

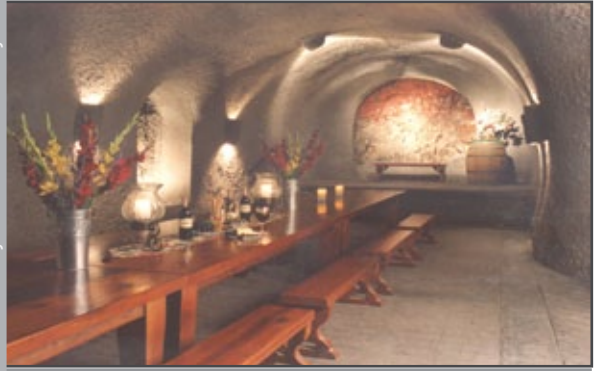


Wine Caves are Back in Style

WINE CAVES, A LONG-ESTABLISHED TRADITION in the Napa Valley, are becoming increasingly popular for the storage and aging of wine throughout California. The natural conditions in a subterranean environment—namely, high humidity, cool temperatures, and low levels of light—are ideal for the aging of wine. Many wine caves also provide a pleasant venue for special events such as weddings, dining, and wine tastings.

The use of caves to store wine can be traced to the Etruscans around 800 BCE. The tradition was continued up to late 400 CE by the Romans, who used the catacombs and tunnels that they excavated throughout Europe to store clay vessels filled with wine. These ancient caverns were later taken over by early vintners in France, who also exploited abandoned “crayeres” or excavations left by the Romans. In the United States, wine caves date to the 1870s when Jacob Schram, a German immigrant and barber, founded Schramsberg Vineyards in the Napa Valley. He employed Chinese laborers who were out of work following the completion of tunnels they had excavated through the Sierra Nevada Mountains for the Union Pacific Transcontinental Railroad. An extensive network of wine caves was also hand dug at Beringer Vineyards by Chinese workers during this period. Beginning around 1970, increased demand and new excavation techniques sparked a renewed interest in wine caves, giving rise to the construction of over a hundred wine caves in Napa and Sonoma counties over the next three decades. The trend has continued, and

Photo courtesy of Kunde Winery



Event area of Kunde Family Estate's wine caves in the Sonoma Valley of California

now wine caves can be found at many wineries throughout California.

Wine caves have several economic advantages over surface warehouses. Wine makers consider humidity of over 75 percent for red wine and over 85 percent for white wine to be optimal; the natural humidity of most wine caves ranges from about 70 to 90 percent. The high humidity also minimizes evaporation leading to a significant reduction in the volume of wine lost, up to 10 percent less, and eliminating the need to periodically top off barrels.

Wine caves are energy-efficient, resulting in long-term savings in energy costs. The temperature of an average wine cave is between 55 and 60 degrees F, which is considered an ideal temperature range for the aging and storage of wines. To achieve this temperature range, most surface warehouses require heating in the winter and air conditioning in the summer. Land use is another factor. In areas where land values are high, subterranean wine caves can free up valuable land for more plantings or other uses. They also usually cost less to construct than a comparable above-ground structure.

The very nature of a wine cave can render its construction challenging. Wine cave design involves the creation of a fairly wide span with

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Earth Systems Chalks One Up at the 2010 I Madonnari Festival

Held at the plaza of the Old Mission in San Luis Obispo, California each September, the I Madonnari Festival is a canvas for the creativity of local artists and young people. This is the third year in a row that Earth Systems has sponsored a square for the festival. Our resident artist, Jen Barnes, created the whimsical design: a friendly yellow Labrador retriever. Lots of people stopped by to watch the Earth Systems' "Soils Lab" take shape.

A tradition that began in Italy in the 1700s, I Madonnari Street Painting Festivals are held worldwide. The San Luis Obispo festival is co-presented by the Children's Creative Project and the American Institute of Architects Central Coast Chapter, and it provides funding for arts education programs and architecture scholarships.



The chalk artists: Jen, Nancy, Sarah, and Meagen

Behind the Scenes of *The Apprentice*



Alex decked out for the boardroom

When Earth Systems Pacific employee Alex Delgado was laid off in February 2010 from his previous job as a construction manager, little did he envision that it would result in an opportunity to star in a popular reality television series. Having accepted temporary employment as a tow-truck driver, Alex and his wife Susan were barely making ends meet when a relative suggested that Alex apply to be a contestant on Donald Trump's *The Apprentice*. For the first time in three years, the producers of the hit show had decided to focus on "regular" people who

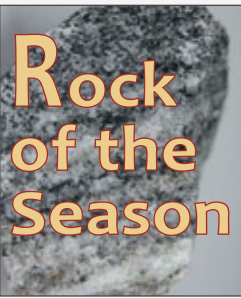
had lost their jobs due to the recession, rather than the celebrities who had dominated the series in recent seasons.

After submitting an on-line application, Alex was surprised to receive a phone call from NBC requesting additional information. He submitted a resume, a photograph, and finally a live video hastily put together with his wife as director/camera operator. A few days later, he found himself in Santa Monica undergoing an interview, a psychiatric examination, a physical examination, and a background check. At the end of May, he was on a plane heading to New York.

The sixteen contestants were housed in a hotel in downtown New York a few blocks from Trump Tower. Shortly following arrival, their cell phones, lap-tops, and even their wallets were confiscated to ensure that no information about the filming would be leaked. Their hotel rooms had no telephones; communication with family members was limited to phone calls supervised by NBC employees.

On the first day of filming, the contestants were picked up by limousine at 6 a.m. and taken to Trump Tower where they met Donald Trump and the NBC production staff. The contestants were divided into two teams, men against women, and given the task of transforming an empty downtown office into a hip and contemporary professional office and boardroom. Alex's team won and survived to move on to the next task, which was to sell ice cream in Union Square. The women's team won this challenge and Alex found himself in the boardroom, along with his team's project manager and another contestant, facing Donald Trump. At the end of the second episode, Alex heard the dreaded words "You're fired."

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Fluorite

It's glassy, translucent, and ranges in color from colorless to a rainbow of purple, blue, green, pink, yellow, orange, and red. The mineral fluorite is formed when hydrothermal veins (hot water heated by magma) or watery molten rock flows through cavities in sedimentary rocks and leaves minerals behind.

Eventually, as the minerals grow they fill up the cracks, forming cube-shaped or eight-sided crystals. Fluorite is formed all over the globe. The largest single crystal of fluorite was found in New Mexico; it weighed almost 18 tons and was 7 feet in diameter.

Fluorite fluoresces blue, violet, green, yellow, and red under ultraviolet light. In fact the word "fluorescent" derives from this quality of the mineral. It is from the Latin verb *fluere*,

meaning "to flow," that fluorite derives its name, due to its low melting point of 2,480 degrees F. Because of these and other properties, fluorite has many uses: for removing impurities from metals; as a flux in steel making; in the manufacture of opalescent glass and enamels; for lapidary and jewelry; for making hydrofluoric acid; for lenses in specialty telescopes, cameras, and microscopes (instead of glass); and for exposure tools in the semiconductor industry. What's more, you probably use it every day; it's the main source of fluoride in toothpaste and drinking water. ■



Stringer Presents Short Course in Wind Turbine Design

Shelton Stringer, president of Earth Systems Global, Inc. and a recognized expert in the design of wind turbine foundations, will present a short course sponsored by the University of Wisconsin, Madison. The course, entitled "Wind Turbine Foundation and Tower System Design," will be taught February 22 and 23, 2011 at the University of California Extension in Santa Clara, California. Topics to be covered include tower selection and design, foundation design, wind power site geotechnical investigation and reporting, and tensionless pier, ground anchor, and micropile design. For more information, check our website at www.earthsystems.com/cm/News/Home.html.

Wine Caves *continued from page 1*

low cover, often in softer rock which is easier to dig but is not necessarily as stable as harder rock. This can result in caving conditions, necessitating on-going stabilization measures as excavation proceeds. Wine caves are generally constructed with two or more portals that provide entry to the cave and to interior tunnels. Most portals that provide entry into the wine caves have a rock/soil overburden depth that is only a fraction of the size of the portal, which also creates a potential for instability. Selecting an appropriate portal site, particularly in areas of complex geology, can therefore be challenging.

Modern wine caves are usually constructed using a tunnel road header that slowly excavates the rock using an array of cutting bits, or an excavator equipped with a milling head attachment. Depending upon the hardness of the rock, progress can vary from 2 to 15 feet per day. Where harder rock is present, drilling and blasting is sometimes necessary. If embedded boulders are present, their removal may be problematic. One method used to facilitate removal is to drill holes into the boulder; the holes are filled with a chemical compound that expands and fractures the boulder, allowing removal by conventional means.

Unless the cave is characterized by conditions that allow the rock to remain in a natural condition, the tunnel portals and interior of the cave are generally supported by shotcrete. Shotcrete is a mixture of pea gravel, sand, and cement that is typically applied over reinforcement consisting of welded

wire fabric. Accelerators are added to enable it to set quickly after application. Soil/rock conditions determine the appropriate thickness of the shotcrete, which can range from about 8 inches to as much as 14 inches. Permanent support for the entrance and tunnel portals is often provided by soil nail and shotcrete walls.

Selection of an appropriate site is a critical element of successful wine cave construction. As the geologic and geotechnical conditions of the site greatly influence the cost and constructability of wine caves,

involvement of a geoprofessional early in the planning process is prudent. Earth Systems' staff of registered geotechnical engineers, engineering geologists, and geophysicists is experienced in investigation and analysis for wine cave sites, and is available to assist in site selection, subsurface exploration, geotechnical engineering, and materials testing and inspection. ■



Earth Systems' Judd King inspecting wine cave construction



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The Kitchen Sink



That's So Funny!

What do you get when you play New Age music backwards? New Age music.

What's the difference between a puppy and a singer/songwriter? Eventually, the puppy stops whining.

Not So Trivial Trivia

Horses, *Equus caballus*, had been extinct in North America since about 7,000 BCE when Columbus re-introduced them to the New World in 1494 on the island of Hispaniola. Horses reached the mainland in 1519 when Cortez landed in Mexico with 17 horses: ten stallions, six mares, and one colt that was born during the voyage.

Words about Words

The 1928 *Webster's New International Dictionary of the English Language* listed over 3,500 new words. Here are a few: aircraft, aspirin, bonehead, cellophane, formica, lipstick, motorize, movie, realtor, robot, spit ball, subatomic, vitamin, wristwatch, and zoom.

The Apprentice continued from page 2

Once contestants were eliminated, they were sequestered in another hotel until the entire series finished filming. As Alex was eliminated in just the second episode, this turned out to be almost an entire month. As confidentiality about the filming was still a priority, the eliminated group had little freedom to explore New York. Group activities were organized to keep them entertained, but they were closely supervised by the NBC staff, and for most, the waiting became very tedious.

When asked if the “reality” show actually depicted real events, Alex confirmed that real conflicts and drama did occur; contestants were told to be themselves and nothing was staged. The contestants, however, were well aware that conflict makes for good television and engaging in dramatic confrontations would translate to more air time. Alex opted for a different approach. Believing that the best way to achieve a good outcome on any project is to work well with your team, he was cooperative, positive, and tried to build consensus rather than incite conflict. He hoped that the value of these qualities would be recognized. Unfortunately, this strategy backfired and most of the scenes that showed camaraderie of the team ended up on the cutting room floor.

In retrospect, Alex feels that if had he been more assertive in spotlighting his own accomplishments and focusing on himself rather than trying to be a good team player he might have been more successful on the show. But he has no regrets, he found the experience very fun and rewarding, and he made many close friends among the other contestants.

In July, Alex joined the Earth Systems' team as a field technician and materials inspector. He enjoys the everyday realities and challenges of the job, and his cooperative positive attitude is considered a real asset. ■



Alex tests the density of soil cement at the Santa Maria Levee Improvement project