

Sustainable Construction Practices at Sandia National Laboratories

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Jack Mizner, P.E., LEED AP



Sandia National Laboratories

- **Multi-program Security Laboratory**
 - NM & CA Sites, about 6M GSF
 - Non-proliferation of nuclear, chemical and biological weapons
 - Critical energy infrastructures
 - Homeland security
- Collaborates with industry, universities & other government agencies to commercialize new technologies
- <http://www.sandia.gov/>

What Is Sustainable Design ?

- Sustainable Design: *Designing into the Facility's construction and operation, resource productivity and pollution prevention, for life cycle cost savings.*

Five Categories:

- *Sites*
- *Water Efficiency*
- *Energy and Atmosphere*
- *Materials and Resources*
- *Indoor Environmental Quality*





SD Requirements for DOE Sites

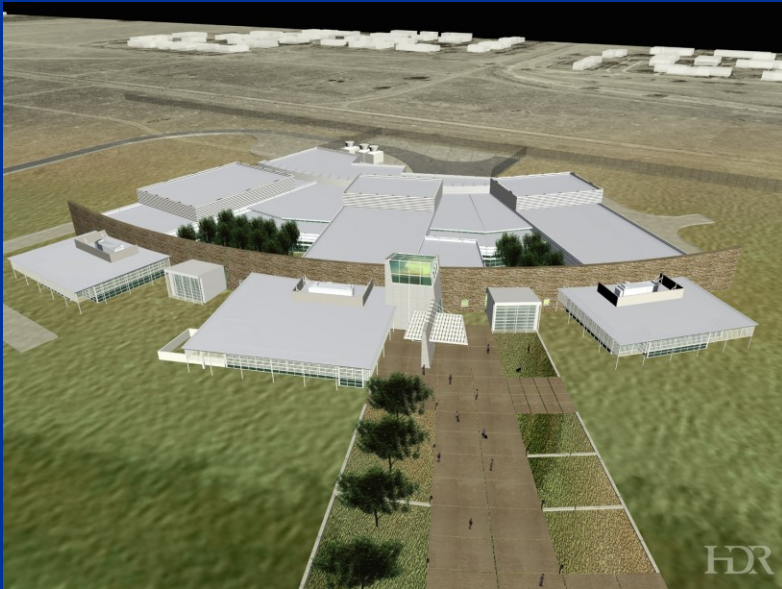
- Executive Order 13101
- Executive Order 13123
- Executive Order 13148
- DOE Order 450.1
- DOE Order 413.3
- DOE Order 430.2A



SNL/NM Sustainable Design Requirements

- Based on LEED™ criteria, Labs21 approach and DOE O 430A.2 CRD
- Green Construction Specifications require SD
- Chapter 2 of Design Manual presents SD philosophy (Goals, Objectives, Life-cycle Analysis and Value Engineering, LEED Certification, Whole Building Design Approach, Commissioning)
- Included in Program documents, design criteria and contractor selection
- **Graded Approach:** Requirements for Small Office buildings are less than those for Large Line Item projects

LEED Registered Buildings At SNL/NM



SD in GPP Buildings at SNL/NM



- Based on 01000S Spec for IGPPs
- SD Report required
- Employed at six buildings

- 15% or more better than ASHRAE 90.1
- **Construction Waste Management** (13 – 50% recycled)
- Emphasis on daylighting
- **Environmentally preferable materials**



SD - Remodels and Existing Buildings

- SD Guidelines for Conference Room remodels
- Specifications guide material purchases
- Conducting LEED-EB evaluation of Building 823, as pilot for incorporation lab-wide
- Energy Management program seeks better efficiency in buildings
- EMS can serve as a driver to increase energy and water conservation, promote better indoor environmental quality and promote recycling and a preference for environmentally friendly materials.



Demolition Projects

- Work with Facilities to establish standard practices for deconstruction activities
- Continue to recycle and track waste diversion through contracted "salvage rights"
- Solve the big issue - Concrete



SNL/NM C&D Waste Recycling Strategy

- C/D is 80% of SNL/NM solid waste
- SNL/NM P2 Goal:
 - ✓ Recycle > 50% of all waste generated.
- STRATEGY:
 - ✓ Focus on Construction Projects
 - ✓ Expand Internal Capabilities
 - ✓ Issue Specification 01505
 - ✓ Simple, Cost Effective, and Resource Efficient



SNL Internal Recycling Capabilities

Cardboard	Dumpster from SWTF
Carpet	Deliver to CONEX
Concrete	KAFB Landfill
Metal	SNL Property Reapplication
Soil	SNL Borrow Area
White Paper	Container from SWTF



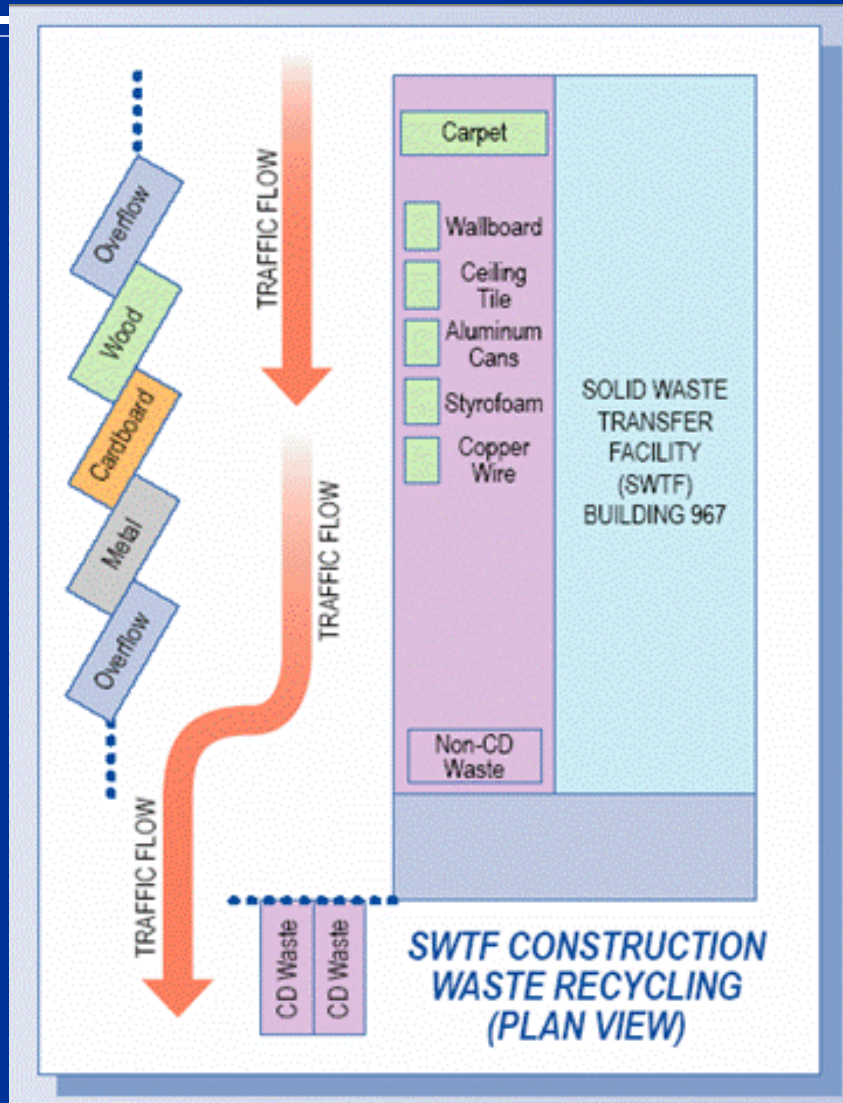
External Recycling Capabilities

Ceiling Tiles	Armstrong Recycling Program
Metal	Ace Metal
Wall Board	American Gypsum Pilot Project
Wood	Soilutions

Divert It.... And Weigh It...It's Easy



Recycling Infrastructure for Small Projects



- One-Stop Location for Disposition of Construction Waste
- Intended for Small Volume Waste Generation Projects (T&M Contractors)

SWTF C/D Recycling Center





Reporting (Large Projects)

Waste Diversion Log

Project_____

Period____to____

Material	Quantity	Disposition	Destination	Date
<i>Wallboard</i>	<i>4 tons</i>	<i>recycle</i>	<i>Am. Gypsum</i>	

Progress Report

Project_____

Company_____

Report Period_____

Material	Landfilled	Recycled	Reused	Salvaged
<i>Concrete</i>	<i>5 tons</i>		<i>30 tons</i>	

Reporting (Small Projects)

Identify C&D Waste Materials Deposited in Labeled Containers		
		Yes
1	ALUMINUM CANS: Aluminum beverage cans only. <i>NO</i> aluminum foil, pans, or other items [see “Aluminum (Not Cans)” below].	<input type="checkbox"/>
2	ALUMINUM (NOT CANS): Any and all aluminum items, other than beverage cans. Aluminum sheet, plate, foil, or other items. <i>NO</i> sealed aluminum containers, devices, or items containing residues.	<input type="checkbox"/>
3	BRASS: Any and all brass items. Brass tubing, piping, fittings, valves, hardware, fasteners, etc. <i>NO</i> sealed brass containers, devices, or items containing residues.	<input type="checkbox"/>
4	CARDBOARD: Clean, corrugated cardboard. Remove any packing material. Knock down and fold flat. <i>NO</i> chip paper or chipboard is allowed, such as cereal boxes and file folders.	<input type="checkbox"/>
5	CARPET: Clean, dry carpet tiles and/or carpet roles. Clean carpet is free from dirt, demolition debris, garbage, and tack strips. Stack carpet tiles neatly inside container. Pack tightly rolled carpet neatly inside container. Scrap and waste carpet from new installations must be packaged in cardboard boxes and stacked neatly inside container. <i>NO</i> carpet padding.	<input type="checkbox"/>
6	COPPER WIRE: Insulated or bare copper cords, wire, etc. <i>NO</i> electronic devices.	<input type="checkbox"/>
7	COPPER (NOT WIRE): Any and all copper items, other than copper wire. Copper tubing, piping, fittings, etc. <i>NO</i> sealed copper containers, devices, or items containing residues.	<input type="checkbox"/>

Materials Brought By (print):		Date:	
Company:		SWTF Initials:	

SNL Project Case Study - JCEL

- JCEL - Joint Computational Engineering Laboratory
- 55,000 ft.² facility to Support Weapons Program
- Registered with USGBC for LEED Silver Certification



Successful Recycling It CAN Be Done

JCEL



**Containers are
clearly labeled
and color coded
with large signs.**

**RESULTS: ~85%
recycled**



Building 805 D&D Project

- 75,000 Sq. Ft.
- 3 Story
- Basement Mech. Room
- Primarily a Chemical Laboratory Facility
- Limited Radiological Use
- Largest D&D Project at SNL/NM



Building 805 - Salvaged Material



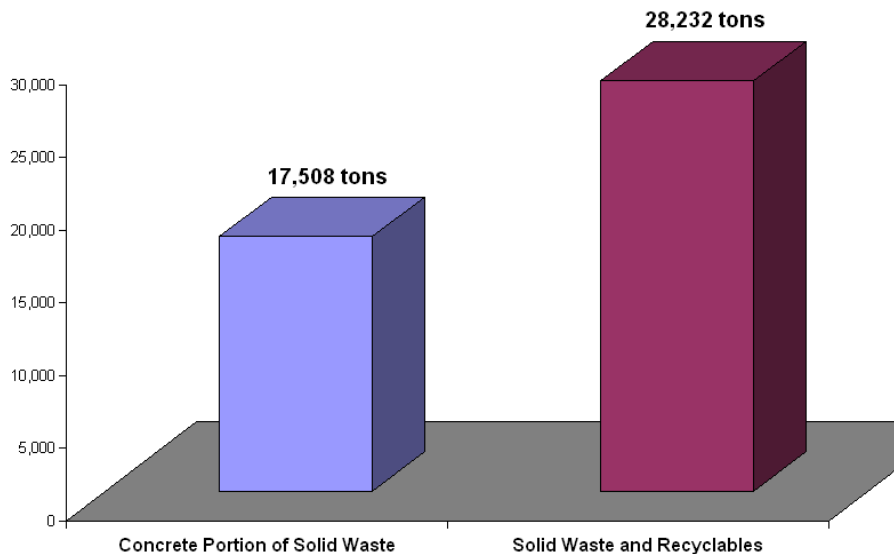


Bldg 805 Material Disposition Summary

Item/Material	Quantity
Carpet	~ 5,500 sq. ft.
Ceiling Tile	~ 40,600 lbs.
Lab Furnishings (good condition)	~ 59,000 lbs.
Lab Furnishings (fair condition)	~ 20,000 lbs.
Lab Furnishings (poor condition)	~ 6,000 lbs.
Modular Wall Panels	~ 2,800 linear ft.
Scrap Metal (incl. poor condition lab furnishings, wall panels, etc.)	~ 292,000 lbs.

Concrete - the Problem Child

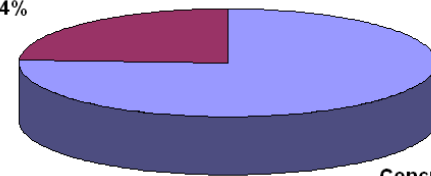
Concrete Waste Comprised 62% of All Sandia's Materials Recycled or Sent to a Landfill in FY05



Prior to 2003, concrete debris used for erosion control and at KAFB landfill.

Concrete was 76% of the Waste Sandia Sent to Landfills in FY05 (in tons and percent of total)

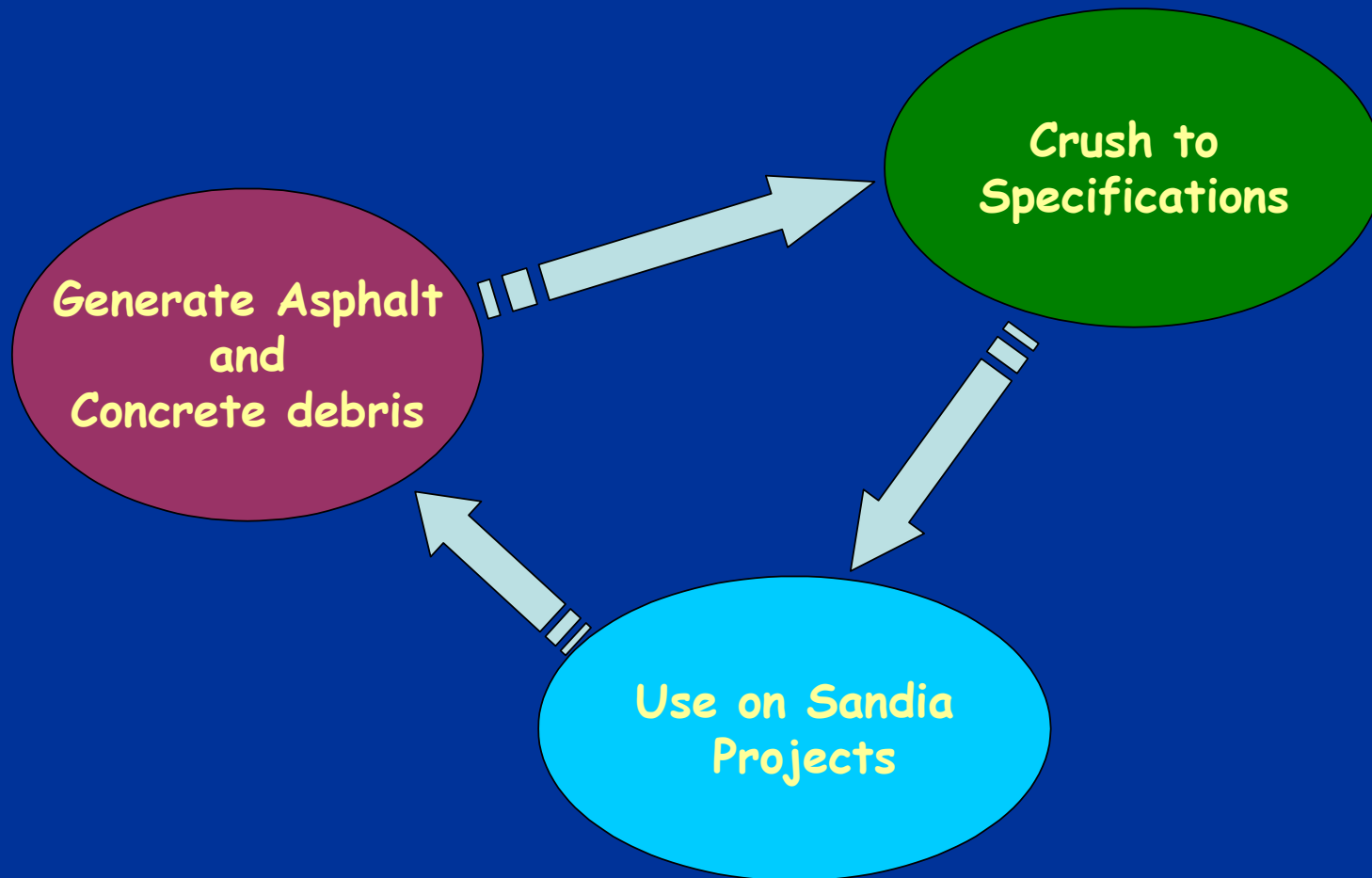
Solid Waste That is Not Concrete = 5,544 tons or 24%



Concrete Portion of Solid Waste = 17,508 tons or 76%

Embodied energy of concrete estimated at 1-3 kWh/lb; 90% attributable to the production of Portland cement.

The Solution







Environmentally Preferable Materials

- Construction Specifications require EPP
- Required reporting for all AP (Affirmative Procurement) CPG (Comprehensive Procurement Guideline) materials
- LEED, recycled content, locally manufactured and non-toxic requirements for all construction projects (line and GPP)
 - Reported in SD Reports

Date_____ P.O. Number_____

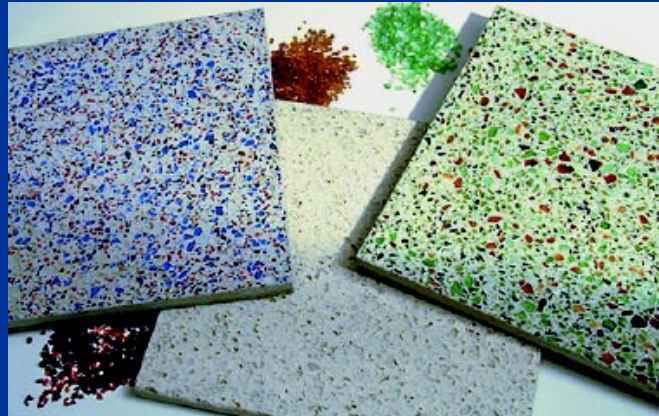
Contractor Name_____

Phone_____email_____

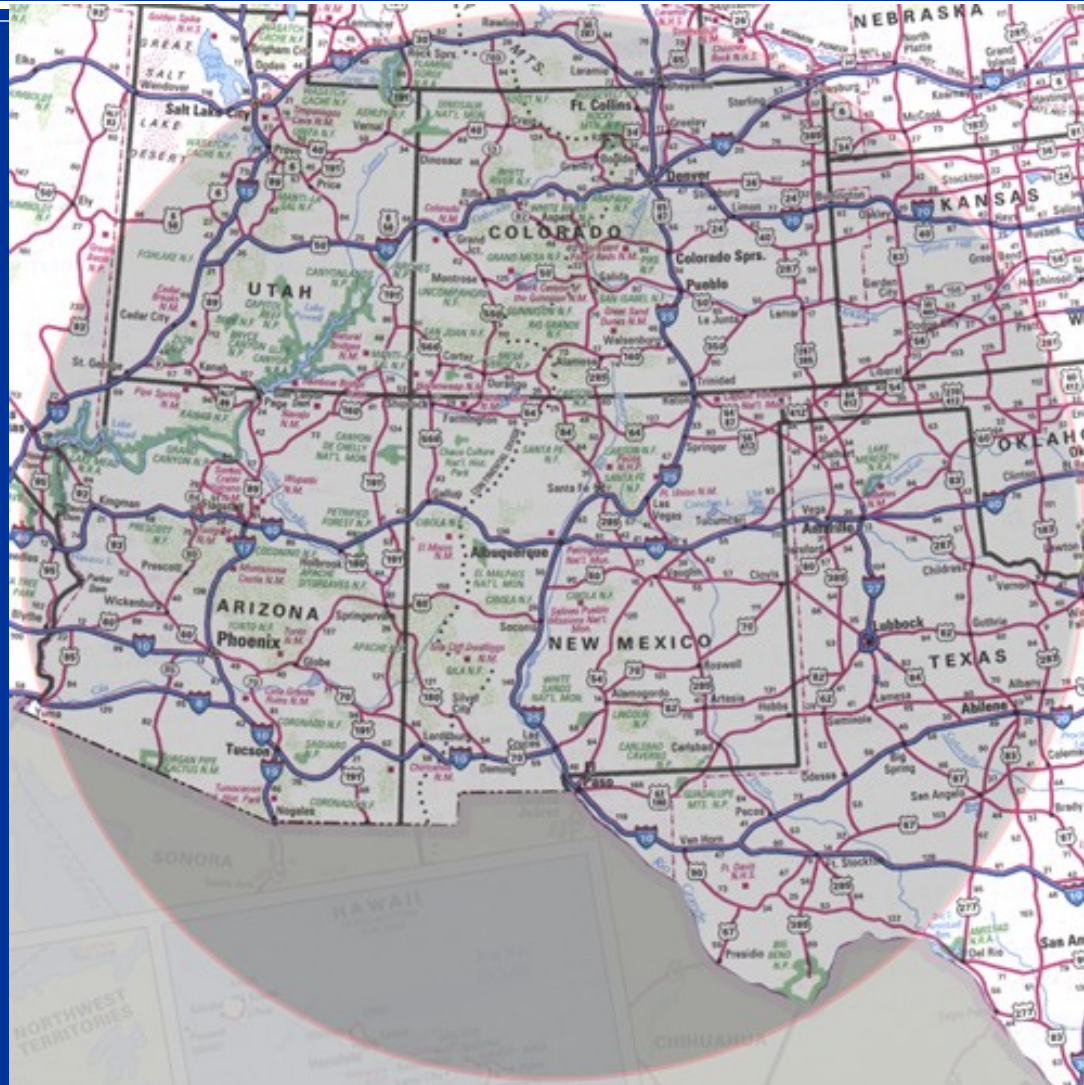
No Purchases this Reporting Period _____

Material Type	Materials Purchased (\$)	Recycled Content Material (\$)
Concrete/Cement		
Flowable Fill		
Building Insulation		
Carpet		
Plastic or Rubber Floor Tiles		
Latex Paint		

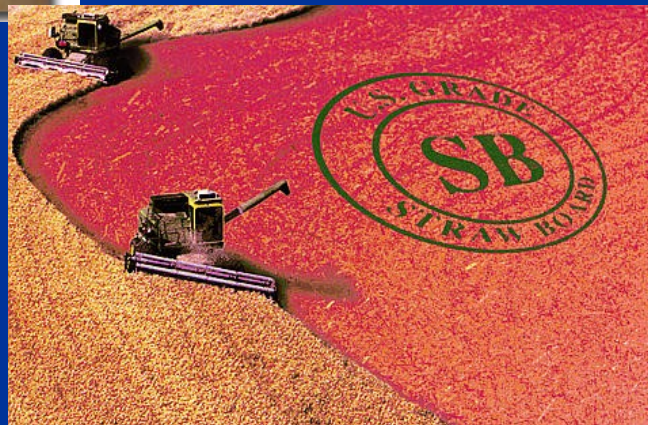
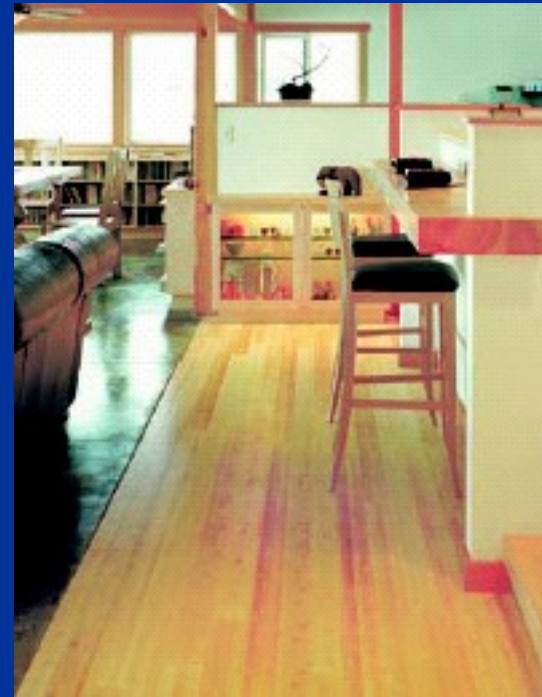
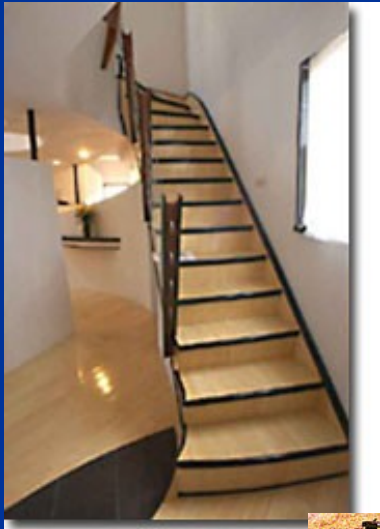
Recycled Content



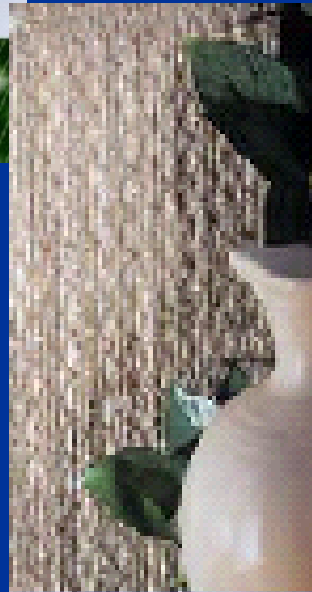
Local Preference



Rapidly Renewable



Other EPP



Case Study - Marmoleum

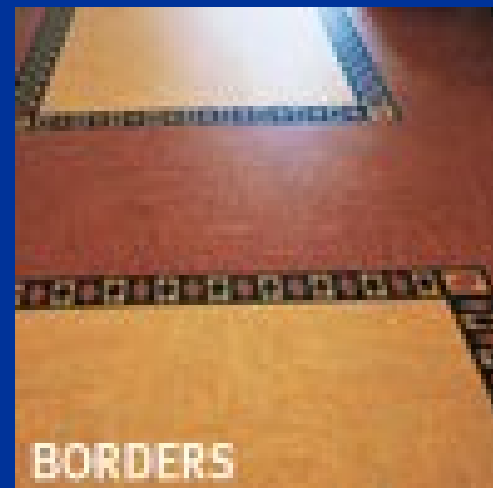


Marmoleum is a natural product made from linseed oil, woodflour, pine rosin, jute, and limestone. Once installed, Marmoleum is hygienic and anti-static. After its long life, it is completely biologically degradable.

Higher initial first costs

Lower maintenance costs

- No waxing or stripping required
- Clean by damp mopping





THANK YOU

QUESTIONS ?