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The NRMCA Story – Part 2

1960-1969

NRMCA kicked off this decade with a move to a new headquarters in Silver Spring, MD. The new office building — built of reinforced concrete, of course — opened in 1962 and also housed NRMCA’s sister organization, the National Sand and Gravel Association. The total cost of the land and building was $480,000, and it was proudly noted that “… [the building] was built without borrowing and without asking member companies for contributions.” In fact, the headquarters’ distinctive design and structural creativity won it a top award in a regional architecture contest in 1964. This two-story building at 900 Spring Street continues to house NRMCA offices today.

In the early 1960s, the failures and shortcomings of concrete were receiving a great deal of negative attention. With the reputation of the ready mixed industry in question, NRMCA began work on a concrete plant certification system to assure concrete production facilities were setting high standards for a quality product. The NRMCA Checklist for Ready Mixed Concrete Production Facilities was approved at the annual Board of Directors meeting in 1965 and the program began in 1966. It was initially only open to NRMCA members, although in later years it was expanded to include non-members as well. The certification program has evolved over time and gained respect from industry producers and inspectors alike and continues to be offered by NRMCA. The association also began giving exams during the Short Course and developed a personnel certification plan with three levels of certificates issues: Concrete Field Testing Technician, RMC Production Control Technician and Concrete Technologist.

Stanton Walker, the association’s first director of engineering, retired in 1962. A true giant in the concrete world, he claimed to have known all 40 presidents of the American Concrete Institute and all chairmen of ASTM C-9 from Stanford Thompson to Bryant Mather. To commemorate his 32 years of tireless dedication and work on behalf of the industry, NRMCA and NSGA established the Stanton Walker lecture series at the University of Maryland. For 10 years, the lecture was given at the annual Short Course by a well-respected leader in the concrete or aggregate field. Delmar Bloem took charge of the association’s technical activities upon Walker’s retirement and throughout the remainder of the decade oversaw the distribution of such important publications as Effect of Curing Condition on Compressive Strength of Concrete Test Specimens (1963) and Modern Ideas for Handling Ready Mixed Concrete (1967). In 1969, the lab erected a full-size batching plant and embarked on a three-year study of the uniformity of concrete mixed in truck mixers. Between 1965 and 1970, Bloem’s department studied the strength of drilled cores and their relationship to specified cylinder strength of concrete. This work was recognized in the 1971 ACI Building Code and remains virtually unchanged today.

The annual trade show held at association conventions underwent an enormous change in 1964 when the National Crushed...
Stone Association ended its separate show and joined forces with NRMCA and NSGA to create a combined concrete and aggregate show, known as CON-AGG. A most popular feature of these 1960s conventions was the Pat Wheat Slide Show, produced by Pat Wheat of Transit Mix Concrete Co. in Beaumont, TX. The shows featured attractive trucks, plants and offices and are remembered today by many as being the convention highlight during those years.

The association’s first president, Vincent Ahearn, Sr., retired in 1966 after serving NRMCA for 36 years. In addition to his dedication to and involvement with NRMCA, NSGA, the Truck Mixer Manufacturers Bureau and the Concrete Plant Manufacturers Bureau, he served on a number of government committees. Among his many achievements and wide recognition were his positions as a management member of the National War Labor Board during World War II, management delegate to the President’s Labor-Management Conference in 1945 and executive director of the President's Conference on Occupational Safety from 1948 to 1958. Ahearn’s successor was Kenneth E. Tobin, Jr., a member of the NRMCA staff since 1948 and manager of the industry’s biennial concrete and aggregate show.

1970-1979

The new decade began with two important pieces of legislation that had significant ramifications for the ready mixed concrete industry and the association. President Nixon created the Environmental Protection Agency in 1970, endowing it with power to create and enforce environmental standards. Within a year, the agency initiated and spearheaded the passage of the Clean Air Act, the first of many such environmental regulations that would follow throughout the decade. In response to the ready mixed concrete industry’s concern over how these rulings would affect their ability to produce their product, NRMCA began to take a more active role in environmental issues. Its first director of environmental affairs, Edward K. Davison, whose family business was ready mixed concrete and sand and gravel dredging in the Pittsburgh area, was hired in 1971. He led the association’s efforts to act as an intermediary between the industry and the EPA in order to find a middle ground that would encourage environmentally responsible work habits while allowing ready mixed producers to continue supplying quality product. The Occupational Safety and Health Act was also passed in 1970, marking the first nationwide, federal program to protect workers from job-related injury, illness or death. The Occupational Safety and Health Administration (OSHA) was then established in 1971 to administer the act, which provided specific guidelines and standards for the construction and concrete industries to follow.

“These are not two industries for faint-hearted men. The struggles ahead are formidable, but our great asset as we look to the future is the caliber of the young men who are making their careers in the sand and gravel business and the ready mixed concrete business. Those who launched our two industries played a heroic role; those who operate our companies now will be undaunted by the tasks which lie ahead.”

—Vince Ahearn, retirement, 1966
In 1974, NRMCA began to provide an opportunity for ready mixed producers to meet and discuss the industry’s environmental and safety concerns with the Operations, Environment, and Safety Forum, held that first year in Columbus, OH. This forum has been held annually since then and was designed to facilitate the exchange of ideas relating to concrete plant operations, equipment management, employee safety, environmental compliance and training, among other considerations. That same year, the NRMCA Research Laboratory moved to its current location in College Park, MD, built on land donated by Mr. and Mrs. Alfred H. Smith. This 5,000-square-foot, tilt-up concrete building contains state-of-the-art equipment surrounded by an extensive outdoor test area, allowing the laboratory to conduct a wide range of concrete and aggregate testing based on ASTM standards. The facility was the newest development in the laboratory’s long history of dedication to concrete research, industry training and certificate programs. Also in the mid-1970s, Richard Gaynor assumed the position of director of engineering upon Delmar Bloem’s death.

The concrete boom that the industry had long enjoyed began to drop off sharply in the 1970s, mirroring the nation’s economic woes and crises. Between 1973 and 1974, the industry’s volume output had decreased by a substantial 20 percent, while costs to producers rose a great deal. This production decline could be traced to changes in the country’s population trends — for the first time, the country had entered a period of zero population growth that was expected to be permanent. Construction growth usually follows population growth and, as a result, the industry was facing a relatively smaller total construction market. This blow left the industry reeling and in need of reformulation and direction. NRMCA responded by entering into a joint marketing program with the Portland Cement Association to expand the use of cement and concrete in all construction applications.

In order to stay afloat during these changing times, this joint program proposed a complete transformation of how the concrete and cement industries marketed their products. It was no longer sufficient to simply sell the product — in order to secure their future profitability, these businesses needed to promote the product and create sales opportunities where none existed before. The teaming of NRMCA and PCA reflected the need to combine efforts in order to best achieve the goal of expanding the use of concrete and cement. The

“…Continued growth of the ready-mix industry requires deeper penetration into markets of competitors. That means replacing their product with ours. This is the offensive side of the game plan. At the same time, we must protect existing concrete markets from incursions by the competition — in other words, we must have a defensive strategy. Both are essential to successful, long-term promotion and market development.”

NRMCA’s Great Lakes Region Marketing Committee, 1975
booming and the concrete industry was back on track.

1980-1989

During the first years of the decade, the state of the ready mixed concrete industry reflected the general economic state of the country, with a sluggish economy and a growing unemployment rate. After finishing the ‘70s with a record production rate, the concrete industry soon experienced a downturn, with production dropping 12 percent in the first three years of this decade. With the annual Short Course in its 34th year and as popular as ever, NRMCA began to offer a second Short Course around the country in addition to the traditional one held in Silver Spring, MD. That same year, the association celebrated its 50th anniversary. In 1984, President Ronald Reagan addressed the annual Short Course in its 34th year and as popular as ever, NRMCA began to offer a second Short Course around the country in addition to the traditional one held in Silver Spring, MD. That same year, the association celebrated its 50th anniversary. In 1984, President Ronald Reagan addressed the annual conventions of NRMCA, NSGA and the National Crushed Stone Association in Chicago at the Con/Agg Show at McCormick Place. Also that year, the association’s second president, Kenneth E. Tobin, Jr., resigned and was succeeded by Vincent P. Ahearn, Jr.

In 1982, the association published the first Ready Mixed Concrete Drives Manual. It was intended to be kept in mixer trucks to provide quick and useful information to drivers. The NRMCA laboratory kept busy during these years. It conducted research on pervious concrete, with results published in a paper by ACI that discussed the use of pervious concrete for parking lots in Florida to reduce storm water run-off. The lab also researched and promoted the use of a new product, flowable fill, and was invaluable in

NRMCA Marketing Committee conceived this co-marketing idea in 1973 and restructured its current efforts by dividing the nation into eight marketing regions, each of which contained a PCA regional office. A member of the NRMCA Marketing Committee oversaw each region and acted as chairman of the regional NRMCA marketing committees, which were comprised of local ready mixed members. This system facilitated easy communication between NRMCA and members across the U.S. and allowed them to pursue aggressive marketing tactics to widen the role of concrete and cement in the construction business.

According to the numbers, NRMCA’s promotion push was successful. Between 1975 and 1979, concrete production rose 31 percent. In 1979, 5,000 ready mixed companies in the United States produced more than 228 million cubic yards of concrete, employed approximately 80,000 people, operated between 8,000 and 10,000 plants and ran 42,000 vehicles. That same year, NRMCA formed a new political action committee, reflecting how large and successful the industry had become in those past few years. On October 2, 1979, CONCRETEPAC was founded to support and protect the flourishing industry’s interests in Congress. In 1979 and continuing through today, this bipartisan, multi-candidate federal action committee aims to help elect pro-business, pro-industry candidates to Congress. CONCRETEPAC gives the ready mixed industry a voice in Washington and allows for maximum involvement in important political issues that affect the industry. By the end of this decade, business was

“Between 1975 and 1979, concrete production rose 31 percent. In 1979, 5,000 ready mixed companies in the United States produced more than 228 million cubic yards of concrete, employed approximately 80,000 people, operated between 8,000 and 10,000 plants and ran 42,000 vehicles. That same year, NRMCA formed a new political action committee, reflecting how large and successful the industry had become in those past few years. On October 2, 1979, CONCRETEPAC was founded to support and protect the flourishing industry’s interests in Congress.”
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developing the initial ACI report on Controlled Low Strength Material (CLSM). When ACI imposed specification limits on the chloride levels allowed in ready mixed concrete, NRMCA researched the sources of chlorides and published a guide to the industry.

In 1988, Joseph Carpenter of Rinker Materials, West Palm Beach, FL, passed away. He was instrumental in formatting the NRMCA Committee on Maintenance and to celebrate his commitment to the association and industry, NRMCA established the Joseph E. Carpenter Award for Outstanding Contributions to the OES Committee. The first award was presented to Doc Rinker in 1990 for his support of the fledging equipment maintenance program that grew into one of the major programs of the association. In March 1988, the NRMCA research laboratory was dedicated in honor of Alfred H. Smith, a staunch supporter of the association's research activities who donated the land on which the lab is located. Smith's support of the lab made possible decades’ worth of research that has benefited the ready mixed industry around the world.

The industry picked up steam toward the end of the '80s, with 1989 production rates up 31 percent from 1980 levels. New innovations in ready mixed concrete, from the addition of colorful dyes to the use of various new ingredients such as fly ash and ground slag, were developed, providing the industry with new marketing and expansion opportunities.

**1990-1999**

This was a decade of expansion and progress for NRMCA, full of new ideas, initiatives and programs designed to strengthen and promote the ready mixed industry. The timing was crucial after the stagnation of the 1980s and the recession of 1991 that brought in record low profits for the industry. In 1991, an alliance between NRMCA and leaders of the ready mixed concrete community was formed in the RMC Research Foundation. With donations from industry companies and individuals, the foundation began funding projects under the broad headings of research, education and product knowledge. The result was the simultaneous development of programs to emphasize the importance of competitive business dealings and well-informed employees and research that advanced the industry. The foundation is currently headquartered in NRMCA’s headquarters building in Silver Spring while the RMC Research Foundation Education Center is adjacent to NRMCA’s offices.

What was undoubtedly the most important program of the decade began being developed during a special forum held at the 1993 NRMCA convention in San Antonio. Leaders of the industry met to discuss its current state and decided it was time to formulate a strategy of change — the beginning of the Ready Mixed Concrete 2000 (RMC 2000) movement. These leaders, which included such industry visionaries as Gene Martineau, Bruno Benna, Mike Shydlowski, Wally Johnson and Michael Kaney among others, believed that concrete was not remotely close to fulfilling its huge potential as a construction material and that the industry was amiss in not pursuing these opportunities. The goal was to make fundamental changes and improvements to better the ready mixed industry from the ground up by 2000 in order to ensure its success in the 21st century. From this initial forum, a National Steering Committee was formed that included regional, state and national directors to spread the plan throughout North America and in 1995, NRMCA finalized the strategic plan and integrated it into its long-range plans. To protect concrete's stake in the construction market and broaden business elsewhere, RMC 2000 encouraged producers to focus on marketing and promoting concrete as a great product as much as they did their trucks, equipment and operations.

When Vincent P. Ahearn, Jr., NRMCA president since 1984, resigned in 1994, Robert Gale became president and served until 1996. Robert Garbini, a divisional vice president at the time of Gale’s departure, was elevated to head the association, eventually being named president in September 1998.

Notable achievements this decade included NRMCA obtaining a 24-hour reset modification in the Drivers’ Hours of Ser-
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offer a Concrete Industry Management (CIM) program, which began with the help and support of the industry, including NRMCA. Since its inception, an NRMCA staff member has served on the program’s National Steering Committee and the association routinely hosts students as interns to give them real-world professional experience in the concrete industry. MTSU’s program has flourished, from an initial graduating class of two students to more than 300 students in 2003. NRMCA is currently working to expand the program into three other universities around the country.

The first Political Partners for Concrete Results Government Affairs Conference of the Concrete and Cement Industries was held in Washington, D.C., in May 1997. Co-sponsored by PCA and the American Concrete Pavement Association, this two-day affair has since been held annually to ensure that Washington’s policy makers are well briefed on ready mixed concrete and cement issues. The conference affords attendees an up-close look at the government affairs work that NRMCA undertakes on a daily basis and provides opportunities for industry members to become involved in the process. In 1998, NRMCA formed a strategic alliance with the American Society of Concrete Contractors to increase customer satisfaction and maximize opportunities for producers and contractors to run efficient businesses and projects.

Toward the end of the decade, the association established a number of annual member awards recognizing outstanding work in all areas of the concrete business. The Commitment to Environmental Excellence Award began in 1995 and is given annually to the producer who has instituted and maintained outstanding ecologically aware practices. The Driver of the Year Award began in 1996 to recognize the invaluable contribution of ready mixed truck drivers to the industry, honoring one driver a year for his professionalism, dedication and safety record.

The association has also received awards. In 1998, for example, the NRMCA Research Laboratory was awarded the Arthur R. Anderson Award from ACI. Named for a past president of the Institute, it is awarded annually for outstanding contribution to the advancement of knowledge of concrete as a construction material.

In 1999, NRMCA helped establish the Volumetric Mixer Manufacturers Bureau (VMMB), a third sister organization to the Truck Mixer Manufacturers Bureau and the Concrete Plant Manufactures Bureau. VMMB was organized to promote mobile mixer equipment throughout the industry.

By the end of the decade, NRMCA had grown to such a degree that it required a physical expansion as well. After the National Aggregates Association moved from the building, NRMCA had its landmark building to itself.

2000-2005

The new millennium found NRMCA working to increase its interaction with other construction industry trade associations and organizations. One of the association’s first activities in this new decade was helping to form the Concrete Alliance, formed from NRMCA, PCA, the American Concrete Paving Association and the American Concrete Contractors Association. These associations felt that the opportunity for concrete and cement product expansion was enormous and that the best way to develop new markets and expand upon traditional ones was to work together. The Concrete Alliance, now the North American Concrete Alliance, continues to plan and provide industry pro-
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grams to facilitate continued market penetration, offer educational opportunities and encourage cooperation among different sectors of the concrete industry.

The association has also increased its emphasis on environmental and safety issues by launching a number of new programs, starting with the Environmental Short Course in the spring of 2001. The course, first held in Houston, provides concrete producers with an in-depth look at the environmental rules and regulations they need to follow and suggestions for implementation back at their own plants. Later that year, NRMCA joined the EPA’s Performance Track Program, a public/private partnership recognizing top environmental performance among participating facilities. In 2002, the association ran its first Safety Course, a two and a half-day hands-on OSHA compliance program, tailored specifically for the ready mixed concrete industry. The association also worked on compiling safety benchmarking and truck rollover surveys, allowing member companies to gauge their safety performance with similarly sized companies and the industry overall and providing a better understanding of why rollovers occur.

The final months of 2003 were quite busy for the Government Relations Department. In November of that year, the association signed a Strategic Partnership Agreement with OSHA. Its goals included decreasing the total case incident rate for member companies by 30 percent in three years, increasing the number of ready mixed producers who have formal health and safety programs, and increasing the number of employees who complete OSHA 10- and 30-hour training courses. That same month, NRMCA’s Grassroots Action website was established, generating an average of more than 100 Congressional contacts per month. In 2003, CONCRETEPAC raised more than $175,000 for the first time and in May 2004, a record 23 organizations sponsored the Political Partners for Concrete Results Government Affairs Conference in Washington, D.C.

Also of great importance was the 2003 launch of NRMCA’s Prescription to Performance Initiative (P2P), an effort to encourage innovation, quality control, cost effectiveness and consistency in concrete. The goal was to shift the emphasis from prescribing ingredients and their proportions in concrete mixtures to an emphasis on the performance properties of the combined mixtures. By promoting the voluntary use of performance specifications for concrete construction and the acceptance of new technologies, the overall performance level of the industry would be elevated.

In 2003, CONCRETEPAC raised more than $175,000 for the first time and in May 2004, a record 23 organizations sponsored the Political Partners for Concrete Results Government Affairs Conference in Washington, D.C.
High Performance Leadership: Optimizing Company Returns and Shareholder Value

By Stephen Roebuck

We are offered a myriad of lessons throughout our personal and professional lives, some more important than others. Early in my career as I was learning the ropes of leadership, a mentor took me aside one day during a particularly difficult assignment and offered these sage words, “Stephen, always remember that the most brilliant ideas, strategy, culture and even talent will not bridge the gap of poor performance. To lead effectively and to succeed in business, you have to perform. Period.” Those words remain steadfastly with me to this day and form the basis by which we measure ourselves at Roebuck Consulting Group.

Working with companies both large and small, we are able to observe leadership — the management structures they create and the strategic and tactical deployment of their businesses — in a variety of forms. And while we are privileged to work with a number of astute and highly successful leaders, we also frequently see leaders who place too much emphasis on big picture strategy and not enough on implementation that drives performance. By taking their eyes off maximizing the “here and now,” some leaders effectively delegate dollars right out the window while chasing the “end run” of some far away and often hard to reach objective. Too often, these leaders spend vast amounts of time touting the latest management fad or technique du jour while failing to understand the practical yet critical importance of performance, thus undermining the value of the initiative.

The fundamental problem is that many leaders have come to believe that performance is merely the tactical side of business. Performance is not just tactics — it’s a discipline and system that must be seamlessly woven into an organization’s culture, strategies and operations. To be optimally successful, leaders must be deeply vested and immersed in achieving performance and in communicating the same urgency to others throughout the business.

Performance as a discipline is not something that naturally occurs. It is a specific set of behaviors that organizations must master in order to enjoy competitive advantage in the marketplace and is driven by the relentless pursuit to excel each and every day. To be clear, we are not suggesting that businesses should be evaluated with only a short term view. Rather, we are suggesting that daily performance measures help team members focus on the most important issues and
serve as predictors of monthly, quarterly and annual performance.

High performance leadership is performance-based management on steroids. It is a discipline that drives current, future and most importantly, sustainable organizational success. There are five over-arching tenets that begin our discussion of high performance leadership.

The first begins with a clearly defined culture and sound business strategy. High performance leaders are the architects of a culture and strategy that is co-authored by team members throughout the organization and is tied directly to the operating plans of the business. The designs that emerge are not rigid doctrines. They are clearly defined yet flexible and dynamic, allowing quick response to unexpected changes in economic, competitive or market conditions. Perhaps even more importantly, high performance leaders understand that a strategy cannot be worthwhile unless the organization is equipped with the resources and people necessary to be successful. State-of-the-art technology, equipment, processes, systems and the top talent employed to operate it all carry an attendant cost and there are few bargains today in these arenas.

Second, high performance leaders understand that performance drives everything in the organization, from serving the customer to quality of life for all team members to the earnings that make it all possible. Of course, performance does not exist in a vacuum. Performance does not override environmental, health and safety issues. It is not an acceptable substitute for customer care or relationship development. High performance leaders understand that operating safely, efficiently and with the best interest of the customer and company in mind are central to the success of the organization.

Third, leaders understand that measurement in concert with the pursuit of continuous improvement and the ability of all team members to understand their roles in and contribution to the organization are critical components of high performance leadership. Key performance indicators tied to the business’ critical business drivers and measured on a daily basis keep everyone in the business focused on the most important operating issues.

Fourth, leaders understand the value of open, consistent and thorough communication throughout the organization. High performance leadership cannot flourish shrouded under a veil of secrecy. While from time to time there may be certain strategic and tactical imperatives that must be held close to the vest to create or maintain a competitive advantage, operating the business on a daily basis with a thirst for information and knowledge is a recipe for the development of people, innovative ideas that come from those closest to the operation and customer and ultimately better business decisions.

The fifth tenet is a commitment by leaders to operate with honesty and integrity in all that they do. Even the best reputations and organizational performance can become sullied in the absence of a strict ethical code by which all leaders and team members must adhere. The ruins left in the wake of the Enron scandal serve to remind us all of the importance of ethics in business today.

Performance and Culture

From the perspective of many leaders, performance is something that is delegated. These leaders want to spend their time strategizing and philosophizing while leaving the details of performance to others, not
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realizing that leadership also includes the painstaking and persistent work of developing and implementing the ideas. Shaping a broad strategy into a set of measurable actions requires high performance leaders to utilize analytical skills as well as intellectual and creative thought, as the final plan must resonate with all stakeholders to be successful. Therefore, for performance to be relevant to all stakeholders, it must be integral to the culture of the company.

Performance measurement is not a fad to be thrust upon an organization. Leaders and team members throughout the organization must be committed to and thrive upon consistent and measurable performance in pursuit of optimal success. High performance leaders identify the gaps in current performance compared to desired outcomes in everything from profit margin to the selection of people for promotion. They then make necessary adjustments and raise expectations throughout the organization. This discipline of performance only works when all team members are educated in the system and use it consistently. Too often, companies leap to re-engineer their management structure or overhaul processes at the first sign of poor performance, when the real culprit is the absence of everyone understanding the importance of performance and consistently applying performance measurement criteria.

With leadership and all team members working together to drive a performance based culture, operational excellence can be realized.

Performance as a Discipline

Performance as a discipline includes evaluating the business environment, assessing the company's capabilities, connecting strategy to operations and the people who will be responsible, measuring progress, establishing rewards for success and maintaining flexibility to respond to change and challenge.

The basis for successful performance lies in three primary areas: people, strategy and operations. Most leaders involve themselves to some degree in all of them, but too often we see leaders maneuver through the details of each as quickly as possible so they can return to their “real” work. For these leaders, unfortunately, process reviews are either more dictatorial in nature, as team members sit passively through the misses of an autocrat rather than interactively debating business concepts and issues, or they take the form of exercises in regurgitation, where subjects periodically march in and report the results of the activities of their fiefdoms to enlighten the king. Neither works well and both ultimately alienate team members from being actively engaged and vested in the performance and success of the company.

To be successful, high performance leaders and team members must vigorously discuss such issues as: who will do the job; how will they be evaluated; what technical, equipment, financial and human resources will be required and when; and will the strategy and action plans lead us ever closer to performance excellence. With a disciplined approach to answering these questions, high performance leaders and team members reach specific and practical conclusions to achieve strategic and operating goals in pursuit of optimal results.

While each of the three areas — people, strategy and operations — is crucial, people are by far the most important... Simply put, unless the right people are selected for the job, a business will never reach its full potential.

set strategic goals and establish accountability for operational execution. These actions are the foundation of performance and they must not be delegated.

Only a leader has the broad perspective to ask the necessary questions and then guide the decision making process. Only a leader can set the frequency and tone for dialogue in the organization. High performance leaders encourage candid, productive debate among team members to find realistic solutions and this can only be accomplished if everyone is working on a peer-to-peer basis.

Six Guidelines for High Performance Leadership

So what does a leader in charge of perfor-
formance do, without becoming too caught up in the details of running the business? We suggest six guidelines for leaders in pursuit of superior performance.

1. Know your business and your people. Leaders have to know their business inside and out. In companies that don’t perform, leaders are usually out of touch with day-to-day operations. While information is reported to them, the data is filtered through others with their own perceptions and agendas that color what the leader receives. If leaders are not in the know about the business, they can’t have a comprehensive understanding of their organization or people. People within the organization can’t really be in touch with uninformed leadership either.

2. Demand the truth. Leaders must constantly strive for open dialogue and debate that searches for the truth. Many people want to hide their mistakes or create excuses while they attempt to find a solution to a problem they can’t handle. Others want to avoid confrontation. Leaders and team members can slip into denial as they focus on their organization’s strengths but ignore its weaknesses. It is crucial to communicate honestly and openly and to face the reality of situations in order to find meaningful ways to improve performance.

3. Set clear and measurable performance goals. An organizational strategy can only encompass a few priorities at a time. Focusing on just three or four goals will produce the best results as team members clearly understand what they are trying to achieve. An organization that attempts to have a multitude of priorities will become fragmented as team members attempt to make endless tradeoffs for competing resources and ambiguous responsibilities. Organizational priorities should be communicated simply and directly throughout the organization, including actionable steps and measurable performance goals.

4. Be actively and passionately engaged in the business at the operating level. Goals are meaningless if no one takes responsibility for follow through. High performance leaders set the pace for responsibility and accountability with regard to performance objectives. Once the organization has defined a clear strategy and the action plans to achieve goals, all team members must be empowered to perform, measure progress and accept accountability for results. High performance leaders also consistently ask a fundamental question: Is it difficult to do business with our company from an internal or external perspective? If the answer is yes to either question, high performance leaders aggressively seek to identify and stamp out bureaucracy that seems to inevitably creep into businesses.

5. Stretch and bring out the best in others. It is important for leaders to share their knowledge, experience and wisdom with the next generation of leaders to expand the capabilities of everyone in the organization, individually and as a group. Developing individuals with potential is best accomplished through mentoring and coaching, by teaching them how to perform and reach goals rather than simply giving orders. The most effective way to coach is to observe a person in action and then provide specific, useful feedback that identifies positive behavior as well as things that need to be improved upon. High performance leaders ask incisive questions, either one-on-one or regarding business issues in a group setting, encouraging people to think. These questions identify issues that need to be addressed and effective leaders then carry the discussion further into helping identify a strategy for change, setting an example from which developing leaders can learn.

6. Reward performance at every level. Many organizations do a poor job of linking rewards to performance. Often, people who achieve significant results are rewarded the same as those who don’t. An individual with leadership potential is not likely to remain in a company with a socialistic view of rewarding everyone equally or nearly equally, regardless of their effort and achievement. As part of the culture of the organization, high performance leaders instill performance-based incentives that reward achievement and promote those who are successful.

Leading an organization while striving for peak performance and success requires a disciplined approach to creating open dialogue among team members in pursuit of the truth; setting clear and measurable goals to achieve a select few priorities; identifying and developing leadership talent that will achieve the company’s short, mid-range and long-term goals; and leadership being in touch with the organization on every level to make knowledgeable decisions regarding strategy, people and operations. With this comprehensive approach, high performance leaders optimize company returns and shareholder value while providing for the sustainable success of their organizations.

Stephen Roebuck is president of Roebuck Consulting Group. For more information, contact Roebuck at 813/251-8838 or via email at sjroebuck@roebuckconsulting.com.
The Facts:
- 459 reported accidents
- 13 of these resulted in fatalities
- 22 of these were permanent disabilities
- 42% of these accidents happened while performing maintenance

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How many times have you been on a job site and the contractor/finisher makes a drinking motion with his hand to his mouth?

You got it, the concrete is too dry (or he thinks it is too dry) and he wants water added.

The CDP puts the drum in FULL mix direction, increases the truck throttle to MAXIMUM RPM, then opens the water valve and counts his usual time for adding water.

Note: Maximum drum speed at maximum truck engine throttle is in the 16-18 RPM range.

The CDP then lets the drum turn at maximum speed for a minute or two. They start discharging once again, and lo and behold, two things have happened: 1) the last yard or so of concrete is still drier than desired; and 2) the last yard seems to have more stones in it.

Stop and think a second. Put some stones in a bucket, fill the bucket half full of water, add some dirt to the water, now take the bucket and swing it in a circle in front of you over your head. Keep on swinging. Do the stones come out? No. Do the stones and dirt become evenly mixed in the water? No, the stones are held in place at the bottom of the bucket by centrifugal force. Theoretically, when you spin the mixer drum at maximum speed with the truck engine at full throttle, in essence you are creating a separator and not a mixer.

The heavier stones in the concrete are thrown to the extremities of the drum and pulled to the front by the blading. Thus the last of the load is usually stonier and drier because the concrete:

1) was not mixed thoroughly enough; and
2) was mixed at a speed that was too fast.

Do you want concrete that is completely homogeneous from first to last yard? Slow down the drum speed and mix for just a little longer when adding water. You will see the difference!
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Let us introduce you to the Granite® Axle Back featuring the new Cornerstone™ chassis that provides more rail options and greater strength with less weight. The new Granite Axle Back gives you improved maneuverability, ride and handling. With Mack’s best built cab ever, featuring more space and comfort. No wonder the Granite Axle Back is the next line of trucks that will continue to carry our legendary jobsite reputation. The Granite Axle Back. Jobsite Proven.™ To find out more, visit us at www.macktrucks.com. See your local dealer or call 1-800-922-MACK to locate a dealer near you.
One of the hottest topics on the building scene today is the ever-increasing popularity of the construction of “green” buildings. Testament to that is the proliferation of municipalities as well as public and private companies deciding to institute the Leadership in Energy and Environmental Design (LEED®) Green Building Rating System as part of their own specifications in new building construction and the rehabilitation of existing buildings. LEED, a creation of the United States Green Building Council (USGBC), was developed with the express goal of advancing the concepts of sustainability, energy efficiency, water and other savings while integrating them into one overall green building design concept. The response so far has been remarkable. In order to further the use of concrete within this system, the RMC Research Foundation recently released the Ready Mixed Concrete Industry LEED® Reference Guide as a vital tool for industry professionals to use in that effort.

Several factors have no doubt contributed to this growing call for “green” construction. Some notable examples include the need to deal with the “urban heat island” effect in places such as Atlanta; the penalty of losing federal highway funds in areas that are designated as being in “non-attainment” status with respect to air pollution such as in Houston, Chicago, and others; and the heightened concern nationwide for the conservation of resources. As more localities make it a policy to implement “green” building standards, the availability of recycled materials increases while their costs, previously prohibitive for many projects, decrease. The knowledge-base of the application of energy efficient and environmentally friendly building concepts on the part of construction industry professionals has also significantly increased, thereby creating even more advocates for its use.

Already, eight federal agencies, 15 states, 42 states/provinces/counties and 10 colleges/ universities have adopted or are considering adoption of LEED building standards (see accompanying list). Interest in pursuing “green” building is not just popular among governments, either. The business community is also beginning to pursue vigorously the use of LEED standards for their own projects, indicating their desire to demonstrate their own environmental consciousness to the communities they serve.

As an integral material in the construction industry that can offer significant environmental and energy benefits, concrete is ideally suited to meet the sustainability criteria as defined by LEED. However, the LEED Green Building Rating System does not necessarily provide detailed guidance for how concrete can best be used within the LEED evaluation scoring criteria. This fact signaled the tremendous need to educate architects, engineers, specifiers and other construction professionals involved in the building process — especially those who will be looking for ways to build a new structure that will qualify for a LEED rating — on the many ways that the use of concrete can contribute to increasing the LEED rating for building projects. It is particularly important to ensure that professionals within the concrete industry itself understand all the intricacies related to superior environmental stewardship and how to incorporate them into their own companies. The Ready Mixed Concrete Industry LEED® Reference Guide was created specifically to educate concrete industry professionals on the various ways they can strive to meet the high environmental standards that will become the norm in the not-too-distant future.

Application of the LEED Green Building Rating System will no doubt significantly increase all over the country in the years to
Adoption of LEED® Green Building Rating System Grows Daily

The following list includes agencies, governments and other organizations that have adopted or are considering adoption of some type of LEED Green Building Rating System, either for the construction of government buildings or all types of new construction within their jurisdictions (such as the construction of new state government buildings). For more information on the scope of LEED standards adopted by those listed here, please visit www.usbgc.org.

Federal Agencies
- Department of Energy
- Department of Interior
- Environmental Protection Agency
- Government Services Administration
- Department of State
- United States Air Force
- United States Army
- United States Navy

States
- Arizona
- California
- Connecticut
- Florida
- Illinois
- Maine
- Maryland
- Massachusetts
- Michigan
- New Jersey
- New York
- Oregon
- Pennsylvania
- Washington

Cities/Counties
- Acton, MA
- Alameda County, CA
- Arlington, MA
- Arlington, VA
- Atlanta, GA
- Austin, TX
- Berkley, CA
- Boulder, CO
- Boston, MA
- Bowie, MD
- Calabasas, CA
- Calgary, British Columbia
- Chicago, IL
- Cook County, IL
- Dallas, TX
- District of Columbia
- Eugene, OR
- Frisco, TX
- Houston, TX
- Issaquah, WA
- Kansas City, MO
- King County, WA
- Long Beach, CA
- Los Angeles, CA
- Montgomery County, MD
- New York, NY
- Omaha, NE
- Phoenix, AZ
- Pleasanton, CA
- Portland, OR
- San Diego, CA
- San Francisco, CA
- San Jose, CA
- San Mateo County, CA
- Santa Monica, CA
- Santa Barbara, CA
- Scottsdale, AZ
- Seattle, WA
- Suffolk County, NY
- Vancouver, British Columbia
- West Hollywood, CA
- Arizona State University
- Carnegie Mellon
- Clemson University
- Dartmouth College
- Emory University
- Massachusetts Institute of Technology
- Santa Clara University
- State University of New York
- University of Cincinnati
- University of Florida

Come and, as part of this trend, will continue to raise the bar for environmental standards in construction. With this in mind, it is in the best interest of all ready mixed concrete producer companies to look to ways to implement and improve their environmental systems and energy preservation applications. The sooner the ready mixed concrete industry is able to demonstrate itself as being on-board with the environmental emphasis placed on the construction industry, such as with the LEED system, the sooner concrete will become more widely known as the most environmentally sound building material of choice.

The development of the Ready Mixed Concrete Industry LEED® Reference Guide was primarily underwritten by the RMC Research Foundation, with financial assistance from the Portland Cement Association and with primary technical assistance from the National Ready Mixed Concrete Association. This document is a stellar example of the types of research projects supported by the RMC Research Foundation that have unmistakable, immediate and lasting impact upon the industry. The effect of this particular tool will enhance the industry in a way that will not only improve the industry’s environmental stewardship overall, but will also benefit the communities that undergo new construction, whether it be in the form of buildings, roads or bridges — anywhere and everywhere that concrete is placed.

Although specifically designed to provide assistance in meeting LEED Rating rating criteria, the Ready Mixed Concrete Industry LEED® Reference Guide also provides a wealth of resources on many environmental issues and material uses that will benefit ready mixed concrete companies, regardless of the extent of their participation in LEED construction projects. For more information on other exciting and innovative research projects supported by the RMC Research Foundation or for more information on proposing a new research project, please visit www.rmc-foundation.org.
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When a regulatory agency takes steps to prevent pollution and improve environmental quality, how do we as an industry respond? Most ready mixed concrete producers are accustomed to the requirements of their National Pollution Discharge Elimination System (NPDES permit generally issued by the state environmental agency to allow for the discharge of process water and stormwater) and understand their responsibility to protect water resources. Environmental controls and practices are generally considered to be a cost of doing business. Extreme regulation, without science and risk assessment as a starting point, can be devastating to both industry and consumers.

A recent proposed action by the California Regional Water Quality Control Board resulted in the mobilization of ready mixed concrete producers who took action to prevent its implementation. The proposal includes requirements for major structural modifications and other prohibitive measures in a very limited timeframe. For example, an established ready mixed production site constructed with concrete surfaces and engineered settling basins would have to remove all of the concrete in place and dismantle the plant and supporting structures. The next step requires excavation of the site and installation of an impermeable liner and a leak detection system. The concrete surfaces and settling basins can then be replaced and the plant can be reconstructed. There are also requirements for groundwater monitoring overseen by a third party registered geologist. It should be evident to you by now why this proposed regulation is unilaterally opposed by most if not all ready mixed concrete producers in California’s Central Valley Region.

NRMCA has always supported working with regulators to find mutually beneficial outcomes that benefit the environment. Sometimes regulatory schemes go well beyond environmental compliance and even environmental excellence to a point where everyone loses. Cursory estimates indicate that the cost per plant to implement the proposed measures will be at least $500,000. This calculation does not include the loss of revenue incurred during the construction period or the need to raise prices to pay for the modifications. Also not included are the lost wages to staff who will not be able to work during the lengthy modification period. An overall estimate of the costs resulting from the implementation of the proposal exceeds $3.2 billion. The question is, does the environment or any citizen benefit from the implementation of this proposed regulation?

The Construction Materials Association of California (CMAC) has been working aggressively with its members to counter this excessive regulatory action. Efforts include the creation of a coalition of ready mixed concrete producers and other interested parties, as well as hiring a legal team to support their efforts. NRMCA sees a clear need to work with CMAC on this issue with the expectation that if realized, other states may also require the implementation of unnecessary measures to protect the environment. NRMCA staff has participated in strategy sessions with CMAC and will continue to provide assistance to help to resolve this issue. It is clear that this issue requires an examination of science and risk before taking actions that are devastating to the ready mixed concrete industry. Some have expressed concern that enacting this rule may cause a domino effect of regulatory excess imposed by other agencies that may see such action as worthy. NRMCA hopes that all in the ready mixed concrete industry take note and attempt to preempt any such action.

For more information, contact Edward Herbert at eherbert@nrmca.org or via phone at 240/485-1154.
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New Concrete Organization Spans the Americas
North, Central and South America to Pool Resources

RMCA along with representatives of Canadian, Central and South American ready mixed groups have announced plans to form the Ready Mixed Concrete Organization of the Americas (RMCOA). Extensive discussions among NRMCA, Canadian Ready Mixed Concrete Association (CRMCA) and Federación Iberoamericana del Hormigón Premezclado (FIHP) have centered on increasing the positive awareness of industry products, increasing the efficiency of research and enhancing the capabilities of personnel throughout North, Central and South America.

This landmark cooperative effort — announced in March during the CONEXPO-CON/AGG Show in Las Vegas — in the worldwide ready mixed concrete industry will center on the areas of research and technology, operations, education and promotion. Each party recognizes the interest and need for a fully-fledged international organization that would support, promote and whenever needed, coordinate efforts by interacting with other professional groups, international societies, academia and policy makers. RMCOA will also provide a platform for discussions, exchange and education among all those working in the concrete industry and promoting the concrete industry to the general public. RMCOA is already extensively represented through a network of members in North, Central and South America.

“Each individual organization has publications, programs and other materials that may be of interest and/or benefit to the members of the other organizations,” noted Hardy Johnson, NRMCA’s past chairman of the board who signed the RMCOA formation document.

“The member organizations of RMCOA hold each other in mutual trust and respect,” added FIHP president Nelson Parra.

CRMCA president Melvin Fiander said, “By creating a formal organization, the bond between our organizations will be enhanced.”

CRMCA, based in Mississauga, Ontario, represents all provincial and regional ready mixed concrete associations across Canada. Its purpose is for the exchange of both industry and association information and the identification of trends and issues that will impact the concrete and construction industries. Initiatives such as government relations, environment, safety, marketing and promotion and education are developed with the desire to assist each association for the betterment of their members.

FIHP, based in Bogota, Colombia, represents the national associations of Latin American countries from Mexico to Argentina and also includes for historic, common interest and fellowship reasons the national associations of Spain and Portugal. FIHP helps to improve the national efforts to promote the use of concrete and also the development of the ready mixed concrete industry in the region. These goals are reached through the coordinated sharing of individual experiences in training and technical, environmental and logistical issues, as well as expanding the knowledge of concrete both inside and outside the industry.
RMCA is working on an initiative to evolve specifications from prescriptive requirements to performance-based concepts for concrete mixtures. The Prescription to Performance (P2P) Initiative has been identified by the concrete producers as one of the significant ways to raise the level of credibility and performance of the ready mixed concrete industry. It provides the concrete producer more control over his product to satisfy the needs of the owner.

When the concepts of P2P were discussed it was suggested that the advantages of performance specifications over prescriptive specifications should be clearly demonstrated through examples and technical data to support changes in codes and specifications. NRMCA Research Laboratory took up the challenge. The idea was to identify certain concrete applications, design the concrete mixture according to the current typical prescriptive specifications and demonstrate the benefits by developing concrete mixtures to intended performance criteria. Two applications, concrete floors and bridge decks, were chosen. The concrete floor mixture was designed according to the prescriptive specification used by one of the nation’s largest retailers. The bridge deck was designed according to the prescriptive high performance concrete specification used by a state highway agency. A third part of the experimental study addressed some of the prescriptive requirements for concrete durability in the ACI 318 Building Code for Structural Concrete.

Concrete mixtures were prepared according to the prescriptive provisions of these

“The Prescription to Performance (P2P) Initiative has been identified by the concrete producers as one of the significant ways to raise the level of credibility and performance of the ready mixed concrete industry.”
 specifications and compared to mixtures that satisfy the intended performance attributes. Fresh and hardened concrete properties were measured and compared. This comparison demonstrated the benefits and optimization of concrete mixtures for performance over prescriptive provisions. Funding for the study was provided by the RMC Research Foundation.

**Experimental Study**

**Case 1: Concrete Floor Specification (FS)**

The main features of the concrete floor specification used by one of the nation’s largest retailer’s are as follows:

a. Specified 28-day compressive strength = 4000 psi; a required over design of 1200 psi, the required average strength will be 5200 psi
b. Maximum water to cement ratio of 0.54. W/CM to be measured by microwave oven test — penalties for higher w/cm and concrete rejected beyond a limit
c. No fly ash or slag is allowed
d. Slump < 4 inches
e. Non-air entrained
f. Combined aggregate gradation shall be

8% - 18% retained on each sieve below the top size and above the No. 100 sieve. Maximum aggregate size will be 1 1/2”
g. No high range water reducer allowed

The performance criteria targeted the following requirements:

a. Specified 28-day compressive strength = 4000 psi; Average strength based on ACI 318 or ACI 301 from past test records
b. Supplementary cementitious materials may be used
c. Slump = 4 – 6 inches
d. Length change (drying shrinkage) (ASTM C 157) < 0.04% at 28 days of drying after 7 days of moist curing.
e. Setting time (ASTM C 403) under laboratory conditions = 5 1/2 hours

Five concrete mixtures were cast. The mixture design and test results are provided in Table 1.

All mixtures were non-air entrained and adjusted to achieve the target slump requirement. No water reducing admixtures were used as initial trials with water reducing admixtures showed high air contents with the fly ash mixtures. It was felt that eliminating the use of water reducers would not affect the general conclusions of the project.

**Discussion of Test Results**

Mixture 1 is the control mixture designed according to the prescriptive specification. The 8-18 aggregate gradation specification was achieved by combining an ASTM C 33 No. 467 aggregate with a small amount of No. 8 aggregate. The specification also requires that the w/cm will be measured by the microwave oven test and concrete accepted based on the measured w/cm. To allow for the variability of the measured water content using the microwave oven test (AASHTO T 318), the
producer will need to target a much lower w/cm to ensure compliance. The target w/cm ratio was set to 0.49 compared to the maximum limit of 0.54. To achieve this w/cm with the aggregates available, the producer is forced to use a higher cement content of 611 lbs/yd³ and not include any supplementary cementitious materials. As shown in Table 1 this results in a 28-day compressive strength of 5870 psi, which is significantly higher than required. The average length change (ASTM C 157) after 7 days of moist curing and 28 days of drying was 0.018% and was 0.032% after 90 days of drying. The laboratory initial setting time (ASTM C 403) of the concrete mixture was 4 h 12 m.

Mixtures 2-5 were designed to satisfy the performance based criteria.

Mixture 2 was similar to Mixture 1 except that it had a lower cement content at 517 lbs/yd³ and thus a higher w/cm (0.57). In this case it is assumed that the producer is not restricted by a prescriptive low w/cm requirement. This mixture was targeted to achieve an average strength of 4600 psi assuming that the producer has prior test records that will permit him to reduce his required average strength in accordance with ACI 318 and 301. The measured 28-day compressive strength was 5050 psi, which achieves the objective. The average length change (ASTM C 157) after 7 days of moist curing and 28 days of drying was 0.020% and was 0.045% after 90 days of drying. The length change was within the 28-day limit of 0.040%. It was surprising that the 90-day length change of Mixture 2 was much higher than Mixture 1, which had a higher cement (94 lbs+) and hence a higher paste content (1.95%). The laboratory initial setting time of the concrete mixture was 4 h 45 m, which just satisfied the performance requirement.

Mixture 3 had 20% ASTM C 618 Class F fly ash and the total cementitious content was also slightly higher at 530 lbs/yd³. The water requirement of the fly ash concrete mixture was slightly lower (280 lbs/yd³) to achieve the target slump. The measured 28-day compressive strength was 4860 psi, which achieves the strength requirement. The average length change (ASTM C 157) after 7 days of moist curing and 28 days of drying was 0.014% and was 0.031% after 90 days of drying. The laboratory initial setting time of the concrete mixture was 5 h 30 min, which just satisfied the performance requirements.

Mixture 4 was similar to Mixture 3 except that the aggregate gradation did not meet the prescriptive 8-18 grading specification. The intermediate size No. 8 aggregate was not used. The combined grading of the No. 467 coarse aggregate and fine aggregate were found to be just out of range of the 8-18 grading. To further exaggerate the effect, additional coarse aggregate between 3/4 and 1/2 inch was added to the coarse aggregate. The water requirement of the fly ash concrete mixture was 280 lbs/yd³ to achieve the target slump. The measured 28-day compressive strength was 4980 psi. The average length change (ASTM C 157) after 7 days of moist curing and 28 days of drying was 0.012% and was 0.022% after 90 days of drying. The laboratory initial setting time of the concrete mixture was 5 h 17 m. The lack of uniform aggregate grading did not adversely impact the drying shrinkage. In fact this mixture had the lowest length change values recorded of all five mixtures.

Mixture 5 was identical to Mixture 4 except that it was a ternary mix with Class F fly ash (15%) and slag (20%) as part of the total cementitious content. The water requirement of the ternary concrete mixture was 289 lbs/yd³ to achieve the target slump. The measured 28-day compressive strength was 4720 psi. The average length change (ASTM C 157) after 7 days of moist curing and 28 days of drying was 0.035% and was 0.038% after 56 days of drying. Even though the shrinkage value met the performance requirements this concrete mixture had the highest length change value. The laboratory initial setting time of the concrete mixture was 5 h 59 m, which exceeded the targeted limit of 5 h 30 m. The slower setting was likely due to the higher quantity of supplementary cementitious materials (35% of total cementitious) used.

In addition, the following tests were also carried out:

Slab Finishability: Small concrete slabs 2x1 foot at 4 inches thickness were made in the lab and finished by hand. A “finishability rating” value between 1 and 5 was given as a measure of the concrete finishability with the following criteria (5=Excellent to 1=Poor). All 5 slabs had a rating above 4.5 thus indicating excellent finishability.

Rapid Indication of Chloride Ion Penetration (ASTM C 1202): Two cylinders from each mixture were cast and moist cured till the test age. The rapid chloride permeability test was carried out at an age of 75 to 80 days except for Mixture 5, which was tested at an age of 95 days. Mixtures 1, 3 and 4 had an average chloride ion penetrability of about 3000 coulombs and hence these mixtures would be classified as having a moderate chloride ion penetrability. Mix-
ture 2 had about 4500 coulombs and would be classified as having a high chloride ion penetrability. Mixture 5 had an average chloride ion penetrability of 839 coulombs and would be classified as having a very low chloride ion penetrability. Rapid chloride penetrability is typically not a desired performance requirement for concrete floor applications. Comparing the performance of Mixtures 3 and 4 indicates that the aggregate grading did not have much impact on the chloride ion penetrability.

Segregation Test: In this test a concrete 6 x12 inch cylinder was cast after the concrete slump was raised to between 5 and 6 inches. The cylinder was vibrated using an internal vibrator. The cylinder was cut after 7 days of moist curing and the density of the top and bottom halves were determined by weighing them in air and submerging in water. Variation in density was presumed to be a result of segregation, i.e. migration of the coarse aggregate particles toward the bottom. Since the calculated density of coarse aggregate particles (specific gravity x unit wt. of water) in this case is much denser (177 lbs/ft³) as compared to the mortar (calculated to be about 131 lb/ft³), this was used to estimate the variation in coarse aggregate content between the top and bottom specimens from the difference in density. The difference in the coarse aggregate content was consistently about 20% except for Mixture 5, which was about 15%. This leads to a conclusion the aggregate grading differences of the mixtures within the scope of this study did not impact the segregation characteristics of the mixtures at higher slumps.

The above experimental study brings out the following conclusions:
1. Prescriptive specifications do not essentially result in good performance. Conforming to a uniform aggregate grading in this study did not have significant impact on the segregation, finishability or drying shrinkage of the concrete. A more extensive study focused on the effectiveness of uniform aggregate gradation is ongoing at the NRMCA Research Laboratory. Specifying the 1200 psi over design and conforming to the required w/cm ratio is unnecessary and could in fact adversely impact intended performance.
2. Another analysis that can be conducted here is the economy of the concrete mixture. Using certain assumptions of material costs from the NRMCA Industry Data Survey, it is estimated that the material costs of Mixture 1 will be about $43.4/yd³. In comparison the performance concrete mixtures save between 8.8% and 15.2% of the material costs. Cost savings will be higher if one considers the elimination of the use of the intermediate size No. 8 aggregate needed to achieve the 8-18 aggregate grading.
Case 2: High Performance Concrete (HPC) Bridge Deck Concrete Specification

The main features of the high performance concrete bridge deck specification used by one Department of Transportation are as follows:

a. Specified 28-day compressive strength = 4000 psi; required average strength will be based on a historical test record in accordance with ACI 318.
b. Maximum water to cementitious ratio of 0.39
c. Total Cementitious Content = 705 lbs/yd³. 15% Fly ash plus 7% to 8% silica fume is required as a replacement to cement
d. Slump = 4 – 6 inches
e. Air entrainment of 4% to 8% required

The performance criteria were established to target the following requirements:

a. Specified 28-day compressive strength = 4000 psi; required average strength based on ACI 318 or ACI 301 using past test records
b. Supplementary cementitious materials are allowed and their dosages will not exceed limits of ACI 318 to protect against deicer salt scaling
c. Slump = 4 – 6 inches
d. Air entrainment of 4% to 8% required
e. RCPT (ASTM C 1202) = 1500 coulombs after 45 days of moist curing
f. Length change (drying shrinkage) < 0.04% at 28 days of drying after 7 days of moist curing

Four concrete mixtures were cast. The mixture design and test results are provided in Table 2.

All mixtures were designed for the slump and air requirement. All four mixtures contained a standard ASTM C 494 Type A water reducer dosage at 4 oz/cwt and an ASTM C 494 Type F HRWR dosage sufficient to attain the desired slump.

Discussion of Test Results

Mixture 1 is the control mixture designed according to the prescriptive specification. The w/cm was 0.39 and the total cementitious content was 705 lbs/cyd out of which 15% was Class F fly ash and 7% was silica fume. The measured 28-day compressive strength was 7480 psi, which is significantly higher than required. The 45-day charge passed by ASTM C 1202 was 1563 coulombs (average of two specimens). The average length change (ASTM C 157) after 7 days of moist curing and 28 days of drying was 0.043%.

Mixture 2 had the same w/cm (0.39) as Mixture 1 but had a much lower total cementitious content (600 lbs/yd³ as opposed to 705 lbs/yd³). The silica fume content was set at 4% and the quantity of Class F fly ash was increased to 25% by mass of cementitious materials. The measured 28-day compressive strength was 6800 psi, which exceeded the strength requirement. The 45-day rapid chloride permeability value was 1257 coulombs (average of 2 specimens). The average length change (ASTM C 157) after 7 days of moist curing and 28 days of drying was 0.024%. The reduced shrinkage value is likely because of the lower paste content (4.36%). Another interesting observation is that the required HRWR dosage was about 27% lower for Mixture 2 compared to Mixture 1 even at a lower water content of the concrete by over 15%. This is because of the much lower silica fume content and higher fly ash content used in Mixture 2. The performance of Mixture 2 exceeded that of Mixture 1.

Mixture 3 had the same w/cm (0.39) as Mixture 1 but had a much lower total cementitious content (600 lbs/yd³ as opposed to 705 lbs/yd³). This mixture contained 50% slag by mass of cementitious materials without silica fume or fly ash. The measured 28-day compressive strength was 8970 psi, which is much higher than required. The 45-day charge passed by ASTM C 1202 was 1126 coulombs (average of two cylinders). The average length change (ASTM C 157) after 7 days of moist curing and 28 days of drying was 0.026%. The HRWR dosage required was about 40% higher than that of Mixture 1. The performance of this mixture was significantly better than the DOT-specified Mixture 1.

Mixture 4 was similar to Mixture 2 with the replacement of ultra fine fly ash (UFFA) instead of silica fume. Based on supplier’s recommendations the quantity of the UFFA

---

Table 2: Details of the HPC Bridge Mixtures

<table>
<thead>
<tr>
<th>Mixture Proportions, lb/yd³</th>
<th>Br-1</th>
<th>Br-2</th>
<th>Br-3</th>
<th>Br-4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cement</td>
<td>550</td>
<td>426</td>
<td>300</td>
<td>426</td>
</tr>
<tr>
<td>Fly Ash</td>
<td>105</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Silica Fume</td>
<td>50</td>
<td>24</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Slag</td>
<td>0</td>
<td>150</td>
<td>300</td>
<td>150</td>
</tr>
<tr>
<td>Ultra Fine Fly Ash</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>34</td>
</tr>
<tr>
<td>Coarse Agg (#67)</td>
<td>1800</td>
<td>1922</td>
<td>1940</td>
<td>1945</td>
</tr>
<tr>
<td>Sand</td>
<td>1121</td>
<td>1199</td>
<td>1209</td>
<td>1214</td>
</tr>
<tr>
<td>Water</td>
<td>275</td>
<td>234</td>
<td>234</td>
<td>218</td>
</tr>
<tr>
<td>AEA (oz/cwt)</td>
<td>0.40</td>
<td>0.45</td>
<td>0.40</td>
<td>0.40</td>
</tr>
<tr>
<td>Water Reducer (oz/cwt)</td>
<td>4.0</td>
<td>4.0</td>
<td>4.0</td>
<td>4.0</td>
</tr>
<tr>
<td>HRWR (oz/cwt)</td>
<td>13.0</td>
<td>9.4</td>
<td>18.4</td>
<td>11.1</td>
</tr>
<tr>
<td>w/cm ratio</td>
<td>0.39</td>
<td>0.39</td>
<td>0.39</td>
<td>0.36</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fresh Concrete Properties</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slump, in</td>
</tr>
<tr>
<td>Air Content, %</td>
</tr>
<tr>
<td>Density, lb/ft³</td>
</tr>
<tr>
<td>Temperature, °F</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hardened Concrete Properties</th>
</tr>
</thead>
<tbody>
<tr>
<td>28-day Strength, psi</td>
</tr>
<tr>
<td>Length change 90-day, %</td>
</tr>
<tr>
<td>C 1202 Charge passed, Coulombs</td>
</tr>
<tr>
<td>Rapid Migration, mm/V-hr</td>
</tr>
</tbody>
</table>
was about 40% higher than that of silica fume used in Mixture 2. The water content of this mixture was about 7% lower than Mixture 2. The measured 28-day compressive strength was 7180 psi. The 45-day charge passed by ASTM C 1202 was 1244 coulombs (average of two specimens). The average length change (ASTM C 157) after 7 days of moist curing and 28 days of drying was 0.023%. The required HRWR dosage was about 15% lower for Mixture 4 as compared to Mixture 1 even with a water content that was reduced by over 20%. The performance of this mixture achieved the performance criteria by a significant margin over the DOT-specified Mixture 1.

In addition the following tests were also carried out:

**Rapid Migration Test (AASHTO TP 64):** This test is similar to ASTM C 1202 in that chloride ions are driven into the concrete with an electric current. In this method, the depth of penetration of chloride ions is measured by spraying the fractured specimen with silver nitrate. The Rapid Migration Test is considered to be a more reliable indicator of the permeability of concrete. The results are reported as rate of penetration, which is calculated by dividing the depth of penetration (mm) by the product of applied voltage (V) and the test duration (hr). The measured rate of penetration for the mixtures after 65 days of moist curing varied between 0.018 mm/V-hr and 0.023 mm/V-hr (average of two cylinders). These numbers indicate no significant differences.
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between the concrete mixtures and comply with the performance requirements of FHWA’s HPC Grade 2 according to AASH-TO TP 64. No measurable chloride penetration was observed for the slag concrete mixture (Mixture 3).

Sorptivity Test (ASTM C 1585): In this test 2-inch-thick concrete slices from a cylinder are exposed to a thin layer of water in contact with one face of the specimen. The other surfaces are sealed. The increase in specimen weight due to moisture absorption is measured with time. The rate of water absorption is calculated and reported. The tests are in progress at the time of writing this article.

Chloride Diffusion Test (ASTM C 1556): In this test the concrete cylinders are sealed and immersed in chloride solution with one unsealed face exposed to the solution. After a specific exposure period the cylinder is removed and ground in 2 mm thick layers from the exposed surface. The chloride content is measured at different depths from which an apparent chloride diffusion coefficient is calculated. At the time of this report the exposure to solution is continuing and data are not available.

The above experimental study brings out the following conclusions:
1. The prescriptive DOT specification for bridge deck concrete can be significantly optimized for improved performance on drying shrinkage, strength and permeability. The optimized mixtures resulted in improved workability (were less sticky) and had reduced dosage of HRWR.
2. Concrete mixtures optimized for performance help achieve remarkable cost savings. It is estimated that the material costs of Mixture 1 will be about $57.8/yard. In comparison, the performance concrete mixtures save between 15.5% and 22.8% of the material costs.


Durability provisions are addressed in Chapter 4 of ACI 318 Building Code for Structural Concrete. The code addresses durability requirements for concrete exposed to freeze-thaw cycles, deicer scaling, sulfate resistance, protection from corrosion of reinforcing steel and conditions needing low permeability. In all cases, the primary requirement of controlling the permeability of concrete is a maximum limit on the water to cementitious materials ratio (w/cm).

The scope of this part of the study was limited to compare the performance of concrete mixtures with different cementitious materials and content with regards to permeability. Drying shrinkage measurements are also compared even though this is not a
limitation in the code. Four concrete mixtures were prepared with the same w/cm=0.42. Mixtures were designed in accordance with ACI 211.1, with certain variations. The slump ranged between 3.75 and 6.5 inches and the air content ranged between 4.1% and 7.4%. The mixture proportions and test results are provided in Table 3.

Discussion of Test Results

Mixture 1 contained 750 lbs/yd³ of ASTM C 150 Type I portland cement. The measured 28-day compressive strength was 5440 psi. The 28-day charge passed by ASTM C 1202 was 8356 coulombs (average of two specimens). The average length change (ASTM C 157) after 7 days of moist curing and 28 days of drying was 0.044%. The measured rate of penetration using the Rapid Migration test for the mixture after 53 days of moist curing was 0.069 mm/V-hr.

Mixture 2 contained 700 lbs/yd³ of total cementitious content out of which 25% was ASTM C 618 Class F fly ash. The paste content was lower by 1.16% as compared to Mixture 1. The measured 28-day compressive strength was 5950 psi and the 28-day charge passed by ASTM C 1202 was 5610 coulombs (average of two specimens). The average length change (ASTM C 157) after 7 days of moist curing and 28 days of drying was 0.038%. The measured rate of penetration for the mixture after 52 days of moist curing was 0.049 mm/V-hr.

Mixture 3 contained 564 lbs/cyd of total cementitious content out of which 25% was ASTM C 618 Class F fly ash. The paste content was lower by 1.16% as compared to Mixture 1. The reduction in paste content was compensated for by increasing the fine aggregate content. The measured 28-day compressive strength was 5670 psi and the 28-day charge passed by ASTM C 1202 was 4462 coulombs (average of 2 specimens). The average length change (ASTM C 157) after 7 days of moist curing and 28 days of drying was 0.032%. The measured rate of penetration for the mixture after 52 days of moist curing was 0.049 mm/V-hr.

Mixture 4 was identical to Mixture 3 except that the reduction in paste content was accomplished largely by an increase in the total coarse aggregate content. The measured 28-day compressive strength was 5600 psi and the 28-day charge passed by ASTM C 1202 was 4036 coulombs (average of two specimens). The average length change (ASTM C 157) after 7 days of moist curing and 28 days of drying was 0.032%. The measured rate of penetration for the mixture after 52 days of moist curing was 0.037 mm/V-hr.

Chloride diffusion studies are still ongoing at this stage. The above experimental study brings out the following conclusions:

1. At the same w/cm concrete performance can be drastically different by changing the type and quantity of cementitious materials and by using chemical admixtures. Code limitations on w/cm ratio do not assure the owner that a concrete mixture with a low permeability will be achieved. Even though the compressive strength was fairly similar the drying shrinkage varied over a very wide range, between 0.032% and 0.060%. The durability represented by the 28-day rapid chloride permeability values varied.

Table 3: Details of the ACI 318 Mixtures

<table>
<thead>
<tr>
<th>Mixture Proportions, lb/yd³</th>
<th>318-1</th>
<th>318-2</th>
<th>318-3</th>
<th>318-4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cement</td>
<td>750</td>
<td>525</td>
<td>423</td>
<td>423</td>
</tr>
<tr>
<td>Fly Ash</td>
<td>0</td>
<td>175</td>
<td>141</td>
<td>141</td>
</tr>
<tr>
<td>Coarse Agg (#67)</td>
<td>1800</td>
<td>1800</td>
<td>1800</td>
<td>2020</td>
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<td>Sand</td>
<td>1005</td>
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<td>Water</td>
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<td>235</td>
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<tr>
<td>AEA (oz/cwt)</td>
<td>0.35</td>
<td>0.39</td>
<td>0.49</td>
<td>0.39</td>
</tr>
<tr>
<td>Water Reducer (oz/cwt)</td>
<td>4.0</td>
<td>4.0</td>
<td>4.0</td>
<td>4.0</td>
</tr>
<tr>
<td>HRWR (oz/cwt)</td>
<td>n/a</td>
<td>n/a</td>
<td>7.4</td>
<td>9.0</td>
</tr>
<tr>
<td>w/cm ratio</td>
<td>0.42</td>
<td>0.42</td>
<td>0.42</td>
<td>0.42</td>
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<th>Fresh Concrete Tests</th>
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<td>6.50</td>
<td>3.75</td>
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<td>7.4</td>
</tr>
<tr>
<td>Density, lb/ft³</td>
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<td>146.5</td>
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<tr>
<td>Temperature, ºF</td>
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<td>69</td>
<td>67</td>
<td>65</td>
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<thead>
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<th>Hardened Concrete Properties</th>
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<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>28-day Strength, psi</td>
<td>5442</td>
<td>5948</td>
<td>5673</td>
<td>5602</td>
</tr>
<tr>
<td>Length change 56-day, %</td>
<td>-0.06</td>
<td>-0.044</td>
<td>-0.038</td>
<td>-0.032</td>
</tr>
<tr>
<td>C 1202 Charge passed, Coulombs</td>
<td>8356</td>
<td>5610</td>
<td>4462</td>
<td>4036</td>
</tr>
<tr>
<td>Rapid Migration, mm/V-hr</td>
<td>0.069</td>
<td>0.042</td>
<td>0.049</td>
<td>0.037</td>
</tr>
</tbody>
</table>
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between 4036 coulombs and 8356 coulombs and the measured rate of penetration varied between 0.037 mm/V-hr and 0.069 mm/V-hr. Even though these values are high, suggesting that all mixtures have a high chloride ion penetrability, these are expected to decrease with age, especially for mixtures containing the supplementary cementitious materials and it is expected that the difference in the concrete performance will be more pronounced.

2. Over the years considerable advances have been made in understanding the influence of concrete mixture optimization for concrete durability. Requirements in the ACI 318 Building Code have not kept pace with those developments. It continues to attach importance to w/cm as the primary means of controlling concrete durability. This test program shows that significant difference in durability and shrinkage can be attained at the same w/cm and similar strength. Alternative options for durability should be considered to the current limitations of the ACI 318 Building Code.

Summary

The above three examples of concrete floors, HPC bridge decks and ACI 318 code limitations demonstrate that:

1. Performance criteria in specifications for concrete will assure the owner that the performance objectives are achieved. Prescriptive specifications that imply performance do not assure anything. In both applications studied in this project — concrete floor and HPC bridge deck — targeting specific performance criteria resulted in equal or better performance (shrinkage, workability/lower admixture dosage, lower chloride permeability, etc.) as compared to prescriptive limitations in the specification.

2. Performance specifications allow a great opportunity to optimize the concrete mixture designs. This ensures that different producers can compete based on their knowledge and resources and better serve the needs of the project.

3. ACI 318 w/cm limits that control intended durability need a fresh look as this test program demonstrates significant differences in performance related to permeability and shrinkage can be attained even at the same w/cm and similar strength.
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Then we revolutionized it.
It is that time of year again. The swimming pools have opened back up, the trees are green, the boys of summer are playing baseball and once again the concrete business is humming along at full speed. The ready mixed trucks are as busy as can be and driver hours are at a premium. We all know the retail industry makes the bulk of its sales in the Christmas season, but ready mixed concrete makes hay while the sun shines. Some of us in the southern climate markets don’t see as dramatic a shift in demand as other parts of the country, but it even affects the southern tier states. During the winter, when construction activity is at a slower pace, it is easy to produce more promotion calls and activities.

Why should you engage in promotion activities when the business is running at a frantic pace? Owners, specifiers and contractors need your help now more than any other time of the year. Also, the sheer bulk of work going on right now increases the chance your message is relevant to your markets needs. Since it is not as easy to find the time now, chances are your competitors probably won’t make the time. Good promotion requires a well thought-out strategy, a consistent message and diligence. These are just a few of the reasons to promote in the summer months.

Owners, specifiers and contractors need your help most when they are busy. More than any other time of the year, you have the opportunity to show the value you bring to their team. Your employees’ knowledge of concrete, concrete construction and ways to add value by replacing other materials with concrete can help improve their profitability as well as yours. If you’re not out there promoting, you might not make it on their radar screen and before you know it you have lost an opportunity. Being visible increases your odds of success.

The bulk of work going on now increases the chance your message is relevant this instant. For the sake of discussion, let’s say your primary promotion efforts revolve around integrally colored concrete. When you go out and promote decorative concrete this time of year, odds are very good someone in the audience has a project to which colored concrete will add value. In the winter when it is easier for everyone to find the time, your audience may not have a project at that very moment that is a fit with color’s numerous value propositions. You are relying on effective follow-up strategies or the memory of your audience to kick in when the job arrives. Either way your message probably has less relevance than it does today. Don’t get me wrong, there are many reasons to promote year around, but today we are focusing on the summer pluses.

It is not as easy to find the time now so your competitors probably won’t. (You know them, the steel, wood and asphalt people, to name a few — not just other ready mixed producers.) Most people in the construction industry are so busy they probably will put off promotion until later in the year when
Promotion requires strategy, consistency and diligence. Before you begin or continue your promotion activities it is always good to make sure you have a strategy and a plan. What are you promoting? Colored concrete, concrete parking lots, ICFs, whitetopping, tilt-up, the choices are endless. If you want your message to resonate you want to keep it simple and not try to promote everything at once. Now that you know what you’re promoting, what is the value to the customer? It is easy to get wrapped up in the concrete technology or some other interesting attribute, but owners buy value, so make sure the clearly defined message is the value they will see. An example could be to illustrate how colored concrete will save them money versus competing decorative flooring systems. Have the real numbers for your market and show them. The value is there, it is real and you will create believers if you deal from a fact-based position. You will also establish credibility for your organization at the same time.

Now that you have your strategy and you have rolled out a message you need to be consistent. I have heard it reported that in an average day Americans are bombarded with 5,000 marketing messages. From TV to radio, billboards, sales calls, direct mail, telemarketing, the packaging on every product you buy, the list goes on and on. The point is your message probably has to be heard more than once to resonate. If your message keeps changing, it may not be heard. If your message is so complicated it cannot be distilled into a handful of consistent salient points, it will be lost. You have to be consistent to drive your promotion efforts.

Diligence, persistence, whatever term you prefer, you have to take the consistent message and repeat it in order to succeed. Diligence can come in many forms. You may have a big promotion event or demonstration where you partner with suppliers or your state ready mixed organization. These are good ways to get the ball rolling. But keeping the message out there can be as simple as a stuffer included in invoices. It can be a question your customer service people ask all callers. It can be painting one of your trucks with a message so it stands out like the Southwest Airline’s “Shamu” plane. The options are endless and limited only by your creativity. For that matter, it doesn’t even have to cost a lot. When you diligently drive the message for a year you will start to see results. Be patient, it can take longer. This brings us back to where we started — if you are not promoting in the summer months, your message gets lost for a few months and you could lose any traction you have created in the past. So don’t forget to promote this summer.

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In 1986, Bill Geiger felt it was time to automate our dispatching effort and Command Alkon was the best company to fulfill that need. Today, we still believe that Command Alkon remains the best company to fulfill that need.

How long has the Command Alkon/Geiger partnership lasted?

Our relationship began in 1976 when we purchased our first Alkon batching computer; ten years later we automated our dispatching effort with Command Alkon products. In 1999 we took the opportunity to research the market to understand what our options were with respect to a system upgrade. After several months of investigation, we decided to remain with Command Alkon; our research reaffirmed that we made the right decision.

Why does this relationship continue to last?

I believe that it has lasted for several reasons: First, the products work; second, we believe that Command Alkon understands the ready mix industry; finally, we have viewed each other as partners. We feel that we have a very strong relationship with Command Alkon.

Do you feel more secure in your operations knowing that Command Alkon provides the foundation of your automated operations?

Yes. We regard Command Alkon as the industry leader in the area of automated operations.

Do you foresee Geiger growing with Command Alkon in the future?

Yes I do because our relationship has been dynamic since it began. We are always interested in the software solutions that Command Alkon brings to the industry. Today, Geiger has purchased Electronic Document Management software as our next Command Alkon business solution.
Ready-Mix enterprise software wins back the profit you’ve been giving to the competition.

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- Gives accurate pricing based on true material costs.
- Charges for all the little extras you missed out on before.
- Gives you total control of your business.
- Integrated quarry & readymix operations.
- Mix design management.
- Order entry.
- Truck fleet management.
- Order scheduling.
- Delivery scheduling.
- Batch control.
- Microwave moisture sensing.
- Dispatching/ticketing.
- Invoicing, link to accounting.
- Aggregate gradation analysis.
- Mix design formulation.
- Inventory control.
- Customizable delivery tickets and reports.
- Twin shaft mixers.
the most stress,” he continued, leaning over a computer screen. “And try the new code to control the robotic filler.”

“Sure thing, John.” The younger man pushed several buttons in rapid succession. A titanium steel alloy arm swung out from the wall and fastened onto a large pipe suspended from the ceiling. With micrometer precision, the robotic arm maneuvered the pipe towards a row of prefab house forms. A stream of concrete flowed from the tube, filling the forms. A laser beam shot out from the wall to check if they were level. Servo-motors whined as the frame made a millimeter adjustment. Then a hydraulic lift lowered from the ceiling. The robotic arm lifted the frames onto it.

“Well, keep up the good work. I have to see a representative from a robotic firm to buy some sub-assemblies,” said John. He walked out of the lab into his adjoining office. Inside a short stocky man was sitting on a chair.

“Sorry to be late,” said John easily as he eased down into a plump leather chair behind his desk. “Four years of engineering courses over. Now to get jobs, John.”

John’s thin face broke into a smile. “I’m going into concrete, Will.”

“Concrete?” Will rolled his eyes, “Boring!”

John stiffened. “Concrete’s fascinating! It’s…”

Will laughed. “Mixing grey mud pies with a hand trowel! Fascinating! I’m going into robotics. See you in twenty years and we’ll compare notes.”

“The concrete order needs to be done by 5:00,” said a tall middle-aged man to his colleague in the large structural laboratory. “The virtual test lab results say to add 2.4% less water and 0.17% more water reducer to the concrete for the sections that undergo

“Yes, let’s get to business,” said John. “We want to increase the precision of our concrete handling units and to purchase a device to automate the lasers we use to level the slabs for roads…” Soon the two men were deep into conversation. At last, John said, “Well, I think your new robotics systems will just suit our needs.”

Will entered the order into his handheld computer.

“Thanks, I’ll have payment authorized today if possible.” John frowned, “The secretaries are always behind this time of year. So many people are applying for jobs, you see. We’ve had to turn away more MIT graduates this year than ever before.”

Just then a young man rushed in the office. “John, the Linex cluster running the hydration model for the high rise construction is down and the Department of Transportation just called with an order to pave an interstate and…”

“In a moment,” said John calmly. He turned to Will. “I’d like to stay and talk, but I’m rather busy right now.”

Anne P. Garboczi of Gaithersburg, MD, a home-schooled high school senior, is the winner of NRMCA’s eighth annual National High School Essay Contest. For more information on how your state can participate in NRMCA’s National High School Essay Contest, please contact Nicole Maher at 240-485-1158 or via email at nmaher@nrmca.org.
When Dwight Hikel began planning for construction of his new manufacturing facility, one of his concerns was maximizing the amount of paved area on the 12-acre lot. Hikel is president of Shelter Systems Limited, a Westminster, MD-based manufacturer of engineered wood roof and floor trusses. The pavement, used as a staging area, was critical to the production rate of his truss systems. So when Carroll County officials calculated that with a 131,000-square-foot building on the site it would require 1.5 acres of retention pond, Hikel began to look at his alternatives.

That is when Roy Trent of Conewago Enterprises made the recommendation to use pervious concrete for the paved surface. Conewago is a design-build general contractor and ready mixed producer from Hanover, PA. Trent had heard of pervious concrete and had been interested in using the product. He had learned that pervious concrete had been widely used with great success for light-duty parking areas. But Shelter Systems was a different application. This pavement was going to be subjected to heavier loads and there was concern that pervious concrete might not hold up. Hikel was also interested and said he would welcome the concept if Conewago could provide the necessary durability.

Along with David Donharl and Don Rummel from Conewago’s Ready Mixed Concrete division, Trent proposed to experiment with pervious concrete at their own plant. With help from Don Simmons, territory manager, and Mike Hammer, technical services manager, both with Hercules Cement Company, Rummel was able to adjust the concrete mix design slightly to provide a higher strength material. When coupled with roller compacted placement techniques, he was able to provide a durable concrete with high permeability.

In June 2003, Conewago placed three separate pervious concrete slabs at its Hanover plant, two within the yard and one for use as the employee parking lot. The concrete was placed 7-inches thick with an ABG Dual Compaction paver and finish-rolled with a 10-ton steel-drum roller. The concrete exhibited less than a half-inch compaction from the roller. Beam-type samples were cut from the pavement and were provided for flexural strength testing. At just seven days strength, the concrete flex test results averaged over 600 psi. Everyone agreed that the concrete design would be acceptable.

Now Trent had a bigger task. He needed to convince the Carroll County officials that pervious concrete would satisfy local

“Aside from being able to maximize development of the entire parcel, Hikel calculates that the pervious concrete pavement saved approximately $400,000 in underground drainage work that was eliminated.”
stormwater run-off regulations. Cores were taken from the test pavements and sent to Pennsylvania State University for permeability testing. Results of the testing on the 6-inch cores showed that the pavement could handle 80 inches of rain per hour. That is more than 10 times the intensity of a 100-year storm event at a five-hour interval.

Armed with these test results, Trent invited the local and county officials to the ready mixed plant for a demonstration. He also arranged for the local fire department to bring their water tank truck to the site. As officials watched, the firemen opened the main discharge valve of the tanker, emptying all of its contents onto the pervious pavement. The water ran directly through the pavement with minimal sheeting. Trent provided the county with the pervious concrete infiltration rates and a pavement design that included a 6-inch stone base. The county approved the project with one exception: the 1.5-acre retention pond was still required and would need to be maintained until such time as the officials were satisfied that the pervious pavement system could handle the run off.

Using the same roller compacted placement technique and an on-site plant, Conewago began the paving project in late summer 2004. Daily placement averaged 1,000 to 1,200 cubic yards per day. When the project was completed, 7 acres of parking lot had been paved. The paved area not only serves as parking lot but also as a staging and loading area for the completed truss systems. When at full capacity, Hikel expects 30 to 40 trucks per day loading out and hauling across the pervious concrete pavement.

After monitoring the pavement infiltration system during various rain events, the county officials have now approved the closing of the retention pond, allowing Hikel room to expand the operation. Aside from being able to maximize development of the entire parcel, Hikel calculates that the pervious concrete pavement saved approximately $400,000 in underground drainage work that was eliminated.

The completed project has weathered one full winter. To date, the pervious pavement has performed excellently and Hikel is very satisfied. “We are in the lumber business,” says Hikel, “and with pervious concrete, none of our lumber will ever be sitting in water.”

For more information on this project, contact Trent at Conewago Enterprises, 717/632-7722. For additional information on pervious concrete pavements, go to www.nrmca.org.
The key advantage of performance-based specifications for concrete is that contractors and producers are empowered to use their expertise in developing concrete mixtures optimized for performance and installing concrete efficiently and economically. This is in the owner's best interest since he/she is ultimately interested in building a well-functioning structure or facility at reasonable cost. However, despite this obvious advantage, there are still several barriers to adopting performance-based specifications for concrete. One key barrier is the definition of who is ultimately responsible for different aspects of performance of a concrete structure.

Concrete construction is somewhat unique in that it requires a relatively large number of entities to be involved in the process. Entities include numerous material suppliers (cement, fly ash, slag, aggregate, admixtures, etc.), design (formwork design, structural/architectural design, etc.), producers (mix design), distributors, installers (contractors and subcontractors) and users (owners, tenants, etc.). Custody of the product changes several times throughout the course of a project and those responsible at each point can affect the ultimate performance of the structure.

Architects and engineers say they are held responsible when something goes wrong with concrete construction. They often cite this as the reason for using prescriptive specifications since it gives them more control over means and methods of construction and mix design. However, many engineers and architects also recognize they are not experts in concrete mix design or construction methods and are attracted by the idea of collaborating with contractors and producers. At the same time, many express doubt that all contractors and producers have the necessary expertise when it comes to mix design and concrete installation.

Similarly, contractors and producers indicate that they are usually blamed when something goes wrong with concrete construction even when they meet all the prescriptive requirements of the owner's specification. Contractors and producers often propose more efficient mix designs and construction methods to the owner but they are often rejected by the project architects and engineers. Still others express concern over taking on more responsibility (and potential liability) that accompanies performance-based specifications.

Clearly everyone loses when something goes wrong with concrete construction so it behooves the entire construction team to work together to avoid problems. The best approach is to count on the expertise of each member of the construction team. Engineers and architects are experts in designing structures for form, function and aesthetics. Contractors are experts in construction methods and concrete producers are experts in designing concrete mixes and maintaining consistent quality during the job to meet the contractor's requirements for the plastic concrete (workability, set time, etc.).

The most important point to remember is that responsibility and authority go hand-in-hand. Without the authority to make decisions on characteristics of mixtures and construction methods the contractor and producer should not be held responsible for performance of the concrete. The same is true for engineers and architects. If they lack the expertise to design mixes and develop construction methods they should not take on the responsibility to control mixture parameters in the specification. They do, however, have the authority as the owner's representative to question aspects of the mix design or the construction method that impacts the final outcome.

In the end, whether the project is design-bid-build or design-build the architect/engineer, contractor and producers ultimately share responsibility to produce a structure or facility that meets the owner's functional requirements at a reasonable cost. Although this seems obvious and all parties involved usually understand this concept, adversarial relationships or lack of trust between the parties can develop if roles and responsibilities are not well defined.

As the United States construction industry moves toward performance-based specifications it is imperative that we address the issue of roles and responsibilities in construction both within building codes and standards and within construction contract documents (construction drawings and specifications). Building codes and standards in the United States have not done a particularly good job of delineating roles and responsibilities. One model that the United States construction industry may consider following is the new Canadian Standards Association (CSA) document CSA A23.1-04/A23.2-04 titled Concrete materials and methods and concrete construction/Methods of test and standard practices for concrete.

Canadian Standard

The new Canadian standard provides two alternatives for specifying concrete with
The concrete producer must provide verification that the plant, equipment and all materials comply with the standard and demonstrate that the concrete complies with the prescriptive criteria. The producer is also responsible for informing the contractor of any anticipated problems or deficiencies with the mix design related to construction.

Under the prescription alternative the contractor and producer are not responsible for the strength or durability of the concrete so long as they follow the strict prescriptive requirements for mix design and approved installation procedures. This may seem attractive to contractors and producers but it certainly doesn’t reward innovation or quality construction. For example, an innovative contractor who has the ability to complete a project more quickly and with less labor using self-consolidating concrete versus conventional concrete is at a disadvantage if self-consolidating concrete is not identified as an acceptable option since a prescriptive specification just will not work for this type of concrete. Likewise a producer who has the ability to optimize mix designs based on superior quality control (lower standard deviation of strength test results for example) would be at a disadvantage since he is not permitted to optimize the mixture or to change proportions to accommodate changing materials or environmental conditions.

In the United States, codes, standards and project specifications don’t always identify the roles and responsibilities of each party. When the owner (architect or engineer) specifies mixture proportions and construction means and methods there is an implied expectation of performance. The problem is these implied expectations only surface after problems occur. Since the roles and responsibilities were not well defined in the contract documents everyone is held responsible, including the contractor and producer even though they had little influence over mix design and construction means and methods.

### Performance Alternative

In the performance alternative of the Canadian Standard the responsibility for mix design, construction methods and quality control shifts from the owner and toward the contractor and producer. Along with increased responsibilities comes increased authority. In other words the contractor and producer have significantly more latitude to innovate and optimize on mix designs and construction methods.

The owner’s responsibility is to specify the required strength at age, the durability criteria, including the class of exposure and any additional requirements such as limits on shrinkage or creep, color, finish and texture. He also is responsible for defining the

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**Figure 1.** Canadian Standard – Table 5: Alternative methods for specifying concrete from CSA A23.1-04/CSA A23.2-04, Canadian Standards Association, Mississauga, Ontario, CANADA.
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Choosing Between Prescription and Performance

In the Canadian Standard, the owner is assigned the task of selecting the appropriate alternative: performance or prescription. The owner must determine the relative benefits of each alternative. The owner may select the prescription alternative if he believes he has a better knowledge of local concrete materials and construction techniques than producers and contractors in an area. In this case the owner takes full responsibility for performance and economy. The prescription alternative requires a less vigorous quality assurance program since he only needs to verify that prescribed concrete proportions and installation procedures were followed.

The prescription alternative is probably best suited for locations where concrete producers and contractors lack the facilities and qualifications to design concrete mixes and construction techniques such as in rural areas. Another example is when an owner has developed a relationship with a contractor and producer and feels he is already receiving good quality concrete work at reasonable cost and can forgo the expense of a rigorous quality assurance program.

The performance alternative is probably best suited for owners (architects and engi-
contractor and producer, the rewards outweigh the risk. A quality producer and con-
tactor will presumably be awarded more
contracts since they will be able to meet the
owner's performance needs more competi-
tively. As the United States construction
industry modifies codes and standards to
allow for performance specification, it must
be diligent in defining roles and responsibil-
ities such that the benefits can be realized.

United States Standards -
ACI Guidelines

The American Concrete Institute (ACI)
Committee on Responsibility in Concrete
Construction (RCC) has re-released a docu-
ment titled Guidelines for Authorities and
Responsibilities in Concrete Design and Con-
struction, Concrete International, April
2005. This document emphasizes the neces-
sity for authority and responsibility to go
hand-in-hand.

Presumably the producer already has
cement mix designs that are pre-qualified
for the particular strength and exposure
class since the performance criteria are pre-
defined in the standard (see Figures 2 and
3) and he would have completed pre-quali-
fication testing and trial designs for differ-
ent classes typically specified in his area.

There's no doubt the contractor and his
suppliers, including concrete producers,
take on more responsibility in the perfor-
manece alternative. However, for a quality

contractor and producer, the rewards out-
weigh the risk. A quality producer and con-
tactor will presumably be awarded more
contracts since they will be able to meet the
owner's performance needs more competi-
tively. As the United States construction
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sity for authority and responsibility to go
hand-in-hand.

As would be expected, the designer is
responsible for the structural and architec-
tural design of the completed structure. This
includes providing sizes and location of
structural components; strength, size,
location and spacing of reinforcement; and
strength and other requirements of concrete
including testing and inspection. The
design professional is responsible for review-
ning (but not necessarily approving) the con-
crete mix designs unless he explicitly
indicates in the project specifications that
approval is required.

The document states the constructor
(including suppliers) is responsible for pro-
viding concrete mixture proportions that
meets the specification requirements. Alter-
atively, if stated in the contract documents,
the owner's testing laboratory may prepare
the concrete mixture proportions. The
document goes on to indicate the mixture pro-
portions, materials, special procedures and
testing data should be submitted for review
to the design professional for approval if
required in the contract documents. Unfor-
unately, the document does not clearly state

![Figure 2. Canadian Standard – Table 1: Definitions of exposure classes from CSA A23.1-04/CSA A23.2-04, Canadian Standards Association, Mississauga, Ontario, CANADA.](image)

![Figure 3. Canadian Standard – Table 2: Requirements for classes of exposure from CSA A23.1-04/CSA A23.2-04, Canadian Standards Association, Mississauga, Ontario, CANADA.](image)
how much information the design professional should provide in the contract documents with regard to mixture proportions. This usually results in project specifications that overly prescribe mixture proportions and thus override the ability for contractors and producers to innovate and optimize.

ASTM C 94

The current ASTM specification for ready mixed concrete ASTM C 94 provides for three options for ordering concrete with differing levels of responsibility for each. It states that in the absence of a project specification, the purchaser must specify slump, air content, aggregate size and one of the three options A (performance), B (prescription) or C (mixed) shall be used for the basis of determining mixture proportions.

Option A is used when the purchaser (owner) requires the manufacturer to assume full responsibility for selecting mixture proportions. In this case, the purchaser specifies compressive strength in addition to slump, air content and aggregate size.

Option B is used when the purchaser assumes responsibility for proportioning the concrete mixture. In addition to specifying slump, air content and aggregate size he must specify the cement content, maximum allowable water content and admixture dosages.

Option C is used when the purchaser requires the manufacturer to assume responsibility for the selection of the proportions for the concrete mixture with a minimum allowable cement content specified. The purchaser must specify the slump, air content and aggregate size along with compressive strength, minimum cement content and admixture dosages.

Unfortunately option C, which is a combination of prescription and performance, is most commonly selected, which means the producer is provided little latitude for innovation and optimization but is held responsible for concrete performance. The ASTM C09.40 subcommittee, responsible for ASTM C 94, is currently developing a revision to outline only two options — prescription or performance — with more clearly defined associated responsibilities.

The NRMCA P2P Initiative (Prescription to Performance Specifications for Concrete) is currently working on developing model specifications that would better define roles and responsibilities and performance criteria. A research project headed by Ken Hover, John Bickley and Doug Hooten is currently underway to investigate standards from around the world, including the Canadian standard, in an effort to develop a comprehensive model performance-based specification. Visit www.nrmca.org/P2P for more information about the P2P Initiative and research progress.

Lionel Lemay is senior director of applied engineering with NRMCA. His primary responsibilities include interfacing with engineers and architects to promote performance-based specifications for concrete. He is a registered professional engineer and structural engineer in Illinois and a LEED Accredited Professional.
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For more information, contact Kerri Leininger at 888-846-7622, ext. 1159 or at kleininger@nrmca.org
Hosting a tour of your company’s operations is one of the most effective ways you can get to know your members of Congress while at the same time educating them about important issues facing the industry. Especially this year, with the reauthorization of the Transportation Equity Act for the 21st Century (TEA-21) looming and the effort to obtain passage of the power take-off tax correction still ongoing, the need for players in the ready mixed concrete industry to have close-knit relationships with members of Congress is vital.

So how does one go about setting up a plant tour with a member of Congress? First, draft a formal invitation well in advance of the date that you would like the legislator to tour your plant. Make sure the appointment request corresponds with a date that Congress is out of session, when members of Congress generally return to their districts. August recess is an optimal time that entails a high probability of good weather. Scheduling far ahead not only improves the odds of legislator participation, it also gives you time to make sure your plant is in top-notch shape before the visit. Sweep down the plant grounds to control dust, wash truck mixers and properly dispose of wastes that cannot be recycled or reused. Ensure that your operations are in compliance with federal regulations, especially those pertaining to safety and the environment.

Soon after sending the invitation, follow up with the legislator’s appointment secretary in his or her Washington, D.C., office. Be flexible and cognizant of your legislator’s hectic schedule. Offer to provide local transportation for the legislator and be sure to advise the scheduler that the legislator should dress in comfortable attire for the visit.

After securing a date and time that fits both of your schedules, the fun begins.
When the legislator arrives, have a knowledgeable and personable spokesperson lead the tour. Fill the legislator in on the history of the company, the scope and scale of its operations and the impact it has on the local and/or state economy. Prepare a brief written summary of facts on the company (including number of people employed, amount of production, etc.).

It’s also important to toot your own horn. Explain innovative compliance techniques or equipment in which you have invested. Point out where you have gone above and beyond what is required. Discuss good safety records, community relations activities or awards or recognitions your company has received. When it comes time to discuss legislative and regulatory issues with your legislator, use specific examples to demonstrate how your operations are or could be affected. For instance, when discussing the power take-off tax correction, be sure to point out the actual power take-off shaft and how it diverts energy to operate the mixer drum.

Consider inviting the local media and have a photographer take pictures while the legislator is visiting. Remember to coordinate with the legislator’s press secretary on any publicity arrangements. If the legislator has generally voted consistent with the preferred industry position on key issues, you may want to consider bundling a personal and/or company Political Action Committee (PAC) contribution with a CONCRETEPAC check and presenting it to him or her during the tour. NRMCA will also publicize your plant tour by including your photographs in future editions of NRMCA publications.

After the plant tour, send a thank you letter to the legislator for visiting your plant. It’s a good idea to include a small memento of the visit, such as a photograph, company bumper sticker or scale model of a truck mixer. Continue to cultivate your relationship by visiting or calling your legislator periodically. If you need further assistance with the logistics of your plant tour, please do not hesitate to call NRMCA’s Government Relations staff. Good luck!

For more information, contact Kevin Voelte at kvoelte@nrmca.org or 240/485-1152.

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CONCRETEPAC Wishes to Thank the Sponsors of the CONCRETEPAC Appreciation Reception at the 2005 NRMCA Annual Convention

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*2004 Merger of RC Cement and Lone Star Industries*
The ready mixed and concrete products industry is a challenging business. There’s plenty of competition and customers do not hesitate to make you earn the business — often through aggressive competitive bid processes. Margins are squeezed and customers are becoming ever more demanding for on-time deliveries, short lead times, extras without up charges, etc. How do you survive in such a demanding market?

A business becomes more profitable by increasing product prices, changing its product mix to more profitable lines, selling more products or reducing costs. Each opportunity has its own constraints. Increasing prices and changing the product mix are definite challenges in today’s market. Selling more products often requires buying market share from competitors, which inevitably requires lowering prices — compromising significant profitable growth.

That leaves cost reductions. But what more can be achieved here? Labor rates and benefits continue to escalate, productivity improvements are increasingly difficult and materials are going up due to rising energy costs and stronger demand.

A silver lining to current business conditions resides in the fact that there are opportunities to lower material costs. A gold mine of value in fact.

Consider that a typical concrete products company spends two-thirds of its revenue with suppliers. Consider that one of the synergies being achieved by the growing global companies in the industry is leveraging their buying clout. With a critical mass of volume large buyers demand cost reductions from their suppliers and they get it.

The global companies are expanding partly due to the advantages of being large and leveraging their position in the market.

Observe the following chart that reflects the very large market share held by the largest companies. Also note that there are still a large number of smaller independent companies in the industry that need to exercise similar leverage of material requirements with suppliers in order to retain their share of this market. The trend is clearly toward independents being acquired by the global entities. Strategically, a market remains robust if smaller and mid-sized companies sustain an ability to be competitive with global companies. This is where innovative ideas often develop and where the standard for outstanding service to customers is often defined.

A typical independent that is acquired by a large global firm will enjoy material cost reductions in the 10 percent to 20 percent range for many leveragable categories of materials. That is part of the synergy that justifies paying premiums for acquisitions.

Suppliers are willing to make these concessions because large incremental volume for them can be more efficiently serviced. And they cannot afford to lose such large volumes of business.

These large buyers deploy full-time procurement professionals who know how to negotiate and gain commercial concessions in exchange for consolidating their supply base to a much smaller number of suppliers. They enter into definitive supply agreements for longer terms and deliver the business to the successful suppliers with high compliance from operations.

Other industries have learned how to leverage their buying clout with more combined volume by working through buying consortiums. These consortiums are a form of buying cooperatives that manage the combined common requirement of materials across a group of independent companies. The consortium is managed by procurement professionals who assess market conditions on a fulltime basis and develop sourcing strategies that achieve significant value for their members.

Is this a new concept? Not hardly. Buying consortiums or cooperatives are prevalent in other industries. They have successfully operated for years in industries such as retailing, healthcare, farming, steel, textiles and forest
Why hasn’t this concept been tried in the ready mixed and concrete products industry? Partly because the industry is so fragmented. Global companies have enough leverage from their own requirements. Independent companies are smaller than in other industries so combining common requirements is more difficult to achieve. And independents by their very nature are wary of working this closely with other companies.

However, this business philosophy is changing. Perhaps necessity really is the mother of all creative ideas. The concept is evolving in the industry and strategically it will be good for business. Common material costs can typically be reduced more than 10% to 20%. These cost reductions go right to the bottom line and provide a sustainable competitive advantage year after year.

From a strategic perspective this will be good for the industry. Lower operating costs enable industries to be more competitive with other market segments, thereby fueling growth. Our industry should focus less on taking market share away from others and instead concentrate on being of more value to potential customers.

If concrete products become more economically viable relative to other forms of construction materials, the industry will grow. Growth from being more cost effective fuels profits for everyone in the industry and helps the industry achieve sustainable long-term growth.

The concept of a buying consortium for the ready mixed and concrete products industry is “thinking out of the box,” but this industry needs to test more of these new business concepts. Being more efficient is what makes us better and the industry more viable.

Good suppliers welcome such an approach. A good supplier is not afraid of competition and recognizes the efficiencies that can be gained by working with a well-run consortium that efficiently delivers business through high compliance definitive commitments where significant additional business can be obtained.

A well-run buying consortium can significantly lower material costs for independent companies in the industry. Suppliers welcome the opportunity to be more efficient in selling the industry and to grow their business. In these challenging business conditions where opportunities to grow profits are constrained, this unique business process is worth considering.

James C. Byrd is president of Concrete Products Cooperative, LLC. For more information, visit www.concretecoop.com or call 770/594-1215.

The views and opinions expressed are those of the author and do not necessarily reflect the views and opinions of the National Ready Mixed Concrete Association.
Hexavalent Chromium: A Health Standard in 2006

By Thomas Harman, M.S., CSP, Director of Safety Compliance

A fter 10 years of petitions and lawsuits, Public Citizen’s Health Research Group (HRG) was successful in 2002 in forcing OSHA to promulgate a new standard regulating hexavalent chromium \([\text{Cr(VI)}]\) in the workplace. (Hexavalent chromium is in cement in minute quantities as a byproduct of the manufacturing process.) The U.S. Court of Appeals for the Third Circuit ruled in HRG’s favor on December 24, 2002, ordering OSHA “to proceed expeditiously with a \([\text{Cr(VI)}]\) standard.” In October 2004, OSHA published its proposed rule to establish a comprehensive health standard regulating hex chrome in the workplace. In the proposal, OSHA mandates management of \([\text{Cr(VI)}]\) in the general industry and maritime sectors but judiciously excluded the material in the construction sector. The exclusion came about as a direct result of work accomplished by a coalition that included the Associated General Contractors, the National Association of Home Builders, the National Concrete Masonry Association, the National Ready Mixed Concrete Association and the Portland Cement Association.

The rule includes seven primary components aimed at reducing and controlling worker exposure: initial exposure monitoring; personal protective equipment; medical surveillance; housekeeping; record keeping; training and hygiene areas. NRMCA examined the costs to comply with the proposal and determined with a high degree of confidence that the industry will conservatively expend more than $135 million to comply with the proposal.

In December 2004, the RMC Research Foundation accepted a proposal to study ready mixed concrete workers’ exposures to hexavalent chromium and the first independent, stratified health study of its kind to analyze the ready mixed concrete workplace for the presence of \([\text{Cr(VI)}]\) was completed. In late December, certified industrial hygienists (CIH) placed personal air monitoring equipment on employees at four ready mixed concrete plants. CIHs oversaw the project and one American Industrial Hygiene Association-accredited (AIHA) laboratory analyzed the collected samples. The report, \*Personal Exposure Monitoring Assessments for Hexavalent Chromium at Four U.S. Ready Mixed Concrete Facilities*, revealed that hex chrome was not detected in 50 percent of the personal samples; the remaining samples detected \([\text{Cr(VI)}]\) at merely trace levels or at levels that do not approach the action level or the PEL mandated by the OSHA proposal.

In January 2005, NRMCA submitted comment to OSHA on the proposed rule and requested either: 1) that Portland cement be excluded in the general industry sector as in the construction sector; or 2) that ready mixed concrete manufacturing be exempted from the final rule based on the absence of hex chrome, as demonstrated by the study, vis-à-vis the significant costs to the industry to comply with the rule as proposed. NRMCA and other coalition members provided testimony at informal hearings held throughout the month of February about how the proposal will affect our members. The coalition has also prepared and submitted post hearing comments on the proposal.

OSHA is bound by the Court to issue the final rule on hex chrome sometime in the first quarter of 2006. The alliance members continue to work to educate agencies in the federal government about this rule and its deleterious effects on our sector’s employees. To force exposure monitoring on employees and companies wherein no discernible benefits exist demonstrates a “one size fits all” approach and potentially results in unnecessary, burdensome regulation.

For more information, contact Tom Harman at tharman@nrmca.org or via phone at 240/485-1155.
Throughout 2005, NRMCA is celebrating a notable milestone… our Diamond Anniversary. Founded in 1930, NRMCA continues to be the leading industry advocate working to expand, improve and promote the ready mixed concrete industry through leadership, education and partnering… helping keep America strong. To celebrate our 75th Anniversary, we’re proud to introduce a new logo, projecting confident leadership as we accelerate into an exciting future.

Thanks to our Diamond Anniversary Sponsors, whose support allows NRMCA to shine a spotlight on this important occasion.
Unbonded concrete overlays give new life to old streets

Faced with an aging road system, state and local governments are shifting their emphasis from new construction to maintenance of existing pavements. The Road Information Program, a national non-profit transportation group, reported in 2003 that one-fourth of major urban roads offer drivers “an unacceptable ride quality and are in need of resurfacing or reconstruction.”

Many of these pavements were built in the early 20th century, and have long since exceeded their design life.

Some cities try to restore failed pavements with asphalt overlays, only to find out the hard way that their “solution” must be repaired or replaced again within two to seven years. Why go through the hassle and expense of repeatedly fixing the same stretch of road, when there are methods that provide sustainable, smooth roadways? Unbonded concrete overlays provide two to three times the service life of conventional asphalt, at a fraction of the cost of reconstruction.

Get in, get out, and stay out with concrete overlays

Using concrete overlays to repair distressed pavements means your crews can get in, get the work done and get out fast—reducing costs and driver frustrations. As part of any balanced pavement management program, they offer unbeatable benefits:

- **Strength:** Concrete hardens over time. After its first month in place, concrete slowly increases in strength by about 20% over its lifetime.

- **Durability:** With an average lifespan of 30 years, concrete can outlast the competition. And concrete pavements frequently surpass their design lives.

- **Ease of construction:** Concrete pavements can be constructed and open to traffic in a matter of hours if necessary.
Low life cycle cost: Longer life expectancies and minimal maintenance costs give concrete a long-lasting value.

Safety: Concrete pavements are safer, boasting significant light reflectivity, reduced wet spray and excellent traction and skid resistance.

Sustainability: Recycled content in concrete—including recycled, crushed concrete and industrial byproducts like fly ash and slag—helps reduce waste.

Customized appearance: Modern design techniques offer a variety of aesthetic choices for each application.

Unbonded concrete overlays save existing concrete

Existing concrete pavements are still utilized with unbonded concrete overlays. This method is ideal where the existing pavement has little or no remaining structural life, extensive and severe disability distress, medium to very heavy truck traffic and a very weak or wet subgrade. A layer of material between the old and new pavements keeps the distress of the old concrete from affecting the new pavement.

The placement of an unbonded overlay begins with evaluation of the existing pavement, the condition of which dictates feasibility of repair. Only very serious distresses in advanced stages need be repaired before the overlay is placed. An interlayer (or separator layer) of hot mix asphalt about one inch thick is applied to the existing concrete, and in warm climates, a layer of whitewash is applied to the asphalt to reduce heat build-up. The concrete overlay is then placed in a thickness of four inches or more, texture is applied as needed, and the concrete is cured. Joints are sawed approximately 12 to 24 hours later. In many instances, traffic can return to the pavement within 12 hours.

Unbonded overlays can be used on any concrete pavement type. The design of unbonded concrete overlays requires very little preparation, and the resulting pavement provides improved structural capacity on a very strong concrete base. Concrete pavements also feature reduced potential for faulting, pumping, or loss of support in the new overlay, and offer drivers a smooth, quiet, and safe new riding surface.

Resource List

Guidelines for Unbonded Concrete Overlays, TB005P, ACPA, Skokie, Illinois

*For more information on The Road Information Program, visit www.tripnet.org.
When 25-year-old Brad Stokes took a job as a plant operator at Mann Ready Mixed Concrete and Aggregates, Inc., he wasn’t naïve about coping in the workplace. When he started to work at 18, his first boss thought every hour was cocktail hour. And while his employees loved him and he ran a profitable business, his staff devised many “workarounds” to keep things functioning. So Brad moved on to his second job where his new boss expected Brad to master controlled mediocrity — stride the middle between a blaze of glory and sheer incompetence so the department stayed under corporate radar.

After a couple more frustrating years, Brad’s career was idling. He longed to find a company that could give him the jumpstart he was searching for. Brad was excited when he landed a job as a plant operator at Mann Ready Mixed Concrete and Aggregates because the HR manager painted a picture of a well-run company. Brad’s general manager promised him the opportunity to work hard, build a career and make a difference. It took a week for Brad’s new reality to set in. The general manager, who had promised during the interview process to mentor Brad, visited Brad’s small plant so infrequently that Brad’s co-workers had lapsed into an “Animal House” culture. Forget teamwork. Bad behavior was rampant, including belching, cursing, gambling, fighting and cheating. The concept of promotion through a meritocracy had been twisted to include playing sports and/or drinking silly at a local watering hole, and pulling pranks with the right people on “the other people.”

Brad now is resigned to figure out how to distance himself from work and the people he works with. “I was hoping to find a coach here so I could finally develop a career, but after how all my past supervisors

Building a 21st Century Workforce

By Eileen Dickson, Director of Education
managed their staff, I’ve come to realize that work does not have perfect people,” he says. “I don’t think I was too idealistic but after seeing the antics pulled at three jobs, I’m not as gung-ho as I used to be. I still have not found a job I want to make into a career.”

Unfortunately, behaviorists analyzing workplace supervisory conditions do not find Brad’s situation an anomaly. Studies show that bad behavior as exhibited by Brad’s supervisors greatly influence an employee starting out. This becomes a challenge in our industry, which is working hard to find solid, long-term employees who can and want to rise through the ranks.

The challenge becomes more critical when one looks at some of the broad industry data and thinks about how those numbers could impact the stress of filling jobs. According to RS Means, a Kingston, MA, construction estimator, U.S. construction hit $1.05 trillion in 2004, with spending rising 9.2%, the biggest increase since 1996, when the construction industry emerged from the last slump. The very visible rising costs of steel and cement, as well as other materials, have helped fuel the reported 10.5% leap in the average cost of a new building. Prices of materials, especially steel and rebar, which shot up a whopping 60% in the California and Florida markets, are hurting builders’ profits. But at the same time, the increases have not prevented many projects from being built. The higher costs have had little impact on demand, which is driven more by interest rates than higher costs, according to construction industry analysts. In fact, one of the largest U.S. home builders, Miami-based Lennar Corp., posted a 39% rise in its first quarter profit, with its gross margin rising to 24.6% from 22.5% the previous year. As in the building industry at large, the ready mixed concrete industry remains healthy, coping with the challenges it is presented.

Nevertheless, reported figures about construction industry workers retire earlier than many others in the labor pool, typically between the ages of 50 and 55; therefore the industry is the first to already begin to feel the effects of the baby boom retirement dilemma. In fact, in more technical construction jobs, the number of workers in the job pool has plummeted. Gasperow predicts, “We’re going to have to bring more people in regardless of the state of the economy because of the retirement of older workers.”

Over the long term, as thousands of experienced foremen, construction workers and equipment operators retire, the shortage of construction workers will drive up costs even more. Recruiting talent remains one of the critical, long-term worries in the construction industry, as does retention of those employees already on the payroll.

Workforce recruitment specialist Mel Kleiman believes that the key to employee retention begins before the hiring process. A critical problem in many industries, not just construction, is senior management not allowing busy, entry level managers to take the time to train about how to supervise employees. When entry and mid-level team leaders lack the skill to act as the buffers between upper management and frontline employees, the cost can be lost productivity and lawsuits filed by a wronged employee when a manager unknowingly makes a supervisory blunder.

A manager ready to hire a direct report must know what makes his/her company appealing, how the company is perceived by job candidates and current employees, and what drives people to work for that manager in order for him/her to effectively retain those whom they hire. Kleiman states that managers should know the answers to four important questions before interviewing job candidates:

1. Can we do this job another way?
2. Would I work for myself?
3. Why would anyone want to work for me?
4. When I hire the right person, what do I plan to do to make sure that person is successful on the job?

While a straight-laced work environment might not always be the norm, it is the responsibility of senior management to set a solid standard, illustrated by its actions. It must provide the vision and pathway for frontline leaders to do battle every day in the trenches, drive daily operations and make it happen.

Bibliography

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Annually, NRMCA offers approximately 50 skill- and knowledge-based workshops and seminars to help rising leaders change how they approach their jobs in the ready mixed concrete industry. Workshop topics and content are suggested by panels of NRMCA members, with the goal of filling knowledge gaps by targeting technical, operational, managerial, sales and promotion areas. For specific information on workshops that can help your company push forward in the 21st century, please contact NRMCA’s Education Department or visit NRMCA’s website.
Hire the Best and Avoid the Rest

By Gregory P. Smith

Businesses are hiring employees again. There is an abundance of well-qualified applicants looking for jobs. Finding and placing the right person in the right job is critical to success. Now that the economy is improving, there is no reason to lower your standards and hire the first person who walks through the door — a dreadful strategy. Now is the time to improve your hiring process.

The difficulty lies not in finding people, but selecting the right person. Have you ever faced this situation? The new person you just hired had an impressive resume. He answered all the interview questions correctly. The background check came back with no blemishes. He seemed like the right person for the position. You even had him interviewed by two other managers. However, his first week on the job, he had two employees in tears and one of your best workers quit. Was this a case of Dr. Jekyll or Mr. Hyde? Where did you go wrong?

One bad hiring decision can damage or in this case “kill” a healthy organization. Take notice — job interviewing alone is unreliable in today’s market.

One reason interviewing by itself is unreliable is because most of today’s job seekers are proficient at interviewing — they already know what to say and how to answer your questions. They can put on a good “presentation” and bluff their way through.

Even the best interviewer has trouble seeing past the superficial image and identifying an applicant’s true attitudes and behavior patterns — their ability to interact with others. Furthermore, job resumes are often exaggerated and unreliable. What makes matters worse, many companies do not properly train managers in interviewing techniques.

A better approach is needed. Many organizations are turning to behavior assessments and personality trait testing for both hourly workers and managers. Back in the late ‘90s, only five percent of Fortune 500 companies used some type of assessment. Today, that figure is climbing to 65 percent.

A 2000 study by the American Management Association showed nearly half the 1,085 employers polled use at least one assessment in their interviewing process.

Javier Lozano, SPHR, an organizational capability coordinator for Chevron USA, recently told HR News, “A validated pre-employment test can be a strong predictor of future performance and whether an applicant is a good fit for the job. If used correctly, a validated test can be one of the best retention tools available to the employer.”

For example, many companies are using integrity assessments that measure the “six deadly sins” of a bad hire. It identifies applicants who may steal from the employer, engage in computer and sick leave abuse, workplace aggression and other counterproductive behaviors.

QWIZ Inc. has several automated tests that help measure basic job skills such as word processing, computer skills and basic reading and mathematics. They also have a product that can help select better applicants to work in call centers.
One of the key factors leading to high turnover is the relationship between the employee and his or her supervisor. In a survey we conducted, 42 percent of the employees said they quit their last job because of the poor management skills of their supervisor.

Often people get hired, and in other cases promoted, for the wrong reasons. Many times supervisors have not had the benefit of proper training and development.

Soft skills or what is called Emotional Intelligence (EQ) can also be measured and individuals can benefit from these assessments.

On the market today, there are many varieties available. There are specialized assessments for sales professionals, management or pre-employment assessments.

Hundreds of organizations are using a special version of the DISC assessment, which identifies the eight common behavior patterns found in most people. The reason this is superior is its simplicity, validity, accuracy and availability on the Internet 24 hours a day. Individuals or the employer receive a personalized 25-plus-page report that can be used for hiring, coaching or development purposes. This report provides detailed information on the individual’s:

- Value to the organization
- Communication preferences
- Ideal work environment
- Motivation needs
- Management expectations and needs
- Areas of improvement
- Areas for improvement
- Leadership strengths on a ranking scale from 1-10

This report can also be used with current employees to facilitate a positive dialogue between the manager, the team or co-workers. Most assessments only take 10 to 15 minutes to complete and score and can be e-mailed to anyone in the world within minutes.

If you want to learn how to use assessments to identify and hire top performing people, please go to www.behaviorprofile.com.

Greg Smith is a nationally recognized speaker, author and business performance consultant. He has written numerous books including his latest, Here Today, Here Tomorrow: Transforming Your Workforce from High Turnover to High Retention. He has been featured on television programs such as Bloomberg News, PBS television and in publications including Business Week, USA Today, Kiplinger’s, President and CEO and the Christian Science Monitor. Smith is president of a management-consulting firm, Chart Your Course International, in Atlanta, GA. Phone him at 770/860-9464. More articles are available at www.chartcourse.com.
Question:

What must I do to comply with the Federal Motor Carrier Safety Administration’s (FMCSA) new entry-level driver training requirements contained in 49 Code of Federal Regulations 380.503?

Answer:

The new law, which took effect on July 20, 2004, requires that drivers with less than one year of experience operating a commercial motor vehicle (CMV) in interstate commerce receive training on a minimum of four subjects before being allowed to drive. These subjects include driver qualifications, driver wellness, drivers’ hours of service and whistleblower protection. FMCSA recommends, but does not require, a minimum of 10 hours of aggregate training on the specified topics. The personnel administering the training and the training methods are at the discretion of the employer. The trainer must issue each driver a certificate of successful training completion, which must be kept in each driver’s driver qualification file for the length of his or her employment and for one year thereafter. Please keep in mind that although this rule is specific to interstate CMV operators, nothing prevents states from adopting it for intrastate drivers. Please check with your state’s appropriate regulatory agency to determine whether it is currently enforcing this regulation for intrastate CMV operators. NRMCA has developed a compliance guide and training materials to help member companies comply with this regulation.

For more information, contact NRMCA’s Kevin Voelte at 888/846-7622, ext.1152 or at kvoelte@nrmca.org.

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.
Best Sellers from the NRMCA Bookstore

1. **2PCIP100 – Concrete In Practice Package**
Concrete in Practice Sheets are short 1-page discussions on various concrete topics and 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 a great resource to give to your contractors and customers. English CIP Full Set 2PCIP100 - contains 20 sets of each CIP topic 1-38. Spanish CIP Full Set 2PCIP100es - contains 20 sets of each CIP topic 1-36. ($180 members, $720 non-members); English Single Set 2PCIPS & Spanish Single Set 2PCIPSes ($20 members, $80 non-members)

2. **2PVR034 – The Twilight Pour**
Using a unique acronym, D.A.R.K., the Twilight Pour provides detailed safety and “how-to” information on the four critical elements involved in safely delivering concrete to a job site at night. This is a “must have” lesson if you find yourself working in the dark! 9 minutes. ($70 members, $90 non-members)

This manual educates truck mixer drivers about concrete and customer relations. Completely updated for 2004, it 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. ($10 members, $40 non-members); (20 or more copies $6 members, $32 non-members.)

4. **2PEB119 – Concrete Floors and Moisture**
Understanding moisture in concrete leads to successful floor projects. Reference: Kanare, Howard M., Concrete Floors and Moisture, EB119, Portland Cement Association, Skokie, Illinois, and National Ready Mixed Concrete Association, Silver Spring, Maryland, USA, 2005, 164 pages. ($30 members, $40 non-members)

5. **2187 – Compilation of ASTM Standards Relating to Concrete**
Contains 43 ASTM specifications, practices and test methods relating to cement, fly ash, slag, silica fume, admixtures, aggregates and concrete. Included in the ASTM Manual of Aggregates and Concrete Testing. Reprinted by NRMCA in January 2005, it contains the most recent versions of the ASTM standards at that date. ($40 members, $60 non-members)

6. **2P159 – 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. ($20 members, $80 non-members)

Twenty comprehensive chapters explain every section of ASTM C 94 and $4M, including background, scope, referenced documents, ordering information, materials and much more. ($50 members, $67 non-members)

8. **2PCP – Pervious Concrete Pavement**
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 storm water 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, $25 non-members)

9. **2PCPA5 – Concrete Pavement Analyzer Software**
This parking area design and costing software has been developed to quantify the differences between concrete and asphalt pavements. ($50 members, $200 non-member)

10. **2P179 – Review of Variables That Influence Measured Concrete Compressive Strength**
This paper summarizes the many variables that can affect the measured compressive strength of concrete cylinders, including procedures for sampling, casting, initial curing, transporting, laboratory curing, capping and testing. Reprint from ASCE Journal of Materials in Civil Engineering from May 1991. ($3.50 members, $14 non-members)
The National Ready Mixed Concrete Association is proud to present the inaugural class of member companies that have met the criteria for classification as an NRMCA Premier Producer.

These member companies have demonstrated, through their involvement in and dedication to the association, their commitment to excellence.

**Gold Premier Producer:** RMC Pacific Materials (now Cemex), Pleasanton, CA

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Newington Concrete Corp./NewRock Materials, Newington, VA
Ocean Construction Supplies Limited, Vancouver, BC
Rempel Bros. Concrete, Langley, BC

NRMCA’s Premier Producer Program seeks to recognize member companies that exemplify the mission of the association. Points are awarded for participation in NRMCA educational programs, plant certification programs, NRMCA member surveys and a variety of other important milestones. Companies are also awarded points for length of membership, membership in state associations and participation with partner organizations such as ACI. For more information on this program and how your company can become an NRMCA Premier Producer, contact Kathleen Carr-Smith at kcarrsmith@nrmca.org or via phone at 240/485-1145.

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