



Tire Derived Products Types & Benefits

CalRecycle 

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This presentation provides a menu of options for use of tire derived products.

The state does not endorse any one company's product. Rather we seek to put you in contact with all vendors so that you may make an informed choice about the best product for your project.

Agenda

- **CalRecycle Purpose**
- **Health & Safety Research Findings**
- **LEED Resources**
- **Funding Assistance**
- **Tire Derived Products & Benefits**
- **Feedback/Discussion**



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The agenda and we welcome your feedback at the end.

CalRecycle Purpose

Working to protect public health and the environment by effectively and efficiently managing California's waste disposal and recycling efforts.

Divisions:

- Administration, Finance & Information Technology Services
 - Materials Management and Local Assistance
 - Recycling
 - Waste Permitting, Compliance and Mitigation



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CalRecycle's government oversight work and structure.

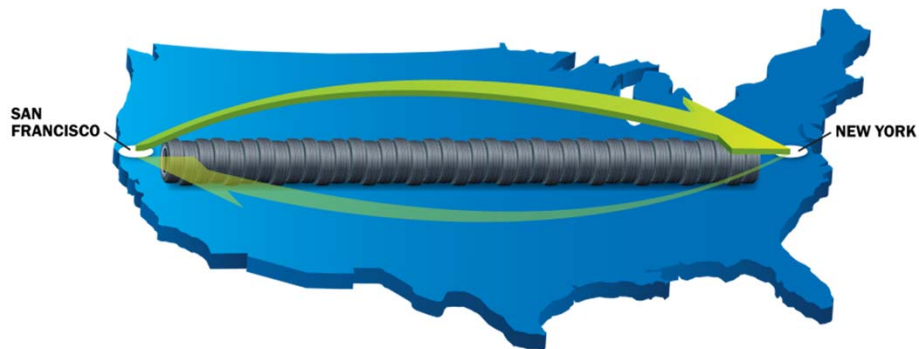
CA Integrated Waste Mgmt. act of 1989 (AB939) legislation requires that 50% of CA waste be diverted.

CIWMB now CalRecycle is charged w/ its implementation oversight/compliance, enforcement and includes permitting of solid waste facilities, local assistance towards meeting the mandate.

How Much is 40 Million Passenger Waste Tires?

40 Million Tires = 5,681 Miles

Distance from San Francisco to New York City..... AND BACK!



CA generates 40 million waste tires/year... enough to stretch from San Fran to NYC and back.

Assuming 9 inch tire width per passenger tire; 2,907 miles from SF to NYC.

Waste Tires

2 Major Threats: Pests and Fire

Negative Impacts

- Hazardous
 - Potential for fire and toxic chemicals from smoke
- Public Health
 - Tires are a breeding ground for mosquitoes
- Environmental
 - Air, water and land pollution with potential public health effects
- Aesthetic
 - Ugly piles of tires stockpiled on a parcel of land



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Why is this a concern to the state? We want to prevent any hazards that impact public H&S

Tracy fire, others due to illegal dumping waste tire piles. Now very few small dumps remain.

Mosquitoes, rodents, health & sanitation issues w/ these.

Seeking to divert 90% by 2015 ; currently at 82%.

Health & Safety Research

- **Building Materials Emissions Study (BMES)- 2003**
- **Tire-Derived Rubber Flooring Chemical Emissions Indoor Reference Exposure Limits (IREL) Study**

Research Findings posted at:

www.calrecycle.ca.gov/greenbuilding/Materials/Research/TireStudy.htm

www.calrecycle.ca.gov/Publications/Tires/2010009.pdf



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We have numerous reports regarding public health impacts of recycled tires posted on-line.

Findings include:

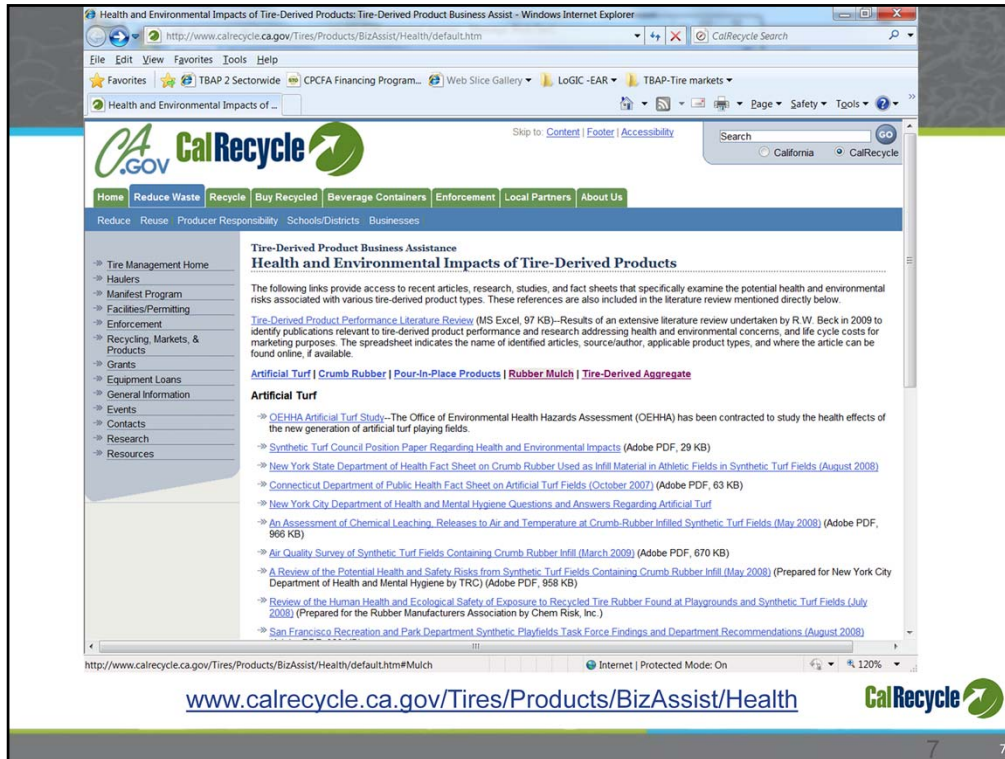
- Recycled content products performed about the same as virgin content products;
- Both product categories have the potential to emit chemicals of concern;
- Low-emitting building materials are readily available;
- To ensure they are low-emitting, all building products should be tested using CDPH *Section 01350* indoor air quality protocols;
- Proper ventilation plays an important role in good indoor air quality.
- Tire products had some very high emissions of unknown VOCs- recommended further study AND testing, currently being done

Extra info. (just FYI – don't need to speak this part)

CSI = The Construction Specifications Institute www.csinet.org

Tire Flooring study (2010)

- Currently in draft form for internal review- expect to release within the next couple of months
- Examined VOC emissions from various TDR and new rubber floorings and decline over time
- Used CDPH 01350
- Preliminary findings and recommendations will deal with issues such as:
 - VOC screening to determine indoor use
 - Emissions for *interior-only use* vs. *exterior use* products
 - emission rates over time
 - pre-occupancy *flush out* periods



Numerous reports on various products posted on our web

Research includes materials emissions (VOCs, formaldehyde), abrasion testing, air quality, more.

Material Safety Data Sheet Prepared 01/31/2012

HAZARDS IDENTIFICATION

Primary route(s) of Exposure: Inhalation, skin contact, eye contact, ingestion.

effects of overexposure:
Inhalation: Irritation of respiratory tract. Prolonged inhalation may lead to mucous membrane irritation, dizziness and / or light-headedness, headache, nausea, coughing, central nervous system depression.
Skin Contact: Irritation of skin.
Eye Contact: Irritation of eyes. Prolonged or repeated can cause conjunctivitis, tearing of eyes, and redness of eyes.
Ingestion: May cause fatigue, drowsiness, dizziness and / or light-headedness.
Medical Conditions: Aggravated by exposure: eye, skin, respiratory disorders.

FIRST-AID MEASURES

Inhalation: Remove to fresh air. Restore and support continued breathing. Get emergency medical attention. Have trained person give oxygen if necessary. Get medical help for any breathing difficulty. Remove to fresh air if inhalation causes eye watering, headaches, dizziness, or other discomfort.
Skin Contact: Wash thoroughly with soap and water. If any product remains, gently rub petroleum jelly, vegetable or mineral baby oil on to skin. Repeated applications may be needed. Remove contaminated clothing. Wash contaminated clothing before re-use. If irritation occurs, consult a physician.
Eye Contact: Flush immediately with large amounts of water, especially under lids for at least 15 minutes. If irritation or other effects persist, obtain medical treatment.
Ingestion: Do not give liquid if unconscious or drowsy. Give no more than 2 glasses of water. Obtain medical attention.

ACCIDENTAL RELEASE MEASURES

Steps to be taken in case material is released or spilled: Comply with all applicable health and environmental regulations. Ventilate area. Clean up with towels, boom, or other absorbents. Large spills – Use a respirator if not in a ventilated area. Shut-off leak. Surround and contain spill. Pump to storage or salvage vessel. Use absorbent to pick up excess residue. Keep salvageable material and rinse water out of sewers and water courses. Small spills – use absorbent to pick up residue and dispose of properly. Clean up with soap and water.

HANDLING AND STORAGE:

Handling and Storage: Keep out of surface waters, sewers, and waterways entering or leading to surface waters. Keep containers tightly sealed when not in use. Store in temperatures between 40°F - 100°F. DO NOT FREEZE.

TOXICOLOGICAL INFORMATION:

Route of Entry: Irritation caused through all routes of Entry. Hazard through repeated or prolonged inhalation and ingestion.
Toxicity to Animals: Not established.
Toxicity: This product has not been tested to determine environmental effects.
CARCINOGENIC EFFECTS: None of the ingredients in this product are listed with OSHA, IARC, or NTP as carcinogenic.

DISPOSAL CONSIDERATIONS

Waste disposal: Dispose in accordance with all applicable regulations. Avoid discharge to natural waters. Under EPA-RCA (40 CFR 261) This material is not a hazardous waste.

REGULATORY INFORMATION:

As of the date of this MSDS, all of the components in this product are listed (or are otherwise exempt from listing) on the TSCA inventory. This product has been classified in accordance with the hazard criteria of the CPR (controlled products regulations) and the MSDS contains all the information required by the CPR.

Toxic Substances Control Act: This product is in compliance with the U.S. Toxic Substances Control Act (TSCA) inventory requirements.

FOR EMERGENCY CALL: 1-800-424-9300 (CHEMTREC)

HMS (U.S.A.)

Health Hazard: 1
 Fire Hazard: 0
 Reactivity Hazard: 0
 Personal Protection: B

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Typical School Procurement Safety documentation required:

1. Material safety data sheets (MSDS)
2. Material product descript; cut sheet; describe how installed (troweled, sprayed-on, etc) & maintenance required.
3. Letter from manufacturer if no prop 65 docs. Must be on company letterhead disclosing info. required by prop 65.
4. Any proprietary or trade secret ingredients must be disclosed.
5. No Lead, mercury, etc. verification. – verify product contains no heavy metals

Requirement Resources

- **Standards and Specification Development Resources**
 - CA Dept. of Public Health Standard Practice ([Section 01350](#))
 - [CALGreen](#)- State Green Building Standards Code
www.bsc.ca.gov/Home/CALGreen.aspx
 - C&D Debris Recyclers (CalGreen 50% diversion required) resource:
www.calrecycle.ca.gov/condemo/recyclers



CalRecycle's Statewide Technical and Analytical Resources division Provides Technical Assistance via Standards Development:

including information regarding:

CDPH [Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers, Version 1.1 \(2010\)](#)

California Department of Public Health (CDPH) developed Section 01350 in 2000 for the State's East End Project in Sacramento as a way to test building materials for VOCs and formaldehyde.

A health based protocol using reference exposure limits for chemicals.

Updated in 2004 and again in 2010

CALGreen- Worked with the various agencies lead by the Building Standards Commission in development of green code.

2010 update effective January 1, 2011.

CHPS- National non-profit- Develops a master list of Criteria, similar to LEED, developed by experts across the Country for the construction of High Performance Schools. Allows regional or local versions to be adopted, the California Criteria were last updated in 2009.

CalRecycle is a Charter member and currently has a seat on the Board of Directors as well as on numerous Technical committees developing criteria.

Databases:

- C&D Database lists material recyclers, searchable by county and material type, self-reporting
- CHPS products dB- Lists product by type and by attribute, single or multiple (e.g. recycled content and or low-emitting), and also by level of certification (manufacturer self-certified or third party tested)

Market Incentive Funds

Tire-Derived Product Grant Program

- Eligible: Public schools, CA cities, counties and state agencies
- Reimbursement Grant
- Max \$150K/applicant, based on \$5 for passenger tire equivalent diverted
- Contact CalRecycle at: 916/341-5062 or grants@calrecycle.ca.gov

Prop 1D High Performance Incentive Grants

\$41.7 Million in bond authority as of January 2013 available & to only assist the **Overcrowding Relief Grant Program (ORG) only**. This enables districts to reduce the number of portable classrooms on overcrowded school sites and replace them with permanent classrooms.

Contacts:

- Tim Hegedus, Project Manager, at timothy.hegedus@dgs.ca.gov 916.375.4672
- Brigitte Baul, Supervisor, at brigitte.baul@dgs.ca.gov 916.375.5984

More info is at:

www.dgs.ca.gov/opsc/Programs/highperformanceincentivegrantprogram.aspx



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1) **TDP grants** are most relevant to product procurement. See call or email info. on slide.
Note: Angela Gilliam 341-6460 runs program.

funded at \$3.4 million annually, targets cities and counties with awards to offset costs of tire-derived products (such as mulch, playground covers, rubberized sidewalks, etc.)
web:

www.calrecycle.ca.gov/Tires/Grants/Product

2) IF a state agency/department/entity audience, note **SABRC program**.

3) The **High Performance Incentive (HPI)** grant is a supplemental grant available to districts with projects that have increased costs associated with high performance attributes in school facilities. \$60 Million pot of money.

4) If relevant to audience: [Recycling Market Development Zone \(RMDZ\) Loans](#) (*Businesses*)

Economic development to fuel new businesses, expand existing ones (equipment), create jobs, and divert waste from landfills. www.calrecycle.ca.gov/rmdz; 916/341-6600

Market Incentive Funds Continued

Highway Safety Improvement Program (HSIP) and Cycle 3 High Risk Rural Road Program (HR3)

- HSIP ~ \$100 Million / HR3 ~ \$15 Million

Jim Day HSIP/HRRR Coordinator (530) 741-5116 james_p_day@dot.ca.gov

Bike Transportation Account

- \$7.2 Million

Deborah Lynch (916) 653-0036

deborah.lynch@dot.ca.gov

Environmental Enhancement and Mitigation (EEM) Program

- \$10 Million Annually

Brenda Herron(916) 653-6930

brenda.herron@dot.ca.gov



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[This slide shows funding resources via Dept. of Transportation aka CalTrans](#)

[Next cycle 2014?](#)

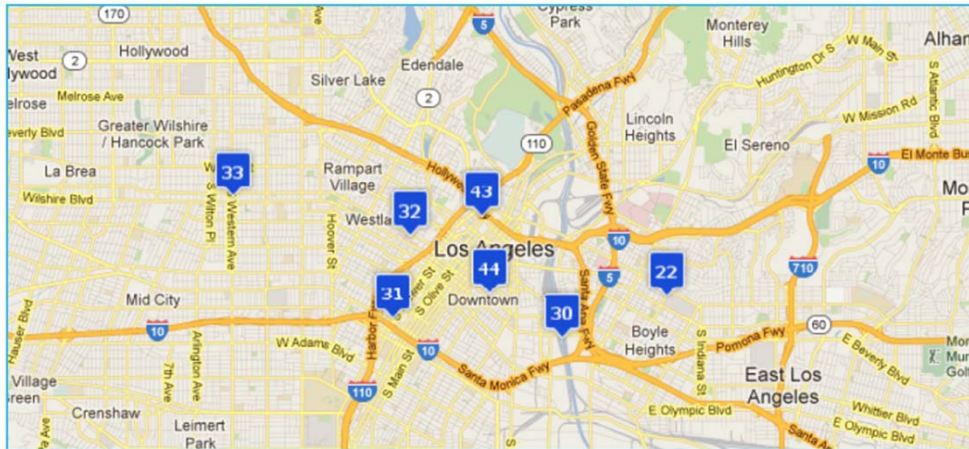
[Safe Routes to School Programs](#)

\$45 Million for 2 year cycle - Deadline was March 30, 2012

<http://www.dot.ca.gov/hq/LocalPrograms/saferoutes/saferoutes.htm>

Locations of Installed Tire-Derived Products

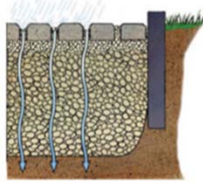
City of Los Angeles



Locations statewide are listed at: <http://goo.gl/maps/VoPu>



Tire Derived Products Contribute to LEED



- Waste materials diverted from waste stream
- Materials containing recycled content
- Integrating stormwater design principles
- Reduce heat island effect
- Water efficient landscaping
- Low emitting materials
- Materials & resources extracted, processed and manufactured regionally



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Throughout this presentation you'll see green boxes that demonstrate the potential for each product's **Leadership in Energy and Environmental Design (LEED)** credits.

Including features on slide and more:

- Locally derived (minimize transport)
- recycled content products

TDPs can contribute to Green construction -- the wave of now and the future.

Tire Derived Product Categories

- Accessibility Ramps, Paths & Sidewalks
- Animal Care Products
- Artificial Turf
- Flooring & Mats
- Sports Surfacing
- Landscaping & Rubber Mulch
- Outdoor Surfacing, Pavers & Tiles
- Playground Surfacing
- Traffic Related Products



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Top left- United Sports Surfacing of America (USSA), Mid left- USSA PolyTurf, bottom left- Tot Turf,

Upper right- Rubber Sidewalks Inc, Mid right- Rubber Designs, red track-generic surface, bottom right- West Coast Rubber

TDP Pricing

- Some TDPs typically have higher initial costs than competing products
- But these TDPs usually have lower life-cycle costs because they
 - Are more durable
 - Last longer and
 - Reduce replacement and maintenance costs
- Plus, TDPs often provide other performance or safety benefits



TDP Pricing Examples

Product	Approximate Initial Price*
Pour-in-Place Playground Surfacing	\$8 - \$17 per square foot**
Pour-in-place Sidewalks	\$9 - \$17 per square foot**
Rubber Mulch	\$2.25 per square foot
Sidewalk Tiles	\$9 - \$13 per square foot

* These prices do not account for life-cycle cost savings related to reduced maintenance and/or replacement costs associated with TDPs.

** About \$3 - \$5 per square foot accounts for installation costs.



Janitorial Products



Product Types

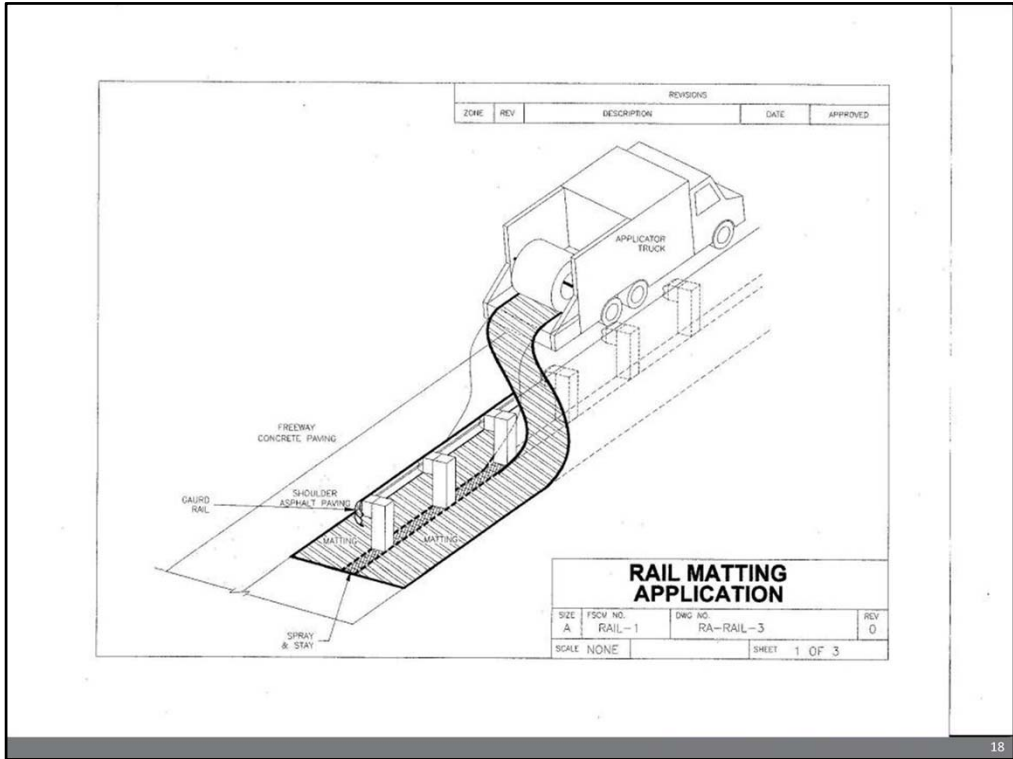
- Wringer Bucket
- Janitorial Cart
- Recycling and Waste Containers



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Delamo “Green Clean” product line only – rubber and plastic 100% post consumer

Provided through Delamo and only comes in black.



Rubber Rolls

Product benefits may include:

- Environmental
- Economic
- Health & Community



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USRR weed abatement mats/ rolls, can be used as temporary walkway

It does meet ADA compliance requirements at schools during construction.

Point of this slide and previous, is to demonstrate how they are rolled and look when it is installed. I.e: walkway between portable classroom, when done they can roll it up and use it again.

Accessibility Ramps, Paths & Sidewalks

Product benefits may include:

- Enhanced durability & resilience
- Easy maintenance & installation
- Enhanced safety & reduced liability
- Enhanced comfort
- Absorbs and retains less heat than concrete
- Reduced storm water run-off depending on product permeability



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Left-United Sports Surfacing of America, (USSA), middle-Rubber Sidewalks Inc., right-Safe Path Products access ramps for portable classrooms

Accessibility Ramps, Paths & Sidewalks

Product Types

- Sidewalks
- Paths, Trails & Tracks
- Ramp End Landings
- Tree Wells



Vancouver 2010 Winter Olympics
Used rubber tiles from recycled tires instead of asphalt



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Left-Safepath products, Top-Rubber Sidewalks Inc. (RSI), Bottom Middle - United Sports Surfacing of America, Inc (USSA), Right - Treewell

Case Study: Modular Sidewalk

City of Santa Monica

- For every 100 square feet of modular recycled tire sidewalk,
- California tires diverted from landfills: **89 tires**

Savings

- The cost to install and repair a 20 foot stretch of recycled rubber modular sidewalk 5 ft. wide is less expensive than a concrete sidewalk
- Reduced trip and fall settlement claims for the City

Benefits:

- Diversion of tires from landfills
- Fewer trips and falls
- Rainwater percolates through sidewalk seams to recharge groundwater



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100 square feet of modular sidewalk tile = 89 tires; almost 1 tire per square foot.

\$1.50 per square foot to repair rubbersidewalks compared to \$8.00 per square foot for repairing concrete.

Set & Lock Flexible Sidewalk Modules



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Individual tiles that dowel together. Easy to replace or move

Rubbersidewalks People Care: 4 perspectives

1) Personal liability 2) Tree 3) Financial 4) Waste management

1) Personal liability: risk management and city attorneys view rubbersidewalks as a solution to trip and fall litigation settlements. Pedestrian's perspective

2) Trees: rubbersidewalks benefit the health and stability of mature trees in an urban environment. The Arborist's perspective

3) Financial: rubbersidewalks as new maintenance solution to costly repetitive sidewalk repairs. Street Maintenance perspective.

4) Waste management: rubbersidewalks use recycled waste tires that have been processed into crumb rubber, and rubber buffings.

Subtitle: a technological alternative in an Urban Environment

3 aspects to subtitle 1) crumb rubber technology

2) an alternative sidewalks i.e. other than concrete

3) Urban environments / special considerations

The crumb rubber industry has developed the technology over the last 15 years to process used tires into crumb rubber, and then mold and press various new products. 2) Rubbersidewalks benefit from the advance in rubber chemistry to produce a sidewalks as a technological alternative to concrete.

3) Urban environments need trees and a way rethink the urban space.



89 tires = 100 sq. ft. of tiles

Made by Terracon.

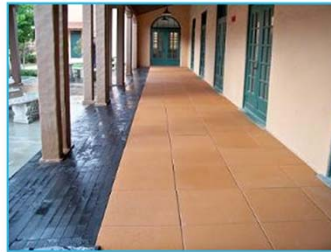
Case Study: Accessibility Ramps

Liberty Station, San Diego, CA

- Made from **100% California recycled tires**
- California tires diverted from landfills: **3,200 tires**

Benefits:

- Compliance with federal ADA access laws codified in local building requirements
- These recycled rubber tire ramps have no load-weight limitations
- Unlike other construction materials such as aluminum, wood and plastic
- Installation of recycled tire rubber accessibility ramps do not require jack-hammering or sawing



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Accessibility Mats



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Safepath products

Safer Sidewalks for City Blocks



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USSA, Inc.

Installed with the same basic equipment and methods used with concrete or asphalt

We suggest seeking the manufacturer regarding the use of a licensed contracted installer to ensure these walkways are installed correctly for best performance and longevity.

BROKEN GROUND?

- TDP allows tree root movement without breaking or heaving concrete.
- Pour-in-place application, there are several manufacturers in listing/handout
- Installed with the same equipment and methods as concrete or asphalt

- Stormwater Design (SS Credits 6.1 & 6.2)
- Reduces storm water runoff (MR Credit 4.1)
- Reduces the heat island ratio by absorbing and retaining less heat. (MR Credit 4.1)
- Recycles approximately 1 scrap tires per square foot of sidewalk. (MR Credit 4.1)

Multipurpose Pavements and Tracks Grant Elementary, Petaluma, CA



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For what is shown above, Permeability: ~20-25 Gal Per Sq. Yard

Made by USSA.

Or Poured over gravel for short life situations, ~3-5 years.

Pour in Place & Tree Wells Monrovia High School



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Tree wells saved beautiful oak trees at Monrovia High School. Facility managers laid 2 inches of pour in place rubber over former dusty dirt area. Also, Pour in place tree wells replace metal grating that won't be stolen in tough economic times

Some cities claim the rubber tree wells are better because the lesser need of weed problems, looks better, and no one would steel the rubber wells like they do with the metal ones.

Tree wells saved beautiful oak trees at Monrovia High School. Instead of pulling up asphalt, facility managers laid 2 inches of pour in place rubber directly over asphalt. Also, Pour in place tree wells replace metal grating that won't be stolen in tough economic times

Examples of the color black used on a sidewalk retrofit



CalRecycle 

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- Detectable warning mats for sidewalks, as produced by Millennium Molding
- CADSA (State Architect) has approved this product as a “dark on light” for cement installation/ scenario.
- Caltrans does not use black
- This shot is from an installation in the City of Davis where the city guidelines for dark on light, light on dark are met.

Flooring & Mats

Product benefits may include:

- Durability & wear-ability
- Low installation & maintenance costs
- Reduced injuries & enhanced comfort
- Non-skid surface & slip resistance in both wet / dry conditions
- Reduced fatigue & improved productivity



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Left-Swisstrax, center USRR, right-West coast anti fatigue mat

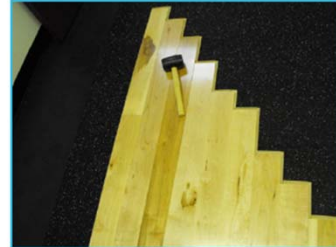
Case Study: Flooring Underlayment

Concerto Lofts, Los Angeles, CA

Solair Condos, Los Angeles, CA

Benefits:

- Reduces the noise from foot traffic, televisions and stereos
- Superior impact sound isolation required for multi-family, condominium and commercial installations
- Resilience of tire rubber maintains its form over time
- Durable compared to other underlayment materials



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Case Study: Reusable Flooring Tiles

Barrett-Jackson Car Auction

- Car auctions and trade show exhibits display flooring is often made of carpet.
- Recycled rubber tiles snap together, enabling exhibit flooring to be cleaned and reused many times.



Savings:

- Carpet: 1 to 2 uses for exhibit events
- Recycled rubber tiles: reused at multiple events

Benefits:

- Life cycle greenhouse gas emissions for multiple-use recycled rubber tiles are a fraction of greenhouse gas emissions from carpeting that is used twice



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- **Location:** Barrett-Jackson car auction, Orange County, CA
- Barrett-Jackson holds a series of collector car auctions in California, Arizona and Nevada. In the picture above, recycled rubber floor tiles were used to showcase cars in Orange County, California, in 2012.
- Over 40,000 square feet of reusable black tiles were used in this installation.
- The black tiles were made from recycled tires and recycled plastic.
- After the show, the tiles were reclaimed by the manufacturer who sold one-quarter of them to garages then cleaned and reused the rest at the next event.
- **ASTM standards:** ASTM D638; ASTM D4060; ASTM D2240; ASTM F137; ASTM C1028; UL94 2006

Outdoor Surfacing, Pavers & Tiles

Product benefits may include:

- Durable and resilient to various climates and exposure to elements
- Resistant to fading and cracking
- Low installation and maintenance costs
- Reduced injuries and enhanced comfort
- Non-skid surface & slip resistance in both wet /dry conditions
- Permeable surface, depending on product



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Tiles by US Rubber Recycling

Denise said it will last 5-8 years at most.

Solid Surfaces, Pavers, Bound Mulch & Tiles

Product Types

- Patios & Decks
- Walkways
- Courtyards
- Pool Decks & Hot Tub Areas
- Sports Arenas
- Ski Resorts
- Water Parks



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Case Study: Playground Tiles Glen Paul School, Eureka, CA



BEFORE

- Woodchips float on puddles
- Mushrooms grow



AFTER

- Improved safety
- Increased access for students with disabilities

"The tiles have made a big difference. Kids bounce off them when they fall and are surprised that they don't get hurt." -Tess Ives, Principal



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Tire rubber supplier: Environmental Molding Concepts

Location: Glen Paul School, 2501 Cypress Ave., Eureka, CA 95503

Date Installed: 2011

Specific tile or individual tiles can be replaced if it is worn, instead of whole thing.

Description: With a grant from CalRecycle, the school had molded tiles installed below playground equipment. The molded tiles were made from a mixture of 6,350 ground-up recycled tires, binder and pigment.

A \$57,165 Tire-Derived Products grant from CalRecycle enabled the Glen Paul School to purchase recycled rubber molded tiles for both playgrounds.

Savings: Every two years, the school used to replenish the wood chips at a cost of \$2,000. Every eight or ten years they used to remove and replace all the wood chips which cost \$10,000.

Source: Ron Loyd, Environmental Molding Concepts

ASTM standard: The recycled rubber molded playground surfacing tiles meet ASTM F1292 "Standard Specification for Impact Attenuation of Surface Systems Under and Around Playground Equipment," ASTM F1951 "Standard Specification for Determination of Accessibility of Surface Systems Under and Around Playground Equipment" and the new Americans with Disabilities Act standards regarding the accessibility of public playgrounds that went into effect March 15, 2012.

Pour-in-Place



PD Play Pad

Lasting 4-5 years, maybe, depends on how they are installed. Must be installed Properly.

Denise said 5-8 years, at most.

Case Study: Parks

Livermore Area Recreation and Park District

- California tires diverted from landfills: **3,281 tires**

Benefits:

- Requires less maintenance
- Less frequent replenishment vs. sand and wood
- Meets ASTM F1292 and ASTM F1951 standards



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Case Study: Playground Mulch

Snowden Elementary & Hester Elementary School

- California tires diverted from landfills: **29,986 tires**

Benefits:

- Safer surface cushions child's fall
- Eliminates splinters
- Fade reducing colorant coating
- Long lasting and durable
- Tires diverted from the landfill
- Meets ASTM F1292 and ASTM F1951 standards



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Schools in Farmersville, CA outside of Visalia

Case Study: Landscaping Bark

Redding Recycling and Transfer Station

- California tires diverted from landfills: **6,183 tires**

Savings

- Reduced labor, maintenance and replacement of wood chips every few years
- The bark controls weed growth, reduces dust, provides excellent drainage and is long lasting

Benefits:

- Durable
- Aesthetically pleasing
- Diverts tires from landfills



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Case Study: Rubber Mulch



Santa Clara County Sheriff's Office, Training Academy

- Prevents weeds
- Reduced mulch erosion
- Discourages animals

"We are located right against the foothills near a county park, and the landscape generates weeds very quickly. This mulch prevents weeds from growing and provides cushioning for falls." - Deputy Sheriff Devin Fontana



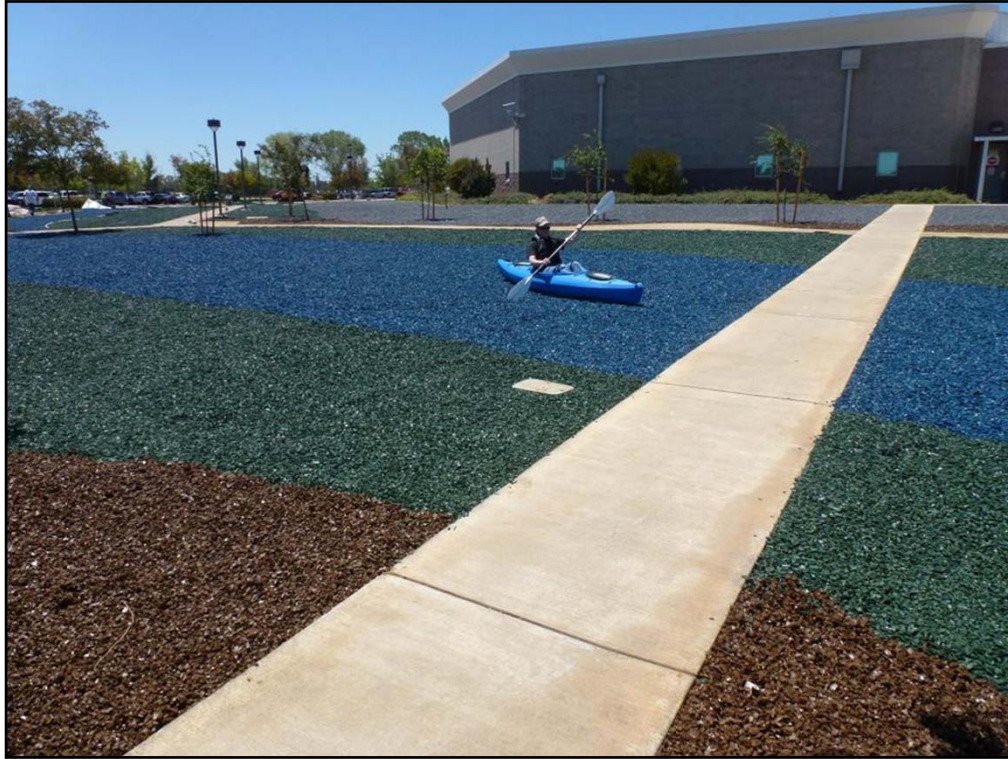
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Description: The Santa Clara County Sheriff's Academy training center uses recycled tire loose-crumb rubber mulch under the monkey bars and pull-up bars on its obstacle course. Deputy Sheriff Devin Fontana says, "We are located right against the foothills near a county park, and the landscape generates weeds very quickly. This mulch prevents weeds from growing and provides cushioning for falls." The sheriff's office is using recycled tire mulch throughout the campus to replace much of the traditional wood bark mulch, which blows around or is dug up by animals. The project diverted 10,500 tires from the landfill with a TDP grant from CalRecycle.

Source: CalRecycle TDP grant database



- The Mather FAA Center showcases 5 acres of rubber mulch nuggets in 5 colors. This project eliminated watering and significantly reduced maintenance costs
- 5 acres of Rubber Bark™ technically they are rubber nuggets. 3 inches deep.
- FAA control center at Mather.
- Completed last August 2012.
- Need to control dust and dirt, by putting Rubber bark down they eliminated maintenance issue and water use issue, and the use of Recycled products.
- Blue is for water.

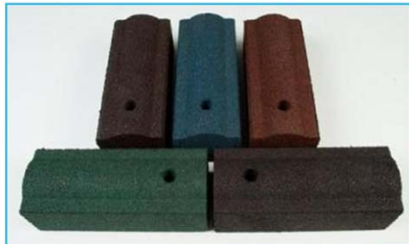


Walkway is a recycled tire material.

The colored nuggets are separated by a bender board made from recycled plastic from company in Lodi with a rubber sidewalk.

Landscape Edgings

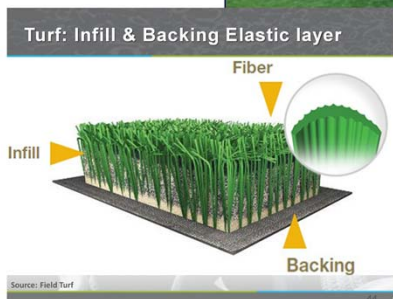
Colors available:



Synthetic Turf

Product benefits may include:

- Durability in all climates
- Easy installation
- Low maintenance
- Reduced injuries
- Enhanced comfort
- Reduced water usage



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- Middle slide is USSA's PolyTurf
- Artificial turf needs no water, mowing or fertilizing.

PolyTurf Green Fields with Solar Reflectance

**Multi Purpose System
with pervious paving,
resilient underlayment
and Cool Plus Fiber
technology.**



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LEED Credits Oakland

Low Maintenance



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- First photo is of un-manicured lawn with a discarded tire around the corner from 7th and F Street in Sacramento.
- Right - Westfield Sacramento, 7th and K Streets

Case Study: Sport Field

Humboldt State University

Savings:

- Water bill
- Soil amendments
- Fertilizers
- Lawn mower fuel
- Maintenance labor

Benefits:

- Extended field use to year round activity.
- Reduces the university's need to rent space off-site to accommodate group activities that require field time.
- ASTM F1292 and ASTM F1951 Certified



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HSU just renewed their synthetic turf field again, rather than going back to grass again.

Sports Surfacing

Product benefits may include:

- Durable & resilient surface
- Easy maintenance & installation
- Slip resistant & traction in both wet / dry conditions
- Enhanced cushioning & comfort walking / running
- Enhanced safety and reduced injuries from falls
- Enhanced performance as shock absorption reduces stress on joints, muscles, legs & back



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Left- generic sports track, right - court edge reducers, Safepath Products

Multipurpose



CalRecycle 

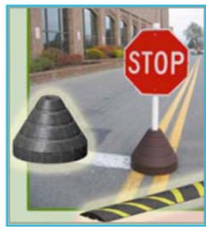
50

Sacramento 24 hr Fitness

Traffic Related Products

Product benefits may include:

- Durable & resilient to various climates and exposure to elements
- Low installation & maintenance
- Weighs less than many non-recycled product substitutes
- Reduced cost
- Variety of product options



CalRecycle 

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Left-3 D traffic works, center is tire stops, right is seismic joint.

Far left picture is blurry.

Far right is made by 3D

Case Study: Tire Stops

Dow Chemical

- Installed 400 three ft. tire stops in their parking lot
- California tires diverted from landfills: **800 tires**

Benefits

- Lasts longer compared to conventional concrete
- Maintenance free
- Easy to install
- Lightweight
- Reduced risk of damage to vehicles



CalRecycle 

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Dow Chemical in Pittsburg, California.

All are West Coast, Wheel Stops

Cameron Wright with West Coast Rubber Recycling: Dow Chemical in Pittsburg, Calif., has 400 wheel stops in their parking lot. Each 3' wheel stop uses 2 tires which means this installation has diverted 800 tires from landfills.

3 ft. and 6 ft. Wheel Stops are available.

Traffic Products

Throughout California

- 1 – 3 tires used in sign base
- Provides stability for a variety of portable signs
- Use in pedestrian zones near K-12 schools, in parking garages and at public events

Benefits:

- Heavy weight of the recycled tire rubber provides stability
- Rubber bases are reboundable or detach upon impact
- Divert scrap tires from the landfill



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Made by 3D.

Other Products

Product benefits may include:

- Durable & resilient in all climates
- Low maintenance & easy installation
- Enhanced comfort & safety
- Reduced noise levels from sound absorption
- Absorbs & retains less heat than traditional counterparts
- Enhanced permeability reduces storm water run-off



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Left- Modular Rubber Drains, Middle two are right-
Eco Blok sand bag replacements

Case Study: Erosion Control Blocks

CalExpo

- California tires diverted from landfills: **7000 tires**
- In 2008 CalExpo installed a quarter mile long retaining wall made from dense recycled rubber blocks and rebar

Benefits:

- Durable to outside elements
- Consistent size – each block replaces two typical gravel bags
- Sturdy recycled rubber blocks effectively provide erosion control and effectively control Stormwater

Savings:

- Less cost for materials and permitting fees.



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Location: CalExpo, 1600 Exposition Blvd., Sacramento, CA 95815

Overview: During rainstorms at the CalExpo fairgrounds, stormwater used to flow down the hill from the horse racetrack to the road below. To prevent the hillside soil and eucalyptus leaves from washing down the steep hill and into the roads and water system, CalExpo used sandbags. When the bags broke, sand added to the sediment in the stormwater runoff, exactly what CalExpo was trying to prevent.

A quarter-mile concrete retaining wall was going to cost hundreds of thousands of dollars and would require permitting. Given budget constraints and the need for a quick solution, CalExpo installed a one-foot retaining wall made from dense recycled rubber blocks.

The block shape, which is concave at one end and convex at the other, creates a tight seal between the rubber blocks. Two holes in each block allow the blocks to be stacked and staked for stability.

CalRecycle provided grant funding for the project in order to showcase the use of recycled tires. The recycled rubber wall cost a fraction of what a concrete wall would have. CalExpo was able to order the blocks and install them in a matter of days.

Manufacturing process: Massive steel wheels mechanically grind up tires into smaller and smaller pieces. Steel and nylon belt residue is removed. Polyurethane binder is added to the crumb rubber and the mixture poured into an 800-pound mold. The mold heats up, compresses the rubber and polyurethane mixture then releases the 24" x 12" x 4" block. Curing happens partly before the mold releases the block and partly afterward.

Stall & Flooring Mats

Product Types

- Flooring Tiles
- Stall Mats
- Arena Cover
- Bedding Options



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Generic mats, several manufacturers...Ag Link, Rubber Designs pictured

Mike said he tells Caltran that these thick flooring mats make a nice alternative to storing heavy equipment rather than using wooden pallets or 2 by 4s

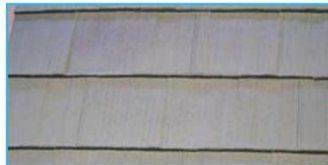
Denise said some places use these tiles with hay on it. Last very long.

Dog Bone

Other Products

Roofing

- Paints
- Sealants
- Rubber Drains



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2 top EcoBlok, center left- Hyperseal, center right- MD technology, lower left Hyperseal, lower center and right- MD technologies, Center Top: Kirkhill roofing product

Case Study: Preventative Tire Sealant



Street Sweepers at Los Angeles County Public Works, Division 4 Vehicle Shop

Savings:

- Each flat tire costs ~\$150 in terms of driver down time and tire patching labor
- Pre-sealant puncture rates between 1 and 6 repaired tires/month
- \$1900 (1x) to install sealant vs. \$13,700 annually to repair

Benefits:

- Sealant helps the tires maintain air pressure resulting in better gas mileage
- Street sweeper drivers finish their routes uninterrupted by flats



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- Historically the Los Angeles County Public Works Department has replaced or repaired one to six tires per street sweeper per month. Road Maintenance Division 4 street sweepers frequently run over nails, bolts and other sharp objects on their daily routes resulting in punctures to the tires. As does their Ford F150 pick-up truck, that is driven 45-50 miles per day on and off of the highway. Prior to using the tire sealant, a punctured tire resulted in two to three hours of down time for both the truck and the driver.
- In October 2012, the LA County Public Works Division 4 Vehicle Shop installed this recycled rubber tire sealant into each of the six large tires of its 8 vehicle fleet
- The average time to install the tire sealant is 30 minutes per tire.
- Historically the life of the street sweeper tire was two years. Based on the positive results of using this recycled rubber tire sealant, District 4 has adopted the Best Management Practices (BMP) of installing the tire sealant when a tire is replaced.
- Manufacturing Process: Water and finely ground crumb rubber are the key components of this recycled rubber tire sealant. To apply, the product is pumped in through the tire's valve stem. The manufacturer recommends rotating the tire to distribute the product evenly inside of the tire. This can also be accomplished by driving the vehicle at 60 mph for a few miles.

Case Study: Roofing Sealant

Chrisman Pumping Plant

- California tires diverted from landfills: **157 tires**
- The 300 mils thickness ensures the roofing can handle foot traffic
- The roof was then coated with a Cool Roof rated coating to meet Title 24 and reduce energy consumption



Benefits:

- Contains ~8% recycled rubber which contributes to the system's waterproof qualities
- Durable waterproof layer is flexible and can withstand hot temperatures
- Heat welding creates strong bonds with adjacent pieces



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- **Location:** Chrisman Pumping Plant, 4201 Sabodan St., Bakersfield, CA 93313
- **California tires diverted from landfills:** 157 tires
- **Made By MBT**

Overview: The California Aqueduct moves water collected in the Sierra Nevada, Northern California and Central California down to Southern California. Most pumping stations serve to convey water to the next pumping station in this system. Chrisman Pumping Plant in Bakersfield feeds the Edmonston Pumping Plant which sends water 1,926 feet over the Tehachapi Mountains.

Installers removed the old roof and laid down a two-ply SBS modified bitumen roofing system over tapered insulation. The 300 mils thickness ensures the roofing can handle foot traffic. The manufacturer adds cryogenically size-reduced tire crumb rubber to an asphalt base to improve elasticity, elongation and durability. The roofing system is then reinforced with a tough polyester and fiberglass mat and surfaced with aluminum foil or white granules. The membrane can be applied with cold adhesive or a heat weld application. The roof was then coated with a Cool Roof rated coating to meet the requirements of California Title 24 and reduce energy consumption. This new roofing system contains approximately eight percent recycled rubber which contributes to the system's waterproof qualities.

These plants house energy-intensive pumps and the maintenance staff who watch over them. In 2011, maintenance staff noticed the old asphalt roof on the 50-year old Chrisman Pumping Plant was leaking and needed to be replaced. With summertime high temperatures in the 90s and 100s, the facilities manager knew a new, lighter roof would reflect heat and keep their air conditioning bills down.

***Cool Roof sealant is made by MBT also, as mentioned in the last slide.

Meets California Title 24 requirements. Although this project was not LEED certified, the roofing system would contribute four points if it were a LEED certified green building project.

Case Study: Cool Roof Sealants

Anaheim Hilton Hotel

Options for leaking roof:

- \$1,000,000 to replace roof
- \$450,000 to repair roof
- Best option: \$150,000 to reseal roof



Benefits:

- Diversion of tires from the landfill
- Energy savings
- Reduction of carbon emissions
- Mitigation of the heat island effect where dark, non-reflective hardscapes and buildings absorb heat.



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Rubberized primer application

Discussion/Questions?

- Feedback on TDPs & effective marketing methods
- 2010 TDP Catalog on-line at:

www.calrecycle.ca.gov/Tires/Products/BizAssist/Marketing/Catalog.htm

Contains product specification sheets, etc.

**We hope this presentation
has been informative.
Let us know how we might improve.**



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New product or new application ideas?