

The 2012 Bunyan Pervious Roast is where pervious concrete industry professionals gather in a think tank to share ideas for better pervious pavement. The event is attended and sponsored by those people with special attention to those who produce this concrete, those who build this pavement and the people who teach them. The training and certification that is done by the National Ready Mixed Concrete Association and their local sponsoring groups are the focus of our attention. The LSG is also a promoter of pervious concrete, with a critical role in advising the potential owners of this pavement and those who build it. We are talking about pervious concrete that is made in a drum and is delivered to the site on wheels. We consider the ready mix concrete producers to be the single greatest influence on the success of a pervious project.

The Pervious Promotion Committee of NRMCA held their annual meeting during the 2012 Bunyan Pervious Roast, conducted by Frank Kozeliski and organized by Phil Kresge. Phil leads the pervious effort at NRMCA, in support of both producers and installers. We believe that if producers and installers build this pavement with confidence, promotion is made easier and more effective. In this, we have a common interest with NRMCA, their producer members and their local sponsoring groups.

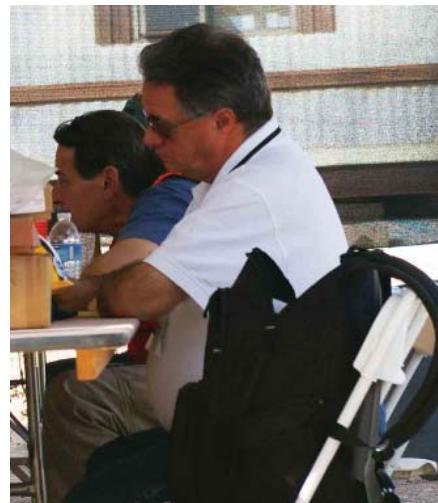


## LSG Champions

We recognize the champions among the LSG organization mostly because they are great teachers. We want to use the experience of those who are bold in leading the industry among their local membership and the rest of us, who also gain from their progress.

Jereme Montgomery, from Nebraska Concrete and Aggregates Association presented "Density Is Our Destiny", a summary of his quality control program. He used data from two projects in Omaha, to illustrate density from start to finish. He showed good evidence that three of the density indicators will correlate with the fresh, unit weight produced by the ASTM 1688. His study shows very consistent data, where every load is tested and logged, based on five types of density.

- Aggregate Voids
- Design Density
- Fresh Unit Weight
- Hardened Unit Weight
- Average Infiltration



Jereme makes everything look easy and his presentation is perfect. He started with aggregate voids and carried through cores and infiltration. Mr. Flood expressed confidence in this density presentation and said it follows the trend of materials testing of pervious concrete at ASTM. Jereme Montgomery is well connected and well informed. We appreciate what he brings and we appreciate the NCAA for allowing Jereme to take time away for our event.

Bruce Cody brings us his promotion experience from the Pennsylvania Aggregates and Concrete Association. Their members count on Bruce to keep informed of pervious concrete technology. He is informed and fearless in his leadership for producers. As their producer members have gained confidence in their pervious products, their promotion can enjoy the same confidence. Bruce has done a great job in making that connection. He has also produced a detailed comparison of the costs of construction, operation and maintenance for pervious concrete, as compared to asphalt pavement systems.



Lonnie Gray teaches pervious in Salt Lake through the Associated General Contractors and through Oldcastle Materials. He is the coach for our Bunyan Crew and the referee for the debates about mix variations that we have run at this venue. Lonnie has great ideas for pervious mixtures and for repairs.

Alan Sparkman runs the Tennessee Concrete Assiciation and is also involved in the construction program at MTSU, where Heather Brown and her crew have carried their program forward with some very noteworthy pavement. Alan agreed to try some admixture and silica fume to compare to our batches. He spoke to us and showed his data.

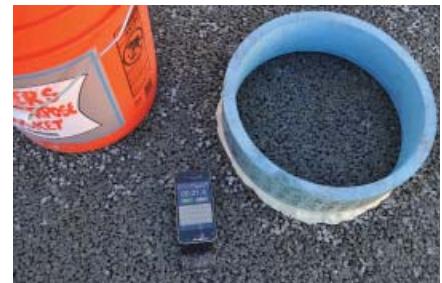
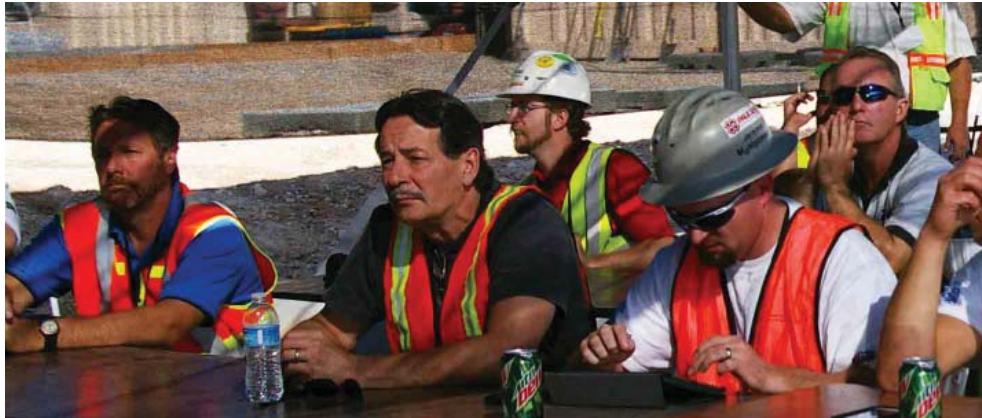
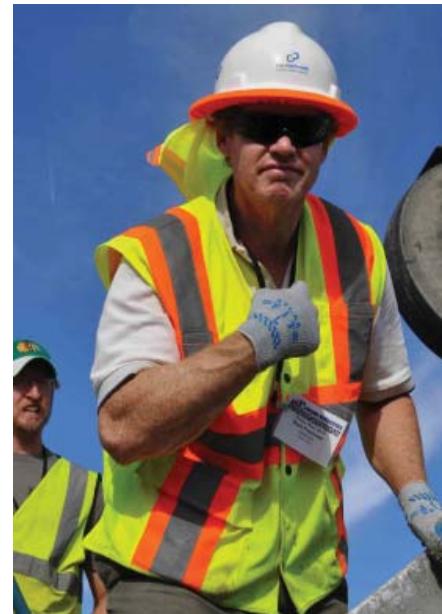




I hope to keep from going astray by following direction from Colin Lobo and from Mr. Flood. Experimentation and demonstration can take an abstract course, as we strive to find relevant ways to evaluate pervious concrete performance. As we look to ASTM for answers, we are pleased to have Mr. Walter H. Flood IV, from Flood Labs on hand to guide us in formal testing and evaluation. Walt has even agreed to help us with some of the unusual things we have tried. His experience from Flood Labs and his affiliation with ASTM makes him a key player in our group. We are fortunate to have him involved.

I am also a student of David Frentress, from Cal Portland. He gave us the realities of producing and marketing pervious. This guy inspires me every time he speaks.

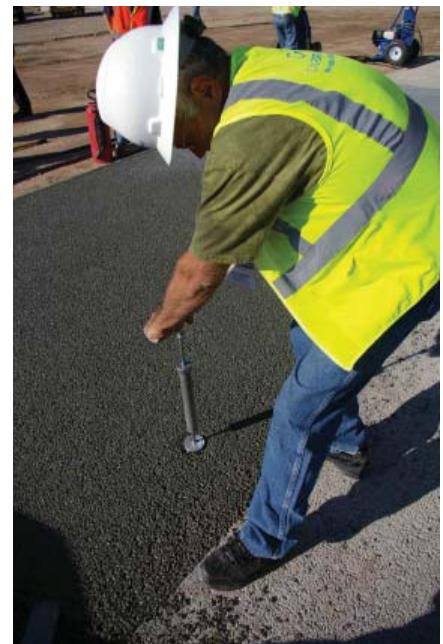
We anticipate the release of formal studies by John Kevern about high performance pervious mixtures at the University of Missouri, Kansas City. Pervious research done by John is well known to this group. His current work includes silica fume and we got some details about this from Tony Kojundic, at Elkem. Tony also presented the trends of how silica fume has been performing in pervious mixtures.



Matt Offenberg and I will sometimes have the occasion to share the speaking podium for a previous crowd. When I first met Matt, he seemed uneasy during certain parts of my presentation. I too, felt uneasy during some of his presentation and it occurred to me, maybe Matt thinks parts of my talk was complete BS! Later, when Matt and I discussed this possibility, he came up with this great little bell. We called it the BS bell, like the ones you see at the hotel counter, designed to make you think you're being noticed. We would pass this off to each other between talks and we could politely express BS alarms, without undue interruption.

I always thought that I could prevail if I held the microphone last. I need to remember to move Matt close to the front so I can hear it better. Or, maybe a bigger bell.

Matt gave us a great tool, for using photographs to compare surface density. He introduced me to the tool called "Image J" for this comparison tool as well as for our microscopy.



Admixtures and pozzolans have shown good benefit for pervious mixtures and we clearly need more experience to broaden the recommendations for their use. We want to make our pervious products greener, stronger and more sustainable. We also want to make pervious construction more profitable. The perfect pervious mix design is different for each user, defined mainly by budget and the materials available.

We have also used fume with our favorite pervious admixtures and they seem to be compatible. In fact, the toughest ones are used in fish filters, cast in sheets that are one inch thick...thin enough to show daylight.

One of the reasons why we like Sloan is that the environment conditions are as adverse as anywhere. We chose to leave the aggregate in bone dry condition instead of enjoying SSD because we don't want anything made easy. Trial batches from prior to the 2012 Bunyan Pervious Roast and during the event showed good performance in the breaks but our curing issues appeared in the abrasion tests. Our cylinders were nicely formed but neglected in curing. The only surviving muffins were the ones taken from the Hexicrete batch. This speaks well for Hexicrete. But, the nagging question remains, is there no forgiveness for curing issues in a fume mixture? Some of our loads were rendered comotose, with stabilizer and they suffered the worst. Fume mixtures seem to do better if you let them go off and cure them properly.

The Hexicrete admixture is integral and a topical application of cure is optional. Our cylinders are integral only, without the topical application. The split tensile was increased by 62% in the Hexicrete cylinders. But, certainly these strength numbers would be better without the abuse of our Sloan environment. Hexicrete seems to inhibit evaporation and this is enhanced with the topical cure. We noticed that water would bead on the cured part and protected the slab better than the part where penetrating cure was used. Brad Roderick presented guides for the use of Momentive Hexicrete and gave us an evaluation of what we should expect from mixtures that include this product.



Our batches are using a lot of variables in combination. Brian Lutey said that we should better describe our process because the public does not understand our goals as we push the envelope. We should prepare to see extreme positive performance and other examples of extreme wreckage, as we push the envelope to see what is possible.

Alan Sparkman said that leaders in this discovery business tend to have a lot of arrows stuck into them. Those arrows come from those who don't understand the process. We learn more from a mix that doesn't work than one that works. I agree.

We have made trials of every mix variation to discover the limits of each one, along with the touch and smell of handling these mixes. Most of what we accomplish here is anecdotal and is intended to illustrate the flaws of a particular combination, where detailed testing should be done and where caution should be observed.

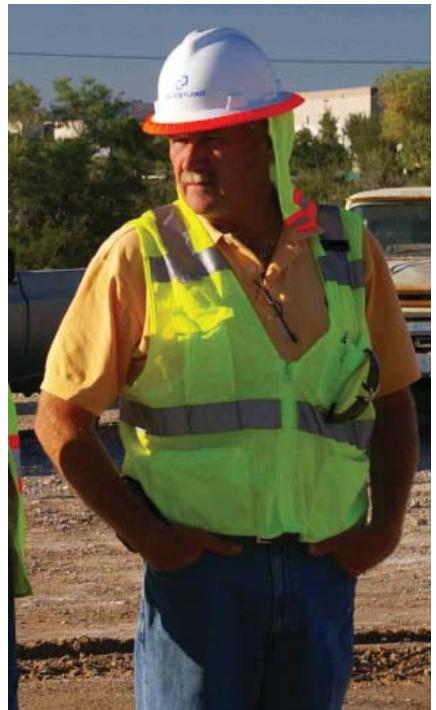
One of the great challenges of pervious is to use the maximum allowable amount of fly ash. Chris Bedford, from Headwaters presented the different types of ash and how their limits will vary between different types and different sources.

Chris Barker presented an engineers viewpoint of the owner's experience. He offered great insight for those who promote pervious with his cost comparisons between pavement types and storm water system types. Chris led discussion on pavement texture and the point at which coarse textured pervious concrete might cause a hazard for ladies (or other people) wearing pointed heels.

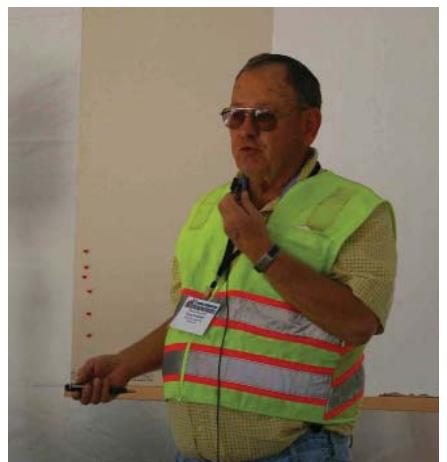
I thought we were making progress on the heels subject. But, Katha Redmon informed us that the men in the group have no idea! We will continue to look for ways to evaluate this kind of footwear, without actually wearing them. Maybe Mike has some suggestions.



We look for ways to polish the image of this pavement product and help it to prevail when it is compared to other choices. We enjoy great support from those who strive to make better pervious pavement. Bill Larson understands the potential for pervious concrete pavement and has worked for many years to develop the resources of the concrete industry to promote, to produce and to install pervious pavement. We asked Mr. Larson to share his thoughts about marketing pervious concrete and about our progress.



Frank Kozeliski has also seen the progress of decades as pervious concrete has evolved. His presentation shows his early pervious placements, using a variety of methods. Frank is watching closely where mechanical compactive force is applied. Evaluating the surface density, gets his bigfoot approach, to check the edges.



Michael Repkin, from Repkin Biosystems, is a microbiologist who caught my attention with the teaching tools that he uses in sustainable construction classes. Water biology has been his life's work and he has researched the environment in pervious concrete voids with standing water and with moist aerobic conditions.

Myths have circulated about the plants and animals that are alive in pervious concrete. So, we asked Michael to present the Bug Zoo, to examine the plants and animals that can live in the slab and detention aggregate of your pervious concrete pavement system.

The habits of ostracods, rotifers and the ones Michael calls "perv worms" are fascinating. The ones we like most are the ones that consume pollution. We learned how organisms will vary, depending on their environment and food source. Michael also gave us help with microscopy, for a close look at our bug census as well as our concrete slides.



We hope to make the training program better, especially during the performance demo part of the class. Scott Erickson wrote a checklist for the NRMCA Contractor Certification and we asked him to present it to the group. Nicely done.

When aggregate selection is mentioned, Scott and I bang heads. This is useful to show people that these choices will depend on the preference of the owner. I invite discussion from everyone, especially when it gives us opportunity to share the discussion with others. We appreciate his generous help.



The first year we held the Bunyan Pervious Roast was in 2010, when we dubbed it the "**Pervmaster's Ball**". Then in 2011, it was "**What your mother never told you about Pervious Concrete**".

This year, it's  
**Pervious in Purgatory.**

The annual Bunyan Pervious Roast includes giants of the concrete industry, wizards of ready mix and a team of rock stars who discover the limits of pervious concrete to develop practices for construction of this unique pavement.

### **Pall Bearers:**

Amy Bazella  
Bill Beeson  
Max Berry  
Mark Bliss  
Katie Canant  
Nick Canant  
Matt Cockerham  
Guy Collignon  
Reuel Cyr  
Joana Easton  
Ryan Easton  
Alan Gettel  
Kenny Greenland  
Dan Huffman  
Bill Klawitter  
David Liguori  
Bill Mitchell  
Spencer Mitchell

### **Honored Guests:**

Chris Barker  
Chris Bedford  
Scott Erickson  
Tony Kojundic  
Frank Kozeliski  
Matt Offenberg  
Michael Repkin



### **Perpetrators:**

John Bazella  
Bruce Cody  
Walt Flood  
David Frentress  
Lonnie Gray  
Brian Lutey  
Jim Miller  
David Mitchell  
Nathan Mitchell  
Jereme Montgomery  
Brad Roderick  
Alan Sparkman

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