The art of L&M DURACRETE
Ram Rojas: An American Fresco

How to avoid coating failures
How it all began: Larry Schwietz
PERK!: Enlightened floor coatings
Welcome to this issue of Concrete News.

A number of you have written over the past year, concerned that L&M had taken you off the mailing list. You missed your regular issues of Concrete News and wanted to tell us. Well, it is not so. The financial challenges of the past three years have made it necessary to downsize our expenditures, but I sense that the industry has found its legs again. Many of you report a slight improvement in the overall construction activity in your area. We see the same. Happily, we are recommitting to a more frequent publication schedule.

So, if you have been a faithful reader of Concrete News over the past ten years or more, then welcome back. If this is your first issue, then welcome for the first time. We invite you, as over 30,000 of your peers do, to read, digest and learn more about concrete in this and every issue of Concrete News.

Most of you know that concrete is the world's commonly used building material. Possibly because it is so versatile. Possibly because it is locally manufactured to reasonably acceptable standards. Possibly because it is one of the most economical and, at the same time, most durable of building materials. This issue of Concrete News celebrates the versatility of concrete, and at the same time recognizes its relative fragility in its exposure to the stresses of project demands and environmental assaults.

To celebrate its versatility and durability, we introduce you to acclaimed artist and sculpturer, Ram Rojas, who uses our cement-based Duracrete repair product to create 21st century frescos, reminiscent of the Renaissance artists of old. We also welcome back Dr. Kim Basham to these pages. His informative article on surface preparation is what most people say is 90% of the work on any coating project. His thorough discussion of the topic will inform you and prepare you better for your projects.

As always, like previous issues of Concrete News additional articles are included here to inform you, inspire and instruct you. Thank you for your continued interest in L&M products. We look forward to serving your concrete needs on a project in your near future.

Best regards,

Greg Schwietz
Proudly serving the construction needs of the Pacific Northwest since 1907, Salmon Bay Sand & Gravel carves out long-lasting relationship with L&M Construction Chemicals

There aren’t too many companies these days that can boast having been in business since 1907. Just the longevity of that claim and its historical background says a lot in terms of who that company is today.

When Samuel Nerdrum Sr. founded the company, the Ballard area of Seattle was still the city of Ballard. Huge cedar trees dotted the skyline and three-masted wooden sailing schooners jammed the harbors of what would eventually become Seattle—-one of the largest and busiest seaports in the world. Nerdrum instinctively knew this place was going to grow and flourish and it was a good time to start a construction materials business in the prosperous Scandinavian logging and fishing community located on the shores of Salmon Bay.

The company’s first major project was to supply construction materials to the history-making Alaska 1907 Yukon Exposition. This was the catalyst that launched the company’s first big growth spurt.

These were times of huge growth and economic optimism. Many businesses were founded and many failed. Salmon Bay S&G flourished due to its focus on the construction industry and its ability to procure and distribute materials on time and on demand.

At that time, there were no Ballard Locks or shipping canals to barge large quantities of aggregates, sand, plaster and stone necessary to support the burgeoning outpost in the northwest. So, enormous amounts of sand and gravel were brought into Salmon Bay at high tide and hand-loaded onto horse-drawn wagons for the arduous trip to the exposition site. The original buildings still stand as an active and historic part of The University of Washington campus, a proud legacy to the hard work of Nerdrum’s sweat, tenacity and dedication to get the job done. Over the next 100+ years, Salmon Bay S&G has survived and evolved into one of the Northwest’s largest suppliers of construction materials. The company specializes in all types of concrete and trowel trade supplies, including waterproofing and restoration products, sealants, grouts, decorative concrete products, concrete repair products, form release agents and a complete line of masonry finishing tools and products.

Today, Salmon Bay S&G is run and managed by CEO, Paul Cochran, son-in-law of Sam Nerdrum Jr., who, now in his 80’s, still works regularly at Salmon Bay S&G. This marks the third generation of this hard-working and dedicated family business. Well known in this region, the Nerdrums are respected for their honesty, integrity and tireless Scandinavian work ethic.

L&M is proud to be part of Salmon Bay’s success over the years...but more proud to give the company products that work and sales and technical representation and delivery that they can trust. L&M's sales manager is Bill Pavitt and his key contact with Salmon Bay S&G is outside sales and product specialist, Valeri Boché. Valeri and Bill work closely to meet the needs of her customer’s jobs. Supplying SBS&G with well-respected L&M products that fit the job and trades.

Valeri has been in the Ready-Mix and concrete construction for 25 years. When this author asked if she had to struggle to penetrate the mostly male dominated concrete construction world, Boché said, “No, not really. It took me about 4 or 5 years to get confident in the construction supplier business and work in this industry. In the early years though, I was tested every day in many different ways. I just had to roll with the punches and deliver professionally and treat everyone like I wanted to be treated. I love working with people on all levels. I think I have gained and earned that respect in order to be effective. Both Salmon Bay and L&M are great to do business with.”

Valeri continued, “Bill Pavitt and I have a great working relationship. Bill and L&M have always been there for me and for Salmon Bay S&G. He also has a good relationship with many of the architects and engineers in my area. Bill earned a lot of respect in the construction industry and is quick to solve problems and distribution issues. He and I actually helped create the L&M DURACRETE product for a unique application project up here. Bill held everyone’s hand along the way and, through his tenacity, eventually, the DURACRETE product came to be.

I absolutely LOVE DURACRETE. The product is one of my favorite products to sell. I have found many contractor venues for DURACRETE overlays in the decorative area and other unique applications. I also like the way Bill works with all of us here at Salmon Bay in terms of product training and demonstrations. L&M has earned a lot of respect over the years by being a company that offers a lot of training and product knowledge sessions, it's helped me personally to better represent their products to my customers. I also like the EMERYTOP product and I feel there's a big market for it to be successful.”

To reach Salmon Bay S&G, visit their website at www.sbsg.com or call 1-800-774-8999. Their direct line is 206-784-1234. To reach Valeri Boché, call her direct at 206-730-2941.
When Colorado based FGS Installer Shawn Weaver from Concrete Floor Systems met with Architect Rebecca Greek, from OZ Architecture, Inc. and Tom Blahak, project manager from Manhattan Middle School, to explain the school's proposed floor rehab, Shawn knew this installation would be tough. First, there was a large area of 40-year-old concrete with asbestos-backed tile that had to be professionally abated. Then, there was a layer of four decade old mastic that had discolored deeply into the underlying concrete. After repeated grindings, the checkerboard mastic patterns remained. The remainder of the 23,000 sq. ft. floor was recently poured concrete. It also had to be prepped for the FGS PermaShine installation. Weaver went to work on a long and laborious effort to rough grind off the tile patterns and prep the old floor for the higher # grindings.

Blahak commented, “Shawn and crew worked until they got it right. There were some tense moments, but Shawn never gave up hope that this floor was going to be fabulous. They made everything right. We are all very pleased with the final outcome. We love the multi-colored concrete stain selected by our architect. It looks better and better every day. We are cleaning the floor regularly, (with FGS Conditioner) like Shawn instructed, and we can see that the appearance just improves each time. The school board feels that our FGS polished floor will save the district money in long term maintenance costs and look good besides.”
New advancements in Durable And Beautiful Seamless Polyaspartic Floor Systems. Here's How It Works:

L&M’s exciting PERK! concrete floors with confetti is the perfect way to add color and 3-dimensional drama to satisfy floor owners, designers and spec writers. In addition, contractors will find this product to be a significant new addition to their core business. PERK!, a decorative, simulated granite/terrazzo seamless flooring finish system, can be added to any bare concrete floor. Floor owners will love the many stunning colors and textures that can be theirs with a PERK Floor.

PERK!, the enlightened polyaspartic resin floor system, has 3 times the adhesion and abrasion resistance of standard epoxy floors. In addition, the infused anti-microbial surface is USDA and FDA approved for food service installations. Installers will like the fact that PERK can be applied quickly, with as little as an hour between coats, saving a significant amount of labor during the installation.

How does it work?

PERK is an advanced two-component polyaspartic coating. Historically, polyaspartic resin coatings were used to prevent corrosion on steel structures, such as bridges. Over time, the polyaspartic technology has evolved into the concrete coating industry spanning a wide range of applications, including pharmaceutical/health facilities, supermarkets, food processing plants, restaurants, stadiums, public facilities, industrial plants, garage floors, logos, countertops, and countless other applications. The advantages that polyaspartic concrete floors have over other coatings are many, including durability, time savings, reduced life cycle costs, ease of maintenance, versatility, aesthetics and environmental friendliness, just to name a few. Chemically speaking, the effects of polyaspartic resins are 3 times harder than epoxy and have abrasion resistance comparable to MMA (without the unbearable and unmistakable MMA smell). PERK! is ideally suited for manufacturing and assembly areas, forklift aisles and loading docks.

PERK floors can withstand constant abuse of heavy loads, impact, forklift traffic and exposure to incidental exposure to acids, caustics and other chemicals. It is also UV stable, so it will never “amber.” PERK! possesses high flexibility, giving it the ability to withstand wide temperature fluctuations after installation. So it is very suitable for food preparation areas where hot water or steam cleaning procedures are used.

Quick and easy installation...

PERK installs quickly so that downtime for most facilities becomes a minimized concern and expense. This is due to the unique curing properties of PERK. Contractors can install a multi-coat system in as little as 3-4 hours. In less than 12 hours the floor can be ready for foot traffic and after 24 hours it’s ready to accept vehicle traffic. Floor owners like this fast turn-around system which eliminates excessive downtime. PERK can also be placed in temperatures below freezing, making them ideal for walk-in coolers and freezers. No shutdown of freezer systems are necessary...saving both time and money.

PERK was formulated specifically for facilities in need of concrete floors that are attractive, clean, high-traction and meet local, state, and federal health department regulations and standards. PERK is all of these, and then some!

Cost, maintenance, and long-term service life

In most cases, material cost per square foot of PERK! matches the cost of a typical epoxy system. However, the true cost of any product can only be determined by its performance and durability over time. PERK! Polyaspartic eliminates the need for many costly repairs. It does not ravel, chalk, disintegrate or become brittle over time. Cleaning costs are dramatically reduced. Floors never need to be waxed or stripped. PERK is known for its long, durable service life which results in minimal life cycle upkeep costs.

Installer-contractors love the short learning curve of the simple installation steps. L&M has designed PERK to bridge the gap between high performance and user-friendliness while retaining all the same benefits of advanced polyaspartic technology. PERK! also offers a line of colors, flakes, quartz and metallic additives that can be used to customize a floor allowing you to have one of the most durable, long lasting, economical and best looking floor coatings around. PERK! will satisfy your owner, specification writer and contractor.

It’s easy to be a hero. Installers can add value and beauty to plain concrete floors in just one day.

Want to know more about how PERK! compares to other concrete floor coatings? See the side-by-side comparison chart at lmcc.com/perk

www.lmcc.com

Watch the Perk! Installation Video

www.youtube.com/watch?v=nh3wwrzWPjY
L&M Founder, Larry E. Schwietz Reminisces About 51 Years Of Inventing New Products.

As part of L&M’s 51st Anniversary Year, it is fitting that we pay tribute to the guy who made this unique company happen. L&M Construction Chemicals, Inc. was founded by Lawrence E. Schwietz in Omaha, Nebraska in 1961. Larry had the courage, tenacity and vision to see a need for better products for a growing concrete construction industry. The company was originally based in his home in Omaha and grew rapidly.

In a recent interview with this author, Schwietz said, “Putting food on my table for eight hungry children stared me in the face every day I woke up. This, along with a love of meeting people and solving problems for friends in the construction industry, gave me the drive and impetus to keep the company vibrant and growing in those early years. It was scary, yet an exciting time. A year later in 1962, I moved the company to the basement of a friend's tire warehouse. Fifty years later, after opening numerous packaging plants and warehouses, along with opening an international sales and distribution system, L&M continues to thrive.”

This article focuses on the reason why and how L&M grew from its humble beginnings to a major player in the concrete construction industry. In this article we will feature and examine Schwietz's penchant for being in the right places at the right times...his brilliant chemistry-formulating background and his strong people skills and salesmanship for inventing and selling products for the concrete construction industry.

The following are questions by this author...and answers by Schwietz to give our readers a rare insight into this interesting and remarkable man. Forget your preconceived notions from past sci-fi movies of a lab chemist in a white jacket with bubbling beakers behind him in an evil lab.

Schwietz is, and always has been, an incredibly focused and gifted man with a vision. His vision is to create a better concrete product...for a better world.

Question - Jim Vlcek (JV): Describe your education and first employment out of school before L&M was founded.

Answer - Larry Schwietz (LS): “I was a 1949 graduate of St. John's University in Collegeville, Minnesota with a BS in Science and Chemistry. I worked for STA-VIS Oil Co. as a lubrication chemist in St. Paul, Minnesota from 1950-1953. I worked for the Air Force as a fuels & lubricants inspector. I also set up QC programs at a number of refineries in the Midwest, purchasing aviation gasoline, jet fuels and lubricants from 1953-1956.

In 1957, I accepted a position as chief chemist at McCollister Grease and Oil Company in Omaha. The company formulated and sold lubricants for the automobile and farm industry. During those early years in Omaha, I developed a close relationship with the owner of Allied Oil Company. When I started L&M in 1961, I recruited Allied Oil as L&M's first distributor.

I was very fortunate to have carved-out good and lasting relationships from that early beginning. A lot of people believed in me and trusted that I would solve their problems. There were days that I was more of a salesman than a chemist, and then there were days I was busy inventing new products.”

“Over the years, L&M also has developed a group of nearly 600 certified installers for the densifying, hardening, installation of color and other special floor and repair products. Top quality products installed by trained and competent contractors makes a big difference for many projects.”
“I was very fortunate to have carved-out good and lasting relationships from that early beginning. A lot of people believed in me and trusted that I would solve their problems.”

JV: What was the economic climate back in the days leading up to founding L&M in 1961?

LS: “It was a growing construction economy. The post-war boom continued through the 60’s and there was a lot of opportunity for concrete specific construction products that would do the job effectively and save time and money for the contractors.

JV: What was the typical method you used to formulate and invent a new product?

LS: “I looked for contractors that had a need. Either they weren’t happy with the products they were currently using, or they required something more specific to their needs due to a unique construction method they were using. A lot of my work was based on a problem/solution kind of thinking. I would then formulate something with a lot of trial and error in testing the new product until I knew it would work...and work better than what they had been using.

For instance, I invented a release product that would better release the iron ore from large barges coming across the Great Lakes from the mines to unload at the processing plants. When they tried to dump that ore, tons of it would stick to the sides and bottoms of the barges.

The processing company was denting and beating the pulp out of those huge steel barges in an effort to get the ore to release. They absolutely loved my product. It saved them a lot of money in labor and they didn't have to damage those ore barges anymore.

JV: What was the very first product to come off your inventor's table?

LS: “That would be Debond Form Release Agent. I could see that the contractors needed a better form release product. They weren't happy with using recycled oil or diesel fuel. They needed a product that would release, eliminate or lessen bug holes, keep the forms clean and release properly every time.

Contractors spend a lot of money on maintaining their forms. They also spend a lot of labor money having their crews clean the forms after each job. I invented Debond to release forms properly, save on form cleaning costs, and save them money...simply stated, L&M always finds a better product for the job.”

JV: Where was your concrete lab located back in the early days:

LS: “In those early days, I was constantly in the proverbial 'dog house' with my wife, Marilyn. I did everything out of our home until we had a commercial lab.

The house was a mess...but I couldn't afford a commercial space. Sometimes her kitchen was full of Portland and materials dust and her oven and counter tops were a mess. That...and having to deal with eight hungry little children, who had to eat in that environment, tested her patience with me I guess. She was a saint through it all. She put up with my craziness and still loved me.”

JV: What are some of the other critical things associated with running an in-house concrete lab?

LS: “The testing of raw materials when delivered to our batch plants. Every load of materials is tested to our rigid specifications. If the raw materials don't measure up to our standards, they are rejected immediately.

In a scientific environment, everything must pass our testing before it's unloaded or shipped out. Our products and our reputation are at stake.”

JV: Does L&M ever use outside labs for any reason?

LS: “Yes. L&M uses outside labs on a selective basis for testing certain performance properties of our products. Other quality-minded manufacturers use them as well. Some of the testing machines they use are very specialized and measure performance specs in accordance to ASTM specifications and ACI Guides.

JV: How does the lab and products you invent dovetail into the overall success of the L&M brand of products?

LS: “The sales and marketing side of the company is as important as the product. My son, Greg, is president of L&M and also heads up the sales and marketing division to launch new products.

Our product line is marketed through catalogs and sell-sheets which introduce and explain existing products to the distributors, architects, engineers and specifiers. Getting this information out to the industry is critical in getting the L&M product solutions first and foremost in the minds of these professionals.

Our regional sales and technical managers represent the product line to distributors and other customers. Over the years, L&M also has developed a group of nearly 600 certified installers for the densifying, hardening, installation of color and other special floor and repair products. Top quality products installed by trained and competent contractors makes a big difference for many projects.”

JV: In terms of new product development, what can the industry expect to see from L&M in the future?

LS: “As long as God keeps me alive, I plan to keep working long days solving problems and developing new products to help people with better concrete. I plan to keep my promises with our customers and distributors of providing top quality products to make them successful. At L&M, we’ve always given a lot more than we've taken. We're known as the company that listens, solves problems and holds our customer's hand along the way.”
Some years ago, regional sales manager Mike Tucker from our Texas region was asked to consult on a concrete patch and repair spec for a nine-story condo renovation project in North Beach, Corpus Christi, TX. An initial survey of the project identified severely damaged walkway decks and concrete post and beam supports surrounding the majority of the aging structure. The humid salt water air had taken its toll, and the result was spalling and surface deterioration over much of the exposed concrete structure. The building owner and architect knew they had to effectively repair this damage before going on with the remainder of the re-hab, renovation and remodeling (both inside and out). A local area contractor was selected to do the concrete repair. Duracrete was selected as the primary repair material.

This major project was a collaboration with the home owners association, the L&M distributor-supplier, general contractor, architect and the L&M sales manager. Nearly a decade later, this repair project still remains vibrant and solid. This extremely versatile product “saved the day” said Mike Tucker, the sales manager from L&M. He received on-the-job testimonials from building owners and contractors alike. Tucker said, “Products like Duracrete give me the confidence to help distributors and contractors pick a product that WORKS. I love it when everyone’s happy.”

Tucker continued, “The climate and ocean views at the condo are beautiful and inviting, painting a compelling reason for renters to live in the area. But the relentless winds and salt water can be damaging to exposed concrete. This large project remains a testament to DURACRETE’s effective and long-lasting durability to withstand the elements.”

The versatile working characteristics of Duracrete made for a simple one-product repair procedure. Single component Duracrete is easily mixed with water, varying the water content to adjust for the conditions of the repair. On this project it was used in both thick and feather-edge, horizontal and vertical voids --- even overhead. The long lasting advanced acrylic polymers that are an important ingredient insure a tenacious and long term bond.

After installation, the DURACRETE repairs and remaining exposed concrete surfaces were treated with invisible, water-repellent, AQUAPEL.

AQUAPEL protects concrete from moisture and damaging salt attacks. “Protecting the rehab project with AQUAPEL was a great one-two punch to ward off future damage and deterioration. After eight years this DURACRETE job looks as good as day one.”
Questions: What is a fresco? Why are there so few in America? How did one come to be in Wittenberg, Wisconsin? How did the L&M DURACRETE product play an active role in revitalizing a struggling, rural village? The following answers to these questions are both inspiring and important to rural America demonstrating the strength, artistic spirit and perseverance of its people.

First of all, a fresco (fres-co) is a painting done rapidly in watercolor on wet plaster on a wall or ceiling, so that the colors penetrate the plaster and become fixed as it dries. Its origin began in the late 16th century: the word literally means, ‘cool, fresh’.

What does DURACRETE have to do with fresco art? Most of the world’s fresco art has been located in warmer or temperate-mild climates where there are no significant freeze/thaw issues. Fact is that Wittenberg, Wisconsin has some pretty harsh winters.

For Rojas to use his favorite art medium, he had to find a cement based mortar that not only had the texture, strength and vertical holding tenacity to be able to adhere to masonry, concrete and mortar, it had to be highly resistant to a freeze/thaw environment. Voila! Enter DURACRETE.

The next step for Rojas was experiment with the selected materials to create the fresco texture and the 3-dimensional effect of this ancient medium. He had to separate the painted mediums from the building patterns. This was not an easy task. As an artistically-driven risk taker, Rojas stepped out of the box of a traditional artist’s materials palette to find exactly the right recipe, combining pure color pigments with the high strength, feather-edge finishing properties of Duracete.

With the help of the technical staff at L&M and regional manager, Craig Jared, Rojas experimented to discover a new use for DURACRETE to create a fresco. What at first seemed insurmountable became a creative stepping stone. Through the use of DURACRETE, Rojas was able to combine Old World techniques of fresco painting with modern materials by adding pigments directly to the cement compound, then molding it and shaping it as it hardened.

Ram Rojas

A fresco in America happened because of a uniquely multi-talented artist moving to Wittenberg, Wisconsin. Ram Rojas has traveled the world doing his art. He was born in Caracas, Venezuela, studied in Europe, India, South America, New York, Pennsylvania and California. He now makes his home in Sturgeon Bay, Wisconsin...a town of 1000 residents nestled in the beautiful countryside of rural northeastern Wisconsin. Ram said, “I like small towns, the closeness of a small community where you know everybody and everybody knows you.”

And so, the story begins.
RAM ROJAS:
AN AMERICAN FRESCO

Ram used DURACRETE compound with just the right amounts of color pigments, applied with a palette knife.

He had to move quickly for the fresco effect to be kept fluent and for the surfaces to be bonded permanently.

The 2 ½ story wall showing the seven point star and the seven churches, the cherubs and the angel. This wall commemorates the multi-denominational scope of Wittenberg’s original churches when the city was formed.

The 2 ½ story fresco’d “Angel” stands as a sentinel over the hills of Wittenberg, Wisconsin.

Three dimensional effects of fresco can be seen here. Note the deep, textured relief shown in this beautiful use of DURACRETE as a fresco medium.
L&M DURACRETE:

This unique product has many applications. A single component, polymer-reinforced, high-strength, cement-based patching and repair mortar. Duracrete has been designed to repair, slope or level structurally sound, concrete surfaces that are pitted, worn, scaled or spalled. In addition, this product can be sculpted to repair concrete members and deep voids. This patching and repair mortar is effective in both interior and exterior applications.

When properly applied, Duracrete will produce a strong, durable, well-bonded surface of desired texture.

More about Duracrete at lmcc.com
Coating failures are typically caused by inadequate surface preparation. For a coating to bond properly, the concrete surface must be sound, clean, free from surface defects and dry. The surface should also be properly roughened to establish a good mechanical bond. Failure to properly prepare the surface typically results in adhesion failures or the coating separating from the concrete wasting both time and money.

Before applying a decorative or protective coating to a vertical or horizontal concrete surface, prepare the surface by cleaning and roughening, repairing defects, inspecting and testing the surface for soundness and cleanliness. Because surface preparation requirements vary from one job to the next and for different types of coatings, be sure to read and follow the recommendations provided by the coating manufacturer. Failure to follow the manufacturer's recommendations may void the manufacturer's warranty but, more importantly, may cause the coating to fail.

Perform surface survey

Before starting the job, examine and test the surface to be prepared for the presence of debris, dust, dirt, oil, grease, laitance, mortar splatter, efflorescence, curing agents, sealers and other contaminants. Any of these contaminants will prevent the coating from properly bonding to the concrete.

Test concrete for oil, grease, curing agents and sealers by performing a water absorption test. Place a few drops of water on the concrete. If the water beads up, then a surface contaminant exists. If the water absorption test is inclusive, place a few drops of diluted muriatic acid on the surface. If there is no visible reaction (foaming), then a surface contaminant exists. Next, try to determine the depth of the contamination by progressively sanding or grinding the surface until the surface freely absorbs water or a reaction occurs with drops of acid. If a surface contaminant exists, it must be completely removed either chemically or mechanically before applying a coating.

For concrete floors, test the surface for laitance by scraping the surface with a knife. Laitance is a weak layer of cement and fines brought to the surface by bleedwater. If a powdery material can be scraped from the surface, excessive laitance is present and a coating won't bond properly.

If you anticipate using water to clean a floor surface, conduct a moisture test of the existing concrete to establish a baseline.
floor-moisture condition. Several common moisture tests are described later in this article.

If efflorescence exists on the surface, perform a moisture investigation because efflorescence may be evidence of a moisture problem that can cause future coating failures. Efflorescence is a deposit of salts, usually white, that forms on the surface of concrete related by moisture movements through the concrete. If efflorescence or a moisture problem exists, it must be addressed before applying a coating.

Know surface-condition requirements

Know and understand the project specifications for surface preparation and required roughness. Roughness is sometimes called anchor profile and is achieved by mechanically abrading or acid etching the concrete surface. Project specifications should specify how rough the surface must be before a coating can be applied. Specifications also may address surface uniformity, strength and dryness.

If the specifications give a minimum surface strength to ensure concrete soundness, use the field test procedure outlined in ASTM C1583-04e1. This test requires epoxying a 2-inch diameter steel or aluminum disk to the concrete and measuring the tensile force needed to pull the disk from the surface. The test also can be used to evaluate the need for and adequacy of surface preparation and relative differences in surface strength over the area to be coated. Typically, specifications require a minimum surface strength of 175 psi (Ref. 1) to 300 psi (Ref. 2). Expect variable strengths from this test method.

Read and understand the surface preparation directions and recommendations provided by the coating manufacturer. If the manufacturer’s recommendations aren’t compatible with the project specifications, discuss the discrepancies at the preconstruction meeting.

Schedule a preconstruction meeting

Meet with the project engineer, architect and owner before the job begins to discuss equipment selection, surface preparation and cleaning techniques, surface profile and coating requirements, and time schedules. Submit a work plan to the engineer for approval. Also, establish the means and frequency of testing and acceptable test results for surface soundness, cleanliness and roughness. If the preparation procedure requires water for cleaning, discuss the effect of drying time on the project schedule. Establish the means and frequency of testing for moisture content and values for acceptable test results.

For interior work, establish acceptable levels of noise, dust and fumes. For elevated slabs, ask about weight and vibration restrictions that might affect the choice of surface-preparation equipment or the work plan. Present a plan for wastewater and debris removal.

Clean the surface

Remove all loose dust, dirt and other debris by sweeping, vacuuming, air blasting or water hosing. When sweeping, use a clean stiff-bristled industrial broom. If vacuum cleaning, use a heavy-duty industrial vacuum that will remove all dust from the surface. For air blasting, use a compressed air stream at 80 to 100 psi, delivered through a nozzle held about 2-ft from the surface. Be sure the air stream is free of oil. If water cleaning, use clean, potable water at a pressure high enough to remove dust, dirt and water-soluble surface contaminants. It may also be necessary to hand or power-scrub the surface with a stiff-bristled brush. These methods are not intended to alter the surface profile, only to clean the surface.

Scrape or steam off heavy deposits of oil, grease or other loosely attached contaminants. Then use detergent or a non-solvent emulsifier and a stiff-bristled brush to remove any remaining contaminants. Don’t use solvents to remove oil or grease because they can spread contaminants over a larger area or wash them deeper into the concrete. A good cleaning solution is trisodium phosphate mixed with hot water. Use at least 4 ounces of trisodium phosphate per gallon of water. To remove animal fat, use a 10% solution of caustic soda (sodium hydroxide). Be sure to flush treated areas with plenty of fresh water until all residue of the cleaning solution is removed and the pH of the rinse water meets acceptable levels as recommended by the coating manufacturer.

Clean and roughen the surface

When removing elastomeric coatings, use special coating-
removal machines designed to shave off these thick, flexible materials, and then continue with standard surface-preparation techniques.

Remove thick overlays of dirt, laitance, efflorescence, mortar splatters, incompatible curing compounds and form-release agents, old coatings and unsound concrete by mechanically abrading the concrete surface. Abrading the concrete surface will alter the surface profile of the concrete, creating a roughened and textured surface for better coating adhesion.

Use scarifiers to remove high spots or grinders to reduce or remove slight surface irregularities. Be sure to thoroughly remove all debris and dust.

For horizontal surfaces, use shotblasting to clean and roughen in one step. Light shotblasting creates a 4 to 10-mil profile height or up to a Concrete Surface Profile (CPS) 3; medium to heavy shotblasting can create profile heights from about 40 mils to over 1/8-inch or from CPS 3 to CPS 8 (Ref. 3). Be sure to compare the coating thickness to the surface profile height. If a thin-film coating (7 to 10-mils) is applied over a 20-mil profile, the coated surface will be rough and uneven. It may be necessary to apply one or more primer coats to smooth the surface. Be sure to review the coating manufacturer’s recommendations to establish the required surface profile.

Use acid etching only for areas where no alternative cleaning methods are possible. Etch with a 10-90 to 20-80 dilution ratio of commercial-grade hydrochloric (muriatic) acid in water, applied at a rate of 1 quart per square yard. If chlorides are not allowed, use solutions of citric acid (20%) or phosphoric acid (15%). Citric and phosphoric acids do not contain chlorides and will not corrode embedded reinforcing steel. Apply the acid solution using a low-pressure sprayer or a sprinkling can. After the foaming action subsides, flush the area with water and scrub the surface with a stiff-bristle brush. An area not showing a foaming action indicates a contaminant is blocking the acid from the concrete. Etching should create a profile similar to the texture of fine sandpaper or CSP 1 to CSP 3.

**Repair surface defects**

Chip, grind or bushhammer fins, mortar splatters or other protrusions from concrete wall surfaces. Remove all projections greater than 1/16 inch.

Remove unsound concrete and clean and fill holes, spalls, cracks, honeycombed areas and other surface defects with a commercial Portland-cement-based grout, epoxy compound or other proprietary patching material. Repair all defects wider than about 1/8-inch. When chipping along edges of repair areas, don’t create a featheredge. Chip the edges so they are perpendicular to the surface or preferably sawcut the edges, forming a slight undercut.

Obtain specific recommendations from the repair-material and coating manufacturers about material compatibility and surface-preparation procedures. Don’t coat patches before they have cured unless the manufacturer states otherwise.

Inspect and test the surface

Test for dust by wiping the surface with a dark cloth. If a powder is on the cloth, then the area is too dusty and must be re-cleaned. Sprinkle drops of water on the dried surface. If the surface is free of oil and dust, the water will spread out immediately instead of forming droplets. If droplets form, then the surface is too oily or dusty.

If acid or other chemical solutions were used to clean the surface, use pH paper to determine the acidity at the concrete surface. Repeat the flushing operation if the pH level is less than 4.

**Test for moisture using one or more of the following methods:**

1. Tape tightly to the concrete surface an 18 x18-inch sheet of clear polyethylene film, approximately 4 mils thick, and allow it to remain in place for at least 16 hours. This is a standard test described in ASTM D 4263-83. If moisture collects under the plastic, most likely the moisture content of the concrete is too high and the coating will fail.

2. To measure the rate of moisture-vapor emission, place a measured amount of anhydrous calcium chloride in a dish inside a transparent plastic cover that’s sealed to the floor described in ASTM F1869-11. After 60 to 72 hours, weigh the calcium chloride to determine the amount of water absorbed. The moisture-vapor emission rate is calculated in pounds of water per 1,000 square feet per 24-hour period. Compare the measured rate of moisture-vapor emission to acceptable values provided by the coating manufacturer.

![Grinders are designed for concrete prep and coatings removal and can remove epoxies and mastics when utilizing appropriate grinding disk and wheels. (Photo provided by Blastrac, NA)](image-url)
3. Use a surface moisture meter and compare the measured value to the coating manufacturer's recommendations. Prepare a trial area to check the adequacy of the surface preparation. Apply the coating to a typical prepared area under the same conditions of surface moisture and ambient temperature that will exist during the actual coating application. After the coating has cured, check the bond. For recommended test methods and acceptable test values, ask the coating manufacturer. Also use test patches to evaluate different surface-preparation methods to determine what method works best.

**Standards and References**

**ASTM Standards**

The following ASTM standards can serve as useful guidelines when you are preparing concrete surfaces. To obtain copies of these standards, visit the ASTM Web site www.astm.org.

- Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride (ASTM F1869-11)
- Standard Practice for Surface Cleaning Concrete for Coating (D 4258-05)
- Standard Practice for Abrading Concrete (D 4259-88)
- Standard Practice for Liquid and Gelled Acid Etching of Concrete (D 4260-05)
- Test Method for pH of Chemically Cleaned or Etched Concrete Surfaces (D 4262-05)
- Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method (D 4263-83(2005))
- Test Method for Indicating Oil or Water in Compressed Air (D 4285-06)
- Standard Test Method for Tensile Strength of Concrete Surfaces and the Bond Strength or Tensile Strength of Concrete Repair and Overlay Materials by Direct Tension - Pull-off Method (ASTM C1583-04e1)

**References**

1. ACI 503R-93, Use of Epoxy Compounds with Concrete, Reapproved 1998, American Concrete Institute, www.concrete.org
Win an Apple iPad and be one of the cool kids. Just when you didn’t think we had any new tricks up our sleeve...

There are two hidden pictures in the photo below. One is a 4-ounce version of an L&M Duracrete bag. (Page 8) That one should be pretty easy. If you’re feeling lucky, Kim Basham (Page 15) is tucked away here, too.

Here’s the deal: Give us the coordinates of the Duracrete bag to be entered into the random drawing of correct answers. If the winner adds Kim Basham’s coordinates, we’ll add a bag or two of Duragrout to the grand prize.

Put your answer on the reply card inside and send it in for your chance to win a brand new Apple iPad. Random drawing of correct answers to be held on October 1, 2012. (If you don’t win the iPad, you might be one of two lucky Omaha Steaks winners!)

Of course, there are the usual disclaimers like employees of L&M Construction Chemicals can’t enter and that prizes may be substituted. Your mileage may vary and some settling may occur during shipment. Good luck!

Win!

You could win a brand new Apple® iPad®