

## Green Processing, Green Products

Plant trees to offset CO<sub>2</sub> footprint.

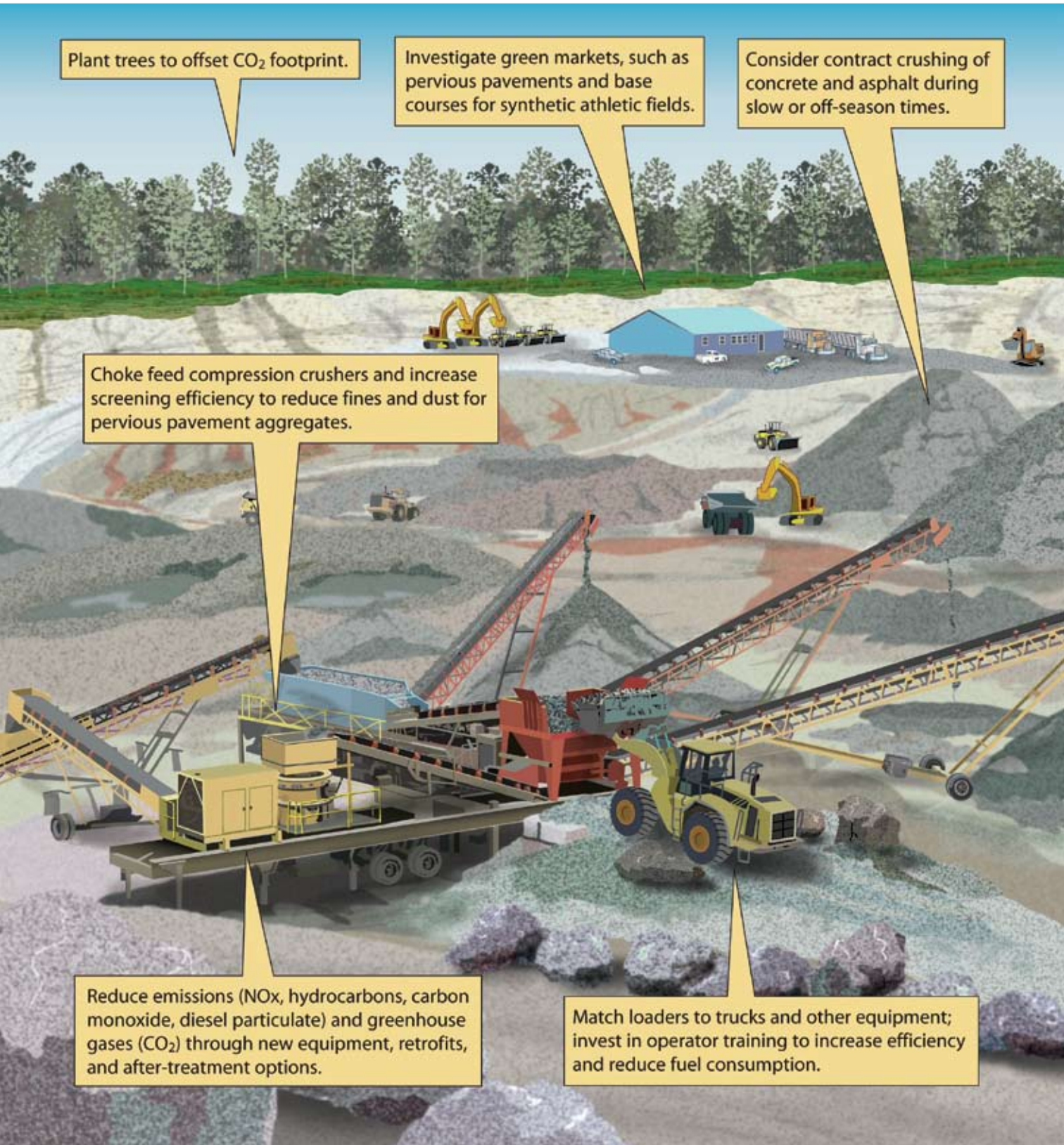
Investigate green markets, such as pervious pavements and base courses for synthetic athletic fields.

Consider contract crushing of concrete and asphalt during slow or off-season times.

Choke feed compression crushers and increase screening efficiency to reduce fines and dust for pervious pavement aggregates.

Reduce emissions (NO<sub>x</sub>, hydrocarbons, carbon monoxide, diesel particulate) and greenhouse gases (CO<sub>2</sub>) through new equipment, retrofits, and after-treatment options.

Match loaders to trucks and other equipment; invest in operator training to increase efficiency and reduce fuel consumption.



# AGGREGATES MANAGER

## Green Processing, Green Products

Aggregate producers already are feeling the effects of the “green” movement. California regulations for emissions now require cleaner-burning technology for existing diesel machinery, in addition to the Tier III and Tier IV compliance schedule for new equipment purchases. And operations outside of California are preparing for similar regulations to head east. But creating greener goals for your operation doesn’t have to be a burden. It can also mean opportunity.

On the most basic level, having a more environmentally friendly operation will earn you points in the community relations arena. According to Michael Readey, product manager for the Emissions Solutions Group of Caterpillar, Inc., many Cat customers are now looking into options for greener equipment upgrades. “Obviously one option is to buy a new, lower emission machine,” he says. “You can also look at running your fleet more efficiently, and there are a growing number of emission tools available to retrofit or add to your equipment.”

But moving beyond the obvious, aggregate producers can also explore new sales opportunities with the materials they make. “One hot area producers can explore is to work with architects and builders who are vying for LEED (Leadership in Energy and Environmental Design) certification,” says Mark Nikitas, marketing and communications manager, Aggregate Industries Northeast Region, Inc. “Products such as pervious concrete and pavers and porous asphalt help these contractors gain LEED

points because of their stormwater management characteristics.”

The U.S. Green Building Council has introduced the LEED program to encourage developers to design more sustainable projects. LEED includes a national rating system to help developers rate the environmental efficiency of their building projects.

The key to pervious or porous pavement materials is to reduce the amount of fines in the aggregate mixes, creating larger voids. These voids allow water to drain into a reservoir, which either leads to a drainage system, or discharges to the ground. Both methods of stormwater management work to minimize surface runoff.

“Another growing application for permeable aggregates is their use under synthetic athletic fields,” adds Tom Mason, aggregates sales manager for CalPortland in Seattle, Wash. “For this application, the need for aggregates is identical to that of pervious pavements. You want to take water off the surface of the field, allowing it to drain to the rock underneath.”

Crushed and recycled asphalt and concrete also play a part in helping contractors to accrue LEED points and is an avenue that aggregate operations are beginning to investigate for additional revenue resources. And simply being a local source of building materials can also help aggregate customers in their LEED certification goals.

“We can’t create the projects,” Nikitas says, “but we can get the word out to engineers and developers that we understand how to incorporate our materials into their LEED projects.”

# OPERATIONS

## Creating Environmentally

1

### Green processing tips



To lower emission levels, in addition to purchasing new Tier IV-compliant equipment, operations can look at engine retrofits and aftermarket products such as diesel oxidation catalysts, DPM filters, and catalytic converters. Matching equipment better to reduce cycles and training operators can also have an impact on lowering total emissions.

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### New ideas for new markets



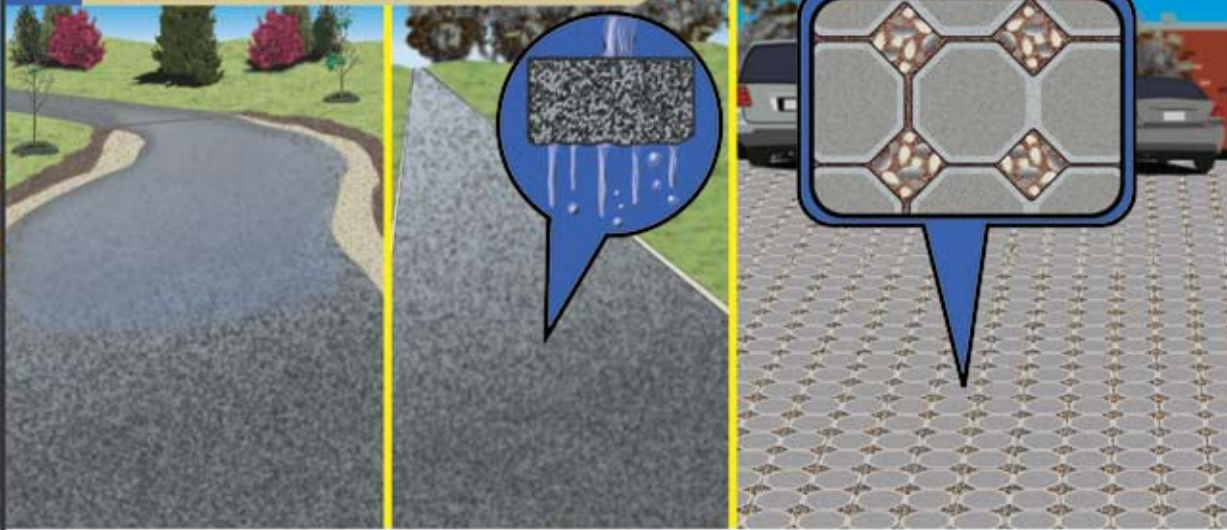
Many municipal secondary schools, private schools, and colleges are beginning to specify synthetic or artificial turf for their athletic fields. Like pervious or porous pavements, the purpose of the synthetic turf is to help manage stormwater runoff. These fields require permeable base and top courses each of unbound aggregates.

# TIONS ILLUSTRATED

## entally Friendly Operations and Products

### OUR EXPERTS

#### 2 LEEDing products for green construction



Michael J. Readey, Ph.D., received his bachelor's and master's degrees in ceramic engineering from Ohio State University, and his doctorate in materials science from Case Western Reserve University. He is the product manager for Caterpillar's Emissions Solutions Group, Marketing and Product Support Division.



Tom Mason is the aggregates sales manager for CalPortland in Seattle, Wash. He started in the ready-mixed concrete industry in 1975, and spent 17 years in Stockton, Calif. In 1993, he started in his current position in the Pacific Northwest. Mason has worked with landscape architects, contractors, and engineers to promote the uses of permeable aggregates in meeting environmental requirements.



Mark Nikitas, marketing and communications manager for Aggregate Industries Northeast Region, entered the construction materials industry in the early 1980s after graduating from Bentley College with a bachelor's degree in marketing management. Nikitas has spent considerable time during the last couple of years vigorously developing and promoting numerous sustainable products.

Producers should consider "going green" in the markets they target for sales. The green building movement includes the need for such products as pervious concrete, porous asphalt, and permeable pavers. All of these products work to better manage stormwater runoff by allowing the water to drain down to a crushed stone reservoir, or recharge bed — and they also can help contractors to obtain credits for LEED (Leadership in Energy and Environmental Design) certification. Aggregates produced for these markets typically must be free of fines. Crushed and recycled asphalt and concrete pavements also net LEED credits for builders and contractors.

#### 4 Contribute to sustainable landscapes



#### 5 Selling to LEED-bound customers



Homeowners — especially those in drought-prone or arid regions — are becoming more interested in reducing their potable water usage. Xeriscaping uses slow-growing and drought-tolerant plants to conserve water, and also relies heavily on the use of stone and rock as part of the fundamental landscaping materials.

Contractors looking to earn LEED credits must also use regionally manufactured or processed aggregates. It's important to note that as contractors increasingly look toward sustainable building projects, aggregate producers must get the word out that they understand how aggregates play a part in green building.

# OPERATIONS ILLUSTRATED

## Green Processing, Green Products

**Michael Readey** ▼

**I**t's interesting to me that many of the customers I work with are just as interested — or more interested — in reducing their emissions from a standpoint of doing the right thing, rather than just trying to meet or exceed regulations," says Michael Readey, product manager for the Emissions Solutions Group of Caterpillar, Inc. "I also find it interesting that customers view emissions in broader terms than the typical NO<sub>x</sub>, diesel particulate, carbon monoxide, and hydrocarbons; they're also grouping greenhouse gases into that definition — mainly CO<sub>2</sub>."

Because of this increased awareness in sustainable aggregate production, Readey says his group has received some interesting questions recently. "We have a customer, a small family-owned business, that is working to compete with bigger companies by being environmentally sustainable. His goal was to have his operations to be CO<sub>2</sub> neutral, and he wanted to offset his CO<sub>2</sub> footprint by planting trees. The question he posed to us was how many trees did he have to plant to offset his CO<sub>2</sub>?" he says.

Readey's group was able to use data from environmental groups and calculate the necessary number of trees for this customer, which numbered in the thousands. At that point, Cat also posed some suggestions to the producer for reducing tree numbers by reducing emissions.

"We determined that two gensets contributed to 80 percent of the customer's CO<sub>2</sub> output," Readey says, explaining that the options Cat suggested to this customer are universal for any producer interested in exploring "green" processing. "By operating more efficiently — through operator training running the engines at the optimum range for the application, and reducing idle time — customers can greatly reduce their emissions footprint," he says.

**Mark Nikitas** ▼

**A**ggregate companies that are vertically integrated are perceptible leaders in recognizing green markets for their products. Companies such as Aggregate Industries, a member of the Holcim Group, are now devoting resources toward helping customers understand how aggregate products can aid in their sustainable building goals.

According to Mark Nikitas, marketing and communications manager for Aggregate Industries Northeast Region, Inc., LEED (Leadership in Energy and Environmental Design) certification guidelines for contractors open opportunities for aggregate producers to sell to "green" customers. The LEED categories that fit with aggregate products include aggregate used for stormwater control, recycled asphalt and concrete pavement, and locally processed aggregate materials.

The latter category is an obvious selling point for aggregate operations. LEED guidelines state that using at least 10 percent of materials from a regional (500-mile radius) source will net 1 LEED point. Also, producers who don't already provide contract crushing of recycled asphalt and concrete pavement might explore this option for customers, who can gain additional LEED credits through 10- to 20-percent use of recycled materials.

Permeable pavement products are all designed to aid in minimizing surface stormwater runoff for parking areas, streets, and other paving projects, he says. "If they can keep the stormwater on site, contractors will pick up points for LEED certification," he says.

From a financial perspective, Nikitas continues, in addition to gaining LEED points, contractors who use permeable aggregates for stormwater management will avoid the cost involved in designing and installing surface draining systems.

**Tom Mason** ▼

**T**he growing interest in permeable aggregates (aggregate material that can be used for permeable paving and other stormwater management applications) creates a need for producers to understand not only the new markets these products present, but also some processing and handling considerations, says Tom Mason, aggregates sales manager for CalPortland in Seattle, Wash.

"The success or failure of a pervious paving system — or synthetic athletic field — is determined in large part by the permeable base course aggregates selected," he notes. "The top, or wearing, course is the only thing that's different in these different applications. And none of the top courses will be worth anything without the proper aggregates underneath."

When specifying permeable base course aggregates, Mason says there are several considerations: performance, constructability, and availability. "Both round and fractured aggregates can provide permeability," Mason says. "But there are a couple of distinct advantages to fractured aggregates." In a paving project, during the construction phase, "a properly proportioned fractured aggregate will allow truck traffic on the surface — with minimal distortion. And the internal friction provided by fractured particles will produce a more stable base by spreading surface loads over a wider area of the sub-base," he explains.

Mason also says that permeable aggregate characteristics can affect product handling methods. "There is a tendency for these aggregates to segregate when handled, and this can affect performance," he says. In order to minimize segregation, he suggests producers keep stockpiles slightly moist and tarp delivery trucks to maintain moisture during delivery.