

# BuildingStone

MAGAZINE

Spring 2007  
Volume 30, Number 1

## STONE FROM AROUND THE WORLD

New Technologies

Green Building

Andrea Palladio

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Spring 2007

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# BuildingStone

## MAGAZINE

Volume 30 • Number 1



### On the Cover:

The new Museum of Modern Art (MoMA) in New York features extensive use of Vermont Unfading Green Slate from the Vermont Structural Slate Company.

Photo courtesy of MoMA

## Features

### 8 Stone From Around the World

Across the globe, natural stone is available in an abundance of colors, styles and various other properties. Whatever the manufactured world provides can be trumped ten fold by Mother Nature. In this issue, we will uncover the various types of natural stone available around the globe, discuss each stone's properties and suggested applications, and unearth the overall riches that natural stone provides.

### 52 New Methods, New Practices, New Possibilities

Thanks to the advances made in technological fields, quarrying and manufacturing technologies have also changed considerably over time. The capabilities that weren't even conceivable just a few years ago are now possible. We'll discover what the new technologies have to offer quarriers, fabricators and designers.

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#### Historical Feature

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Texas prides itself on size – as the saying goes, "Everything is bigger in Texas." The state capitol building in Austin is a grand example. And it's home grown, something of a "Red Rose of Texas," sporting 15,000 rail carloads of Sunset Red granite quarried just 50 miles from the site. And that glorious exterior is entirely structural.

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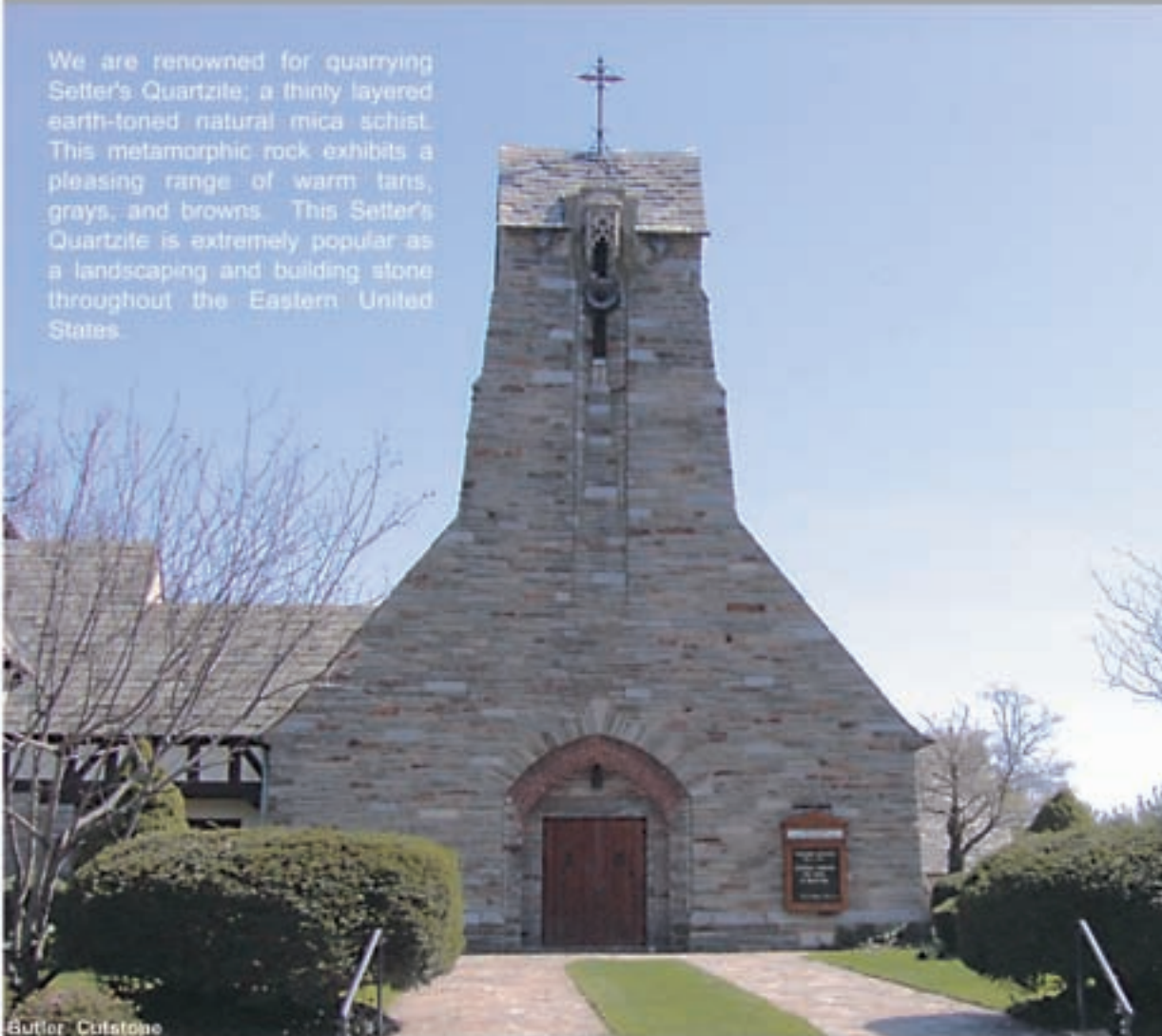
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MAGAZINE

## Features

### 62 Green Stone

Sustainable building practices are coming of age and natural stone lends itself easily to this new design trend. Readers will find out more about natural stone's advantages when used in green building and about the growing support for natural stone's use.

### 70 Andrea Palladio: The Most Inspirational Architect

Andrea Palladio is one of the most influential architects the world has produced. His system of proportions, the elegant symmetry of his projects, and the techniques of composition he used all serve to establish a relationship between each individual component and the whole – something he felt was at the very heart of classical architectural design. He has been an inspiration to countless architects throughout the Western world.



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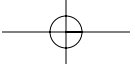
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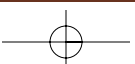
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# BSI Introduction

## Life of Beauty

John Mattke

President, Cold Spring Granite Inc.

**F**OR ONE WHO HAS SPENT his career working in the natural stone industry, there is something very special about locating a deposit of stone, extracting it from the earth, cutting it, shaping it, polishing it, and turning it into something beautiful. It reminds us of when we were children and we found a beautiful, naturally polished agate to add to our collection. We treated those stones like diamonds, each one precious and unique. Who would have thought back then that we would spend our lives celebrating that beauty. We have since learned to share a deep appreciation for what it takes to form that rock in the first place, and will go to great lengths to turn it into something of value for the rest of the world.

*Building Stone Magazine* is a celebration of stone, and offers us an opportunity to share information about extraordinary people, places and events that continue to influence our industry. In that way, this issue is no different. However, in this issue we attempt to educate our readers about the variety of stone types and the characteristics of each that make them different and unique. We show examples of stone types from around the world, share a little history about where they come from, and how they are formed. We discuss the latest in stone quarrying and fabrication technologies that help make stone more readily available and less expensive than some of the techniques of old would allow. And, we celebrate the life

and accomplishments of one of the most influential architects the world has ever known: Andrea Palladio.

We also explore an exploding trend in the building industry that I believe will have a significant impact on all aspects of the natural stone industry as well. I am referring to the increasing emphasis being placed on green building. Green building includes a wide variety of factors, materials and otherwise, that determine whether or not a building project should be considered green. From a material selection standpoint, the common perception is that natural stone is green – after all, it is natural stone! However, there are a lot of other factors that come into play when considering whether or not a material selection is green: energy consumption, longevity, recycled content, natural resource consumption, life-cycle assessment – all are areas to be considered when making green building product selections.

I believe natural stone is not only beautiful and durable, it is versatile, it is natural, and it is green. Through education, awareness and a continuous effort to improve the selection, fabrication and application of natural stone, I have no doubt the future of the natural stone industry in North America will be full of promise.

I hope you enjoy this issue of *Building Stone Magazine* and share with us in celebrating the beauty of natural stone. ♦

# Building Stone MAGAZINE

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BLUESTONE

# The Not-so-blue Stone

By Cory Sekine-Pettite



Photo courtesy of Jupiterimages 2007

**ABOVE:**  
The famous rocks of Stonehenge are Bluestone. According to historians, the stones were placed around 2,600 B.C.

**B** LUESTONE – A VARIETY OF SANDSTONE – is a beautiful and versatile building material, so-named because the stone appears blue when wet or freshly broken. The name is a bit of a misnomer, however, because the stone can be found in a range of colors. Geologically, bluestone is a fine-grained arkosic sandstone, also geologically referred to as a feldspathic sandstone. Though it is a durable stone that resists cracking, bluestone is highly prized as a building material because it can be easily separated into slabs of nearly any desired size. The stone usually is split and used in outdoor paving, such as walkways and patios.

The upper levels of bluestone deposits are well stratified and can be separated into slabs easily.

Sawn from the quarry using concrete saws, blocks of the stratified stone are set on edge to dry in the sun. This drying process exposes the natural seams in the stone, which is then split into pattern bluestone. Bluestone tile also can be cut from this horizontally bedded upper layer. Below the beds, the stone develops a more solid structure. At this level, big blocks can be removed by plug and feather. Cubes of the stone, which can weigh from five to 10 tons, are fabricated into slabs in a similar fashion as granite.

#### Quarries

Tough and weather-resistant, bluestone is easy to use, and is available in both dimensional and irregular sizes of varying thicknesses. It is often quarried as well-laminated, horizontally bedded

## MORE INFO

### Quarry Locations:

- North America: New York and Pennsylvania
- Europe: United Kingdom
- Australia

### Applications:

- Architectural accessories
- Interior accessories
- Building stone
- Countertops
- Fireplaces
- Flooring
- Landscaping
- Sculpture and carving

### Appropriate Finishes:

- Cleft
- Flamed
- Honed
- Natural
- Polished
- Sandblasted
- Sawn (rough)
- Split face
- Tumbled



Photo courtesy of Silverado Building Materials

sandstone, and that is one of its key traits. One of the flattest of all natural stones, Bluestone's tight dimensional tolerances work especially well in many outdoor environments, but it is well suited for indoor applications as well.

Largely known as a North American stone, bluestone is

found mostly in the Catskill Mountain region of New York and in northeast Pennsylvania where the term "bluestone" was first applied to a deep-blue-colored sandstone found in Ulster County, Pa. The geography (and geology) of this region was created from runoff from the Acadian Mountains ("Ancestral Appalachians"), which covered the area now known as New York City. This "Catskill Delta" ran in a narrow band from southwest to northeast and today provides the base material for the high-quality bluestone that is quarried from the two states. Bluestones from this source often are called Pennsylvania River Rock or variations of this name, depending on the market or origin of the stone.

Outside the United States, bluestone varieties can be found in the United Kingdom and Australia, where the building material seems to be increasing in popularity for new construction as well as reconstruction. In Melbourne, Australia, for example, bluestone was used to build many historic buildings, such as HM Prison Pentridge in the 19th century, and is used today to construct walls, bridges, curbs and gutters.

#### Colors

Bluestone is a great way to help a client bring the bountiful colors of the outdoors into or

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around their home or place of business. The material's color range is among the most diverse in nature, consisting of assorted pastel shades of steel blues; tropical greens; regal shades of lavenders and purples; golden yellows; as well as more sophisticated shades of gray, and lighter hues of beige, brown and rusty variations. Each stone is unique in its pigmentation, making a subtle change from stone to stone when set in paving or other applications. The result can provide an almost jewel-like effect that is both whimsical and sophisticated. This subtle, but striking, aesthetic effect makes bluestone a coveted building stone.

**Applications**

The durable texture of bluestone makes it ideal for almost any application. The material is sold as both dimensional and flagstone, providing opportunities for

use as paving, pool coping, wall veneer, countertops, patios, architectural facings, fireplaces, sills, and as a basic building material for churches, institutions, homes and businesses. Bluestone is available in many formats and sizes such as irregular slabs, tumbled pavers, wall rock and tumbled gravel.

Further, the versatile stone offers near-endless possibilities when it comes to finishes,



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whether you desire cleft, flamed, sawn, split-face or tumbled finishes. Bluestone also can be treated thermally, sanded and rubbed, or honed; honed bluestone is said to be a superb material for countertops. Basically, for whatever application you can imagine, it can be carved or cut from bluestone.

### Interesting Facts

The famous rocks of Stonehenge are bluestone. According to historians, the stones were placed there during the third phase of construction at Stonehenge around 2,600 B.C. The stones weigh approximately four tons each. They are believed to have been brought from the Preseli Hills, located 250 miles away in Wales, either through glaciation (erratic theory) or through humans organizing their transportation; scientists are still debating these theories.

In the United States, one of the most well known structures built from bluestone – and perhaps the oldest bluestone structures in this country – is the Starrucca Viaduct in Lanesboro, Pa. The viaduct is 1,000 feet long with 17 arches rising between 90 and 100 feet high to support the span. Completed by the Erie Railroad in 1848, the viaduct is now a National Civil Engineering Landmark. Quarrying became a local industry after the viaduct was built, and in the mid-1800's at least six quarries near the viaduct were cutting bluestone, using the railroad to ship the material across the Northeast. The Starrucca Viaduct is still used by the Norfolk-Southern Railroad. ♦

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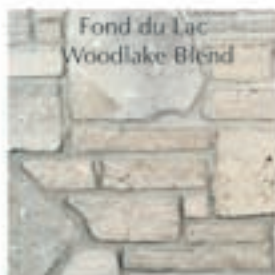
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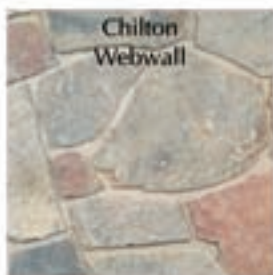
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## GRANITE

# Hardness and Beauty, All in One

By Kate Parrott

**G**RANITE IS ONE OF THE MOST COMMONLY OCCURRING

and widely used stones in the world; in fact, it is thought to be the most abundant type of stone making up the continental crust. Granite is an intrusive, igneous rock that is formed by the slow cooling and crystallization of magma beneath the Earth's crust. The rock has a visibly crystalline texture, creating a unique, beautiful look, which is also incredibly durable. Granite offers permanence in color and texture, making it a suitable stone for a variety of building projects. In architecture, granite is generally classified into two categories: building granite and masonry granite. Building granite is used either structurally or as a veneer for exterior or interior wall facings, steps, paving, copings or other building features, while masonry granite is used in larger blocks for retaining bridges, bridge piers, abutments and arch stones.

Granite generally contains three mineral groups: Quartz ranges from 25 to 35 percent; feldspar from 50 to 65 percent; and dark minerals such as mica, hornblende and magnetite, from one to 10 percent. Other minerals, such as pyrite, garnet and



Photo courtesy of Cold Spring Granite

hematite can occur in small percentages, accounting for the wide range of granite varieties that are available. The term “granite” also is often used to describe other plutonic, igneous stones, such as syenite, monzonite, granodiorite and others that all have similar chemical and mineralogical characteristics.

### Quarries

Granite is quarried across the globe; in the United States, granite is quarried in various loca-

tions throughout the country, including the New England and Great Lakes regions, North Carolina and Georgia, Texas, California and the Midwestern states of Minnesota, South Dakota and Wisconsin. New Hampshire actually has been nicknamed the “Granite State” because of the amount of granite it produces.

Years ago, excavating granite was a timely, laborious process that included the use of a significant amount of explosives and a lot of manual labor in the

drilling process. Today, diamond wire saws and slot drilling are the primary activities used to complete the job, making granite more economical for consumers, as well as a cleaner, safer and significantly less labor-intensive excavation process.

Granite quarries are laid out based on the direction in which the granite will break the easiest, providing the maximum benefit that can be attained from the natural seams and structure. By using these natural seams, the





Photo courtesy of Cold Spring Granite

maximum yield can be obtained from the quarry deposit, thus reducing the amount of stone produced that is not suitable for use as dimensional granite.

The types of natural fractures that can be seen in a granite deposit are based on their relationship to the flow lines, as well as the surface of the granite deposit. Sheeting joints run roughly parallel to the topographic surface at various levels beneath the surface; longitudinal joints are steep cracks that run

parallel to the flow lines; while cross joints are perpendicular to the flow lines.

### Colors

Granite is available in a wide variety of colors, including white, black, pink and red. The varying percentages of quartz, feldspar and mica account for the rock's color, veining and crystallization, making each granite deposit unique. The high presence of quartz can account for many of granite's color vari-

## MORE INFO

### Quarry Locations:

North America: Canada, Mexico, United States  
 South America: Argentina, Brazil, Columbia  
 Europe: Austria, Belgium, the Czech Republic, Finland, France, Germany, Italy, Norway, Portugal, Sardinia, Spain, Sweden, Switzerland, Venezuela  
 Africa: Angola, Egypt, Madagascar, Namibia, Nigeria, South Africa  
 Asia: China, Egypt, India, Iran, Saudi Arabia, Sri Lanka, Taiwan, Thailand, Turkey, Ukraine, Vietnam  
 Australia

### Applications:

- Architectural accessories
- Interior accessories
- Building stone
- Countertops
- Fireplaces
- Flooring
- Landscaping

### Appropriate Finishes:

- Bush hammered
- Flamed
- Honed
- Polished
- Sandblasted
- Sawn (rough)

### Stone Stats:

Average MOHs Hardness: 7  
 Average Absorption Rate (%): .13  
 Average Bulk Density (pcf): 172.8  
 Average Compressive Strength (psi): 23,300  
 Average Modulus of Rupture (psi): 1,855

ations, as quartz can be milky white, rose, smoky, yellow or amethyst. Feldspar, another one of granite's main minerals, can account for a glassy white, blue, green or red appearance. Finally, mica can contribute to a black, green, red, yellow or brown appearance.

### Applications

Granite is widely used as a construction stone because of its hardness and durability. The stone offers permanence, enduring color and texture, with the ability to withstand weathering

compared to many other materials that are vulnerable to the acidity of rainwater. For this reason, granite is commonly used for monuments, stair treads, countertops, windowsills, street curbing, wall cladding, roofing, flooring and paving.

Second only to diamonds in hardness, granite has a reputation for being virtually indestructible. It is a common paver of steps, terraces, plazas and public spaces. The stone is a perfect solution for anyone seeking a high quality, aesthetically appealing, enduring look. Avail-

able in blocks, slabs and tiles, granite's finishes range from polished and honed to sawn (rough), sandblasted, bush hammered and flamed.

Also, granite is an ideal material for monuments. Because it is massive in nature and has a homogenous grain, it is highly effective for decorative use. The stone can take on a good polish, making it pleasing to the eye and is resistant to all types of inclement weather. Granite is also ideal for flooring and countertops; with a wide variety of colors to choose from, granite floors and countertops can match virtually any décor.

BELOW:  
An image of the Carnelian granite quarry

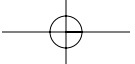


Photo courtesy of Cold Spring Granite

### Interesting Facts

Granite has long been a stone of sturdy use. Its earliest records date back to ancient Egyptian civilizations 7,000 to 8,000 years ago when it was used as one of the building materials for the pyramids. Granite was also used to build pharaohs' sarcophaguses. Today, a relic of the ancient Egyptian dynasty exists in Paris, France. It is called the Luxor obelisk and is made of pink granite, weighing in at an impressive 250 tons.

Stone Mountain, located in Atlanta, is one of the largest exposed outcroppings of granite in the world, behind only Mount Augustus in Australia and Pena de Bernal in Mexico. The mountain is 825 feet tall and covers 523 acres. The mountain also contains a bas-relief, the largest in the world, on its north face. The relief contains three figures of the Confederate States of America: Robert E. Lee, Stonewall Jackson and Jefferson Davis. The carving is larger than a football field and is recessed 42 feet into the mountain. ♦



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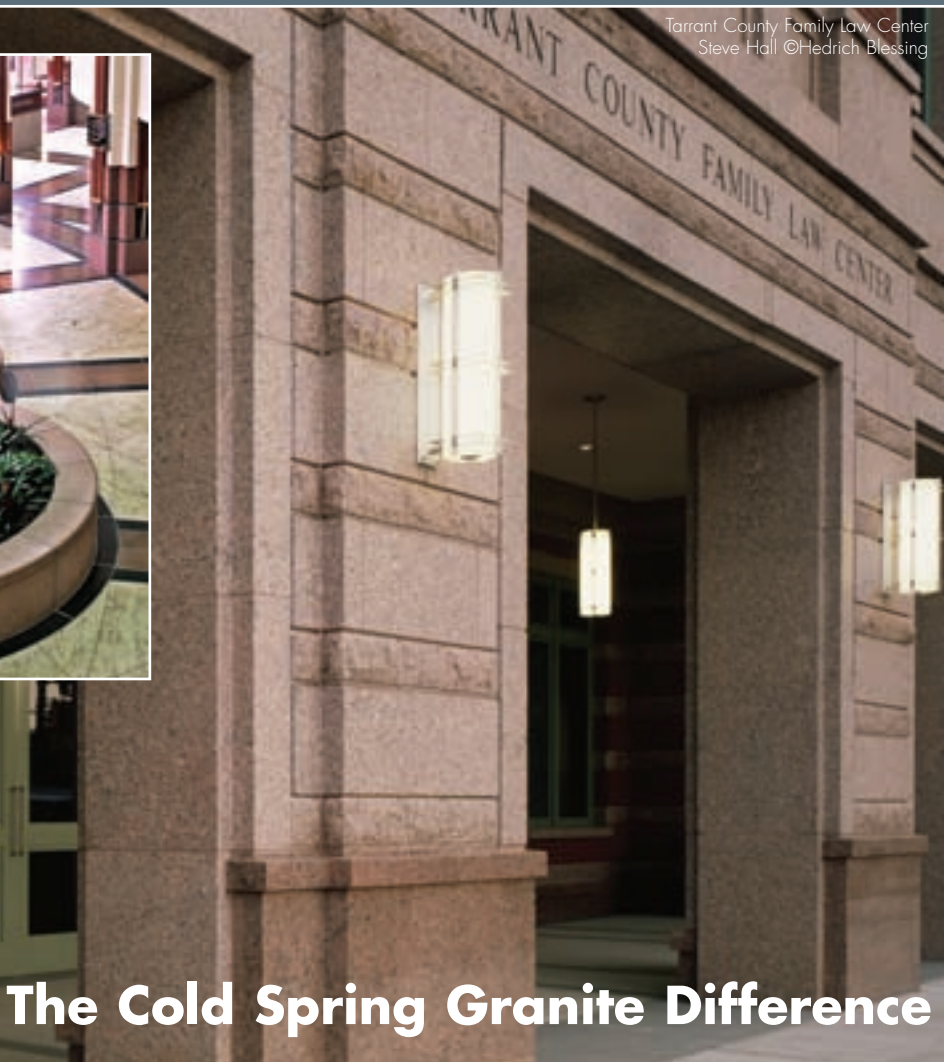
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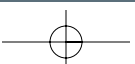




Photo courtesy of Patti and Katie Miller Photography

## LIMESTONE

# Dependable and Adaptable

By Cory Sekine-Pettite

**L**IMESTONE IS SEDIMENTARY ROCK composed largely of calcite (calcium carbonate) that can be found throughout much of the world. Available as an oolitic or dolomitic stone, Limestone generally is a non-crystalline stone (i.e., does not take a polish) that displays a uniform composition, texture and structure. The stone is formed as a result of millions of years of deposits of seashells and fossilized sea creatures. The calcium in the bones and shells combines with carbon dioxide in the water to form calcium carbonate, which is the basic mineral structure of all limestone. And its prevalence around the globe provides real insight and positive evidence of just how much more of our planet used to be covered in water, as a result of various ice ages or glacial periods over millions of years.

Because it is readily available and easy to cut into blocks or more elaborate shapes, limestone is a popular building material in architecture.

## Quarries

In much of the United States, including Texas, Alabama, Wisconsin, Missouri, Iowa, Minnesota and Indiana, one can find limestone quarries. In fact,

the world's largest limestone quarry is located in Rogers City, Mich., which began operating in 1912. However, Indiana limestone probably is the best-known limestone quarried in this country. This particular variety of stone has earned a reputation worldwide as a premier dimension stone. This limestone – and many other varieties – exhibits no preferential direction of splitting; therefore, it can be cut and carved into a variety of shapes and sizes. Moreover, it can be sawed, planed, turned on a lathe, or hand-worked to match design requirements.

Around the world, limestone quarries can be found throughout Europe, as well as in parts of Asia, Africa and in Australia, where the southeastern part of the country is nicknamed “The Limestone Coast.” Much of the region is low-lying and was flooded by sea as recently as 2 million years ago. Scientists also say The Limestone Coast was inundated by a glacial period 15 to 20 million years ago.

## Colors

Often thought of just as a ubiquitous, creamy white stone used by sculptors and interior accessories (tiles, sinks, etc.) craftsmen, limestone actually is much more aesthetically diverse.

**LEFT:**  
The University of Alabama, Birmingham, Shelby Interdisciplinary Biomedical Research Building was constructed using Vetter Stone's Alabama Silver Shadow oolitic limestone. The architect was CUH2A, Princeton, N.J.

## MORE INFO

### Quarry Locations:

**North America:** Much of the United States, as well as Canada, Mexico, and Puerto Rico  
**South America:** Brazil, Dominican Republic  
**Europe:** France, Germany, United Kingdom, Croatia, Portugal, Spain, Italy, Greece, Switzerland, Turkey, Austria, Ireland, Belgium, Sweden  
**Africa:** Egypt, Morocco, Nigeria  
**Asia:** China, Lebanon, Indonesia, Israel, India, Iran, Vietnam  
**Australia:** South Australia

### Applications:

- Architectural accessories
- Interior accessories
- Building stone
- Countertops
- Fireplaces
- Flooring
- Landscaping
- Roofing
- Sculpture and carving

### Appropriate Finishes:

- Bush hammered
- Honed
- Polished
- Rubbed
- Sandblasted
- Sawn (rough)
- Split face

### Stone Stats (medium-density limestone as defined by ASTM):

Abrasion Resistance, min. hardness: 10  
 Max. Absorption Rate (%): 7.5  
 Min. Density (pcf): 135  
 Compressive Strength (psi): 4,000  
 Modulus of Rupture (psi): 1,000 (min)

RIGHT: Egypt is a country rich in stone, particularly limestone, which occurs in many varieties there.



Photo courtesy of Jupiterimages 2007

Its color palate is among the most distinct available in nature – created through mineral and organic impurities such as clay, sand, iron oxide and fossilized marine organisms. These “impurities,” nature’s aggregates if you will, actually strengthen the limestone making it suitable for applications that require more durability or structural strength.

The range of colors can go from simple coffee browns, latte-tinted beiges, and winter greys to richer shades of honey yellow, speckled black, soft blues and other hues in between.

#### Applications

Often incorporated into designs to give a certain Old World charm, limestone also can be used in many of its various shades to provide a contemporary, modern edge. As a building material, limestone is adaptable to many applications and building styles. For years, limestone has been many designers’ choice for bathroom floors and backsplash tile applications, but it also has been used commonly for flooring in kitchens, halls, living and dining rooms, and in commercial spaces. Further, limestone is known as a good conductor of heat and is ideal where under-floor heating is required. Other common applications include countertops, fireplaces, landscaping and even roofing.

Since limestone is known as a porous stone, finishes are an important part of the installation process. According to experts, when limestone is impregnated with a high-quality sealer that absorbs into the stone, it will prevent liquids or food stains from seeping into the pores, allowing limestone to be


utilized for kitchen countertops or other food preparation areas. Further, such sealers allow for limestone to be used in moisture-rich environments, such as showers and baths, while still providing the unique mix of texture and color that only this type of stone exhibits.

#### Interesting Facts

Limestone has been a common building material around the world for centuries. Many of the monuments, churches, government buildings and other structures still stand today as a testament to limestone’s durability. For example, many of Europe’s medieval castles were built with blocks of limestone and survive today as vital, historical links to the past, as well as intriguing tourist attractions. But perhaps the best known of all ancient limestone structures are Egypt’s pyramids.

Egypt is a country rich in stone, particularly limestone, which occurs in many varieties there, such as black, yellow and pink. The material was used extensively by the ancient Egyptians to construct temples and buildings, including the pyramids – from the rough limestone used on the monuments’ cores, to the finer, white limestone often employed for the pyramids’ interior walls. ♦

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MARBLE

# Perfectly Polished Stone

By Kate Parrott





ABOVE:  
Marble has been used as an architectural stone on many of the famous buildings and structures of our time, including the Taj Mahal.



Photo courtesy of Jupiterimages 2007

Photo courtesy of Jupiterimages 2007

**F**OR CENTURIES, marble has been used as a timeless stone to reflect wealth, luxury, class and status. Its beautiful polish is still evident today in the Parthenon, in Michelangelo's famous sculpture of David, St. Peter's Basilica in Vatican City, and through countless other buildings and monuments worldwide.

Marble gained popularity thousands of years ago, notably in ancient Rome and Greece, in part because of its high-polished finish. In fact, the word "marble" is derived from the Greek word *marmaros*, which translates to "shining stone." However, the simple, pristine beauty of marble, which is available around the world in a variety of colors, isn't its only selling point; the stone is also revered for its easy workability for carving and sculpture.

Geologically, marble is the result of metamorphism of sedimentary carbonate stones, such as limestone or dolostone, which are composed mostly of calcite. The metamorphic process results in a complete recrystallization of the original rock into a combination of calcite, aragonite

and dolomite crystals. The beautiful swirls and veining present in marbles are the result of impurities – such as silt, clay, oxides, sand, iron or chert – that were originally present as grains or layers in the limestone. The intense heat of metamorphism recrystallizes these impurities.

### Quarries

Marble is quarried across the world, from Ireland and Spain to China and Australia. Some of the finest marble in the world comes from Italy, where Rome is thought to be the largest marble production sector. Here, mining marble has become an extremely important facet of the Italian industrial landscape. In addition, some of the most developed marble quarries are in Greece, Turkey and Spain.

In the United States, marble is quarried across the country; Georgia is touted as the largest producer of marble in the United States.

The quarrying process of marble has changed dramatically over the years. In the days of the Renaissance, the stone was mined by inserting wooden pegs into naturally occur-

## MORE INFO

### Quarry Locations:

- North America: Canada, United States, Guatemala, Jamaica, Mexico
- Europe: Albania, Austria, Croatia, France, Germany, Greece, Hungary Ireland, Italy, Montenegro, Norway, Portugal, Rome, Russia, Serbia, Spain
- South America: Argentina, Brazil
- Asia: China, India, Indonesia, Iran, Malaysia, Oman, Pakistan, Philippines, Taiwan, Turkey, Uzbekistan, Vietnam
- Australia
- Africa: Egypt, Ethiopia, Zimbabwe

### Applications:

- Architectural accessories
- Interior accessories
- Building stone
- Countertops
- Fireplaces
- Flooring
- Sculpture and carving

### Appropriate Finishes:

- Bush hammered
- Flamed
- Honed
- Polished
- Sandblasted
- Sawn (rough)

### Stone Stats:

- Abrasion Resistance, min. hardness: 10
- Max. Absorption Rate (%): .20
- Min. Density (pcf): 162
- Compressive Strength (psi): 7,500
- Modulus of Rupture (psi): 1,000 (min)



Photo courtesy of JupiterImages 2007

ring cracks in the rock. Then, water was poured onto the pegs, making them swell and eventually making the rock split. Today, contemporary marble quarrying uses a wire cable, approximately one centimeter in diameter and containing diamond chips. Quarryers drill holes into the rock, thread the cable through the holes to form a loop and then drive the loop at high speeds with an electric motor.

### Colors

Marble's colors are widely varied, ranging from milky, snow white to gray, black and everything in between. While the most well known color of marble is white, accessory minerals acting as coloring agents produce a plethora of

colors. Carbonaceous matter accounts for shades of black marble, while diopside, hornblende, serpentine and talc can create hues of green. Hematite present in the stone results in shades of red, and limonite causes variations of yellow and brown. Uneven distribution of these coloring agents causes color spots, an effect that is commonly called "veining."

Often, designers and architects prefer shades of white and light-colored marbles for kitchens and baths because these stones can offset or better compliment other more vibrant colors in a room.

### Applications

The applications for marble are just as varied as its colors, ranging from sinks and floor tiles to sculptures and inlaid designs. Depending on its purity, texture and pattern, marble is quarried for use as dimension stone for statuary, architectural purposes, and both interior and exterior ornamental features.

Marble is available in blocks, tiles and slabs and comes in a number of finishes, including polished, honed, sawn (rough), sand blasted, bush hammered and flamed. The stone is highly prized for its shiny polish, and its natural veining and translucence make it aesthetically pleasing. Also, with a hardness of three on the MOHs scale, marble is a softer stone, making it ideal for carving and sculpting.

Although it is a softer stone, marble can be used for countertops; its virtual imperviousness to water makes it a great material for use in bathroom designs.

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=Quarries=

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Photo courtesy of Brad J. Goldberg



LEFT:  
Italian Fabricator Campoloughi's Sponda  
Quarry above Carrara, Italy.

OPPOSITE LEFT:  
Often, designers and architects prefer  
shades of white and light-colored marbles  
for kitchens and baths because these  
stones can offset or better compliment  
other more vibrant colors in a room.

Marble is often seen as a symbol of luxury, grandeur and status, and its demand is continuing to increase as more end users are seeing it in design magazines. Today, marble is being used as never before in newly constructed hotels, houses, condominiums and office buildings.

**Interesting Facts**

Marble has been used as an architectural stone on many of the famous buildings and structures of our time, including the Taj Mahal, the Cathedral of Pisa, the U.S. Supreme Court, the U.S. Capitol, and the frieze on the Parthenon. ♦

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Photo courtesy of Innovative Stone

PORPHYRY

# The Royal Stone

By Kate Parrott

**F**OR THOUSANDS OF YEARS, porphyry has been renowned as a beautiful and durable paving and facing stone.

A type of volcanic rock consisting of large-grained crystals such as feldspar or quartz, which is formed by a slow cooling process of igneous materials, the stone is valued for its aesthetically pleasing appearance. The term “porphyry” itself refers to the purplish red hues of the stone; in Latin, *porphyry* means purple.

Porphyry’s chemical and mineral composition determine its high compression breaking point, resistance to chemical agents, and low “wearability.” The stone is the most popular paver in Europe, and is favored for its flexibility in design, beauty, durability and low maintenance requirements. The stone is by far one of the most durable pavers in the world. In fact, porphyry has been used internationally to create popular projects, such as the Olympic stadium in Munich, Rodeo Drive in Los Angeles, the underground and market square in

Paris, John F. Kennedy International Airport in New York and the military cemetery in Hawaii.

While porphyry has become a popular paver today, it was originally used for sarcophaguses, busts, vases and columns. The stone that was extracted in the Egyptian desert in the mountain Jebel Dhokan is known as Imperial Red porphyry or Ancient Red porphyry.

Aside from its beauty and durability, porphyry has been revered as a status symbol through the ages. Roman emperors were surrounded by the stone, born in rooms made of the porphyry and were sometimes even buried in sarcophaguses made of the stone. Today, it is highly regarded for both its functionality and beauty.

### Quarries

With quarries found the world over, until recently, the stone was most commonly quarried in Italy, notably in Trentino. There, porphyry is characterized by felsic phenocrystals within a mass of red or pinkish gray color.

#### BELOW:

“Due to its resilience and durability, porphyry is a perfect stone for paving and flooring surfaces,” said Harold German, director of marketing at Innovative Stone. “Not only is it beautiful, but there is never a need to maintain it. It comes as no surprise that our ancestors consistently used this remarkable stone in their finest creations.”



Photo courtesy of Porphyry USA

## MORE INFO

### Quarry Locations:

North America: Mexico

South America: Peru, Argentina

Europe: Italy, Sweden

Asia: Iran

Africa: Egypt

Australia

### Applications:

- Building stone
- Flooring
- Landscaping

### Appropriate Finishes:

- Antiqued
- Bush hammered
- Flamed
- Honed
- Polished
- Sandblasted

Legal issues related to the extraction of porphyry in Italy, along with the desire for a higher level of processed material, such as sawed, polished, semi-polished and flamed, have led to more recent quarrying outside of Europe. Quarry operators also have shown recent interest in the quarrying of porphyry blocks.

Mexican and Iranian porphyry typically display a deep red color, while Argentine porphyry includes diverse varieties, ranging from red to mauve to gray. In some areas of Argentina, the porphyry is quite compact, allowing for the extraction of regular blocks.

In Peru, an unusual type of porphyry, called Verde Esperanza, is quarried. This stone is characterized by a green color, which suggests the presence of chlorite. Verde Esperanza is

mostly used as slabs, with the surface polished or flamed.

### Colors

While the Latin name *porphyry* translates as “purple,” its title can be quite deceptive. Porphyry is commonly known for its striking red and purple colors, but the stone can be found in shades of green, gray, gold, brown and black as well.

Red porphyry is often interspersed with small white spots, caused by feldspar and shorl deposits. Higher quantities of feldspar yield more transparent stones. When jasper enters its composition, porphyry is more opaque and highly colored.

### Applications

Porphyry is highly prized for its durability as a paver, making it an ideal stone for walkways, driveways, courtyards, driveways

and facades. Because it is freeze/thaw- and slip-resistant, porphyry is ideal for any type of outdoor flooring application.

Various sizes, shapes and thicknesses of porphyry are available, including cubes, binders, irregular slabs, ashlar stones, natural tiles and machined tiles. Porphyry cubes, or cobblestones, have perhaps been the most popular throughout the ages and are one of the most popular applications today.

Binders are a versatile product and are often used to mark the edge of paved areas, such as with flowerbeds and traffic islands. Binders also can be used to face low walls and steps. Irregular slabs, distinguished by their sizes and thicknesses, are generally used for paving external areas, such as squares and gardens.

Irregular slabs have a natural surface and rough-cut edges.

Ashlar stones are typically used for facing supporting walls or as coverings for building facades. The front face can be sawn or shaped naturally. Natural tiles are used for paving and facing of both internal and external areas. They are ideal for squares, streets, sidewalks and historical centers. Finally, machined tiles present a stylish and refined finish and are most appropriate for elegant interior areas.

Porphyry is available in a number of finishes, including unpolished, polished, semi-polished, honed, flamed, sand blasted, bush hammered and antiqued.

### Interesting Facts

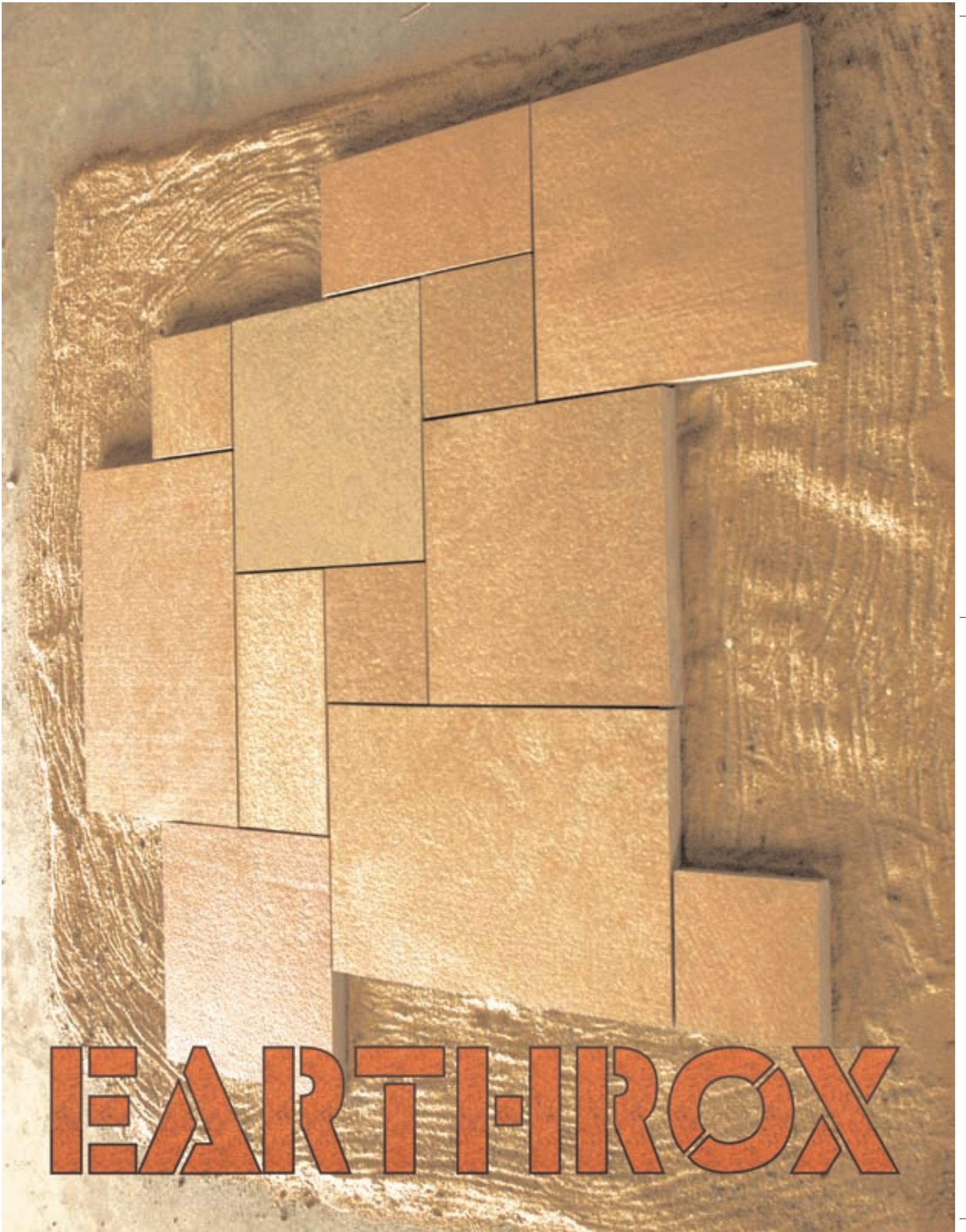
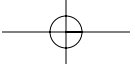
Porphyry has long been prized for its beauty and perception as a stone of royalty. In ancient times, Egyptians were one of the first people to successfully quarry the stone, and Egyptian kings and queens were the exclusive benefactors of porphyry works and masterpieces.

In 300 A.D., the ancient Romans utilized the stone to decorate royal palace rooms for family members of the royal empire. Romans also used porphyry to build their roads. The highly durable stone can still be seen throughout Rome today, although in some places it is crumbling. However, the crumbling is not to any fault of the stone. After the fall of Rome, people scavenged for the prized stone, which was highly regarded for its strength and beauty, to use for their homes and town squares.

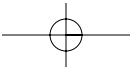
In the late 16th to early 17th centuries, it is said that King Louis XIV of France once had the world's largest collection of porphyry stone. ♦



Photo courtesy of Innovative Stone



# EARTI-IROX



QUARTZITE

# Add a Little Sparkle to Your Designs

By Cory Sekine-Pettite



Photo courtesy of Bonneville Quarries





**LEFT:**  
The Linderman Library at Lehigh University in Bethlehem, Pa., was constructed with locally quarried quartzite.

**OPPOSITE LEFT:**  
This residence in Deer Valley, Utah, was built with quartzite stones. The material helps the house blend in to its environment, while providing an exterior surface that will last for decades.

Photo courtesy of Vinci Stone Products

**Q**UARTZITE IS A METAMORPHIC ROCK that began its geological life as sandstone.

Through pressure and time, the individual quartz grains in the sandstone recrystallized along with the former cementing material to form an intermingling mosaic of quartz crystals. This process results in a glassy luster that lends to the stone's popularity. Typically, pure quartzite – composed of sandstone and silicate minerals, such as mica – displays understated tones of whites, grays or pinks. However, when small amounts of other minerals are involved in the metamorphic process – as is usually the case – quartzite will take on a diverse series of colors.

Quartzite can be found throughout the world, and it is used extensively in the United States and Europe. Known as a hard, resilient stone that is resistant to chemical weathering, quartzite is used widely in the flooring industry to produce both indoor and outdoor tiles. Additionally, pure quartzite provides a source of silica for metallurgical

purposes and for the manufacture of brick. This stone also is used for paving blocks, riprap and roofing granules, among other uses.

### Quarries

In the United States, most quartzite quarries can be found in Idaho, Utah, Wisconsin, New York, Pennsylvania, Minnesota, Montana, South Dakota and Arizona. Europe, Africa, South America, India and China are primary international sources.

The quarries for quartzite tend to be relatively shallow because the silica content of the rock prevents much soil from forming, leaving the smooth stone either bare or covered by just a thin layer of vegetation. Thus, the stone typically is acquired through surface mining. The stone is extracted by first removing any overburden from above the stone, and it is then removed using large excavators. On occasion, some carefully placed explosives may be required to loosen this resilient stone.

Feathers and wedges for plugging and drilling are used for breaking larger blocks into thin slabs. Miners will tap each wedge and continue down the stone

until it begins to separate. Then, the feathers and wedges are removed, and a pry bar is used to finish separating the slab from the rest of the stone. Any further splitting or fabrication of the stone is typically handled by machines.

Industry experts say that fabrication of quartzite has been slow to develop because of the stone's hardness and mica content. This process is still limited to a handful of companies that have the necessary high-tech equipment to service customers and dealers. However, demand for the stone is growing with some distributors claiming that it is double the supply.

### Colors

Most often, quartzite is found in shades of milky white, thundercloud gray, sunset gold or muted brown, but it is sometimes colored medium blue, lime green or black by included minerals. These more sedate, neutral colors mean that quartzite can be blended easily into any type of design scheme, in both warm and cool climates. For more playful or boisterous applications, consider Minnesota Sioux quartzites. In Minnesota, trace amounts of hematite, an oxide of iron, permeates the rock, giving it an amethyst hue of purple to pink.

Further, because of the stone's mica content (or other silicate minerals), quartzite often shimmers with a subtle hint of

## MORE INFO

### Quarry Locations:

- North America: South Dakota, Minnesota, Utah, Arizona, and Pennsylvania
- South America: Brazil,
- Europe: Ireland, Spain, Finland, Italy, Sweden, Germany, Norway, France, Switzerland
- Africa: Morocco
- Asia: India, China
- Australia: Western region

### Applications:

- Architectural accessories
- Interior accessories
- Building stone
- Countertops
- Fireplaces
- Flooring
- Landscaping
- Roofing

### Appropriate Finishes:

- Cleft
- Flamed
- Honed
- Natural
- Polished
- Sawn (rough)
- Tumbled

### Stone Stats:

- Abrasion Resistance, min. hardness: 8
- Max. Absorption Rate (%): 1
- Min. Density (pcf): 160
- Compressive Strength (psi): 20,000 (min)
- Modulus of Rupture (psi): 2,000 (min)

sparkle, which makes the stone a perfect complement to other natural materials, as well as chrome, steel and other metal surfaces and fittings.

### Applications

Quartzite features a natural ability to split along foliations, making it suitable for wall cladding and roofing tiles. Further, its granoblastic, medium-grained texture permits quartzite to be used in flooring applications and all other interior or exterior tile designs. Quartzite distributors say the stone is a perfect choice for pool decks, entrance ways, stair treads and other areas where foot traffic may be heavy because the building material is easy to clean and provides a natural non-skid surface. In fact, the stone is so



Photo courtesy of Stone A.V. USA Inc.

durable that it can be exposed to harsh traffic and heavy weather conditions without worry.

One example in the United States of how a community has made extensive use of its local quartzite resources is Lehigh University in Bethlehem, Pa. According to the university, the local

Hardyston quarries have provided building blocks for many campus facilities, as well as for nearby churches. For instance, the Linderman Library, originally constructed in 1877, is comprised largely of the local Hardyston quartzite with a limestone trim.

### Interesting Facts

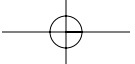
In the United States, quartzite is commonly crushed for use as an aggregate base in paving projects. Because the stone is quite rigid and has almost no porosity, it is less susceptible to breakdown from freeze-thaw activity. In Minnesota, for example, where freeze-thaw cycles can occur as often as 40 times per season, a non-absorptive aggregate such as quartzite, used in concrete or bituminous materials, will extend the life of pavements and thereby minimize the life cycle cost of road construction.

Perhaps a more unique use of the stone began in West Africa in the 17th century when locals started using quartzite as money. The rounded currency was made from quartzite stones with holes drilled from both sides. Each piece was roughly two inches in diameter and weighed just over three ounces. Legends from Ghana and neighboring nations suggest the stones fell from the sky and contained magical powers. ♦

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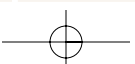
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## SANDSTONE

## Layers of History

By Kate Parrott



Photo courtesy of Lyons Sandstone

**ABOVE:**  
This is the visitors center at the Red Rocks Amphitheater in Red Rocks Park just west of Denver. The round building is faced with pitched Lyons red sandstone veneer. The rock outcropping that you see is red sandstone from the Fountain Formation which lies very close to the Lyons Formation where out red sandstone and the buff colored sandstone is quarried.

**S**ANDSTONE IS A SEDIMENTARY ROCK, which derives its name from the sand-sized minerals or grains that account for its composition. Most sandstone is composed of quartz and feldspar, two of the most common minerals in the Earth's crust. Some of the other common minerals in sandstone, which account for the rock's hardness, include silica, carbonates, clay and iron oxides.

Formation of sandstone usually occurs offshore from river deltas, but desert dunes and

beaches can leave sandstone beds as well. Two main groups account for sandstone's environmental deposits: terrestrial deposits, coming from rivers, channel sand point bars and lakes; and marine deposits, from shoreface sands, deltas and submarine channels.

The rock's formation occurs in two phases: The first is sedimentation, where layers of sand accumulate via water or air; the second is compaction, which occurs when pressure is exerted from overlying materials and precipitation within the pore spaces between the sand grains. Sandstone is formed in layers and,

over time, the layers become compacted until the bottom layers slowly turn into rock.

There are three types of sandstone: arkosic, quartzose and argillaceous. Arkosic sandstones have a high feldspar content – more than 25 percent – and a composition similar to granite. Quartzose sandstones have a high quartz content – approximately 90 percent consistency. Argillaceous sandstones have a high clay or silt content and a very fine consistency.

### Quarries

Sandstone is quarried around the world, from India and Australia, to Canada, Egypt and the United States. In the United States, it is quarried widely, including New York, Idaho, Minnesota, Pennsylvania, West Virginia, Iowa, Wyoming and Kansas.

Sandstone is mined by a process of digging, blasting or cutting. After it is excavated, it is dressed, cut, sawed, surface grinded, polished and edge cut.

### Colors

The color of sandstone is extremely varied and depends on

the quantity and color of the cementitious materials present and the overall color of the mineral grains. Sandstone spans the full spectrum of colors, ranging from sandy yellows to deep golds, pale pinks and light greens.

Light colors generally result from the absence of cementitious materials, or joined by calcite or quartz. Buff, brown and red colors result from the presence of limestone and hematite. Greensand, a type of green sandstone, results from the presence of glauconite.

### Applications

Sandstone is available in tiles, slabs and blocks, in finishes ranging from natural and calibrated, to honed, polished and flamed. Sandstone is a very versatile material, applicable for most types of interior and exterior applications, including wall cladding, roofing and flooring.

Sandstone also has a long history in the building industry. The stone generally has a uniform texture and it is somewhat soft, making it a user-friendly stone for a variety of applications. It is favored for wall claddings because of its low



Photo courtesy of Silverado Building Materials

## MORE INFO

### Quarry Locations:

- North America: Canada, United States
- Africa: Egypt, South Africa
- Europe: Bulgaria, France, Germany, Italy, Portugal, Switzerland
- Asia: China, India, Pakistan
- Australia
- South America: Brazil

### Applications:

- Building stone
- Flooring
- Landscaping
- Roofing

### Appropriate Finishes:

- Calibrated
- Flamed
- Honed
- Polished

### Stone Stats:

- Abrasion Resistance, min. hardness: 8
- Max. Absorption Rate (%): 1
- Min. Density (pcf): 160
- Compressive Strength (psi): 20,000 (min)
- Modulus of Rupture (psi): 2,000 (min)



Photo courtesy of Stone A.V. USA Inc.

absorption rate, high compression strength and aesthetically pleasing appearance. Its appearance and high durability make it ideal for flooring as well. With a variety of colors and finishes, it is also easy to match it to nearly any décor.

The stone is a common paving material because it can be highly weather resistant. As a paver, sandstone is prized for its ability to maintain age and appearance over time, as well as for the different dimensions available. Sandstone pavers can be used for patios, pool surrounds, pool coping, balconies, as well as cladding and veneer.

**Interesting Facts**

Sandstone has been used in some of the world's most famous structures, including the White

House, the Taj Mahal, the pyramids and the Angkor Vat, and ancient Cambodian temples.

To build the White House, the particular sandstone used was discovered to be highly porous and susceptible to water damage. Therefore, masons had to coat the building in a wash of salt, rice and glue, giving the building its first coat of white paint and coining the name "White House."

In Australia, Ayers rock, or Uluru, is a vast outcropping of sandstone rising 986 feet in height and spanning five miles around. Ayers rock is located in Kata Tjuta National Park and is owned by the local Aboriginals. Depending on the time of day, the rock can change colors from blue or violet to glowing red. ♦

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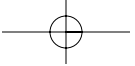
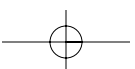


Photo courtesy of MoMA





## SLATE

# The Versatility of Slate

By Cory Sekine-Pettite



Photo courtesy of Jupiterimages 2007

**LEFT:**  
The new Museum of Modern Art (MoMA) in New York features extensive use of Vermont Unfading Green Slate from the Vermont Structural Slate Company.

**P**OPULAR AS A ROOFING AND FLOORING MATERIAL, slate is defined as a metamorphic rock that splits into thin, smooth-surfaced layers. It is known for its resilience and ease of use – it does not stain; it is slip resistant and non-porous; and it is easy to clean. As American Slate Company says on its website, slate is one natural material that has the strength and durability without the constant maintenance and care required by products with man-made surfaces.

Slate is largely comprised of quartz and illite, with mica, calcite and small quantities of other minerals that give the stone its

color. For example, chlorite imparts a green hue, while hematite turns the rock red.

The stone is found in areas where shale has been subjected to heat and pressure during earthquakes. Because of its physical characteristics and its cleavage, slate has been used for a multiplicity of surfaces in different areas of construction.

### Quarries

Slate can be found in quarries around the world, from Vermont to Italy to China, and it has been used as a building stone for centuries. It is cut and sold in a range of sizes and thicknesses to accommodate virtually any application.

## MORE INFO

### Quarry Locations:

North America: Vermont, Pennsylvania, New York, Canada and Mexico  
South America: Argentina, Brazil  
Europe: Italy, United Kingdom, Turkey, Austria and Germany  
Africa: South Africa, Egypt  
Asia: China, India  
Australia

### Applications:

- Architectural accessories
- Interior accessories
- Building stone
- Countertops
- Fireplaces
- Flooring
- Landscaping
- Roofing

### Appropriate Finishes:

- Cleft
- Honed
- Natural
- Polished
- Rubbed
- Sawn (rough)
- Tumbled

### Stone Stats:

Abrasion Resistance, min. hardness: 8  
Max. Absorption Rate (%): .45  
Modulus of Rupture (psi): 9,000 (across grain); 7,200 (along grain)  
Max. Acid Resistance (inches): .015

**RIGHT:**  
Roofing tiles are one of the most common uses of slate in the United States. The stone is durable, weather-resistant and won't fade under the intense rays of the sun.



Photo courtesy of JupiterImages 2007

Raw slate is such a tough, tightly compacted material that it must be blasted out of quarries. The large slabs that are loosened through controlled explosions are then removed by dump trucks and back hoes. The stone is then broken into smaller pieces and later machine-cut into smaller tiles before being split by hand.

According to industry experts, splitting is the most specialized skill involved in the process of mining and shaping slate. But even at the hands of experts, 85 percent of slate becomes unusable or damaged during the manufacturing process. With this knowledge, one can appreciate even more the uniqueness that each slate tile represents.

### Colors

There are at least 60 different colors of slate tile available in the marketplace, depending on where distributors buy or quarry their stone. With such a multiplicity of options, there is sure to be a stone or two to fit any design scheme. Few building stones offer such an immense scope for creativity. The most common colors are the darker shades of carbon black, ash gray, blood red, regal purple and emerald green, though hues of shiny copper, carnation pink and peach also can be found.

Terms commonly associated with slate coloration are fading (or unfading) and weathering (or non-weathering). Some in the industry have used these terms interchangeably, but weathering and fading are not synonymous. Fading refers to a chalk-ashen residue that can form on some slates, lessening their aesthetic appeal. And while colored slates do not fade, some will display varying degrees of color change or weathering. The

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Tivoli Lodge reconstruction, 2006

weathering of slate is caused by the oxidation of the minerals in the stone over time as they are exposed to the elements. In most cases, the weathered stones eventually will appear in an earth tone (beige, brown or gray), but it is not a permanent condition. Slate and other weathering stones can be cleaned and brought back to their original colors if desired.

### Applications

If there is one word to describe slate, it is versatility. Although designers, builders and consumers most often chose slate for interior flooring or roofing applications, slate also can be used for a myriad of other purposes. It is more than a utilitarian stone; indoors or out,

slate offers elegance and sophistication. It makes a durable, beautiful and long-lasting impression because the stone is resistant to weather and temperature changes. Additionally, it is highly resistant to acids, alkalis and other chemicals, and it resists color erosion or fading from UV light. Therefore, one can use slate as wall cladding on a building's exterior. Incorporate it into commercial or residential interior designs for entryways, bathrooms, or fireplace hearths and facings. One can even use naturally waterproof slate tiles to create a stunning fountain or wall of water in an office building or high-end residence.

When all of these positive factors are considered, slate can be particularly cost-effective for

public buildings. But for many homeowners, architects and interior designers, it is in the kitchen where slate really shines. Slate countertops, sinks and backsplashes are gaining in popularity as people seek alternatives from the typical stones used in these applications. With slate, one can choose from a variety of colors and finishes yet still have an anti-bacterial and stain-resistant surface.

### Interesting Facts

The new Museum of Modern Art (MoMA) in New York features extensive use of Vermont Unfading Green Slate from the Vermont Structural Slate Company. Architect Yoshio Taniguchi wanted to create "an ideal environment for art and

people through the imaginative and disciplined use of light, materials and space." The green slate, used throughout the expanded and renovated facility, contributes significantly to this vision.

According to MoMA, the recently completed building project represents its most extensive redefinition since its founding 75 years ago. The 630,000-square-foot museum has nearly twice the capacity of the former facility. And with his design, MoMA says, Taniguchi has demonstrated that architectural expression and the proper environment for looking at art can be brilliantly intertwined. Put simply, the timeless stone surrounds and enhances the viewing pleasure of the museum's timeless art. ♦

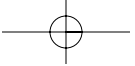
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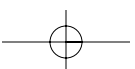
## SOAPSTONE

# Adaptable and Durable

By Kate Parrott



Photo courtesy of Tuulikivi Corporation



**BELOW:**

With its unique texture and appearance, soapstone is swiftly becoming one of the premier stone choices for architects and designers. When put to good use, even the neutral shades can create a remarkable space.



**S**OAPSTONE IS A METAMORPHIC ROCK composed of roughly 50 percent talc and 50 percent magnetite. The stone has a rich history, dating back to approximately 4.6 billion years ago, when the first plants took hold to the earth. Soapstone is an amazingly versatile material, with a softness suitable for carving and the durability to withstand extreme heat conditions.

Talc, the softest mineral on earth, accounts for soapstone's flexibility and ease of use in sculpture. Talc is commonly used in manufacturing cosmetics and in everyday items such as toothpaste, baby powder and chewing gum. Magnetite makes the stone tough and durable. These qualities together create a substance that is incredibly adaptable to a variety of uses, including inlaid designs, sculpture, fireplaces, sinks, kitchen countertops, tile flooring and stoves. These qualities also make the stone highly durable, as it can withstand heat, humidity, bitter cold, acid rain and a plethora of pollutants.

There are two classifications of soapstone: artistic and architectural. Artistic soapstone has a high talc content, making it smooth and soft for carving, while architectural soapstone has a lower talc content, making it dense and durable for everyday use for kitchens, bathrooms, fireplaces and other living areas.

Soapstone is appropriately named, as the material bears a remarkable resemblance to a bar of hand soap. As for tactile characteristics, the stone offers a dry, almost slippery feel when touched, because of the presence of talc.

### Quarries

Soapstone is largely quarried in the United States, namely in the New England regions of Vermont and Massachusetts. Deposits of soapstone can be found in nearly every state of the Atlantic Slope, but no commercial products have been obtained west of the Mississippi River. Outside the United States, soapstone is quarried in Canada, China and Egypt, Brazil and India.

In some areas, notably in New York, soapstone occurs in foliated or fibrous forms, which prove valuable as a filler or makeweight in the manufacture of paper. This variety is known as fibrous talc or mineral pulp.

### Colors

Soapstone's main mineral deposits – talc, chlorite, dolomite and magnesite – account for the stone's smooth, grayish-brown color, which also has light veining throughout. Soapstone can be found in shades of blue-gray, green-gray and charcoal gray.

Soapstone's color can change dramatically, whether by force of nature or manmade process. When the stone is cut, it oxidizes, making the shades of light gray darker. With the application of mineral oil, the recommended care for many soapstone products, the stone will darken tenfold.

### Applications

Soapstone is a very dense, non-porous stone, making it impervious to stains and chemical infiltration. Therefore, it is an ideal surface for sinks, countertops and even floors. Soapstone is also heat neutral, making it a great surface for kitchens, where red-hot cookware can be placed on it without fear of scorching. Because of the stone's high durability, it is often

## MORE INFO

### Quarry Locations:

North America: Canada, United States

South America: Brazil

Africa: Egypt

Asia: China, India, Pakistan

Europe: Italy

### Applications:

- Architectural accessories
- Interior accessories
- Countertops
- Fireplaces
- Flooring
- Sculpture and carving

### Appropriate Finishes:

- Honed
- Tumbled

employed as countertops in labs, where a variety of chemicals could come into contact with the surface without resulting in any damage.

Soapstone's heat storage and heat conductivity also make it an ideal material for fireplaces and stoves. Because the stone radiates and holds even warmth, it is efficient as a liner for fireplaces. It is also commonly used for sculpture and inlaid architectural design.

With its unique texture and appearance, soapstone is swiftly becoming one of the premier stone choices for architects and designers. In the United States and abroad, the stone is used more widely than ever before for items such as balusters, stair treads, windowsills and island tops.

RIGHT:  
A custom-made soapstone sink by Green Mountain Soapstone.

### Interesting Facts

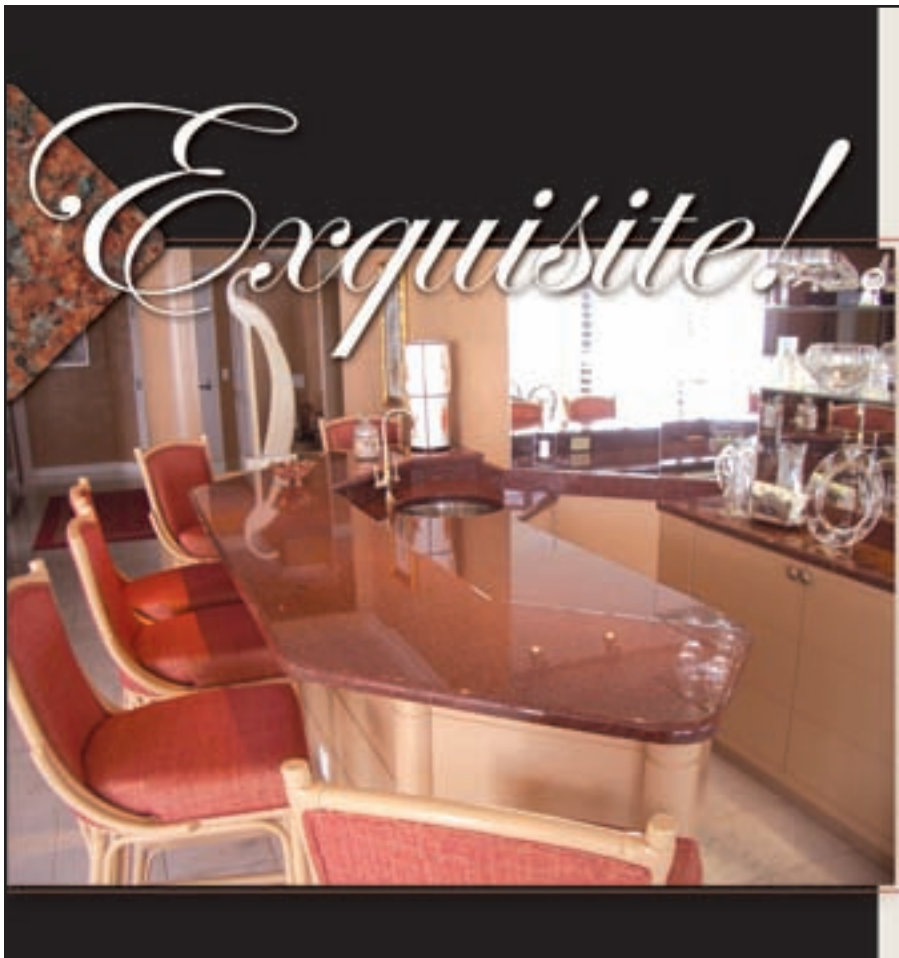
Soapstone has been used around the world for various items for thousands of years. Three thousand years ago, Chinese artists were working with the stone; some of the relics still survive today.

Soapstone was also used by the Indians, Afghans, Egyptians, Minoans and in ancient Iran. The Inuit and Vikings also used this beautiful stone for carvings, bowls, cooking slabs and other objects.

The oldest known soapstone artifact dates back to 7,000 B.C., and was found in Finland. It is a club with an elk's head carved into it, used for ceremonial rituals. ♦



Photo courtesy of Green Mountain Soapstone



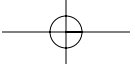
This warm and inviting space was designed around a Wausau Red bartop. The uniqueness of this stone, its superb consistency – in grain and in color – is ideal for countertops, back-splashes, island tops and furniture, such as dining tables, consoles and sideboards.

The results speak for themselves.

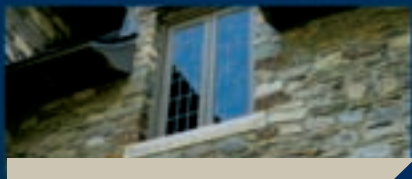
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## TRAVERTINE

# Timeless Travertine

By Cory Sekine-Pettite

**T**RAVERTINE IS A SEDIMENTARY ROCK that began as limestone (calcium carbonate), which over time was heated by the Earth's core, releasing pressurized water and steam to form hot springs. The rising hot water would dissolve the limestone and bring with it granules of stone from below the surface that collected into mud baths. When this mud cooled, it would crystallize into solid stone, now called travertine. The stone is often light in color and beautifully banded as a result of the presence of iron compounds or other organic impurities.

The rock derives its name from Tivoli, Italy, which in ancient Roman times was known as Tibur. The ancient name for the stone – which was used extensively as a building material – was *lapis tiburtinus* meaning tibur stone, which has evolved today to travertine.

The building stone is used most widely in the Mediterranean region (Italy, Greece and Turkey), but is common in the United States as well, particularly for paving patios and garden paths, showers, wall coverings and countertops, though it has been used

in exterior applications on commercial and institutional structures as well, such as the Getty Center in Los Angeles.

## Quarries

Quarried mostly in European countries, particularly around the Mediterranean Sea, travertine is a popular imported building stone in the United States, although there are domestic quarries in New Mexico as well. By the time the stone is removed from the earth, it reveals a smooth, often milky color and a dense building material that evokes a certain Old World charm.

Travertine is removed in large blocks and either cross cut or vein cut, yielding a beautiful stone with either method. Cross cutting is performed with the grain and on the same layer as it formed in the earth. Vein cutting goes across several layers of stone bedding, making for a more stippled or tiger-stripe effect when cut into tiles. The stone is available in a number of finishes, including polished, honed, tumbled and brushed.

## Colors

Pure travertine is a creamy white color, but the building stone is more often found in

various shades of brown, yellow and even red because of the inclusion of other minerals. Common varieties include light beiges, walnut, desert gold and cherry red. The lighter, neutral tones work well for commercial interior and exterior projects. The stone will give those spaces a quaint sophistication and provide architectural interest without commanding all of the attention. And for interior residential projects, the richer travertine colors can be used to the opposite effect, if desired, making kitchens, bathrooms, stairways and other areas into conversation pieces.

## Applications

It should be noted that travertine is characterized by the multitude of holes and depressions found on the surface of the stone, which imparts a unique character and is a major selling point for many people. To untrained eyes, travertine's texture may appear to be from damage; however, the holes formed naturally from the steam and water that passed through the rock during its formation. A good sealer will prevent any damage to travertine tiles placed in potentially messy or high-

**RIGHT:**  
Ancient Romans made extensive use of travertine in constructing their historic structures.



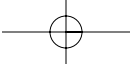


Photo courtesy of Jupiterimages 2007

## MORE INFO

### Quarry Locations:

North America: New Mexico, Mexico

South America: Argentina, Peru

Europe: Armenia, Austria, Belgium, Italy,  
Spain, Turkey, Germany and Portugal

Asia: Iran

### Applications:

- Interior accessories
- Building stone
- Countertops
- Fireplaces
- Flooring
- Landscaping

### Appropriate Finishes:

- Antiqued
- Honed
- Polished
- Tumbled

### Stone Stats:

Abrasion Resistance, min. hardness: 10

Max. Absorption Rate (%): 2.5

Min. Density (pcf): 144

Compressive Strength (psi): 7,500 (min)

Modulus of Rupture (psi): 1,000 (min)

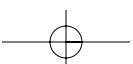




Photo courtesy of the National Park Service

RIGHT:  
The Mammoth Springs in Yellowstone National Park are a great example of how travertine is formed as a result of pressurized steam passing through limestone.

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traffic areas, such as office space flooring or foyers. However, the stone also can be purchased as “filled,” with the holes packed with grout or resin. This would probably be the ideal choice for applications where staining could be an issue, such as kitchen countertops.

Regardless of the intended application, travertine imparts an ageless beauty while providing a largely neutral color range that can be incorporated into any design scheme. Further, by using travertine, one can continue a building tradition that has lasted for thousands of years and harkens back to an ancient civilization that, to this day, still is considered one of man’s greatest artistic and intellectual periods.

#### Interesting Facts

Perhaps the most well-known symbol of that civilization – Ancient Rome – and the

largest known building constructed with travertine is the Coliseum in Rome. Completed under Emperor Titus in 80 A.D., the amphitheatre was constructed using a combination of concrete for the foundations, travertine for the piers and arcades, tufa infill between piers for the walls of the lower two levels, and brick-faced concrete used for the upper levels and for most of the passageways beneath the arena floor.

The Coliseum remained in use for nearly 500 years, with the last recorded games being held there as late as the 6th century. Though the structure has been ravaged by stone robbers, earthquakes and time, much of it still stands today as a testament to architectural genius and the building materials used in its construction. The landmark remains a popular tourist attraction and is a national symbol for Italy. ♦



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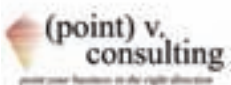
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# Call for Entries

## 2008



Sponsored by Building Stone Institute, the Tucker Design Awards program is the stone industry's most prestigious award program. Highly respected by the architecture and design community, the Tucker Design Awards provide an opportunity to honor those projects that have demonstrated design excellence in the use of natural stone.

### Who May Enter

Architects, landscape architects, interior designers, and others who feel their work has achieved design excellence in the use and incorporation of natural stone are encouraged to enter the 2008 Tucker Design Awards competition.

### Eligibility

Completed projects located anywhere in the world are eligible. Projects in the design stage, under construction, or with unfinished landscaping will not be accepted. A project that has previously received a Tucker Design Award cannot be re-submitted.

### Project Types

The Tucker Design Awards are awarded to honor excellence in the concept, design, and construction of projects that utilize natural stone including residential, commercial, and industrial structures; landscapes; interiors; and restoration. Memorials, landscape elements, and fountains are also encouraged.

### Submission Procedures

Detailed entry guidelines and a submission binder will be mailed to each entrant upon receipt of the Call to Entry form.

The submission requirements include:

- Up to twelve professional quality 8"x10" or 8.5"x11" color photographs of differing views. Images should be carefully selected and identified to include:
  - An overall view of the structure
  - Views of the exterior
  - Views of the interior (if stone is used)
  - Close-up views of the special details

- If the project is a renovation or restoration, at least four of the photographs should be of the project prior to restoration or renovation.

- A written description of the project which should not exceed 500 words and which should include the requirements of the client; a description of how those requirements were met; a description of the project's function; and an explanation of why natural stone was selected.

- For buildings, include a floor plan and section and elevation drawings to illustrate the design and use of stone.

- A site plan. For buildings, the plan should indicate location and use of stone; and for landscape designs, it should indicate areas where stone is used.

- Line drawing showing a typical stone installation detail.

- A separate sheet with the name and address of the design firm and consultants, the project owner, the general contractor or construction manager, the stone installer and the stone supplier, and the types of natural stone used.

*Please Note: Winners will be required to supply digital high resolution images for publicity purposes. Images of the award-winning projects must be accompanied by a signed release which gives BSI permission to use all copyrighted photos to publicize the awards competition. BSI reserves the right to disqualify any entry with incomplete information or visual elements.*

### Presentation of the Awards

The award winners will be notified shortly after the jury's decision. Presentation of the awards will take place at the BSI Tucker Design Awards luncheon in Dallas, Texas during May 2008. Representatives for the award-winning project must be present to receive the award. For a look at the 2006 Tucker Awards, visit [BuildingStoneInstitute.org](http://BuildingStoneInstitute.org)



# Entry Form

Past jurors for the Tucker Design Awards have included:

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## Registration Process

1. Complete this Entry Form and submit with the appropriate fee. Registration fees are \$100.00 for the first entry and \$75.00 for each additional entry.
2. Upon receipt of your entry fee, BSI will mail submission binders to you for completion. *Please note that NO entry fee will be returned in the event your entry is not submitted.* Submission binders will be returned upon your request.

## Competition Schedule

Entry Form and Fees Deadline: **September 28, 2007**

Submission Binders Deadline: *November 16, 2007*

The judging is scheduled for January 2008 followed by the Tucker Awards Presentation May 2008 in Dallas, Texas.

Name and location of project(s) entered (use additional sheets if necessary):

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Fee Schedule: The entry fee is \$100.00 for the first submission and \$75.00 for each additional submission. There is no limit to the number of entries.

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Elgin, IL 60123

For questions about this competition, please call (866) 786-6313.



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Photo courtesy of Omax

# New Methods, New Practices, New Possibilities

By Mark Haverstock

**METHODS USED TODAY** in stone quarrying and manufacturing are an interesting mix, ranging from classic craftsmanship to cutting-edge technology. In a small quarrying operation, one still can find people using feathers and wedges to split stone, something that has not changed for a thousand years. But at the modern end of the spectrum, quarries are cutting stone with diamond saws, while fabricators use robots and the latest in computer technology.

As we enter the 21st century, one could say that we're entering a new Stone Age. Contractors and homeowners are looking for the beauty and permanence of stone at affordable prices. Quarriers and processors of natural stone are looking to new technology to help them meet this demand by better utilizing their resources.

### From the Ground Up

The object of quarrying stone is to remove large, rectangular blocks with the least outlay of time and labor, while keeping the quarry in good shape. In the days of old, that meant brute force and explosives. "One of the things we used to do is spot drilling – you drill a hole and then use the impact of the drill to crack the stone," said Tom Howard, plant engineer for Cold Spring Granite of Cold Spring, Minn. "At the end of the process, you'd use explosives to lift it out."

For the past five years, Cold Spring has been using a process called quarry wire sawing, which requires no dangerous blasting and gives workers more control over the process. "What we do is drill

two holes into the ground and we string diamond wire through the holes – which is diamond segments impregnated in a wire with a resin or plastic," Howard said. "The wire is run through a saw and the saw pulls the wire through the ground and cuts out the block."

According to Howard, when you use explosives, you put stress on the stone, which can cause it to crack. But with the wire saw-

ing, you get better quality stone, especially for stone that is brittle. "We started with some of our more brittle stones and have increased our yield quite a bit by using wire sawing instead of blasting and flat drilling," he explained.

### Belt and Blade

Another useful quarrying saw is the diamond belt saw. Diamond belt saws from W.F. Meyers cut anywhere from 6'3"

**LEFT:**  
Omax Precision water jet creates custom cuts and bullnose edges for granite kitchen countertop.

**BELOW:**  
Park Thinstone TXS System creates high-quality veneer products.



Photo courtesy of Park Industries



Photo courtesy of Cold Spring Granite

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Photo courtesy of Omax

ABOVE:  
Water jet from Omax makes intricate compass inlay pattern of marble and granite.

to 16' depth at 200 square feet per hour. The cutting unit weighs approximately 8,000 pounds and travels on railroad-like tracks into the quarry. To decrease setup time, each model utilizes a rotating guide bar that allows users to cut on either side of the machine. By adjusting the cutting widths, users can maximize the number of usable products. "You get nice square blocks and you don't fracture the stone," said Dick Dunlap, sales engineer for W.F. Meyers of Bedford, Ind. "This means more usable material and less waste."

Cutting quarried material also utilizes the hardness of diamonds, and manufacturers continue to refine this technology. Slab saw and narrow block saws from W.F. Meyers use .530-inch-wide diamond belts. "With limestone, it cuts anywhere from 15 to 19 inches per minute," Dunlap said. "You can cut up a bunch of stone with one machine very quickly."

For sectional fabrication, ripping or jointing, diamond circular blades have been the standard for a number of years. They deliver the cutting power needed to help process the maximum amount of square feet per man hour. Meyers' skilled sawsmiths design Dia-Brasive® blades according to customer specifications by calculating the size, concentration and diamond type for optimal performance.

The Jaguar Saw from Park Industries of St. Cloud, Minn., utilizes diamond blade technology to do precision, straight-line profiling. "It allows you to make coping material and surrounds for all straight-line profiles like window sills, and window and door surrounds," said Jeff Walerius, architectural division sales manager for Park Industries. "This is one of our simpler machines to operate – it doesn't require CAD training or experience to run. You simply download a .DXF file to the machine."

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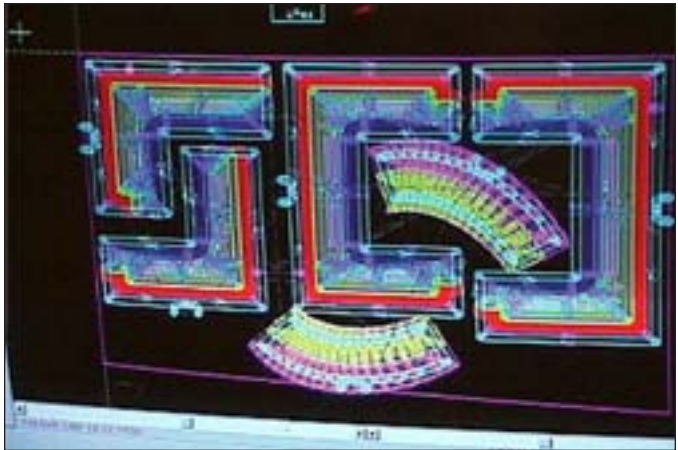
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ABOVE:  
Infinity software displays computer rendering on monitor.

ABOVE RIGHT:  
Finished stone cuts.

Photo courtesy of Park Industries



Photo courtesy of Park Industries

The intuitive touch screen walks you through the process, so users only need basic PC skills.

#### To Infinity and Beyond

Another addition from Park Industries is the company's Infinity line, which raises the ante over conventional saws by

giving precision sawing performance with the ability to change over and do complex shaping using industry-standard milling attachments. "The Infinity profiles stone for your applications, such as columns, archways, door surrounds, window surrounds, fireplace surrounds – anything

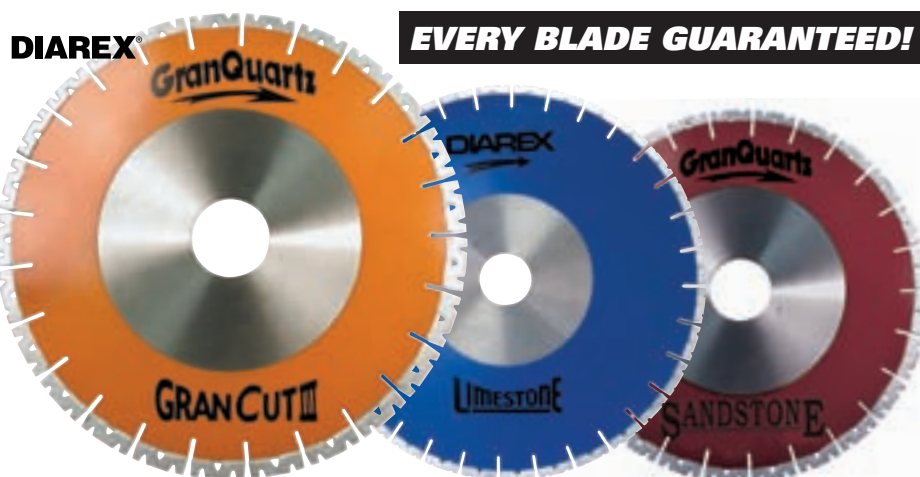
that you want cut in a 3-D format," Walerius said.

The Infinity is a three-axis computer numerical control (CNC) profiling machine that utilizes Mastercam, a type of software that is structured so an operator can enter minimal data to allow the machine to

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Photo courtesy SEIS Group Inc.

function. Interfaces include both keyboard and mouse, as well as a touch screen. It also uses a Siemens DMI control, which has a keyboard and mouse built right on the interface. The machine accepts instructions in both English and Spanish.

“Operators need some basic CAD experience to run the equipment,” Walerius explained. “You can take any .DXF file, download it to the machine, and they can take and manipulate that drawing and produce the product.” Park also recommends some knowledge of G-code, a common CNC programming language, for best results. “We do an intensive 10-day training session here at Park Industries, teaching the standard operating and programming procedures that an operator will need,” Walerius said. “They learn exactly what they need to know to produce the particular products they make.”

**ABOVE:**  
The SEIS RoboJet provides the accuracy of industrial robotics and the flexibility to automatically switch between abrasive water jet cutting, rotary saw cutting, 3-D milling and edge profiling.

# 15

The number of regional educational seminars planned by the Marble Institute of America in 2007, covering virtually every facet of the natural stone business – from marketing and fabricating to renovation and safety. Attend a few seminars and purchase training manuals and videos from the MIA electronic bookstore and chances are you'll save enough from your member discount to pay a large portion of your annual dues.

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### A Cut Above

Omax of Kent, Wash., produces a line of JetMachining® Centers that utilize an abrasive water jet cutter that can trim a large variety of materials, including stone, such as marble and granite. Many stone fabricators utilize water jets like these to process stone for sink cutouts, inlays and just about any kind of three-dimensional cutting.

The abrasive jet pressurizes water up to 55,000 pounds per square inch and then forces it through a small sapphire orifice at about two and half times the speed of sound. Garnet abrasive is then pulled into this high-speed stream of water, and mixed with the water in a long, ceramic mixing tube. A stream of abrasive-laden water moving at 1,000 feet per second then exits the ceramic tube. This jet of water and abrasive is then directed at the material to be machined. The jet's cutting action is a grinding process, but

instead of using a solid grinding wheel, the forces and motions of the cutting action are provided by water.

“We also have a new product called the Fabricator, which is well suited to the stone industry,” said Sandra McLain, OMAX vice president of marketing. “It cuts large pieces – the unit can handle 12- by 12-foot pieces and can grow in length by 72-inch increments if needed.” The unit is run by a CNC motion control system incorporating Windows XP, accepting standard .DXF files. According to McLain, the Fabricator’s abrasive jet excels at contour cutting and producing intricate shapes with precision.

### Lending a Robotic Hand

Since the 1960s, when the first industrial robots took their place on factory floors, their numbers have increased to approximately one million around the world. A decade ago, these machines began finding their way into stone fabrication and finishing. “The stone industry can now benefit from the same kinds of automation technology as other industries, such as automotive or general manufacturing have been using,” said Brian Mullins, chairman of the SEIS Group of Huntington Beach, Calif. “It takes what was

BELOW:  
RoboCut software controls water jet cutting on this granite countertop.



Photo courtesy SEIS Group Inc.

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The amount saved annually by the average participant in the Marble Institute of America's Discount Shipping Program, featuring FedEx, UPS and Yellow Freight. Just one of many money-saving programs available for natural stone industry companies, the more you ship, the more you save. In 2006, savings ranged as high as \$22,483 for one company, enough to pay MIA dues for almost 30 years.

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traditionally a very manual process and brought some levels of machining to it.”

The typical CNC manufacturer ships units in the hundreds per year. However, these robots are sold in quantities of 7,000 to 8,000 a year, and have an installed base of more than 70,000 units. “You get a much different level of support for this kind of product than you do for traditional stone equipment,” Mullins explained. “Also, the mean time between failures – the typical time before you have to do any work on the

RIGHT:  
Installed limestone door and window surrounds add the finishing touch to this stone veneer exterior.

machine or the robot – is about seven years, which is a level of quality you can’t get with old-style machine tools.” Modern automation standards require that similar robotic arms assemble cars 24/7, without any downtime, and are expected to do so for the life of the product line.

The SEIS RoboJet combines the capabilities of a water jet, a CNC saw and an edge profiling CNC to do all kinds of routing and CNC work. “For the price of one machine, you get the capabilities of three,” Mullins said.

“The footprint is also smaller, so you can fit more capability into a facility.”

In addition to engineering tools and how the robot utilizes them, SEIS also writes the software running under Windows XP. They took standard industrial robots that typically are programmed very differently from CNC machine tools and produced software that allows you to program them, much like a traditional CNC. “It gives our users a lot of flexibility, but also ease of use,” Mullins said. “Anyone who uses our machines will find it very intuitive and familiar. You can take the same CAD files you generate now from your countertop templates, for instance, drag them right into our software, and then run them as you would on a traditional CNC.” This means no steep learning curve, since operators can utilize their current knowledge and experience.

Mullins noted that, in 2007, SEIS will release another tool that will compliment the current water jet, the saw and milling devices. “The robots will give even more flexibility – you can add a new tool, and perhaps more later on,” he said. “Soon, we can bring as many of these tools as possible



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into one machine center so you can create a better product more efficiently.”

### Cutting Corners Constructively

One of the hottest items in the natural stone market is thin stone veneer. New technologies are making it easier to efficiently utilize stone to make face and corner pieces. “[Park Industries has] two versions of our Thin-Stone TXS System, one that cuts the flats and a new machine that cuts the corners,” Walerius said. “The advantage of using the corner machine is that it cuts in a single pass.” In the past, corners were made using hand chop saws – a very cumbersome, dangerous and labor-intensive task.

Making corner pieces can be particularly wasteful, unless care is taken to utilize the maximum amount of stone. The process on the Park TXS-4500 system begins with sawing a roughly rectangular piece of full veneer, ranging from four to 12 inches thick, one corner at a time, producing two corner pieces and a leftover piece from the middle. “A lot of our customers are taking that middle piece that is cut on both sides, and they are either tumbling and making another product from it,

or they are splitting it again to process,” Walerius said.

“The efficiency of stone utilization and yield of stone has been an issue in the past for quarriers,” added Stephanie Kadlec, marketing manager for Park Industries. “You visit some old quarries and there are some huge rubble piles, thousands of tons of stone that was thought to be unusable. But with these veneer machines and other modern technology, they’re able to reduce those rubble piles by turning the ‘junk’ stone into profitable stone.”

### Stone for the Masses

Modern stone cutting and fabricating machines reduce labor, labor costs and increase efficiency that can ultimately be passed on to the consumers, making natural stone more affordable. “Ten years ago, only the million-dollar homes had marble countertops and stone exteriors; today, we’re seeing homes in the \$250,000 bracket with similar stone products,” Kadlec said. “Natural stone is becoming more affordable due to technology. Stone really adds to the appearance. We refer to it as the jewelry of the home – it gives homes character, warmth and depth.” ♦

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# Green, Naturally

By Jodi Paper

**I**N ITS FALL 2006 NEWSLETTER, Cold Spring Granite of Cold Spring, Minn., referred to Kermit the Frog's "heartfelt ballad, 'It Ain't Easy Being Green'" and the company's "been-there-done-that course of empathy" with the little guy. The Natural Stone Council (NSC) Committee on Sustainability, whose members include representatives from stone companies from across the country, whistles a similar tune. However, the NSC has a more positive take on the future, particularly in relation to natural stone and its potential as a major player in the "green building" movement.

"Green building," a multi-industrial movement, is more than just a growing trend. By definition, "green or sustainable building is the practice of designing, constructing, operating, maintaining and removing buildings in ways that conserve natural resources and reduce pollution." For John Mattke, president of Cold Spring Granite and an NSC member, "Green building is one of the most significant and exciting developments in the construction industry in the past decade. Environmental responsibility, and a focus on improving the utilization of energy and resources in the creation of products used in the construc-



Photo courtesy of JupiterImages 2007

tion and life cycle of buildings, is good business," Mattke said.

Natural stone, as an abundant and recyclable resource, is an advantageous building material that easily lends itself to the green movement's goals.

## The Natural Stone Council

Created in 2003, the NSC is a collaboration of natural stone businesses and trade associations. "The NSC Committee on Sustainability was formed to advance the position of natural stone as an environmentally responsible and preferred material in sustainable building," Mattke said.

Additionally, the NSC is working to correct any misconceptions the public and the

industry's clients have concerning natural stone.

"There is such a wide and varied perception of stone and how it fits into the green movement," said Bill Eubank, a project manager at Luck Stone Corporation in Richmond, Va., and a member of the NSC Committee on Sustainability. "With quarrying practices, people scratch their heads wondering how green it can be. But we are saying that there is potential for responsible quarrying."

"Not all quarries are equal," said Kathy Spanier, who is the marketing manager at Cold Spring Granite and also a member of the NSC Committee on Sustainability, speaking to the concern that, because stone is



Photo courtesy of JupiterImages 2007

extracted out of the ground and is a natural resource, it runs a high risk of becoming depleted. “Use of energy in [dimensional stone] extraction, as well as [dimensional stone] extraction practices, varies. We are looked at as [if we are] extracting a scarce resource from the earth. This just is not true; stone is a very abundant material.”

In fact, the NSC Committee on Sustainability has developed a set of Best Practices, not only to diffuse any misconceptions about natural stone, but also to ensure that stone is quarried and fabricated in the greenest possible way. These Best Practices, which are guided by federal and state agencies such as the Environmental Protection Agency and the Department of Natural Resources and Environmental Quality, focus on air and water quality, safety and health, solid waste management, environmental impact studies, and quarry reclamation plans. And, while not all operations utilize these Best Practices, the natural stone industry and its associations encourage the sharing of Best Practices to move the industry forward to, shall we say, greener pastures.

#### **USGBC and LEED**

The NSC perceives that many of the misconceptions

about natural stone stem from the lack of representation for the industry in the green building movement. “One way to [correct these misconceptions] is by getting the United States Green Building Council (USGBC) to recognize stone as a category, like wood, and not as a man-made material,” Eubank said. “The NSC Committee on Sustainability is a unified effort to promote stone as a category.”

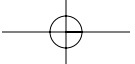
The USGBC is the country’s leading nonprofit organization dedicated to the promotion of environmentally responsible creation and development of healthy and profitable buildings. According to the organization, commercial and residential buildings account for 65.2 percent of total U.S. electricity consumption, more than 36 percent of total U.S. primary energy use, and 30 percent of total U.S. greenhouse emissions. A green building is defined as an environmentally friendly structure that is designed and constructed in such a way as to reduce or eliminate its impact on both the environment and on its occupants.

To this end, the USGBC has developed a program called Leadership in Energy and Environmental Design (LEED), which is

essentially a rating system by which a building’s “greenness” is evaluated. This system was launched in 2000 as a guideline, but has quickly become a benchmark for the design and development of environmentally friendly projects. Within LEED, there are specific programs, including New Commercial Construction and Major Renovation projects, Existing Building Operations and Maintenance, Commercial Interiors projects, Core and Shell Development projects, Homes, Neighborhood Development, Guidelines for Multiple Building and On-Campus Building Projects, and LEED for Schools. “The primary focus of the stone industry on LEED is the New Construction and Major Renovation program,” Eubank said.

The programs take what is referred to as a “whole-building” approach, meaning every aspect of a building, from the construction materials, such as insulation and carpeting, to the air conditioning systems. Five key areas of evaluation are: energy efficiency, materials selection, water savings, sustainable site development and indoor environmental quality. These categories are assigned points, leading to several certification levels – Certified, 26-32 points; Silver, 33-38 points; Gold, 39-51 points; and Platinum, 52+ points.

While stone is not yet a category, stone does contribute to a project’s certification by qualifying for points. To qualify, the stone used in a project must be local or regional, meaning the materials, including extraction and manufacturing, must come from within 500 miles of the project. The higher percentage of the cost that comes from regionally harvested material, the more points that can be acquired.



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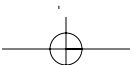
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### Why Natural Stone?

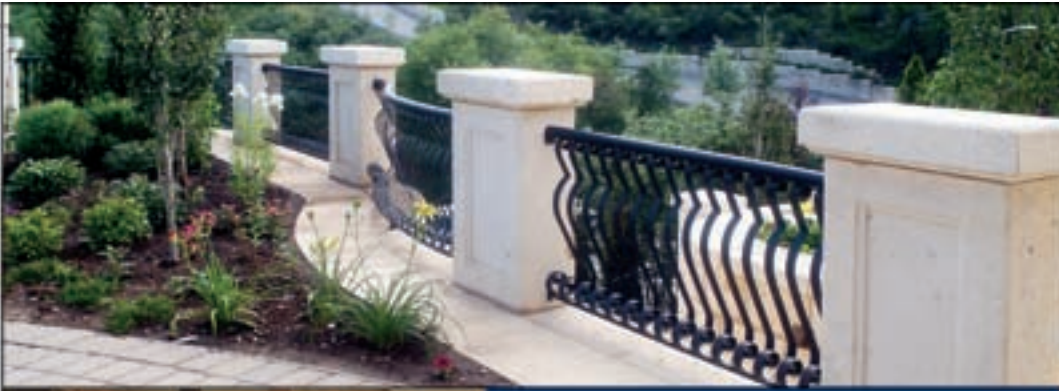
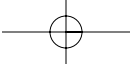
There are several answers as to why stone is a natural fit for green building. To begin with, stone is a natural product with an enduring life cycle. "Many design professionals consider stone a green building material, not just because it can contribute directly to specific LEED credits, like regional materials and material reuse, but also because it is a natural, durable and low-maintenance product with an extremely long life cycle," Eubank said.

The natural stone industry is currently working on commissioning a study of the life cycle cost of natural stone. "A life cycle cost analysis calculates the cost of a system or product over its entire life span," said Garen Distelhorst, an NSC Committee on Sustainability member and accreditation manager at the Marble Institute of America in Cleveland. "It is the hypothesis of the natural stone industry that, when compared to competing products, natural stone will come out on top in terms of life cycle cost. The long life span and minimal upkeep required to keep natural stone beautiful make ongoing energy requirements minimal and, thus, would make it an attractive green building option with respect to life cycle cost."

Also, it's an abundant resource that can be recycled. "Stone can be ground up and used as aggregate in roads," said Spanier. "You can't say that about all building materials."

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For these reasons and many more, natural stone is gaining support from the green building community.

A 2006 survey of architects and landscape architects conducted by the NSC revealed that green certification has become increasingly important when considering a stone company's product. When asked how likely they would be to use a product from a company that has a more proactive approach to sustainability, 77 percent of those surveyed said they

are most likely to go with a proactive company. "The survey was one of the first initiatives of the NSC Committee on Sustainability to assist us in understanding and validating the building industry's perception of stone and the approach we needed to take with natural stone in the green building movement," Spanier said. "In addition to the survey, we have also used trade events and [continuing education] presentations to confirm our information and direction."

The NSC Committee on Sustainability also organized an exhibit at the USGBC show, GreenBuild, in Denver in November 2006. "[Having the booth facilitated] great interaction with our market and created awareness for our effort as an industry," Spanier said.

### Green Projects

An excellent example of a LEED-certified building is the Frisco Public Library in Frisco, Texas. The structure carries Silver LEED certification, due in large part to the fact that it is built from regional and remnant stone materials. "The reason we clad the building in stone is so it can be a 100-year old building," said Malcolm Holzman of Holzman Moss Architecture in New York. "There are very few other materials that can do that."

The fact that construction and demolition waste make up 40 percent of the total solid waste in the United States was another deciding factor; Holzman used "deconstructed" granite – or granite that is taken from one project and then reused on another. The use of deconstructed stone also made sense economically. "This is an excellent investment of taxpayer money," Holzman said.

Likewise, CarMax is shooting for a LEED Silver certification for its corporate headquarters in Richmond, Va. All of the stone used in the project is bluestone from Pennsylvania, quarried within 500 miles of the building, and therefore falls under LEED's regional requirements.

"The stone is used in a natural transition from the outside of the building to the inside," said NSC Committee on Sustainability member Dan Oullette, who is also director of sales at Luck Stone. Additionally, the building was "surgically" inserted into the site, a wooded area, without disturbing the natural surroundings.

"[This method] speaks to the problem of destroying the landscape," Oullette said. "Usually when people build, they clear the area first and then build." In this case, however, "they only cleared out a little beyond what the building would need for space."

### Greener Pastures

No longer is the grass – or stone, as the case may be – greener only on the other side. These days, natural stone plays a major role in the proliferation of the green movement. Although its significance to sustainable building is not yet fully recognized, with the work of the NSC, it is only a matter of time.

As Mattke stressed: "Our goal is to educate the industry on Best Practices in the dimensional quarry and fabrication industry, eliminating misperceptions regarding the scarcity of stone, showing the environmental planning and care that is taken within the dimension stone quarrying industry, and assessing the life cycle and energy consumption impacts of stone versus other building material alternatives." ♦



Photo courtesy of Jupiterimages 2007

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# ANDREA PALLADIO: The Most Inspirational Architect

By Pennie L. Sabel • Photos courtesy of Pennie L. Sabel

**A**NDREA PALLADIO is one of the most influential architects the world has produced. His system of proportions, the elegant symmetry of his projects, and the techniques of composition he used all serve to establish a relationship between each individual component and the whole, something he felt was at the very heart of classical architectural design. He has been an inspiration to countless architects throughout the Western world, including Thomas Jefferson, Inigo Jones and Christopher Wren.

Born Andrea di Pietro della Gondola in Padua, Italy in 1508, he began his career as an apprentice stone mason when he was 13 years old. After several years, he broke from his apprentice contract and went to Vicenza, Italy to enroll in the Vicentine guild of stonemasons. There he began working at the Pedemuro work-

shop, which specialized in sculptural and architectural commissions. It was there that he learned the basics of design, as well as stone carving and house construction from the ground up. As he developed his stone carving skills on window and door frames, fireplaces and cornices, so too he developed a honed sense for architectural details.

His work soon attracted the attention of Count Giangiorgio Trissino, a wealthy intellectual and an amateur architect. They first met when he worked on a new loggia that Trissino had designed for his villa near Vicenza. Trissino became his benefactor and mentor; a lover of all things Greek, Trissino also gave Andrea the name Palladio, an allusion to the Greek goddess Pallas Athena.

Vicenza was a wealthy city, part of the Venetian Republic, and the well-educated nobility looked at architecture as the means of establishing the high cultural standards and values of



the city. At the Pedemuro workshop, Palladio worked on commissions for the wealthy and well-connected aristocrats as his career as an architect began to take shape. He was in the right place at the right time.

Trissino brought Palladio into his circle of students and intellectuals, guiding Palladio's education in architecture, engineering, ancient topography and





Photo courtesy of Pernie Sabel

military science. They made several trips to Rome to study the structures and ruins of antiquity, and there Palladio surveyed, measured and drew theatres, arches and temples, and developed his skills in architectural draftsmanship and perspective studies. The Roman baths made the greatest impression on Palladio, and he studied them for ways to combine large and small

spaces, and their variety of vaulting and spatial configurations. Trissino also introduced him to Vitruvius, the classical Roman architect whose basic principles guided the budding architect.

In 1546, the city fathers of Vicenza decided that a collection of buildings serving as the town hall and basilica – some dating to the 13th century – needed a facelift. Palladio was awarded the

ABOVE:  
San Giorgio Maggiore is clad in Istrian marble and the façade presents two temple fronts that are above and behind one another.



commission to bring a unity and cohesiveness to better reflect the status of the city. Surrounding the buildings, he designed a two-level loggia, consisting of an engaged Ionic Order on a Tuscan-Doric Order ground floor carried on smaller columns between the piers, and balustrades and oculi grouped together to give an elegant effect of light and shade. He opened it onto the Piazza dei Signori and, with the two levels of loggias behind arcades, together with the column motif, gave the buildings a completely new rhythm. It was Palladio's first major commission and it established his reputation as an architect.

### Palladian Design

During his life, Palladio designed and built palaces, villas, bridges and churches. But he is probably best known for the many villas that he designed for the aristocracy of Venice. Up until the 15th century, Venice was a powerful and wealthy city, sitting astride the East-West trade routes, the land route to Asia and the Orient, and the Southern sea route. However, during the 15th and 16th centuries, Venice went into a decline as trade routes changed and aristocrats invested in land rather than in risky, overseas trade ventures.

As more land was acquired and vast agricultural estates were built throughout the Veneto, there was a need for housing and farm buildings. A new type of structure was needed; palace designs were ill suited for the countryside and far too expensive to build. What was needed was something comfortable and well sited for the countryside; an inexpensive complex of buildings that would serve as the functional focus of the working



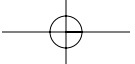
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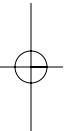
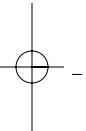
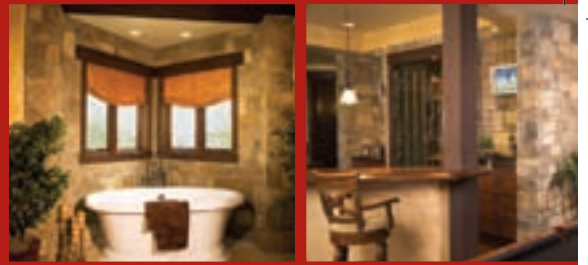
Photo courtesy of Pennie Sabel

**ABOVE:** Il Redentore (The Redeemer) was built in gratitude for saving Venice from the plague. The façade design features interlocking temple fronts with engaged columns and pilasters.

**LEFT:** Built in 1552-53 for Giorgio Cornaro, of a wealthy Venetian family, Villa Cornaro introduced the two-story projecting portico-loggia, which has influenced Western architecture ever since.



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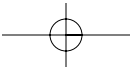
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farm, but also reflected the grand and opulent status of the noble property owners. Palladio had the answer.

Based on his studies of Roman monuments and ruins, the writings of Vitruvius and other architects who came before him, as well as his own insights and observations, Palladio's solution was to design buildings with dramatic exterior motifs, using economical mate-

rials, which would express internal harmony and balance. The country villa was born.

He developed three types of exteriors that we have come to identify as "Palladian." The most basic is a loggia with three openings. The second is based on the Greek temple front, similar to those used by the Romans, who had in turn borrowed from the Greeks. The third is the double loggia

with complete columns above and below. All three designs feature a symmetrical balance from left to right, with a main central block flanked by wings of farm buildings. He strategically placed the villas to take advantage of water sources and the views of the countryside, incorporating porticos or loggias into the villas so the owners could enjoy these views in comfort.

**BELOW:**

The curved transept of Il Redentore is the same width as the nave, allowing full view of the altar from any angle.



Photo courtesy of Pennie Sabel

The interiors of the villas followed the harmony and balance of the exteriors. Rooms are all in proportion to each other, and he used squares, rectangles and circles in a variety of ratios of width to length. In keeping with the economics of the villas, he had the walls frescoed rather than hanging tapestries, since these homes were used in the summer farming months and didn't require the insulating properties of tapestries.

### Divine Architecture

Palladio also was the architect for a number of churches and monasteries in Venice, the most famous and well known of which are the Church of San Giorgio Maggiore and Il Redentore. In his church designs, he merged the classical and the contemporary – much as he did with the villa designs – into a new kind of architecture.

San Giorgio Maggiore sits on its own island across the Basin from the Piazza San Marco and the Doge's Palace. The island had been the site of a Benedictine church and convent since 790, and Palladio was commissioned to rebuild the complex in 1565.

Clad in Istrian marble, the façade consists of two temple fronts behind and above one another. The central, higher front has four, three-quarter composite columns on high pedestals and a complete triangular pediment. Behind, the

**RIGHT:**

A statue of Andrea Palladio stands in the piazza next to the basilica that established his reputation as an outstanding architect.

Photo courtesy of Pennie Sabel



LEFT:  
The interior of the Church of San Giorgio Maggiore is in the form of a Latin cross. The ceiling is a barrel vault, with columns and arches supporting the dome.

lower body of the church is a smaller order of pilasters supporting two lower half-pediments on either side. The interior is in the form of the Latin cross with a transept and side aisles, and brings together the Renaissance ideal of the centralized plan, the medieval tradition of nave churches, and the requirements of the Counter-reformation for functional churches with naves for large

congregations. The ceiling is a simple barrel vault with a semi-circular window that leads to the crossing, and is framed by grouped columns and arches that support the dome and lantern. Cross vaults above the side aisles and a transept with apsidal chapels intersect the nave, and beyond the crossing is the monk's choir and presbytery.

Il Redentore (The Redeemer) was built as a votive church, an



Photo courtesy of Pernie Sabel

expression of gratitude for saving Venice from the plague of 1575-76, and is a demonstration of Palladio's ability to tailor his style to the building site and the structure's functions. When the city officials agreed to build the church, they also decreed that an annual pilgrimage by the doge and the government would be held on the Feast of the Redeemer. This tradition continues today.

Construction of the church on Guidecca Island began in 1577, and it was consecrated 15 years later. The design of the façade is interlocking pedimented temple fronts with engaged columns and pilasters. Composite pilasters support a pediment set into the attic, and the illusion of a portico continues above the attic, where the triangular form of the hipped roof repeats the lines of the pediment and rises toward the dome and bell towers. A balustraded flight of steps leads up to the church, and sculpture niches with small, round gables stand on either side of the entrance.

In the interior, the nave is wide and chapels replace the aisles. The first section is a rectangular block with pairs of engaged Corinthian columns flanking the side chapels. The walls between the chapels serve as piers and rise to form buttresses for the nave vault. The transept is the same width as the nave and is curved so that the altar is visible from every angle. Half-columns, pilasters and a cornice of the Corinthian Order articulate the internal walls and visually link the nave, transept and choir.

### The Four Books of Architecture

In 1570, toward the end of his career, Palladio compiled his vast knowledge of architecture into "*I Quattro Libri dell'Architettura*" ("The Four Books of Architecture") in which he describes the process of building from the foundations up. It is considered one of the most important books in architectural literature, and has been translated into every major Western language. ♦

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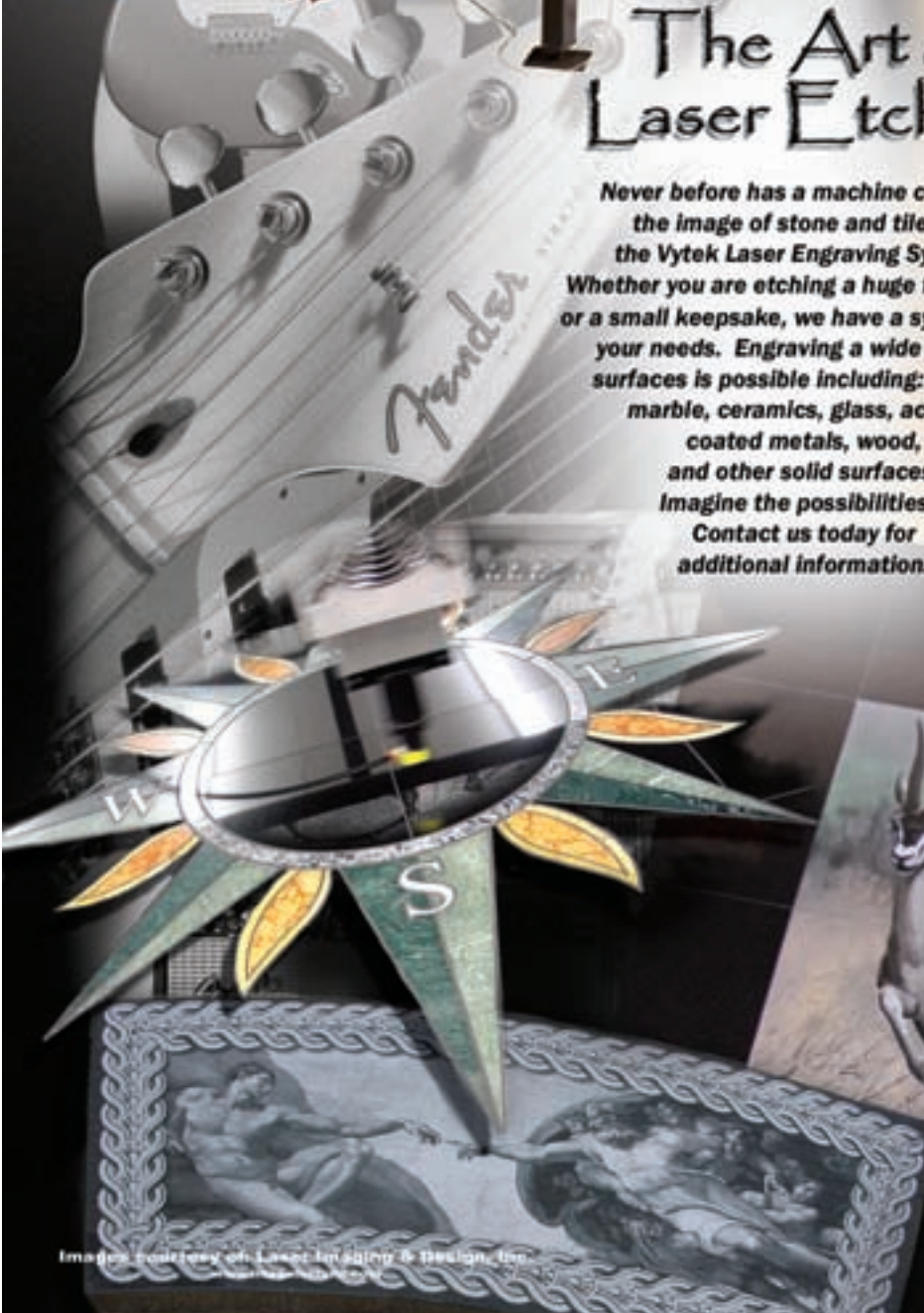
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## Historical Feature

# The Red Rose of Texas

By Christina B. Farnsworth

*Photo courtesy of State Preservation Board, Austin, Texas. Photographer Griff Smith.*



**ABOVE:**  
North view of the Capitol. The building was placed on the National Register of Historic Places in 1970, and designated a National Historic Landmark in 1986.

**A** S A STATE AND A REPUBLIC in its own right, Texas prides itself on size. As the saying goes, “Everything is bigger in Texas.” The state capitol building in Austin is a grand example. The official website is quick to note the building is second in square footage only to our nation’s Capitol in Washington, D.C. However, Texas’ building is more than seven feet taller – 311 feet tall (measured to the Texas lone star held aloft by Goddess Liberty’s hand).

And it’s home grown, something of a “Red Rose of Texas,” sporting 15,000 rail carloads of “sunset red” granite quarried just 50 miles from the site. And that glorious exterior is entirely structural.

However glorious, the building is not without a seamy side. The 1881 design competition that netted architect Elijah E. Myers (who also designed the Michigan and Colorado capitols) was indeed on the up-and-up, earning Myers \$1,700 for the “Renaissance Revival” style project. After that, it got interesting in many ways, including how Texas negotiated its way to the current capitol by trading a huge tract of land for the building and materials. When some of the materials had to be replaced, the state negotiated a donation and then set convicted criminals and imported scab labor to work over the objection of union members.

Placed on the National Register of Historic Places in 1970, and designated a National His-



toric Landmark in 1986 for its “significant contribution to American history,” the building actually is the third incarnation of the Texas capitol.

Texas’ first capitol was an unprepossessing building of “Bastrop plank lumber.” The second was a Greek Revival structure composed partially of limestone that was completed in 1853. When it burned in 1881, The Capitol Board happened to be meeting in the building to discuss the plans for the “new capitol.” They quickly moved themselves and the plans to safety.

Sited on high land, the 566-foot-long by 288-foot-wide structure has a commanding view of the Colorado River. As in the nation’s capital, state law protects Austin’s views of the Texas capitol from being obscured by other structures (including Texas’s own additions to the capital, which are consequently subterranean). When completed in 1888, the building had 392 rooms, 18 vaults, 924 windows and 404 doors. Today, it has some 8.5 acres of floor space and nearly 500 rooms.

Texas paid for the 1888 building not in dollars, but by trading three million acres of the Texas Panhandle for the building and construction to developer Mattheas Schnell of Chicago. The land later became the famous XIT Ranch.

Schnell, who was of German descent, had many contacts with European building suppliers from whom he purchased materials for the building, such as the copper dome and colored glass.

Construction began in February 1882. Builders placed the capitol cornerstone on March 2, 1885, the 49th anniversary of Texas independence. The 12,000-pound cornerstone contains a zinc box enshrining such relics as a stone from the previous limestone capitol, currency from the Republic of Texas and the Confederate States of America, an Austin city directory, and an 1862 meal ticket worth 25 cents.

The foundation and basement of the final building are limestone. The owners of a granite quarry, in what is now Marble Falls, Texas, donated their sunset red granite. But the gift stone needed some TLC – it was still in the ground and needed to be quarried. Texas gave the stone to Schnell along with 1,000 convicts to quarry it. Incensed by

BELOW:  
The Texas state capitol building in Austin was originally constructed with local, “sunset red” granite.



Photo courtesy of Jupiterimages 2007

## Historical Feature

the use of convict labor, the granite cutter's union boycotted the site in 1885. Schnell responded by importing experienced stone-cutters from Scotland.

Estimates are that more than 1,000 people worked on the building, including engineers, contractors, laborers and craftspersons. It took seven years to build, at an estimated cost of more than \$3.7 million based on the land trade value.

The building officially opened on San Jacinto Day, April 21, 1888. San Jacinto Day is important in Texas history because it officially marks the day on which the Republic of Texas' "800-Texian" army surprised Mexican General Santa Anna's 1,600 soldiers and won the Texas War of Independence. Officially, "six flags" have flown over Texas: Spain, France, Mexico, the Republic of Texas, the Confederacy, and the United States. All of these histories are honored in marble on the floor of the capitol's grand rotunda along with the Lone Star, the symbol of Texas. Texas became the 28th state on Dec. 29, 1845.

Temple Houston, son of Sam Houston (who was present at the famous San Jacinto battle), said at the dedication ceremony: "This building fires the heart and excites

reflections in the minds of all ... the architecture of a civilization is its most enduring feature, and by this structure shall Texas transmit herself to posterity."

As with most century-old buildings, changes came over the years, and not all of them were good, despite several restoration campaigns. Parts went missing, and another fire (in 1983) sparked a renovation project in 1990 that led to the replacement of the original zinc Goddess of Liberty with an aluminum re-creation.

Today, the capitol is fully restored to its original 1888 splendor. In 1993, after a \$75-million expansion that doubled the building's square footage, the underground extensions now include a parking garage and 615,000 square feet of government offices.

Two exterior elevators take visitors down to the capitol extension. Their copper roofs and granite enclosures complement the historic structure without copying it. The only real evidence of the sub-grade empire is an atrium poking out of the capital gardens, known locally as the "shark tank" because of the lawyers who mill about under the glass. Apparently, the atrium is the only place in the underground complex where cell phones work.

Some of the elaborate building details have histories of their own. The original iron dome was fabricated in Belgium and, as with many materials imported for the building, came through the historic port of Galveston.

Sargent and Company of New Haven, Conn., designed custom bronze hinges and hardware using glass molds. The eight- by eight-inch hinges each bear the words "Texas Capitol" and weigh more than seven pounds. The hinges came under special assault over the years, with many falling victim to souvenir hunters or remodeling projects. Finally, reproductions were installed using security screws.

Classic details once lost and now restored include 24 "blue oculi windows." Originally installed in the skylight structure located on the north wing roof, the compound glass was made by fusing together two thin panes of glass; one clear and one blue. A diamond-cutting wheel shaved away selected areas of the

**BELOW:**  
Two exterior elevators take visitors down to the Capitol Extension. Their copper roofs and granite complement the historic Capitol without copying it.



Photo courtesy of State Preservation Board, Austin, Texas. Photographer Griff Smith.

Photo courtesy of State Preservation Board, Austin, Texas. Photographer Griff Smith.



blue layer to create the design. By the 1980s, the original oculi had all been replaced with plain clear glass. Only seven of the blue gems remained undamaged, stored in a special crate.

In 1995, a comprehensive interior and exterior restoration of the original building was completed at a cost of approximately \$98 million. This restoration reinstalled six of the original oculi; the other 18 windows

were replicated. The seventh blue oculus is in careful storage for preservation and study. Those working on the project found it interesting that the oculi are so thoroughly inconspicuous from both inside and outside the building. Only when the sun shoots through them and casts rays of bright blue light is anyone aware of them.

In details both permanent and sublime, the Red Rose of Texas shines. ♦

**ABOVE:**

The underground extension. As in the nation's capital, state law protects Austin's views of the Texas capitol, including Texas's own additions to the capitol, which are consequently subterranean.



## Industry News

### Masonry Production and Repair Database Now Available

The Masonry Society (TMS) is pleased to announce "Masonry Production and Repair," a new online resource for TMS members and the general public. An indexed bibliography citing 160 years of masonry research, "Masonry Production and Repair" is a fully searchable database containing complete citations for thousands of masonry-related articles. Additionally, the online resource contains approximately 2,000 full-text articles.

"Masonry Production and Repair" was developed by TMS member Debra Laefer, of University College Dublin, Ireland. Funding for this resource was provided by the United States National Endowment for the Arts and the National Center for Preservation Technology and Training.

For more information on the database, or to use it, visit [www.masonrysociety.org](http://www.masonrysociety.org).

### DuPont™ StoneTech™ Professional Launches Improved Water-Based Sealers for Stone and Tile

DuPont's StoneTech Professional of Walnut Creek, Calif., introduced two improved stone and tile sealers at Stone Expo West in Las Vegas. StoneTech Professional BulletProof® sealer and heavy-duty sealer are water-based, environmentally preferable sealers that have been reformulated to improve performance and allow for easier application.

Using Ceramic Tile Institute standards, DuPont research showed that BulletProof sealer and heavy-duty sealer outperformed competing water-based sealers, and showed equivalent or better performance against competing solvent-based sealers. BulletProof sealer and heavy-duty sealer also showed comparable or better oil, water and stain resistance.

Because BulletProof sealer and heavy-duty sealer are water-based and contain low levels of volatile organic compounds (VOCs), they are environmentally preferable and compliant with recently enacted VOC

regulations affecting areas in Arizona, California, Delaware, Maine, Maryland, New Jersey, New York, Pennsylvania, Virginia and the District of Columbia.

The sealers are available nationally in pint, quart, one-gallon, five-gallon and 55-gallon sizes.

### Stone Shop International Offers Fabrication Franchise Opportunities

Michigan-based The Stone Shop International announced the first-ever stone industry fabrication franchise business program.

The Stone Shop will provide appropriate equipment packages, fabricator training, sales and marketing, sales training, budgets, forecasts and material supply chains – all streamlined for easy entry into this market segment. All training programs will be conducted using Marble Institute of America-approved materials, technical procedures and resource material.

Estimated to become 200 franchisees strong, the company will provide extreme purchasing power. This purchasing network will provide its franchisees the competitive edge in their local markets, while also providing national name recognition, advertising and marketing.

### Forza Introduces Mobile Bridge Saw

Forza Corporation of Burbank, Calif., announced the arrival of the new Spider Mobile Bridge Saw, the world's first mobile saw with an integrated tilt table that also rotates.

The Forza Spider is the perfect saw to take to a job site – requiring no trenching, drains or site prep – and a great saw for any shop that plans to grow.

The new Spider offers a larger cutting area (12-foot length) than the previous model, Forza V, and with the new rotating table, any cut is possible. The cutting blade head rotates in 360 degrees for cutting in both the X and Y axes. Other features include: a 220-volt, single-phase, 10-horsepower Italian motor; variable-speed control joystick operation; laser-

alignment guide; self-contained water recycling system; and set-up time in 15 minutes or less.

### Devonian Stone Now Offering Educational Tours to Architects

Devonian Stone of New York Inc., a sandstone mining and fabrication company in Windsor, N.Y., recently expanded its facilities and is now offering tours to architects and other building industry professionals. Tours include a visit to the company's production facilities, custom-fabrication facilities and quarry, where blasting demonstrations are offered upon request.

Tours of the Devonian Stone operation are more than just a walkthrough of the company's facilities – they are an educational experience. Owner Robert Bellospirito is a registered instructor with the American Institute of Architects, and has educated architects throughout the Northeast about the use of New York sandstone as a building material. Now the classroom has been moved to the source, and the on-site location makes it easier for visitors to better understand the in-depth information that is being shared. Bellospirito personally conducts each tour and carefully explains various stages of the process of how the stone goes from the quarry to becoming the finished product.

In addition, several recently acquired, high-production stone saws will allow Devonian Stone to not only nearly double its production capacity, but will allow for 12 to 15 more jobs during the next couple of years.

### Dagles Appointed Dual Chairperson to FEWA

Vandra C. Dagles, human resource manager at Champlain Stone Ltd. in Warrensburg, N.Y., was recently appointed dual chairperson responsibilities with the Federation of Employers & Workers of America (FEWA). FEWA provides its members with education and informational resources related to cultural, non-immigrant and immigrant labor recruitment, and management issues.

Dagles joined Champlain Stone in 1999 as operations manager, and now oversees its employee recruitment and personnel, including the H2B/H2R seasonal worker program. Dagles' lobbying efforts in Washington, D.C., political networking, and her FEWA member participation concerning the status of federal guest worker programs earned her the appointment to FEWA's advisory board in July 2006.

Dagles will be part of an experienced team, acting as the direct voice to FEWA and its members, insuring the association continues to provide guidance for its members' needs.

### BSI Members Win Nine MISL Masonry Awards

Building Stone Institute members Leonard Masonry Inc. of Hazelwood, Mo., and Spencer Brickwork of St. Louis received a total of nine awards at the recent 2006 Masonry Institute of St. Louis (MISL) Excellence in Masonry Awards.

Leonard Masonry received six awards, including two Excellence in Craftsmanship honors for continuing work on the Washington University campus; Distinction in Craftsmanship awards for Our Lady of Lourdes Catholic Church and Emerson Grand Basin; and Merit of Craftsmanship awards for Arnold Recreation Center and St. John Apostle & Evangelist Catholic Church.

Spencer Brickwork received three awards, including Excellence in Craftsmanship honors for St. Albans Residence and a residential stone fireplace, as well as a Distinction in Craftsmanship award for its work on the Bruning Residence.

The MISL Excellence in Masonry Awards feature projects completed from 2003-2005 by the Bricklayers' Union Local #1 of Missouri.

### New Walker Zanger Website

Allowing designers to work with a large set of collections – to see them, to feel them, to organize them into meaningful subsets – has always been a technical challenge outside of an actual showroom. Now, however,

Walker Zanger has employed innovative thinking to this age-old challenge, the result of which is the company's new, state-of-the-art website, [www.walkerzanger.com](http://www.walkerzanger.com).

Unlike traditional sites that work solely on a point-and-click basis, the new Walker Zanger website provides a complete virtual workshop, in which designers can choose, examine, organize, make notes, and find inspiration, all in one place. It is easy to view complete collections and zoom in on specific samples, as if they were being held. In addition, customization tools make it possible to crop specific products, and bookmark certain areas, which are saved on the user's computer for future visits. There is even a revolutionary new "My Notepad" feature, which, as its name implies, allows the visitor to add comments, flag areas of interest, and create a virtual inspiration file online, ready for saving or printing.

### StonExpo East Show Appears in Atlanta

StonExpo East conference and expo will be held March 21-24 in Atlanta. The show offers more than 200 exhibiting companies with natural stone, machinery and stone-related products, as well as live demonstrations. The conference offers 41 expert-led courses in five targeted tracks, with continuing education credit opportunities available with several professional organizations, including the American Institute of Architects.

### Leonard Masonry Honored at AIA/CPC Awards

Leonard Masonry Inc. of Hazelwood, Mo., received two awards at the 15th annual Excellence in Design awards, sponsored by the American Institute of Architects' St. Louis chapter and the Construction Products Council of St. Louis. Leonard Masonry received a Merit Award for a residential pool house and an Honorable Mention for its work on the Federal Reserve Bank.

"We take great pride in ensuring that our work is exceptional and unique," said Jeff Leonard, president of Leonard Masonry. "We are always gratified when our efforts are recognized by our peers and clients."

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## Industry News

The competition received more than 125 entries in five categories. Supported by two or more judges, the pool house was honored with a Merit award for its precise detail. The owner requested the new pool house match the existing structure, originally built in 1921.

Leonard Masonry also was awarded an Honorable Mention for the tremendous effort of matching new materials with prior masonry work at the Federal Reserve Bank. The mason contractor recommended granite with a thermal finish to blend with the bush hammered and jetted finish of the existing building.

### Coverings Show Appears in Chicago

Coverings takes place April 17-20, 2007, at the McCormick Place Convention Center in Chicago. Coverings attracts more than 32,000 people from more than 100 countries to see 1,200 exhibits in 510,000 net square feet of exhibit space. In addition, Coverings provides a comprehensive educational conference program, featuring more than 75 free educational sessions.

### 2006 StonExpo West Breaks Attendance Records

StonExpo West 2006, which took place Nov. 9-11 in Las Vegas, drew a record total attendance of 7,556 – a 20-percent increase in attendance compared to the 2005 show. The show floor also increased by 25 percent, bringing attendees a total of 102,200 net square feet of the latest stone, stone products, machinery, tools, accessories and more.

### New CounterVision Web Tool Simplifies Surfacing Selection

In a joint venture, Chameleon Power of Novi, Mich., and ETemplate System of Atlanta have launched CounterVision, a new online web tool for installers and fabricators.

With CounterVision, the fabricator can upload an image of the client's room online to display countertop options as they would actually appear. It also allows fabricators to measure and quote the customer in the

same visit, reducing the cost and inconvenience of multiple home visits during the selection and fabrication process.

Countertop, stone distributors and suppliers can load their own product materials or slab images to the CounterVision tool, allowing their customers to select right from their website, to order online and then request a meeting to confirm the selection in the showroom. CounterVision is integrated into the fabricator or distributor's website navigation and populated with the products and materials the company supplies.

"CounterVision gives fabricators the freedom to offer countertop surfacing, flooring, wall colors and other complimentary surfacing to painlessly expedite the selection process," said Dan Dempsey, CEO of Chameleon Power. "The fabricator can now use one image as the template for the actual countertop measurements and as the selection photograph."

### The Gallegos Corporation Receives Safety Awards

The commitment of the employees at The Gallegos Corporation of Vail, Colo., to a safe work environment has been recognized, earning it three prestigious awards. In December, the company received safety awards from both the American Subcontractors Association of Colorado (ASAC) and the American Society of Concrete Contractors (ASCC).

The ASCC recognized The Gallegos Corporation (TGC) for an incident rate that fell well below the national average. TGC's incident rate in 2005 was 3.9; the national average was 4.6 among private industry, and 6.8 for mason contractors. Reporting 775,841 man-hours in 2005, the corporation had only 16 injuries – far below the national average. Also, several of the company's divisions did not report a single accident in 2005.

The ASAC bestowed TGC with two awards: the 2006 Excellence in Safety for a large company with more than 500,000 man-hours worked in one year; and the Most Improved Safety Program, for having an incident rate below the national average.

"I am proud of the initiative my employees take in practicing safe work procedures, and that every year our safety rates improve," said Gerald Gallegos, CEO. "These awards could never have been obtained without the hard work and dedication toward safety from our employees. With insurance costs continuing to rise, it is essential that we maintain a safe workplace."

The Gallegos Corporation is headquartered in Vail, Colo., and has offices in Aspen, Denver and Telluride; Sun Valley, Idaho; Lake Tahoe, Calif.; and Bozeman, Mont.

### OSHA Becomes 'Set in Stone'

The Occupational Safety and Health Administration's (OSHA) Chicago region and the Marble Institute of America presented a "Stone Shop Safety" seminar at the end of 2006 as part of its ongoing alliance to help create a safe and healthy work environment for the natural stone industry.

Stone professionals from eight states attended the event, which covered topics including: developing a safety and health program, preparing for an OSHA inspection, and slab handling and other safety hazards on the job.

The seminar was well received by the attendees, as they recognized the value of ongoing educational seminars about safety and steps that can be taken to minimize dangers in the workplace.

### 2007 Kitchen/Bath Industry Show and Conference

The 2007 Kitchen/Bath Industry Show (K/BIS) and Conference, a source for trends, products and ideas for the kitchens and bathrooms of tomorrow, will be held May 7-10 at the Las Vegas Convention Center in Las Vegas.

The annual K/BIS event showcases the very latest products and cutting-edge design ideas in the kitchen and bath industry. This captivating event features the largest array of product displays and demonstrations, professional development courses, keynote speakers, interactive roundtable sessions and the opportunity to network with thousands of industry professionals.

The forum for dealers, designers, architects, distributors, retailers, home centers and many other kitchen and bath professionals, K/BIS is the world's largest international trade event dedicated to the kitchen and bath industry. K/BIS 2007 will bring together more than 900 companies exhibiting their products and more than 40,000 national and international industry professionals.

### Artisan Manufacturing Forms Strategic Partnership with Boston Granite Exchange

Artisan Manufacturing of New York, producers of high-quality sinks, recently announced they have formed a strategic partnership with Boston Granite Exchange of Haverill, Mass. Boston Granite Exchange will carry Artisan's complete line of high-quality stainless steel sinks to compliment its extensive inventory of quality granite and marble.

### New TelSmith 3258 Portable Crushing Plant Delivers

Designed for high-capacity performance in tough applications, the new TelSmith 3258 portable crushing plant is engineered with features that boost production, reduce maintenance requirements, improve safety and enhance mobility.

Ideal for the portable plant operator, the plant is 13'6" high and 10 feet wide. At the heart of the plant is the TelSmith Model 3258 hydraulic jaw crusher. With a 32-inch gape and a 58-inch wide crushing chamber, it out produces other crushers in its class. Unique, finger-tip controlled, hydraulic adjustment cylinders reduce maintenance and increase uptime production, while the hydraulic overload system automatically protects the crusher from tramp metal.

The crusher is fed with a 60-inch-wide and 20-foot-long vibrating grizzly. For opti-



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## Industry News

mum portability, the grizzly feeder, loading hopper and grizzly bypass chute comprise of one modular unit. The entire module can be removed as one piece, sliding off the back of the plant and simplifying travel in weight-restricted travel areas. Additionally, the chassis is equipped with a standard tri-axle, air-ride suspension. An optional fourth axle can be pneumatically elevated off the ground, reducing wear and tear during tight onsite maneuvering.

The Telsmith 3258 portable plant offers versatility, and ease of operation and maintenance via a variety of standard and optional features.

Equipped with either diesel or electric power, plants feature an optional variable-speed drive for the feeder. Diesel plants incorporate a 365-horsepower engine with a hydraulically activated trans-fluid clutch. Push-button controls engage the clutch automatically, and a hydraulic belt tensioner is used to maintain a constant belt pressure, eliminating the need to adjust belts. Several leveling systems are available as options. Using an innovative approach, Telsmith has tucked the cylinders under the plant, allowing extra room around the support legs for blocking. Large service platforms are built into the chassis for easy access to the jaw, feeder and engine.

### GerrityStone Names Alan Weiner Director of Sales and Marketing

GerrityStone of Woburn, Mass., one of New England's largest importers and fabricators of marble, granite and limestone, announced that Alan Weiner was appointed sales and marketing director for the company. Weiner oversees all internal and external sales and marketing communications strategies and programs for GerrityStone and its three locations in Woburn, Mass., Rockland, Mass., and Salem, N.H.

Weiner comes to GerrityStone from Fordham Marble of Stamford, Conn., where he served as director of sales and marketing since 2005. Prior to that, he was general manager at Stone Technologies of Woburn, Mass.

A seasoned veteran of the residential and commercial stone business, Weiner is active in numerous industry-related organizations, including the National Kitchen and Bath Association, the National Association of the Remodeling Industry and the American Society of Interior Designers.

### Superior Industries Expands Truck Unloading Product Line

Superior Industries of Morris, Minn., has added another model to the RazerTail® truck unloader product line. The 48-inch RazerTail has a six-foot discharge height, 50-horsepower motor, is 44-feet in length and capable of 1,000 tons per hour.

Superior's RazerTail is road portable and can be moved from job to job easily, only taking minutes to set up. This patent-pending truck unloader includes hydraulic ramps for quick and easy clean up of material spillage, eliminates contamination of material from multiple handling, and will reduce operating costs by eliminating the need for loaders.

### The 10th North American Masonry Conference

The 10th North American Masonry Conference will be held June 3-6, 2007, in St. Louis. The conference provides an excellent educational forum for engineers, architects, contractors, producers, suppliers and others interested in masonry. Over 90 papers will be presented at the conference, as well as other informational and enjoyable general sessions, seminars and tours.

For more information or to register, visit [www.masonrysociety.org/NAMC](http://www.masonrysociety.org/NAMC).

### W.F. Meyers Introduces New Pneumatic Tool Accessories

W.F. Meyers Co. of Beford, Ind., has improved its stone cutting products again, this time with its disposable LO-DI muffler

and Polycrystalline Diamond (PCD) end mill. Both products are designed to make stone work faster and quieter.

Designed for use with pneumatic tools only, the new LO-DI muffler, weighing just 13 ounces, effectively reduces sound levels by 25 percent without restricting air flow or horsepower – producing a mere 95 dBA at 90 psi.

Adaptable to a variety of shank lengths, the newly-improved PCD end mill ensures the proper length shank for every job. Unlike segmental grinding tools that change shape over time, PCD tools retain shape with every use, providing the same cut job after job.

### Stonexpress Announces New Distributor

Stonexpress Inc. of Kennesaw, Ga., is proud to announce the newest distributor for its exclusive "Laura Ashley Home" stone, porcelain and ceramic tile collection.

Space Flooring is one of the south's leading flooring and supply distributors, with a total of 15 branches. Partnered with 43 quality, full-service retail flooring stores, Space Flooring will feature the entire Laura Ashley Home line throughout North and South Carolina, Tennessee, Alabama and Georgia.

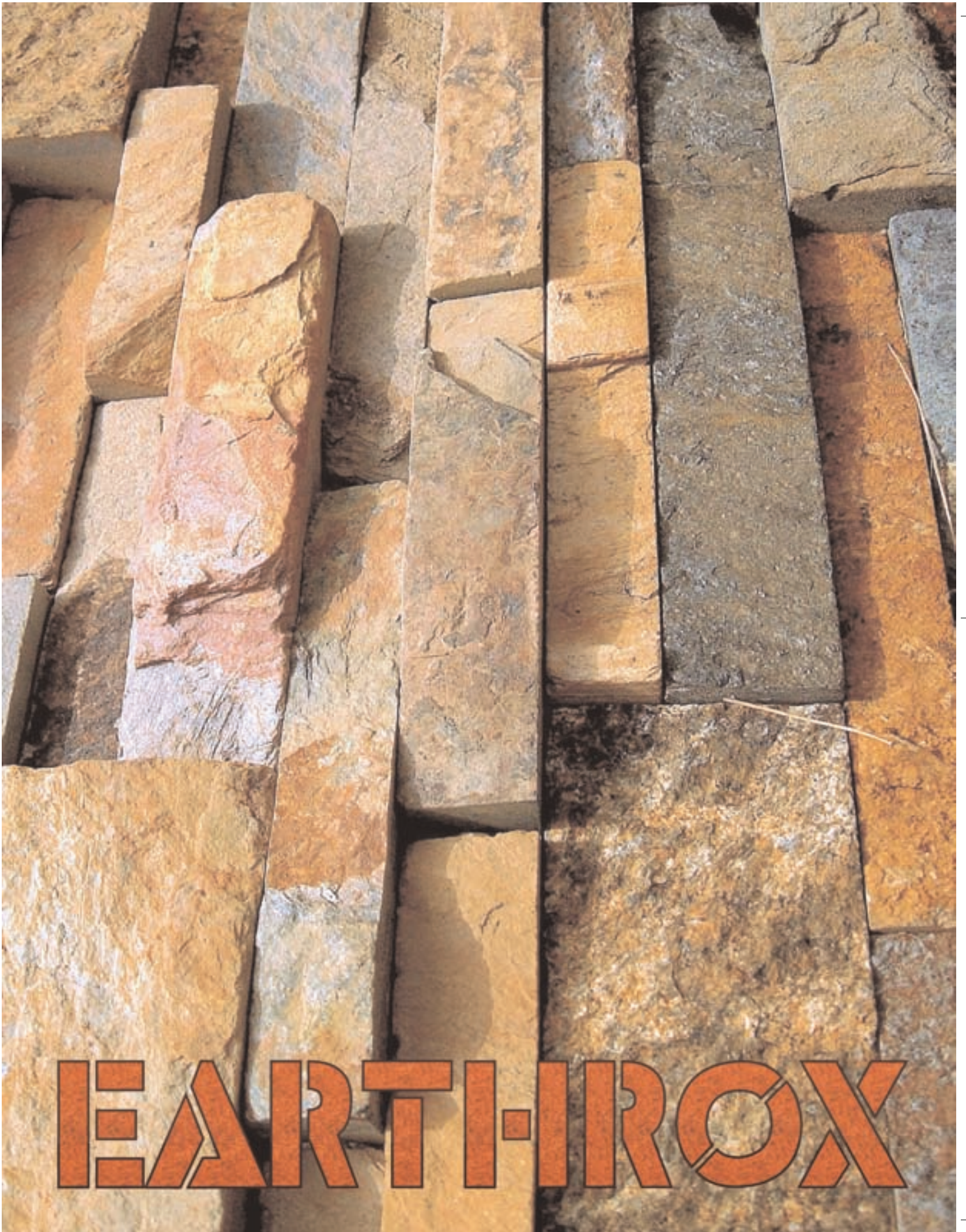
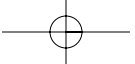
"We are very proud to bring Space Flooring into our Laura Ashley family," stated Bill Reid, vice president of sales and marketing for Stonexpress. "We are confident that they will exceed expectations held by Laura Ashley Home."

Stonexpress is an Atlanta-based organization, supplying natural stone and ceramic for residential and commercial use, providing nationwide express deliveries.

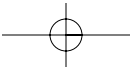
### New Telsmith Primary Impact Crusher

Telsmith of Mequon, Wis., has introduced the new Telsmith PA6060 primary impact crusher. Engineered to maximize crushing hours while minimizing maintenance, the new PA6060 (46- x 60-inch feed opening) is a top-performance pri-





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# Industry News

mary Andreas-style impact crusher designed to tackle large quarried stone with ease – and at lower costs per ton.

Delivering the durability to handle up to 40-inch feed, the new Telsmith PA6060 is loaded with innovations that boost production, service life and ease-of-maintenance beyond typical industry standards. Its advanced features and benefits include: a solid-type sculptured rotor for higher inertia and greater blow bar backing support; a hydraulic tilting feed plate that safely eliminates bridging; interchangeable, reversible mono-block aprons for wear parts cost control; oversized, 220-millimeter-wide bearings; an automatic apron reset that continually returns to defined settings; and advanced hydraulic controls that allow operators to do more crushing and less maintenance.

For versatile operation in new or existing plants, or within portable or stationary setups, the new Telsmith PA6060 can be mounted on portable plants or placed in a fixed location with truck-dump feed arrangements.

## VIC International Launches Smaller Water Filtration System

Designed for stone fabrication shops, VIC International has introduced a new, compact water filtration system that can handle up to 50 gallons per minute.

Designated as the VIC MicroCLEAN™, the newest water clarification system is a mud dehydrator-clarifier, delivering water that is suitable for use in most shops. Designed with similar technology of its big brother, the VIC SurryCLEAN™ system, the smaller system is ideal for any shop wanting to recycle its water but having tight space requirements.

The VIC MicroCLEAN eliminates bag over-flow problems in bag systems, while eliminating the need for chemicals or flocculents. The nominally priced unit is easy to install and maintain, and helps to meet EPA requirements. Providing water for most shop applications, the system is more effective than cyclone systems and less expensive than filter press systems. ♦

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