

Green Building Quarterly

The McGraw-Hill Companies



What is the USGBC?

The U.S. Green Building Council is the nation's leading coalition of corporations, builders, universities, government agencies, and nonprofit organizations working together to promote buildings that are environmentally responsible, profitable and healthy places to live and work.

Since its founding in 1993, the Council has grown to more than 5,200 member companies and organizations, a 50-person professional staff, a broad portfolio of LEED products and services, the industry's popular Greenbuild International Conference and Expo, and a network of 67 local chapters, affiliates, and organizing groups.

For more information:

U.S. Green Building Council
1015 18th St.,
NW, Suite 508
Washington, D.C. 20036
(202) 82-USGBC
or 828-7422

What is LEED?

The LEED (Leadership in Energy and Environmental Design Green Building Rating System) is a feature-oriented rating system where credits are earned for satisfying specified green building criteria. Certified, silver, gold, and platinum levels of green building certification are awarded based on the total credits earned.

The LEED standard has been adopted nationwide by federal agencies, state and local governments, and interested private companies as the guideline for sustainable building.

Tilden-Coil Goes for Green at University of Redlands

Tilden-Coil Constructors recently put the final touches on a green building at the University of Redlands.

The 14,500-sq.-ft. Environmental Studies Building was built incorporating LEED standards and is part of the Stauffer Science Complex expansion at the University of Redlands, for which Tilden-Coil is the general contractor.

Riverside-based Tilden-Coil worked with Meyer & Allen Associates, the architectural firm on the project, to meet the requirements. Certain portions of the requirements were designated by the architect in the design of the building, such as placing half of the building below ground level and covering it with earth and planting, which helps with building insulation and reduces energy consumption.

Additional features also helped the project gain ranking with LEED. Window walls in each classroom open to a courtyard to allow natural light. This is augmented by a master control lighting system that automatically adjusts the lighting in the room to reach a balance with the natural light. The ventilation system incorporates HEPA



filters for increased air quality. The carpets in the building include an anti-microbial backing to reduce the growth of common bacteria, fungi, yeast, mold and mildew.

Tilden-Coil also implemented a number of measures in the way the construction process was managed.

The minimum standards for construction waste management for

LEED are to divert 50 percent of the project's construction waste from landfills. Tilden-Coil set up a recycling program at the building
(Continued on page 8)

SF's Academy of Sciences Project Takes Green Building to New Heights

By Robert Carlsen

You can't get any greener than a two-acre "living roof," and that's just one of dozens of sustainable elements to the California Academy of Sciences project in San Francisco's Golden Gate Park.

The \$392 million, 370,000-sq.-ft. Academy broke ground last September and is scheduled for completion in 2008. Webcor Builders is the general contractor.

Though a LEED rating at its completion is almost assured (the builders are striving for platinum), the design is already winning green awards. The Academy of Sciences was selected last year as the North American winner of the silver Holcim Award for Sustainable Construction in recognition of the innovative "green" design by famed architect Renzo Piano with local partner Chong Partners Architecture.

The competition — organized by the Holcim Foundation for Sustainable Construction in collaboration with five of the world's leading technical universities — promotes sustainable approaches to the built environment. The Holcim Awards are judged by an independent 12-person jury, including leading architects, engineers, and university professors. Globally, more than 1,500 projects from 118 countries were submitted;

the Academy was the sole winner from the United States.

The design is inspired by the Academy's natural setting in Golden Gate Park and incorporates advanced, environmentally-sensitive "green" construction and building technology. ARUP, an international design firm that has worked extensively in integrated sustainable planning and design, provided sustainability consulting and engineering design services,

including structural, mechanical, electrical, plumbing, façade, and lighting design.

The "living roof" is covered with living, native plant species. In Piano's words, the roof's design is like "lifting up a piece of the park and putting a building under it." The roof will be an integral part of the Academy's exhibition program, providing an iconic design as well as ecological and energy efficiency

benefits for the environment. A portion of the roof will be accessible to visitors, allowing an up-close view of the roof-top environment and providing the opportunity for educational programs on green architecture and other topics.

Through its design, the new Academy will both minimize impacts on the natural environment. Saltwater for the aquariums will be
(Continued on page 8)



Strong Financial Incentives for Installing Solar Power on California Buildings

By Donald Simon

For several years, California has led the nation in using renewable energy to power homes and commercial buildings. Most often, this takes the form of installing solar electric systems on buildings already connected to the grid. When the system generates more electricity than the building can use, the meter spins backwards, reducing the monthly utility bill.

Now a host of state and federal incentives make solar more affordable than ever before.

California's State Incentives Program

California provides rebates to defray a portion of the costs for installing a solar electric system. The rebate is calculated based on the size (watts) of the system. For 2006, the state rebate is \$2.80 per watt. The California Energy Commission runs the rebate program for systems smaller than 30 kilowatts, and the Public Utilities Commission operates the program for larger systems.

This past January, the PUC created the nation's largest solar energy program by passing the California Solar Initiative. This 10-year, \$2.9 billion program has a goal of adding 3,000 megawatts of installed rooftop solar capacity by 2017. Incentives will continue in the form of rebates, which will be reduced each year by an average of 10 percent.

The California Energy Commission will oversee one component of the program focusing on builders

and developers of new housing. The PUC will oversee the remainder and majority of the program.

Ten percent of the program funding will be set aside for affordable housing installations, for which a low-cost financing option is presently under consideration.

New Federal Tax Credits

Last Fall, Congress passed the long-debated energy bill into law as the Energy Tax Incentives Act of 2005. Although most notable for the billions of dollars in tax subsidies it provides to the oil, coal and nuclear industries, the act also provides significant tax credits for commercial and residential renewable energy systems.

Separate credits are available for solar electric (photovoltaics), solar hot water (excluding pool and hot tub heating), and fuel cells.

Taxpayers may claim a federal tax credit equaling 30 percent of the system cost (including labor) for systems that are completed in 2006 and 2007. In 2008, the credit for residential installations will disappear, and the credit for commercial installations will be reduced to 10 percent. The credit for residential systems is mostly capped at \$2,000 each per taxable year, but there is no cap on commercial installations.

In addition to the federal credit, solar equipment used in commercial installations may also be depreciated using an accelerated five-year depreciation schedule, instead of the standard 20-year schedule.

Interestingly, the federal tax cre-



Donald Simon

redits are based on programs established during the Carter Administration in response to the energy crisis of the 1970s. The Reagan Administration dismantled these programs and largely abandoned the federal government's interest in renewable energy. One can only imagine the technological advancements and energy security America would now enjoy if the federal government had remained involved and provided renewable energy of even a fraction of the subsidies it has given the fossil fuel industry over the past 25 years.

The Future

The global demand for energy, led by the booming economies of China and India, continues unprecedented growth, driving prices higher and higher.

Simultaneously, policymakers are beginning realize that we cannot continue our reliance on fossil fuels. In response to the dire con-

sequences of climate change, industrialized nations throughout the world have agreed to mandatory reductions of greenhouse gas emissions caused from the burning of fossil fuels. President Bush has thus far rejected the global community on this pivotal issue, but most agree that U.S. compliance is inevitable.

States like California have already adopted ambitious targets for greenhouse gas reductions, and wise companies are planning now for inevitable regulation. Solar and other renewable forms of energy will play a key role in these efforts, and the financial incentives for being part of the solution have

never been brighter.

Donald Simon is a construction law attorney and litigator with Wendel, Rosen, Black & Dean, a full-service law firm in Oakland. Simon also provides consulting services to companies wishing to improve the environmental performance of their business operations. He co-founded the U.S. Green Building Council's Northern California Chapter, for which he was a founding director and serves as general counsel. He is also president of the Green Resource Center, a regional green building non-profit (www.greenresourcecenter.org).

LA's Downtown Diversion Named Top U.S. Construction, Demolition Debris Recycling Facility of the Year

Los Angeles-based Downtown Diversion has been named the top mixed Construction & Demolition Debris Recycling Facility in the nation by the Construction Materials Recycling Association, which announced the honor at its recent annual meeting in Miami.

The company has diverted from landfills more than 200,000 tons of brick, wood, asphalt, concrete, drywall, cardboard, scrap metal, and other items since opening in April 2004. Together with its sister company, Looney Bins, an award winning hauling company, Downtown Diversion has helped dozens of local jurisdictions in their efforts to meet state-mandated waste diversion goals of at least 50 percent.

Downtown Diversion is located just east of downtown Los Angeles and has created 50 new jobs in the last year and a half. The company has obtained one of the highest recycling rates (76 percent) of the 10 facilities under the City of Los Angeles' Certified C&D Processor's Program. The recycler is also a previous recipient of a low-interest-rate business loan from the State of California's Integrated Waste Management Board and its Recycling Market Development Zone (RMDZ) loan program.

"It's a pleasure to see that Downtown Diversion has received this prestigious recognition, it is well-deserved and we applaud their success," said California Integrated Waste Management Board Chair

Rosario Marin. "At the state level, we have worked with Downtown Diversion to increase construction and demolition debris recycling in Los Angeles County and it's wonderful to know their hard work is continuing to pay off for the environment and the economy."

In the Los Angeles area, where recycling capacity is limited and restricted by historically lower landfill tipping fees, Downtown Diversion was established to respond to a huge need for construction and demolition debris (C&D) diversion. The company was created following more than five years of planning, financial structuring, siting, engineering, construction, and customized equipment design efforts.

Downtown Diversion is an environmentally friendly business and has become a model for C&D recycling by using state-of-the-art automated processing equipment to streamline materials processing and maximize material recovery and recycling. Materials are offloaded and processed in an enclosed building. The site has a misting system to mitigate airborne debris and to improve employee air quality. The facility is a clean operation, and both marketed materials and residual debris are managed and removed from the site in strict compliance with full solid waste facility requirements.

For more information about diversion services, call Downtown Diversion CEO Mike Hammer at 877-WE-DIVERT (877-933-4837).



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SF City's First Green Tour Takes in Folsom Dore Apartment Building

By Robert Carlsen

The San Francisco Dept. of the Environment's first Green Building Tour of 2006 took place last month at the Folsom Dore Apartments, a supporting housing development owned by Citizens Housing Corp., built by Cahill Contractors and designed by David Baker & Partners.

The city's tours are designed to show interested parties in the construction and design fields the particulars about green building and financing.

The 98-unit affordable housing project was completed a year ago.

Lots of public and private hands were involved in this project, including CHC's partnership with the city, the Arc San Francisco and Episcopal Community Services; the Partnership for Advancing Techno-

logy in Housing, which is associated with the HUD and is dedicated to accelerating the development and use of technologies that "radically improve the quality, durability, energy efficiency, environmental performance, and affordability of America's housing"; and the Green Affordable Housing Coalition, a public/private group of professionals that urge builders to use green practices.

one-level garage built on a slab of 40 percent flyash concrete. The development includes 3,200 sq. ft. of community and service space that houses onsite supportive services provided by the Arc and ECS, as well as approximately 3,500 sq. ft. of open space.

"It has a real open air design," said Simons as we walked down a courtyard to the rear yard playground whose surface is made from recycled tires. He pointed out that the stairwells throughout the building also are open air.

Simons said the project has met the requirements for LEED certified, though the accreditation has not yet come through.

Cahill stressed recycled products on the project, said Robinson, including Gypsum board, Diamond Bond carpet pad, carpets, sheet



vinyl in corridors and Lonseal sheet vinyl in bathrooms (with 30 percent and 40 percent recycled content, respectively), and MDF trim, cabinet doors and drawers. Cahill also reused brick from an old warehouse previously on the site and diverted at least 50 percent of construction waste.

Other sustainable design features included:

• Energy & Atmosphere – a 13 kw photovoltaic system, a high-efficiency Hydronic heating system, operable windows, natural ventilation in all units and high-performing thermally-broken aluminum windows; Citizens Housing said the energy savings exceeds Title 24 requirements by 20 percent.

• Site & Community – high-density development (98 units on 0.58 acres or 169 units per acre), urban infill site and brownfield redevelopment, multiple public transportation options with 1.4 mile, onsite city CarShare pod and bike storage for 15 percent of the units.

• Health & Safety – urea-formaldehyde free cabinets, low and no VOC paints and sealants, and exterior

venting of kitchen and bath hoods. Melinda Hue, Green Building Associate for the San Francisco Department of the Environment, said the next tours will be April 4 at the California College of the Arts, San Francisco Campus, which is an adaptive reuse of a former Greyhound bus maintenance facility with such Green features as roof-mounted hot water solar heaters, radiant

flooring, reduced energy usage by 60 percent, daylighting, and sprayed cellulose acoustical insulation; and June 2 at the Swinerton Builders headquarters, a Gold LEED Existing Building Pilot Project. To sign up for a tour or for more information, contact Hue at melinda.hue@sfgov.org or (415) 355-3718.



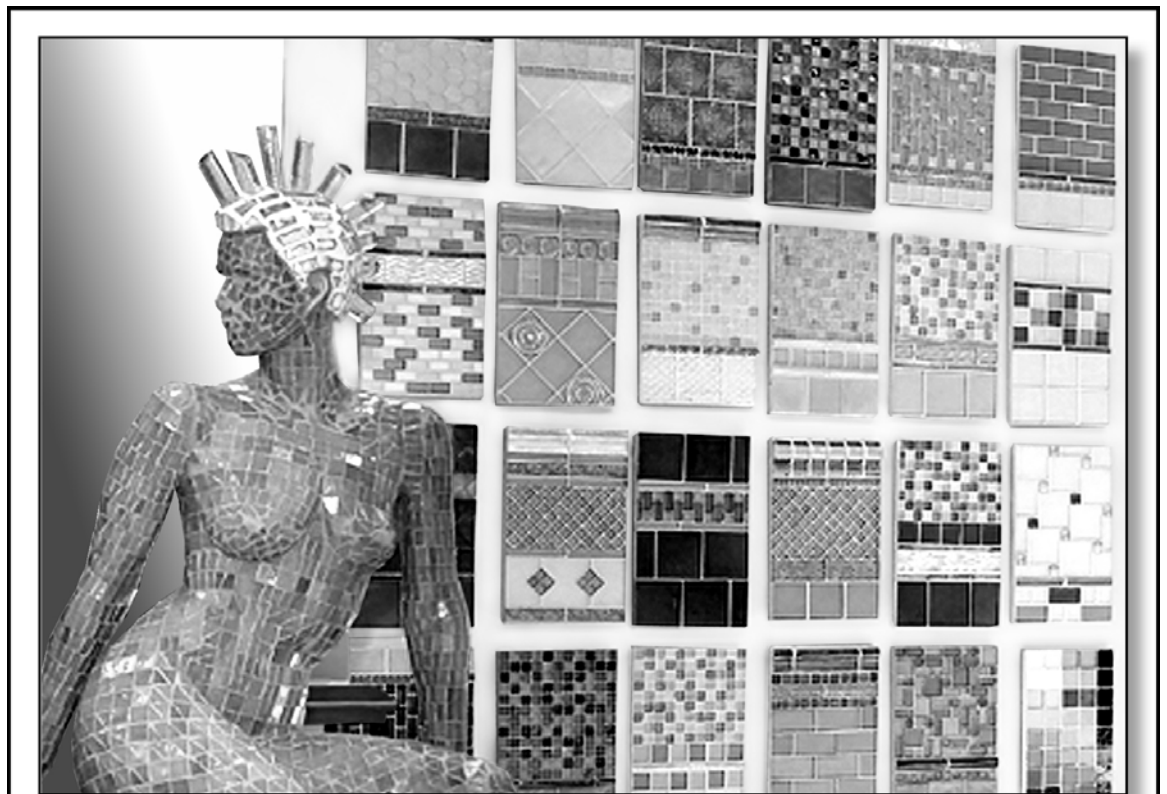
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Use of Green Building Products Provide Genera

This issue's products were recommended by Todd Ahern, senior cost engineer at Redwood City's Rudolph and Sletten. Ahern has been with the general contractor for four years. He has a BS in civil engineering from Santa Clara University.

**Lyptus
Wood Flooring**
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800-551-4803



Lyptus is a premium plantation-grown hardwood from Brazil. A natural hybrid of *Eucalyptus grandis* and *E. urophylla*, Lyptus features many desirable characteristics, including exceptional workability, machining properties, density, finish tolerance and overall strength. This makes it well-suited for diverse high-end applications like furniture, cabinets, flooring and architectural millwork.

Building with Lyptus is a wise environmental choice. Eucalyptus is grown on very productive plantations, where stands of indigenous trees are interspersed to preserve natural habitat. Wood can be harvested in just 14 to 16 years – much faster than other premium hardwoods grown in colder climates.

Two commercial grades of Lyptus are available through Weyerhaeuser. The standard grade contains all colors in the wood's natural continuum, from light pink to red, with no stains. No pieces with sharp color contrasts between the sapwood and heartwood are allowed. The striped grade, on the other hand, may contain stains on the face, and is selected for contrasting colors that create a dramatic striped effect.

Builders can select between pre-finished and unfinished products; the flooring is 1/2-in. thick; tongue-and-groove milling ensures easy installation; planks come in 2 1/2-in. and 3-in. widths; random lengths range from 11 in. to 88 in.; and pre-finished colors include fire, earth and stone.

EcoColor Cabinets/Casework

Columbia Forest Products
Portland, Ore. / 888-664-1964



Columbia Forest Products has introduced EcoColors line of tinted, FSC-certified particleboard designed as an environmental alternative to melamine and other decorative surfaces.

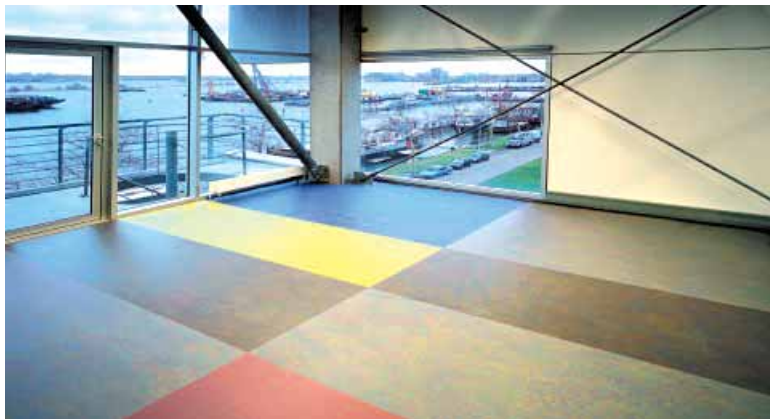
Created to be used in the manufacture of office cabinets, wall panels, residential cabinets, office workstations, furniture components, store fixtures and displays, EcoColors is finished on both sides of each environmentally certified panel. The line comes in seven colors – taupe, zinfandel, charcoal, storm cloud, straw, natural and olive. The transparent finish provides a subtle textural pattern, which distinctively differentiates it visually from melamine or plastic laminate.

Developed by Brisbane, Calif.-based Vida, EcoColors was purchased by Columbia in December 2002 and is now manufactured at the company's Hearst plant in northern Ontario, Canada.

Founded in 1957, Columbia Forest Products is North America's largest manufacturer of hardwood plywood and hardwood veneer. The company also markets and produces engineered and solid wood flooring products.

Marmoleum Resilient Flooring

Forbo Flooring
Hazleton, Penn. / 570-459-0771



Forbo said that Marmoleum is the material of choice for many architects and interior designers. This natural, extremely durable floor covering has become almost synonymous with the optimal solution for hospitals, schools, offices, government buildings and utilities.

Using the new Topshield finish, a water-based finish that Forbo said is the biggest breakthrough in linoleum in many years, the flooring reduces the need for cleaning and maintenance, ensuring lower costs and a better appearance.

Forbo's production facility in Assendelft, the Netherlands, uses life-cycle analyses to quantify the potential environmental impacts of a product system over the lifecycle. The results of a an LCA of a number of floor coverings rank Marmoleum first as a nature-friendly floor covering, together with pure, unacquered wood.

Marmoleum's global 2 line also offers a choice of special products

such as contact sound reducing Marmoleum acoustic and Marmoleum decibel, and Marmoleum ohmex with its enhanced electrical properties.

Ceiling Tiles and Suspension Systems

Armstrong Commercial Ceilings
Lancaster, Penn. / 717-397-0611



Armstrong Building Products is a worldwide leader in manufacturing and marketing acoustical ceilings and suspension systems for commercial and residential applications. The business mix is nearly 90 percent commercial, with approximately two-thirds in improvement projects and the balance in new construction, which includes offices, healthcare, education, retail, transportation and other segments.

Armstrong offers a wide array of commercial acoustical, metal, and wood ceilings, as well as wireless panels and sound systems. Armstrong ceiling suspension systems offer seismically-approved standard and grid-hiding options as well as perimeter

Not only does all Armstrong ceilings contain recycled materials, and many consist of more than two-thirds recycled content, the company also uses post industrial waste products from other industries to manufacture its new ceilings.

Plus, the company's Ceiling Recycling Program has already diverted more than 20 million sq. ft. of old acoustical ceiling tiles from landfills since the inception of the program five years ago.

Low VOC Paints

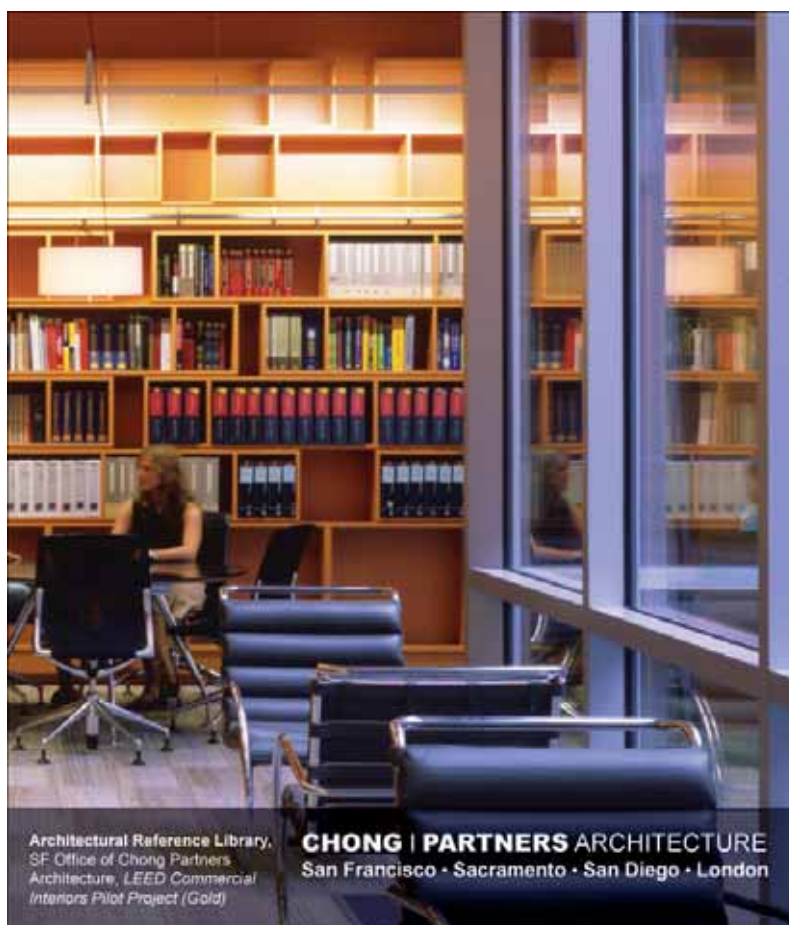
Scuffmaster Architectural Finishes
Minneapolis, Minn. / 800-551-4803

As a member of the U.S. Green Building Council, Scuffmaster Architectural Finishes manufactures interior paint finish products that provide best-in-class durability as well as meet or exceed established standards for environmental soundness.

Scuffmaster said the combination of durability and sustainable design is critical because little is gained if a product is green yet achieves this status only by severely degrading product performance.

Scuffmaster has adopted the guidelines put forth by the USGBC LEED green building rating system. Within the LEED scheme, interior paint products fall into the "low emitting materials" subsection of the Indoor Environmental Quality section. For interior paints, the USGBC adopted the standards of Green Seal, an independent organization that, for a fee, certifies building products on environmental and performance considerations.

Green Seal's five evaluation criteria for interior paints are volatile organic compounds (VOC) content, scrub resistance, opacity (hiding), stain removal and absence of harmful ingredients.



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SF Office of Chong Partners
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Sanford, N.C. / 800-997-3876



with 50 urinals, there is a \$13,000 minimum average savings per year

Zurn said its water-free non-cart-ridge urinals save water, provide a safe, sanitary environment for rest-rooms and reduce both building operating and maintenance costs.

Its Sahara Z5795 waterless urinal can be used for new construction as well as retrofitting existing urinal installations. The average water urinal uses approximately 40,000 gallons of water per year or costs \$280 to operate based on nationally averaged water and sewer costs. The Z5795 waterless urinal costs \$20 per year to operate. So in a typical commercial building

with the Zurn Waterless Urinals. The Z5795 has the lowest annual operating cost of any waterless urinal on the market.

Specs say the urinal is a wall hung vitreous china urinal with integral trap and drain line connection. No special tools are required to maintain the trap seal. Zurn green sealant maintains a sanitary, environmentally friendly and odor free installation. It's furnished with two wall hangers, fasteners, telescoping flange drain line connection, premeasured green sealant bottles and drain line gasket.

Carpets and Carpet Cushions

Masland Carpets and Rugs
Mobile, Ala. / 800-633-0468



Masland carpet is broken down into five collections: Vieux Carre, made from 100 percent dupont stain-master fiber as well as tactesse for softness; Cafe Series, which has several different styles – some display a multidimensional texture and pattern, some are made to look to have a tailored appearance and a texture pattern of parallel lines; Port City, made from Antron legacy nylon; Office/Home, made from highly durable fibers like solution dyed nylon or 6,6 nylon as well as other materials that are known to stand up to high amounts of traffic; and Masland Classics, the company's main line, made from Dupont BCF nylon or high quality Antron.

Masland's environmental initiatives are solid as well. In a joint effort with its parent company, The Dixie Group, Masland operates a state-of-the-art, post industrial recycling facility capable of returning 14 million pounds of valuable resources into sustaining byproducts, including commercial underlayments.

Currently, Masland is the only company producing a carpet cushion manufactured from recycled hard carpet waste. The company said these cushions were developed to enhance carpet performance for longer wear and greater texture retention. In addition, the recycled cushions are non-toxic, odor resistant, provide insulation, prevent carpet delamination, acts as sound absorbers, and impede bacterial growth.

Glass Countertops, Vetrazzo Slabs

Counter Production
Berkeley / 510-843-6919



In 1996, Counter Production began selling custom countertops to a small group of green architects and designers attracted to the mechanical strength, chemical durability, and cost effectiveness of Vetrazzo.

By early 2002, Counter Production had accumulated several tons of glass – a small mountain of beer bottles, old windshields, and broken stemware – and was taking orders and shipping counters to places as far away as Australia and Trinidad. Fortunately, two sprawling old factories across the street from its original shop became avail-

lable and operations were moved to the old Sunsweet Prune Processing Plant, a stately, wood-framed building with a view of the bay and the

San Francisco skyline.

Vetrazzo designs are hand made from recycled glass, thus each slab may exhibit variations and irregularities in color, shade and glass size and particle distribution that are part of the inherent character of mixing post consumer and/or post-industrial recycled glass such as curbside recycling.

Vetrazzo is available in full slabs (108 in. x 60 in. and 1.25 in. thick) and half slabs (108 in. x 30 in. and 1.25 in. thick). Slabs are made-to-order in the quantities and Vetrazzo mix of the builders'

Decorative Resin Panels

3-Form

Salt Lake City, Utah / 800-726-0126



3form's Ecoresin is a specially-formulated polyester resin that is both environmentally friendly and high-performing. 3form's Varia product line now has the added benefits of being made exclusively from this ground-breaking new material, which was over two years in development.

Ecoresin has achieved a flame spread of 40 and a smoke density rating of 355, making it a class B material under section 8 of the building code. These scores make Ecoresin the highest-performing translucent resin product commercially available, said 3form.

In addition, Ecoresin has been engineered to incorporate 40 percent recycle content, without compromising Varia's overall physical properties, thus providing credit towards LEED projects. From a recycle stand-point, Ecoresin is also compatible with one of the largest post-consumer recycle streams.

Ecoresin also is available with a new UV inhibitor which makes it suitable for exterior applications.

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KP's Modesto Medical Center Project Incorporates Green Building Practices

At Kaiser Permanente's Modesto Medical Center, currently under construction and slated to open in September 2007, Kaiser Permanente Project Director Mike Hrast has been a huge proponent of incorporating green building practices into the facility itself, as well as into the construction phase.

"This is about making the community that we are in better for us having been there," said Hrast.

The Modesto facility has served as a learning lab of sorts – Hrast calls it a testing ground for innovative products and ideas, allowing Kaiser Permanente to make sure that the product works, makes sense, and proves itself to be of good value before it is implemented on a larger scale. He said the company has to carefully balance being good stewards of the environment with being good stewards of their members' money.

In fact, Hrast said the vast majority of sustainable initiatives at Modesto make use of products that are superior to more traditional ones and cost less or are cost neutral.

Harbison-Mahony-Higgins Builders is the general contractor on the \$76 million project, which was designed by Chong Partners (template) and Lionakis Beaumont Design Group.

The Modesto Medical Center campus is located on a 50-acre site and will include a 29,000-sq.-ft. central utility plant, a 254,000-sq.-ft., a four-story hospital support building with an ambulatory surgery center, and a 400,000-sq.-ft., five-story hospital with two nursing towers.

Hrast said that Modesto will be one of the greenest medical facilities in the U.S. and Kaiser Permanente is committed to make each new hospital it opens even greener than the last.

"I look forward to the day that I look back and can tell future generations – wow, I used to think Modesto was a green facility, but look how far we've come," he said.

Some green building elements of the project include:



- Instead of handling storm water with detention basins, HMH is installing permeable pavement, which provides a natural filtration process, removing all but one heavy metal and therefore allowing only clean water to make its way to the soil underneath. Rain water goes right through the pavement, thus preventing rain water build up and potential flooding.
- On the construction site, photovoltaic site lighting is being used. This choice saves Kaiser Permanente money due to rebates



from both the public utility sector and the state, and allows Kaiser Permanente to put unused electricity back into the grid.

- In cases where PV lighting is not feasible, High Density Polyethylene (HDPE) piping has been laid instead of the more traditional Polyvinyl Chloride (PVC) piping. And while HDPE is indeed more expensive to make, it has proven to be much cheaper (and faster) to install, and is now being adopted as a standard for all Kaiser Permanente facilities.

- A living (grass) roof has been installed on the entry rotunda. A test for Kaiser Permanente, its belief is that a living roof can lengthen the life span of the roof by 20 years. In addition, live roofs increase insulation, decrease energy bills, decrease costs associated with maintaining the roof and, most importantly, promote healing by providing a better view from rooms that look down upon the roof.

- Building integrated photovoltaics (BIPV) have been installed to surround the mechanical system located on the roof of the medical center, providing not just an aesthetic screen, but a functional one as well.

- A portion of the site has been set aside for a community garden to be shared by employees and members. In addition, as with many other Kaiser Permanente facilities, Modesto will be the home of an on-site farmers' market to promote healthy food choices.

- Modesto has reduced the amount of PVC used in the project's interior building materials, including wall and corner protection, and flooring. This step improves indoor air and environmental quality by reducing exposure to potential triggers of asthma, eczema and respiratory problems.

Hrast said there will be other green building practices considered during construction, and that the successful ones would go on to become standard across the organization, while others may not be pursued after pilot testing.

Green California Web Site Launched

The state of California recently unveiled a new "Green California" web site – www.green.ca.gov

The site is filled with ideas, guidelines, reference materials, engineering data and environmentally friendly purchasing information to assist state and local government agencies and California businesses with the shift toward environmental sustainability, energy conservation and the reduction of landfill waste.

"We believe this new web site will become the primary 'go to' site -- the new, centralized, electronic reference library -- for engineers, architects, building managers, contractors,

purchasing agents and other business and government officials and environmentalists in their quest for a Green California," said State and Consumer Services Agency Secretary Rosario Marin. "It will be a constantly expanding resource, as more and more links, web pages and data are added. We believe it will demonstrate with facts and figures that environmentally smart business decisions can also save big bucks, while making life healthier for all of us."

The site is focused primarily on two broad areas. It provides reference materials

for the design, construction, benchmarking and operation of "green buildings." It also provides government and business purchasing officials with detailed information on

"We believe this new web site will become the primary 'go to' site." – State and Consumer Services Agency Secretary Rosario Marin

environmentally friendly products and services, such as office supplies, paper products, office machines, vehicle supplies, building materials, medical supplies, etc.

In a December 2004 executive order, Governor Schwarzenegger launched an

aggressive action plan to reduce California's energy purchases for the thousands of state-owned buildings by 20 percent by 2015, while conserving other scarce

natural resources. The executive order also urged local governments, K-12 schools, universities, community colleges and business organizations to adopt the same ambitious goals.

The governor proposed to achieve the 20 percent energy reduction federal "Energy Star" rating -- both of which are explained on the Web site. He also directed the State

Architect in the California Department of General Services to adopt guidelines to encourage California schools built with state funds to be resource and energy efficient.

California law now requires all departments of state government to practice Environmentally Preferable Purchasing (EPP), buying goods and services that have a reduced impact on human health and the environment.

The Green California web site includes a complete online version of the EPP Best Practices Manual.

Among other things, it shows officials how to write environmental specifications into their bid solicitations.

The Growth of Green Building

By Charlie Popeck

I'm often asked why Green Building has become so popular in only a few short years. In my opinion, there are several reasons for the popularity of Green Building, but my usual response to this question is "because Green Building makes sense!"

Common Sense Strategies:

The strategies typically used when designing and constructing a high-performance, or "green," building can be common sense solutions to typical design and construction challenges – not rocket science nor brain surgery. I remember my grandfather had a cistern in his back yard that he used for collection of rainwater from the roof. He would use that water to irrigate his vegetable garden all summer long. He didn't have to, because city water was available, but I believe that it was part of his waste not/want not upbringing and beliefs that motivated him.

We have seen a similar strategy used on several LEED certified projects. The bleed water from a building's cooling tower is often plumbed into an underground tank to be used for site irrigation at a later date. Rainwater catchment and grey water systems are integrated into many designs, which help to earn points towards LEED certification.

Another typical strategy is stormwater management. The LEED system discourages designs that discharge a building's storm-



Charlie Popeck

water from the site. If the stormwater is retained onsite with spreading basins or bioswales, the valuable stormwater will help to recharge the groundwater table through infiltration.

Respect for the Environment:

People in our generation believe in treating the environment with respect. After all, this IS the only planet we will ever have. The earth contains finite, limited resources that are available to us as occupants of the planet. I have often wondered how long we can continue to draw oil out of this sphere that we live on. When will the oil supply run out? In our children's lifetime? Our grandchildren's? I'm not sure when, but I feel good about doing something about it now. I'm certain that many others feel the same way.

Timing is Right for Green Building:

Green Building works well with project delivery methods like Construction Manager at Risk and Design-Build. The collaborative, integrated design and construction process encouraged by these project delivery methods dovetails extremely well with the "whole-building" approach that green building teams use everyday. The advent of these delivery methods have contributed to the growth of Green Building and vice versa.

Career Enhancement

Many people like me who have been in the construction industry for most of their lives now have a personal mission that is congruent



with their careers. Through participation in Green Building we can do something that is positive for our community and environment while using the skill sets that we have developed over the years within the construction industry.

Additionally, we are learning new things every day that impact our personal developmental needs.

The LEED Green Building Rating System has provided design and construction teams with an easy to use guideline for creating Green

Buildings. With U.S. Green Building Council membership increasing exponentially every year, it's obvious that more and more people in our industry are "getting it" and moving forward with personal and corporate programs that target Green Building and the benefits that high-performance buildings provide.

It's about time. Charlie Popeck is the president of Green Ideas Environmental Building Consultants. Green Ideas specializes in helping Design, Construction and Facility Management teams to understand and implement the LEED System into their businesses. He can be reached at 602-512-0557 or Charlie@EGreenIdeas.com.

LACCD Receives Award for Sustainable Energy Efforts

The Los Angeles Community College District said recently that it received a Savings By Design award for adopting and implementing sustainable energy principles at its nine colleges by the Southern California Gas Co. The award was presented to LACCD at the first-ever Energy Efficiency Expo, sponsored by The Gas Company.

"Savings By Design has allowed us to pursue our commitment to sustainable building practices and energy efficiency by transforming our campuses and strengthening our commitment to students," said Larry Eisenberg, executive director of facilities

planning and development for LACCD. "Our energy savings will help make dollars available for education."

Since the Savings By Design Program began, LACCD has called on The Gas Co. and taken advantage of the program for more than 14 building projects.

LACCD received not only design assistance but incentives for achieving high levels of energy-efficiency: up to \$150,000 per building for owners and up to \$50,000 per building for design teams.

LACCD's projects have received more than \$870,000 in total incentives.

LACCD is currently undertaking the largest public sector sustainable building program in the United States as part of its \$2.2 billion bond construction program, funded by Propositions A and AA.

LACCD has also set the goal to self produce 25 percent of its energy needs with 10 percent utilizing photovoltaic cells.

In addition, the district's trustees made the decision that if any project is funded by at least half A/AA bond funds, then the project would be required to get at least a LEED-certified rating by the U.S. Green Building Council.



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Tilden-Coil Goes for Green at University of Redlands

(Continued from page 1)

site and achieved a recycling level of more than 84 percent.

Tilden-Coil also designated areas where recycled materials could be used in construction of the building. The concrete used in the floor, walls and roof of the project contains flyash, a byproduct of coal-burning power plants. Flyash is frequently sent as waste to landfills. When used in concrete, flyash acts like cement, and actually replaces a percentage of the cement normally used. Additionally, the existing concrete sidewalks demolished for the building footprint were re-used as courtyard pavers and stacked for garden seat walls in the new project.

LEED requires that 20 percent of the building materials are manufactured within a 500-mile radius, and a minimum of 50 percent of

the materials are extracted within the same area. This supports the regional economy and mitigates transportation effects including traffic congestion, fuel consumption and air pollution. Tilden-Coil reported that 57 percent of the material was manufactured regionally, and more than 72 percent of that was extracted regionally.

Tilden-Coil followed and documented procedures from LEED requiring that certain mechanical systems, air conditioning systems and other features of the building, installed before and during other procedures, are sealed off and protected from dust infiltration until completion of the project, thus protecting the air quality in the finished building. The interior of the building was cleaned continually throughout construction, including



the vacuuming of dust from the ducting and piping above the ceilings.

Tilden-Coil's team of project manager James Messineo, project engineer Tracy Ellis, superintendent Ray Cranmer, project secretary April Woolls, and intern Steve Fuentes, a construction engineering student at Cal Poly, Pomona, worked together in submitting the compiled information to LEED and the U.S. Green Building Council for certification.

Depending on the level of certification of silver, gold or platinum, the University of Redlands will qualify for a grant to offset the cost of the building.

"Tracking a project such as this certainly makes you mindful of how the various aspects of construction must interface with the 'green' building process," said Messineo, "and how even the smallest things make a difference in the environment."

SF's Academy of Sciences Project Takes Green Building to New Heights

(Continued from page 1)

pipled in from the Pacific Ocean and natural systems will be used to purify wastes in the aquarium water so it can be recycled. Aquarium tanks have been designed to be interchangeable and reusable, which avoids waste and facilities maintenance. In addition, green cleaning programs and pesticide-free landscape management will both be utilized.

The new Academy is one of 10 pilot "green building" projects of the San Francisco Department of the Environment, part of a vanguard initiative to develop models for workable, sustainable public architecture.

The new building will feature numerous functions that will minimize the structure's environmental impact and increase its self-sufficiency, including:

Water Efficiency

While standard buildings make little effort to capture or treat storm water runoff, which carries salt, sand, soil, pesticides, fertilizers, oil, litter, and other pollutants into nearby ecosystems, the green roof of the

new Academy will reduce this runoff by at least 50 percent (up to 2 million gallons of water per year).

The roof is designed to collect this rainwater for use as wastewater, which will reduce use of potable water for wastewater conveyance by 90 percent. Overall potable water use will be 22 percent less than required by code.

The new aquariums will use saltwater piped in from the Pacific Ocean through Golden Gate Park. Natural systems will be used to purify nitrate wastes, ensuring that aquarium water can be recycled.

Energy Efficiency

The new Academy will consume 30 percent less energy than federal requirements.

Sixty thousand photo voltaic cells in the roof will supply almost 213,000 kWh of energy annually, or about 5 percent of the new Academy's energy needs, and prevent the release of more than 405,000 lbs. of greenhouse gas emissions (CO₂), the equivalent of planting over 340 trees.

The roof will include evacuated tube solar panels, which could generate up to 50 percent of the hot water demand for the entire site.

The partially planted roof provides a thermal insulating layer for the building that will help prevent overheating during the summer months and reduce energy needs for air-conditioning.

Natural Light and Ventilation

While the Academy will use new "green" technologies, it will also take advantage of simple, traditional engineering techniques involving use of natural light and ventilation.

At least 90 percent of regularly

occupied spaces will have access to daylight and outside views, reducing energy use and heat gain from electric lighting.

Lighting controls will include dimming, linked to the external light level, to ensure that a minimum of electric lighting is used at all times.

The new building will make extensive use of natural ventilation to minimize energy consumption from air-conditioning.

The roof was developed in close collaboration with a team of specialists who analyzed computer-generated models of air circulation to devise a natural ventilation system that will drive increased airflow and remove heat.

In addition, operable windows in the offices will provide fresh air.

Recycled Building Materials

One hundred percent of demolition waste from the old Academy has been recycled so far, including 9,000 tons of concrete, 12,000 tons of metal, and 120 tons of greenwaste.

The new building will be composed of recycled and renewable materials, such as "sustainably harvested" wood, concrete, glass, and steel — 100 percent of the structural steel used will be recycled steel.

At least 50 percent of the wood in the new Academy will be sustainably harvested and certified by the Forest Stewardship Council.

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