

Specifying Green, Healthy & Cost Effective Building Materials

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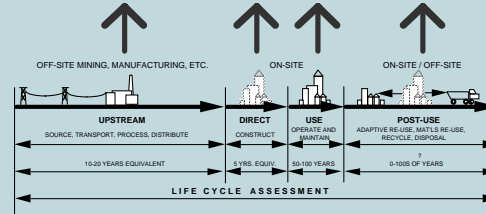
GREENING THE GOVERNMENT
EPA Regions I,II,III
Philadelphia, PA
June 4, 2003



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Life Cycle as a Framework for Decisions



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Ecological Footprint



From William Rees

Today's consumption levels for food, forestry products & fossil fuels are estimated to exceed global carrying capacity by 30%



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UNINTENDED CONSEQUENCES



Courtesy of freefoto.com

U.S. industries' release of toxic chemicals in 1999 increased by 5%, totaling 7.7 billion pounds.



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Buildings' Human Toll



- Ecological Balance disturbed by toxic emissions, climate change, ozone layer depletion & degraded indoor air quality



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EPA Asthma and Indoor Environments 1-866-NO-ATTACKS

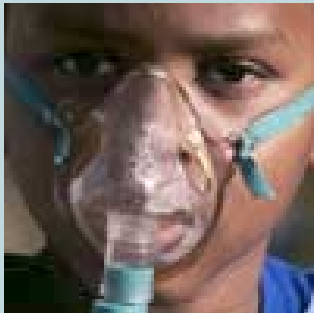


- Formaldehyde in engineered wood products, insulation, carpet
- Plasticizers in vinyl products: wallcoverings, flooring, shower curtains
- Molds, moisture, poor ventilation
- "Sink" materials: carpet, drywall



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ASTHMA



- More than 17 million asthma sufferers in US
- 75% increase in asthma between 1980-1994
- Asthma accounts for 5,300 annual deaths in U.S.



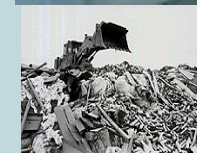
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QuickTime™ and a Photo: JPEG decompressor are needed to see this picture.



QuickTime™ and a GIF decompressor are needed to see this picture.



Buildings' Environmental Toll



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Federal Green Initiatives



GSA Public Buildings Service commits to green building on all projects

National Park Service adopts green building design

US Air Force, US Army Corps of Engineers & Naval Facilities Engineering Command adopt sustainable design practices



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Boston Dept. of Neighborhood Development

- Asthma-Friendly Housing
 - Low VOC paints, finishes, adhesives
 - Alternatives to carpet
 - Moisture control; natural ventilation

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Greening Urban Housing



- Natural linoleum flooring
- Recycled plastic-wood composite decking
- Cement/fiber siding
- Reduced material use: multi-units with common walls & roof



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WHAT'S IMPORTANT

- Impact to human health & benefits
- Impact to environment & benefits
- Performance / durability
- Cost: first cost and O&M
- Availability: quantity & on time
- Special Skills Required to do it right



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Building Materials Used in a Typical U.S. 1,700 Sq. Ft. Home

- 9,700 bd ft lumber
 - 4,850 sq ft sheathing
 - 55 cu yd concrete
 - 2,528 sq ft siding
 - 2,000 sq ft shingles
 - 2,500 sq ft insulation
 - 6,484 sq ft drywall
 - 300 pounds of nails
 - 750 ft copper wire
 - 280 ft copper pipe
 - 170 ft plastic pipe
 - 55 gallons paint
- Based on National Assn of Homebuilders, 1994



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CEMENT & CONCRETE



- Cement kilns release ~ 8-10% CO₂
- Specify alternatives to portland cement, i.e., fly ash, slag
- Specify recycled aggregates: crushed glass & concrete; industrial by-products



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WOOD



- Specify Reclaimed Wood
- Specify FSC-Certified Wood from Regional Sources
- Specify Wood-Free
- Avoid particleboard, plywood, MDF with formaldehyde & fibers from unsustainable forests



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STEEL



- High recycled content steel, >95% post-consumer scrap, manufactured in regional electric arc furnaces used for structural & other applications



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DRYWALL



- Many manufacturers produce drywall with 85%+ synthetic gypsum & 100% recycled paper backing: Temple-Inland, U.S. Gypsum, National Gypsum, G-P Gypsum

PAINT



- Assess impacts to air quality (VOCs) and toxic exposure (see MSDS)
- Specify Green Seal Certified Paints: cost competitive; most major brands

GREEN SEAL PAINTS Prohibited Ingredients



- **HEAVY METALS**
 - Antimony
 - Cadmium
 - Hexavalent Chromium
 - Lead
 - Mercury

GREEN SEAL PAINTS Prohibited Ingredients

- **TOXIC ORGANIC SUBSTANCES**
 - Acrolein
 - Acrylonitrile
 - Benzene
 - 1,2-dichlorobenzene
 - Ethylbenzene
 - Butyl benzyl phthalate
 - Formaldehyde
 - Isophorone
 - Methylene chloride
 - Methyl ethyl ketone
 - Methyl isobutyl ketone
 - Naphthalene
 - Phthalate esters
 - 1,1,1-trichloroethane
 - Toluene
 - Vinyl Chloride

PVC: Miracle Plastic

- Strong & durable
- Rigid or flexible
- Opaque or clear
- Abrasion & moisture resistant
- Rust and corrosion resistant
- Electrically non-conductive



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Mossville, Louisiana



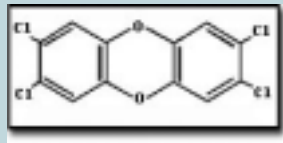
Photo & Text: Greenpeace

- 91% ear, nose, throat problems
- 84% central nervous system illnesses
- 50% higher death rate than national average
- Dioxin levels in blood 3 times national average
- 2 vinyl chloride plants



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Dioxin



- **Cancer**
- **Endocrine disruption**
- **Compromised immune system**
- **Learning disabilities**
- **Reduced sperm counts**
& other reproductive problems



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PVC in Buildings



- 75% PVC (vinyl) used in buildings
 - 58% Pipes & Tubes
 - 16% Siding
 - 5% Windows & Doors
 - 5% Flooring
 - 3.3% Furnishings (i.e. blinds, shower curtains, upholstery)
 - 1% Wallcoverings



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PVC – Toxic in Use

Flexible PVC:

Plasticizers: Phthalates
(DEHP)
Up to 60% by weight
Triggers asthma attacks

Rigid PVC:

Heavy Metals: Lead damages
brain development; Cadmium
neurological damage, cancer;
Organotins Suppress
immunity, disrupt endocrine
system damage reproductive
development



Fire

Hydrogen chloride

Dioxin legacy



Why not recycle PVC?

Impossible brew

too many additives
(heavy metals, plasticizers)



Only down-cycling

drink bottle -> speed bumps

< 1% of N.A. vinyl production is down-cycled

Am Assoc of Postconsumer Plastics Recyclers gave up



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PVC – Never goes away



Photo Greenpeace

- Incineration = more dioxin
- Metal stabilizers not destroyed
- Landfill = more leaching



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Pressure Treated Wood

Treated Wood for All Your Building Needs

Chemical Specialties, Inc. presents treatedwood.com, a service to provide the right solutions for your treated wood requirements. Our goal is to provide advanced technology to enhance the performance of wood-based building materials in a variety of applications.



from Treatedwood.com

- CCA (copper chromated arsenic) is the standard formulation - 22% arsenic, a known human carcinogen
- The U.S. EPA has banned all other uses of arsenic as a pesticide



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CCA RISKS



- CCA-treated wood tested in 13 metro areas in the U.S. had on average 85 to 130 times the arsenic than in a 6 oz glass of water contaminated at the highest level allowed by the World Health Organization.



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Safer Alternatives

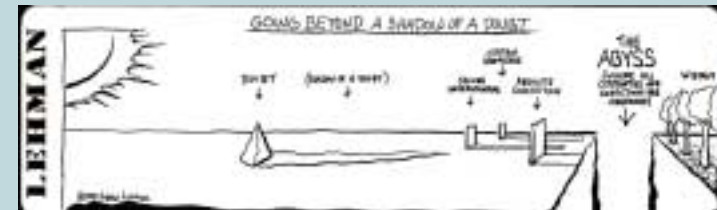


from treatedwood.com

- Specify naturally resistant wood or other materials
- Specify wood treated with safer chemicals including ACQ (alkaline copper quaternary) manufactured by same companies as CCA



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