

Solid Wood Products

Based on "A New Taxonomy of Wood Products" by David Cohen & Simon Ellis, 1998; latest update 2011.

Acknowledging the contribution of Robert Kozak and Bill Wilson in the initial 1996 edition.

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Most solid wood is used in housing

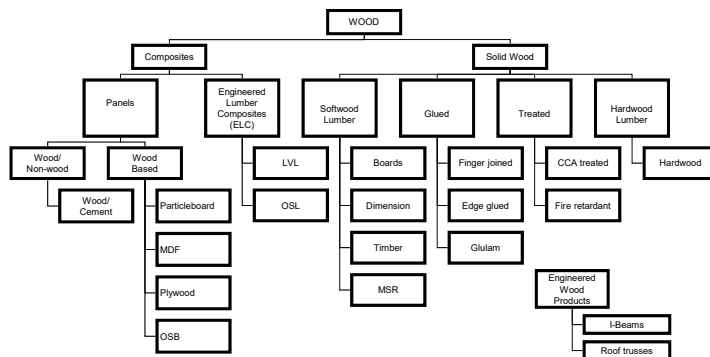


- US house construction and repair & remodeling consume majority of Canadian lumber and panels
- 30-40% of lumber used in new house construction and 30-40% in repair and remodeling

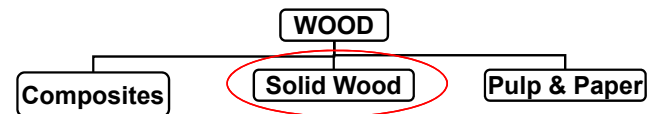
- Other countries that build wood houses: Scandinavia, Japan, Australia, NZ, growing in EU, David Cohen

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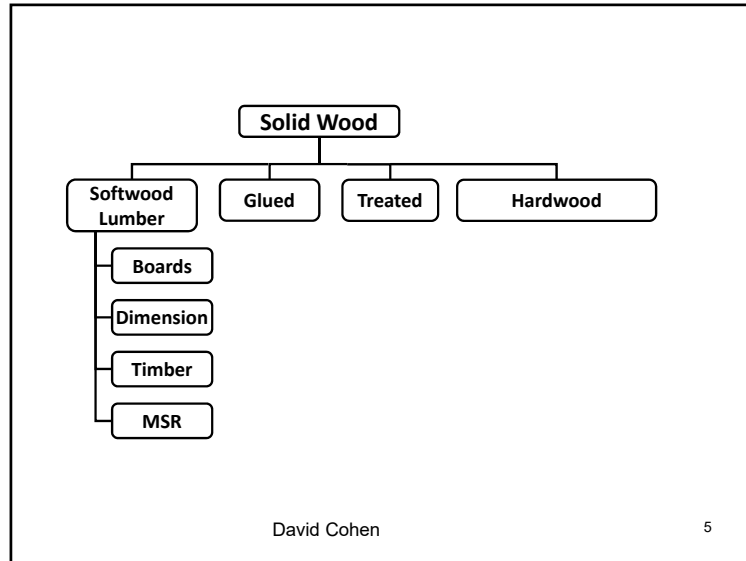


Wood Products Taxonomy



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Softwood Boards

BC Wood Specialties

- What: 1" thick material, 2" width increments, 2' length increment usually dried and planed smooth
- Uses: as a non-structural, finished products to manufacture desks, shelving, furniture etc.
- Where produced: North America and Europe
- Markets are: export, industrial, and home centres
- Trends: lost share to panels cut to size with veneer or laminate surfaces

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Dimension Lumber

- What: "2 by 4", "2 by 6", "2 by 8" construction lumber bulk commodity product with little specialization
- Dominates lumber production NA
- Uses: residential construction & repair/remodeling in NA
- Where produced: majority of lumber produced in NA
- Trends: production grew approx. 1.4%/year from 1985-2005

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Dimension lumber – why is a 2 by 4 not 2" by 4"?

Rough sawn ("nominal" size) 4.0" x 2.0"

After drying (actual size) 3.7" x 1.7"

After planing "Two by four" 3.5" x 1.5"

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Timber

- What: minimum dimensions 5.5"
- Uses: post & beam construction & reman



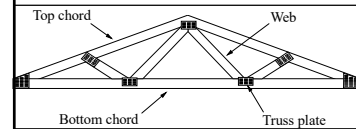
- Produced: in NA and Europe (smaller quantity)
- Trends: declining supply & use due to raw material supply
- Architectural value as well as structural role; popular in vacation homes

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Machine Stress Rated Lumber

- What: lumber is graded by machine (bending → strength)
- Uses: to make engineered structural products used in construction
- Where: made in Canada and EU
- Trends: increased structural & architectural uses (examples below)



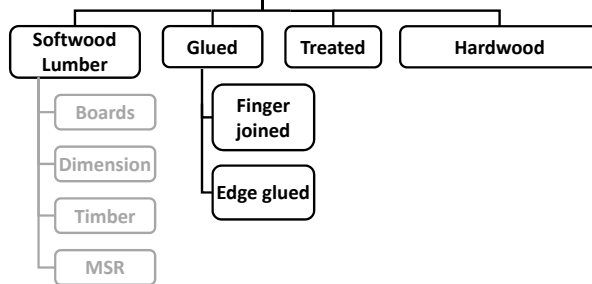
Roof trusses
I-beams



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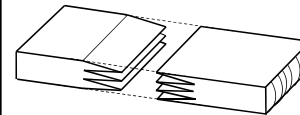
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Finger Jointed Lumber



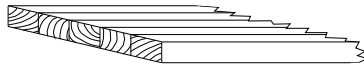
- What: longer lengths made from short stock
- Why: removes defects → ↑ strength & dimensional stability + uses waste
- Production: across Canada, particularly central & eastern Canada
- Uses: in glulam, I-beams, windows, doors
- Trends: relatively stable supply & demand



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Edge-glued Panels



Random end grain patterns reduces cupping

- What: edge-lamination of wood (like a cutting board)
- Uses: to produce **dimensionally stable** panels for table tops, desks and solid panels to be covered in veneers
- Produced: in regions with low labour costs e.g. China & Vietnam
- Trends: stable production and use

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Treated Wood



- What: treated with chemical to preserves wood from decay & rot
- Uses: used in external conditions such as decks, walkways, fences
- Production: most in southern US since species requires no incising (i.e. scoring wood), in Canada wood requires incising
- Trends: treatment becoming less effective to minimize human health & environmental issues

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Hardwood Lumber

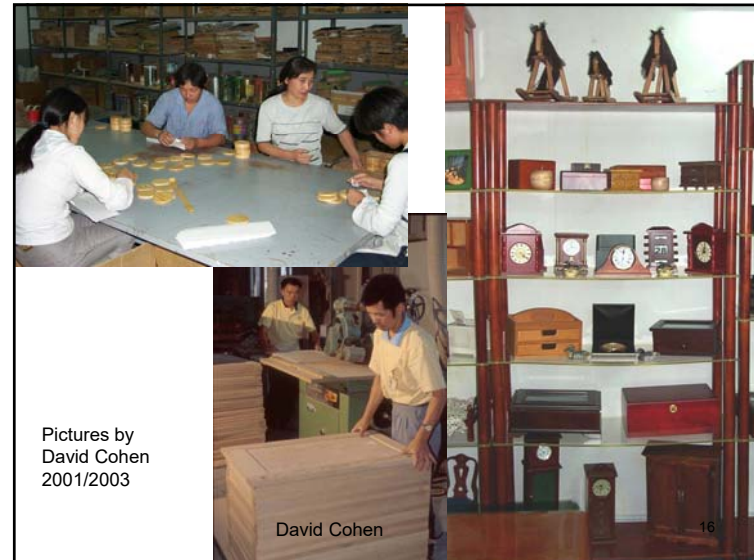


- What: green hardwood lumber often of mixed widths and length
- Uses: decorative & architectural purposes so visual appearance of lumber is key
- Production: mostly where HW grows
- Uses: Flooring, trim & molding, joinery, cabinets, furniture, etc.



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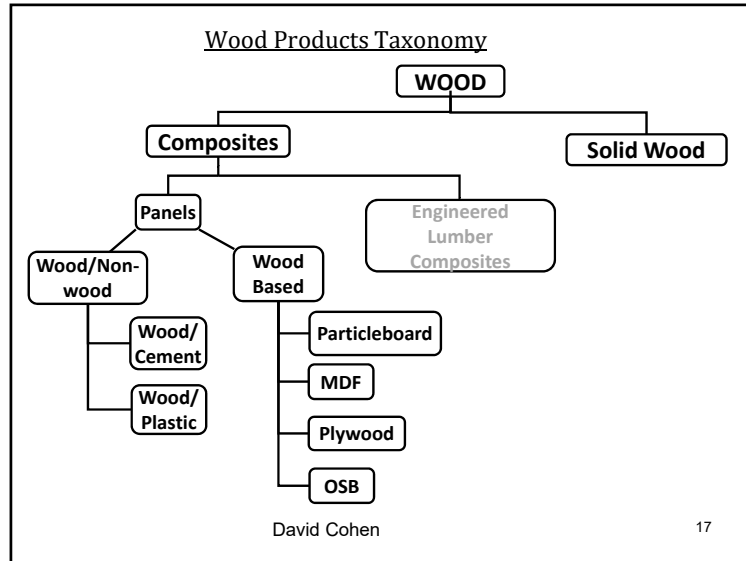
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Pictures by David Cohen 2001/2003

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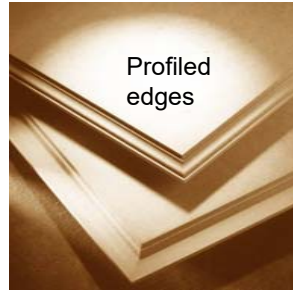
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- Wood-based Panels
- Non-structural panels
 - Particleboard
 - Medium density fiberboard (MDF) & high density fibreboard (HDF) used for laminate flooring
 - Structural panels
 - Plywood
 - Oriented strandboard (OSB)
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- Particleboard
-
- What: non-structural panel made with particles from sawmill waste
 - Uses: smooth surface often covered with laminate → used for cabinet boxes, desks, bookcases, beds, and other low cost furniture
 - Produced: throughout NA and EU close to end use due to weight
 - Trends: being replaced by MDF which has smooth edges, slow decline due to lower cost
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Medium Density Fiberboard (MDF)



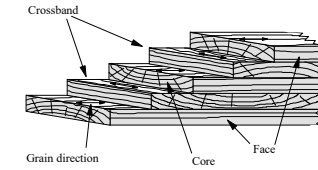
Profiled edges

- What: non-structural panel made from wood fibres from sawmill waste
- Uses: since edges can be machined all four surfaces can be wrapped with laminate and used for molding, cabinet doors, furniture, etc.
- Produced: over 50% is produced in China for its wood furniture industry
- HDF: high density fibreboard is produced for laminate flooring
- Trends: production follows furniture manufacturing

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Plywood



- What: a structural panel produced from softwood veneers
- Uses: for residential construction in NA & concrete forming
- Production: mostly in BC and the US
- Market: has been mostly lost to OSB and continues to decline

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Plywood used as house sheathing

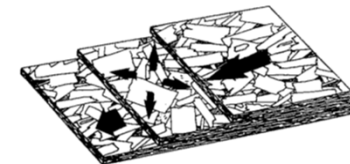


Plywood used for concrete forming

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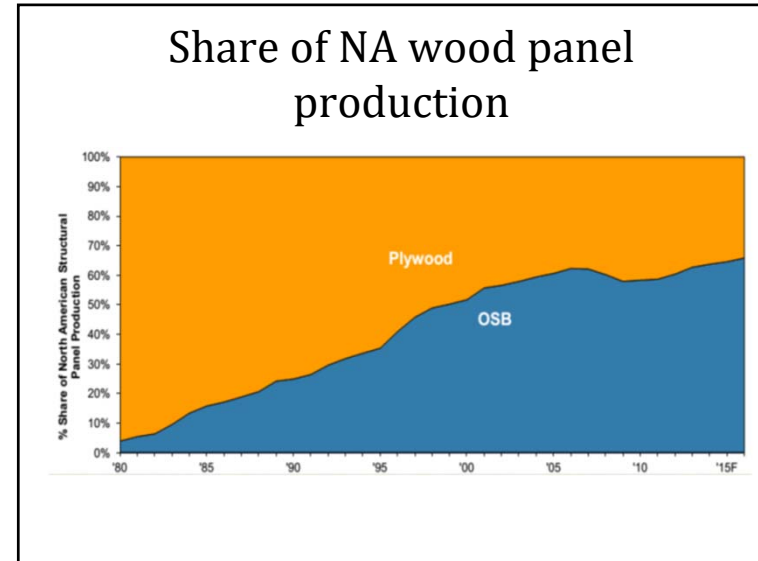
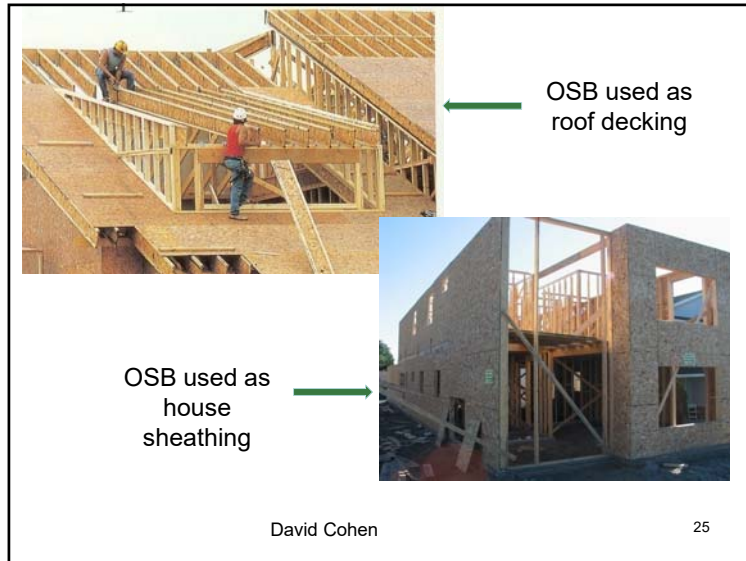
Oriented Strand Board



- What: structural panel that uses strands of low quality hardwoods (e.g. aspen, poplar)
- Uses: replacing plywood in most applications e.g. sheathing
- Production: mostly in Canada & US, growing in Asia
- Trends: overcapacity as global recession hit, demand tied closely to US new housing starts & remodeling

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Wood/Cement Composite Panels

- Combining small pieces of wood with cement
- Acoustic ceiling tiles, roadside noise barriers, exterior siding
- Difficult to produce high quality with proprietary mixes

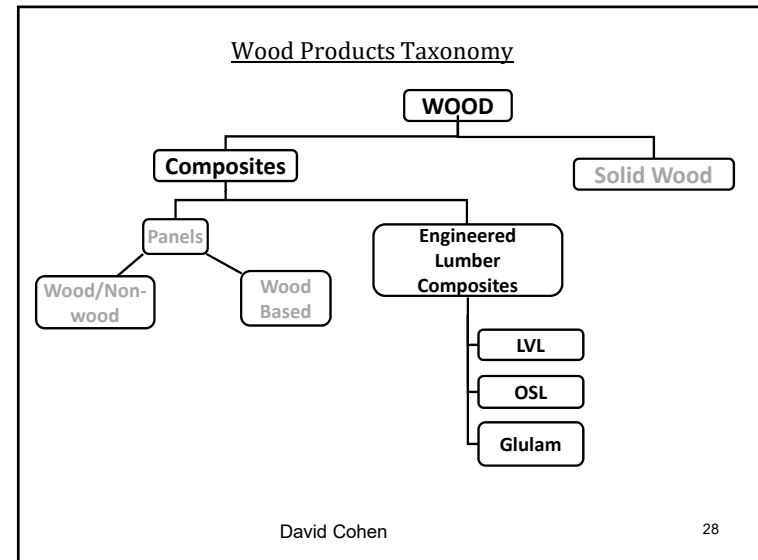


Wood/Plastic Composite Panels


- Non-structural material made from wood residues & recycled plastic
- Uses: in NA for decks and walkways, car parts
- Decking, exterior walkways, etc.




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Wood Elements in EWP




Strands



Veneer sheets



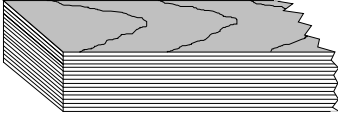

Veneer strips



Lamstock

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Laminated Veneer Lumber

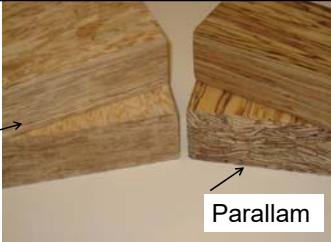
- What: is composed of layers of veneer with the grain of each layer running parallel to adjacent layers
- Uses: used on edge as a beam to span long distances or headers and lying flat as flange material for I-beams
- Production: because LVL beams can be very long production is usually close to end use regions
- Trends: increasing use due to uniformity, length and strength
- Defects are removed from veneers before manufacture → much stronger material than solid wood

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Oriented Strand Lumber

TimberStrand



Parallam



- boards or beam produced by gluing together strands of wood to produce a less variable building material
- TimberStrand made from flakes: and used for window frames, and rimboard
- Parallam made from strips of SW veneer used for high end structural purposes

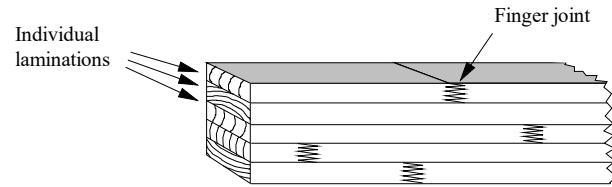
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Oriented Strand Lumber

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Glue Laminated Timber (Glulam)



- Fingerjoined dimension lumber glued together to make a strong stack of solid wood
- Straight glulam can be used for beams, columns, & trusses while curved glulam produces arches & complex curved figures
- Use as architectural feature increasing

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Curved Glue Laminated Lumber (Glulam)



- Curved members can be created
- Tighter curves require thinner laminations
- Architectural as well as structural

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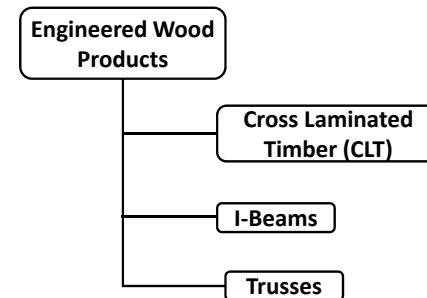
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Cross-Laminated Timber



Wood Design Centre PG, BC

- large panels made from laminations of dimensional lumber with each adjacent layer is oriented with grain perpendicular (like plywood made from dimension lumber)
- Used in tall wood buildings as walls, floors & oil drilling platforms
- Production: 1st plant in NA in BC, more common in EU
- Growing interest in NA but demand not greater than supply

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Cross-Laminated Timber



Photos taken at Structurlam

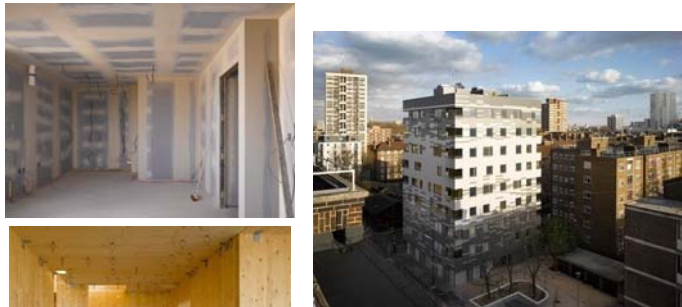
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background composite ELC EWP

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Cross-Laminated Timber

Nine-story residential building (wooden construction)

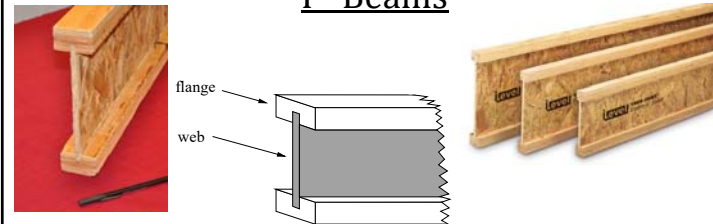


(Waugh Thistleton Architects)

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I - Beams



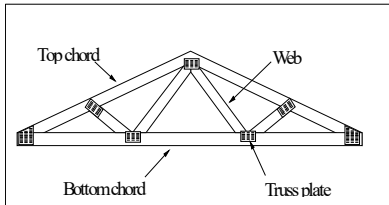
- EWP used as floor or roof support instead of solid wood with a flange & web (uses 40% less wood)
- Flange can be made from MSR lumber, LVL, or Parallam while web can be made from OSB or Plywood
- Used on over half of all floors in new house construction in NA
- Custom manufactured close to construction site
- Growing concern for fire safety & offgassing

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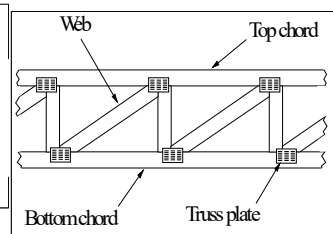
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Trusses

Pitched chord truss



Parallel chord truss



- EWP made up of shorter pieces of MSR lumber used to support roofs in single and multi family homes
- Used in roof renovations & in over 90% of new houses built in NA
- Awkward shapes results in costly shipping so they are manufactured close to where they are used

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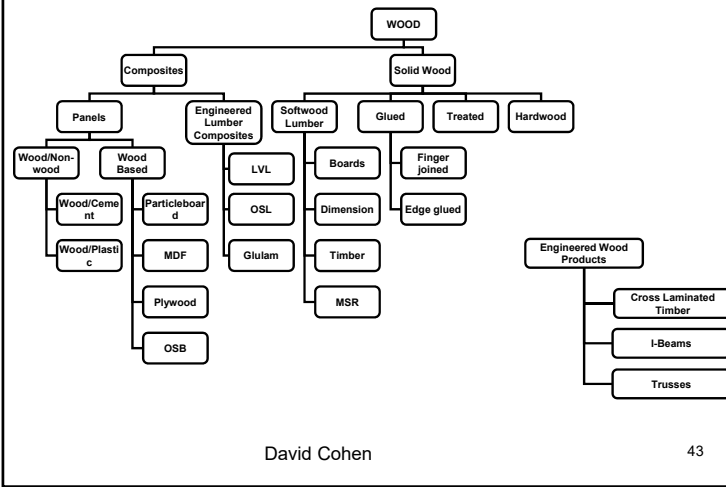
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