Decorative Concrete is a Hot Topic

Sustainable Development: The Wave of the Future

The Importance of Controlling Hazardous Energy

Highlights of the 2007 NRMCA Compensation Survey
We Don’t Make the Concrete... We Engineer Its Performance.

Technological Know-how. The new GLENIUM® 7000 series of high-range water-reducing admixtures represent a revolutionary technology that is molecularly engineered to meet the needs of our customers. The result is a new generation of products optimized for local materials that deliver unparalleled performance, productivity and value.
From innovative products and technical expertise to local field service and support, Grace is there, helping you increase the value you bring to your customers.

1-877-4AD-MIX1  www.graceconstruction.com

Come visit us at ConExpo 2008
Booth #S8529
On the date of Jan 23rd, 2008, SANY truck-mounted concrete pump with the longest boom in the world selected Las Vegas as one of its global road show stops and successfully demonstrated pumping with the most difficult material you can find on earth - Nevada concrete.

This pump is a symbol of the most advanced construction equipment technology, it currently holds the Guinness book record of the longest truck-mounted boom in the world. During the demonstration, it impressed everyone by how quiet and how smooth the operation went. The construction workers were very thrilled to find out the end hose does not bounce up and down like other pumps because of SANY’s intelligent arm support technology. According to Mr. Xu, the leader of Sany R&D Team, this pump also has the largest displacement volume, intelligent energy saving technology, automatic high-low pressure technology, and automatic concrete piston retraction technology, etc. Mr. Xu is very confident that this SANY pump represents the highest standard of pumping machinery by employing the most innovative technologies.
SANY, the leading machinery manufacturer has been well known for its self-innovation ability. SANY R&D staff has increased into more than 1000. Its assembly line is able to manufacture more than 120 specifications of products in 25 series. And SANY has obtained over 200 technology patents, which is a top level around the world.

SANY has sold its products in 130 countries and is now entering the United States market.

Las Vegas was chosen for its first stop on our global road show to display our 66 meter, 216’ 6” concrete pumping truck. SANY will show the U.S. market the quality of our product.

In 2007, SANY opened its manufacturing facility in Atlanta, Georgia to ensure quality parts and service availability.

We believe that SANY, with its innovative technologies, its determination to serve the U.S. market, will achieve what they said... “We are here, and we are here to stay!”
The safest way to increase your payload!

Installed on
Mack • Volvo • International • Peterbilt • Kenworth
Sterling • Freightliner • Western Star • Autocar

www.simardsuspensions.com
1 800 423-5347
Independence Village at the Dominion in San Antonio, TX may look like a typical community development, but these duplex homes represent a new business model in the making.

Unlike typical community developments, the Dominion duplexes are being sold with all utilities, maintenance and insurance costs included in the sale price.

With the obligation to cover these expenses over time, the developer needed a building material that would be durable, easy to maintain, and that would greatly reduce energy and insurance costs.

The developer called on the people of CEMEX.

The solution? Insulating Concrete Forms (ICF).

Walls built with ICF can reduce energy costs by as much as 55%, maintenance costs by 5%, and insurance premiums by at least 10%, since ICF homes are both fire and storm resistant. In addition, concrete exteriors are termite resistant and require less upkeep.

The result. Greener, high quality homes with lasting value and cost-savings that homeowners and homebuilders alike can appreciate for years to come.

We invite you to learn more about this and other unique CEMEX projects at www.cemexusa.com
2007 Sterling LT9511 w/ Terex Advance 11yd Bridgemax Mixer
MBE 4000 370/450hp; 9LL; 20,000lbs Front Suspension;
46,000lbs Haulmax Rear Suspension; Full Locking Differential
Mixer Standard features include: 150 gal, 120 psi aluminum water tanks,
Brinell skin & fins & flight, under 12' hopper height, air chute bake and air flip hopper, slump meter, tow loop, work lights, electronic controls.
Units with Pre-2007 Engine Emissions Available

2007 Peterbilt 357 w/ Terex Advance 11yd Bridgemax Mixer
Cat 350; 9LL; 20,000lbs Front Suspension;
46,000lbs Haulmax Rear Suspension; Full Locking Differential.
Mixer Standard features include: 150 gal, 120 psi aluminum water tanks, Brinell skin & fins & flight, under 12' hopper height, air chute bake and air flip hopper, slump meter, tow loop,
work lights, electronic controls.
Units with Pre-2007 Engine Emissions Available

2007 Freightliner M2-106v w/ Terex Advance 10.5yd Mixer
C9 Cat 350hp; 9LL; 20,000lbs Front Suspension; 46,000lbs Tufftrac Rear Suspension;
Full Locking Differential.
Mixer Standard features include: 150 gal, 120 psi aluminum water tanks, Brinell skin & fins & flight, under 12' hopper height, air chute bake and air flip hopper, slump meter, tow loop,
work lights, electronic controls.
Units with Pre-2007 Engine Emissions Available

2007 Freightliner M2-112 w/ Terex Advance 10.5yd Mixer
C13 Cat 335hp 1550 ft lbs of Torque; Allison Automatic; 20,000lbs Front Suspension;
46,000lbs Haulmax Rear Suspension; Full Locking Differential.
Mixer Standard features include: 150 gal, 120 psi aluminum water tanks, Brinell skin & fins & flight, under 12' hopper height, air chute bake and air flip hopper, slump meter, tow loop,
work lights, electronic controls.
Units with Pre-2007 Engine Emissions Available
contents

features

16 Highlights of the 2007 NRMCA Compensation Survey
20 Concrete Doesn’t Just Come in Vanilla Anymore – Part 4: Decorative Concrete is a Hot Topic
30 Sustainable Development: The Wave of the Future
56 Changing the Way Concrete is Ordered in ASTM C 94
60 Specifying Fly Ash for Use in Concrete
68 Superflat Floors: A Tool for Saving Money in Distribution Centers and Warehouses

departments

11 Truck Tracs: NRMCA Driver of the Year Howard ‘Scott’ Cosar
13 Capitol Comment: A Chaotic Year for Hours of Service
37 Education Matters: Sustainability and the Concrete Industry
39 Environmental Scene: What’s an EMS?
45 Corporate Suite: United We Stand, Divided We Fall
47 Tech Talk: Qualification of Plant Inspectors
51 Safety First: The Importance of Controlling Hazardous Energy
54 Producer Profile: Pennsy Supply
73 Workforce Issues Q & A
81 Advertiser.com
82 Index to Advertisers

Visit our Buyers’ Guide online at NRMCA.OfficialBuyersGuide.net
POWER FROM WITHIN.

The newest Mack® Granite® and Mack Pinnacle™ trucks are the total package. Built around our EPA'07-certified and fuel-efficient Mack MP™ engines, these trucks deliver the high-horsepower and superior low-end torque needed for the workday. And that’s just the beginning. When you consider our complete lineup of Mack trucks were designed with stronger chassis, industry-leading electronics, ergonomic dashboards, quieter cabs and plush interiors, you realize our precision manufacturing has built our best-performing trucks ever.
Carolina Man Named NRMCA Driver of the Year

Lifetime Achievement Award Winner:
Howard ‘Scott’ Cosar, Southern Concrete Materials

“King of the hill,” “the best of the best,” “the professional’s professional” – these are the words commonly used to describe those nominated for the National Ready Mixed Concrete Association’s 12th annual Truck Mixer Driver of the Year award. Applications from around the nation were analyzed and double checked, and scores were tabulated and securitized. The results are in and NRMCA has named Howard “Scott” Cosar of Southern Concrete Materials as its Mixer Truck Driver of the Year for 2007. A panel of judges from the ready mixed concrete industry selected Cosar from a group of outstanding applicants from across the United States.

Cosar was honored for his career achievements, safety record, professionalism, driving competency and customer service skills. He has driven a truck mixer for more than 25 years. “Mr. Cosar epitomizes the safe driver that we all want to have working for us,” writes Southern Concrete Materials Vice President of Safety Gary Gresh. “Scott is the driver we select when the job is tough, tricky or dangerous!” Cosar has gone 25 years without a rejected load, 25 years without an on-the-job accident and 25 years without a vehicle accident of any type. His company honors include the Black Jacket and Black Hat for lifetime accident-free miles, the Five-Star Driver award for a lifetime of safe driving, the SCM Lifetime Achievement Award and the company’s 2007 Driver of the Year award.

The award acknowledges the significant contributions of ready mixed concrete truck drivers to the growth and success of individual companies and the concrete industry. As a salute to the key members of the concrete production team, the award highlights the driver’s career achievements, safety, professionalism, competence and customer service skills. The judges review and grade all applications based on years and months of service to a company, driving record, yardage hauled, licenses and any other special recognition the driver has received. The judges also heavily weigh their decision on supervisors’ comments and customer letters of compliment or testimonials.

Along with the winner, four runners-up were selected by the judges. They are, in alphabetical order, Ken Blair, Concrete Co. of Springfield, MO (the NRMCA 2007 National Mixer Driver Championship winner); Harold Hubbard, Redi-Mix, LCC, Euless, TX (a youth baseball and football coach and part of the Dallas County Inmate Ministry); Steve Larsen, Cemstone Products Co., Mendota Heights, MN (a 19-year mixer driver veteran in the top 10 in yards hauled every year); and Dee Rosenlof, Westroc, Pleasant Grove, UT (a 28-year mixer driver veteran with no accidents or citations).

As the winner of the 2007 award, Cosar will receive a $5,000 check from the Truck Mixer Manufacturers Bureau. In addition, runners-up will receive $500. The Driver of the Year and runners-up will be honored at the NRMCA Annual Convention in March in Las Vegas. The Chicago-based trade magazine Concrete Products is a cosponsor of the Driver of the Year program.
EVERY ALLISON AUTOMATIC BUILT (ALMOST 5 MILLION) HAS A TORQUE CONVERTER. IT'S WHAT MAKES ALLISON AUTOMATICS FULLY AUTOMATIC, ALLOWING SMOOTH, SEAMLESS UNINTERRUPTED POWER SHIFTS.

The torque converter and the resulting uninterrupted, non-jarring shifts mean you have reduced wear and tear on vehicle, cargo and driver. Better vehicle and driver productivity. Longer transmission service intervals. Virtually no clutch maintenance or replacement. Greater driver satisfaction and retention. Lower overall vehicle life cycle costs.

Try as they may, automated manuals simply can't match the performance of an Allison automatic transmission. Because without a torque converter, you don't have a fully automatic transmission. Instead you have a fundamentally conventional transmission that's partially electronically actuated. You don't have true automatic shifting at just the right points on the torque power curve. That's why without an Allison Automatic, you simply don't have Allison Automatic performance.

So now that you know our secret, make use of this valuable information on your next truck order. Ask your truck dealer to specify an Allison Automatic.
A Chaotic Year for Hours of Service

By Kevin Walgenbach
Government Affairs Coordinator, NRMCA

Since 1935, when the Motor Carrier Act (MCA) was enacted, the federal government has, through its driver’s hours of service (HOS) regulations, limited the number of hours drivers of commercial motor vehicles could drive and be on duty. Under the MCA, jurisdiction over HOS regulations was transferred once from the Interstate Commerce Commission (ICC) to the Federal Highway Administration (FHWA) in 1995 and then again to the current Federal Motor Carrier Safety Administration (FMCSA) when it was created in 2000. From roughly 1940 to 2000, most HOS regulations went largely untouched. However, over the past several years and particularly in 2007, the federal HOS regulations have been subject to a litigation roller-coaster ride.

Starting in May 2000, the FMCSA issued a Notice of Proposed Rulemaking (NPRM) outlining significant and sweeping proposed changes for HOS rules. The proposal sought to curtail the total number of hours drivers could be on duty and to eliminate a number of provisions important to the ready mixed concrete industry, including the intrastate tolerance guidelines. After receiving more than 50,000 comments on the NPRM, the FMCSA issued a final rule in April 2003 that was very different from the original proposal and, due to NRMCA’s vigilance, retained the provisions that directly benefit our industry.

However, shortly after issuance of the new rule, Public Citizen, a public safety advocacy group, brought suit against the FMCSA in the U.S. Court of Appeals for the District

Though 2007 was a chaotic and uncertain year, it is important to keep in mind that the HOS provisions most important to the ready mixed concrete industry remain unchanged.
of Columbia Circuit ("D.C. Circuit"), alleging that the 2003 rule was vastly different from the 2000 NPRM and, therefore, that the FMCSA had been arbitrary and capricious in its issuing of the rule. The D.C. Circuit agreed and stated in its July 16, 2004, opinion that the 2003 rule was “arbitrary and capricious because the agency failed to consider the impact of the rules on the health of drivers, a factor the agency must consider under its organic statute.” In August 2004, the FMCSA petitioned for an indefinite stay of the current rules, but the court was preempted by Congress’ temporary extension of the 2003 rule until a new rule could be proposed. In January 2005, the FMCSA issued a new NPRM, which largely re-proposed the 2003 HOS rule.

In December 2006, a little more than a year after the new rule had gone into effect, the Owner-Operator Independent Drivers Association (OIDA), Public Citizen, the International Brotherhood of Teamsters, AFL-CIO and other public safety advocacy groups once again filed suit in the D.C. Circuit challenging the 2005 rule. Last July, the court issued an opinion striking down the HOS rule. Specifically, the court vacated the 11-hour daily driving limit and the 34-hour restart provisions because their implementation had not been fully subject to notice and comment.

The American Trucking Associations (ATA) filed a motion for a stay of the ruling for an eight-month period, and at the end of September, the court granted the stay, but only for a 90-day period. Two and a half months later, on Dec. 17, the FMCSA issued an interim final rule (IFR) that retained the 11-hour driving limit and the 34-hour restart provisions. The agency took this action after obtaining new data that showed the vacated provisions have actually helped to improve highway safety.

Just before Congress adjourned for the 2007 legislative year, the Senate Subcommittee on Surface Transportation and Merchant Marine Infrastructure, Safety and Security held a hearing on FMCSA actions with regard to the IFR. John Hill, FMCSA administrator, and Dave Oseicki, vice president of safety, security and operations for ATA, testified in support of the IFR. However, subcommittee Chairman Frank Lautenberg (D-NJ) called the IFR a “sham” and decreed what he claimed was a lack of attention to public safety while drafting the rule. Within hours after the hearing ended, Public Citizen filed its third suit with the D.C. Circuit, requesting that the court vacate the IFR and direct the FMCSA to issue a new rule in accordance with the court’s previous ruling. The FMCSA and ATA promptly filed responsive pleadings opposing Public Citizen’s latest challenge.

Though 2007 was a chaotic and uncertain year, it is important to keep in mind that the HOS provisions most important to the ready mixed concrete industry – the construction materials 24-hour clock restart, intrastate tolerance guidelines, the 16-hour short-haul exemption and the 100-air-mile logbook exemption – remain unchanged. While the litigation roller-coaster ride will continue in 2008, NRMCA will remain vigilant to ensure that these provisions are protected when the HOS regulations are ultimately finalized, which so far has been 77 years in the making.
ACCURATE COLOR. CONSISTENT RESULTS.
EQUIPMENT THAT DOES THE JOB RIGHT EVERY TIME.

SGS SOLOMON COLORS, INC.
The World Leader in Concrete Coloring Solutions

Whether it's the incredibly consistent ColorFlo® liquid color or our accurate ColorSelect® dispensing system, you can count on Solomon Colors' legendary reliability and dependability. No matter what size concrete coloring job your customers have, we give you uniform color and durability.

From custom colors to onsite equipment training, you always get the most consistent concrete coloring solutions in the world with Solomon Colors.

Visit us at solomoncolors.com or call us toll free, and we'll show you why working with Solomon Colors will work for you.

IL: 800-624-0261 • CA: 866-747-2656 • www.solomoncolors.com
The Business Administration Committee of the National Ready Mixed Concrete Association annually administers the Industry Compensation Survey. The survey is a benchmarking tool against which companies in the ready mixed concrete industry can gauge their compensation packages. The survey is confidential in that all information submitted by each company is submitted directly to and compiled by an independent, certified public accounting firm and is then destroyed once the survey is complete. Individual company details are restricted to the company submitting the survey and the accounting firm.

The survey covers various positions ranging from hourly personnel through salaried executives and the related benefits of the positions. An average minimum and maximum and an overall average salary range are provided for each position. A total of 42 different job position classifications are evaluated, and each respondent is asked to provide appropriate information for each of those positions as applicable. Not all questions apply to all companies, and responses may not be an average of the total population of companies that submitted surveys but an average of those that responded to that particular question. Also, for those questions for which there were fewer than five responses, no statistical conclusion can be determined, and that question is marked as “N/A” for reporting purposes.

Operations:

<table>
<thead>
<tr>
<th>Position</th>
<th>Mean Union Wage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Driver</td>
<td>18.74</td>
</tr>
<tr>
<td>Clean-Up Laborers</td>
<td>17.60</td>
</tr>
<tr>
<td>Loader Operators</td>
<td>18.87</td>
</tr>
<tr>
<td>Batch Operators</td>
<td>20.48</td>
</tr>
<tr>
<td>Regular Mechanics</td>
<td>19.55</td>
</tr>
<tr>
<td>Maintenance Supervisor</td>
<td></td>
</tr>
</tbody>
</table>
Operations Managers, Dispatch and Sales:

Each company that submits a survey is provided with a report for its region as well as a summary of all regions nationwide. Those regions are as follows:

- Northeastern/Mid-Atlantic (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont, Delaware, Maryland, New Jersey, New York, Pennsylvania, Virginia, West Virginia, Eastern Canada)
- Southeastern (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, Puerto Rico, South Carolina, Tennessee)
- North Central (Iowa, Minnesota, North Dakota, Nebraska, South Dakota)
- South Central (Arkansas, Kansas, Louisiana, Missouri, Oklahoma, Texas)
- Great Lakes (Midwest) (Illinois, Indiana, Michigan, Ohio, Wisconsin)
- Rocky Mountain (Colorado, New Mexico, Utah, Wyoming)
- Pacific Northwest (Alaska, Idaho, Montana, Oregon, Washington, Western Canada)
- Pacific Southwest (Arizona, California, Hawaii, Nevada)

Following are charts and graphs highlighting a portion of the results of the 2007 survey.
Incentive Plans and Benefits: continued from page 17

<table>
<thead>
<tr>
<th>Employer Paid Benefits</th>
<th>Percentage Paid by Employer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health</td>
<td>80%</td>
</tr>
<tr>
<td>Dental</td>
<td>70%</td>
</tr>
<tr>
<td>Vision Care</td>
<td>60%</td>
</tr>
<tr>
<td>Life Insurance</td>
<td>50%</td>
</tr>
</tbody>
</table>

For information on how your company can participate in the 2008 survey, contact Olivarri at 240-485-1130 or via e-mail at molivarri@nrmca.org.

Summary of Results

There were 82 respondents to the 2007 survey, versus 83 respondents to the 2006 survey. The average company size by total yardage of concrete of those responding in 2007 and 2006 was 905,120 and 1,140,192, respectively, reflecting a change in the size of those companies responding year-over-year.

For 2007, compensation increases from 2006 levels for the positions shown were as follows:

- Hourly, Union: 1.65%
- Hourly, Non-Union: 3.43%
- Salaried, Non-Exempt: 2.39%
- Salaried, Exempt: 3.18%
- Executives: 2.88%

Environmental Activist

At Holcim, we recognize the need to make a difference. After all, the choices we make have an impact on our business, society and the environment.

So we’re taking a stand. Holcim is actively committed to sustainability as we develop and produce the world’s leading cement materials.

We recognize that you care about the environment, too. That’s why we’re proud to offer our Envirocore™ family of environmentally-friendly products.

Envirocore products provide the same quality, durability and finishability you expect from Holcim, plus they may help you qualify for LEED® credits, too.

Together, we can make a difference.

For more information, call 888.646.5246.

www.holcim.us
FMI CORPORATION is the premier investment banking and management consulting firm serving the worldwide construction materials industry. For more than 50 years, FMI has built a reputation for assisting our clients in the creation and realization of value in their firms.

The assets of Simpson Materials* Peerless Park, Missouri and Mirimec Trucking Inc.* Peerless Park, Missouri have been acquired by

The Quikrete™ Companies, Inc. Atlanta, Georgia

* Represented by FMI Corporation

The assets, barging, quarry and construction aggregates operations of Jim Smith Contracting Company* Grand Rivers, Kentucky have been acquired by

Roanoke Cement Company LLC Troutville, Virginia (a subsidiary of Titan Cement America LLC)

* Represented by FMI Corporation

Feltes Sand and Gravel Company* Elburn, Illinois has been acquired by

Lafarge North America, Inc. Herndon, Virginia

* Represented by FMI Corporation

The Superior Group of Companies* * Superior Asphalt & Concrete * Western States Asphalt * Transtate Asphalt * Mid Columbia Asphalt * Blue Mountain Asphalt * Basin Asphalt Yakima, Washington have been acquired by

Granite Construction Inc. Watsonville, California

* Represented by FMI Corporation

For more information, visit our website at www.fminet.com, or contact George Reddin at 919.785.9286 or Will Hill at 303.398.7237.
Concrete Doesn’t Just Come in Vanilla Anymore
Decorative concrete is a hot topic today in construction. With tremendous economic and aesthetic value and sustainable-construction attributes, it is no wonder it continues to experience significant, double-digit growth rates every year.

This is the fourth article in a series on some of the different types of value-added concrete you can include in your menu of products to actively promote in a local marketplace. Some of those choices include concrete with fibers, quick-setting mixes, decorative concrete, waterproof concrete, flowable fill, self-consolidating concrete (SCC), easy-finishing mixes, “Green” concrete, pervious concrete, high-strength concrete and corrosion-resistant concrete. In our last article, we highlighted the applicability of quick-setting mixes and how to actively sell and promote them. This article will talk about decorative concrete.

Decorative concrete is a hot topic today in construction. With tremendous economic and aesthetic value and sustainable-construction attributes, it is no wonder it continues to experience significant, double-digit growth rates every year. If you haven’t been on the decorative concrete bandwagon, now is the time to jump onboard or else you are going to be left behind.
I have heard excuses like:
• It causes me extra work to clean out the trucks.
• I’m afraid I’ll get color in the next load.
• The equipment costs too much.
• It isn’t consistent.
• It adds too much to the cost of a yard of concrete.

Well, if you are still leaning on those outdated misconceptions, then you are going to miss the train, not to mention an opportunity to make more profits and add value to owners and contractors. Sure, it takes extra cleaning of the trucks, but you should be getting paid and profiting off that work. Yes, if you don’t clean a truck, you can contaminate the next load, so you need to develop a process that your drivers follow to ensure that doesn’t happen. The equipment is available in many flexible financial terms from all the admixture suppliers, so talk with yours.

You say it isn’t consistent? Look at a recently built Wal-Mart Supercenter or Kroger in your area. They usually have a reddish-brown floor. Those slabs represent hundreds of truckloads of independently
ERIE concrete batch plants meet the application, production and job size requirements of all ready mix producers, and they’re backed by a century of construction equipment manufacturing experience.

Contact an ERIE representative:
P.O. Box 1031, Erie, PA 16512
Phone: (814) 456-7001  Fax: (814) 452-3422
www.eriestrayer.com  sales@eriestrayer.com
batched trucks that prove it can be done with an acceptable amount of consistency. (Remember, even paint suppliers don’t warranty across lots.) Lastly, it does add a cost to concrete that may make it seem expensive on a yard-by-yard basis, but when compared to the cost of a slab plus the cost of vinyl flooring, it is less money on larger jobs and is competitive on many smaller ones – on a first-cost basis! Taken as a whole, these reasons not to participate in this growing market don’t hold water.

So now that we have dispelled many of the ready mixed concrete producers’ concerns, let’s get to the purpose of this article – features, benefits and economics that make decorative concrete sales something you want to include on the product menu your salespeople bring to market.

Decorative concrete delivers value in a myriad of ways. Some of them include:

1. As a first-cost replacement for carpet, vinyl, tile, wood or other floor coverings
2. As a green, sustainable construction material
3. By reducing lifecycle costs of a facility
4. As a perceived “premium” flooring material
5. In hardscape applications in lieu of brick, pavers, wood, stone or tile

Decorative concrete provides value as a first-cost replacement for carpet, vinyl, tile, wood or other floor coverings. When you look at the in-place cost, which includes labor, overhead, hardeners, sealers, carpet and pads, vinyl and adhesives, tile and grout and the like, decorative concrete can be significantly cheaper on a first-cost basis. If you don’t believe me, get a copy of R.S. Means’ current costs, use the geographical adjustment factors for your locale and run the numbers.

In the table that was done based on R.S. Means’ 2005 national data, you can see how it competes very favorably with other hardscaping materials. In my own discussions with a number of national accounts, I have consistently heard that it costs less than vinyl tile flooring on a first-cost basis in 80,000-square-foot to 200,000-square-foot placements around the country. I am sure there is some small square-foot footprint where it may be slightly more expensive, but its quality, durability and lifecycle cost savings easily make it possible to sell the price difference.
That “one thing” for Shumaker Industries is serving the ready-mix producer. We do not have a large portfolio of product lines – we are specialists, and **what we do, we do well.**

Since 1953, Shumaker Industries has gained a reputation for manufacturing long lasting replacement drums and mixer parts. We have over 50 years of experience in on-site plant work such as fabrication and installation of central mix blades, polyurethane liners, and various other custom jobs. Shumaker Industries is also a distributor of EL Ready Mix Truck Wash, Barracuda Concrete Stripper, Durex Polyurethane Liners, and Housby Mixer Systems.

800-326-9349  www.shumakerindustries.com
Our industry has “given away” value in a number of market segments. The selling price shouldn’t be based solely on the cost of the concrete in place; it should be based on the value delivered by the product.

Decorative concrete is a green, sustainable construction material. Most interior floor coverings emit VOCs (volatile organic compounds) that reduce indoor air quality. Decorative concrete employing environmentally sensitive curing agents, hardeners and/or sealers emit negligible amounts of VOCs. The table shows what a significant difference concrete makes in minimizing VOCs (Source: The University of Western Ontario).

<table>
<thead>
<tr>
<th>Building Material</th>
<th>VOC Emission (mg/m²/h)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vinyl flooring</td>
<td>2.3</td>
</tr>
<tr>
<td>Particle board</td>
<td>2.0</td>
</tr>
<tr>
<td>Plywood</td>
<td>1.0</td>
</tr>
<tr>
<td>Acrylic Latex Paint</td>
<td>0.43</td>
</tr>
<tr>
<td>Linoleum</td>
<td>0.22</td>
</tr>
<tr>
<td>Carpet</td>
<td>0.080</td>
</tr>
<tr>
<td>Gypsum board</td>
<td>0.026</td>
</tr>
<tr>
<td>Concrete</td>
<td>0.003</td>
</tr>
</tbody>
</table>

Decorative concrete is recyclable and could be crushed and used as road base. It also doesn’t typically end up in a landfill, as many carpet and vinyl-flooring products have in the past. If you integrally color the concrete, it could be diamond ground at a later date to create a brand-new-looking floor. Also, it is generally produced with local materials and doesn’t have lots of plastic or cardboard packaging around it to end up in the landfill. The fact that it can last for so many years also means you don’t have greenhouse gas emissions every few years like carpet and tiles produce when they are replaced. All in all, there is an impressive list of favorable comparisons to other available options.

Decorative concrete adds value by reducing lifecycle costs of a facility. Numerous national accounts have reported less cost and lesser amounts of chemicals in
Where, When, Why And How?

Teletrac Fleet Director®
Gives You The Answers

Know where your trucks are. When they arrived. When they left the jobsite. Why they were late or early and how the situation developed. With Teletrac Fleet Director, you always have the answers you need to boost productivity, control operating costs and improve customer service levels.

So why is Fleet Director ideal for ready-mix operations? It gives you enhanced, GPS-based real-time location and status information for every driver, every load. Plus real-time, 2-way wireless communications between drivers and dispatchers to maximize productivity and efficiency.

And when equipped with Teletrac’s Turn-By-Turn™ navigation module, drivers are never lost, driver-to-dispatcher “chatter” is eliminated and a much calmer, more efficient dispatch environment is created.

Plus, Fleet Director is easily integrated with other leading software packages such as AceCo, Command Alkon, Systech and Jonel Engineering.

Fleet Director lets you manage with facts. Using operating information collected by the Prism™ TM2 onboard data recorder/transmitter, Teletrac eClient® software provides a full range of reports. Reports that let you objectively measure driver and vehicle performance.

J-Bus-captured vehicle diagnostics and versatile sensors deliver additional value. For longer-haul operations, automated HOS and fuel tax reporting options help reduce expenses even more.

Discover why over 4,000 commercial fleets operate with Teletrac Fleet Director. Start with a call and get your free ROI analysis. See for yourself what Fleet Director would do for your operation.

1-800-835-3872
www.teletrac.net/cif
cif@teletrac.net

Teletrac customers consistently report the following average improvements:

- 13% Fuel Savings
- 15% Overtime Savings
- 13% Fewer Wasted Miles
- 12% Reduction Of Unauthorized Usage
- 12% Increase In Productivity

(Source: 2007 Teletrac Customer Survey)
Everything from stone to brick to terrazzo floors can be imitated. As the market evolves, it is up to us in the concrete industry to establish and position decorative concrete in this manner.

Decorative concrete should be perceived as a “premium” flooring material. It surprises me that major homebuilders do not offer decorative concrete as an upscale alternative to traditional floor coverings. It can be textured, stamped, rolled or diamond ground to produce a plethora of different looks. Everything from stone to brick to terrazzo floors can be imitated. As the market evolves, it is up to us in the concrete industry to establish and position decorative concrete in this manner.

Lastly, exterior hardscapes are a natural fit for decorative concrete and a leading application in many markets. Here, instead of competing with carpet and tile, we are competing with stone, pavers and the like. As noted earlier in the table, pricing advantages exist, and the future is very bright in this growing space. If your sales team can call on specifiers, landscape architects are a great place to spur demand in this segment.

In closing, I would like to discuss value and pricing. Our industry has “given away” value in a number of market segments. The selling price shouldn’t be based solely on the cost of the concrete in place; it should be based on the value delivered by the product. If pharmaceutical products were based on cost, many would sell for just fractions of their current prices. The current prices already give the lion’s share of value to the contractor and owner rather than the ready mixed producer. Consistent, disciplined pricing strategies build value for all parties involved and build markets. Once a price is dropped in any product or market, it is hard to raise it back to previous levels. Mature, disciplined markets adhere to these principles.

For more information about NRMCA’s promotion program, contact Vance Pool at 281-557-8415 or via e-mail at vpool@nrmca.org.
Dramix® and the ready mixed concrete industry working together to build a solid foundation

Dramix®

Deliver reinforced concrete using Dramix® steel fibers

- Dramix® Booster: automated steel fiber handling system
- Safe, accurate and automated steel fiber dosing systems available
- Certified steel fiber designs available
- Let the Bekaert team design your next load of concrete using Dramix® steel fibers

Bekaert Corporation
1395 S. Marietta Pkwy
B 500, S 100 Marietta
GA 30067
USA
T 770 421 8520
F 770 426 8107
dramix.nafta@bekaert.com
www.bekaert.com/building
Sustainable Development: The Wave of the Future

And the Future is Now

By Jennifer LeFevre
RMC Research & Education Foundation Program Director
With pervious concrete’s stellar stormwater management qualities, its positive environmental impact and potential safety benefits, it’s not surprising that its popularity has soared in recent years.

In early 2007, the foundation released two projects developed by the Stormwater Management Academy at the University of Central Florida: “Construction and Maintenance Assessment of Pervious Concrete Pavements” and “Hydraulic Performance Assessment of Pervious Concrete Pavements for Stormwater Management Credit.” The reports, funded in cooperation with Rinker Materials and the Florida DOT, support the increased use of pervious concrete by demonstrating its effectiveness in stormwater management practices and through outlining proper maintenance techniques. Both studies also underscore the importance of proper placement and mix design.

The U.S. Senate’s Environment and Public Works Committee and the Environmental Protection Agency (EPA) have expressed deep concern over the environmental impacts of various pavements. In an effort to address some of these concerns, the Villanova Urban Stormwater Partnership at Villanova University is undertaking a side-by-side comparison of pervious concrete and porous asphalt. Funded by the RMC Research & Education Foundation, Villanova University, the EPA and Prince George’s County, MD the study will examine the differences between pervious concrete and porous asphalt with regard to durability, maintenance requirements, the ability to transmit or filter key contaminants such as hydrocarbons and the ability to mitigate heat-island effects. Given the intense government interest in the environmental impacts of pavement, a key component of this project will include the impact these two pavements have on water quality.

It is not surprising, given the successful use of pervious concrete pavement in parking areas and sidewalks, that the construction and design communities would be interested in expanding its use – along with its environmental benefits – to streets, local roads and even highways in the future. The RMC Research & Education Foundation is working with The CP Tech Center at Iowa State University to study just such a possibility. This pervious concrete mix design for wearing-course applications study will examine the development of concrete mix designs that have adequate strength and durability for wearing-course pavements.

Additionally, the pavement would have surface characteristics that reduce noise and enhance skid resistance while also providing adequate removal of water from the pavement surface and structure. The development of pervious concrete mixes for use in highways, street and local road applications will examine their suitability for this use as well as their long-term behavior. The tremendous interest in bringing pervious concrete to roadway use is evidenced by the study’s co-funding on the part of the Federal Highway Administration, the American Concrete Pavement Association and the Pooled Resources Fund of several state Departments of Transportation.

One explanation given for the hesitation to embrace the use of pervious concrete in Northern climates was the uncertainty of its performance in freeze-thaw conditions. In order to assure those concerns, the RMC Research & Education Foundation funded a long-term field performance study of pervious concrete’s performance in harsh weather conditions. The study, “Portland Cement Pervious Pavement: Field Performance Investigation on Parking Lot and Roadway Pavements,” validated the belief that pervious concrete could perform well in freeze-thaw environments, with little maintenance required. The findings of the study will allow Northern states to use pervious concrete with confidence. Builders in cold climates are particularly excited about the prospect of being able to use pervious concrete, not only because of all of its environmental benefits, but also because of the safety benefits it offers. On impervious services, when snow melts and refreezes, the resulting ice poses a danger to pedestrians. Pervious concrete allows melting snow to run through it so there is no ice when temperatures again fall below freezing.

A concrete design and its mix could perfectly meet specifications, but if the concrete isn’t placed correctly, any subsequent problems are a black eye on the entire industry. Pervious concrete pavement, like other
concrete projects, must be placed correctly to maximize performance. However, not as many contractors are familiar with pervious concrete as they may be with the placement of other concrete mixes since it is a newer application. For this reason, the RMC Research & Education Foundation funded the development of a "Pervious Concrete Contractor Certification Craftsman Text" to complement a certification offered by the National Ready Mixed Concrete Association. Ensuring the proper training of concrete contractors who place pervious concrete was a high priority for the industry, and the Board of Trustees felt this educational tool would provide an opportunity for contractors to better acquaint themselves with the nuances of pervious concrete and its proper placement.

The RMC Research & Education Foundation strives to ensure that it does not engage in duplicative research. With the eruption of pervious concrete research projects both in the United States and abroad, and with a steady stream of pervious concrete research proposals proliferating within the research community, the foundation wanted to compile a comprehensive list of past, current, and proposed research projects on the subject. Working with Dr. Heather Brown with the Concrete Industry Management program at Middle Tennessee State University (MTSU), the original pervious concrete research compilation was released in the summer of 2006. A revised compilation was released in the spring of 2008 in an effort to include information on projects completed since the original compilation was released and to add links to access many of the research papers.

The foundation’s Board of Trustees always wants to review all existing data when considering new proposals, not only to avoid duplication but also to be aware of projects and/or data that may encourage or discourage additional examination.

A hallmark of the green building tide is the increased number of building projects seeking certification in the USGBC’s LEED program and the growing number of governments, agencies and companies requiring that new construction be LEED-certified. Given the many ways in which the use of concrete contributes to the qualification process for LEED points, the RMC Research & Education Foundation chose to fund the development of the “Ready Mixed Concrete Industry LEED Reference Guide” in cooperation with the Portland Cement Association. The guide provides a dual educational purpose. First, it educates designers, architects and others involved in building projects about how concrete can contribute in the LEED certification process. Secondly, it educates those in the concrete industry about the LEED program.

The foundation’s Board of Trustees recognized the growing popularity of sustainable-development rating systems and seized upon the opportunity to showcase how well concrete’s energy and environmental benefits fit with the LEED program.

Concerning the recycling aspect of the sustainable-development movement, the foundation’s study “Crushed Returned Concrete as Aggregates for New Concrete – Final Report” is extremely popular. The intense interest surrounding the report stems not only from the findings’ potential to save the concrete industry up to $300 million annually in materials and disposal costs, but also how the use of crushed concrete aggregate supports sustainable construction initiatives. The study demonstrated that crushed concrete aggregate (CCA) can be properly reused in fresh concrete, with concrete still meeting performance requirements. The data from this study will be used by NRMCA and partnering organizations to support changes in specifications to allow increased use of CCA for a variety of concrete applications.

The RMC Research & Education Foundation is partnering with several organizations in its efforts to advance other sustainability-related efforts. This is demonstrated through its support of the American Concrete Institute (ACI) Strategic Development Council’s (SDC) development of a sustainability vision roadmap for the concrete industry. Through workshops funded by the foundation and other industry companies and organizations, SDC will draft the vision and roadmap document, with the outcomes presented to concrete and masonry-related association groups to seek their endorsement and adoption of the recommendations. The final document will define the industry’s vision of utilizing concrete effectively in sustainable construction and will outline specific industry needs and initiatives to support that vision. The foundation is also working with the Water Environment Federation and the American Society of Civil Engineers to update a manual of practice entitled “Design of Urban Runoff Controls” that will include detailed information on pervious concrete. Additionally, the foundation is looking into proposals for funding the development of a sustainable plant guideline for the ready mixed concrete industry as more and more large, national construction users require a sustainable approach by their suppliers.

Never before have the concepts of sustainable development and green building been more important than they are today. In looking toward the future, the concrete industry will play an extremely important role as energy and environmental considerations become a priority in the design, building and construction communities. The RMC Research & Education Foundation, as part of its charter to support projects that will benefit the concrete industry and the citizens of the United States, will continue in its commitment to seek and support projects that promote sustainable development. Of course, it’s easier to do that when you start with a superior material like concrete. But even the best can become better!

Many of the reports and final studies referenced in this article are available for download from the foundation’s Web site at www.rmc-foundation.org. Information on how to submit proposals or make a contribution to the foundation is also available from the Web site. Or, contact Executive Director Julie Garbini or Program Director Jennifer LeFevre at jgarbini@rmc-foundation.org or jlefevre@rmc-foundation.org for more information.
OUR ADMIXTURE SPECIALISTS SUPPORT YOU FROM CONCEPT TO CONCRETE.

We believe in personalized consultations because no two people or projects are the same. We work side-by-side with you to make every project a success. We bring innovative concrete admixtures to your projects, no matter where you are. We find unique solutions through our admixtures — so you can work smarter, work faster and increase profits. And we deliver the reliability you need to build a strong business, because our admixture specialists are true professionals who never stop working for you.

To get rock-solid support for your next project, visit www.sikaconstruction.com or call 1-800-933-SIKA (7452).

©2006 SIKA Corporation. All rights reserved.
SLIDE GATES

5 Reasons for WAM Slide Gates

- Easy to handle
- Ex-stock delivery
- Highly abrasion-resistant
- Easy to fit
- Time-saving maintenance

Limited time offer: March-April Special 15% off from the list price for any size!!!

Where you can use WAM Slide Gates?

- Silos for Building Materials
- Ready Mix & Precast
- Food Processing
- Animal Feed Milling
- Plastics Processing

WAM Inc.
75 Boulderbrook Circle
Lawrenceville, GA 30045

Phone 770/339-6767
Fax 770/339-4727
E-mail: wamgeorgia@waminc.com
Internet: www.waminc.com
Thanks to the RMC Research & Education Foundation Golf Tournament Sponsors!

The RMC Research & Education Foundation would like to thank the sponsors from its highly successful fundraising golf tournament last October.

Gold Sponsors
Aggregate Industries
Allison Transmission
Bandag/Snyder Tire
Banc of America Leasing
Buckeye Building Fibers, LLC
Carew Concrete & Supply Co. Inc.
Carolina Ready Mixed Concrete Association
CBMW-Continental Manufacturing Co. Inc.
Cemex Inc.
Central Concrete Supermix Inc.
Chandler Concrete Co.
Chapman Concrete Products Inc.
Command Alkon
Concrete Supply Co.
Delta Industries Inc.
Erie Strayer
Essroc Cement
The Euclid Chemical Co.
Grace Construction Products
Hanson Aggregates
Headwaters Resources
Holcim (U.S.) Inc.
Irving Materials Inc.
Lafarge (two gold sponsorships)
Lehigh Cement
Mack Truck Sales of Charlotte
Maricopa Ready Mix
Martin Marietta Materials
McNeilus, a division of Oshkosh Truck
Merrill Lynch
MHC Kenworth
NRMCA
Oldcastle Materials
Ozinga Bros.
Peterbilt Motors Co.
Prairie Materials
Ready Mix USA
Sika Corp.
Stephens Manufacturing Co.
Terex Roadbuilding
TMW Systems Inc.
Trimble Mobile Solutions
UBS Financial Services
U.S. Concrete Inc.
Volvo Construction Equipment
Vulcan Construction Materials
Wachovia Financial Services

Silver Sponsors
Mack Trucks
Ready Mixed Concrete Co.

Bronze Sponsor
S & W Ready Mixed Concrete Co.

Beverage Cart Sponsors
BASF Admixtures Inc.
Propex Concrete Systems
FOCUS ON SUSTAINABLE DEVELOPMENT

Learn the latest from expert papers, presentations and a product expo.

Join us for the 3rd Annual Concrete Technology Forum: Focus on Sustainable Development, May 20-22, 2008, at the Marriott Denver Tech Center. The forum will bring researchers and practitioners together to discuss the latest advances, technical knowledge, continuing research, tools and solutions for sustainable development.

Session Topics
Researchers, designers, contractors and product manufacturers will present state-of-the-art developments, new construction techniques and product formulations that optimize environmental performance of concrete construction including:

- Pervious Concrete Systems
- Concrete’s Impact on Urban Heat Islands
- The Carbon Footprint of Concrete
- Sustainable Development Initiatives
- Optimizing Recycled Content

Product Expo
A product expo featuring companies that offer products and services for sustainable development will be open during the conference.

Attendees
Researchers, engineers, architects, contractors, concrete producers, public works officials, material suppliers, and concrete industry professionals are invited to attend.

Professional Development Hours
Attendees will earn valuable professional development hours (PDHs) and will receive a copy of the conference proceedings.

Register Early and Save
Sign up today for the Concrete Technology Forum and enhance your expertise and knowledge on sustainable development.

- Early Registration: $595 (on or before 4/28/08)
- Late Registration: $695 (after 4/28/08)
- Students and Speakers: $295

Register online at www.ConcreteTechnologyForum.org by phone at (240) 485-1152.
Sustainable development, green building and climate change in particular are now facts of life. Corporations in every industry are increasingly being shaped by their customers’ demands to be more environmentally responsible. Government regulations aimed at limiting the environmental impact of manufacturing will continue to place pressure on corporations to improve environmental performance. Environmental performance, including the reduction of greenhouse gas emissions, will be increasingly monitored and regulated. In the near future, individual companies will compete to see which can have the smallest environmental impact and, most likely, the smallest carbon footprint. Companies that ignore these challenges (or opportunities) will lose. Those not able to adapt to these changes simply will not survive.

The construction industry is especially affected by these changes since the built environment has a significant impact on the environment. Operating our buildings, houses and infrastructure consumes enormous amounts of energy, which further deteriorates the environment and contributes to global warming. The built environment consumes substantial amounts of fresh water and other natural resources for human consumption, waste and irrigation. Refuse and waste mostly end up in landfills. Homes and buildings emit significant amounts of air and water pollution during operation.

Although to a lesser degree, constructing our built environment and manufacturing building products also have significant impacts on the environment. The construction process and building-product manufacturing consume natural resources and require significant amounts of energy. The transportation of building materials and on-site machinery for construction projects significantly impact greenhouse gas emissions. And at the end of a project’s life cycle, much of the demolished material is discarded instead of being recycled into new products.

In the United States alone, buildings account for:
- 65% of electricity consumption
- 36% of energy use
- 30% of greenhouse gas emissions
- 30% of raw materials use
- 30% of waste output (136 million tons annually)
- 12% of potable water consumption

Triple Bottom Line

The concept of sustainable development attempts to balance social, economic and environmental impacts, or what is commonly referred to as the “Triple Bottom Line.” Sustainable development tries to integrate these perspectives on how we live and how we affect the world around us by taking into account local, regional and global impacts. For example, a company that focuses on environmental impacts without considering the economic consequences might not survive. The employees would lose their jobs, the local economy would suffer and a company without an environmental conscience might fill the void.
The concrete industry is uniquely positioned to meet the challenges of sustainable development. It has a great opportunity to provide products to meet sustainable-development objectives, including energy-efficient products such as tilt-up walls and insulating concrete forms.

Building owners, architects, engineers, contractors and product suppliers are taking action to reduce their environmental impacts through voluntary action or market and regulatory pressures. There are many forces at work to move the construction industry toward improved sustainable-development practices, including programs such as the U.S. Green Building Council LEED Green Building Rating System and legislation to reduce greenhouse gas emissions.

The concrete industry is uniquely positioned to meet the challenges of sustainable development. It has a great opportunity to provide products to meet sustainable-development objectives, including energy-efficient products such as tilt-up walls and insulating concrete forms. Pervious concrete can help conserve water and reduce storm-water runoff. Light-colored pavement can help reduce the urban heat-island effect. Concrete and many concrete products are manufactured locally, thus reducing the impact of transporting the materials. Concrete products use a significant amount of recycled products, and at the end of its useful life, concrete can be recycled into aggregates for base material and, in some cases, for use in new concrete.

Although concrete products contribute greatly to green building and sustainable-development practices, there is always room for improvement. Products can be developed that are more energy efficient. Recycled content can be increased. The energy efficiency of transportation can be improved. And, certainly, the entire manufacturing and construction process can be made more efficient.

NRMCA Offers New Course on Sustainable Development

Sustainable-development issues are often complex and not easily understood. And that’s the major reason NRMCA launched its new course, “Concrete’s Role in Sustainable Development in 2007.” The purpose of this course is to educate ready mixed concrete-industry personnel on the environmental attributes of concrete and how the concrete industry can benefit from promoting concrete as a sustainable construction material. The green building movement continues to gain momentum as developers, government agencies and designers build structures to minimize environmental impact. To take full advantage of this movement and be a participant in the process, the ready mixed concrete industry must have a detailed understanding of the design concepts and guidelines used in the green building movement, such as LEED and Green Globes.

In addition, the course outlines how the concrete industry can begin to transform the way it produces its products to meet sustainable-development goals. The strategic benefits of sustainable development are presented. The course is intended for ready mixed concrete sales and marketing professionals. Ready mixed concrete technical and operations professionals also benefit from this course. The course is taught in a one-day format with the following key topics covered:

- The Green Building Movement – The Great Debate
- Environmental Attributes of Concrete
- LEED Green Building Rating System
- Other Green Building Rating Systems (Green Globes, Energy Star, etc.)
- Strategies for Promoting Sustainable Development

In addition to this new course on sustainable development, NRMCA is offering several other programs throughout 2008 designed to help concrete producers understand and participate in the sustainability movement, including the third annual Concrete Technology Forum: Focus on Sustainable Development, Pervious Concrete – A Stormwater Solution, and Environmental Professional Certification for the RMC Industry. These programs are helping transform the concrete industry. They are encouraging concrete producers to develop products and practices that are more energy efficient, use more recycled content and help conserve natural resources, including water. Visit www.nrmca.org/STEPS for more details on these and other programs offered by NRMCA.
What’s an EMS?

By Douglas E. Ruhlin
Principal Environmental Consultant,
Resource Management Associates

In the last issue of Concrete InFocus magazine, NRMCA unveiled its new Green-Star Certification Program (“Continual Improvement,” winter 2008 issue). The Green-Star program is now well under way, and many in the concrete industry are excited about using this new program to obtain recognized certification as an industry leader in the field of environmental compliance and operations. Furthermore, this program will provide a real competitive edge in participating in today’s green building movement. It will allow concrete companies to realize a tangible return for their environmental efforts, as well as streamlining processes, reducing impacts on the environment and providing an enhanced compliance level.

What is the primary requirement for obtaining Green-Star certification? The development and implementation of an Environmental Management System (EMS). But what is an EMS? What does one look like and contain?

The U.S. Environmental Protection Agency (EPA) defines an EMS as “a continual cycle of planning, implementing, reviewing and improving the processes and actions that an organization undertakes to meet its business and environmental goals.” In other words, a program for continual improvement relative to environmental performance. An EMS is typically built around what is called the “Plan, Do, Check, Act” model for continual improvement:

• **Plan:** Identifying environmental aspects and impacts and establishing goals.
• **Do:** Implementing, including training and operational controls.
• **Check:** Checking, including monitoring and corrective action.
• **Act:** Reviewing, including progress reviews and acting to make needed changes to the EMS.

After completion of one cycle of the EMS, another cycle is automatically begun with a set of new goals and targets. This concept of constant implementation and refinement of the model is what provides continual improvement.
Most who are gearing up for Green-Star are developing their own facility-specific, written plans that define what they will be doing to implement plans for continual improvement.

This activity is done cyclically – after completion of one cycle of the EMS, another cycle is automatically begun with a set of new goals and targets. This concept of constant implementation and refinement of the model is what provides continual improvement.

There really is no one “right” model for what an EMS is. Some may wish to develop this management system by tying together a combination of existing written procedures and documents, environmental compliance documentation and personnel procedures. Others may utilize generic, computer-based management programs. But for most, the EMS will comprise a written (documented) program of identified impacts, goals toward better performance to reduce those impacts, specific steps and procedures to achieve those goals and the development of procedures to quantitatively measure progress toward meeting those goals. In other words, a written management plan. Most will use a written plan of procedures and documents that follows the requirements of Green-Star and can be modified before and after each EMS cycle to reflect changing activities, goals and results. Most who are gearing up for Green-Star are developing their own facility-specific, written plans that define what they will be doing to implement plans for continual improvement.

For Green-Star certification, it is important that the EMS plan, regardless of how it’s developed, be created to match the specific needed components. Briefly, these specific components are:

1. An environmental policy statement. The policy would typically be similar to a corporate mission statement but will instead outline the facility’s commitment to continual improvement, pollution prevention and regulatory compliance.
2. A description of a program for continual improvement. This program must include the identification of industry-specific environmental aspects (activities conducted at a concrete plant) and the resultant impacts (the environmental effects of the activities) for the management of water quality, air quality, hazardous materials, solid materials, community issues and sustainability. The continual improvement program must also include measures to evaluate current levels of performance in these areas, the identification of measurable goals to reduce impacts, a description of the specific practices that will be used to meet the stated goals and a means to evaluate performance at the end of the EMS cycle (i.e., to determine if the goals were met).
3. A program to gauge compliance level. This would typically be a compliance-auditing program conducted by either the facility itself or through a third-party compliance audit. This is to be done for each cycle of the EMS.
4. The development of measurable goals to be used as performance benchmarks, as well as measurable results.
PUMP MORE, PLACE MORE

Taking on your toughest concrete and material placing challenges and always delivering more, Putzmeister excels at technological innovation and product performance. Our boom pumps feature smooth, surge-free flow and the ability to choose high pressure or high volume from the same setup. Our exclusive Telebelts® convey a wide variety of materials in the most demanding applications. What’s more, Putzmeister’s commitment to customer support and parts on demand means we’re there for you.

For more information, call 1-800-884-7210 or visit www.putzmeister.com.

Putzmeister
5. An environmental training program for key personnel, which could include one of several NRMCA training courses (e.g., Environmental Certification Course, Plant Manager’s Certification Course) or company-specific training activities.

6. A demonstration of adequate staffing and management commitment.

7. A public outreach program, which would vary according to each facility’s situation and needs (e.g., a Web site, a newsletter or community day events).

Let’s consider a hypothetical example: a mixer truck barrel washout at a concrete plant. This activity (an environmental aspect) has the potential to degrade surface water quality if improperly discharged into the environment (an environmental impact). As part of its EMS cycle, the concrete facility might determine that while this discharge is covered by an appropriate water-quality discharge permit for this activity, it’s a preventable discharge and can be eliminated over time by using this process water for new concrete production. Furthermore, the compliance audit may have uncovered that this discharge exceeded the permit limits for total pollutant loads that could be discharged (a potential compliance issue).

As part of an EMS cycle, a stated operational goal would be to utilize a certain percentage of all washout water produced for new concrete production (for example, a 10% reduction over the EMS cycle), as well as setting goals to ensure that pollutant loads were within permit limitations (a compliance goal). This could be measured by reduced discharge flow, keeping data on washout activities or data on water use during the batch process. The pollutant levels could be measured by analytical data from the discharge. The EMS would spell out the ways in which this goal was going to be met (such as data collection, the reduction of discharge activities, concrete batching with process water, staff training, etc.) as well as how the activity would be measured at the end of the EMS cycle. When the cycle is complete, the facility would evaluate whether this goal was achieved and proceed accordingly. Then a new EMS cycle commences and new goals and objectives are set out. This is an example of continual environmental improvement.

Setting out this program in a written plan, along with procedures dealing with audits, training and the other Green-Star components, is really what an EMS is all about and what a Green-Star auditor will...
It makes sense to think of what a Green-Star auditor will review when your site is visited for Green-Star certification. The more coherent and organized your EMS is, the easier it should be to demonstrate conformance with the requirements and obtain certification.

be looking for when it comes time to obtain Green-Star certification (which requires the completion of a minimum of one cycle of the EMS).

It makes sense to think of what a Green-Star auditor will review when your site is visited for Green-Star certification. (Your program will require review and certification by a Green-Star-accredited auditor before receiving certification.) The more coherent and organized your EMS is, the easier it should be to demonstrate conformance with the requirements and obtain certification. (It would also be easier to spot any deficiencies that would need to be addressed before certification can be issued.) Your EMS may make sense to you, but how does it look to an outside party? Is it clear and well organized? Does it clearly follow the requirements of Green-Star? For most, a notebook binder divided into sections that follow the Green-Star requirements, corresponding to each cycle of the EMS, would be a great way to develop and implement an EMS. However it’s put together, it should be clear, concise and usable by the concrete plant and its personnel.

Is it likely that a concrete facility already has many of the required EMS components in place? Yes. In fact, it would be an unusual concrete plant today that did not have at least some of these components already under way. However, the EMS will require these components to be tied together in a coherent fashion that can be used by the concrete facility. For most facilities, a Green-Star EMS will not have to be “started from scratch.”

Does a facility have to be environmentally perfect, or 100% compliant with all applicable rules and regulations in order to have an EMS or to ultimately become Green-Star certified? No! Remember, the Green-Star program is a process-oriented program, rather than one that concentrates on the end result. The concept of continual improvement will deliver just that, constant environmental improvement over time, and should lead to a very high level of environmental performance (both operational and compliance).

The benefits of Green-Star certification and a program for continual improvement are clear. It’s just as clear that the development and implementation of an EMS is well within the grasp of virtually every concrete plant. There’s little reason not to participate and to obtain the benefits of continual environmental improvement today!

Contact Ruhlin at Resource Management Associates, P.O. Box 512, Forked River, N.J. 08731; (609) 693-8301; www.resourcemanagementassoc.com; or via e-mail at druhlin@resourcemanagementassoc.com
NEW Mixer Performance Standards!

BUY CPMB

MEMBERS

Besser Company
C & W Mfg. and Sales Co., Inc.
CON-E-CO
Erie Strayer Co.
ODISA Concrete Equipment
RexCon, LLC

Simem America
Stephens Mfg.
Terex Roadbuilding
Vince Hagan
WAM USA

BUY QUALITY

Each of the CPMB members participates in establishing the highest standards for our industry. When you buy a concrete plant with a CPMB plate, you know it’s built with the best in quality and design.

Our new performance-rated mixer plates will now be accepted by the NRMCA Plant Certification Program (with visual inspection) as an alternative to uniformity testing of your mixers.

Join construction industry leaders who for nearly 50 years have looked to CPMB when choosing precision and value in concrete plants and components.

Call the Concrete Plant Manufacturers Bureau for more information.

Concrete Plant Manufacturers Bureau
900 Spring Street • Silver Spring, MD 20910
Office (301) 587-1400 • Fax (301) 587-1605
www.cpmb.org

Endorsed by and Affiliated with:

NRMCA
CPMB
P2P

CPMB Supports P2P Initiative
United We Stand, Divided We Fall

By Greg Smith

This morning you arrive at work early to check on a special project. As you enter the building, you hear excited voices coming down the hall. As you walk through the office door, Mary, your sales manager, notices the surprised expression on your face. She says, "Hi, boss! I took care of that project you gave me yesterday, and it is running great. We will exceed our sales goals again this year!" You see your staff huddled around a table working on the new proposal to improve customer service. They came in ahead of time to work on the project. Ceiling lights illuminate the charts and graphs showing their progress.

There are no walls or barriers separating your team members from each other. The room is full of energy, a charged, innovative environment of motivated team members. They are proud of themselves and their accomplishments. Is this a dream, or is this for real?

The advantages of having people work together in teams still remain a critical element in building a positive work environment and high job satisfaction. In a rapidly changing world that values technology, speed and flexibility, teamwork unites individual efforts and is key for success, innovation and creativity.

Teamwork has improved morale, reduced costs and dramatically enhanced productivity in businesses. William J. O’Brien, the former CEO of Hanover Insurance Co., said many years ago, "The fundamental movement in business in the next 25
years will be in dispersing of power, to give meaning and fulfillment to employees in a way that avoids chaos and disorder.” Teamwork is still a major ingredient in high-performing organizations.

Teams can decrease the need for excessive layers of middle managers and supervisors. Aetna Life & Casualty reduced its ratio between workers and middle management from one supervisor for every seven workers to one supervisor for every 30 workers while improving customer service. At a General Mills plant in Lodi, Calif., productivity surged to 40 percent above comparable plants because of teams.

However, many businesses do a poor job building teamwork. I have visited organizations where open conflict existed between individuals and departments. Imagine working for a company where individuals do their best to sabotage each other’s efforts. According to the Web site Mediate.com, managers spend 30% of their time dealing with conflict. How long can a business stay viable when people refuse to work together? Jon Katzenbach and Douglas Smith, in their book “The Wisdom of Teams,” provide an excellent definition of a team. They say, “A team is a small number of people with complementary skills who are committed to a common purpose, performance goals and approach for which they hold themselves mutually accountable.”

In their book, the authors talk about the following successful criteria in high-performing teams.

Complementary Skills. Each person on a team possesses a particular skill or talent. When blended, these talents and skills improve the capability of the team. In a high-performing team, members can perform each other's jobs.

Committed People. Teams reach maximum performance when they are committed to each other and trust management. Personalities and human dynamics are critical to team success. Until team members trust one another and understand each other's personalities and individual work styles, commitment to the project is difficult.

Common Purpose. Most teams work on a particular project, task or specific type of work. Committees are not teams. The most effective teams are ones that have a written charter outlining a clear goal, purpose and mission.

Common Approach. You can’t throw some people into a room and expect them to become an effective and productive team. Not having a structured way of doing work is one major reason teams fail. For example, project teams should follow a standardized methodology for solving problems, designing a new service and/or improving a process. Initially, teams require training, mentoring and coaching.

Smith is the CEO and founder of Chart Your Course International in Atlanta. He helps organizations recruit, hire and retain talented people. As a business growth consultant, he has helped business owners reduce turnover, increase sales, deliver better customer service and reach long-term prosperity. He is a former examiner for the Malcolm Baldrige National Quality Award as well as one of the nation’s “Top 10 Rising Stars” in human resource management, as selected by Human Resource Executive Magazine. He has authored eight books, including “Here Today, Here Tomorrow: Transforming Your Workforce from High Turnover to High Retention.” For more information, visit www.chartcourse.com or call 800-821-2487.
Qualification of Plant Inspectors

The NRMCA Plant Inspector’s Guide
By Dr. Colin Lobo, Ph.D., P.E., Senior Vice President of Engineering, NRMCA

The NRMCA Plant and Truck Certification program has been administered for more than 40 years. It serves as an independent audit of a ready mixed concrete production facility – both plants and delivery vehicles – verifying that they conform to industry standards. It assures both the purchaser and producer of ready mixed concrete that one important part of a quality system is in place.

There is a distribution of responsibilities for the NRMCA Plant Certification Program:

• The NRMCA Research Engineering and Standards (RES) Committee maintains the inspection checklist, with periodic technical revisions and policy decisions, subsequently approved by the NRMCA Board of Directors.
• The company hires a licensed engineer to conduct the inspection.
• A responsible official of the company signs an agreement to maintain the facility in conformance for the period of certification – primarily with respect to the accuracy of batching devices.
• NRMCA verifies the inspection submissions and issues certification cards for delivery vehicles and a Certificate of Conformance for the production facility.

Up until 2007, NRMCA did not have a formal approval process for persons conducting inspections. It was presumed that licensed engineers would abide by their professional code of ethics to perform work they felt qualified to do. That assumption does not change; however, a more formal qualification process has been instituted starting in 2008.

With funding support from the RMC Research & Education Foundation, NRMCA has developed the Plant Inspector’s Guide, a useful resource for inspecting engineers, their assistants and the companies requesting plant inspections.
Are You Ready to Compete with the Big Boys?

In today’s competitive market, you don’t need a large fleet to compete. What you do need is real time access to your vehicles and drivers to meet your customer’s demands. Bottom line: You need more revenue, per truck, per day.

Designed specifically for Ready Mix operations, the TrimView RM™ solution delivers real-time vehicle auto-status information to your dispatchers for the entire ready mix delivery loop cycle—without driver interaction—as well as two-way text messaging.

By leveraging cellular and GPS technologies, coupled with vehicle sensors—designed specifically for the harsh environment of ready mix operations—your dispatchers will have access to a variety of critical information including: vehicle location, plant activities, jobsite arrival, water-add events, begin and end-pour, washout status, and jobsite departure, all in a highly graphical and easy to interpret format.

With TrimView RM™ you’ll have the confidence to make customer commitments, just like the big boys. The benefits are many:

- More deliveries per truck
- Lower variable costs
- Accurate customer and driver communications
- Improved customer service
- A more effective dispatch environment
- Strengthened competitive position

With Trimble’s patented auto-status solution it’s never been easier or more affordable to get started. To learn more about how you can gain a competitive advantage today, download our whitepaper at www.trimblems.com/advantage. Or call 1-877-883-4367.

With funding support from the RMC Research & Education Foundation, NRMCA has developed the Plant Inspector’s Guide, a useful resource for inspecting engineers, their assistants and the companies requesting plant inspections. The guide addresses each item of the plant certification checklist by discussing the intent, illustrating with images and providing numerical examples where necessary. It provides hints to the inspecting engineer on what to look for when inspecting specific items in a concrete plant or delivery vehicle. The guide establishes clarity in intent for the inspection program and facilitates uniformed understanding of expectations for both the inspector and the ready mixed concrete producer. The guide has been authored by D. Gene Daniel, who previously chaired the NRMCA Plant Certification Task Group and is a longtime member of the ASTM subcommittee responsible for ASTM C 94, Specification for Ready Mixed Concrete.

With the availability of the guide, the current policy requires all inspectors and their assistants who perform inspections to obtain a copy of the Plant Inspector’s Guide, complete a set of 50 review questions related to the information in the guide and obtain a score of at least 75%. They need to submit a statement of qualifications and sign a pledge to conduct inspections and maintain the integrity of the NRMCA certification program. Persons who complete this process will be approved to conduct inspections of concrete production facilities for the NRMCA certification program.

The goal of the RES Committee in developing these qualification requirements for inspecting personnel is to enhance the value and credibility of the certification program. More details on the NRMCA certification program for ready mixed concrete production facilities is available on the NRMCA Web site at www.nrmca.org/products/certification/plantandtruck.asp.

Visit our Buyers’ Guide online at NRMCA. OfficialBuyersGuide.net
You gotta love all the choices Terex Ready-Mix trucks and Terex | Johnson-Ross concrete batch plants from Terex Roadbuilding give you. Select mixers, capacities, plant designs and truck models and options to create a match made in heaven for your application.

1-888-TEREXRB • www.terexrb.com

Equipped with high quality Allison transmissions.
GET TOUGH ON SAFETY, SAVINGS AND QUALITY.

If you’re serious about growing your fiber reinforced concrete sales, it’s time you used the UltraFiber 500® dispenser – the world’s leading automated fiber dispensing system. It puts the batch maker in total control. With a simple push of a button he can insure that precisely the right amount of UltraFiber 500 is added into each batch and truckload of ready-mix every time. And that reinforces your bottom line because using the dispenser eliminates dangerous loading practices, resulting in minimizing the risk for injury, and maximizing efficiency and cost savings.

Plus Buckeye’s automated dispenser requires no capital investment when you specify UltraFiber 500, the patented cellulose fiber that delivers a superior, smooth, blemish-free finish. And it’s backed by the strength of Buckeye Technologies, the world’s leading provider of cellulose fiber solutions for over 80 years.

Cement a perfect finish to every project with Buckeye’s UltraFiber 500. Contact us today.

ultrafiber500.com or 866.663.8999
The Importance of Controlling Hazardous Energy

The Second-Most Cited Standard in the Ready Mixed Concrete Industry

By David Ayers, CHMM, CSP, MS, Managing Director of Compliance, NRMCA

Hazardous energy comes in many forms and is unforgiving. The OSHA standard on the Control of Hazardous Energy or Lockout/Tagout (LO/TO) is found in 29 CFR 1910.147. The LO/TO standard is one of the least understood and one of the most cited in the ready mixed concrete industry; only 29 CFR 1910.146, Permit-Required Confined Spaces, is more frequently cited. Hazardous energy comes in all shapes and sizes. Hazardous energy sources include: electrical (belt motors), chemical (acid truck washing), mechanical (belts and pulleys), pneumatic (from the plant air compressor), steam (plant boiler), hydraulic (ready mixed concrete delivery truck) and stored energy (spring).

The LO/TO standard covers the servicing and maintenance of machines and equipment in which the unexpected energization or startup of the machines or equipment, or the release of stored energy, could cause injury to employees. The LO/TO standard classifies employees into three separate categories:

**Authorized Employee** – An employee who locks or tags out machines or equipment in order to perform servicing or maintenance of equipment. An affected employee becomes authorized when the employee’s duties include performing service or maintenance on the machine or equipment.

**Affected Employee** – An employee whose job requires him to operate or use a machine or equipment on which servicing or maintenance is being performed under lockout or tagout or whose job requires him in an area in which servicing or maintenance is being performed.

**All Other Employees** – These are employees who do not fall into the authorized employee or affected employee classifications. Employees must be trained to recognize LO/TO devices and tags and do not attempt to start a machine under LO/TO.

The LO/TO standard also requires equipment-specific LO/TO procedures to be created. Good resources for this are the equipment maintenance technicians and the operators who use the equipment every day. Once these procedures are written, they must be covered with the authorized employees and revised as needed. A replacement-in-kind motor may not need any updated equipment-specific LO/TO, but a new/updated motor may need to have the equipment-specific procedures updated to reflect the new change. When this occurs, the authorized employees will also need to be retrained on the procedure.

On many occasions, outside contractors are brought in to service the equipment. Equipment-specific procedures will still need to be created for the contractors to review. Before the work commences, the facility project manager or foreman should talk with the contractors to ensure they understand the scope of the job and to ensure they have the required LO/TO equipment to complete the job safely.

Proper communication between facility authorized and affected employees is sometimes difficult, given the operating footprint of a ready mixed concrete facility. The communication is even more difficult when outside contractors are brought into the facility. They will know and understand the job but may not know how to tell the affected employees that a particular belt or motor is going down for maintenance. The important step may be missed by accident and a hazardous situation created from it.

In general, the LO/TO process follows six steps:

1. **Preparation for Shutdown** – Before authorized or affected employees turn off a machine or equipment, the authorized employee will have knowledge of the type and magnitude of the energy, the hazards of the energy to be controlled and the means to control the energy.

2. **Machine or Equipment Shutdown** – The machine or equipment will be shut down using the specific procedures for
that specific machine. An orderly shut-down will be utilized to avoid any additional or increased hazards to employees as a result of equipment de-energization.

3. **Machine or Equipment Isolation** – All energy-control devices that are needed to control the energy to the machine/equipment will be physically located and operated in such a manner as to isolate the machine or equipment from the energy source. Try to start the machine; it should not start. If it starts, then it has not been isolated.

4. **Lockout/Tagout Device Application** – The authorized employees will affix LO/TO devices to energy-isolating devices. Lockout devices will be affixed in a manner that will hold the energy-isolating device in a “safe” or “off” position.

5. **Stored Energy** – Following the application of the LO/TO devices to the energy-isolating devices, all potential or residual energy will be relieved, disconnected, restrained and otherwise rendered safe.

6. **Verification of Isolation** – Prior to starting work on machines/equipment that have been locked out, the authorized employee will verify that isolation or de-energization of the machine or equipment has been accomplished.

After the work has been completed, the following steps bring the equipment or machine back to operational status:

1. **Inspect Machine or Equipment** – The work area will be inspected to ensure that nonessential items have been removed and machine/equipment components are operationally intact. All guards must be in place on the machine or equipment.

2. **Notify Affected Employees** – The work area will be checked to ensure that all employees have been safely positioned or removed. Before the LO/TO devices are removed and before machines/equipment are energized, affected employees will be notified that the LO/TO devices will be removed. After the LO/TO devices are removed and before machines/equipment are energized, affected employees will be notified that the LO/TO devices have been removed.

3. **LO/TO Removal** – Each LO/TO device will be removed from the energy-isolating device by the employee who applied the lockout.

Hazardous energy sources include: electrical (belt motors), chemical (acid truck washing), mechanical (belts and pulleys), pneumatic (from the plant air compressor), steam (plant boiler), hydraulic (ready mixed concrete delivery truck) and stored energy (spring).

In conclusion, the control of hazardous energy is one of the least understood and one of the most cited in the ready mixed concrete industry today. Not complying with the LO/TO standard can have deadly consequences for your employees or contractors at your ready mixed concrete facility.

For more information about NRMCA’s safety programs, contact David Ayers at 240-485-1155 or via e-mail at dayers@nrmca.org.
Plant owners will appreciate the fuel savings possible with these new heaters. They have extremely high thermal efficiency—up to 99 percent.

The heaters heat mix-water up to 180 degrees F for making concrete in cold weather. They operate at flow rates from 13 to 467 gpm, depending on the heater model. They produce virtually no unwanted atmospheric emissions.

Each heater is fully assembled and tested at our factory.

The heater shell is stainless steel and has a 5-year warranty.

For additional information please contact Tom Wilkey at 1-800-235-5200 or visit our website at heatec.com.
In the Pink:
The Right Color for Pennsy Supply’s Fundraising Campaign

By Frank Cavaliere
Communications Manager, NRMCA

Look around and you’d be hard-pressed to find a more male-dominated industry than the ready mixed concrete industry. So, when last fall’s idea to “pave Pennsylvania pink” spread among the drivers at Harrisburg, Pa.-based Pennsy Supply, an NRMCA producer member, you would have forgiven them for some quizzical looks.

But if pink was worn proudly by rodeo cowboys in Wrangler Jeans’ “Tough Enough to Wear Pink” campaign for breast cancer awareness and research last summer, then Pennsy employees were certainly willing to do their share in a high-profile campaign that began last September with a parade of trucks through downtown Harrisburg. And not just pink ribbons for the company’s 500-plus employees, nor an enlarged ribbon decal that could be affixed to each mixer drum. No, for a cause that has touched the families of many of Pennsy’s employees and a quest for a cure for breast cancer, something more demonstrative needed to be done. And so the mixer drums were painted pink, and residents throughout Pennsy’s large southeastern Pennsylvania business area would always be reminded that October was designated as Breast Cancer Awareness Month.

Last fall’s campaign kickoff by Pennsy Supply and the Pennsylvania Breast Cancer Coalition (PBCC) began a unique, two-month campaign that centered around the four pink mixer trucks and the combined efforts of Pennsy, a part of the Mid-Atlantic Group of Oldcastle Materials, and the PBCC to place a different spin on breast cancer awareness. Though the public still thinks of breast cancer as a disease that only affects women, breast cancer statistics also include men. The all-inclusive message is one of the reasons Pennsy, with a
largely male work force, decided to develop the “Paving PA Pink” campaign. The campaign was a natural choice for Pennsy – the company’s employees actively support more than 21 organizations through volunteer efforts.

“The PA Breast Cancer Coalition is doing wonderful things in terms of educational programs, advocacy and support for breast cancer survivors in Pennsylvania. We hope this unprecedented approach of pink trucks will raise more awareness and support for what the coalition is doing,” said Randy Lake, president of the Mid-Atlantic Division of Oldcastle Materials, during the campaign kickoff. “Breast cancer affects all of us, either through our own personal experience or through the experience of someone we know and love. Pennsy wants to get as many people involved as possible in supporting survivors and their families.”

PENNSY SUPPLY INC.

Pennsy’s pink trucks were driven to Pennsy job sites and showcased in various events and parades in central Pennsylvania throughout September and October. The public also made donations through the campaign Web site, www.pavingPApink.com. Pennsy also made a corporate donation in the form of a pink check to the PBCC at the Oct. 15 Harrisburg parade, with Pennsy Supply General Manager Barry Duffy presenting a $5,000 check from monies raised by company employees to PBCC officials.

Like many NRMCA members, Pennsy’s community involvement is long-standing. In addition to the pink mixer truck campaign, for example, the company also has provided free advertising for local charity and community organizations on its concrete mixer trucks, including the Big Brothers Big Sisters of the Capital Region, the Keystone Area Boy Scouts, Susquehanna River Rescue, the Bethesda Mission, Rockman and the Multiple Sclerosis Society.

“Pennsy people have a strong sense of community pride and are always seeking ways to help enhance our community,” Pennsy Director of Customer Support Brian Groff said during the campaign kickoff. “Our partnership with these numerous charities allows us to give back to the community by creating awareness of vital organizations that pass on knowledge and leadership skills to the next generation, raise awareness and funding for public health issues and make our communities better places to live.”

Groff said the final amount raised during the fall campaign was more than $6,000, noting that the decision to paint the mixer drums was the first time the Pennsy fleet was adorned with anything but the company logo or smaller charitable organization markings. He said the four trucks will be repainted at some point early this year and that Pennsy will continue its support of local charities throughout 2008.

The Pennsylvania Supply Company was founded in 1921 by Walter Mumma to provide building materials to contractors in Dauphin and Cumberland counties. Over the years, the company expanded by acquiring quarries in new territories and producing aggregate. In 1993, Pennsy became a member of Oldcastle Materials Inc. and eventually formed the Mid-Atlantic Group of companies along with Slusser Brothers, Tilcon Delaware and Pioneer Concrete. Oldcastle is a leading vertically integrated supplier of aggregates, asphalt, ready mixed concrete and paving services in the United States and is one of four divisions of CRH PLC, the international building materials group.

“Pennsy people have a strong sense of community pride and are always seeking ways to help enhance our community.”

“The PA Breast Cancer Coalition is doing wonderful things in terms of educational programs, advocacy and support for breast cancer survivors in Pennsylvania. We hope this unprecedented approach of pink trucks will raise more awareness and support for what the coalition is doing,” said Randy Lake, president of the Mid-Atlantic Division of Oldcastle Materials, during the campaign kickoff.
Changing the Way Concrete is Ordered in ASTM C 94

By Dr. Richard S. Szecsy
Vice President of New Product Development and Risk Management, Lattimore Materials Company, LP, McKinney, Texas

ASTM C94, “Specification for Ready-Mixed Concrete,” was first published in 1935 and is one of the most widely used ASTM documents. While it explicitly is the governing standard for ready mixed concrete, it also serves to clarify items omitted in purchase agreements or project specifications, thereby providing a level of protection to the involved parties. ASTM C94 is clear in Section 1.1 that the purchaser’s requirements govern over the provisions in this standard. While portions of the document have changed to reflect changes in technology, compliance with national codes and even the correction of some technical errors, the document has remained relatively unchanged for decades.

Over the last 10 years, a change has begun to occur within the concrete construction industry. An increase in demand for faster construction, lower costs and the rapid influx of newer technologies have caused many within the industry to move more and more toward performance-based specifications. As related to the material ready mixed concrete, the term “performance-based” is intended to mean a measurable property of the material with associated criteria for acceptability that are understood and agreed to by the purchaser and the manufacturer without any constraints on the proportions of the mixture. It is further recognized that there are some performance aspects desired by the purchaser that cannot be defined in measurable terms, and in some cases, prescriptive criteria are necessary to satisfy the performance intent based on considerable experience with that parameter. In this context, a performance-based specification for ready mixed concrete does not assure service-life expectations of the owner of the structure. There need to be decisions made by a design professional based on the serviceability expectations of the structure being built that are then translated into measurable concrete properties. Further, there are construction practices that need to happen to ensure that the potential performance as intended by the design professional are realized in the structure. It is also assumed that projects of any significant economic value will and should have a project specification that addresses material and construction aspects pertinent to that project that cannot be covered in ASTM C94.

To foster performance-based specifications, ASTM itself has issued several public statements about migrating current standards and creating numerous new standards focused on performance. Several other code-writing organizations, such as ACI, have active processes under way to create and migrate toward performance-based codes and standards. Regardless of the potential cost improvement and liability reduction associated with performance-based standards, there are still many participants within the industry who will continue to favor prescriptive-based standards for concrete. As a consequence, any change to ASTM C94 must allow for this market segment as well while still protecting the manufacturer and the purchaser.

Unfortunately, as it exists today, the section of ASTM C94 on ordering concrete fails to explicitly protect either the manufacturer or the purchaser. In the most general sense, there are two direct entities involved in the transaction to purchase and supply concrete: the manufacturer (the entity that batches the concrete and typically delivers it) and the purchaser (the entity that pays the manufacturer for that concrete). There is also an implicit third party that may or may not be the purchaser, and that is the specifier. In some cases, the purchaser and the specifier are the same entity. In the majority of the cases, the specifier provides a specification for concrete construction and the purchaser (contractor) in turn provides the sections pertinent to concrete material to the manufacturer.
However, if you consider the current ordering options under ASTM C94 in “Section 6.0 Ordering Information,” a user of the document is confronted with three choices to order concrete:

**Option A:** When the purchaser requires the manufacturer to assume full responsibility for the selection of the proportions for the concrete mixture.

**Option B:** When the purchaser assumes responsibility for the proportioning of the concrete mixture.

**Option C:** When the purchaser requires the manufacturer to assume responsibility for the selection of the proportions for the concrete mixture with the minimum allowable cement content specified.

The issue is not necessarily with the party that has direct responsibility for the proportions of the concrete mixture, but with the accountability for the actual concrete performance, especially when prescriptive limitations are placed on the proportions. Based on the ordering methods in Section 6.0, the party accountable for the performance of the concrete may not have been the same party responsible for establishing the proportions. In other words, the manufacturer is going to be held accountable for the performance of a proposed concrete mixture that the manufacturer has little to no control over. By way of example, in looking at all three ordering options, the concrete performance accountability can be summarized in Table 1.

<table>
<thead>
<tr>
<th>Concrete Performance Accountability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specifier</td>
</tr>
<tr>
<td>Option A</td>
</tr>
<tr>
<td>Option B</td>
</tr>
<tr>
<td>Option C</td>
</tr>
</tbody>
</table>

**Table 1. Responsibility for performance under the current standard.**

As the standard is written currently, all of the accountability for concrete performance rests with the manufacturer, regardless of which option for ordering is used under Section 6.0. However, when comparing this to which party is responsible for establishing mixture proportions, Table 2 presents a different view:

<table>
<thead>
<tr>
<th>Responsibility for Mixture Proportions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specifier</td>
</tr>
<tr>
<td>Option A</td>
</tr>
<tr>
<td>Option B</td>
</tr>
<tr>
<td>Option C</td>
</tr>
</tbody>
</table>

**Table 2. Responsibility for mixture proportions under the current standard.**

When looking at Table 1 and Table 2 in conjunction, there is a clear conflict between who is responsible for developing the proportions of the concrete mixture and who is accountable for the actual performance of the concrete.

Currently, the ASTM Subcommittee C09.40 that is responsible for C94 is ballot ing revisions to the standard that will provide for only two options for ordering concrete – prescriptive and performance – and defining the associated responsibilities. The proposed changes hope to create very clear and explicit alignment that makes sure that the party that is responsible for the proportions of the concrete mixture is accountable for the performance of the concrete as specified. On the flip side, the party that takes responsibility for establishing proportions of the concrete mixture has to accept the accountability for how the mixture performs. This is outlined in Table 3:

<table>
<thead>
<tr>
<th>Responsibility for Mixture Proportions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specifier</td>
</tr>
<tr>
<td>Prescriptive</td>
</tr>
<tr>
<td>Performance</td>
</tr>
</tbody>
</table>

**Table 3. Responsibility for establishing mixture proportions in proposed change.**
Under the prescriptive option of ordering, the purchaser assumes the responsibility for establishing the proportions for the concrete mixture. The manufacturer assumes the responsibility to furnish a mixture that complies with the prescriptive provisions of the order. Conversely, under the performance option of ordering, when the purchaser specifies the performance requirements to the manufacturer; the manufacturer assumes the responsibility for establishing the concrete mixture proportions that comply with the specified performance requirements.

As summarized in Table 4, the accountability for the concrete performance is directly linked to the party that is responsible for establishing the proportions of the concrete mixture.

<table>
<thead>
<tr>
<th>Concrete Performance Accountability</th>
<th>Specifier</th>
<th>Purchaser</th>
<th>Manufacturer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescriptive</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Purchaser assumes full responsibility for proportions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Performance</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Manufacturer assumes full responsibility for proportions</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4. Responsibility for performance under proposed change.

Finally, Table 5 illustrates how the responsibility for establishing mixture proportions and the accountability for concrete performance can be correctly aligned under the proposed ordering system.

<table>
<thead>
<tr>
<th>Mixture Proportion Responsibility</th>
<th>Performance Accountability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Option A</td>
<td>Manufacturer</td>
</tr>
<tr>
<td>Option B</td>
<td>Purchaser</td>
</tr>
<tr>
<td>Option C</td>
<td>Purchaser / Manufacturer</td>
</tr>
<tr>
<td>Prescriptive</td>
<td>Purchaser</td>
</tr>
<tr>
<td>Performance</td>
<td>Manufacturer</td>
</tr>
</tbody>
</table>

Table 5. Alignment of mixture proportions responsibility and concrete-performance accountability.

The current Option A does allow for the manufacturer to be responsible and accountable for both actions, which is essentially the performance option. In essence, Option A has been relabeled to become the performance ordering option, and in a sense, is redundant as Option A. The prescriptive ordering option correctly aligns the purchaser’s responsibility and accountability.

While the proposed changes may appear to represent a dramatic shift in appearance to ASTM C94, it actually works to make the document more practical and less cumbersome for the user. The proposed changes create explicit requirements rather than implicit assumptions. The purchaser will still be fully protected, as will be the manufacturer. In fact, the protections will be greater than they currently are because much of the ambiguity that exists in the current document will be removed.

As part of the proposed change, some examples of performance and prescriptive orders will be suggested in the non-mandatory Appendix of ASTM C94. As indicated earlier, there will be some cases where prescriptive provisions may be necessary either because performance tests do not exist or it takes too long to conduct such tests to establish the performance of a concrete mixture. A case in point is for durability requirements for concrete exposure classes in the ACI 318-08, “Building Code for Structural Concrete,” intended to provide adequately durable concrete, have primarily prescriptive provisions for concrete. In these cases, the requirements for concrete for the anticipated exposure are based on considerable experience with these prescriptive parameters to provide the necessary performance, and if the purchaser orders concrete by specifying an exposure class, this could be considered a performance-based order.

Szecsy is the incoming chairman of ASTM Subcommittee C09.40. He has been a member of the subcommittee for more than 10 years. In the subcommittee, he has been the task group chair for addressing the use of recycled water that was responsible for establishing the standards: ASTM C1602, Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete, and ASTM C 1603, Test Method for Measurement of Solids in Water. The basis for this article is the rationale being used to support the revisions to the Ordering Information Section of ASTM C94.
RESULTS SPEAK FOR THEMSELVES . . .

M&A ADVISORY AND CAPITAL RAISING EXPERTISE FOR READY MIXED CONCRETE COMPANIES THAT POUR MORE THAN 200,000 YARDS PER YEAR.

www.mccollpartners.com
Eric Andreozzi, Managing Director, at (704) 333-0518 · Brian Davis, Director, at (704) 333-0136
100 North Tryon Street · Suite 5400 · Charlotte · North Carolina · 28202
100 Crescent Court · Suite 700 · Dallas · Texas · 75201
Over the past several decades, the use of fly ash in concrete has had a successful track record. The performance benefits fly ash provides to mechanical and durability properties of concrete have been well researched and documented in actual structures. Currently, fly ash is used in more than 50% of all ready mixed concrete placed in the United States, yet many design professionals continue to remain overly restrictive when it comes to using fly ash in concrete. Then how is it that we, as an industry, are not using more fly ash in concrete? This article addresses some optimal ways of specifying fly ash for use in concrete while ensuring that the desired concrete performance is achieved. Most of these recommendations form part of a larger NRMCA publication that should be released later in 2008. Project specifications for most commercial work in the United States are typically written as per American Institute of Architects MasterSpec format. Any cementitious material is typically addressed under Section 2.5 (Concrete Materials) of that format as follows.

Cementitious materials: Use materials meeting the following requirements:

- Hydraulic Cement: ASTM C150 or ASTM C1157 or ASTM C595
  - Specify type of cement required for the work; C150 – I, II, III, V; C595 – IP, IS; C1157 – GU, HE, MS, HS, MH, LH
- Pozzolan or Fly Ash: ASTM C618
  - Specify class of fly ash if pertinent to the work – Class N, C or F
- Slag: ASTM C989
  - Specify grade of slag if pertinent to the work; Grade 100 or 120
- Silica Fume: ASTM C1240
  - Specify type of silica fume to use in concrete; Class S, C, F, SF, I, II

The above format clearly states that fly ash has to meet ASTM C618, which is the standard specification for coal fly ash and raw or calcined natural pozzolan. This by itself is adequate for specifying fly ash in concrete. Frequently, design professionals make it more complicated and too restrictive. Some of these restrictions, their possible rationale behind them, and issues related to not having these restrictions are discussed below.

Limitations on quantity of fly ash

When fly ash was originally used in concrete in the 1970s, there was some basis for restricting its use. However, after extensive research and several decades of successful use of fly ash in concrete, there is no basis for a restriction on the quantity of fly ash that should be permitted to be used in concrete. Some may say that the ACI 318 Building Code restricts fly ash in concrete. This is not the case. The ACI 318 Building Code is silent on the subject. The Code states that fly ash may be used as a replacement for fine aggregate in concrete mixtures. The Code also states that the use of fly ash in concrete does not affect its performance. Therefore, the Code is silent on the subject. The Code only states that fly ash may be used as a replacement for fine aggregate in concrete mixtures. The Code does not restrict the use of fly ash in concrete.

Currently, fly ash is used in more than 50% of all ready mixed concrete placed in the United States, yet many design professionals continue to remain overly restrictive when it comes to using fly ash in concrete. Then how is it that we, as an industry, are not using more fly ash in concrete? This article addresses some optimal ways of specifying fly ash for use in concrete while ensuring that the desired concrete performance is achieved. Most of these recommendations form part of a larger NRMCA publication that should be released later in 2008. Project specifications for most commercial work in the United States are typically written as per American Institute of Architects MasterSpec format. Any cementitious material is typically addressed under Section 2.5 (Concrete Materials) of that format as follows.

Cementitious materials: Use materials meeting the following requirements:

- Hydraulic Cement: ASTM C150 or ASTM C1157 or ASTM C595
  - Specify type of cement required for the work; C150 – I, II, III, V; C595 – IP, IS; C1157 – GU, HE, MS, HS, MH, LH
- Pozzolan or Fly Ash: ASTM C618
  - Specify class of fly ash if pertinent to the work – Class N, C or F
- Slag: ASTM C989
  - Specify grade of slag if pertinent to the work; Grade 100 or 120
- Silica Fume: ASTM C1240
  - Specify type of silica fume to use in concrete; Class S, C, F, SF, I, II

The above format clearly states that fly ash has to meet ASTM C618, which is the standard specification for coal fly ash and raw or calcined natural pozzolan. This by itself is adequate for specifying fly ash in concrete. Frequently, design professionals make it more complicated and too restrictive. Some of these restrictions, their possible rationale behind them, and issues related to not having these restrictions are discussed below.

Limitations on quantity of fly ash

When fly ash was originally used in concrete in the 1970s, there was some basis for restricting its use. However, after extensive research and several decades of successful utilization of fly ash, there is no basis for a restriction on the quantity of fly ash that should be permitted to be used in concrete. Some may say that the ACI 318 Building Code restricts fly ash in concrete. This is not the case. The ACI 318 Building Code is silent on the subject. The Code states that fly ash may be used as a replacement for fine aggregate in concrete mixtures. The Code also states that the use of fly ash in concrete does not affect its performance. Therefore, the Code is silent on the subject. The Code only states that fly ash may be used as a replacement for fine aggregate in concrete mixtures. The Code does not restrict the use of fly ash in concrete.

Currently, fly ash is used in more than 50% of all ready mixed concrete placed in the United States, yet many design professionals continue to remain overly restrictive when it comes to using fly ash in concrete. Then how is it that we, as an industry, are not using more fly ash in concrete?
ash use to 25% of total cementitious content. However, that is inaccurate. The new ACI 318-08 Building Code in Chapter 4 defines very severe freeze-thaw exposure (Exposure Class F3) as concrete exposed to freezing and thawing cycles that will be in continuous contact with moisture and exposed to deicing chemicals. For concrete structural members subject to Exposure Class F3, there is a limitation on the quantity of supplementary cementitious materials, expressed as a percentage of the total cementitious materials, as follows:
1. Fly ash or other C618 pozzolans – max: 25 percent
2. Total of fly ash or other pozzolans and silica fume – max: 35 percent
3. Combined fly ash, pozzolan and silica fume – max: 50 percent with fly ash or pozzolan not exceeding 25 percent and silica fume not exceeding 10 percent
4. Ground granulated blast-furnace slag – max: 50 percent
5. Silica fume – max: 10 percent

The primary reason for these limits in the Building Code is to minimize the potential for deicer-related surface scaling that can subsequently compromise the concrete cover over reinforcement and initiate corrosion earlier than expected. There is no technical reason to extend this maximum 25% limit for other applications. It is seen that for adequate resistance to alkali silica reaction (ASR) with some types of aggregate and for sulfate resistance, more than 25% of fly ash frequently is required. Also, with greater quantities of fly ash, the durability of concrete related to resistance to ASR, sulfate attack and chloride-induced corrosion is further enhanced. Further, the use of fly ash in concrete supports sustainable construction.

While it is true that greater quantities of fly ash can delay setting and early strength gain, these could be addressed to a large extent through the effective use of chemical admixtures. The concrete producer can evaluate the setting and early strength-gain characteristics of concrete containing fly ash under varying ambient conditions to assure the contractor that these needs will be achieved. It should be left to the concrete producer to optimize concrete mixtures to accommodate different quantities of fly ash.

Prescriptive limits on fly ash amounts do not help concrete performance in any way and may actually limit the improvement in concrete durability.

Limitations on the loss on ignition (LOI) of fly ash to less than x% (x = 2 is typically 2 or 4)

Most commercially available fly ashes will not meet this specification limitation, so in effect, this requirement will prevent fly ash use. In fact, C618 already has a LOI limit of 6%.

LOI is a measure of unburnt carbon in fly ash. Certain forms of unburnt carbon can absorb air-entraining admixtures and affect air entrainment of concrete. So, some may argue that by restricting LOI contents, the air-entrainment problems due to fly ash can be reduced. However, that is inaccurate. Figure 1 illustrates that at the same LOI, different fly ashes can lead to different performance related to generating the necessary air content. In fact, the low-LOI fly ash in that study was more sensitive to air entrainment than the higher-LOI fly ash. The reason for this is that certain fly ashes have finer carbon, which, in spite of lower LOI, can have a more significant effect on air entrainment. So, restricting the LOI of fly ash to 2% or 4% does not eliminate the problems with air entrainment.

The issue is not the LOI but rather the variability of carbon content and type at a given source. If the carbon content and type varies frequently (even as often as during the day) in an unpredictable manner, then it will be challenging for the concrete producer to supply air-entrained concrete with consistent levels of entrained air. This is really a quality-control issue that the fly ash marketer and concrete supplier have to resolve through frequent testing. The fly ash marketer can do a quick indicator test every four truckloads and supply that information to the concrete producer when delivering the fly ash load. The concrete producer can adjust the air-entrainment dosage on that basis and confirm the air content of the produced concrete. Some of the indicator tests are LOI, mortar air content and fly ash foam index test.
Specifying a maximum LOI limit does not resolve the air-entrainment problems related to fly ash use and might in fact provide a false sense of security because these effects may not be determined before concrete is placed in the structure.

28-day strength requirement

In general, concrete containing fly ash has a slower rate of strength development and often results in a higher later-age strength than with portland cement concrete. In some projects, there may not be a need for a 28-day strength requirement for members or classes of concrete that will not have anticipated construction or service loads applied at 28 days. For example, specifying 8,000-psi compressive strength to be achieved at 56 instead of 28 days for columns will result in highly optimized mixtures. A later-age strength requirement when feasible will permit a higher quantity of supplementary cementitious materials, reduce the total cementitious content (paste volume) and therefore reduce the potential for cracking while improving long-term concrete durability. Many projects have been successfully completed where the specified strength had to be attained at 56 days.

If there is a need to obtain information about the acceptability of concrete strength at an earlier age, one might use a percentage of the specified strength at the designated earlier age or an accelerated curing procedure in accordance with ASTM C684. This will allow for necessary quality-control actions if necessary.

Limitation on mixture proportioning, such as replacing “1.2 pounds of fly ash per pound of cement”

This mixture-proportioning approach was popular when fly-ash use in concrete was in its infancy and the use of chemical admixtures was not very prevalent. The objective was to achieve 28-day strength equivalent to a portland cement concrete mixture with some sources and types of fly ash, cement, aggregates and chemical admixtures. It was understood early on that there is no magic replacement ratio of cement with fly ash. The optimum replacement level will depend on the strength targets at different ages, the properties being targeted, climatic conditions, the use of admixtures and cement and fly ash sources. The concrete producer must be allowed to tailor concrete mixture proportions to satisfy strength, durability and fresh properties such as workability, setting time, etc.

Limitations on the class of fly ash or supplementary cementitious material

Some specifications only permit the use of C618 Class F fly ash. In many parts of the country, good quality Class C fly ash is also available. In some regions, a good quality Class N pozzolan, such as calcined clay, is also used. Slag cement may be the preferred supplementary cementitious material in some markets. Concrete producers will generally not stock more than one or two types of supplementary cementitious materials. Project specifications must address local availability and experience to allow fly ash and pozzolans meeting C618, slag meeting C989 and silica fume meeting C1240 in the specification.

Fly ash has to meet ASTM C618, which is the standard specification for coal fly ash and raw or calcined natural pozzolan for use in concrete. This by itself is adequate for specifying fly ash in concrete.

It is true that Class F fly ash is more effective in increasing concrete’s resistance to ASR and sulfate attack. However, rather than disallowing Class C fly ash, durability can be ensured through a performance specification as discussed below:

Requirement for Class F fly ash for resistance to Alkali Silica Reaction (ASR)

Design professionals often specify prescriptive requirements such as quantities of Class F fly ash, slag, low-alkali cement, the use of a non-reactive aggregate, etc., to avoid ASR-related distress in structures. Class C fly ash may not be allowed. Concrete resistance to ASR can be ensured by incorporating the performance option provided below in the concrete specification:

Alkali silica reactivity – If the aggregate is deemed reactive as per Section XX.X and for structural concrete members that will be moist in service, submit documentation qualifying the proposed cementitious materials used with the aggregate by ASTM C1567 tests with an expansion after 14 days of exposure less than or equal to 0.1%.

C1567 is a standard test method for determining potential alkali-silica reactivity (ASR) of combinations of cementitious materials and aggregate. Generally, fly ash, silica fume and slag are used to mitigate problems associated with deleterious ASR, with increasing levels typically leading to improved resistance. If the aggregate is deemed reactive, the concrete supplier can perform ASTM C1567 tests with different types and proportions of supplementary cementitious materials and choose the combination that yields a 14-day expansion lower than 0.1%. For example, if 25% fly ash A shows expansion below 0.1%, the concrete supplier should use at least 25% of that fly ash in the mixture proportions. This is a better approach because more than 70% of the aggregates are typically found to test as potentially reactive to ASR by the ASTM...
IT STANDS LIKE A MONUMENT TO YOUR GOOD BUSINESS JUDGMENT.

Ready mix producers around the world depend on CON-E-CO® batch plants to maximize productivity and keep their fleets running profitably. The quality and reliability are renowned. And you get 24/7 access to the industry’s best dealer network and factory support. Contact your local CON-E-CO dealer today. Or visit our web site and use the Configurator to spec one for your business.
C1260, Potential Reactivity of Aggregates (Mortar-Bar Method). Most of the aggregates that test to be potentially reactive show good field performance. Disallowing Class C fly ash on the basis that the aggregate fails the C1260 test or even the C1293 concrete prism test is not a good approach. The use of C1567 test limits allows the possibility of using Class C fly ash at different dosages while ensuring that the concrete can attain resistance to ASR.

Limits on the available alkali of fly ash

ASTM C618 used to have an optional limit on the available alkali content of fly ash. Research indicated that there was no good correlation between the measured available alkali content and the performance of the fly ash to mitigate ASR. This limit has been deleted from C618 and it is not measured by marketers of fly ash. This requirement, however, continues to remain in some project specifications. However, if the total alkali of fly ash is high (> 5% Na2O equivalent), the fly ash has not been found to be effective in controlling ASR. These high-alkali fly ashes, when tested with reactive aggregate, will exceed the ASTM C1567 expansion limits. Therefore, there is no need for a separate limit on the total alkali content of fly ash.

The requirement of a certain quantity, type of fly ash or another supplementary cementitious material for resistance to chloride ion penetration

For concrete exposed to chlorides (deicing chemicals, marine exposure), it is well known that fly ash, silica fume and slag can increase resistance to deterioration related to the corrosion of reinforcing steel by reducing chloride ion penetrability of concrete, with increasing levels typically leading to improved performance. However, it is not advisable to invoke prescriptive proportions, type and choice of fly ash, silica fume and slag to attain the improved performance.

The ASTM C1202 test, which really measures the electrical conductivity of concrete, provides a rapid indication of concrete’s ability to resist chloride ion penetration. By requiring a low C1202...
coulomb level, the design professional ensures that the concrete mixture will have a potential for low chloride ion penetrability without establishing prescriptive limits on the quantity, choice and types of fly ash, slag or silica fume. If the test option is used, it will need some necessary lead time for developing and testing one or more mixtures. Depending on the criteria, a value of 1,500 to 2,000 coulombs at 28 days might be selected as the criterion. The test samples must be standard cured for seven days, followed by 21 days of curing in 100-degree water. For standard laboratory curing, the test period should be extended to at least 56 days to recognize the benefit provided by fly ash. The use of C1202 test criteria provides freedom to the concrete producer to optimize mixture proportions while ensuring that concrete of low chloride ion penetrability is used.

Note that the C1202 test has a high testing variability and is not very suitable for the testing of samples obtained at the jobsite. It is suggested to be used primarily to qualify concrete mixtures. For critical projects, if the design professional is interested in the use of C1202 criteria for concrete acceptance, a more rigorous statistical approach is appropriate, as discussed in Reference 8.

Requirement for Class F Fly ash for resistance to sulfate attack

For different levels of sulfate exposure, the 318 Building Code has w/cm, compressive strength and cementitious type requirements. Concrete containing Class C fly ash is not known to be very effective against sulfate attack. Therefore, engineers prescribe only Class F fly ash for concrete exposed to sulfate environments. The new 318-08 Code adopts a more progressive approach and allows a performance-based evaluation of the proposed cementitious materials by ASTM C1012. The code also permits the evidence of past successful field performance to be used. The use of C1012 criteria ensures that the concrete is resistant to sulfate attack and does not restrict the use of Class C fly ash or any other material. The one disadvantage of this approach is the considerable lead time needed, since tests progress for six months to one year.

The use of silica fume without any other supplementary cementitious material

A concrete specification that requires the use of, say, 7% silica fume without any other supplementary cementitious material may not be an optimized mixture for the application. The design professional should focus on the intended performance requirement (permeability, resistance to ASR, sulfate attack, etc.) and allow the concrete producer to combine supplementary cementitious materials judiciously to attain target performance levels. The use of a lower quantity (3% to 4%) of a highly reactive pozzolan such as silica fume with fly ash or slag can lead to optimum early age strength, fresh concrete properties and significant long-term durability benefits.

Reference to water to cement ratio (w/c)

It is common for concrete to have supplementary cementitious materials such as fly ash and slag that are included in the

<concrete>
<control>
<advantage>
<with>
<users>
<significant>
<quality>
<about>
The design professional should focus on the intended performance requirement (permeability, resistance to ASR, sulfate attack, etc.) and allow the concrete producer to combine supplementary cementitious materials judiciously to attain target performance levels.

calculation of w/cm. The ACI 318 Building Code has limitations on the maximum water-to-cementitious-materials ratio (w/cm) for various durability requirements. Referring to w/c may be misleading, and this should always be referred to as water-to-cementitious-materials ratio (w/cm).

Minimum cementitious content requirements

ACI 301 and 302 recommend minimum cementitious material content (not cement) for floor slabs only, primarily to improve finishability. There is no technically valid reason to include a minimum cementitious content for other structural elements, provided the performance requirements for that element are achieved. Even for floor slabs, the finishability can be determined by placing trial slabs rather than the prescriptive minimum cementitious material content approach, which does not necessarily ensure good finishability. Also, a high minimum cementitious material content frequently leads to non-optimized mixtures, high paste contents, higher shrinkage, high temperatures due to heat of hydration and associated cracking.

References
1. Guide Toward Improving Concrete Specifications, NRMCA publication (under development)
4. ASTM C618, C989, C1202, C1240, C1260, C1293, C1567, Annual Book of ASTM Standards Volume 4.02, ASTM International
5. ACI 318-05, “Building Code Requirements for Structural Concrete,” ACI Manual of Concrete Practice, American Concrete Institute, www.aci-int.org
For more information, contact Obla at 240-485-1163 or via e-mail at kobla@nrmca.org.

Visit our Buyers’ Guide online at NRMCA.OfficialBuyersGuide.net
Your company’s reputation – and future orders – are depending on your performance today.

Buying only equipment with TMMB rating plates ensures that your equipment will perform up-to-spec time after time.

The manufacturers of the Truck Mixer Manufacturers Bureau guarantee that mixers have specified capacity, accurate water control, precise mixing speed and uniform mixing performance to ensure quality concrete is delivered that way.

In fact, in many states TMMB rated equipment is required on state jobs.

Contact us to learn more about the TMMB advantage.
Superflat Floors: A Tool for Saving Money in Distribution Centers and

By Ken S. Shoemaker
Vice President of Engineering, ALLFLAT Consultants Inc.

Initial investments to ensure a superior VNA superflat floor will be returned many times over through increased throughput, increased vehicle operating time, increased productivity and decreased maintenance costs for vehicles, pallets and racks.

Introduction

Modern industrial floors, particularly Very Narrow Aisle (VNA) defined-traffic type floors found in distribution centers and warehouses, are rapidly becoming one of the most important factors in the push to improve productivity, throughput and the bottom line. As new technologies such as automated guided vehicles and high-reach lift trucks place greater emphasis on achieving productivity goals, the role of the VNA superflat floor in operational cost comparison calculations should not be overlooked.

Initial investments to ensure a superior VNA superflat floor will be returned many times over through increased throughput, increased vehicle operating time, increased productivity and decreased maintenance costs for vehicles, pallets and racks. In addition, the intangible and immeasurable but equally beneficial effect of superflat floors is the improved safety savings through reduced operator fatigue and/or injury. But most important is return business for everyone associated with the project.

In this article, the author examines the basic tenants of concrete floors, the role of
the concrete supplier in achieving superflat floors, the effect of a floor’s surface condition on lift trucks and estimated cost savings through increased lift-truck performance with the use of superflat floors.

The Basic Tenants of Superflat Floors

“Superflat” is an often-misused term. People frequently use the term to describe any concrete floor with a flatness and levelness requirement. According to the American Concrete Institute standard 302.1R, there are nine classes of floors. These are based on the intended use of the floor and suggested final finishing technique. Superflat floors are Class 9 floors. They have a single course or topping with an exposed surface, and they have a critical surface finish tolerance for special materials-handling vehicles or robotics requiring specific flatness and levelness tolerances.

Why Does a Floor need to be Superflat?

The short answer is: To save time and money and to improve productivity. Architects and operations managers of new construction and existing distribution centers or warehouses often overlook the concrete floor as a means of saving money in daily operating costs. After all, it’s just concrete, right?

To the contrary! Successful distribution center and warehouse operators say that the most effective wheeled vehicle material-handling system is one that is based on floors that have superior flatness and levelness. For any VNA operation, having a superflat floor becomes even more important as rack height increases.

Extraordinarily flat and level floors provide for quick and immediate access to inventory and they provide a measure of operator safety with regard to lift-truck operations. Achieving maximum lift-truck performance and machine utilization depends directly on floor flatness and levelness. The flatter and more level the VNA floor, the fewer problems one will encounter in overall material-handling operations.

Typically, superflat floor slabs are poured in strips approximately 8-10 inches thick, range between 15 and 30 feet wide and can be almost any length. Slabs of 300 feet or more are not uncommon. However, this author has witnessed successful placement of 50-foot by 325-foot, four-aisle VNA slabs using two Somero laser screeds with limited corrective grinding.

Why Do I Need to Know About Superflat Floors?

The concrete supplier for a distribution center or warehouse construction project plays an important role in the successful placement and finishing of a superflat floor. Specifically, the variables normally found in concrete production are difficult enough,
but effectively managing these variables along with delivery timing is crucial to superflat success. In monolithic, continuous-pour slabs, the variations in slump, sand-to-aggregate-to-cement-to-water ratios, mix temperature, admixtures, ambient air temperature, ground moisture content and delivery timing have a profound effect on the flatness and levelness of a superflat floor.

For instance, slump differences affect the ability of the contractor to perform continuous and uniform finishing. As a result, the slab begins to cure at differing rates and in different areas of the slab, thus causing minute changes to the surface flatness and levelness readings that are insignificant for random traffic floors but highly significant for VNA floors. Sometimes, these minute differences (usually measured in thousandths of an inch) mean the difference between a slab meeting specification and the need for corrective grinding.

Load timing may be less important in random-traffic floors, but cold joints associated with delayed deliveries in a superflat floor often require corrective grinding. In short, the concrete supplier can help alleviate finishing woes by providing a product that is uniform from load to load, ready to place and available when needed.

Floor Flatness and Levelness

Modern floor-measurement techniques are traceable back to the 1976 World of Concrete exposition, where Sam and Allen Face, a father-and-son team, first recognized the impractical nature of using a 10-foot straight edge to measure floors. Their introduction of the DipStick measuring tool revolutionized concrete measurement.

The FF/FL System

“FF” and “FL” stand for “floor flatness” and “floor levelness.” These criteria are the accepted method for specifying and measuring the flatness and levelness for random-traffic floors.

One definition of FF is the “bumpiness” of the floor. FL is the pitch, inclination or overall levelness of the floor. FF/FL measurements are taken at successive one-foot intervals in a random sampling method and provide the necessary data to calculate the overall flatness and levelness of the floor surface. The comparison of the starting and ending values along with other mathematical formulas determine the FF/FL ratio.

The Fmin System

A second measurement system for VNA defined-traffic floors is called “Fmin” (Fig 1). Because VNA lift trucks do not vary in their movement down the aisle, measurements taken by a simulated lift truck in the defined wheel paths of the aisle using a differential axis electronic surface Profilograph to formulate the data of the Fmin calculation.

Four separate characteristics comprise the Fmin numbering system. They are:

1. The FminL tolerance band consisting of:
   (a) Longitudinal flatness, and
   (b) Longitudinal levelness

2. The FminT tolerance band consisting of:
   (a) Transverse flatness, and
   (b) Transverse levelness

3. FminAL rate of change within 12-inch intervals

4. FminAT rate of change within 12-inch intervals

“Longitudinal” refers to the long axis of the aisle and the relationship in height change between the front and rear wheels of the lift truck (Fig 2). Transverse refers to the side-to-side relationship between the right and left side of the vehicle at either the front or rear sets of wheels (Fig 3).

Although ACI 302.1R classifies a super-flat floor as generally meeting or exceeding FF/FL 50, it is important to note that the use of the FF/FL system will not guarantee trouble-free operations of VNA lift trucks. This is because of the randomness of the FF/FL measurements and the possibility that a floor defect in the wheel path could be missed. Therefore, there is no direct correlation between FF/FL and Fmin. The FF/FL and Fmin systems are completely different measuring systems and there are no corresponding indices for comparison purposes.

The main reason for developing the Fmin system is quantifying the threshold for preventing lift truck-to-racking conflicts. Floor defects in the wheel paths that cause sudden changes in floor flatness or levelness (slope defects) over time will result in catastrophic truck failure, such as mechanical breakdowns, lost loads or conflicts between machine and racking.

In the following table, the effects of seemingly insignificant floor-height discrepancies clearly show the amount of mast lean a lift truck will encounter while at rest. This is called static lean – one front wheel resting on top of a known defect of the size indicated creates static lean as indicated in the table:
In addition to the above static-lean values, the added effects of dynamic frame and mast flexing caused by inertia easily shows the potential for disastrous results. In short, the relationship between mast height, aisle width, size of the floor defect and inertia determines the Fmin requirements for a particular lift-truck application. The following table identifies the Fmin tolerances for typical rack heights:

<table>
<thead>
<tr>
<th>Rack Height</th>
<th>Defined Traffic Values</th>
<th>Profile Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>0’ to 25’</td>
<td>F min L 40 F min T 50</td>
<td>Level I Average</td>
</tr>
<tr>
<td>26’ to 35’</td>
<td>F min L 50 F min T 65</td>
<td>Level II Flat</td>
</tr>
<tr>
<td>36’ to 45’</td>
<td>F min L 65 F min T 85</td>
<td>Level III Very Flat</td>
</tr>
<tr>
<td>46’ to 50’</td>
<td>F min L 85 F min T 100</td>
<td>Level IV Superflat</td>
</tr>
<tr>
<td>51’ &amp; up</td>
<td>F min L 100 F min T 125</td>
<td>Level V Ultraflat</td>
</tr>
</tbody>
</table>

The Affect of the Floor Surface Condition on Lift Truck Performance and Service Life

There are several reasons why VNA superflat floors are important to successful distribution-center and warehouse operations. Some of them are as follows:

Fork Placement – Seemingly minor variations in floor flatness and levelness amplify problems with placement and retrieval as mast height increases.

Operator Safety and Fatigue – Over time, continuous jostling from bumpy floors causes operators to become fatigued, causes lost-time injuries and makes operators prone to accidents, material-handling mishaps and misplaced inventories.

Mast Deflection – Vibration from uneven floors increases the “fishing rod effect” on lift-truck masts.

Frame Stress Cracks – Consider that lift trucks generally do not have a suspension system. A sudden height variation (slope defect) or small bump of only 0.066 inches (≈1/16”) in floor flatness can cause one or more wheels to become airborne at speed and cause frame stress cracking from continuous dynamic cyclic flexing of the frame steel (Fig 4).

Vehicle Maintenance – Vibration from rough surfaces not only causes deflection in lift-truck structural materials but can also affect axles, seals, bearings and other key components.

Decreased Productivity – Rough-surface floors prohibit rapid movement of lift trucks and add to daily operating costs by increasing material-handling time and reducing overall throughput. Lift truck operators must constantly judge the surface of the floor and adjust their speed according to the immediate condition of the floor. Sometimes, operators must slow to crawl speed in order to negotiate certain floor defects such as joints, bumps, dips or other problem areas. However, on VNA superflat floors, full-speed lift truck operations are commonplace. In short, Superflat floors provide the least amount of lost time in VNA lift-truck operations.

Estimated Cost Savings of Superflat Floors

A typical VNA superflat distribution center/warehouse aisle is approximately 300 feet long. To accurately calculate lost productivity from non-superflat floors would require more space than this article will allow. However, some fundamental mathematics reveal very interesting if not startling results.

For instance, let us assume an average empty high-reach lift truck travels at a full speed of approximately 6.5 miles per hour, or about 9.5 feet per second (FPS). The required time to traverse from one end of the 300-foot aisle to the other is approximately 31.5 seconds at full speed. Empirical data taken from Profilograph® floor measurements of newly placed VNA superflat floors indicate an average of approximately 10 percent of the pour, or about 12 areas, need remedial grinding to meet the required floor flatness specification. Also, let us assume that the lift truck driver must slow down significantly (about 1.5 seconds lost to deceleration and acceleration) to negotiate each out-of-tolerance area. In this scenario, for every time the lift truck travels a typical 300-foot VNA aisle, an additional 18 seconds are needed to safely negotiate the out-of-tolerance areas.

Next, let us assume that the cost per hour to operate the distribution center/warehouse is around $100 per lift truck ($15 per hour plus benefits, taxes and insurance). Multiply 18 seconds by $0.28 per second ($100 per hour divided by 3,600 seconds per hour) to get $0.50 per run. In other words, every time a lift truck traverses from one end of a 300-foot aisle to the other and the floor does not meet the FminL - FminT tolerance, the building owner loses a 50-cent piece.

One can easily see from these basic calculations how VNA superflat floors save time and save money. Consider the number of lost 50-cent runs made each eight-hour shift for each lift truck, multiplied by the number of shifts per working day, by the number of days per week, by the number of days per year and the result is startling – about $1,000 in lost productivity per three-shift day.

Calculations:

Eight hours minus 0.5 hours for lunch, minus the standard 15% for employee personal needs, fatigue and unavoidable delays = 6.375 hours lift-truck operating time per shift. Multiply 6.375 times 6.5 mph = 41.5 possible miles of lift truck travel per shift.

Architects and operations managers of new construction and existing distribution centers or warehouses often overlook the concrete floor as a means of saving money in daily operating costs.
Multiply 41.5 miles by 5,280 feet per mile = 218,790 feet. Divide 218,790 by 300 feet per aisle = 729.3 aisles per shift. Multiply 729.3 by 0.50 dollars per aisle = $364.65 per shift. Multiply 364.65 by three shifts per day = $1,093.95 in lost productivity dollars.

**Recommendations**

Architects, design engineers, concrete suppliers and building owners should spend time familiarizing themselves with the Fmin system and the benefits of having their floors meet this specification. Although some confusion may arise as customers and contractors attempt to determine superflat floor specifications, the time spent with an Fmin-qualified concrete consulting company before work begins on the project is money well spent.

Initial investments of time and money to ensure a superior floor will be returned many times over through increased throughput, increased vehicle operating time, increased productivity and decreased maintenance costs for vehicles, pallets, racks and operator fatigue. Superflat floors are an important consideration in calculating cost savings of distribution-center and warehouse daily operations.

**About the Author:**

Ken S. Shoemaker is the vice president of engineering for ALLFLAT Consultants Inc., the owner of FACE Consultants Profiling. ALLFLAT offers Fmin consulting services and measures floor surface profiles using digital Profilograph® measuring equipment. Ken has two decades of experience in the construction industry, ranging from laborer to educator. He has been an assistant professor at the community college and university levels. As an educator, Ken’s experience includes creating, developing and teaching construction technology courses leading to student certification from the Associated Builders and Contractors (ABC), the Associated General Contractors of America (AGC) and International Conference of Building Officials (ICBO). You can contact him at P.O. Box 232396, Encinitas, CA 92023; via phone at 760-479-1720; or via e-mail at ken@allflat.com.

**Bibliography**


(Dare K 22 VNA Warehouse Floor Flatteners - Concrete Grinding Specialists at CeMat)Dare, K. (22). VNA Warehouse Floor Flatteners - Concrete Grinding Specialists at CeMat. Retrieved August 8, 2006, from Forklift Action Website: http://www.forkliftaction.com


(Fricks T J 1992 New warehouse technology makes well-designed floors a necessity. (designing floors in warehouses) Industrial Engineering, 24(9), 31-32.


Q I understand that the Federal Motor Carrier Safety Administration (FMCSA) issued new training requirements for anyone applying for a commercial driver’s license (CDL). Is this true?

A Yes. The FMCSA issued a new rule on training requirements for drivers seeking a new or upgraded CDL on Dec. 28, 2007. The current rule, which was published in 2004, requires just less than 11 hours of classroom instruction. The proposed new regulation would mandate a minimum of 76 hours in the classroom and 44 hours behind the wheel, for a total of 120 hours of instruction.

Previously, behind-the-wheel training was not required. Under the proposal, the classroom instruction will continue portions of the current curriculum. In addition, it will cover CDL safety regulations, vehicle operation and safe-operating practices. Drivers would have to obtain their training from a truck-driving program or institution accredited by the U.S. Department of Education or the Council on Higher Education Accreditation.

Please note: The column contained here should in no way be considered a substitute for competent legal counsel. It is only meant as a guide to help employers know when it is necessary to consult an attorney on issues pertaining to labor-management relations and other workplace issues.
Who to Call at NRMCA

LOCAL: (301) 587-1400
TOLL-FREE: 1-(888) 846-7622
WEBSITE: www.nrmca.org

CODES AND SUSTAINABILITY
Erin Ashley, Ph.D.  (240) 485-1306
eashley@nrmca.org

COMMUNICATIONS
Frank Cavaliere  (240) 485-1141
fcavaliere@nrmca.org

CONCRETE PROMOTION
Glenn Ochsenreiter  (240) 485-1140
gochsenreiter@nrmca.org
Jon Hansen  (515) 266-1058
jhansen@nrmca.org
Dan Huffman  (503) 292-7729
dhuffman@nrmca.org
Phil Kresge  (610) 966-7220
pkresge@nrmca.org
Doug O’Neill  (585) 436-8310
donell@nrmca.org
Vance Pool  (281) 557-8415
vpool@nrmca.org

ENGINEERING
Colin Lobo Ph.D., P.E.  (240) 485-1160
clobo@nrmca.org
Lionel Lemay, P.E., S.E.  (847) 918-7101
llemay@nrmca.org
Karthik Obla, Ph.D., P.E.  (240) 485-1163
kobla@nrmca.org

REGULATORY AFFAIRS
Gary Mullings  (240) 485-1161
gmullings@nrmca.org

FINANCIAL ACTIVITIES
Michael Olivarri, CPA  (240) 485-1130
molivarri@nrmca.org
Debbie Werden  (240) 485-1131
dwerden@nrmca.org
Tamara Waugh  (240) 485-1132
twaugh@nrmca.org

GOVERNMENT AFFAIRS
Bob Sullivan  (240) 485-1148
rsullivan@nrmca.org
Kerri Leininger  (240) 485-1159
kleininger@nrmca.org
Kevin Walgenbach  (240) 485-1157
kwalgenbach@nrmca.org

INDUSTRY RELATIONS
Nicole Maher  (240) 485-1158
nmaher@nrmca.org

INFORMATION TECHNOLOGY
Lawrence Afable  (240) 485-1167
lafable@nrmca.org

MARKETING
Paul Laporte  (240) 485-1142
plaporte@nrmca.org

MEETINGS
Jennifer Leonard  (240) 485-1156
jleonard@nrmca.org
Jessica Moore  (240) 485-1152
jmoore@nrmca.org

MEMBERSHIP
Kathleen Carr-Smith  (240) 485-1145
kcarrsmith@nrmca.org
Kimberly Pittmon  (240) 485-1146
kpittmon@nrmca.org

OFFICE OF THE PRESIDENT
Robert Garbini, P.E., President  (240) 485-1139
rgarbini@nrmca.org
Deana Angelastro  (240) 485-1138
dangela@nrmca.org

OPERATIONS/EQUIPMENT MAINTENANCE
Gary Mullings  (240) 485-1161
gmullings@nrmca.org
Greg Vickers  (240) 485-1136
gvickers@nrmca.org

PUBLICATIONS
Jacques Jenkins  (240) 485-1165
jjenkins@nrmca.org

RMC RESEARCH FOUNDATION
Julia Garbini  (240) 485-1150
jluther@rmc-foundation.org
Jennifer LeFevre  (240) 485-1151
jlefevre@rmc-foundation.org

SAFETY
David Ayers  (240) 485-1155
dayers@nrmca.org
Gary Mullings  (240) 485-1161
gmullings@nrmca.org

TRAINING/EDUCATION/CERTIFICATION
Eileen Dickson  (240) 485-1164
edickson@nrmca.org
Susan Bachenheimer  (240) 485-1166
susan@nrmca.org
Michele Elhenawi  (240) 485-1182
melhenawi@nrmca.org
Best Sellers from the NRMCA Bookstore

1. **2P188 – Truck Mixer Driver’s Manual** – This manual educates truck mixer drivers about concrete and customer relations. This booklet also highlights driver duties, safety precautions, equipment inspection and maintenance procedures and what the driver should do in case of an accident. This 64-page manual is easy to understand and contains common-sense information every driver should know.

2. **2PCIP100 – Concrete in Practice Package** – Concrete in Practice Sheets are short, one-page discussions on various concrete topics, are written in a “What? Why? And How?” scheme and are intended to provide information in a non-technical format. The CIP topics are researched and written by members of NRMCA’s Research Engineering and Standards Committee. These are great resources to give to your contractors and customers.

3. **2PRD032DVD – Driver Training DVD – Keeping Your Head in the Game** – Mixer drivers, learn how to deal with the public’s increasingly aggressive driving behaviors without developing your own “road rage trap” while on a delivery. Ten minutes, 24 seconds long. (70 members, $90 non-members).

4. **2PENVKIT – Environmentally Sound Practice in the RMC Industry Kit** – This video-based training package is designed to educate and enhance the environmental awareness of all ready mixed concrete-industry employees. The 17-minute film addresses the industry’s important environmental challenges and offers numerous best management practices to meet these challenges. In addition to the video, the kit includes NRMCA’s popular Environmental Management Practices (2P191), which provides extensive background information for the session facilitator, a package of 20 Best Practices Guides for distribution as a reference handbook for trainees and a 10-page facilitator’s guide.

5. **2CSB – Cement Safety Brochure (Packages of 100)** – Send a pocket-sized, four-page cement burn safety brochure with each load and you’ll help ensure that your customers safely manage the risks of using concrete. With colorful, easy-to-read instructions and illustrations on safety equipment and the proper ways to work with concrete, plus clear warnings about risks posed by concrete, the brochure serves as a tool that demonstrates your professionalism while increasing customer knowledge about managing the health and safety risks of working with wet concrete and cement. Sold in packages of 100. ($25 members, $100 non-members).

6. **2P159CTM – Plant Operator’s Certification Training Manual** – This text reference serves as the content for NRMCA’s Plant Operator’s Certification program. It includes valuable information on materials, batch tolerance, aggregate moisture calculations and much more. Development of the text was funded by the RMC Research & Education Foundation and prepared by NRMCA. ($30 members, $120 non-members).

7. **2P059 – Concrete Plant Operator’s Manual** – Jointly prepared by the Concrete Plant Manufacturers Bureau and NRMCA, this manual is a comprehensive guide for the batch plant operator. It includes valuable information on materials, batch tolerance and aggregate moisture, calculations, plant maintenance, safety and more. ($23 members, $92 non-members).

8. **2PFFF1 – Flowable Fill Flip Chart “Pitch” Book** – Due to the great reception of the Concrete Parking Promotion Flip Chart “Pitch” Book, NRMCA has introduced additional flip-chart books to assist in promoting the benefits of concrete to specifiers. The latest is a comprehensive, 20-page presentation on Flowable Fill. The presentation includes attractive, clear and compelling information for the specifier, backed by key additional information that the specifier does not see. This approach helps every promoter stay organized, reinforce the key points and cover additional helpful information to support the specifier. The Pitch Book also comes with a Windows PowerPoint version on CD for electronic presentations, which also enables editing and printing of page updates to the flip-chart book. (1-9 copies: $35 each; 10 or more copies: $30 each).

9. **2CP – Pervious Concrete Pavements** – Pervious concrete as a paving material has generated tremendous interest due to its ability to allow water to flow through itself to recharge groundwater and minimize stormwater runoff. This introduction to pervious concrete pavements reviews its applications and engineering properties, including environmental benefits, structural properties and durability. Both hydraulic and structural design of pervious concrete pavements are discussed, as well as construction techniques. ($15 members, $15 non-members).

10. **22HYDRO – Pervious Hydrological Software Resource CD-ROM** – An important pervious concrete reference tool filled with technical and promotional resources, including Pervious Concrete Pavements, this is an outstanding reference that covers pervious applications and engineering properties, environmental benefits, structural properties and durability. The CD also includes an analytical tool on hydrological design, based on the Pervious Concrete Hydrological Analysis Program, which illustrates the behavior of pervious concrete systems in relatively simple situations. (1-5 copies: $25 members, $35 non-members; 6 or more copies: $15 members, $25 non-members).
Innovative Design Has Produced An Acid Wash Brush That Is Guaranteed To Outlast All Other Acid Wash Brushes

2 In 1 Brush That Is Soft Enough For the Cab & Yet Tough Enough For The Drum

(Introduced to the Ready Mix Industry in 1988)

For a Catalog, Free Samples or To Order
Call 1-800-225-4724 – Fax 1-510-222-4725 or Visit www.RivieraBrush.com
Water Flow Monitoring for Concrete Trucks
Rugged, Reliable, and Field Proven

Flowmeter with local indication, Model SFI-100T
- Pulsed output for flow rate and totalization
- Weatherproof and UV resistant construction
- Field replaceable electronics

Flow proving switch, Model V-11
- Switch contact to prove flow or no flow
- Weatherproof construction
- Field replaceable switch

- 100% Recycle of Aggregates and Residual Water
- Residual Water Density Monitoring and Interfacing
- Minimum Fresh Water Usage
- Ability to handle fiber
- Above Ground Construction
- High-Quality Components
- Simplicity in Design and Operation

W.E. Anderson - A Div. of Dwyer Instruments, Inc.
*Phone: 1-800-872-9141 *Fax: 219-872-9057  
*e-mail: lit@dwyer-inst.com *www.dwyer-inst.com
MEMCO, Inc. is the manufacturer of one of the finest above-ground fuel systems available, offering fire-rated ENVIROSAFE™ Fireguard® and Flameshield® Fuel Systems.

Tanks arrive at your location in turnkey condition ready to be placed on your concrete slab and wired to your 110 or 220 single-phase electric.

Our systems are light weight and easily transportable. Our 2085 systems weigh 70% less than other comparable encased models.

500 gal. to 30,000 gal. tanks available

1-800-284-0414
20303 Alfalfa Dr., Lago Vista, TX 78645

(800) 555-4754 • www.envirosafetanks.com
Products & Services Marketplace

Dry Aggregate Works Better

Ag-Flow™ is the ultimate aggregate control system - it heats cold material and dries wet material to reduce weather related production losses.
- New or Retrofit
- Individual Control for Up to 8 Bins
- Logic Relay or PC/PLC
- Automatic or Manual Controls
- Economical

To learn more just give us a call
1-800-756-4937
www.mixersystems.com

Instant Steam Generator

Designed specifically for heating water and aggregates, all with the one unit.

“Will not make aggregate MUSHY”

Fuel savings up to 50%
Low carbon monoxide levels
Full bore steam in 15 seconds
No stationary engineer required
No chemical treatment of water

for More info
Call: 1-800-338-1339
or visit: www.steamengineering.ca

Quality.
Consistency.
Availability.
Pride in using a fly ash processed without adding another new source of combustion to a world that just doesn’t need it.

Bright Green Beneficiation™

1-888-4PROASH
www.proash.com

Your Foundation to Successful Construction

Put our products to work for you:

Cement - Aggregates
Sand - Fly Ash

Serving the ready-mix industry with quality products, experience and integrity.

for More info
Call: 1-800-338-1339
or visit: www.steamengineering.ca

Put our products to work for you:

Cement - Aggregates
Sand - Fly Ash

Serving the ready-mix industry with quality products, experience and integrity.

Your Foundation to Successful Construction

Put our products to work for you:

Cement - Aggregates
Sand - Fly Ash

Serving the ready-mix industry with quality products, experience and integrity.

Your Foundation to Successful Construction

Put our products to work for you:

Cement - Aggregates
Sand - Fly Ash

Serving the ready-mix industry with quality products, experience and integrity.

Your Foundation to Successful Construction

Put our products to work for you:

Cement - Aggregates
Sand - Fly Ash

Serving the ready-mix industry with quality products, experience and integrity.

Your Foundation to Successful Construction

Put our products to work for you:

Cement - Aggregates
Sand - Fly Ash

Serving the ready-mix industry with quality products, experience and integrity.

Your Foundation to Successful Construction

Put our products to work for you:

Cement - Aggregates
Sand - Fly Ash

Serving the ready-mix industry with quality products, experience and integrity.

Your Foundation to Successful Construction

Put our products to work for you:

Cement - Aggregates
Sand - Fly Ash

Serving the ready-mix industry with quality products, experience and integrity.

Your Foundation to Successful Construction

Put our products to work for you:

Cement - Aggregates
Sand - Fly Ash

Serving the ready-mix industry with quality products, experience and integrity.

Your Foundation to Successful Construction

Put our products to work for you:

Cement - Aggregates
Sand - Fly Ash

Serving the ready-mix industry with quality products, experience and integrity.

Your Foundation to Successful Construction

Put our products to work for you:

Cement - Aggregates
Sand - Fly Ash

Serving the ready-mix industry with quality products, experience and integrity.

Your Foundation to Successful Construction

Put our products to work for you:

Cement - Aggregates
Sand - Fly Ash

Serving the ready-mix industry with quality products, experience and integrity.

Your Foundation to Successful Construction

Put our products to work for you:

Cement - Aggregates
Sand - Fly Ash

Serving the ready-mix industry with quality products, experience and integrity.

Your Foundation to Successful Construction

Put our products to work for you:

Cement - Aggregates
Sand - Fly Ash

Serving the ready-mix industry with quality products, experience and integrity.

Your Foundation to Successful Construction

Put our products to work for you:

Cement - Aggregates
Sand - Fly Ash

Serving the ready-mix industry with quality products, experience and integrity.

Your Foundation to Successful Construction

Put our products to work for you:

Cement - Aggregates
Sand - Fly Ash

Serving the ready-mix industry with quality products, experience and integrity.

Your Foundation to Successful Construction

Put our products to work for you:

Cement - Aggregates
Sand - Fly Ash

Serving the ready-mix industry with quality products, experience and integrity.

Your Foundation to Successful Construction

Put our products to work for you:

Cement - Aggregates
Sand - Fly Ash

Serving the ready-mix industry with quality products, experience and integrity.

Your Foundation to Successful Construction

Put our products to work for you:

Cement - Aggregates
Sand - Fly Ash

Serving the ready-mix industry with quality products, experience and integrity.

Your Foundation to Successful Construction

Put our products to work for you:

Cement - Aggregates
Sand - Fly Ash

Serving the ready-mix industry with quality products, experience and integrity.

Your Foundation to Successful Construction

Put our products to work for you:

Cement - Aggregates
Sand - Fly Ash

Serving the ready-mix industry with quality products, experience and integrity.

Your Foundation to Successful Construction

Put our products to work for you:

Cement - Aggregates
Sand - Fly Ash

Serving the ready-mix industry with quality products, experience and integrity.

Your Foundation to Successful Construction

Put our products to work for you:

Cement - Aggregates
Sand - Fly Ash

Serving the ready-mix industry with quality products, experience and integrity.

Your Foundation to Successful Construction

Put our products to work for you:

Cement - Aggregates
Sand - Fly Ash

Serving the ready-mix industry with quality products, experience and integrity.

Your Foundation to Successful Construction

Put our products to work for you:

Cement - Aggregates
Sand - Fly Ash

Serving the ready-mix industry with quality products, experience and integrity.

Your Foundation to Successful Construction

Put our products to work for you:

Cement - Aggregates
Sand - Fly Ash

Serving the ready-mix industry with quality products, experience and integrity.

Your Foundation to Successful Construction

Put our products to work for you:

Cement - Aggregates
Sand - Fly Ash

Serving the ready-mix industry with quality products, experience and integrity.

Your Foundation to Successful Construction

Put our products to work for you:

Cement - Aggregates
Sand - Fly Ash

Serving the ready-mix industry with quality products, experience and integrity.

Your Foundation to Successful Construction

Put our products to work for you:

Cement - Aggregates
Sand - Fly Ash

Serving the ready-mix industry with quality products, experience and integrity.

Your Foundation to Successful Construction

Put our products to work for you:

Cement - Aggregates
Sand - Fly Ash

Serving the ready-mix industry with quality products, experience and integrity.

Your Foundation to Successful Construction

Put our products to work for you:

Cement - Aggregates
Sand - Fly Ash

Serving the ready-mix industry with quality products, experience and integrity.
Turning Gray Concrete GREEN

These microscopic, glassy spheres are fly ash – and at Headwaters Resources, we sell millions of tons of them every year.

Produced by burning coal at electric power plants, fly ash might be destined for disposal in a landfill. But when added to concrete, fly ash makes concrete easier to work, stronger and more durable.

Fly ash also enhances the environmental performance of concrete. Mining and manufacturing of natural raw materials can be reduced along with decreasing greenhouse gas emissions. In fact, using a ton of fly ash can save almost a ton of CO₂ emissions from being introduced into the atmosphere. In addition to concrete, fly ash is used in mortars, stuccos, paints, artificial stone, carpets, ceiling tiles, soil cement, pervious concrete and a variety of other building materials.

That's an improvement worth specifying.

Contact Headwaters Resources for free technical literature and information on how fly ash use benefits the environment.

DIRECT CONTACT WATER HEATING

Direct Contact Water Heating reduces annual operating costs while increasing productivity

Advantages:
- 99.8% Combustion Efficiency
- Sizes from 20 Gpm to 600 Gpm
- Temperatures to 180° Fahrenheit
- Constant temperature
- 30% to 40% Fuel savings

Features:
- Welded to ASME standards
- Non pressure vessel
- All Stainless steel construction
- Packaged systems
- Interfaces with your existing water system

Ludell Manufacturing
5200 West State Street
Milwaukee, WI  53208
(800) 558-0800
(414) 476-9864 (fax)
gthorn@ludellmfg.com
www.elliscorp.com

As American as...
For 30 years, Intec Video Systems, Inc. has pioneered the rear vision camera industry setting the standard for others to follow. With the widest field of view available, in both color and black and white versions, operators can easily observe previously hidden areas surrounding any large work vehicle. Tested to withstanding all construction and aggregate generated and environmental conditions, Intec’s safety camera systems are the highest performing and longest lasting systems available. Backed by the industry’s most reliable warranty, our customers benefit form the lowest total life cycle cost or ownership. See our cameras at the ConExpo/ConAgg 2008 - Booth S-10131.

INTTEC VIDEO SYSTEMS

BATCH PLANTS

BMH SYSTEMS

BMH Systems

71 Du Tremblay
Boucherville, QC J4B 7L6
Phone: (450) 449-4770
Fax: (450) 449-4838
E-mail: info@bmsystems.com
Web: www.bmsystems.com

BMH Systems is a North American leader in the design, engineering and manufacturing of custom concrete batch plants. BMH Systems brings together best of breed equipment from the world’s leading suppliers with in-house design, engineering and drafting, state of the art manufacturing facilities, quality control and project management to ensure our customer’s strategic business goals are met. BMH Systems' RollMaster® reversing drum mixer is the most profitable type of concrete mixer for the ready-mix industry. It provides you with an edge over your competitors by offering superior consistency, low operating cost, durability and reliability.

CAMERA SYSTEMS FOR COLLISION AVOIDANCE

Intec Video Systems, Inc.

23301 Vista Grande
Laguna Hills, CA 92653
Phone: (949) 859-3800
Fax: (949) 859-3178
E-mail: info@intecvideo.com
Web: www.intecvideo.com

For 30 years, Intec Video Systems, Inc. has pioneered the rear vision camera industry setting the standard for others to follow. With the widest field of view available, in both color and black and white versions, operators can easily observe previously hidden areas surrounding any large work vehicle. Tested to withstanding all construction and aggregate generated and environmental conditions, Intec’s safety camera systems are the highest performing and longest lasting systems available. Backed by the industry’s most reliable warranty, our customers benefit form the lowest total life cycle cost or ownership. See our cameras at the ConExpo/ConAgg 2008 - Booth S-10131.

CHUTE CLOSURE DEVICE

Shute Shutter® by Forfam Incorporated

1642 Las Trampas
Alamo, CA 94507-1824
Phone: (925) 631-6118
Fax: (925) 637-1484
E-mail: sales@forfamin.com
Web: www.forfamin.com

Shute Shutter®, the fully automatic chute closure device, stops spills, concrete theft, windshield & damage claims, saves time & money & reduces insurance costs. Utilize Close & Go (trade mark) if washouts are not allowed.

EXECUTIVE SEARCH

ConcreteCareers.com

ConcreteCareers.com

P. O. Box 900
Bremen, GA 30110-0900
Phone: (770) 537-3237
Fax: (770) 537-1484
Toll Free: 877-5 WIN WIN
E-mail: Gene.Vineyard@ConcreteCareers.com
Web: www.ConcreteCareers.com

Since 1976, ConcreteCareers.Com has been a PERSONNEL resource EXCLUSIVELY for the concrete industry. C.C. conducts contingency and retainer search’s to identify Middle, Upper, & Executive level personnel for Concrete related companies. We identify and qualify all levels of personnel. We have placed President’s, CEO’s, Plant Managers, General Managers, Engineering Managers, Corporate Quality Assurance Director’s, Sales Manager’s, Dispatch Directors, and many more positions. CCC are members of most Concrete Associations including ARMA, NPCA NCMA, PCI, ACI, NPCA & ASCE. All Inquiries are confidential. Please call, Toll Free 877-5 WIN WIN (877-594-6949) or visit our web site at www.ConcreteCareers.com.
**advertisers’ index**

<table>
<thead>
<tr>
<th>Category</th>
<th>Company Name</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ADMIrxTUES</strong></td>
<td>BASF Construction Chemicals.........</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Inside Front Cover L.M. Scofield Company</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Outside Back Cover Sika Corporation</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Solomon Colors</td>
<td>15</td>
</tr>
<tr>
<td><strong>AGGREGATE EQUIPMENT</strong></td>
<td>Putzmeister America, Inc.</td>
<td>41</td>
</tr>
<tr>
<td><strong>AGGREGATE HEATING EQUIPMENT</strong></td>
<td>Mixer Systems, Inc.</td>
<td>79</td>
</tr>
<tr>
<td></td>
<td>Steam Engineering</td>
<td>79</td>
</tr>
<tr>
<td><strong>AGGREGATE SPREADING EQUIPMENT</strong></td>
<td>Putzmeister America, Inc.</td>
<td>41</td>
</tr>
<tr>
<td><strong>AGGREGATES</strong></td>
<td>CEMEX USA</td>
<td>7</td>
</tr>
<tr>
<td><strong>BATCH PLANTS</strong></td>
<td>BMH Systems</td>
<td>81</td>
</tr>
<tr>
<td></td>
<td>CON-E-CO</td>
<td>63</td>
</tr>
<tr>
<td></td>
<td>Merts, Inc.</td>
<td>52</td>
</tr>
<tr>
<td></td>
<td>Mixer Systems, Inc.</td>
<td>79</td>
</tr>
<tr>
<td></td>
<td>Odisa Concrete Equipment</td>
<td>64</td>
</tr>
<tr>
<td></td>
<td>Plant Architects</td>
<td>46</td>
</tr>
<tr>
<td><strong>BLADES, MIXER</strong></td>
<td>Mixer Systems, Inc.</td>
<td>79</td>
</tr>
<tr>
<td><strong>BRUSHES</strong></td>
<td>Riviera Brush Co.</td>
<td>76</td>
</tr>
<tr>
<td><strong>CAMERA SYSTEMS FOR COLLISION</strong></td>
<td>Intec Video Systems, Inc.</td>
<td>81</td>
</tr>
<tr>
<td><strong>CEMENT</strong></td>
<td>Buzzi Unicem USA</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>CEMEX USA</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>Holcim</td>
<td>7</td>
</tr>
<tr>
<td><strong>CEMENT SILOS</strong></td>
<td>Merts, Inc.</td>
<td>52</td>
</tr>
<tr>
<td></td>
<td>Fortam, Inc.</td>
<td>81</td>
</tr>
<tr>
<td><strong>CHUTE CLOSURE DEVICES</strong></td>
<td></td>
<td>81</td>
</tr>
<tr>
<td><strong>CONCRETE</strong></td>
<td>Putzmeister America, Inc.</td>
<td>41</td>
</tr>
<tr>
<td></td>
<td>Titan America</td>
<td>79</td>
</tr>
<tr>
<td><strong>CONCRETE BATCH MIXERS</strong></td>
<td>Schwing America, Inc.</td>
<td>42/43</td>
</tr>
<tr>
<td><strong>CONCRETE BATCH PLANTS</strong></td>
<td>Concrete Plant Manufacturers Bureau</td>
<td>44</td>
</tr>
<tr>
<td></td>
<td>Erie Strayer Company</td>
<td>23</td>
</tr>
<tr>
<td><strong>CONCRETE CHIPPING</strong></td>
<td>Coast 2 Coast</td>
<td>80</td>
</tr>
<tr>
<td></td>
<td>Jim’s Concrete Chipping Service, Inc</td>
<td>78</td>
</tr>
<tr>
<td><strong>CONCRETE CONSTRUCTION ACCESSORIES</strong></td>
<td>Putzmeister America, Inc.</td>
<td>41</td>
</tr>
<tr>
<td><strong>CONCRETE FIBER</strong></td>
<td>Buckeye Building Fibers, LLC</td>
<td>50</td>
</tr>
<tr>
<td><strong>CONCRETE FIBER REINFORCEMENT</strong></td>
<td>Buckeye Building Fibers LLC</td>
<td>50</td>
</tr>
<tr>
<td><strong>CONCRETE PUMPS &amp; PLACING BOOMS</strong></td>
<td>Putzmeister America, Inc.</td>
<td>41</td>
</tr>
<tr>
<td></td>
<td>Schwing America, Inc.</td>
<td>42/43</td>
</tr>
<tr>
<td><strong>CONCRETE RECYCLERS</strong></td>
<td>Schwing America, Inc.</td>
<td>42/43</td>
</tr>
<tr>
<td><strong>CONSTRUCTION EQUIPMENT</strong></td>
<td>Putzmeister America, Inc.</td>
<td>41</td>
</tr>
<tr>
<td></td>
<td>Sany America, Inc.</td>
<td>4/5</td>
</tr>
<tr>
<td><strong>CONSTRUCTION PRODUCTS</strong></td>
<td>Grace Construction Products</td>
<td>3</td>
</tr>
<tr>
<td><strong>CONVEYORS</strong></td>
<td>Merts, Inc.</td>
<td>52</td>
</tr>
<tr>
<td></td>
<td>Mixer Systems, Inc.</td>
<td>79</td>
</tr>
<tr>
<td></td>
<td>Westcon MFG Inc., THEAM Conveyors</td>
<td>73</td>
</tr>
<tr>
<td><strong>DECORATIVE CONCRETE</strong></td>
<td>Concrete Solutions, Inc.</td>
<td>76</td>
</tr>
<tr>
<td><strong>DRIVE SHAFT SAVERS</strong></td>
<td>Power Train Savers</td>
<td>22</td>
</tr>
<tr>
<td><strong>DUMP TRAILERS</strong></td>
<td>Travis Body &amp; Trailer, Inc.</td>
<td>78</td>
</tr>
<tr>
<td><strong>EMPLOYMENT SERVICES</strong></td>
<td>ConcreteCareers.com</td>
<td>81</td>
</tr>
<tr>
<td><strong>ENVIRONMENTAL</strong></td>
<td>Enviro-Port, Inc.</td>
<td>77</td>
</tr>
<tr>
<td><strong>EXECUTIVE SEARCH</strong></td>
<td>ConcreteCareers.com</td>
<td>81</td>
</tr>
<tr>
<td><strong>FIBER REINFORCEMENT</strong></td>
<td>Buckeye Building Fibers, LLC</td>
<td>50</td>
</tr>
<tr>
<td><strong>FINANCIAL SERVICES</strong></td>
<td>McColl Partners, LLC</td>
<td>59</td>
</tr>
<tr>
<td><strong>FLEET MANAGEMENT SYSTEMS</strong></td>
<td>Trimble Mobile Solutions</td>
<td>48</td>
</tr>
<tr>
<td><strong>FLY ASH</strong></td>
<td>Headwaters Resources</td>
<td>80</td>
</tr>
<tr>
<td></td>
<td>Separation Technologies, LLC</td>
<td>79</td>
</tr>
<tr>
<td><strong>INVESTMENT BANKERS</strong></td>
<td>FMI Corporation</td>
<td>19</td>
</tr>
<tr>
<td><strong>INVESTMENTS</strong></td>
<td>FMI Corporation</td>
<td>19</td>
</tr>
<tr>
<td><strong>MERGERS &amp; ACQUISITIONS/INVESTMENT BANKING</strong></td>
<td>FMI Corporation</td>
<td>19</td>
</tr>
<tr>
<td><strong>MIXER DRUMS</strong></td>
<td>Shumaker Industries</td>
<td>25</td>
</tr>
<tr>
<td><strong>MIXER LINERS</strong></td>
<td>Argonics, Inc.</td>
<td>76, 81</td>
</tr>
<tr>
<td><strong>MIXER TRUCKS</strong></td>
<td>Custom Truck &amp; Equipment, LLC</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Truck Mixer Manufacturers Bureau</td>
<td>67</td>
</tr>
<tr>
<td><strong>MIXERS</strong></td>
<td>Mixer Systems, Inc.</td>
<td>79</td>
</tr>
<tr>
<td></td>
<td>Putzmeister America, Inc.</td>
<td>41</td>
</tr>
<tr>
<td></td>
<td>WAM, Inc.</td>
<td>34</td>
</tr>
<tr>
<td><strong>PERSONNEL</strong></td>
<td>ConcreteCareers.com</td>
<td>81</td>
</tr>
<tr>
<td><strong>PNEUMATIC CONVEYING</strong></td>
<td>Steam Engineering</td>
<td>79</td>
</tr>
<tr>
<td><strong>PUMPS &amp; SYSTEMS</strong></td>
<td>Putzmeister America, Inc.</td>
<td>41</td>
</tr>
<tr>
<td><strong>READY REMOTE CONTROLS</strong></td>
<td>BASE Engineering, Inc.</td>
<td>28</td>
</tr>
<tr>
<td><strong>RECYCLERS</strong></td>
<td>Merts, Inc.</td>
<td>52</td>
</tr>
<tr>
<td></td>
<td>Mixer Systems, Inc.</td>
<td>79</td>
</tr>
<tr>
<td><strong>SAFE EQUIPMENT/FALL PROTECTION</strong></td>
<td>Safe-T-Strap</td>
<td>77</td>
</tr>
<tr>
<td><strong>SILOS, CEMENT</strong></td>
<td>Mixer Systems, Inc.</td>
<td>79</td>
</tr>
<tr>
<td><strong>STAFFING</strong></td>
<td>ConcreteCareers.com</td>
<td>81</td>
</tr>
<tr>
<td><strong>STEEL FIBERS</strong></td>
<td>Bekaert Corp.</td>
<td>29</td>
</tr>
<tr>
<td><strong>STORAGE TANKS</strong></td>
<td>Memco, Inc./Envirosafe</td>
<td>78</td>
</tr>
<tr>
<td><strong>TRANSMISIONS (TRUCK/AUTOMATIC)</strong></td>
<td>Allison Transmission</td>
<td>12</td>
</tr>
<tr>
<td><strong>TRUCK MIXERS</strong></td>
<td>Custom Truck &amp; Equipment, LLC</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Schwing America, Inc.</td>
<td>42/43</td>
</tr>
<tr>
<td></td>
<td>Terex Roadbuilding</td>
<td>49</td>
</tr>
<tr>
<td><strong>TRUCK SUSPENSIONS</strong></td>
<td>Simard Suspensions, Inc.</td>
<td>6</td>
</tr>
<tr>
<td><strong>TRUCKS</strong></td>
<td>Custom Truck &amp; Equipment, LLC</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Mack Trucks, Inc.</td>
<td>10</td>
</tr>
<tr>
<td><strong>VEHICLE TRACKING SYSTEMS</strong></td>
<td>Teletac, Inc.</td>
<td>27</td>
</tr>
<tr>
<td><strong>VIBRATORS</strong></td>
<td>Vibeo, Inc.</td>
<td>73</td>
</tr>
<tr>
<td><strong>VOLUMETRIC MIXERS</strong></td>
<td>Cementech</td>
<td>65</td>
</tr>
<tr>
<td><strong>WATER FLOW MONITORING</strong></td>
<td>Dwyer Instruments, Inc.</td>
<td>77</td>
</tr>
<tr>
<td><strong>WATER HEATERS &amp; CHILLERS</strong></td>
<td>Pearson Heating Systems, Inc.</td>
<td>77</td>
</tr>
<tr>
<td><strong>WATER HEATING EQUIPMENT</strong></td>
<td>Heatec, Inc.</td>
<td>53</td>
</tr>
<tr>
<td></td>
<td>Kemco Systems, Inc.</td>
<td>66</td>
</tr>
<tr>
<td></td>
<td>Ludell Manufacturing</td>
<td>80</td>
</tr>
<tr>
<td></td>
<td>Steam Engineering</td>
<td>79</td>
</tr>
</tbody>
</table>

Visit our Buyers’ Guide online at NRMCA.OfficialBuyersGuide.net
**PEARSON**

**water heating and cooling systems for concrete production...**

*the only way to put the pieces together!*

- All tanks built to UL specs.
- Burners have UL, local, state approval
- Operates on #2 oil, natural gas or propane (or combination)
- No gas needed for ignition on #2 oil
- Weatherproof construction/no building required
- No water treatment necessary
- No boiler inspection required
- Heat transfer efficiency 90%-95%
- Automatic operation/virtually maintenance free

**MODELS:** 3000-30,000 GAL • HEATS UP TO 120,000 GAL./DAY

**STATIONARY AND PORTABLE • CHILLERS:** 200-6000 YDS/DAY

---

The **best equipment**. Feature for feature our systems reflect leading edge technology, which we continually upgrade to maintain a leadership position. That's why, when it comes to temperature control for concrete, our systems are the most rugged, efficient and reliable out there. With a form-follows-function design for easier installation and service. Plus many off-the-shelf brand name replacement parts for availability and cost savings. And options that include total water management systems, slurry temperature control and specialty pumps. There's even a heater combustion kit for self installation into an existing tank.

**The highest level of service.** Our technical people are available before, during and after installation to make sure our equipment keeps doing all that it's supposed to do! With in-house personnel and a nationwide network of dealers and representatives, to assure prompt, competent service.

Our air-cooled water chillers offer significant performance advantages. Including energy efficiency to 10.2/full and 13.5/part, a unique heat exchanger tube design, a field-proven hermetic scroll compressor, reduced noise and vibration – and easy access for serviceability. Plus much more.

So when you need water temperature control for concrete production – look to **PEARSON** for both pieces of the puzzle: superior equipment and technical service you can count on.
NEW! SCOFIELD® REVIVE™ & REVIVE™ VOC COLORED SEALERS

To improve the appearance of interior or exterior colored concrete flatwork

To improve the appearance of flatwork where there may be color imperfections due to application or wear and tear

As a curing compound for freshly placed concrete

COLORS
- Available in 24 standard Chromix Admixture colors
- Concrete Gray, Black and White

PACKAGING
- Base Units - 4 gallon pail
- Tint Cups - 16 ounce cans

COVERAGE
- 300 - 500 sq. ft./pail, per coat
- 1-4 tint cups may be used per 4 gallon pail depending on opacity requirement

New SCOFIELD® Revive™ and Revive™ VOC are durable, solvent-borne, color-matched sealers and curing compounds developed to improve the color uniformity of concrete surfaces.

Revive is ideal for projects that need improvement in a hurry, or existing projects that need to be refreshed. Try new SCOFIELD Revive. The latest entry from the leading provider of Decorative Concrete Systems.