

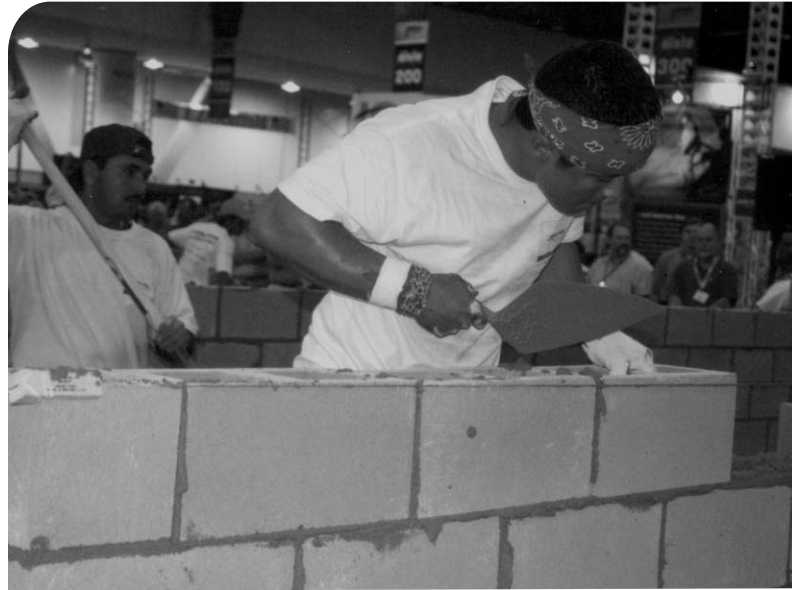


## Arizona mason takes top spot at national Fastest Trowel on the Block

"I like being out there and doing your best against top masons," said Moroni Meja II of Rhino Masonry, Inc., Flagstaff, Ariz., when asked what he liked about competing in the Fastest Trowel on the Block. On Wednesday, March 24, Meja did his best against 16 top masons from across the country and went home the national champion. The contest was held in conjunction with the MCAA Masonry Showcase in Las Vegas, Nev.

Not only did Meja compete against a field of skilled journeyman masons, but most of them were seasoned competitors of the Fastest Trowel on the Block. Pascal Robertson placed second and Glenn Houghton finished third at the 2003 Fastest Trowel competition in Tampa, Fla. Melvin Dawson made his first try at the race in Tampa last year and he returned to give it another shot. Ramon Gonzalez, Art Canez and Meja won first, second and third place, respectively, at the Arizona MCA's Fastest Trowel competition in October. Mike Canez had placed second, third and fourth places between 1997-2002. Jeff Voss has competed almost every year since 1989. Chino Ramirez took the top spot in 2001. Phillip Neiman placed second in the 2003 Southeast Florida regional race. Dennis Scheer, Chris Belinte, Luis Culajay and Mauricio Avendano had previous experience competing at the regional level, and Scott Tuttle, Britton Wood and Oscar Bojorquez were in for the first time.

For 20 grueling minutes, each competitor and his team of tenders strained their backs and arms, lifting block and building their walls as fast and as skillfully as they can. The Fastest Trowel competition measures a mason on the sum of his skill as well as speed. If a competitor doesn't turn out a "sellable" wall, he can't be held up as a paradigm of the craft. Contestants were judged on number of



**Moroni Meja II of Rhino Masonry, Inc., Mesa, Ariz., works quickly and cleanly to win the Fastest Trowel on the Block in Las Vegas, Nev.**

block, plumb, voids, story, level, and true and workmanship.

Because of the quality factors involved in the judging, first-place mason Meja didn't have the biggest wall, having laid 103 block, but the quality of his craftsmanship tipped the scale in his favor. Meja has been a mason for six years and has competed in the Arizona regional Fastest Trowel on the Block in 2002 and 2003. This was his first try at the national competition.

A special thanks to the SPEC MIX® mudslingers who also spent a mean 20 minutes mixing mortar and hauling it to each competitor's station. Also thanks to SPEC MIX licensee Tri Delta for providing the mortar, and to JLG, Rinker Materials, Sterling Handling Equipment, the National Lime Association, MultiQuip and EZ Grout Corporation for their contributions to the event. It's because of the commitment of the mudslingers and contributors that SPEC MIX and the MCAA can bring this event supporting the masonry industry to the Masonry Showcase every year.

**Continued on Page 2**

# Fastest Trowel on the Block (continued from Page 1)

## Fastest Trowel on the Block winners

- 1st place: **Moroni Meja II** of Rhino Masonry, Inc., Flagstaff, Ariz., 103 block
- 2nd place: **Pascal Robertson** of Pascal Robertson Masonry, Apopka, Fla., 103 block
- 3rd place: **Ramon Gonzalez** of Canyon Rock Masonry, Inc., Flagstaff, Ariz., 117 block

## Also competed

- Mauricio Avendano** of NuWay, Inc., Riverside, Calif.
- Chris Belinte** of Rhino Masonry, Inc., Mesa, Ariz.
- Oscar Bojorquez** of Nuway, Inc., Riverside, Calif.
- Art Canez Sr.** of CJS Enterprises, Phoenix, Ariz.
- Mike Canez III** of Triple M Masonry, Inc., Phoenix, Ariz.
- Luis Culajay** of NuWay, Inc., Riverside, Calif.
- Melvin Dawson** of Surber Brothers Masonry, Panama City, Fla.
- Glenn Houghton Sr.** of Houghton Masonry, Blue Grass, Iowa
- Phillip Neiman** of Coastal Masonry, Davie, Fla.
- Rudolfo (Chino) Ramirez** of GBC Concrete and Masonry Construction, Lake Elsinore, Calif.
- Dennis Scheer** of D&R Masonry, Cedar Rapids, Iowa
- Scott Tuttle** of Quik Trowel, LLC, Elk Ridge, Utah
- Jeff Voss** of NuWay, Inc., Riverside, Calif.
- Britton Wood** of Al Slattery Masonry, Yukon, Okla.



**Second-place winner:** Pascal Robertson of Pascal Robertson Masonry, Apopka, Fla.



**Third-place winner:** Ramon Gonzalez of Canyon Rock Masonry, Inc., Flagstaff, Ariz.



First-place winner Moroni Meja II (far right) of Rhino Masonry, Inc., Flagstaff, Ariz., receives a custom Crick level and a check for \$5,000 from MCAA President Alan Griffin (middle) of Griffin Contractors, Morganton, NC, and SPEC MIX Vice President Brian Carney, Mendota Heights, Minn.



The 2003 third-place winner Glenn Houghton of Houghton Masonry, Blue Grass, Iowa, puts his 28 years of experience as a mason to the test at the Fastest Trowel Competition in Las Vegas, Nev.

# Switching Raw Materials - Part 1: Not all cements are created equally

BY MARK R. LUKKARILA, SPEC MIX® TECHNICAL SERVICES MANAGER

Whether good or bad, have you ever experienced a change in behavior of either the cement you are currently using or a cement that you switched to? There are many possible reasons why this may occur. In this article, I will shed some light on the relatively complex nature of portland cement and what changes in performance can arise due to potential differences in portland cement from multiple or single sources.

Changing constituent materials in a mix design can significantly change the behavior of the final product. When switching raw materials one must be cognizant of the potential differences in chemical and mineralogical makeup and physical properties of the materials being used.

The properties of cement can vary from manufacturer to manufacturer and even from batch to batch. Significant variations in performance can result from even a small variation in the chemical and/or mineralogical composition. The properties of cement that are of particular interest when contemplating a change include, but are not limited to:

- Compressive strength
- Setting characteristics
- Compatibility with admixtures

In more than one instance, we have experienced admix-

ture incompatibility issues when portland cements have been changed. In particular, we have seen this in accelerators for mortar and shotcrete. For example, two Type I/II portland cements from different manufacturers right across the road from one another required different accelerators because of differences in chemical and mineralogical makeup. These manufacturers used the same primary raw material.

Portland cement is manufactured through pyroprocessing of a mixture of limestone, silica, clay and an iron source. The raw materials are homogenized either as a wet slurry, a powder, or combined as pellets and is referred to as raw feed. The homogenized raw feed is then transported through a number of zones within a kiln. Table 1 is an example of reactions that take place within a kiln.

The manufacture of a portland cement that is consistent and of good quality is a balance between properly proportioned and homogenized raw feed, proper flame structure, optimum cooling rate, and the grinding process. Variabilities in any of the manufacturing steps, from the quarry to the bag house, such as, chemical and mineralogical composition, kiln and cooling conditions, and grinding process, can potentially change the properties of the cement.

From a chemical standpoint, different portland cements, can have similar simple oxide compositions, which in turn produce similar calculated (Bogue) compounds. The Bogue calculations are a “potential compound composition” and are calculated on the assumption that high temperature reactions in the kiln have gone to completion.

The actual manner in which the simple oxides are bound together as compounds are typically different from the calculated alite (tricalcium silicate [C<sub>3</sub>S]), belite (dicalcium silicate [C<sub>2</sub>S]), celite (tricalcium aluminate [C<sub>3</sub>A]), and felite (tetracalcium ferroaluminate [C<sub>4</sub>AF]) contents (see Table 2). Even if the quantities of alite, belite, celite, and felite are similar within different cements, the distribution and reactivity of

TABLE 1

Temperature, °C	Processes	Chemical Reactions
< 200	Free water evaporates	
100 to 400	Adsorbed water evaporates	
400 to 750	Decomposition of clay forming meta-kaolin	$Al_4(OH)_8Si_4O_{10} \rightarrow 2(A_2O_3 \cdot 2SiO_2) + 4H_2O$
600 to 900	Decomposition of meta-kaolin, forming reactive oxide mixtures	$A_2O_3 \cdot 2SiO_2 \rightarrow A_2O_3 + 2SiO_2$
600 to 1000	Decomposition of limestone, forming CS and CA	$CaCO_3 \rightarrow CaO + CO_2$
800 to 1300	Absorption of lime by CS and CA, forming C <sub>4</sub> AF	$CS + C \rightarrow C_2S$ $2C + S \rightarrow C_2S$ $CA + 2C \rightarrow C_3A$ $CA + 3C + F \rightarrow C_4AF$
1250 to 1450	Further absorption of lime by C <sub>2</sub> S	$C_2S + C \rightarrow C_3S$

**Note:** C = CaO, S = SiO<sub>2</sub>, A = Al<sub>2</sub>O<sub>3</sub>, F = Fe<sub>2</sub>O<sub>3</sub>

Source: Baumgart, W.; Dunham, A.C.; Amstutz, G.C.; Process Mineralogy of Ceramic Materials, Inorganic Binders, Elsevier, NY, NY, 1984, Pg. 57

Continued on Page 5

## Arizona Masonry Guild announces winners at the third annual “Masonry: It Makes a Village”

The third annual design/build competition, “Masonry: It Makes A Village” was held Friday, March 26 and Saturday, March 27 at Tempe Town Lake. This timed event pitted teams of Arizona architects and mason contractors against each other to produce the most creative and original “village” structures with the use of brick, block, natural stone, and architectural precast.

The competition was designed to showcase the beauty and quality of masonry construction by providing an opportunity for Arizona architects and mason contractors to work side by side with each other on both the design and construction phases of the project. A total of nine teams competed in this year’s event.

The winning projects were judged by industry experts and were chosen for creativity of design and use of materials, teamwork, workmanship and overall quality. The jury panel consisted of: Dennis Cahill, City of Tempe; Israel Torres, Registrar of Contractors; Maynard Blumer, FAIA Architect; Linda Muller, Masonry Association of Kentucky; Barbara Headrick, Masonry Institute of Washington; Jim Rogers, Post-Tensioning Institute; and Aleta Fairbanks, Utah Masonry Council.



Architect and masonry team of Architectural Resource Team, Inc. and Sun Valley Masonry, Inc., take first place for their project titled “Jail” at the “Masonry: It Makes a Village” event in Tempe, Ariz.

The concept for “Masonry: It Makes A Village” was developed five years ago in Washington state by Barbara Headrick, Executive Director of the Masonry Institute of Washington.

The Arizona Masonry Guild sponsored this local event. The Guild has played a significant role in economic development, new product and construction standards, enhanced safety policies and increased energy efficiency of masonry products. It has also been on the forefront of developing and implementing statewide consumer education campaigns and scholarship programs with Northern Arizona University, Arizona State University and the University of Arizona. The Arizona Masonry Guild, Inc. can be reached at (602) 265-5999 in Phoenix, toll-free at (888) 511-5999 or at the website, [www.MasonryforLife.com](http://www.MasonryforLife.com).

### Winners of “Masonry: It Makes a Village”

**1st Place:** “Jail”

Architect: Architectural Resource Team, Inc., Phoenix  
Mason: Sun Valley Masonry, Inc., Phoenix

**2nd Place:** “Clock Tower”

Architect: NAU Construction School, Flagstaff  
Mason: Phoenix Bricklaying JATC, Phoenix

**3rd Place:** “Phases of Life”

Architect: Perlman Architects of Arizona, Inc., Phoenix  
Mason: MAG Construction, Phoenix

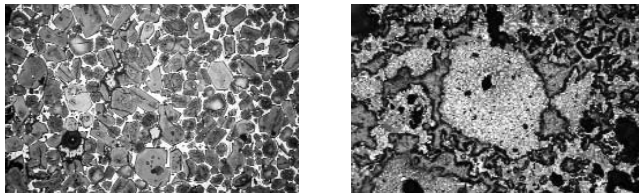
**3rd Place:** “Barbecue”

Architect: Dick & Fritsche Design Group, Phoenix  
Mason: Canyon State Masonry, Phoenix

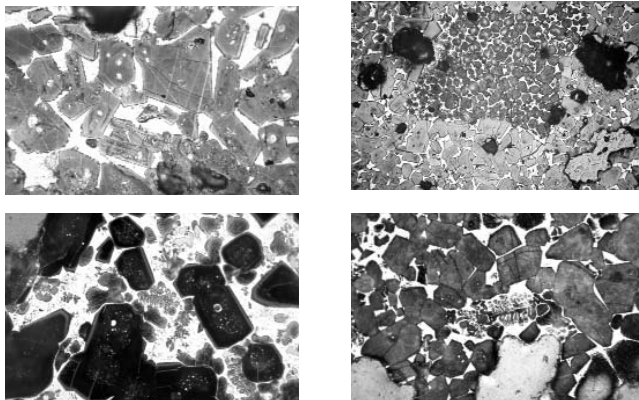
**People’s Choice Award:** “Phases of Life”

Architect: Perlman Architects of Arizona, Inc., Phoenix  
Mason: MAG Construction, Phoenix

# Switching Raw Materials - Part 1 (continued from Page 3)



**Figure 1:** Clinker photomicrographs at same magnification of portland cement clinker from two different cement plants. Both have similar chemical properties. Note the difference in size of crystallites and voids between the two clinkers as well as the large tightly-packed belite nests in the photo on the right. Nital Etch, Field Length = 1.4 mm



**Figure 2:** Clinker photomicrographs at same magnification illustrating differences in cement clinker mineralogy due to differences in raw materials and/or manufacturing processes. Nital Etch, Field Length = 0.35 mm

these constituents may differ significantly depending on the raw feed characteristics, kiln conditions, and cooling rate (Figure 1).

The final process in the manufacture of portland cement is grinding. Sulfate is interground with the clinker to produce the final product we know as portland cement. Sulfate is added as a set regulator. Without the sulfate present, cement will flash set. Typically, the sulfate added to the grinding mill is in the form of gypsum. If mill temperatures reach a high enough temperature, the gypsum ( $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ ) loses some of its chemically bound water and converts to hemihydrate ( $\text{CaSO}_4 \cdot 0.5\text{H}_2\text{O}$ ), which can lead to false-setting characteristics. A false-setting cement in a mortar can lead to complaints regarding loss of boardlife and can lead to excessive retempering.

Another significant difference between cements can be their fineness. The fineness of cement can significantly impact workability and water demand. This is due to the increased surface area with corresponding increase of reaction sites. Some clinker can be harder to grind than others due to mineralogical differences. Differences in fineness can also be a reflection of grinding mill operations (i.e., ball charge and grinding media maintenance).

**TABLE 2**

**Calculated Bogue Composition vs. Microscopic Determination of Clinker Phases**

NIST Clinker	RM 8486		RM 8487		RM 8488	
	Bogue	Pt. Count	Bogue	Pt. Count	Bogue	Pt. Count
C3S %	48	58.47	65	73.39	57	64.97
C2S %	28	23.18	12	7.75	22	18.51
C3A %	7	1.15	13	12.09	7	4.34
C4AF %	11	13.17	6	3.27	12	12.12

Source: Rasberry, S.D., National Institute of Standards & Technology — Report of Investigation, Reference Material 8486, 8487, 8488, May 22, 1989, Gaithersburg, MD

Because of limitations of time and space, I have touched upon only a few of the aspects regarding the impact manufacturing parameters can have on the performance of portland cement. I hope that it is clear that the manufacture and/or properties of portland cement is relatively complex and that Cement A should not simply be swapped for Cement B without fully understanding the properties of Cement B. SPEC MIX® is dedicated to ensuring quality and consistent products.

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## Young mason to follow in father's footsteps

Andrew Miller, a 17-year-old senior at Pisgah High School in Pisgah, Ala., knows exactly what he wants to do after graduation. He wants to be just like his father, Terry, owner of his own masonry construction business.

Miller's effort to make his dream become a reality began when he started masonry classes at the Earnest Pruet Center of Technology (EPCOT), an educational extension of eight Alabama high schools.

As a sophomore, Miller won the State SkillsUSA-VICA competition. As first place state winner, he went to compete at the National Leadership and Skills Conference in Kansas City, Mo. As a junior, Miller again won his state competition. More determined and focused in his second national competition, Miller placed second and earned a silver medal in the 2003 National Masonry Contest held in conjunction with the SkillsUSA-VICA National Leadership and Skills Conference.

"Andrew is a hardworking student that any instructor would enjoy having in their classroom," says Charles West, masonry instructor at EPCOT. "He is polite, enthusiastic and a smart young man. Most importantly, he never shies from accepting and meeting a challenge. Considering Andrew's accomplishments in just two years of masonry, I feel like I have an opportunity, as an instructor, to help him meet his potential of becoming a world-class craftsman."

Miller continues to work to improve his masonry skills by working with his father. He says he hopes to represent the state of Alabama and return to the national masonry contest where his goal is to "win it all."



Josh Knudtson of Dawson, Iowa, checks his work during the 2003 National Masonry Contest held in conjunction with the SkillsUSA-VICA National Championships in Kansas City, Mo.

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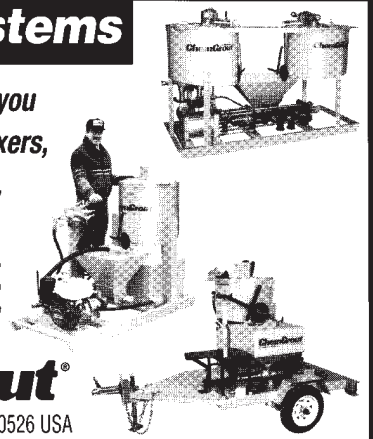
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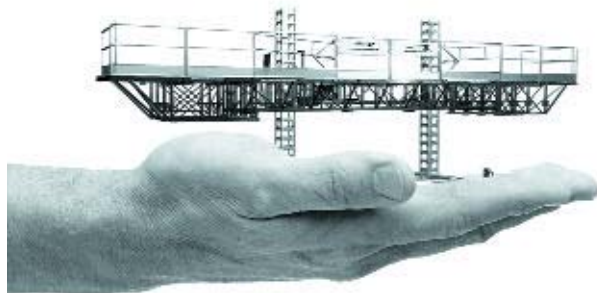
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### **ACI International Conference on Advance in Concrete Technology**

May 26-29  
Las Vegas, NV

### **AIA 2004 National Convention and Design Expo**

June 10-12  
Chicago, IL

### **ASTM Committee C 09**

### **ASTM Committee E 05**

### **ASTM Committee C 12**

### **ASTM Committee C 15**

### **ASTM Committee D 35**

### **ASTM Committee C 07**

### **ASTM Committee C 01**

June 13-16  
Kansas City, MO

### **National SkillsUSA-VICA Conference**

June 22-25  
Kansas City, MO

### **SkillsUSA-VICA Masonry Competition**

June 24 at 9 a.m.  
Bartle Hall Convention Center  
Kansas City, MO

### **Interbuild 2004**

June 25-29  
Birmingham, UK

### **13th International Brick/Block Masonry Conference**

July 4-7  
Amsterdam, The Netherlands

### **NCMA Midyear Meeting**

August 4-8  
Cambridge, MD

### **ICC Codes Forum**

August 26-29  
Salt Lake City, UT

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