MAKING GREENER MATERIAL CHOICES
Healthy Materials, And the Alternative

Rebuild Green Expo
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Healthy Building Science, Inc.
What is a sustainable material?

• Minimally processed
• Low embodied carbon
• Energy efficient
• Regionally harvested
• Rapidly renewable
• Healthy
  • Ecology - upstream, downstream
  • People - upstream, downstream
  • During/After Fire?
“When you can’t breath, nothing else matters.”
Why?

Good IEQ Makes a Difference!
When To Engage

Design Phase
• Architect
• Interior Designer?
• Decorator?
• Specifications

Construction Phase
• Quality Control
• Green Police

Pre-Occupancy
• Commissioning & Testing
• Green Cleaning
Construction IAQ - Assess

Is Your Home Lead Safe?

Lead

Was your home built before 1978?
Do you have a child younger than age 6?
Are you worried about lead in your water?

If you answered yes to any of these questions, read more below to learn how to keep your home and children safe.

Asbestos
Are there nasties? Low- & High-Tech

Low-tech

High-tech
Material Selection Process

Building Biology Principles:

• Natural and unadulterated building materials
• Humidity-buffering materials
• Low moisture content of new materials
• Materials with low radioactivity
Material Selection Process

Who ultimately decides:
- Designer of record
- Builder of record
- Owner

Process of Review:
- Questionnaire
- How deep
- What cycles of life matter most
- Chamber testing

Transparency:
- Product disclosures
- Review process
- Limitation of liability
Material Selection Process

Who’s Health?

- Family and pets
- Neighbors
- Environment
- Manufacturing
- Construction
- Emergency workers
- Maintenance personnel
Healthy Building Materials 101

Living Building Challenge
“The project cannot contain any of the following...”

- Asbestos
- Cadmium
- Chlorinated Polyethylene and Chlorosulfonated Polyethylene
- Chlorofluorocarbons (CFCs)
- Chloroprene (Neoprene)
- Formaldehyde (added)
- Halogenated Flame Retardants
- Hydrochlorofluorocarbons (HCFCs)
- Lead (added)
- Mercury
- Petrochemical Fertilizers and Pesticides
- Phthalates
- Polyvinyl Chloride (PVC)
- Wood treatments containing Creosote, Arsenic or Pentachlorophenol

What standard “green” materials contain these ingredients?
Healthy Building Materials 101

Living Building Challenge
“The project cannot contain any of the following...”

- Asbestos
- Cadmium
- Chlorinated Polyethylene and Chloroform
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- Chloroprene (Neoprene)
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- Halogenated Flame Retardants
- Hydrochlorofluorocarbons (HCFCs)
- Lead (added)
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- Petrochemical Fertilizers and Pesticides
- Phthalates
- Polyvinyl Chloride (PVC)
- Wood treatments containing Creosote
MSDS Isn’t Enough
Healthy Building Materials 101

Health Product Declaration

HPD Health Product Declaration

- Ecotoxicity
- Human Toxicity

EPD Environmental Product Declaration

- Abiotic Depletion
- Acidification potential
- Eutrophication potential
- Global Warming potential
- Ozone Layer Depletion potential
- Photochemical Ozone Creation potential
Chamber Testing = Sure Thing
### 4th Case Study

**Hot granite?**

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<th>% over Baseline</th>
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<td>Crema Bordeaux</td>
<td>845</td>
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<td>42</td>
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Managing IAQ Best Practices

Are there nasties? (Assess)

Control nasties (6 Strategies)

Avoid New Nasties #1 (Material Selection)

Avoid nasties #2 (Ventilation)

Live healthily ever after...
Don’t just trust the team...

Most Design/Build Teams Need Help!
“When you can’t breath, nothing else matters.”

THANK YOU &
Be Safe!

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MAKING GREENER MATERIAL CHOICES

Generally, prefer wood, stone, and natural fibers and plant based finishes

Carefully consider plastic finish materials and sealants
MAKING GREENER MATERIAL CHOICES

• Use the HOMEFREE SPECIFICATION by Healthy Building Network
• OTHER RESOURCES: BuildingGreen, Pharos, CalGreen, Green Science Policy Institutes
• LOCAL STORES:
  – Hendricksen Natürlich Flooring Sebastopol.
  – Natural Home Products, Rohnert Park:  
    http://www.naturalhomeproducts.com/index.html
  – Transmineral USA, Petaluma (lime plasters, paints, putty, and more):  http://limes.us/
  – Auro outlet in Petaluma
  – Friedman’s some green building materials
  – Pine Street Interiors, Sausalito
  – EcoHome Improvement, Berkeley
HOMEFREE SPECIFICATIONS

ANTIMICROBIALS:

• They are pesticides

• A few names: Tricoslan, Microban, Silver Nanoparticles

• Where are they?
  – PAINTS, SEALANTS, GROUT, CAULK.
  – CUTTING BOARDS, DOOR KNOBS, COUNTERTOPS
  – TEXTILES, CARPETFIBERS, FLEXIBLE PVC
  – WOOD PRODUCTS

• In many cases, it is advertised and so easier to avoid
HOMEFREE SPECIFICATIONS

FLOORING: Best to use solid wood, bamboo, earth or polished concrete

- Use plant based finishes such as Rubio Monocoat, Linseed oil and beeswax.
- Mineral silicate with polished concrete

Bob Theis Architect

Massey Burke Construction
HOMEFREE SPECIFICATIONS

PAINTS:
• Avoid VOCs and minimize preservatives
• A few examples: AFM Safecoat, Colorhouse, Milkpaint
• Some tints are high in VOCs
• Paint free finishes such as plaster, clay, wood, and tadelakt shown here
HOMEFREE SPECIFICATIONS

Paint Free finish: diamond coat plaster over drywall

Leger Wanaselja Architecture
HOMEFREE SPECIFICATIONS

Specify natural gypsum drywall only, or, no drywall at all

DeBoer Architects
THERMAL INSULATION

Saves energy, improves comfort and carbon footprint of manufacture is repaid in most cases with 5 years of energy savings.

Leger Wanaselja Architecture
Insulation: Global Warming potential

Lifetime GWP Payback XPS & SPF due to release of HFC blowing agents
Insulation: Toxicity Issues

- **Halogenated Flame Retardants**
  - Rigid plastic foam
  - Spray foam

- **Flammability and Fire Hazards**
  - Rigid Foam
  - Spray foam

- **Formaldehyde**
  - Some fiberglass, though most manufacturers have phased it out
  - More common in rigid mineral wool though also phasing out
Insulation: Blown in Cellulose

- BuildingGreen Top Pick for residential cavity fill
- Lowest carbon footprint
- Recycled product
- Low toxicity of flame retardant, borate
- Relatively inexpensive for high performance
- Use air or water as blowing agent
Insulation: Cork

- Naturally insulating
- Very low carbon footprint
- Renewable
- Damp tolerant
Insulation: Cork

Cork used as both insulation and siding.
Insulation: Natural Building Alternatives

- Scoria/Lava Rock
- Light clay straw
- Straw bale
- Hemp and light clay hemp
Insulation: Rigid Mineral Wool

- Can be used in the same places as foam plastic insulation:
  - Roofs
  - Walls
  - Under concrete slabs
- Can contain formaldehyde
Insulation: Fiberglass

- Can be installed as batts or loose fiber
- Can contain formaldehyde
Air Sealing without Foam

- Canned foam or “gun foam” is inexpensive and easy to apply
- May provide initially good sealing, but does not hold up in the long term
- Failed air sealing (wires and pipes pulling away from foam) is difficult to fix; requires a deep retrofit
Alternatives to Spray Foam

- Cotton batt roving for bigger gaps
- Caulk for small gaps
- Tape
- Better construction
HOMEFREE SPECIFICATIONS

COUNTERTOPS
- Stone around the sink with a Carnauba Wax
- Salvaged oak and tanoak counters with linseed oil
- Purebond plywood cabinets

CABINETS

DOORS

Leger Wanaselja Architecture
Glass tile, slate floor. No sealants on stone or grout
• Wood floors sealed with plant based resin from Bioshield
• Cabinets and counters with food grade linseed oil from Bioshield
• Concrete floor sealed with Mexiseal by AFM Safecoat
Avoiding Halogenated Flame Retardants

• Buy products that do not contain polyurethane foam

• Buy products manufactured before TB117 enacted, late 1970s, or after 2014
Avoiding Halogenated Flame Retardants

- Avoid products with a TB117 label
- Look for products with a TB117-2013 label
- For specific manufacturers visit Greensciencepolicy.org
Avoiding Halogenated Flame Retardants

Avoid Foam Carpet Underlayment
MAKING GREENER MATERIAL CHOICES

“Everything you can do is more important than what you can’t do.”
–Tom Lent, Healthy Building Network

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Leger Wanaselja Architecture
Why use natural interior finishes?
Building for Life

Designing and Understanding the Human–Nature Connection

Stephen R. Kellert

Biophilic Design

The Theory, Science, and Practice of Bringing Buildings to Life

Stephen R. Kellert, Judith H. Heerwagen, Martin L. Mador
natural remodeling for the Not-So-Green House

Bringing Your Home into Harmony with Nature

Carol Venolia & Kelly Lerner

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