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## Formulating Chemical Cleaning Systems For Historic Structures



MONTECELLO

Manufacturers of restoration cleaning products as well as restoration contractors have had to deal with much misunderstanding over the design and safety of chemical cleaning products for masonry. Even with the array of sophisticated building cleaning products on the market today, we are unfortunately still dealing with the unsavory reputation that the building cleaning industry earned during the 1950's and 1960's when building exteriors were cleaned using raw hydrofluoric acid and the strong alkalis that were, and still are, used as floor strippers. Many beautiful building exteriors

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## THE ROSENDALE REVIVAL: NATURAL CEMENT, AN AMERICAN TRADITION, MAKES A COMEBACK

*By Michael P. Edison*



The Statue of Liberty stands atop Fort Wood, a War of 1812-era fort. The statue's pedestal was built with natural cement from Rosendale, New York.

The history of natural cement use in America is a reflection of American history in the 19<sup>th</sup> century. During the War of 1812, in which the British sought to overturn the results of the American Revolution and reoccupy their former colonies, the new Capitol city of Washington, DC was captured and the White House was burned. The American military, determined to prevent further such attacks by foreign troops on American soil, designed and built a system of coastal fortifications consisting of more than 50 heavy masonry forts along the east, Gulf

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ICRI-BWC/ACI  
JOINT MEETING

THE ICRI-BWC/ACI JOINT DINNER  
MEETING IS ON  
FEBRUARY 11, 2010!

THE TOPIC IS:

**"INSPECTION, MONITORING AND  
REPAIR TECHNIQUES OF POST-  
TENSIONING TENDONS: MULTI-  
STRAND, MONO-STRAND AND  
STAY CABLES"**

**SEE PAGE 3 FOR MORE  
INFORMATION**

**OR CHECK OUT OUR WEBSITE**

**[WWW.ICRIBWCHAPTER.ORG](http://WWW.ICRIBWCHAPTER.ORG)**

## COLUMNS

Safety Column

Fueling Stations on Small Scale Jobsites

Flooring Column

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Legal Column

Are You in Compliance with Virginia's State  
Contractor License Requirements?

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## EVENTS

## WORLD OF CONCRETE

*for more information see page 8*



# ICRI MISSION STATEMENT

*The mission of the International Concrete Repair Institute is to be a leading resource for education and information to improve the quality of repair, restoration, and protection of concrete and other structures in accordance with consensus criteria.*

*ICRI is an organization composed of Engineers, Consultants, Contractors, Manufacturers and other Material Suppliers, Property Managers and Owners all working together for the betterment of the industry and of all involved. Providing an open forum to speak about our work, new technologies and methods, exchange ideas.*

*Creating and following standards to produce the best results for all involved.*

## PRESIDENT'S MESSAGE



Happy New Year to all of our Baltimore-Washington DC Chapter ICRI members! I would like to start by saying it is an honor to serve as your chapter president in 2010 and I look forward to a very successful year. I am enthusiastic to continue the great progress our board and chapter members

have achieved over the past two decades. A round of applause is owed to our Past President, Neil Savitch, who grew membership and implemented a number of new and successful programs for our chapter over the past year. I would also like to welcome our new board members Dan Anagnos, Marty Fisher, Brian Greene and Mike Miller. I believe they will bring a lot of knowledge and enthusiasm to the board and help our chapter grow.

The new Board of Directors had their first meeting on January 7<sup>th</sup> and it was very successful. We worked through an extensive agenda and developed and outlined our chapter goals and plans for the new year.

Several of the major goals include:

- Grow our chapter membership by 15%
- Increase attendance at our dinner meetings and seminars
- Complete the chapter incorporation process mandated by ICRI National
- Regain chapter of the year honors for 2010 at the Spring ICRI National Convention
- Complete our chapter history documentation and develop the chapter history webpage

We have expanded our chapter sponsorship program this year in hopes of raising chapter revenues. Details of the sponsorship program are included in this issue of the Aggregate and our chapter website. The increase in revenue will be used to accomplish a number of things including continuation of the chapter

scholarship program which awards scholarships for continuing education, offer better technical and educational programs to the chapter members, host a social event to facilitate networking between chapter members (and have fun!) and to help fund chapter sponsored community outreach programs. I would like to thank all the material suppliers, contractors and engineers that have committed to or plan to be a chapter sponsor this year.

As our new year begins, I encourage our members to get involved by volunteering to serve on the chapter's technical committees or to help out at community outreach projects and other chapter sponsored events. We want your ideas and expertise to make this chapter excel! Please feel free to contact me or any other board member if you are interested in volunteering. A list of the technical committees and chairpersons is located on the chapter website.

The board of directors sent out surveys to our chapter members last fall to get your input on what you want to see for technical programs and a social event in 2010. We are pleased to announce that the February 11<sup>th</sup> presentation will be on Post-Tensioned Concrete Inspections and Repairs, the most requested program based on the survey results. We thank you for your input; the members are the heart of the chapter and with your help and input this chapter will continue to thrive. The 2010 chapter planning calendar is included in this issue of the Aggregate. Please make note of the dates for our chapter events this year as we hope to increase attendance. As always, chapter information, including all upcoming events, forms and chapter news can be found on the chapter website, [www.icribwchapter.org](http://www.icribwchapter.org).

Thank you and I look forward to serving the chapter this year.

*Matt Nachman*

*Tadher-Cohen-Edelson Associates, Inc.*



# THE BALTIMORE/WASHINGTON, DC CHAPTER OF ICRI

Thursday, February 11, 2010

Holiday Inn College Park

1000 Baltimore Blvd.

College Park, MD

301-345-6700

Exit 25 (Baltimore Blvd. North US 1) off Beltway, Hotel  
on Left

Advance Reservations by 02-01-10: \$40

After 02-01-10: \$50

4:00	Board Meeting
5:30	Social Hour
6:30	Dinner & Presentation

## OUR FEATURED SPEAKERS

### Andrew Micklus and Dominique Deschamps

*Freyssinet*

**Andrew Micklus** has 25 years experience with design & construction of a wide variety of prestressed structures, segmental bridges, stay cables, heavy lifting, structural repair/strengthening. He is the COO of Freyssinet since April 2000 and holds a BSCE from the University of MD. He is a registered PE in CA, FL and OH. He is a member of ASCE, ICRI, PTI, ASBE. And is on the Board of Directors of PTI & ASBI. He serves on a number of Technical Committees including the PTI Stay Cable Committee, ASCE Committee on Cable Supported Bridges, PTI's Grouting, Bonded Tendon and Barrier Cable Committees, ASBI Grouting Committee

**Dominique Deschamps** is a Technical Manager of Freyssinet, Inc. He holds a Civil Engineer Master from Ecole Centrale de Lyon, France. He followed with a CHEBAP specialization from CHEC Institute in Paris, France, in Reinforced and Prestressed Concrete. Dominique is a PTI member at DC-80 repair committee. He has more than 20 years experience in Design, Technical Assistance on site and has an extensive knowledge of overseas codes and norms as he has worked in many countries such as: France (of course), Mexico, Portugal, Hong Kong and the USA.



ICRI - ACI  
FEB 2010  
JOINT  
DINNER  
MEETING



## "INSPECTION, MONITORING AND REPAIR TECHNIQUES OF POST-TENSIONING TENDONS, MULTI-STRAND, MONO- STRAND AND STAY CABLES"

## OUR FEATURED PRESENTATION



- Importance of Inspection and Monitoring of Post-tensioning Tendons
- Methods of Monitoring
- Method of Inspection
- Available Alternatives for Repairs
- Project Examples

REGISTRATION DEADLINE IS **February 1, 2010**

NO-SHOWS WILL BE BILLED

Please email ([pomalley@c-p-rinc.com](mailto:pomalley@c-p-rinc.com)) or print this page and fax to **Pat O'Malley**, Secretary, at 410-298-4086 no later than February 1, 2010. Checks to ICRI BWC may be turned in at the meeting or mailed with your form to:

Pat O'Malley, Secretary  
ICRI BW Chapter  
c/o Concrete Protection & Restoration, Inc.  
6737 Dogwood Road  
Baltimore, MD 21207

Name: \_\_\_\_\_  
Company: \_\_\_\_\_  
Telephone: \_\_\_\_\_  
Email: \_\_\_\_\_  
Number of Guests: \_\_\_\_\_ Payment: ☐ Enclosed ☐ Online  
(Please include receipt)  
Guest Names: \_\_\_\_\_  
Guest's Company: \_\_\_\_\_

**You may also register and  
pay online at**

[www.ICRIBWChapter.org](http://www.ICRIBWChapter.org)



## 2009 GOLF TOURNAMENT SPONSORS

On October 1, 2009, ICRI-BWC held its Annual Golf Tournament. We had a number of sponsors for the tournament that should have been mentioned in the last issue of the Aggregate. This did not happen. We sincerely apologize for this omission and are appreciative of all of our sponsors, of whom the Tournament would not have been a success. We present here the list of sponsors:

**LUNCHEON SPONSOR** Concrete Protection & Restoration, Inc.

**BEVERAGE SPONSOR** East Coast Building Services, Inc.

**BREAKFAST SPONSOR** Eastern Waterproofing & Restoration Co., Inc.

**RANGE BALLS** Choice Restoration Services, Inc.

### COMPETITION SPONSORS

*Closest to Pin - Men/Women*

*Longest Drive - Men/Women*

*Straightest Drive*

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Tools & Accessories

### HOLE SPONSORS

- 1 Eastern Waterproofing & Restoration Co., Inc.
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- 3 Kenseal Construction Products Corp.
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- 5 Commercial Waterproofing, Inc.
- 6 Metro Sealant & Waterproofing Supply, Inc.
- 7 American Railing Systems
- 8 Watson Bowman Acme
- 9 The Blue Book
- 10 Simpson Unlimited, Inc.
- 11 Miracote
- 12 Chemtrete
- 13 Construction Specialties Group
- 14 Tools & Accessories
- 15 BASF Building Systems

## CHAPTER HISTORY

### ICRI-BWC HISTORY

#### LOOKING FOR INFO



Did you know that ICRI was not always the "International Concrete Repair Institute"? In 1988 the organization was formed under the name the International Association of Concrete Repair Specialists, Metropolitan Washington Chapter. It was not until 1993 that the name was changed and given its current title, the International Concrete Repair Institute.

Over 20 years information can get lost. After an initial gathering of items we are still missing some pertinent pieces of information, if anyone has any knowledge of the following items, please send it to the Chapter Historian:

- Officers and Board Members prior to 1995
- Meeting Minutes prior to 1990 and after 1994
- Speakers/Meeting Topics after 2001

Please forward all information to Cindy Snow at [cindys@skaengineers.com](mailto:cindys@skaengineers.com)



## CHAPTER SPEAKS BEFORE AIA



Mr. Eric D. Rigsbee, P.E., Board Member of ICRI-BWC, gave a facade presentation to approximately 50 Washington, DC AIA members on Friday, January 8<sup>th</sup>. The presentation reviewed types of finishes (brick, EIFS, stucco, precast, poured-in-place, etc.), and construction deficiencies in new low rise wood framed structures finished with EIFS-Brick-Stone, as well as ICRI technical guideline 410.1-2008 "Guide for Masonry Facades." The presentation focused on real life situations that emphasized field conditions and understanding of engineering principles.

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## Upcoming Chapter Events

Feb. 11	ICRI-BWC/ACI Joint Dinner Meeting Holiday Inn, College Park, MD
May 6	ICRI-BWC Membership Meeting
Sept. 16	ICRI-BWC Membership Meeting
Oct. 2010	ICRI-BWC Annual Golf Tournament <i>Specific Date TBD</i>
Nov. 4	ICRI-BWC 2010 Awards Banquet

## Upcoming National Events

Feb. 1	ICRI WOC 2010 Kick-Off Party Rio Hotel & Casino Las Vegas, NV
Apr. 14-16	ICRI 2010 Spring Convention Theme: <i>"Aesthetics in Concrete Repair"</i> Myrtle Beach Resort & Spa at Grande Dunes Myrtle Beach, SC
Oct. 20-22	ICRI 2010 Fall Convention Theme: <i>"Transportation Structures"</i> Omni William Penn Hotel Pittsburgh, PA

## THE ROSENDALE REVIVAL: NATURAL CEMENT, AN AMERICAN TRADITION, MAKES A COMEBACK

and west coasts. The forts were constructed based on intensive research and development by a fledgling Army Corps of Engineers, headquartered at West Point, New York. The building material they chose was Rosendale natural cement, and today, more than a century-and-a-half later, nearly all of them remain standing.

The construction of the Erie Canal was the largest engineering project of its time, and when completed in 1825 it linked the Eastern seaboard with the Great Lakes, beginning the settlement of the upper Midwest and a long period of westward expansion. The locks, dams, bridges and retaining walls for the canal system were built using natural cement, which was also used in the construction of dozens of other canals during this period.

The transcontinental railroad system was the realization of the dream of a country that stretched "from sea to shining sea". The system required construction of hundreds of bridges, depots, viaducts and roundhouses, built using natural cement.

After the Civil War, a period of rapid industrialization followed. Dams for hydro power and massive factory complexes had to be quickly constructed. Natural cement was the material of choice for large scale, rapid construction.

From 1818 to 1915 more than 70 billion pounds of natural cement were produced and consumed in the United States. Thousands of natural cement buildings, bridges, monuments, water systems, tunnels, piers, lighthouses, docks, dams and other structures remain in service from this period, in many cases outperforming more modern Portland cement structures.

Although Portland cement production overtook and generally replaced natural cement in the early 1900's, the use of natural cement continued in specialty applications into the late 1960's, at which time the last of the natural cement mines closed. For 35 years, this material has been commercially unavailable, but in 2004 one of the original Rosendale natural cement mines was reopened and authentic natural cement is now being produced for use in restoration.



### What is Natural Cement?

Natural cement is very different from other masonry binders, such as Portland cement, lime and hydraulic lime. Yet it also has some similarities to each of these materials.

Like Portland cement, natural cement is a true hydraulic binder. Unlike lime, which requires carbon dioxide from the air to harden in a very slow process, natural cement sets quickly when mixed with water, and it was often used in the construction of underwater structures. It was particularly valued for its resistance to sea water and it

Inside a Rosendale, NY natural cement mine in the 19th Century. Nearly half of the 70 billion pounds of natural cement produced between 1817 and 1915 came from Rosendale mines.

*continued on page 7*



was not uncommon to mix natural cement with sea water and beach sand in coastal construction.

Unlike Portland cement, however, natural cement is not an artificial mixture of various ingredients burned at high temperatures. Like lime and natural hydraulic lime, natural cement is the product of burning natural limestone at moderately high temperatures. Limestone with a high clay content (argillaceous limestone, or "natural cement rock"), when burned at the proper temperature, produces a clinker which can then be ground into a cement powder. This natural cement clinker will not slake to crumble into a powder or form a putty when water is added, as do lime and natural hydraulic limes, but must be ground in order to be used.

## Comparison of Rate of Strength Development

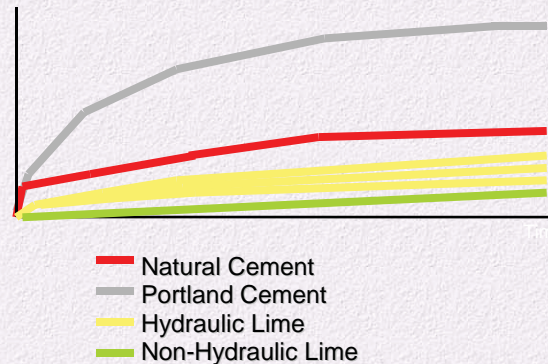
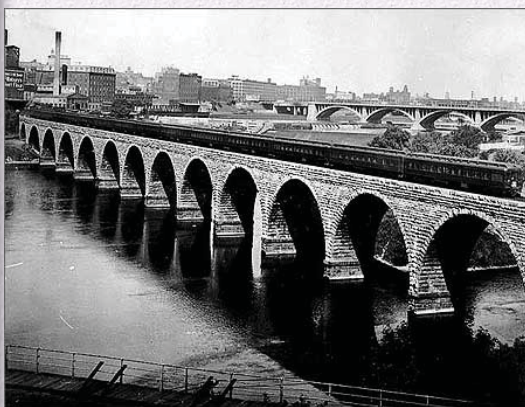


Figure Courtesy Structures North Consulting Engineers, Inc.

The cured properties of natural cement are in many ways intermediate between lime and Portland cement, but are in some ways unique to natural cement. Set time is typically faster than for Portland cement, and a great deal faster than for hydraulic lime, while non-hydraulic lime sets considerably more slowly than any of the other binders. This fast-setting characteristic was one of the primary advantages of natural cement over lime, allowing much faster construction of large masonry buildings and structures and also permitting construction to proceed under less favorable early Spring and late Fall weather conditions.

Once it has set, natural cement rises in strength much more slowly than Portland cement, achieving its ultimate strength over the course of 12-24 months. The ultimate compressive strength of natural cement may typically be on the order of less than half that of Portland, and modulus of elasticity may be similarly lower.



Massive masonry structures, like the Stone Arch Bridge in Minneapolis, were built without expansion joints and yet did not crack due to the low modulus of elasticity of the natural cement binder used in its construction.

Chemically, natural cement is composed primarily of dicalcium silicates and aluminates ( $C_2S$ ,  $C_2A$ ). The lower density of this structure, compared with the  $C_3A$  and  $C_3S$  common in higher-fired Portland cements, results in a less rigid, more vapor permeable matrix. Even as Portland cement largely replaced natural cement in the early 1900's, natural cement continued to be used in the most demanding applications, particularly those involving water and salt water exposure, as the permeability and relative flexibility of natural cement improved freeze-thaw resistance. In the 1950's, major projects like the construction of the New York State Thruway utilized blends of Rosendale natural cement with Portland, typically at a 1:2 proportion, to take advantage of the durability enhancements achieved by the use of natural cement. Eventually, the concrete admixture industry developed air entraining admixtures, which displaced natural cement in these applications as well. Shortly thereafter, the last of the Rosendale cement mines closed.



### Why Use Natural Cement Today?

There are a number of technical and philosophical justifications for using natural cement in restoration and preservation work today. The most basic justification is the mandate that repair or replacement *in kind* should be the preferred approach under the historic restoration guidelines of the Secretary of the Interior. Now that natural cement is again available for these purposes, this approach is a very feasible alternative, providing the required performance while maintaining the character of the historic building fabric, and assuring long-term compatibility of new materials with the original construction.

Beyond this direct mandate, however, historic value is often defined in terms of materials and methods that are particular to a period in history. Natural cement was the dominant hydraulic binder used in 19<sup>th</sup> century American masonry construction. Relatively little Portland cement was used before the turn of the 20<sup>th</sup> century, when domestic production began in earnest. Although the natural cement mortar, stucco or concrete used in any particular building or structure may not be that structure's most striking or evident characteristic, taken as a whole natural cement technology is central to the architecture and engineering of this period. Given the pervasiveness of its use, natural cement, in and of itself, becomes worthy of preservation.



**The New York State Capitol is one of at least 12 state houses built with natural cement.**

Finally, natural cement use can be justified today on the basis of performance, durability and sustainability. Looking back at 185 years of natural cement performance history in the United States, the record is nothing short of remarkable. The technology has worked and endured under some of the most challenging exposures imaginable, and has done so on a massive scale.

As a restoration material, if natural cement can deliver the sort of durability it has provided as a material of original construction, there is the compelling prospect of less frequent repointing, fewer interventions over time, and less damage to historic fabric which inevitably results from every intervention.

Our historic buildings must be managed in a way that sustains them for future generations. The focus is not the next ten years, or 20 years, but our grandchildren's lifetimes, and their grandchildren's lifetimes and beyond.



**Fort Jefferson, 70 miles off Key West in the Gulf of Mexico, has withstood more than 150 years of severe ocean exposures with little or no maintenance. Today restoration is in progress using Rosendale natural cement.**

### WORLD OF CONCRETE

Offer Extended - FREE Exhibit Hall Registration at World of Concrete! Share the wealth!

There is no better time to take advantage of your relationship with ICRI. Through us, you, and everyone you know that's going to World of Concrete, can SAVE MONEY by using ICRI's Free Exhibit Hall Registration. (Saving You \$65). You can also get \$40 off each 3-Hour Seminar AND 90-Minute Seminar.

Use SOURCE CODE A36

Support The International Concrete Repair Institute  
Offer Good Until 1/29/10

Contact [dale.regnier@icri.org](mailto:dale.regnier@icri.org) to register for World of Concrete 2010 Compliments of ICRI.

Exhibits: Feb. 2-5, 2010 - Seminars: Feb. 1-5, 2010  
Las Vegas Convention Center





were compromised during that era. The industry has come a long way, but we are still fighting the connotation that chemical cleaning is unsafe for historic substrates. I would like to attempt to review the process of how a product for cleaning stone is designed and formulated. The purpose is not to offer a definitive course in chemistry, but to give the architect, contractor, historical consultant and building owner a general understanding of the thought process that a modern manufacturer uses to develop safe, effective cleaning systems for masonry substrates.

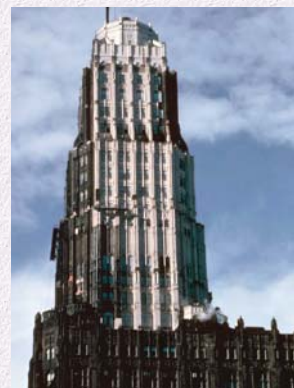
The first step in designing a cleaning product is to identify the contaminants that we are trying to remove. In large metropolitan areas masonry buildings have some carbon build-up, various salts, silicates and oxides from the incomplete combustion of fossil fuels. The over simplified chemistry of fire is that the exhaust (smoke) is acidic and the ash is alkaline. So when the exhaust from power plants and automobiles is deposited on buildings we have, in addition to the carbon contamination, sulfur oxides from the incomplete combustion of high sulfur fuel oils and nitrogen di-oxides and tri-oxides from the incomplete combustion of gasoline. Reintroduce moisture in the form of humidity or rain and these oxides form sulfuric acid and nitric acid, both of which are extremely detrimental to masonry substrates. Other exterior contaminants include various metals such as magnesium, iron, copper, aluminum and other metals and their salts that are inherent to our industrialized economy.



Most manufacturers attack the contaminants found on brick, granite, sandstone, limestone or marble building exteriors with water-based cleaners that either have an acidic or an alkaline pH. The acid(s) or alkaline(s) in the formulation perform various functions necessary to break the bond of the predetermined soils from the stone. Wetting agents are added to the formula to release the surface tension of water and thus allow the water based cleaner to penetrate into all areas of the contamination. The job of emulsifiers is to hold the contaminants in suspension until the rinse cycle can be applied. Good emulsifiers will also help to insure that the product will rinse well which will assure the removal of all traces of the

cleaner/contaminant effluent during the rinse cycle. Buffers are used as a safety factor and their job is to retard the reaction of the acids or alkalis. Even though some products necessarily use a percentage of acids or alkalis in their formulations that are considered, by themselves, to be very strong, the buffers serve to retard the reaction to the point that the formulation is safe for use on masonry. Thickeners give the formula some body and that helps the product to hold on a vertical surface. Some products have humectants that attract moisture to help the product stay wet until it is time to rinse.

Brick, granite and sandstone can generally be cleaned using a one step, single product process that can remove both the organic (carbon) and inorganic (metals) contaminants from the building. The rinse cycle, which is a separate but equal part of the cleaning system, serves to both flush the product/contaminant effluent from the stone and to neutralize the stone so that upon completion of the rinse process the substrate is left evenly cleaned and with a neutral pH.



Limestone and marble are comprised of the more sensitive calcium carbonate, so these building substrates usually are cleaned with a two-step process. The first step is to apply an alkaline cleaner that will loosen the organic (carbon) based contaminants. After a dwell time the effluent is rinsed and a mild acidic product is applied and rinsed. The acidic product will perform two functions. The first is to remove the inorganic contaminants (metals) and the second function is to neutralize any residual alkalinity left from the first step. It is important that any building be left with a neutral pH, but as calcium carbonate buildings are basically alkaline to begin with, we do not want to leave any excess alkalinity imbedded in the pores of the stone. Calcium carbonate based substrates are extremely sensitive to harsh cleaning methods, so great care must be taken when choosing acid or alkaline constituents for cleaning products.

Interior contaminants are much less complicated to clean and generally consist only of carbon-

*continued on page 11*



# 2010 ICRI-BWC MEMBERSHIP & SPONSORSHIP

## ICRI-BWC NEEDS YOUR HELP!

It is time to begin planning for 2010! We have a great year ahead of us and need your help to make it happen!

To this end, the Board of Directors of the Baltimore/Washington, DC Chapter is pleased to present a new and expanded sponsorship program for the chapter. This plan will afford increased exposure for the companies to our membership and, in addition, provide an additional revenue source to expand and enhance the member service program of our chapter.

## BENEFITS OF MEMBERSHIP

- Industry Recognition
- Peer Networking
- Concrete Repair Bulletin and the Aggregate
- Technical Support
- Discounted Pricing

These are just some of the reasons for becoming a member of ICRI and the Baltimore/Washington, DC Chapter!

**BECOME A SPONSOR!**

**BECOME A MEMBER!**

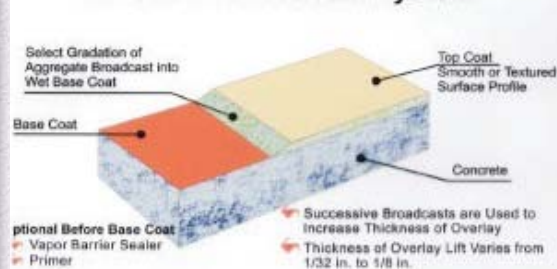
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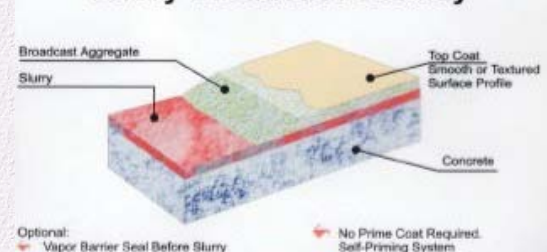
## FLOORING

Once you have analyzed the details of the flooring project as recommended in the ICRI Technical Guidelines entitled "Guide for Design, Installation and Maintenance of Protective Polymer Floor Systems for Concrete" you should: know the service conditions of the specific floor; have tested for the vapor conditions; know the necessary surface preparation and floor repairs; and know whether it's to be decorative or strictly functional. With all this information, you should be able to determine the specific type of flooring system would be most serviceable and applicable for you application. Though in some cases, polymer coatings are sprayed or rolled simply, even on floors. However, in most cases, there is a need for a non-skid or a filler of some sort to help the polymer systems meet the required service conditions. Most polymers will use three different types of systems (having to do specifically with the application methods) or combinations of those. Those Basic systems are Seeded or Broadcast system; Slurry broadcast overlay; and Trowel down overlay. Depictions of each are shown below.

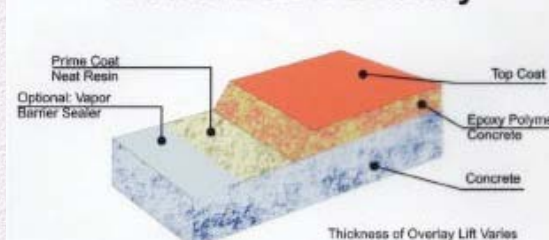
### Seeded or Broadcast System



### Slurry Broadcast Overlay



### Trowel Down Overlay





based soils such as hand sweat, cigarette smoke and soot from the building's heating system. Generally all that is needed is a mild alkaline cleaner that can emulsify the soils and then a thorough rinse using a rinsing system designed for building interiors.



Some building cleaning projects require the removal of paint. The buildings may be totally coated with paint or there may just be some graffiti. Paint removal requires a different type of chemistry that will be discussed in a future article.



Manufacturers of chemical cleaning products will provide detailed instructions on the proper use of their products.

These instructions must be followed exactly. Depending on the individual formulation, the application of the product, the dwell time and the rinse process may vary from manufacturer to manufacturer. So for the best results, the contractor must pay close attention to the outlined procedures. Each product is designed to safely emulsify building contaminants and hold them in suspension until the rinse cycle can be applied. The rinse cycle is just as important as the application of the cleaner. Its function is to flush all traces of the contaminant/cleaner effluent from the stone and to leave the stone neutralized. The rinse cycle must be accomplished in a timely manner and must be performed slowly and deliberately thus assuring a complete rinse of the substrate.

The rinse process must have a certain pressure and volume ratio to accomplish the task of thoroughly rinsing the stone. The hitting force of water is determined by both the volume of water and the pressure at which the water is delivered to the surface of the stone. Any good cleaner is designed to migrate into the stone in order to emulsify the interior soils as well as the surface soils. Therefore the rinse cycle must have the power to flush into the substrate to remove all traces of the contaminate/cleaner effluent.

Water hose or other ludicrously low pressure/volume combinations will not adequately rinse a building unless the rinse process goes on and on poring great volumes of water into the building. Most non-friable building substrates can be safely cleaned using a pressure of 1500 to 1800 pounds per square inch (psi) and a volume of 4 to 5 gallons per minute (gpm). The water/pressure rinse combination is delivered through a high-pressure water gun with a 15 to 25 degree fan tip. This pressure/volume will work with brick, granite and most sandstones. It will also safely rinse most calcium carbonate based limestone and marbles. These pressure/volume combinations have been successfully used for many years and will not harm the substrate or any sound mortar. In addition to assuring a complete flush of all traces of the cleaner, these pressure/volume combinations play a vital role in assuring that the building is evenly cleaned and that the rinse effluent is dilute enough to inter the City's sanitary sewer system.

In the case where a substrate is extremely friable, lower pressures may be necessary. It will be the contractor's responsibility to be sure that the building has been thoroughly rinsed. The contractor can test for any residual acidity or alkalinity remaining in the building's substrate by using pH paper, which should be on every building cleaning jobsite. The objective is to leave the building's surface as close to a neutral pH as possible.

A properly cleaned building will display a symmetry of evenly cleaned stone that will showcase the natural color and hue of the masonry. The cleaning will have been accomplished without altering the surface or the porosity of the stone. Once completed, it will accurately represent the original architect's aesthetic design and intent.

Remember that cleaning a building requires the adoption of a system that includes the choice of the right cleaning product, the right pressure/volume rinse combination and the right contractor who will perform the work. Compromising any of these three elements could compromise the entire cleaning project. The best safety net is for an owner/architect/building manager to insist on using experienced product manufacturers and experienced contractors both of whom should have a long demonstrated history of cleaning historic buildings.

*Thomas H Rudder, President  
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## FUELING STATIONS ON SMALL SCALE JOBSITES

Many restoration projects are performed by small crews on jobsites with limited space for storage and mobilization. In addition, these projects often require large equipment like compressors, skid steers and generators to perform their operations. Re-fueling equipment improperly is easily cited by OSHA. How can we avoid costly fines, or worse, injures and property damage with little impact on current methods of operation? If this sounds familiar, I have a few simple solutions for your fueling operations to reduce exposure to injures, property damage and OSHA citations.

Fueling equipment poses to basic hazards: dispensing flammable and combustible liquids and storage of flammable and combustible liquids.

Although there are many ways to comply with the standard, these are a few that I have found to be the easiest to incorporate into a safety program:

### **Dispensing Flammable and combustible Liquid**

Generally speaking, wherever an employee transfers fuel from a tank or container to another tank or container certain safety precautions must be observed. I recommend my clients dispense fuel a minimum of 25 feet from other operations (doing this also serves to avoid other costly alternatives.) Most moveable small equipment can be fueled this way with ease. Stationary equipment or equipment that will not be moved for fueling can be easily converted into a fueling area by:

1. Locating equipment at least 25 feet from operations.
2. Posting No Smoking signs. I typically pop-rivet signs directly to equipment on the

filling side.

3. Having a 20 lb. fire extinguisher within 50 feet of the fueling station. Whenever possible, attach the fire extinguisher to the equipment so that it is always available. By placing a 20 lb. extinguisher within 50 feet you have complied with several regulations and protected yourself when refueling from a container or a tank.

Always remember to shut off the equipment before re-fueling, properly maintain your fire extinguishers and no open flames in these areas.

### **Storage of Flammable and Combustible Liquid**

Storage of flammable and combustible liquids for refueling operations can be broken down into how and where fuel is stored. Use only safety cans for dispensing fuel in quantities of 5 gallons or less. If you use the plastic containers that are found in the gardening section of a hardware store, get rid of them. Those types of containers do not belong on a construction site. Larger amounts of fuel shall be stored in approved closed containers either above or underground with approved dispensing nozzles. Transferring by means of pressurized air is prohibited and all containers must be labeled.

Whenever possible, store these materials outdoors at least 20 feet from buildings. Install a barricade (Jersey wall) around above ground storage tanks. If indoor storage is the only option, no more than 25 gallons can be stored outside of an acceptable storage cabinet. Storage cabinets and storage rooms, although costly, can accommodate larger quantities and have their own set of regulations. Remember, in the eyes of OSHA, a container is

always considered full regardless of the actual quantity of the contents. For example, five 5 gallon containers equal 25 gallons, even if they are empty. It is forbidden to store LPG indoors. Keep storage area clear and do not store any other material in the same area.

Many other regulations in this standard may affect a jobsite. Following these few steps will point you in the right direction for compliance. For further assistance or to recommend a topic for discussion in a future publication of The Aggregate contact me at [d.p.cagle@gmail.com](mailto:d.p.cagle@gmail.com)

*David Caple, COHC, CEAS, a Construction Safety and Health Specialist, is the Principal Member of Pinnacle Safety Network, LLC. He has over 15 years experience in a combination of structural restoration and safety.*





## ARE YOU IN COMPLIANCE WITH VIRGINIA'S STATE CONTRACTOR LICENSE REQUIREMENTS?

By Jennifer A. Mahar, Esq.

The arrival of the New Year is not only a good time to review your strategic business plan for 2010, but a good time to conduct a compliance review of your company's business and contractor licenses. Conducting business in the Baltimore/Washington, DC corridor presents the possibility that your company is subject to the requirements of multiple jurisdictions – District of Columbia, Maryland and Virginia. Each jurisdiction has its own requirements.

If you are a contractor planning to conduct business in Virginia, particular care must be taken to comply with Virginia's state contractor license requirements. Virginia's contractor license statute is a penal statute and is thus strictly construed by Virginia courts. As a result, a contract entered into by a contractor who is not in compliance with Virginia's contractor license requirements when the contract is executed is void unless the contractor "gives substantial performance within the terms of the contract in good faith and without actual knowledge that a license or certification was required by this chapter to perform the work for which he seeks to recover payment." Accordingly, contracting in Virginia without the proper Virginia state contractor license could result in an unenforceable contract whereby you risk not receiving payment for your work. You also risk exposure to criminal penalties as it is a Class 1 misdemeanor (up to 12 months in jail and/or maximum fine of \$2,500) to contract in Virginia without the proper state contractor license.

With limited exception, contractors who bid upon or undertake contracting work in Virginia must possess a valid Virginia state contractor license issued by the Board of Contractors, a division of the Virginia Department of Professional and Occupational Regulation ("DPOR"). Virginia's contractor license statute provides: "No person shall engage in, or offer to engage in, contracting work in the Commonwealth unless he has been licensed under the provisions of this Chapter." VA Code § 54.1-1103(A). The statute broadly defines *contractor* and *contracting work* as:

*any person, that for a fixed price, commission, fee, or percentage undertakes to bid upon, or accepts, or offers to accept, orders or contracts for performing, managing or superintending in whole or in part, the construction, removal, repair or improvement of any building or structure permanently annexed to real property owned, controlled, or leased by him or another person or any other improvements to such real property.*

VA Code § 54.1-1100. This licensing requirement applies to contractors at all tiers of contracting, including general contractors, subcontractors, and sub-subcontractors. Limited statutory exemptions to this broad licensing requirement exist and are listed at VA Code § 54.1-1101.

Virginia divides its contractor licensing scheme into three classes – Class A, Class B and Class C, which are tied to the contractor's volume of work or size of the contractors' single contract undertaking. The license classes are defined as follows:

- **Class A license** – total value referred to in a single contract or project is \$120,000 or more, or the total value of contracting work undertaken by the contractor within any 12-month period is \$750,000 or more.
- **Class B license** – total value referred to in a single contract or project is \$7,500 or more, but less than \$120,000, or the total value of contracting work undertaken by the contractor within any 12-month period is \$150,000 or more, but less than \$750,000.
- **Class C license** – total value referred to in a single contract or project is over \$1,000, but less than \$7,500, or the total value of contracting work undertaken by the contractor within any 12-month period is less than \$150,000.

To obtain a Virginia state contractor license, applicants must submit an application and fee to the Board for Contractors. Applicants for Class A and Class B contractor licenses must pass a written exam and complete an eight-hour Board-approved business course. Virginia state contractor licenses are valid for two years. To renew a license, a contractor must submit a renewal form and renewal fee within 30 days of the license's expiration date.

It is important to note that the Virginia state contractor license is held by the person or firm that applied for the license and cannot be transferred to another person or firm. Further, a contractor who does not possess the required Virginia state contractor license when the contract is executed cannot cure this defect by subsequently obtaining the required license. It is therefore critical that you obtain the proper license before you pursue work in Virginia.

The Board for Contractors maintains an extensive website that can be accessed at [www.dpor.virginia.gov](http://www.dpor.virginia.gov). Materials available on the website include the Virginia Contractor Licensing Statute (VA Code § 54.1-1100 *et seq.*), the Board's regulations (18 VAC 50-22-10 *et seq.*), and license applications. The Board's website also includes a licensee lookup feature through which you can verify the status of your company's Virginia contractor license.

For further questions, Jennifer can be reached at [jmahar@smithpachter.com](mailto:jmahar@smithpachter.com) or 703-847-6300.