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It’s Just a Concrete Plant

By Douglas Ruhlin, Principal Environmental Consultant, Resource Management Associates

Recently, I had the privilege of representing a company that was going before a local board to obtain approval to construct a new ready mixed concrete plant within an industrial park (happily, we gained approval). During the hearing, a relatively savvy member of the board inquired as to why the applicant didn’t consider “hiding” the concrete plant behind a thick buffer of mature trees, since it was unlikely that anyone entering the industrial park would want to see a concrete plant. The inherent belief was obvious – concrete plants are not attractive to look at and most people will not want to see one on a daily basis.

The applicant answered, much to his credit, that he didn’t think concrete plants had to be ugly, and that he in fact thought they looked interesting and would be a benefit to the industrial park and surrounding area. I’m sure if you’re reading this article you probably feel the same. But what of the general population? What does the average guy think of a concrete plant? Does he share this same opinion?

I thought it a sad commentary on the concrete industry that someone from the public on an appointed board would make this comment; yet thought the applicant’s answer was right on the money. Furthermore, since his company constructs, operates and maintains state-of-the-art plants, I have little doubt that the concrete plant to be constructed will be a great looking plant and will be a benefit to the industrial park and community. In short, a plant that anyone, anywhere would be happy to see on a daily basis.

But do we within the industry play into this perception ourselves? I think for many of us, the answer is yes. For too many within the concrete industry, it’s “just a concrete plant.” Those plants are operated and maintained in a way that does not present a visually attractive or interesting perspective view – the type of plants that few want to see on a daily basis and which are probably best hidden away from public view.

So what then is the difference? Is it indeed “just a concrete plant”? I say NO! While certainly it’s easier to construct a new plant in a manner that is a detriment to a community than it is to polish up an older plant that may have been present for years, but have you ever seen an older concrete plant that looked absolutely fantastic? I know I have. What makes them unique?

I think the answer is obvious – the operating philosophy of the concrete plant operator itself. Consider it “just a concrete plant” and likely that’s how it looks. But consider it to be an attractive, interesting industrial plant, and likely that’s how it looks. Which would you rather look at on a daily basis? Which do you think the public would rather look at?

As a longtime judge of the NRMCA Environmental Excellence Awards and as someone who has been fortunate to visit an awful lot of outstanding concrete plants, I can attest that there are an extremely large number of concrete plants that look truly outstanding and would an asset to any community. While obviously not all plants can live up this lofty standard, we would all benefit by having more plants striving to move toward visual excellence.

It doesn’t always take a lot to move in the right direction. Some housekeeping, new signage, a little bit of landscaping and some paint on plant equipment can be a huge step in the right direction. But it starts with an attitude – that’s it’s NOT “just a concrete plant” – it’s our home away from home, our industry and our source of pride.

How do you view your concrete plant? Why not occasionally step back and look at it like the public may be looking at it. If it’s more than “just a concrete plant” to you, you’re probably on the right track and a welcome addition to nearly any community.

For further information on any of the issues in this article, Doug Ruhlin can be contacted at Resource Management Associates, PO Box 512, Forked River, NJ 08731; (609) 693-8301; www.resourcemanagementassoc.com; or via email at druhlin@resourcemanagementassoc.com.
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What’s in Store for 2011 and Beyond?

By John Richardson

Over the past two years and counting, we have seen the pressure on the labor and employment front mount. Clearly some of the key drivers are the continued high levels of unemployment, continued downward pressure on housing and pricing, increased foreclosures and an economy that just isn’t improving as predicted. Wages are flat; unions are rattling their sabers with little to show for it. In 2008 there was much excitement about the Employee Free Choice Act, then the Patriot Act, the Health Care Reform Act, the Americans with Disabilities Act Amendment Act, and so on. The new secretary of labor promised more scrutiny and enforcement pressure in workplace safety, wage and hour reform, labor-employer relations, record keeping for government agencies, and on and on and on. Concurrent to increased pressure from government, we were, and still are, facing greater local and global competition. Along with more government interference, control, regulation and enforcement in our businesses beginning to approach what some would call disastrous conditions, we are about to face another crisis; employment. So you say, what do you mean employment? We have more unemployed people in our country than any time since the early 1980’s. How can we be facing a crisis in employment?

Let’s examine each of these areas in more detail and let’s start first with government intrusion. Three years ago, the hot issue of the day was EFCA (Employee Free Choice Act) or better known as “card check.” EFCA is for all practical intents and purposes, dead. The Congress has all but dismissed and defeated it. The Administration has made it clear, there are greater issues to deal with as in more jobs and jobless benefits. It is turning its back on its promises to big labor unions. Unions have been in the news a lot lately but not for the usual reasons. The BLS (Bureau of Labor Statistics) presented some startling new stats, in July of 2010 which show that the total number of National Labor Relations Board (NLRB) union elections has dropped by 60% from 1997-2009: There were 3,261 elections in 1997, but only 1,304 elections in 2009. Likewise, elections won in favor of union representation during that time declined 48%, from 1,656 elections in 1997, but only 864 elections in 2009. Likewise, elections won in favor of union representation during that time declined 48%, from 1,656 elections in 1997, but only 864 elections in 2009.

While labor had a slightly higher success rate in winning elections, this is because labor focused on trying to organize fewer shops and organizing smaller, more easily organized shops. The shift away from trying to organize the large multinational companies that define wage standards to smaller less economically significant
shops has occurred because unions are desperate to gain dues to keep themselves alive. They’ve lost 1.1 million private sector members from 1995 to 2008. These factors combined with low morale due to slow times and layoffs have made the ready mix industry a particularly vulnerable target.

On the union front however, there is some good news. Unions are struggling with low funds, high expenditures, and organizing very small non-integrated units is expensive and risky for them. There are two union matters in the news media worth noting as this article is being written. The Kohler company (a plumbing ware manufacturer headquartered in Kohler, Wisconsin, which back in the 50’s endured the longest strike in labor relations history) was scheduled to vote on a historical proposal (Sunday December 19, 2010) which includes in addition to many other items a “flexible workforce” provision which, if ratified, would be a great bellweather for the ready mix concrete industry. The company would be able to use new or laid-off workers as non-union, at-will employees, called a flexible work force to fill up to 25 percent of the posts now held by union workers. Under the proposal, the flexible work force employees could be fired without cause and generally would not accrue seniority or be guaranteed a minimum number of hours. They would receive no health insurance until they work 1,000 hours in a given year. If this should be ratified, it may write a whole new chapter for labor-employer relations and of Labor Hilda Solis’ commitment to refocus OSHA’s priorities on enforcing standards to protect workers. One of these egregious enforcement actions included the largest total penalty in OSHA’s history. The penalty, $81,340,000, was issued to BP Products North America Inc. for the company’s failure to correct potential hazards faced by employees. The prior largest total penalty, $21 million, was issued in 2005, also against BP. Other egregious enforcement actions have included fines for significant hazards at a cement and asphalt bagging plant in Scotia, New York and more than $1.6 million following the death of a teen worker at a grain storage site.

OSHA’s renewed emphasis on enforcement also includes the Severe Violator Enforcement Program (SVEP). The SVEP is slated to replace the Enhanced Enforcement Program this fiscal year. The SVEP will concentrate OSHA’s resources on inspecting employers that have demonstrated indifference to their OSH Act obligations by committing willful, repeated or failure-to-abate violations. Gone are the Alliance, Strategic Partnership Program and the VPP’s. The government under Secretary Solis is bent on “teaching employers a lesson.” Will the change in leadership of the Congress relieve some enforcement pressure? At least for now, we will have to wait and see, but one thing is certain, OSHA has funded many more inspectors with much less experience in our industry. Being well prepared and diligent in our record keeping is vital to avoid being a target and the recipient of a large fine or consent order.

contracts. The second bit of good news for those who are opposed to having their workplaces organized is the rejection of unionization by nine groups in a row from Delta Airlines. Though the “new” National Labor Relations Board is highly skewed in favor of organized labor, the recent results do not portend well for it. Though EFCA is essentially dead, there is still the possibility that several provisions of the proposed legislation could be handled by administrative proceeding. In the simplest of terms, the labor–employer relations arena bears continued scrutiny, but it is not the hot topic as in the past.

So that brings us to two other issues that have become very “immediate” for our industry. First, in all regulatory issues, especially OSHA/MSHA and Wage Hour, is the need for precise, detailed and accurate record keeping which hasn’t been more important or rigorously enforced for the past two decades or more. The second is the move from cooperation and education, to robust enforcement. OSHA is committed to refocusing OSHA’s priorities through developing and enforcing standards to protect workers and moving toward tougher citations and penalties to provide a powerful incentive for employers to respect their workers, integrate protection into business operations and make prevention a priority. During the past year, OSHA has issued more egregious enforcement actions and higher fines than in previous fiscal years. This reflects Secretary Wage hour issues is the other hot topic for Labor Department enforcement. Employment law attorneys tell us their number one area for advice to their clients is centered in wage hour issues and litigation surpassing EEOC discrimination, and workplace harassment. The real difficulty in wage hour violations for us is the ability for the department to go back two years and not only assess fines but also back wages. Consider the plight of “Amalgamated Concrete” (we are using a fictitious name to protect the identity of the company actually the subject of this case) which classified its batchpersons as salaried employees exempt from overtime pay. Amalgamated’s position was that they not only batched concrete, but supervised drivers insofar as they gave drivers their tickets and instructions to the jobs. The Labor Department found otherwise, stating the company clearly had a plant manager/supervisor who set schedules, handled driver discipline, and had control of hiring and terminations. These responsibilities were not in the purview of the batchperson. As a direct result, the DOL fined the company $250K, required Amalgamated to calculate all the overtime hours for all such titled and functioning personnel for the previous two-year period, and ordered an overtime payment to the affected employees, current and terminated, amounting to more than $350K.
If the examples above weren’t enough, another crisis is looming, namely employment. Employment you say? How can that be with over 10% of Americans unemployed? Ask your friends and colleagues in the Mid West and Northwest part of our country today about this issue. Most will tell you they are seeing a slight increase in their volume but are experiencing difficulty in servicing this new volume level because of short staff situations. During the period 2007-2010, the average employer has reduced staffing levels in excess of 25% in our industry and in some cases as drastic as 50% plus. America’s workforce is weary.

Overworked and overstressed, many employees are frustrated and frightened. They feel they have little control over their work lives and, even worse, little hope that things will get better anytime soon. Employees of all ages are fatigued, under stress, depressed, experiencing feelings of burn out. Moreover, they worry about reprisals and job loss should they vent their feelings. Certainly, the employee-employer bond has been fraying for many years, but it seems more tenuous than ever. Gone is loyalty to the companies that employ them.

Business has sent a clear message over the past 10 years that employment is really “at will” and that employment security has all but disappeared. As discussed earlier, even the unions aren’t able to stem this tide any longer. In a recent SHRM (Society of Human Resources Management) study, HR managers agreed that employee fatigue is a bigger problem than in the past many years. “It’s a perfect storm of employers cutting their workforces as far as they can and workers being stretched as far as they can” says Mark Moschetto, vp of marketing for Workforce Management.

Workplace fatigue isn’t new, of course, but it’s receiving more attention as employers keep their overburdened staffs lean. It’s also in the spotlight because of high-profile accidents in recent years caused by sleep-deprived workers as well as federal and industry regulations meant to reduce employee fatigue.

One of those accidents happened in February 2009, when a Colgan Air Inc. crew flying for Continental Airlines crashed outside Buffalo, New York, killing 50 people. Federal aviation investigators blamed the accident on pilot error but said that fatigue hurt performance, too.

Fatigue also has been cited in several high-profile trucking accidents in recent years, including a 2009 accident in which a 76-year-old driver hit several vehicles and killed 10 people on an Oklahoma highway. In its investigation, the National Transportation Safety Board said acute sleep loss, shift work and mild sleep apnea contributed to driver fatigue that caused the crash.

In October, the transportation safety board recommended that trucking companies adopt fatigue management programs, which could include such things as screening and treating sleep disorders, scheduling with safety concerns in mind, and installing video and data recorders to collect information in the event of an accident.

We can count on OSHA to pay attention to these recommendations and the subsequent actions taken by employers.

How long will restive workers put up with the fatigue and fear? It’s unlikely that many will bolt soon because landing a new job today often means accepting lower wages. But as the economy strengthens,
companies will likely see some of their top talent depart. In its Global Workforce Study this year, the consulting firm Towers Watson & Co. found that half of the workers didn’t see any career advancement opportunities in their current jobs and 43 percent said they believe that they must change employers to move to a higher-level position. Even so, 81 percent said they weren’t actively seeking a new job—at least not now.

One certainty however, people are not flocking to this industry in droves. Many who have been laid off over the past 3 years have left this industry never to return. Few companies are finding job seekers flocking to their door to take on jobs they perceive as low respect, low pay, uncertain hours and schedules, hard and erratic work in what is normally described as a very harsh environment. Less and less experienced candidates are in our hiring pool. Our aging workforce and our younger workers are less willing and/or able to work the hours and schedules of yesterday.

Vocational/technical schools are seeing a decrease in people entering transportation-related programs, including diesel mechanics and truck driving. As our economic model continues to morph from a manufacturing and product economy to a service economy, we are not likely to attract more and more people to our industry without making some fundamentals changes in how we conduct our business and manage our employees. To prevent a talent drain, future minded managers and executives will have to figure out ways to relieve the stress and motivate their best performers to stay put. Some employers in this industry are trying to prevent burnout by limiting the number of work hours; some are creating more definitive work schedules as part of their “guaranteed work hours” program. Some are trying to figure out how to create a quasi-owner operator models aimed at giving employees more control over their destiny.

If we want to prepare for 2011, 2012 and beyond, one thing is undeniable, we will have to change the way we approach the way of work for our employees, our management and our investors. We will have to manage the whole business with a much higher rate of government regulation, rules, enforcement and employee protections. We can learn much from other industries if we will take the time to observe, listen and ask questions. At the same time we may benefit most by engaging our employees to help us move our business model into the future. Perhaps the most valuable strategy is to make employees feel valued and help them see opportunities ahead.

John Richardson, principal at John Richardson & Company, Inc., specializes in safety and risk management, employee — labor relations, and organizational effectiveness with a particular focus on executive team coaching. He is a regular participant and contributor to NRMCA events and publications. For more information about this article or other information, contact John at john@johnrichardsonandco.com

The views and opinions expressed in this article are those of the author and do not necessarily reflect the views and opinions of the National Ready Mixed Concrete Association.
Taking the Next Step:
NRMCAs Members Embrace Industry’s Call to Improve, Promote Sustainability Efforts

By Frank Cavaliere, Director of Communications, NRMCAs

Back in April of last year, the National Ready Mixed Concrete Association took another step in its efforts to improve the industry’s efforts in promoting the sustainability movement. This latest effort occurred in Arizona during NRMCAs 2010 Concrete Sustainability Conference held in Tempe. It was there that the Association and the Wildlife Habitat Council signed an agreement that promotes the biodiversity of ready mixed concrete production facilities. This new partnership is designed to encourage participation in the programs of each organization and to engage and demonstrate voluntary corporate leadership in environmental performance, including enhancement and restoration of wildlife habitat.

Just so many words? Not to an increasing number of NRMCAs producer members, notably Titan America, where its Roanoke (VA) Cement subsidiary immediately saw the implications – and benefits – of becoming involved in the NRMCa/WHC partnership.

“The biodiversity toolkit is helping us move from ‘environmental impact’ to making positive environmental contributions,” said Don Ingerson, vice president of sales and marketing for Roanoke Cement. “It aided us in re-thinking the maintenance plan for several areas of grass that were typically mowed. Those parcels are being converted to demonstration meadows. This is creating positive spaces for birds and other wildlife, while at the same time reducing the fuel burned and CO2 discharged that is associated with mowing. I am pleased with the cost effective and common sense ideas that the toolkit has offered and that we are now implementing.”

Roanoke Cement acted quickly once the NRMCa/WHC agreement was formalized and piloted the programs at three locations, in Richmond and Front Royal, VA and Winston-Salem, NC. These three sites were audited this summer by the WHC. Recommendations from the audits included the elimination of invasive plants in favor of native plants, the creation of pollination habitats by converting mowed grass to meadows with wildflowers and the addition of bird boxes for habitat.

“Instituting the biodiversity toolkit is a small step toward sustainability, but an important one,” said Erin Ashley, NRMCAs senior director of sustainable construction. “It makes sense for these producers to take stock of their land and the wildlife living in it, and evaluate how easy it is to make it a better, richer existence for everything in that environment.”

Such a commitment by one of NRMCas largest members bodes well for the program’s future expansion, notes NRMCa President Robert Garbini.

“The Wildlife Habitat Council programs support NRMCas sustainability mission – which is to transform the built environment by improving the way concrete is manufactured and used in order to achieve an optimum balance among environmental, social and economic conditions,” he noted at the April sustainability conference and has repeated at various industry meetings throughout the rest of last year.

“Cement and concrete production facilities typically do not have expansive tracks of land to dedicate to conservation,” added Josiane Bonneau, WHCs director of field programs. “But every initiative benefiting habitat and wildlife has value. The dedication, regardless of how large or small, can represent a stopover for migratory birds, a food source for pollinators or an opportunity to increase diversity.”

The council is a nonprofit, non-lobbying organization dedicated to increasing the quality and amount of wildlife habitat on corporate, private and public lands. It devotes its resources to building partnerships with corporations and conservation groups to create solutions that balance the demands
of economic growth with the requirements of a healthy, biodiverse and sustainable environment. Council-assisted wildlife habitat and conservation education programs are found in 48 states, the District of Columbia and nine other countries.

Toward Greener RMC Plants

WHC’s program is recommended for sites that are less than 10 acres in size. With the help of Lafarge, an active NRMCA and WHC member, the WHC developed a biodiversity toolkit specifically designed for the ready mixed concrete industry to engage in habitat projects and further its sustainability mission. The resulting toolkit provides contextual information and detailed how-to instructions needed to implement voluntary biodiversity projects at production facilities. The toolkit is designed to introduce employees to potential projects and the benefits they can bring to the production facilities as well as the environment. When prepared for a partner, the biodiversity toolkit includes a brochure presenting standard habitat enhancement recommendations chosen to fit the industry and the typical plant landscape.

Those project opportunities include:
• Identify and manage exotic, invasive species
• Create habitat for pollinators
• Establish an avian management program
• Enhance visual berms
• Wetland / pond structural enhancement
• Conservation education

Several supporting documents are also provided as part of the biodiversity toolkit. These include native species lists, technical references, links to priority actions in the state, potential partner contact, wildlife management plan templates, sample monitoring logs and certification information. WHC’s goal is to provide the production facilities with all the information they need to readily pursue one or more of these projects and initiate a strong program.

The biodiversity toolkit and associated voluntary habitat projects are part of WHC’s Wildlife at Work program. Under the program, valuable habitat projects going above and beyond mitigation and regulation are eligible for certification. Certification requirements are detailed in the biodiversity toolkit and can also be found on WHC’s Web site at www.wildlifehc.org and at www.nrmca.org/sustainability. Production facilities initiating projects, participating in the program and/or pursuing certification can also obtain points under the NRMCA Sustainable Concrete Plant Guideline system.

For more information about the WHC Biodiversity Toolkit, contact WHC’s Director of Field Programs Josiane Bonneau at 240-247-0905 or jbonneau@wildlifehc.org or NRMCA’s Erin Ashley at eashley@nrmca.org.
The New Business Machismo: Sleep Deficient

By Eileen Dickson, Vice President of Education, NRMCA

Senior mixer driver John works first round. A customer specifically asked for him to work a weekend pour that starts at midnight. Dispatch planned John’s week to comply with his hours-of-service time allotment. Even then, by Saturday, John was exhausted. His mind wandered and he yawned while driving; he dozed while in line at the site. As John returned to the plant at dawn, a rising sun beam hit his eyes just as he made a right turn onto the exit ramp. As a result, he overcompensated, rolling the mixer, falling left, landing on the exit ramp below him, killing himself and the passengers in the car he crushed. The investigation showed that while John complied with hours of service regulations, he had an evening part time job at a hardware store. Even though dispatch properly scheduled John, he still worked his same evening hours at the store.

Accident finding: driver error. John’s whole sleep cycle was not only thrown off but he was not getting enough continual sleep. As a widower, John left three teenage kids, one with medical issues. The other accident victims were a dad dropping off his 18-month old and three-year-old at daycare on the way to work. His wife, the only remaining member of the family, sued the producer for a substantial settlement while she remained in psychiatric care in St. Joseph’s Mental Health Hospital. John’s kids, taken in by relatives, aren’t adjusting well. A cloud still hangs over the staff at the ready mix concrete company. With all the other changes in the company due to the poor economy, this incident took on the aura of all that went wrong over the past three years.

How this relates to your business

Boom or bust, one characteristic of the entire construction sector is how hard folks work. In fact, working with less sleep has been touted as almost a requirement, showing high performance and vitality. Our industry is, by no means, alone. Sleep deprivation is now pervasive in our American work culture. We’ve developed a “sleepless machismo,” relates Charles Czeisler, M.D., Harvard Medical School. He and many other experts express serious concern that widespread sleep deprivation effects America’s brainpower and creativity. Persistent exhaustion contributes to decline in work productivity, poor performance, machinery-related and motor vehicle accidents.

So in preparation for economic recovery, and with the Department of Transportation due to revisit drivers’ hours-of-service regulations, is it appropriate for your company to re-examine factors that alter performance and work processes? A company’s measurable accident costs are money and time. The untold costs which can’t be specifically attached to an accident also hit the bottom line, including productivity, efficiency, job commitment, turnover/lost experience, hiring expenses and training, and unknown lost customers and opportunities. The easy response is that employees must take responsibility, as with John, but expenses still extract a toll, suggesting that a sleep policy will not only positively
impact net income but serve your employees’, as well as the public’s, greater good.

Coupled with a producer’s rising health care costs, the lack of sleep is implicated in expensive, ongoing physical problems, including high blood pressure and obesity. Sleepiness causes workers to react slower, have poorer vision, lapses in judgment and delays in processing information. That not only goes for drivers and others in operations-related jobs but also salaried, “He-man” mid-level managers and executives who work 60-80 hour weeks without “hours of service” compliance requirements.

Medically, sleep deprivation can have the same impact as alcohol. If awake for more than 20 hours, impairment equals a blood alcohol concentration above the legal limit in all states. Additionally, there is the same impact with consistently getting only four to six hours of sleep a night. Quoting Dr. Charles A. Czeisler, “It amazes me that contemporary work and social culture glorifies sleeplessness the same way we once glorified people who could hold their liquor. The analogy to drunkeness is real because, like a drunk, a person who is sleep-deprived has no idea how functionally impaired he is. Moreover, efficiency at work suffers substantially, contributing to the phenomenon of ‘presenteeism’ which exacts a large economic toll on business.”

Driver fatigue, often unreported and virtually impossible to detect or measure, is estimated to annually cost the U.S. economy $12.5 billion. The National Sleep Foundation and the AAA Foundation have released similar thought-provoking stats. Sixty percent of the registered U.S. driving population, about 168 million drivers, admits to driving while drowsy. Of those, 13% say they do so at least once a month. More than one third (about 100 million Americans) admit to falling asleep behind the wheel. About 11 million drivers admit to an accident because they dozed off. They are responsible for one fifth of motor vehicle accidents, annually killing 8,000. Seventy-five percent admit to experiencing an untreated sleeping problem, including chronic pain, medications, hot flashes, stress or health conditions such as heart disease, depression and arthritis. Many lack the sleep they need because their schedules do not allow adequate time. Few surveyed know the negative effects lack of sleep can have on their health and functionality.

Medical sleep experts recommend companies set behavioral expectations that include a sleep policy. When analyzed, what they recommend pretty much falls in line with DOT’s drivers’ hours-of-service regulations. But what about extending recommendations to the salaried and executive ranks? Recommendations expand to include air travel: no red eye flights because they severely disrupt sleep. When traveling internationally, take at least one day to adapt and no driving that first day. Here’s why. With a 7 p.m. flight from New York to Europe, landing at 5-6 a.m. really means landing around midnight back home. Scientifically, the passengers’ exposure to daylight upon landing switches the body’s circadian rhythm to Hawaiian time rather than European time. Now an executive has a 14-15 hour time shift, turning the whole day’s awake/sleep rhythm upside-down. There has also been press about the “power nap”- no longer is midday drowsiness a red flag of incompetence but accepted, understanding those who are 40 and older have natural circadian rhythms that wind them down between 2-3 p.m. so they can catch their second wind, keeping up their demanding pace and intellectual prowess.

Training should include how eating right and exercising combats sleeping problems. That includes how alcohol, caffeine, the light from TVs, gaming devices, smart phones and Blackberries interfere with sleep. Finally, sleep specialists recommend that professions with swing shifts provide annual screening for sleep disorders to see who might be at risk. (They are Web-based surveys. Many police and fire departments already access them as part of policy.)

Finally, employees should be told, if drowsy, it is OK to pull over. To quote sleep physician Dr. William Dement: “Drowsiness is the last step before falling asleep, not the first. There is an abrupt shut down of the neural processes that allow us to perceive the world around us. At one moment we are awake, and can see and hear. A fraction of a second later we are asleep and we are completely blind and completely deaf.” He thinks of sleep as the “default program” when we can no longer resist sleep, when our alerting centers can no longer prevent sleep. We transition to sleep. We don’t realize that it is possible to fall into a 3-4 second microsleep without realizing it.

Thought for us all.

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Creating a Concrete Culture

By Jon Hansen, Senior Director of National Resources, NRMCA

Culture, customs, traditions, way of life, call it what you will, habits of the way things are done and choices people make have one thing in common: They all have roots that go back many years. We have all heard about the “concrete cultures” in states like Texas and Iowa where well over 50% of their roads and parking lots are paved with concrete. Or cities like Minneapolis and Chicago, where concrete structures are the norm. And we also have heard the comments from other regions of the country that point to these concrete culture regions and find an excuse as they say “Well this is not Texas, Iowa, etc., we can’t do that here.” Which makes me wonder how a concrete culture has been created in some regions of the country and not in others?

Iowa’s journey with concrete started around 1920 with the Good Road Movement and its mission of getting Iowa out of the mud. The goal was to build hard surface roads that would allow for transporting farm products to market in any weather and to accommodate the ever growing number of automobiles, buses and trucks. But even prior to 1920, the first concrete street in Iowa was built in Le Mars in 1904, which many would agree was the birth of the concrete culture in the state.

In the state of Texas, some say the birth of the concrete movement came in the 1940s when a public works director in Dallas became one of the first in the nation to seriously evaluate the cost of construction materials and the maintenance associated with each material. His cost benefits assessment showed concrete to be the strong winner. Bob Lopez, retired director of the Cement Council of Texas, explains. “When I started promotion in 1974, we realized the significance of this research and information that had been done over 30 years earlier. Dallas then became our target city at the hub of our promotion wheel. We worked outward from that center of success to hand deliver the message to other public works directors in all directions from Dallas.”

Any region in the nation that has created a culture for concrete all share some common traits. They all have a long history of building and maintaining an industry relationship with designers and decision makers.
and taking care of what they started. Said another way, the association, company, or other group has consistently been a resource from start to finish, beginning to end, in good times and bad.

Too often we hear reasons why people fail to start the process of creating a culture. Things like:

- “We don’t have residential concrete driveways because the homeowners refuse to pay more for them.”
- “We can’t build our parking lots like that here. We have to build them this thick, with steel reinforcing, etc., etc.”
- “Just because you do that in Iowa or Texas, doesn’t mean we can do it here.”
- “We just can’t get the engineers to design it right”
- “We just don’t have the contractors to bid the jobs”

All may be valid points today, but all identify opportunities for change. Again, Bob Lopez tells another story: “We went into the town of Denison, Texas and eventually got the public works director to include a concrete alternate for 77 blocks of city paving. There were no concrete pavers in town, so we got on the phone and called everyone we knew asking them to help find contractors to bid the job. End of the story is that 66 blocks were paved with concrete instead of asphalt, the other 11 blocks being dropped from that year’s paving program. What was paved, we got them all which stated the culture change in Denison.”

Finding opportunities in excuses? It has become the motto for Kevin McMullen, executive director of the Wisconsin Concrete Paving Association and his “No Excuse” policy when promoting concrete. Recently he was talking to a consultant about a concrete application for an existing road that required taking core samples. The designer said he didn’t have the ability to take cores, thinking the excuse would send Kevin away. “We went out and bought a core drilling rig and took the cores for him,” Kevin explained. “We weren’t going to let the excuse keep us from doing everything we could.”

Selling concrete door to door? A description more fitting for vacuum cleaners than concrete but one that Mitch Voehl, a sales and marketing representative with GCC in Minnesota, uses with pride. “I recently target Windom Minnesota for concrete streets. I established a relationship with the city consultant. I got to know all the city council members. I visited them at their place of business or their home. I told them what I was working on and if they had any questions, I was their go to person. Since most of the paving on the first project was in the downtown area, I went door to door downtown and got to know all the merchants. I answered their question, told them how great the finished project would be. I made contractors aware of the upcoming project. We have completed the initial project and are moving into the neighborhoods. Once people feel they have a choice to have concrete over asphalt, and have been part of the process, they will expect to have concrete.”

Any great accomplishment in history has been done by people who were told over and over by their peers why an idea won’t work, a plan can’t succeed, a change can’t occur. Creating a culture for concrete in your area is no different. What can you do to start the process today to create a concrete culture where you live? There is no single answer that works everywhere, but Randy Riley, P.E., executive director of the Illinois Chapter of ACPA and seasoned industry professional, states: “For us to create a concrete culture, then we must change the culture of the concrete industry.” He goes on to say that “we must become involved in our states, communities, local business and schools. The day of waiting for the phone to ring to fill orders is over. Be assured when I am at functions at the state and local level, the competition is there also, networking, listening and building relationships. If I am not there, then it is just them. Think about this as it pertains to any region.”

Concrete cultures are created. They take years to create, with our industry being diligent in client support that includes both promotion and technical. A can-do attitude with consistent effort are the traits that stand out with those groups that have either created the culture or are now charged with protecting and expanding it where opportunity present. The easiest place to start a concrete culture is at home. How many in our industry back our cars out of our garage onto an asphalt driveway, then drive on an asphalt street on our way across town or state to talk to someone about concrete paving? We wonder why our message is not getting attention when the client probably had the same experience. Before you make your next sales or promotion call, ask yourself this: Have I talked to the developers in my own city about concrete streets, have I talked to my own city public works director, city council members, street department, mayor, school board, county supervisor, county engineer, the list goes on and on. If your job in the concrete industry is not in sales or promotion, become involved in your community, school, church and become the “ears” for the promoters and sales people. John Cunningham, vice president of the Iowa Concrete Paving Association, encourages promoters and sales people to “start small with a high profile project, like a new street in front of the school, one that everyone in town will see,” and Len Swederski, president of Swederski Concrete Construction, says “if your city is building a new city hall, it HAS to have a concrete parking lot simply because every key decision maker in the city will see and use the lot.”

So what legacy does your daily work leave? Are you simply here for a job, a place to hang your hat and repeating the excuses of those before you why things are the way they are in your region with no hope of changing because of forces you can’t change? Or are you part of the larger plan that has “No Excuses” like Kevin in Wisconsin or “door to door Mitch in Minnesota,” who every day do their job and make changes to their cultures. We are in a unique time, a trying time without argument, but unique in that we have so many things going our way. Now is not the time to retreat, but to advance the culture of concrete nationally.
Over the past decade, concrete industry producers have adopted polyurethane liners for central mix drums. In fact, most Original Equipment Manufacturers now offer polyurethane liner kits as a standard option. Years of field research, performance testing and product evaluation have proven that polyurethane liners offer the best protection against the harsh production environment found in the concrete industry.

Operational Success of Polyurethane Liners in the Concrete Industry

The success of this liner material in the mix drums has lead to application success in other areas of the plant as well. Liner kits for aggregate bins, weigh batchers, directional chutes and dump cones are all available in high-performance polyurethane. Market acceptance has been excellent, with top producers being the largest adopters of urethane technology.

Switching to polyurethane liners is an investment in operational efficiency. The polyurethane liner delivers superior longevity against impact and abrasive wear. Users of polyurethane kits report the following key performance factors:
➢ Superior resistance to material build up
➢ Lighter weight - reducing loads on structures, drives, bearings and gears
➢ Shock resistance, vibration absorption and noise reduction
➢ Exceptional durability

Polyurethane liners typically come in kit form, with a variety of pre-cut shapes and sizes designed to fit specific process equipment. Several different attachment options are offered and thickness can be adjusted to suit the application. Polyurethane liners are also available in standard sheet sizes, including 4’x8’, 4’x10’, 5’x8’ and 5’x10’. Polyurethane liners are easy to order, easy to install and will reduce maintenance requirements.

Maintenance Procedures for Polyurethane Liners

Polyurethane liners will perform for a very long time with proper care and maintenance. Performing the following maintenance procedures throughout the life of the liner will ensure trouble-free operation.

Of course, as with any piece of mechanical equipment it is important to read all installation documentation to understand the process thoroughly. In addition to reading the liner installation documentation, we recommend you follow this quick checklist of installation and maintenance procedures for all your polyurethane components.

Installation

Many liner kits offer embedded steel disks. These are used as bolt anchors or tack welds to the structure. During installation make sure that every weld disk is completely attached. Once the liner has been properly installed and the plant is operational, make a daily visual inspection of the equipment.

Seam Maintenance

During the installation procedure, special attention should be paid to seams or gaps, with the installer filling any seams or gaps that appear between the liner sections. A fast set polyurethane-based caulk adhesive with a 100-minute cure time or faster is recommended. If that is unavailable, then pure silicone caulk is a good second choice. It’s a good idea to contact the manufacturer of the liner if you have any questions regarding the installation. Seams should be inspected weekly and resealed as required.

Plug Fitting

All plugs should fit snug. If a plug pops out or becomes loose, material may penetrate though the weld hole. Use caulk to secure loose plugs and seal any holes as soon as possible.

Accidental Gouges or Tears

In the event that a gouge or tear occurs, use a polyurethane-based caulking adhesive to fill holes or fix damaged areas. The affected area should be cleaned, dried, stripped of grease or other contaminants and patched. Do this as soon as possible after you notice the gouge or tear in order to eliminate aggravation of the affected area.
Cleaning
Cleaning your liner will loosen and remove any material buildup that may occur during the course of normal production. Cleaning should be done at the end of each production period or more frequently if you are working with fast-setting admixes. Use a high-pressure hose to remove stubborn deposits before they have a chance to harden and grow. Cycles of clean aggregate may also be used if buildup is wide spread (for example when using Cement Treated Base).

Chipping
When chipping is required, use plywood boards to protect the liners from miscues that could result in gouges or tears. For areas around mixer blades, air chisels are more maneuverable and less bulky. For buildup on seams or on other drum sections, use a hammer or another wide displacement strike tool. The resilient urethane should compress enough to release the concrete without chiseling.

Mixing Blades and Blade Liner Cleaning
Mixing blade liners often wear two times faster than drum liners. This is due to the shearing action of the material in the mix environment. Most blade liner kits are designed with replaceable tip sections at the perimeter. Because these areas are the most susceptible to wear, we recommend welding bar stock along the leading edges of the blade liners. This welding creates a barrier that resists material penetration between the poly liner and the steel blade. Neglecting the blade tips could result in damage to the blades themselves, so be sure to replace blade liner tips as necessary.

Storage for Future Installation
Proper maintenance and care begins as soon as the liner kit is received. If the liner will not be installed in the near future, protect it from the elements. Ultraviolet rays, solar heat and oxidation of the weld disks may degrade the quality of the liner over time. If polyurethane-lined equipment is going to be out of service for a long period of time, position the equipment for proper water drainage.

The bottom line is that polyurethane liners can extend the operational life of your equipment. Performing proper maintenance and caring for your liners will ensure that you receive longterm performance from the equipment.

For more information about polyurethane liner kits or their maintenance, call Argonics, Inc. at 800-991-2746, or visit www.argonics.com. Founded in 1994, Argonics Inc. is one of the world’s largest producers of castable polyurethane elastomers. With state-of-the-art production facilities in Gwinn, Mich. and Louisville, Colo., Argonics provides high-performance urethane solutions for the concrete, conveyor, mining and municipal industries with its team of qualified personnel. For more information visit the company’s Web site at www.argonics.com.

The views and opinions expressed in this article are those of the author and do not necessarily reflect the views and opinions of the National Ready Mixed Concrete Association.
Mixing Water Control
Part V of Concrete Quality Series

By Karthik Obia, Ph.D., P.E., VP, Technical Services, and Colin L. Lobo, Sr. VP, Engineering

Parts I and II of the Concrete Quality series1,2 discussed that a good measure and benchmark of concrete quality is the Standard Deviation (SD) of compressive strength test results. The primary factors that impact the SD are variability associated with materials, production and testing. In order to reduce the strength standard deviation the concrete producer needs to manage those aspects of variability that can be controlled. Part IV3 discussed and quantified the concrete strength variability due to variation in water and air content. It concluded that in order to attain a low SD of compressive strength, among other things, it is important for the producer to attain a low variation in water content and air content as they contribute significantly to the variation in strength. This article discusses how a producer can manage the various factors that will reduce the variability of mixing water content in concrete mixtures.

Mixing Water

Compared to other ingredients, there are several sources (and potential errors) by which mixing water is incorporated in a concrete mixture. ASTM C944 and ACI 1175 state that the total mixing water should be within ±3% of the quantity required by the mix design. ASTM C94 states that mixing water includes water added to the batch, ice added to the batch, water occurring as surface moisture on the aggregates and water introduced in the form of admixtures. The primary sources of mixing water variation and methods by which it can be controlled to be within a tight tolerance are discussed below:

Washwater in truck mixer drum from previous load

When concrete is discharged at the jobsite a mortar coating adheres to the surface of the mixer drum. Depending on the situation, type of mixture or company practice, the concrete mixer truck operator may wash the interior of the drum at the jobsite or on arrival at the plant. In some cases, this water may not be discharged and remain in the truck when the next load is batched. Washing the mixer drums between every load leads to several possible problems:

1. It consumes a lot of water;
2. If discharged, it generates process water at the concrete plant that will have to managed in compliance with environmental regulations;
3. If not discharged, water (anywhere from 5 to 30 gallons) may remain in the mixer drum when the next load is batched.

ASTM C94 recognizes the last possibility and states a condition that the wash water retained in the drum for use in the next batch should be accurately measured. However, it is not easy to accurately measure the quantity of wash water retained in the drum. Therefore in compliance with ASTM C94 truck operators should be educated of the importance of disposing of all of the wash water prior to batching a fresh concrete load. The process of discharging the mixer wash water into a wash out pit may take time but it is an important step toward achieving quality concrete. The more common industry practice is to not wash out the mixer drum after every load. The mortar coating will not significantly change the water content or any of the properties of the new load of concrete. Washing the inside of a mixer drum may be necessary in hot weather conditions when it can lead to undesirable hardened concrete buildup inside the drum, with special concrete containing color or fibers, or when required by company policy.

Batch water

Batch water is the water added to the ready mixed concrete truck. Generally this constitutes the primary source of mixing water. Water can be measured by volume using water meters or volumetric tanks; or by weight in scales. ASTM C94 requires that the added water should be accurate to within ±1% of the design total mixing water. The NRMCA plant certification process requires that volumetric water measuring devices should be accurate to within ±1.5% of the desired amount of water which corresponds approximately to an accuracy of ±1% based on total mixing water for typical aggregate moisture levels. Scale accuracy requirements are tighter. The NRMCA measuring tolerance is more easily verified during a batching process or by review of batch records. The NRMCA plant certification process requires that batching measuring devices be verified for accuracy at stated frequencies or when there is reason to assume their accuracy is in question. It is one thing to have a well calibrated water batching device. It is additionally important to ensure that the added water in every concrete load that is shipped from the plant is within tolerance. Batching errors do occur from time to time. All computerized batch panels have some form of error monitoring and alerting system which may be overridden and accepted with a keystroke. Automated evaluation and alerting systems available nowadays can send e-mail alerts to Quality Control/Quality Assurance (QC/QA) personnel when a load is found to be outside prescribed or company-set tolerances. Improving batching accuracy has been discussed at a great length elsewhere.6

Most chemical admixtures added to concrete contain in excess of 60% water. It is important to consider the water content contributed by chemical admixtures, particularly those which are used in high dosages such as corrosion inhibitors or accelerators. In general, if the
Admixture dosage is around 1 gallon per cubic yard or greater, batch water compensation should be made to account for water incorporated with admixtures. For the admixtures that are used in high dosages, if the dosages change significantly between loads and the water from the admixtures had not been considered then it may lead to a high mixing water variation.

**Free Water from Aggregates**

Free water from aggregates constitutes a portion of the mixing water. If the coarse aggregate and the fine aggregate have a free moisture content of 1% and 5%, respectively, assuming a typical concrete mixture that contains 1800 lbs of coarse aggregate and 1200 lbs of fine aggregate, the contribution that the aggregates provide to the mixing water is 78 lb/yd³. If the total mixing water is 270 lb/yd³ the free water from the aggregates contributes 29% of the mixing water in this example. Therefore, an error in estimating the aggregate moisture content can cause a significant variation in the mixing water content. To address this many concrete producers use moisture probes in the fine aggregate bins. These moisture probes provide real time moisture measurements of the fine aggregate based on which the added water is adjusted automatically or manually. NRMCA plant certification requires that moisture probes be verified for accuracy at defined frequencies or when there is an assumption of error. Alternatively, aggregate moisture should be determined at the concrete plant using a hot plate or a microwave oven according to ASTM C566. If such a process is followed the NRMCA plant inspector guide suggests that the aggregate moisture be measured not less than 3 times per week. This can vary depending on aggregate storage methods or frequency of receiving shipments. Moisture probes are not commonly used in coarse aggregate bins due to wear. Coarse aggregate moisture should be periodically measured using a microwave oven or a hot plate. Since they constitute the largest quantity of ingredient batched, a small change in the coarse aggregate moisture can result in a large change in the mixing water content. Another important factor is the procedures used by the loader operator to feed aggregates from stockpiles to the batch plant. The key is to avoid loading aggregates with variable moisture and to ensure that the aggregate being batched is representative of the moisture content assumed in the batching process. In general, working the complete face of a stockpile tends to average out the moisture content and minimize variation.

**Water added at the “slump rack”**

Almost all concrete is accepted at the job site based on a certain slump level or visual consistency to facilitate ease of placement, regardless of whether the project specification includes a slump requirement. After loading all of the materials, truck mixer operators move the truck to the wash down area or slump rack to clean the loading hopper, chute, and sides of the mixers before leaving the plant. At this point they visually estimate the slump and might retemper the load to achieve the desired mixture consistency, including some anticipated slump loss during transit. In some cases actual slump measurements may be made and/or slump meters on truck mixers may be used. But typically this adjustment is done on a visual basis that is subjective to the truck operator. Water added at the slump rack can be a large source of variation of mixing water in concrete and needs to be managed by proper company policy and education of truck operators. Some options to control this include using timers on water hoses; using high pressure, low volume spray bars; installing water meters on the water lines or using water from the truck water tank for retempering to obtain a measurement of the added water. The goal should be to minimize the water added to the mixture at this point and to be able to record the quantity of water added to the mixture. It is important to educate the truck operators to minimize the water entering the mixer drum and record the amount of water added.

Automated water addition devices installed in truck mixers are also available. These devices introduce recordable quantities of water to the concrete mixture based on calibrated slump meters that measure the mixture consistency. These devices can be controlled to shut off when the mixing water reaches the quantity permitted for the mixture. Automated admixture addition devices are also being explored.

**Water added at the job site**

When the truck arrives at the job site and the concrete is about to be unloaded it is quite possible the concrete slump is lower than that specified or desired by the contractor for placement. This depends on the time elapsed from batching, ambient and concrete temperature, and mixture proportions used, among other factors. ASTM C94 allows a one-time addition of water so that concrete slump can be brought to specified levels provided the design mixing water content is not exceeded. It is common practice for producers to “hold back” water to permit job site water addition. This water addition should be done before any significant quantity of concrete is discharged; C94 allows for slump and air tests on a preliminary sample to facilitate this. C94 requires that the water added by the receiver of concrete and his initials be recorded on the delivery ticket. At the request of the purchaser, C94 requires that the delivery ticket has all the information required for calculating the total mixing water. It is a good practice for producers to note the amount of water that can be added at the job site so that design water content is not exceeded. Adding about 2 gallons per yard over the design amount can result in a loss of the strength overdesign for the specified strength. ACI and ASTM standards do not establish accuracy requirements for water added from truck water tanks. The NRMCA Plant Certification has accuracy requirements for measurement devices on truck water tanks. Sight gauges can generally measure accurately to ±1 gallon and water meters on truck water systems can do better.

**Variation in Mixing Water Demand Due to Temperature, Delivery Time and Air Content Variation**

As mentioned earlier, concrete at the job site is expected to be within a specific slump range before it can be placed. Temperature, delivery time, air content and a host of other factors affect the mixing water demand of a given concrete mixture that needs to meet a specific slump level.

Table 1 summarizes the effect of temperature and delivery time on mixing water demand from a previous NRMCA research study4. The study shows that if a mixture had been designed at a concrete temperature of 65°F and a delivery time for 20 minutes an increase in temperature to 95°F and delivery time to 90 minutes can cause an increase in average mixing water content of 33 lb/yd³. This variation in mixing water can clearly lead to increased SD in strengths and low strength problems. The concrete producer...
has limited control over concrete temperature and very little control over the delivery time.

The producer can reduce the mixing water variation due to temperature variation through the following steps: 1. Table 1 shows that for every 10°F increase in concrete temperature the water demand increases by 5 lbs/yd³ (about 2% of the mixing water amount used typically) assuming a delivery time of 60 minutes. So the producer could increase the dosage of water-reducing admixtures as the concrete temperature increases by more than 10°F. 2. Concrete mixtures that are designed at a concrete temperature of 65°F cannot be used when the concrete or ambient temperature exceeds 85°F. When the temperature reaches and exceeds 85°F adjustments, such as the use of retarders and increased amounts of pozzolans like Class F fly ash or slag cement, allow for longer slump retention without excessive water addition.

Variation in mixing water demand due to delivery time variation is much harder to control since the producer cannot predict the delivery time of any particular load in advance. Based on Table 1 concrete producers should aim to hold back about 2 gallons/yd³ (or target a slump of 2 in. higher than the minimum permitted at the job site) to compensate for slump loss that can occur due to the delivery time. There will be no variation in mixing water demand due to delivery time variation if the concrete mixtures do not exhibit any slump loss. As explained earlier, use of retarders and increased amounts of pozzolans like Class F fly ash or slag cement allows for longer slump retention, but one has to be careful adopting those techniques when concrete and ambient temperatures are below 85°F due to potentially delayed setting times. Job site admixture (water reducer) addition may also help reduce the variation in mixing water demand due to delivery time variation provided qualified personnel are available to administer that. Automated admixture (water reducer) addition devices can also be considered when available.

ASTM C94 and ACI 117 state that for air entrained concrete the tolerance is ±1.5%. Figure 1 extracted from the NRMCA Concrete Technologist Certification program shows the typical reductions in mixing water content expected due to the entrained air content. Added air illustrated in the figures is the difference between the target air content in air entrained concrete and that present as entrapped air in non-air entrained concrete with the same materials. Air entrainment causes greater water reductions for low cement factor or higher w/cm mixtures. If two successive concrete loads have a total air content at the concrete plant of 7.5% and 4.5% (just meeting the tolerance of ±1.5%) the added air for each load can be calculated as 6.0% and 3.0% and therefore the difference in mixing water content can be estimated from Figure 1b as 20 lbs/yd³, assuming a design w/cm of 0.50 for that concrete mixture. There is a silver lining in this though. Generally, a higher air content results in a higher air content is somewhat reduced. Another consequence of this is that when water is added and mixed into a relatively fluid air-entrained concrete batch at a moderate temperature, additional entrained air is generated thereby increasing the slump more than anticipated by normal rules of thumb. Once again job site admixture (water reducer) addition or the use of automated admixture (water reducer) addition devices can help reduce the variation in mixing water demand due to air content variations.

Water Variation and Slump Variation

For a given concrete mixture if 10 different truck loads have slump varying over a tight range (4 in. to 5 in. for example) would it be reasonable to expect that the mixing water content is controlled to a tight range? The answer to this question is “yes,” provided everything else stays the same.

Consider the job site data for the following 2 truck loads that used identical materials and mixture proportions:

Load A, Concrete temperature=65°F, Air content=7.5%, Delivery time=20 minutes, Slump=4 in.

Load B, Concrete temperature=65°F, Air content=4.5%, Delivery time=90 minutes, Slump=4 in.

From the discussions in the previous section it can be quickly estimated that Load B is likely to have about 35 lb/yd³ higher mixing water content than Load A even though the slumps measured at the job site are the same. If the temperature of Load B is 20°F higher than that of Load A it can be estimated that Load B is likely to have nearly 45 lb/yd³ higher mixing water content than Load A! In addition other variables such as presence of fines in aggregate, dust on the aggregate surface, variations in cementitious shipments can also influence the water demand, thus resulting in loads that are similar in slump but that differ in mixing water content. With this kind of potential difference in mixing water demand for two loads with the same slump one wonders about the basis of rejecting concrete at the job site on the basis of slump.

Slump measurement at the plant (not at the job site) does have an interesting benefit for the producer. Let us say a producer targets a slump range at the plant which is the same as at the jobsite and holds back 15 lb/yd³ to compensate for the slump loss that can occur due to delivery time. If the slump measured at the concrete plant prior to any water addition at the slump rack is out of that target slump range for that mixture it is a clear indication that either the mixing water content is not within tolerance or the water demand for that mixture has changed due to a change in characteristics of the materials, batched quantities, concrete temperature or air content. When a slump measurement is out of the target range it is a good idea to conduct a quick aggregate moisture test either through the microwave oven or a hot plate or using a Speedy moisture meter. If the aggregate moister is as designed then it is clear that the problem lies elsewhere:

1. Was there wash water in the mixer drum?
2. Was the batch water out of tolerance? (Typically, batch water is 200 lb/yd³, so the maximum possible variation in mixing water is ±3 lbs/yd³ if batch water is in tolerance)
3. Was the air content out of tolerance? (Typically, the air content tolerance is ±1.5%; this can lead to a variation in mixing water of ±10 lbs/yd³)
4. Was the concrete temperature more than 20°F different from the design concrete temperature for that mixture? (From Table 1 it can be estimated that for every 10°F increase in concrete temperature the water demand should increase by 2 lbs/yd³, provided the slump is measured at the plant within 10 minutes after batching the materials)

If the answer to these questions is “no” then changes in material characteristics, such as excessive fines in aggregate, dust on the aggregate surface, variations in cementitious shipments or batched quantities, should be evaluated. If air contents and concrete temperatures
Table 1. Average Mixing Water Increase Due to Temperature and Delivery Time (from Reference 8)

<table>
<thead>
<tr>
<th>Condition</th>
<th>Average Mixing Water Increase, lb/yd³</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delivery time maintained at 20 min. and concrete temperature increased from 65°F to 95°F</td>
<td>12</td>
</tr>
<tr>
<td>Delivery time maintained at 90 min. and concrete temperature increased from 65°F to 95°F</td>
<td>19</td>
</tr>
<tr>
<td>Temperature maintained at 65°F and delivery time increased from 20 to 90 min</td>
<td>14</td>
</tr>
<tr>
<td>Temperature maintained at 95°F and delivery time increased from 20 to 90 min</td>
<td>21</td>
</tr>
<tr>
<td>Temperature increased from 65°F to 95°F and delivery time increased from 20 to 90 min</td>
<td>33</td>
</tr>
</tbody>
</table>

Mixing water increase was averaged over 8 different mixture types (2 different cements, 2 different strength levels, with and without fly ash). In all cases mixing water content was adjusted to attain a slump level of 4±1 in. at discharge.

Table 2. Sources of Mixing Water Variation and Means to Reduce it

<table>
<thead>
<tr>
<th>Sources of Mixing Water Variation</th>
<th>Recommended Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Washwater in truck mixer drum from previous load</td>
<td>Avoid washing the mixer drum after every load. If that is not always feasible educate truck mixer operators to discharge all of the wash water prior to batching a fresh concrete load.</td>
</tr>
<tr>
<td>Batch water out of tolerance</td>
<td>Calibrate water measurement devices to be accurate to ±1.5% of the target quantity and verify accuracy at least every 90 days and more often if necessary. Educate batchmen not to override batching error alerts. If possible invest in an automated alerting system for out-of-batch tolerance that can send e-mail alerts to QC personnel to address a load before it reaches the customer.</td>
</tr>
<tr>
<td>Aggregate moisture</td>
<td>Have moisture probes in fine aggregate bins if possible and verify for accuracy at least every 90 days. Do not ignore measuring coarse aggregate moisture content. If probes are not used, use a hot plate or a microwave oven and measure aggregate moisture and update batch computers at least three times a week. Adjust added water in all loads to account for changes in aggregate moisture content. Stockpile aggregates and load aggregates into the plant to minimize variations. All of the above are an NRMCA plant certification requirement.</td>
</tr>
<tr>
<td>Water added at the slump rack</td>
<td>Establish company policy and equipment for slump rack water adjustment. Consider adding the water from truck water tank or install water meters in water lines. Record the amount of water added.</td>
</tr>
<tr>
<td>Water added at the job site</td>
<td>ASTM C94 allows a one-time addition of water to enable slump adjustments. Note the amount of water that can be added at the job site so that design water content is not exceeded. Truck operators should be required to record job site water addition and obtain the signature of the purchaser or representative on the delivery ticket. Ensure measuring devices on truck water tanks comply with the NRMCA Plant Certification accuracy requirements.</td>
</tr>
<tr>
<td>Temperature, Delivery Time, Air Content and Other Factors</td>
<td>Increase the dosage of water-reducing admixtures to target a 2% mixing water reduction for every 10°F increase in the concrete temperature increases by more than from the design temperature. Concrete mixtures that are designed at a concrete temperature of 65°F should appropriately be modified when the concrete or ambient temperature reaches or exceeds 85°F. Concrete producers should aim to hold back about 15 lb/yd³ (or target a slump of 2 in. higher than specified) to compensate for slump loss that can occur due to the delivery time. Consider mixtures with good slump retention performance without delayed setting times to address delivery time variations. Consider job site admixture (water reducer) addition with qualified personnel at the job site to address delivery time and air content variations. On a daily basis QA/QC personnel can utilize the slump measurements at the plant prior to any water addition after batching as a quality assurance tool to ensure that the mixing water content is within tolerance or ingredient characteristics are unchanged. Alternatively, daily records of water added to the mixture at the slump rack can be used.</td>
</tr>
</tbody>
</table>
are not measured one could still do the above exercise but the investigation process should be started when the measured slump varies more than 1 in. from the target slump range. The 1 in. allowance is mainly to account for the air content and temperature variations.

It is impractical to measure slump at the plant prior to water addition for every load that leaves the plant. It may be sufficient to do that every 10 loads. For the remaining loads visual slump estimations can be made by the truck operators. These slump estimations and measurements should be captured and analyzed on a daily basis by QC/QA personnel and any large deviations from target slumps can be investigated as discussed above. Instead of measuring slumps at the slump rack one could also look at the daily record of the water added to the mixture at the slump rack. If more than 1 gallon/yd³ is being added it can mean one or more of the following:

1. Mixing water content is not within tolerance
2. Water demand for that mixture has changed due to a change in characteristics of the materials or batched quantities
3. Air content is below the tolerance level
4. Concrete temperature is more than 20°F above the design concrete temperature for that mixture
5. The target slump range is again being exceeded; investigations as outlined before can be carried out.

Summary

The different sources of mixing water variation and the means to control it is summarized in Table 2. The producer can employ the suggested practices to carefully calculate the mixing water content in the concrete. However, the variation in mixing water demand due to variation in concrete delivery time, air content and concrete temperature can be nearly 45 lbs/yd³! So steps as discussed in this article are needed to reduce this variation in mixing water demand. By following the various steps, a producer focused on quality should be able to maintain a good control on the mixing water content and meet the ASTM C94 and ACI 117 tolerance of ±3% of the quantity required by the mixture proportions. On a daily basis QA/QC personnel can utilize the slump measurements at the plant prior to water addition at the slump rack as a quality assurance tool to ensure that the mixing water content is within tolerance. Alternatively, daily records of water added to the mixture at the slump rack can be used.

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- **Nally & Haydon, LLC** and its affiliates have sold its Eastern Kentucky operations to a subsidiary of **Lafarge** (a Rinker Group Limited company)
- **J.C. Compton Company** (dba Riverbend Sand & Gravel, Valley Concrete & Gravel and Salem Road & Driveway) have been acquired by **Oldcastle Materials, Inc.** (a U.S. subsidiary of CRH, Dublin, Ireland)
- **Tom Brok, Inc.** have been acquired by **Shockey**
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The National Ready Mixed Concrete Association (NRMCA) and Grey Matters Consultancy of the United Arab Emirates (U.A.E.) hosted the first International Concrete Sustainability Conference, December 13-14, 2010 in Dubai, U.A.E. NRMCA has hosted the annual Conference in the U.S. since 2006 and significant interest from international researchers and concrete producers prompted the offering of this conference to an international venue.

The conference provided learning and networking opportunities on the latest advances, technical knowledge, continuing research, tools and solutions for sustainable concrete manufacturing and construction. Twenty-two presenters from 10 countries presented on the latest developments related to sustainable design, specifying, manufacturing, testing, construction and maintenance of concrete. Over 150 people from around the Middle East, Europe, North Africa and Asia attended the conference.

Rabih Fakih, managing director of Grey Matters Consultancy organized the conference with the Middle East concrete industry in mind. “In addition to green building and sustainability, concrete companies in the Middle East are interested in several of NRMCA’s popular certification programs that measure concrete quality and sustainable manufacturing practices,” said Fakih. He added, “NRMCA and Grey Matters Consultancy are working together to offer NRMCA certifications in the Middle East.”

The conference would not have been possible without additional conference partners and sponsors. Conference Partners included Readymix Abu Dhabi and Saudi Readymix. Gold sponsors included United Corrosion Technologies and Mapei. The conference was also endorsed by Emirates Green Building Council, Morocco Green Building Council, Qatar Green Building Council, Saudi Green Building Council and Trakhees, and also had bgreen as a media partner.

Lionel Lemay, senior vice president of sustainable development for NRMCA, opened the conference by outlining the trend toward sustainable development and the challenges and opportunities in the concrete industry. “Sustainability has become part of the fabric of society. Corporations in every industry are shaped by their customers’ desire to be more environmentally responsible. Companies that adopt sustainable practices will become preferred suppliers. Environmental performance, including greenhouse gas emissions, will be increasingly monitored and regulated,” noted Lemay during his opening remarks.

Lemay concluded his opening remarks by saying “...the objective of this conference is to bring researchers, academics, students, engineers, architects, contractors, concrete producers, public officials and material suppliers together to explore ways to improve the sustainability of concrete construction and the sustainability of the concrete industry as a
whole in order to help reduce the environmental impact of the built environment.”

Lemay also provided a brief introduction to the U.S. cement and concrete industry’s investment in research at the Massachusetts Institute of Technology (MIT) to support concrete’s role in sustainable development as an example of the concrete industry’s dedication to continuous improvement in product and process innovation.

Opening General Session

The opening session was anchored by a dynamic presentation from Mark Wilhelm with Green Ideas in Phoenix on energy efficiency in building design. Mark summarized strategic initiatives toward energy efficiency and development of renewable energy in several countries. He specifically illustrated the relationship between development and energy use, indicating that the U.S. and U.A.E. had among the highest per capita energy use. The overlay of governmental regulation and incentives and competitiveness between building owners will drive sustainable development. Sustainable development results in market transformation and will result in innovations in building design and energy conservation. He concluded that the three strategies to promote green building were to create awareness, educate and build demand.

Lemay delivered a presentation titled Sustainable Concrete Production: The Next Step Toward Industry Sustainability. Lemay outlined the U.S. concrete industry’s sustainability vision, strategies and targets. “The vision of the ready mixed concrete industry is to transform the built environment by improving the way concrete is manufactured and used in order to achieve an optimum balance among environmental, social and economic conditions,” stated Lemay. He went on to describe how the industry has developed the Sustainable Concrete Plant Guidelines, funded by the RMC Research & Education Foundation, to outline strategies for concrete production facilities to help them reduce their overall footprint.

Technical Sessions

The technical sessions included presentations on green building design practices, innovative products and advance concrete technologies. Examples include:

• Colin Lobo, senior vice president of engineering for NRMCA, presented a general overview of pervious concrete. His presentation covered various applications, general benefits to sustainable development, design, construction and maintenance. There seemed to be interest in this special concrete application in spite the low levels of precipitation in the gulf area.

• Ivan Diaz from Louisiana Tech University spoke to research in progress on geopolymer concrete – using activated fly ash as the cementitious binder. The study has completed a comprehensive compositional characterization of fly ashes from several sources in the U.S. Diaz is working toward developing predictive correlations between compositional characteristics and mechanical performance, such as flexural strength and modulus of elasticity. It was illustrated that geopolymer concrete follows similar empirical relationship of mechanical properties used for conventional concrete.

• Nadja Ortner, a consultant associated with the Qatar Green Building Council, discussed the role of green design rating to obtain a building permit. She discussed research and initiatives in Qatar regarding the use of recycled materials in concrete. Recycled materials included reuse of wash water and crushed aggregates from returned concrete. Recycled aggregate from electric arc furnace slag from the manufacture of steel was evaluated with some success. Various methods for energy conservation in production were evaluated to replace the use of crushed ice when reducing concrete temperature.

• Neil Kirkpatrick from the Royal Group spoke about the drivers for change toward sustainable construction in Abu Dhabi. He outlined the development of a tool to manage sustainability impacts in buildings called Estidama. This tool has concepts similar to the LEED rating system with specific strategies focused on the Middle East region. Estidama, when adopted, establishes some mandatory requirements relative to sustainable development for new buildings in Abu Dhabi and further goes on to establish a rating system based on a structured methodology to improve performance. Estidama will be applicable to communities and all building types, with specific guidance for villas. Developers will have to achieve a minimum design rating to obtain a building permit. After construction, a minimum construction rating is needed to obtain a certificate of completion.

• Siham Omri from the Moroccan Green Building Council discussed the role of green building councils in the development of renewable energy industries and their importance in the elimination of CO₂ for the sustainability and prosperity of our planet.

• Mohammad Nagi with the American University in Dubai discussed the formation of an industry-university partnership to...
support durability-related research specific to the severe environment of the Middle East. The development of test methods and specification criteria to evaluate durability of concrete was discussed.

• Nur Yazdani, University of Texas at Arlington, presented on the sustainability of concrete bridges by taking a holistic look on the impacts of material selection, construction, maintenance, repair methods and demolition of concrete bridges on sustainable development.

• Lionel Lemay and Rabih Fakih presented an overview of the NRMCA Sustainable Concrete Plant Certification program which is scheduled for launch in early 2011. This new NRMCA certification program provides a quantitative, performance-based metric to allow ready mixed concrete producers to demonstrate excellence in sustainable development. To certify, plant personnel use the NRMCA Sustainable Concrete Plant Guidelines to rate a plant’s level of sustainability within different credit categories. Plants can achieve between 0 and 100 points depending on how many sustainability credits are achieved and their level of performance within each credit.

• Dr. Takafumi Naguchi, University of Tokyo, delivered a presentation on the challenges of recycling concrete construction demolition waste in Japan. He illustrated reasons for the increase in construction waste and the potential of elimination of waste disposal sites in Japan in 10 years. Japan has developed criteria for characterization of crushed concrete aggregates for use in new construction. Crushed concrete aggregates acceptable for use in concrete without limitation were obtained by repeated crushing and heated (to 300 ºC) scrubbing. A complete recycling technology was outlined whereby high energy microwaves for short periods debonds aggregates in crushed concrete for recovering virgin aggregates. The flaked mortar fines are used as a raw feed for cement manufacture, considerably reducing carbon dioxide emissions.

• Dr. Yixin Shao, McGill University, described ongoing research on the use of early age carbonation for property enhancement of dry cast concrete products. Pressurized carbon dioxide facilitated the capture of 10% to 15% by weight of cement along with enhancement of concrete properties. Hydration of cement continued after initial carbonation to allow for continued property enhancement.

NRMCA will host the 2011 International Concrete Sustainability Conference, August 9-11, in Cambridge (Boston), MA, at the Hyatt Regency Cambridge and the Massachusetts Institute of Technology campus. This will be the sixth time the conference has been held in the U.S.

Purpose of the Conference

The International Concrete Sustainability Conference provides learning and networking opportunities on the latest advances, technical knowledge, continuing research, tools and solutions for sustainable concrete manufacturing and construction. The 2011 International Concrete Sustainability Conference is being held in conjunction with the MIT Concrete Sustainability Hub 2011 Industry Day scheduled for August 11, 2011. Registrants and speakers at the Concrete Sustainability Conference will have the privilege of attending both events.

Who Should Attend?

Researchers, academics, students, engineers, architects, contractors, concrete producers, public works officials, material suppliers and concrete industry professionals are invited to present and attend the conference.

Session Topics

Experts will present on the latest developments related to design, specifying, manufacturing, testing, construction, maintenance and research of concrete as it relates to sustainable development. Topics include:

• Low Impact Development
• Urban Heat Island Reduction
• Carbon Footprint and Embodied Energy
• Sustainable Development Initiatives
• Recycled Materials
• Performance-based Concrete
• Government Initiatives
• Private Initiatives

For more details about the conference and to register, visit www.SustainabilityConf.org.
In a session on Life Cycle Assessment, Wayne Trusty with the Athena Institute discussed the use of life cycle assessment (LCA) to assess environmental performance of building systems. Trusty outlined the ISO 14040/44 framework of life cycle assessment and outlined the inventory analysis to impact assessment with the goal to measure ultimate impacts on human and ecosystem health. He summarized research studies on pavement systems conducted by the Canadian National Research Council and Athena Sustainable Materials Institute. These studies compare the energy and CO₂ equivalent of Portland cement and asphalt pavements and the truck fuel usage comparisons illustrating the superior performance of Portland cement concrete pavements.

Providing a different perspective, Alex Amato with consultants Davis Langdon/AECOM discussed the different building rating systems worldwide and indicated that these systems have not yet evolved to a life cycle assessment basis because of the complexity involved in LCA. He illustrated the LCA studies of office buildings in Hong Kong comparing steel and concrete systems. He outlined a computer modeling tool for assessment of sustainable construction that can be used by design teams in evaluating cost and environmental impact of alternative proposals. One finding was that the environmental impact of initial construction was about 9% of the life of a building over a 55-year life span (LCA); and the initial construction cost was about 19% of the total life cycle cost (LCC). Finally, Dr. Amato outlined recent developments with the move to environmental impact assessment using CO₂ equivalent as the primary measure due to the perception that this is the single most important impact to climate change.

Olafur Wallevik, with the Innovation Center Iceland (ICI) in Iceland, gave a dynamic multimedia presentation illustrating the development of eco-friendly mixtures for self-consolidating concrete (SCC). With optimized use of aggregate grading and mineral fines he demonstrated the rheological characteristics of SCC mixtures with very low cementitious contents which he calls Eco-SCC.

Kamil Kaloush with Arizona State University discussed impact of urban materials on urban climate change. Dr. Kaloush has conducted extensive work on measuring hot spots associated with dark colored surfaces and other properties of pavement materials and documented the impact on local ambient temperature.

The conference concluded with concurrent sessions outlining two of NRMCA popular education programs.

Colin Lobo provided an overview of the NRMCA Concrete Technologist Middle East certification currently under development. The content will include most portions of the NRMCA Technical Short Course and durability courses with subject matter developed specifically for the Middle East. It is anticipated that this program will be available by the end of the first quarter of 2011.

Lionel Lemay presented an overview of NRMCA’s online course and certification titled Concrete’s Role in Sustainable Development. The course provides a background on the sustainability movement and details information on how concrete can be used to minimize environmental impact of the built environment. NRMCA is offering a 20% discount to conference attendees if they register for the online course. Those who take the course and pass the certification exam earn the NRMCA Concrete Sustainability Specialist Certification.

The conference concluded with a panel discussion to help answer the question: Is sustainable concrete economically justified? A building design consultant, a land developer, a green building council director and a ready mixed concrete producer represented the panel. Audience members participated in a lively discussion on the subject with a wide variety of opinions on the topic. The next International Concrete Sustainability Conference is scheduled for August 9-11, 2011 in Boston in conjunction with the Massachusetts Institute of Technology Concrete Sustainability Hub. In addition, NRMCA and Grey Matters Consultancy are also planning another conference in the Middle East region in 2011 based on enthusiastic reaction to the Dubai conference. Details of the Dubai conference, including conference proceedings, can be found at www.SustainabilityConf.org.
Repair Shop Safety

Part I

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

Repair shops are often out of sight and out of mind at a ready mixed concrete facility. Mixers see all sorts of use, from off road use to deliver a load to tight city streets strewn with potholes and high curbs. Mechanics work hard at keeping the fleet running. There are a variety of accidents that can happen in repair shops. Part I will cover some of the more common accidents. The shop supervisor is the person with the greatest impact on the safety performance of the mechanics. Their attitude drives the mechanics’ actions. Housekeeping or the lack of housekeeping can be a contributing factor to the accident. Slips, trips and falls are the most common injury in the ready mixed concrete industry. Spilled oil, grease, loose parts and an attitude of “fix the mixer” and we’ll clean the shop when times get slow. Times never get slow enough to go back and clean up the shop. Housekeeping is not something that is done on a weekly or monthly basis. Good housekeeping is an ongoing process that in order to be effective must be included in every activity that occurs at a ready mixed concrete repair shop. A clean shop is a happy shop.

Hand and power tools can be a source of accidents. Bench grinders are very helpful, but need constant love and attention. As the grinder is used, the grinding stone gets smaller. The grinder has a work rest and a tongue guard. The maximum tolerance (open space) between the work rest and the grinding stone is 1/8 of an inch. For the tongue guard (upper guard), the maximum tolerance (open space) between the tongue guard and the grinding stone is 1/4 of an inch. These guards are in place to protect the operator in case of a grinding stone explosion. It is very important to use the grinder correctly. It is very easy to have a finger pulled between the grinding stone and the work rest if the open space is too large.

Welding also typically occurs in the repair shop. Besides going through the welding permit system, always have a fire watch patrol the area for 30 minutes after the welding has been completed. Fire can smolder and not show any signs of smoke and fire for 30 minutes. Ensure that any welding occurring inside of the mixer drum is following the guidelines of OSHA’s Permit-Required Confined Space. Welding inside the drum or any other confined space changes the atmosphere from a safe atmosphere to a potentially dangerous atmosphere if proper ventilation is not maintained.

Any repairing or welding of the water and admixture tanks should follow the manufacturer’s recommendation. Never defeat a safety device on the water and admixture tanks. Always use a regulated air source to ensure the tanks are not over pressurized. Recently, a mechanic was killed while attempting to fix a leaking water tank. Always follow the manufacturer’s recommendation.

When a part breaks, the mechanic sometimes must maneuver himself in awkward positions to reach the broken part. These difficult to reach positions can require the mechanic to stretch, bend or position his body parts (hands) in tight locations. Tires and parts are very heavy so ask your mechanics to get help if they need help.

Finally, if the mixer has to be run in the shop, ensure the exhaust is vented outside to keep a potentially hazardous atmosphere from forming. Consider placing a carbon monoxide sensor in your shop to warn mechanics that a hazardous atmosphere has formed. Vehicle exhaust can displace oxygen. Repair Shop Safety, Part II will focus on the storage and transfer of flammable and combustible liquids.
Best Sellers from the NRMCA Bookstore

Technical Related Publications

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 on 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 topics 1-42. Spanish CIP Full Set 2PCIP100es - contains 20 sets of each CIP topics 1-42. ($220 members, $320 non-members); English Single Set 2PCIPS & Spanish Single Set 2PCIPSes ($27 members, $110 non-members)

2. 2P170 – ASTM Standards for Concrete Technician Certification– Updated in April 2010, this publication includes 12 ASTM practices and test methods related to testing fresh and hardened concrete, including those required for ACI grade 1 field-testing and strength testing technician certification. ($42 members, $190 non-members)

3. 2P190 – Guideline Manual for Quality Assurance Quality Control – This publication describes the basic requirements of a ready mix producer quality plan, including a reprint of ACI 121R-04 Quality Management System for Concrete Construction and a section on statistical concepts for quality control purposes. The publication includes a variety of standard reports that the industry can use. ($22 members, $44 non-members)

4. 2PEB119 - Concrete Floors and Moisture - Understanding moisture in concrete leads to design of floors and flooring systems that provide excellent service for many years. This book discusses sources of moisture, drying of concrete, methods of measuring moisture, construction practices, specifications and responsibilities for successful floor projects. The second edition incorporates a brief discussion of terrazzo issues, additional references on drying times of lightweight concrete, an extended discussion of issues with ASTM F1869 moisture emission testing and updates to the sources of supplies and standards. ($40 members, $50 non-members)

Environmental Related Publications

5. 2P191 - Environmental Management Practices - Environmental Management Practices is an introduction to understanding and complying with environmental regulations. Offers practical advice on improving operating practices and provides key community relations tips for ready mixed concrete producers. This comprehensive guide includes chapters on water management, solid materials management, admixture, chemical and fuel management, air quality management, noise management and plant closure procedures. It also includes diagrams, checklists and a glossary of key environmental terms. 44 pgs. ($14.00 members, $30.00 non-members)

6. 2PCSR01 - Concrete’s Contribution to LEED 2009 NC (Pkgs. of 20) - Concrete Sustainability Reports (CSR) are technical publications that discuss various sustainability-related topics. They are intended to provide a summary of complex topics to help design professionals and concrete industry professionals utilize concrete sustainably. CSR01, the first in the series, provides a brief description of the LEED 2009 green building rating system and how concrete can contribute within each credit category. Examples of how concrete can be used to influence points in LEED are presented and a table summarizing how concrete contributes to each credit is provided. 8 pages. ($15.00 members, $25.00 non-members)

Safety & Operations Related Publications

7. 2P188 – Truck Mixer Driver’s Manual – This manual educates truck mixer drivers about concrete and customer relations. This booklet also highlights driver duties, safety precautions, equipment inspection and maintenance procedures, and what the driver should do in case of an accident. Also available in Spanish – 2P188S; ($14 members, $54 non-members); (20 or more copies $12 ea. members, $54 ea. non-members.)

8. 2P159 - Concrete Plant Operators Manual - 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. (Member Price $25, Non-members $100)

Promotion Related Publications

9. **2PPBI – Concrete Parking Promotion Flip Book** – The 20 page flip-chart book comes complete with an up-to-date parking lot presentation that also provides the promoter key additional information that the specifier does not see. This approach helps every promoter stay organized, reinforce the key points and also cover additional helpful information to support the specifier. The Pitch Book also comes with a Windows PowerPoint version on CD for electronic presentations which also enables editing and printing of page updates to the flip-chart book. ($29.00 members, $29.00 non-members)

10. **2PPGSPB50 – Green Schools Promotion Brochure (Pkg. of 50)** - With attractive, colorful images and informative, comprehensive text detailing the many green qualities that concrete applications and solutions offer, this brochure supports the use of ready mixed concrete as an important part of sustainable (“green”) school design. In the short term, this brochure was created with the expectation that the Federal government’s $72 billion in stimulus investments for education would result in opportunities to increase concrete’s share of construction for new schools and facilities. Support your efforts to grow our business by making these brochures part of your promotion arsenal. ($52.50 members, $52.50 non-members) Also sold in packages of 100, 250, 500 and 1000.

**FEATURED PRODUCT**

The National Ready Mixed Concrete Association has released its Emergency Plans for the Ready Mixed Concrete Industry. This is NRMCA Safety Series #20.

This CD-based PowerPoint presentation and instructor notes are designed to explain the OSHA-mandated plans of Emergency Action and Fire Prevention. Additionally, a Vehicle Recovery Plan is covered to help companies quickly and effectively deal with getting a vehicle recovered from an accident or break down. Finally, a quiz and training documentation form are enclosed to help track personnel training.

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