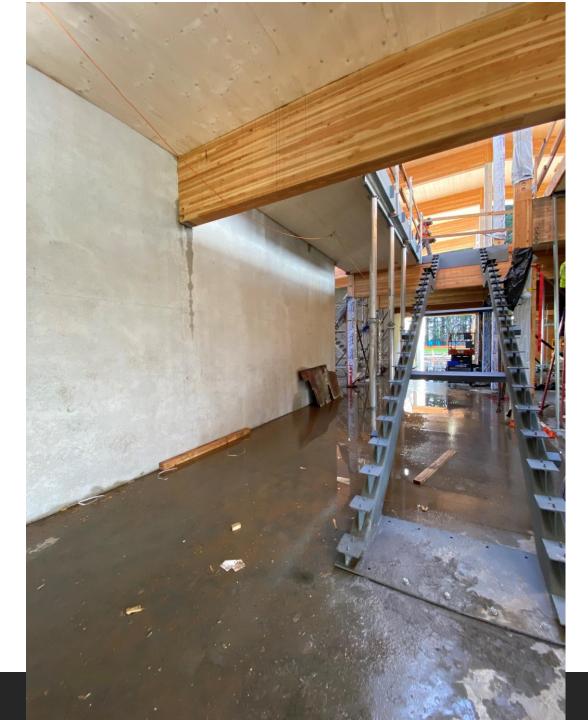


Why Do You Care?

Who are You?

Do you really care about daily price Fluctuations?

Do you have any Choice?



The Whole Picture

The Global Economy

Global Manufacturing

Insurance

Industry Manufacturing Process

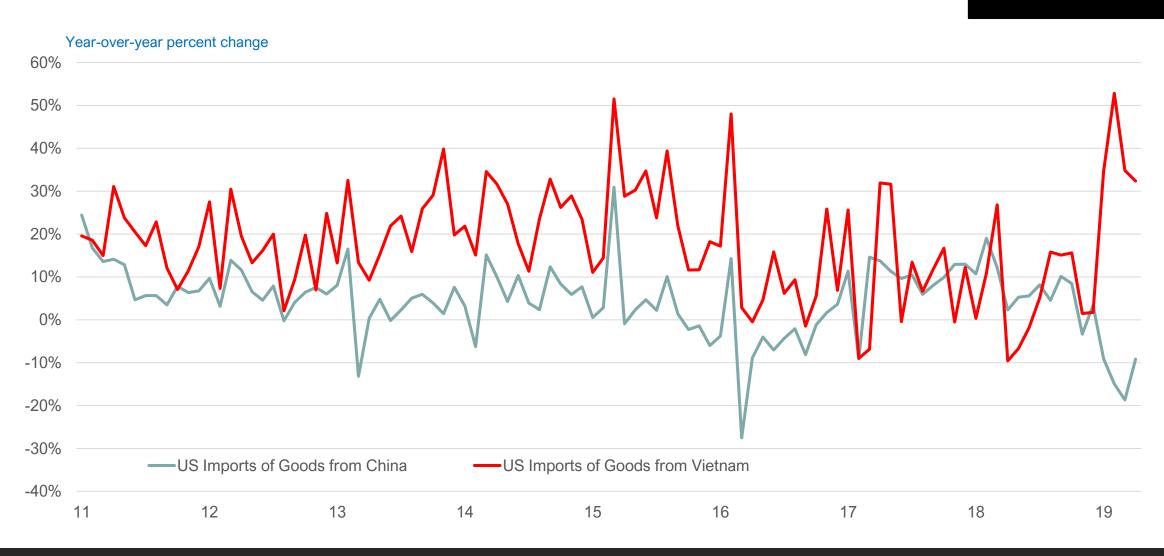
- Steel
- Aggregate
- Wood

Labor

Environmental Impact

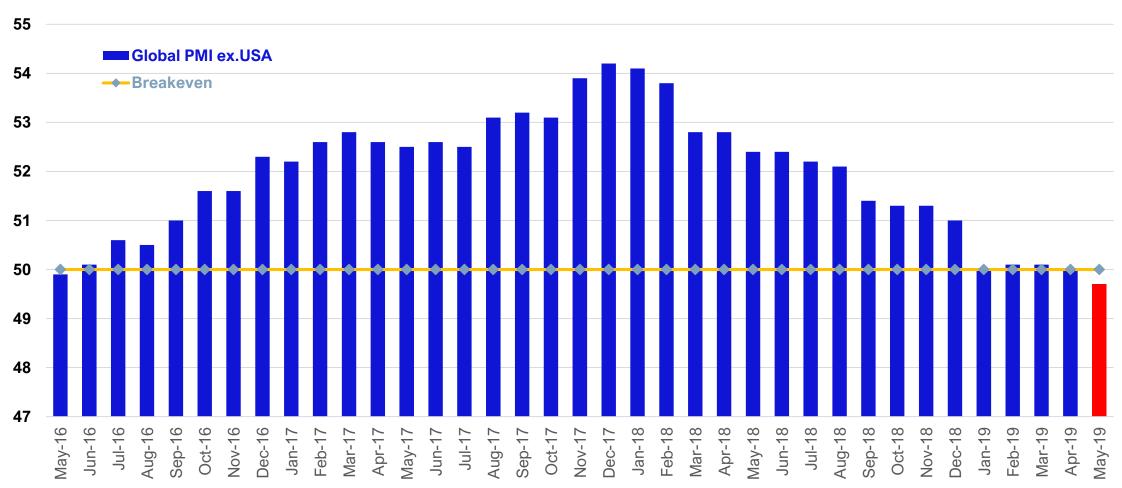


Global Supply Chains are Reacting to China-US Trade Dispute



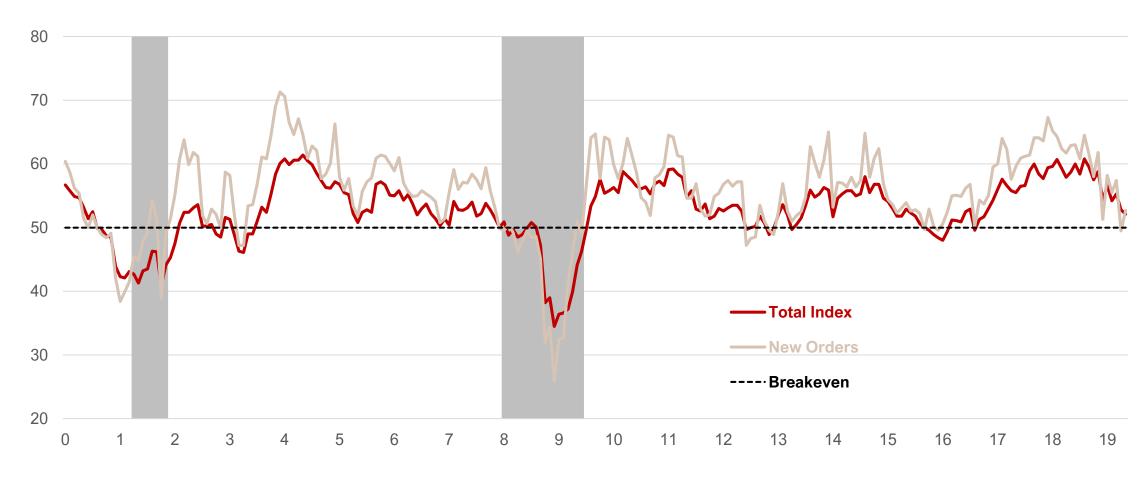
Global Manufacturing Sector Has Been Declining Since Late 2017





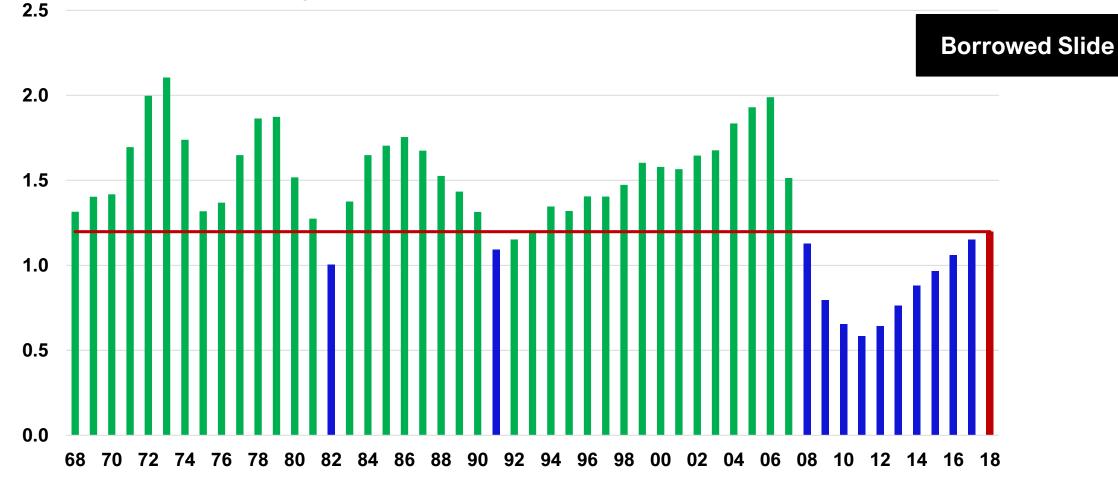
Purchasing Managers' Indices Show Manufacturing Sector is Slowing

Purchasing Managers' Indices, Breakeven Level = 50

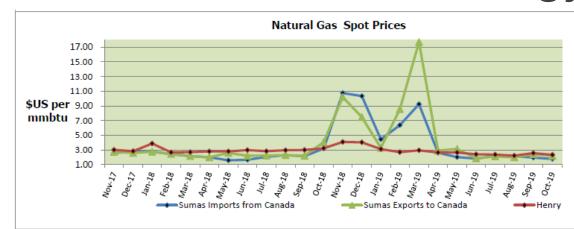


The 2018 Level of Housing Completions Was Typical of a Recessionary Low in Previous Economic Cycles

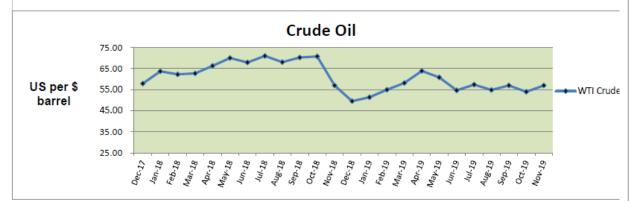
Annual Level of Housing Completions, Millions



Oil, Gas and Energy



West Texas Intermediate (WTI) WTI crude oil is of very high quality and is excellent for refining a larger portion of gasoline. Its PI gravity is 39.6 degrees (making it a "light" crude oil), and it contains only about 0.24 percent of sulfur (making a "sweet" crude oil). This combination of characteristics, combined with its location, makes it an ideal crude oil to be refined in the United States, the largest gasoline consuming country in the world. Data is based on the monthly average from

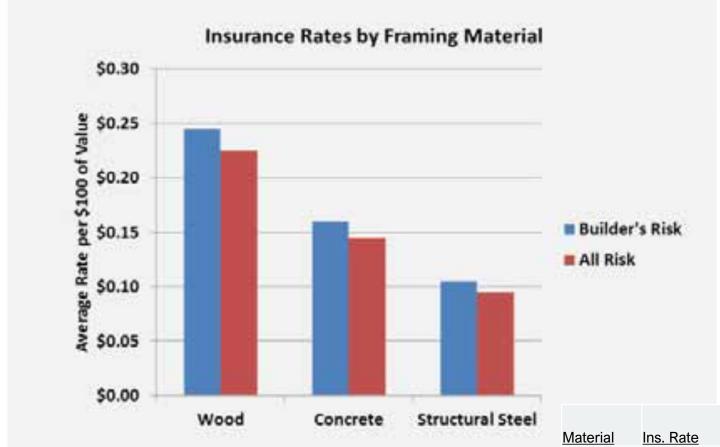




Mid Columbia Electrical Prices Most pertinent trading point for electrical pricing in the Pacific Northwest. Data is the monthly average from http://www.eia.gov/electricity/wholesale/index.cfm.



Insurance Rates Based on Material

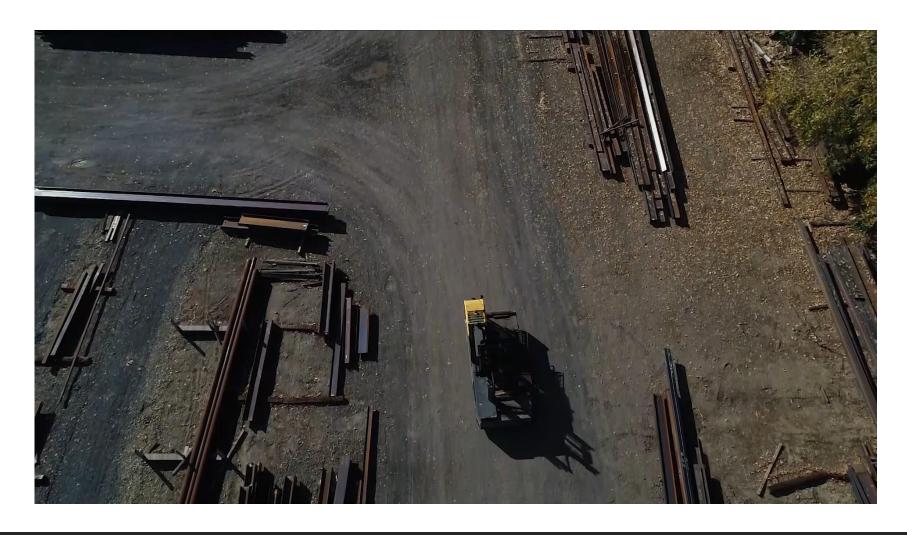


<u>Material</u>	<u>Ins.</u>	<u>Rate</u>	Premium %	Bldg. (Cost	Ins. (Cost/yr	Ins 50 yrs	Total Cost
Wood	\$	0.24		\$	2,000,000	\$	4,800	\$ 240,000	\$ 2,240,000
Concrete	\$	0.16	4%	\$	2,074,074	\$	3,319	\$ 165,926	\$ 2,240,000
Steel	\$	0.11	6%	\$	2,123,223	\$	2,336	\$ 116,777	\$ 2,240,000

Steel, ENR 20 City Average

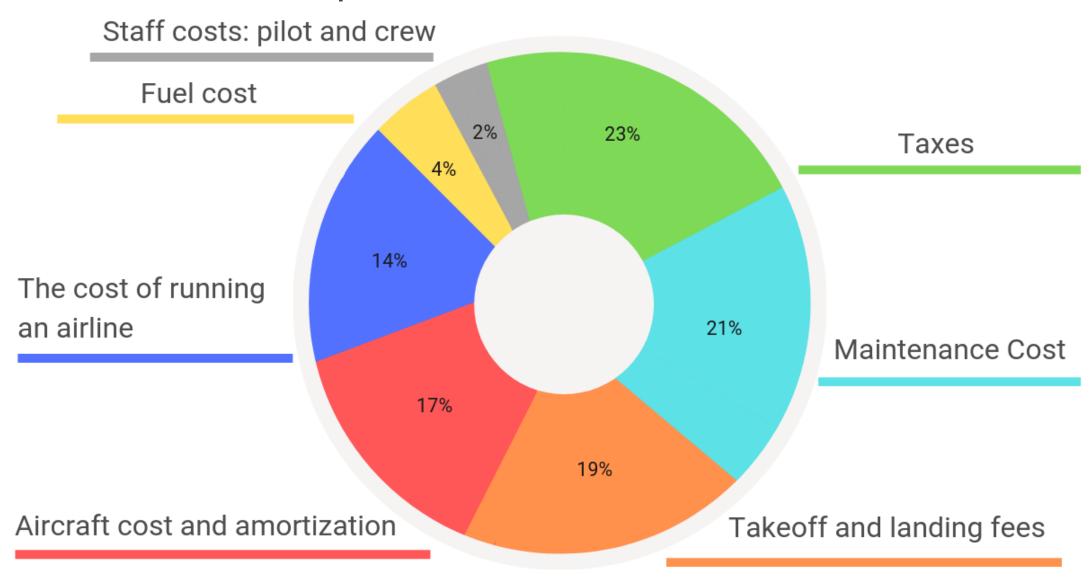


Fabricated Steel: Consider the "All In Price"

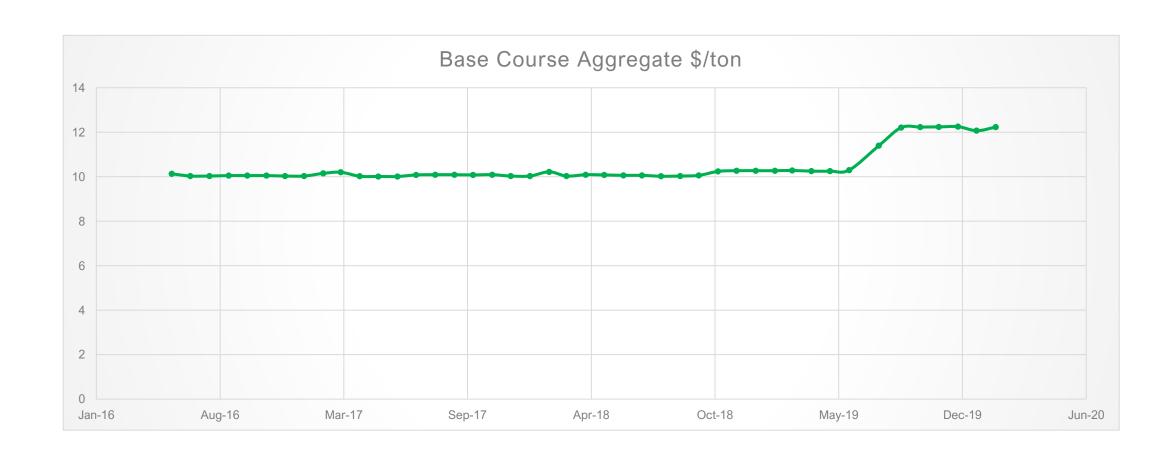


Installed Steel: \$1.50 to \$2.00/cwt

Airline Comparison



Aggregate, 20 City Average



Wood Products are Sustainable

Inputs
Seed
Soil
Water
Sun
CO₂











Outputs
Oxygen
Habitat
Stored Carbon
Mature Forest
Wood Products

30-80 years of forest management

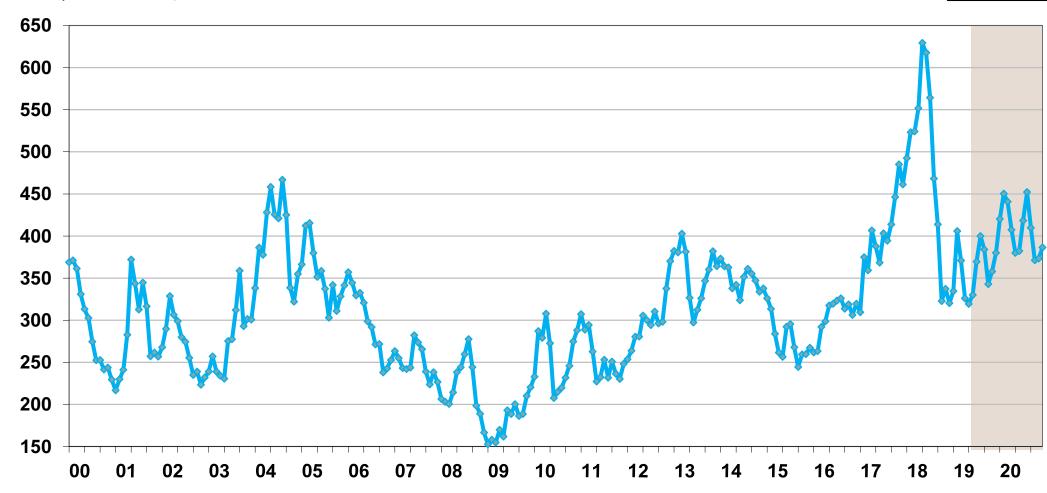
Preserved wood products are more sustainable

A replacement has grown in the 30-80 years of expected product life span

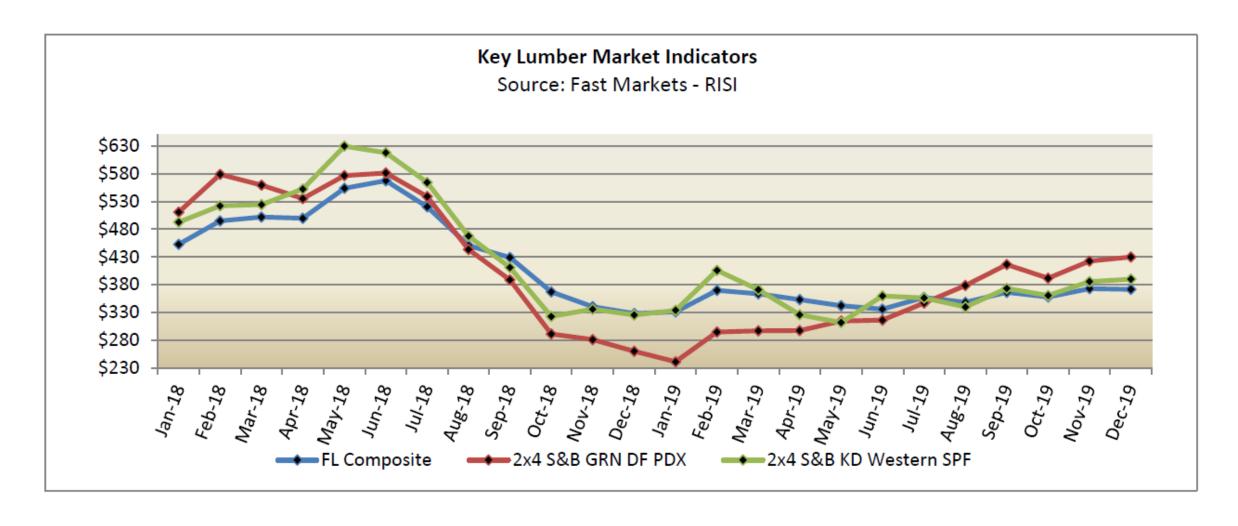
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Lumber Prices to Trend Upward

2&Btr 2x4, Western SPF \$US/MBF

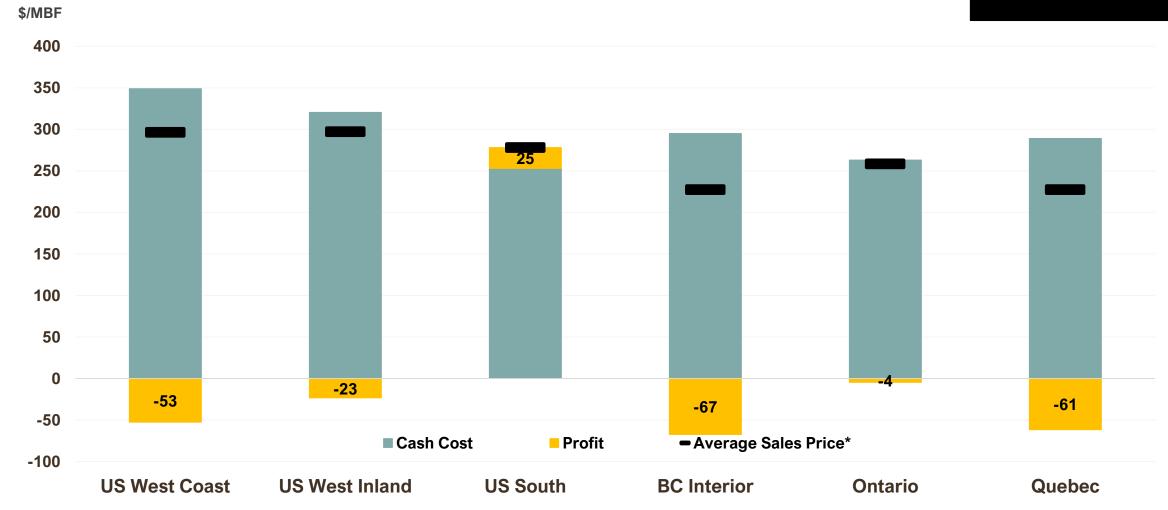


Wood Prices Last Two Years by Month



Mills Were Losing Money On Cash Costs

Borrowed Slide



*After deducting duties for Canadian Mills

The Last Time Prices Were This Low, We Saw Significant Curtailments And It Has Begun Again

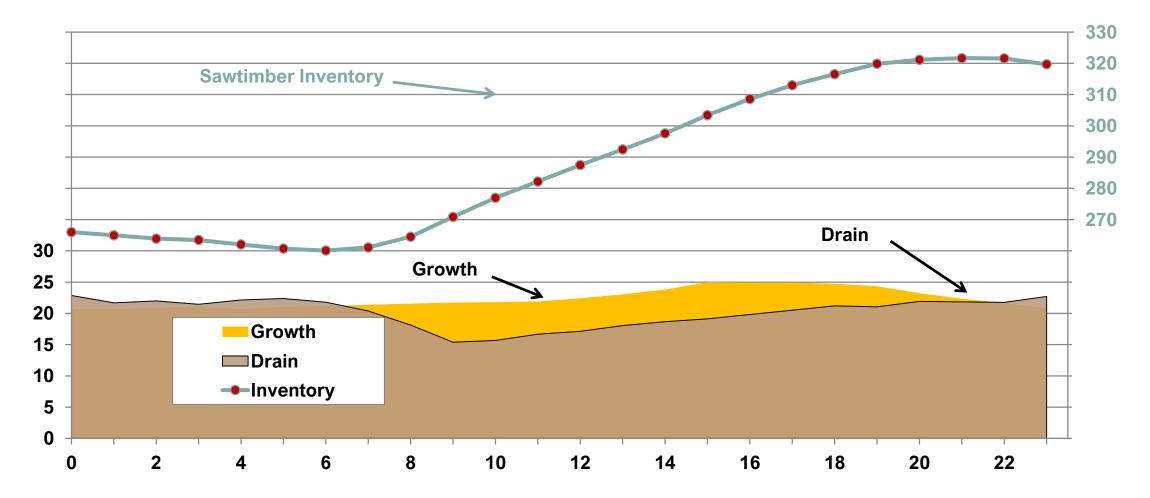
	LIC Wood			Canada			
	US West						
6/6/2019	Manke	1 Mill	6/5/2019	Tolko	2 Mills		
5/31/2019	F.H. Stoltze	1 Mill	6/3/2019	West Fraser	5 Mills		
5/1/2019	Saratoga FM	1 Mill	6/3/2019	Conifex	2 Mills		
2/26/2019	Swanson	1 Mill	6/4/2019	Canfor*	Vavenby		
12/11/2018	Rosboro	2 Mills	5/31/2019	Aspen Planers	Remove 1 shif	ť	
12/11/2018	Saratoga FM	1 Mill	5/25/2019	Interfor	All BC mills		
			5/23/2019	Tolko	2 Mills		
12/6/2018	Schmidbauer	1 Mill	5/16/2019	West Fraser	2 Mills		
11/28/2018	Swanson	1 Mill	5/10/2019	Western	1 Mill		
11/14/2018	Rosboro	1 Mill	5/1/2019	Conifex	2 Mills		
11/13/2018	Swanson	1 Mill	4/25/2019	Interfor	All BC mills		
11/8/2018	Seneca	2 Mills	4/24/2019	Canfor	All BC Dimens	sion mills	
*Permanent							

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The South's Softwood Sawtimber Inventory Will Continue Expanding in the Near Term

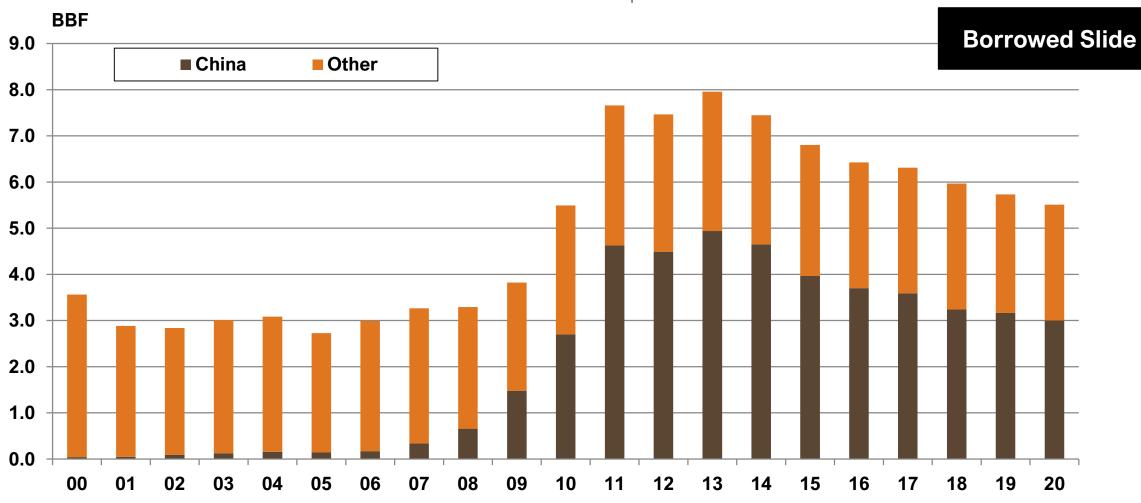
Growth & Drain, BBF Int'l 1/4"





Growth In Chinese Demand Is Slowing

North American Overseas Wood Exports



China Imposed Tariffs on US Softwood Log and Lumber

SYP log: 25% tariff

Hemlock log, 15cm+: 5% tariff

Douglas fir log, 15cm+: 5% tariff

Hemlock log, <15cm: 20% tariff

Douglas fir log, <15cm:20% tariff

Spruce log:20% tariff

Douglas fir lumber, SYP lumber, Hemlock lumber: 20% tariff

Is Mass Timber the Wave of the Future?

What are the different types of mass timber panels?

CLT - Cross Laminated Timber



NLT - Nail Laminated Timber



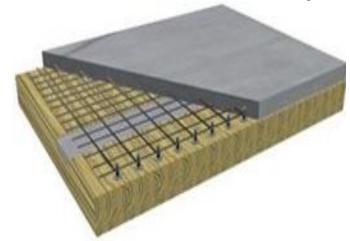
DLT - Dowel Laminated Timber



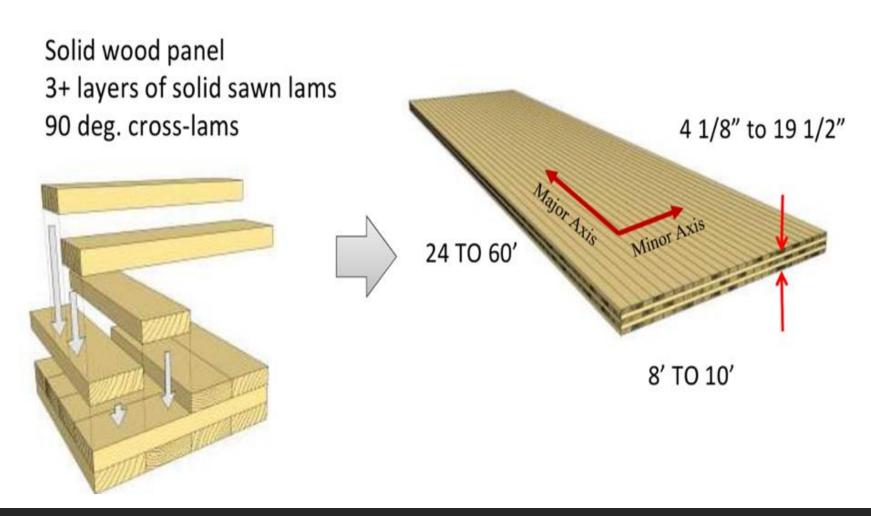
MPP – Mass Plywood Panel



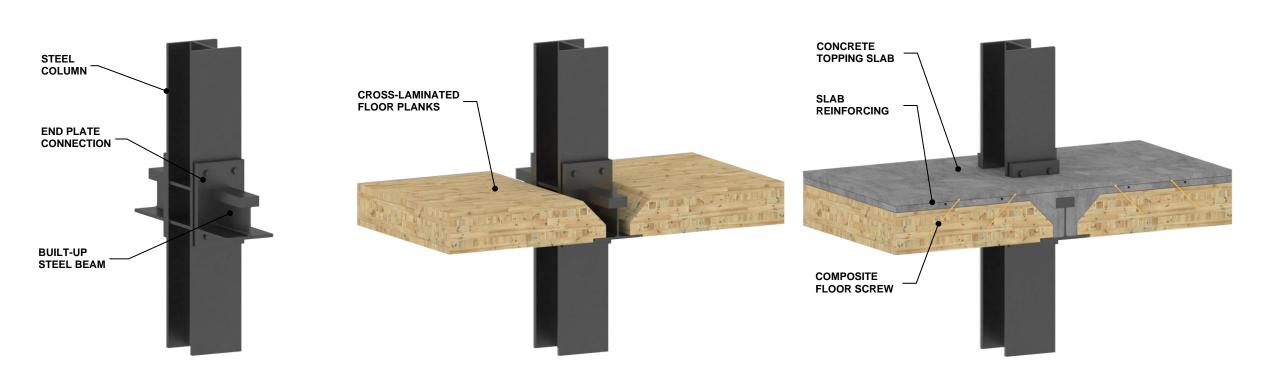
TCC – Timber-Concrete Composite Timber



The dominant mass timber panel product is CLT



Steel, Wood and Concrete: the devil is in the details



<u>STAGE 1 - STEEL FRAMING</u> <u>STAGE 2 - CLT FLOOR PLANKS</u> <u>STAGE 3 - CONCRETE TOPPING</u>

Why has offsite construction been gaining ground globally?

- Construction-labor productivity is very poor.
- Severe shortages of skilled onsite construction labor.



The Construction Industry Has A Terrible Productivity Record

Circa 1940s

> Circa 2016

Key advances

Productivity Growth¹

Agriculture





Land assembly and automation for scale Advanced bioengineering to increase yields

1,512

Manufacturing





Entirely new concepts of flow Modularized and standardized designs Aggressively automated to increase production

760

Retail





Utilized scale advantages and cutting edge logistics to provide affordable goods to the masses

699

Construction





Limited improvements in technological capabilities, production methods, and scale

6

Employment in Residential Construction Has Stalled Even as the Unemployment Rate for Construction Workers Has Plunged

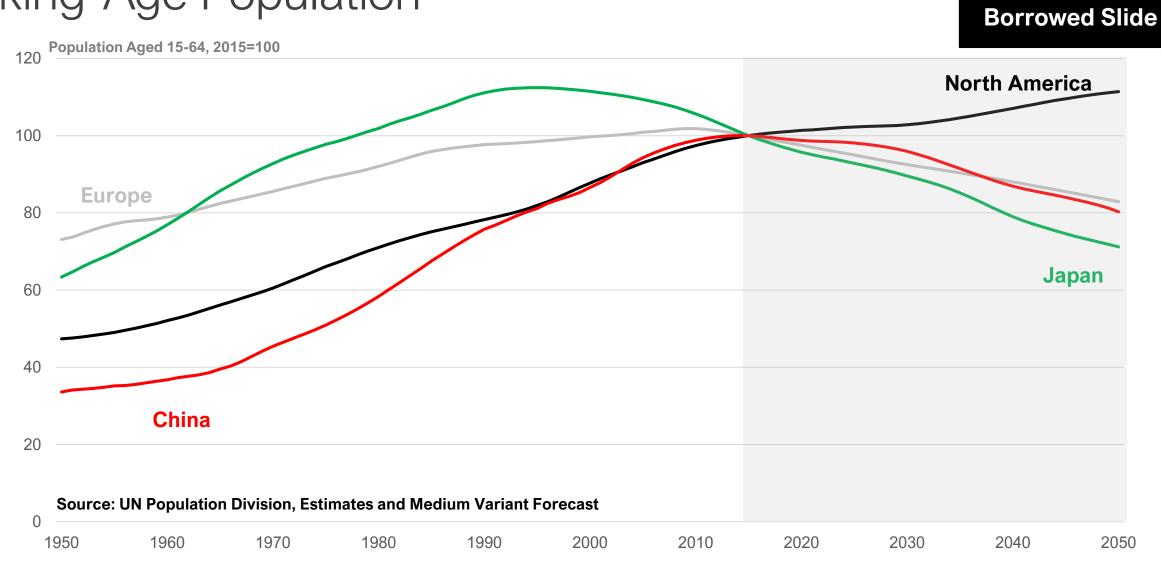


Labor

"greatest innovation in residential construction is the invention of the nail gun"

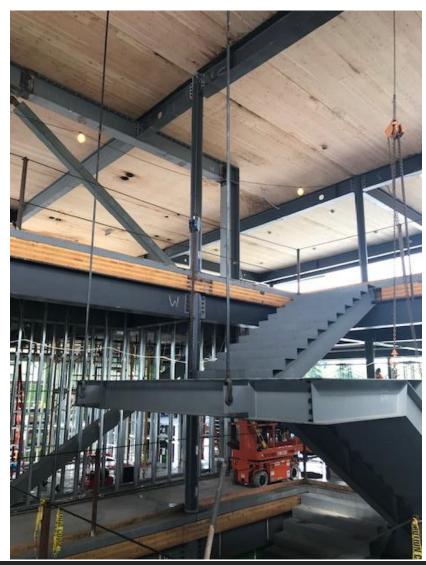
Labor shortage isn't just about contractors it is about their suppliers too.

North American is Only Major Economy With Growing Working-Age Population



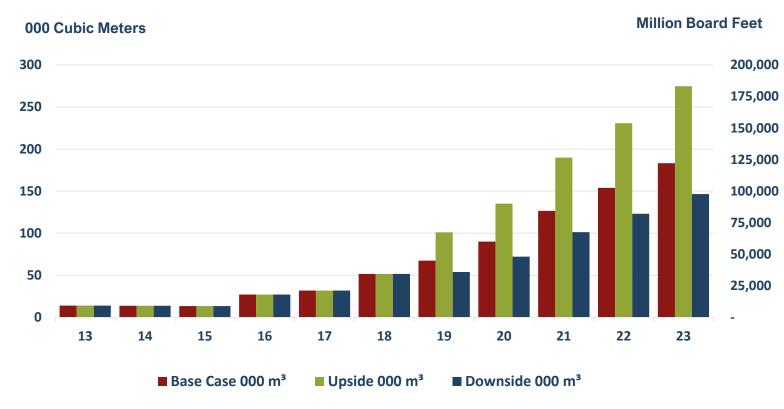
Wood, Steel and Concrete Hybrid Construction

The Right Material for the Right Applications



We Expect CLT Consumption Growth to Average 29%/year through 2023

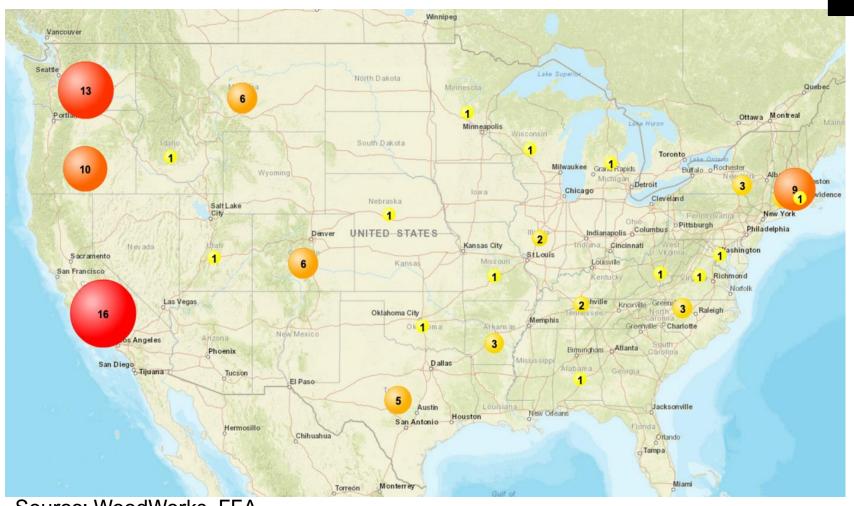
North American CLT Consumption Forecast Construction Only



Source: FEA

Mass Timber Panel Projects Built &/or Started Since 2010

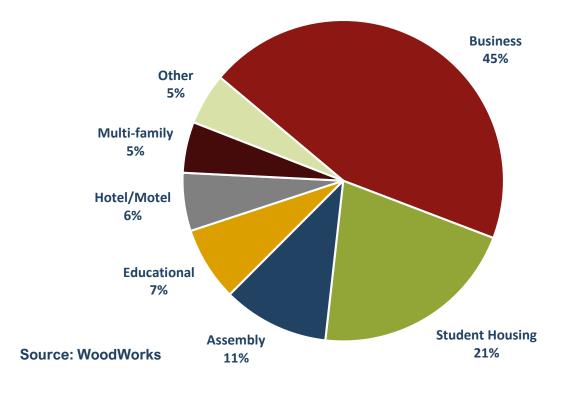
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Source: WoodWorks, FEA

Mass Timber Panel Projects Built &/or Started Since 2010

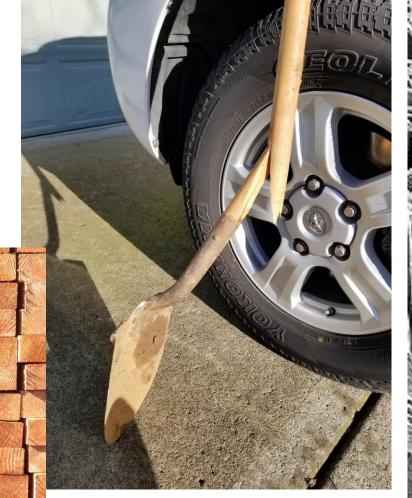
US Mass Timber Panel Consumption by Building Occupancy, 3-Year Average 2016-2018

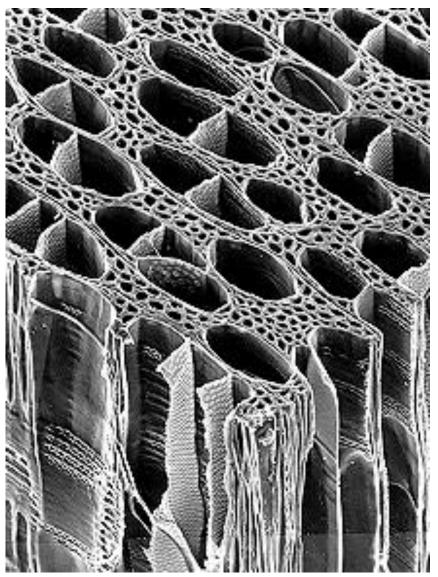


Wood- Natures Steel and Concrete

Made up of Tiny Straws.

Pound for pound stronger than steel





Wood

First Board Installed On Every House

- Preserved wood Sill Plate
- Chemical protect the rest of the wood.



Mistakes Can be Made

Industries

After the Berkley deck collapse, rather than requiring preserved wood, construction industry advocated and passed requirements for a drain under "impervious barrier" over wood

Berkeley balcony collapse: Water-damage lawsuits plague construction company

By Thomas Peele and Matthias Gafni Bay Area News Group Updated: 06/18/2015 01:38:44 PM PDT

BERKELEY -- The construction company that built the apartments where six students died Tuesday when a fifth-story balcony gave way has been sued at least three times over water damaged balconies and other structures and paid more than \$6 million to settle two of them, according to court records.

Water damage that caused wood to rot is the likely cause of the fatal Berkeley collapse, said engineers who have reviewed photos of the damage for this newspaper.

Lawsuits in Santa Clara, San Mateo and Contra Costa superior courts show Pleasanton-based Segue Construction has been accused of leaving newly constructed buildings susceptible to water incursion that



red Segue in 2001 for work on ary 2009, Irvine "discovered including on "elevated decks tions," records show.

llation has grown that dry rot ny collapse at the Library parts of the San Jose

and Segue later sued a

imaged balconies were

er intrusion causing tangible Benior Housing Associates

-SELECT THE RIGHT PRESERVED WOOD FOR YOUR PROJECT-LANDSCAPE WALL **SHAKES & SHINGLES FASCIA & TRIM** GROUND CONTACT ABOVE GROUND BOVE GROUND, PROTECTE Use Category 4A or higher Use Category 3B or higher Use Category 3A or higher DECK RAILING ABOVE GROUND 1 FENCE PICKETS Use Category 3B or higher ABOVE GROUND, PROTECTE Use Category 3B or higher DECK BOARDS STRUCTURAL ABOVE GROUND 1 Use Category 3B or higher POSTS **GROUND CONTACT** Use Category 4A or higher POSTS PORCH FLOORING SILL PLATE GROUND CONTACT ABOVE GROUND Use Category 4A or higher Use Category 3A or higher lse Category 2 or higher STAIRS ABOVE GROUND Use Category 3B or higher IOISTS & BEAMS GROUND CONTACT ABOVE GROUND 1 Use Category 4A or higher Use Category 38 or higher LEDGER **GROUND CONTACT** Above Ground components that may be required to be preserved for ground contact include joists and beams PERMANENT WOOD Use Category 4A or higher **GROUND CONTACT ¹** that are difficult to replace and critical to the structure or components that may be exposed to ground contact GARDEN BOX type hazards due to climate, artificial or natural processes or construction. Use Category 4A or higher FOUNDATION NOTE: This is designed to help identify the appropriate Use Category for the intended use. Some commodities GROUND CONTACT GROUND CONTACT may require a retention for a specific application beyond that suggested, due to the critical nature of their use. Use Category 4A or higher Use Category 4B or higher The designer should use their best judgement to determine the appropriate specification for a particular use. AMERICAN WOOD PROTECTION ASSOCIATION (AWPA) PRESERVED WOOD USE CATEGORIES UNDERSTANDING THE END TAG UC4 Ground Contact, fresh water UC4A — General use 1 ABOVE GROUND ◆ Above Ground, exterior construction UC2 Interior Construction, above ground, damp UC3 UC3A - Coated, rapid water runoff Brand AWPA U1, UC3B . Name or ALSC CA-C -CA-C UC4B - Heavy duty Logo UC3B - Uncoated, poor water runoff 1 Use Category (UC) information is found on the end tag or treatment stamp



Home The Story Uses How To Tech Resources Who We Are

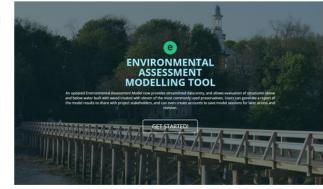


What's New

Online model guides preserved wood selection for aquatic uses

Determining any potential impacts from using preserved wood in aquatic or sensitive environments is now easier with a new, user-friendly Environmental Assessment Model.

The online model streamlines the process of modeling the conditions for a project to estimate the potential migration of preservatives from preserved wood immersed or over water. It is



based on pioneering research by Dr. Kenneth Brooks and has been peer reviewed, repeatedly field tested and proven to protect the environment.

The model, which is also available as an Excel spreadsheet, has been used by the National Oceanic and

Everything you need for using preserved wood



The best resource for Western preserved wood products is just a click away with the Preserved Wood Tech Library.

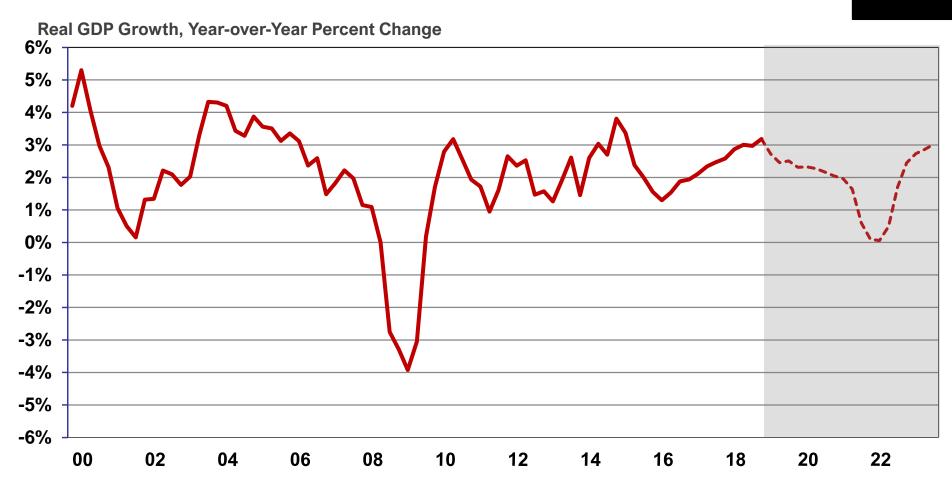
The library offers an extensive collection of downloadable publications, technical sheets and design tools to properly select, specify and use Western preserved wood on almost any project.

Check out the online library!





Economic Cycle Forecast



Sources: US Bureau of Economic Analysis, FEA

Housing Start Profile



Sources: US Bureau of Economic Analysis, FEA

Did We Get Along?

Wood Guy

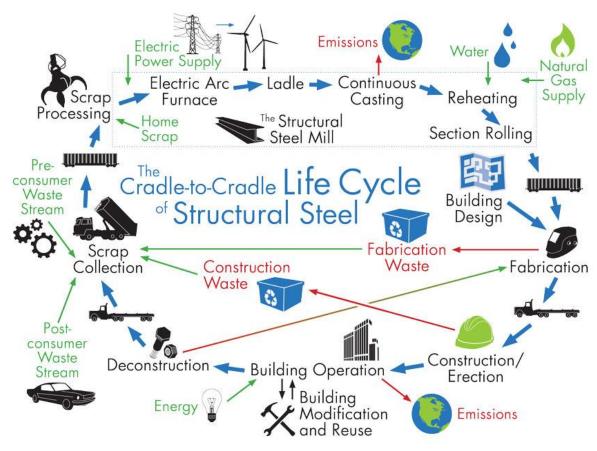
Steel Guy



Concrete and Plastic



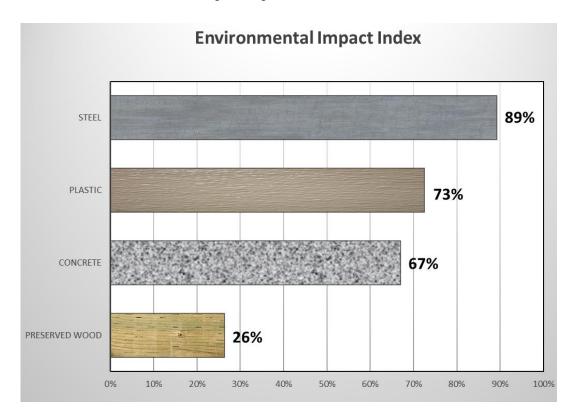
Life Cycle of Steel



- Enough steel is created each day to build 548 Eiffel Towers
- 217 kg of steel, on average, is used in new products per person globally
- 8 million people work in the steel industry

You have a choice

Wood Guy Says



Steel Guy Says

Embodied Energy (per the "Wood Guys"):

Concrete: 12.5 MJ/kg

Steel: 10.5 MJ/kg

Wood: 2.0 MJ/kg

Steel/Wood Factor 10/2 = 5

Case Study- 16" deep member w/ 40' span

Glulam- (2) 8 3/4" x 16 1/2" at 70 lb/ft

Steel- (1) W16x45 at 45 lb/ft

Steel/Wood Wt Ratio: 45/70 = 64%

Adjusted Factor $5 \times 64\% = 3.2$

For wood add: fire-retardant, paint, pesticide, etc.

For steel add: recycled content, paint, fire-proof

Thank You For Your Time





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www.SunSteelllc.com