

## At the click of a mouse

By Randell Riley

Starting with a new format for a newsletter creates both an interesting challenge and an opportunity. But it might also put me out of a job! Why do I say that? Much of what your association staff does in supporting you in your role as producers or contractors is ferret out small gems of information for promotion or troubleshooting. When you call us for help, what do I do? I do many of the same things I have been doing for more than thirty years, but I'm going to let you in on a little secret. In the past I used to spend more time in technical libraries, but now much of the time I find information faster and more efficiently by searching the deep resources available on the web.

Of course searching the web is about the tools you use and knowing how to ask the question to find that critical tidbit. Google is good, as is Microsoft's Bing, for doing general searches, and I use one or the other all the time. Google is the more powerful to me because you can use qualifiers such as "+" and "-", or enclose an exact phrase in quotes if you are looking for a specific phrase. The instructions for how to do this can be found [here](#). Use some of these tricks and you will find you can help yourself quite a bit after hours when association staff are unavailable.

It is also possible to create specialized search engines and some very powerful ones exist. Say you want to know about how the different Departments of Transportation might handle fly ash in their mixtures in comparison with Illinois. A good place to start is [here](#). Get to the search engine and type, for example, "fly ash" "texas" in the input box and up will pop several thousand references, most from DOT websites, from which you can further drill down in your search for that nugget.

This is one step better than searching the broad web where you are going to get far more hits than you can likely scan. Google is pretty good but cannot read your mind - yet! It can do a respectable job of pointing you in the right direction. As search intelligence gets better this will likely improve.

One of the downsides of search engines is, of course, the game of cat and mouse that is constantly being played as search engines strive to provide you with the best, most relevant results while advertisers blatantly attempt to get your business with their equivalent to junk mail and email.

If you want to avoid broad results there are other ways to successfully search, and you may already have access to many of these resources, including ones that are in a very real sense prequalified for your business.

As a service to the industry National Ready Mixed Concrete Association has resources [here](#) for both members and nonmembers.

Want to get the latest on concrete overlays? The National Concrete Pavement Technology Center has many excellent resources [here](#).

The latest *Guide for Concrete Overlays of Asphalt Parking Lots* may be exactly what you need to convince an architect or engineer that it is entirely feasible to overlay an asphalt parking lot with concrete. It can be downloaded at the CP Tech Center website and through the Ready Mixed Concrete Education & Research Foundation [here](#).

One of the revolutionary changes not just on the web but within the industry is

the movement towards the use of apps. These small programs are run on a centralized server or on your phone or perhaps on both depending on the system.

Want to know if your dry, windy day is going to be one which is prone to producing plastic shrinkage cracking? You can find out by checking the evaporation rate [here](#). This, combined with knowledge from American Concrete Institute publication 305R-10, *Guide to Hot Weather Concreting*, found [here](#), can provide you and your contractors with what they need to know to help avoid problems later this construction season when the winds are blowing, the temperature is hot, and the humidity is low.

The American Concrete Pavement Association website has a fairly extensive list of apps and full program downloads, so go check it out [here](#). There are five or six that may be of use to you as a producer or small contractor. Most of them are of use to me a pavement engineer in one way or another.

Finally, don't forget your own association's [website](#), where Illinois Ready Mixed Concrete Association has downloadable resources to use in your promotion efforts or to help solve some of your technical problems. The best thing about IRMCA's website is the fact that the articles and promotion pieces listed on the site are largely based on Illinois projects. One of the biggest hurdles one faces in promoting a project is convincing someone that they are not the first to have done something they have never heard of. "Whitotopping? Never heard of it. Can't be done." IRMCA's website has plenty of examples of completed projects of all types, including concrete overlays, pervious concrete pavements and the newcomer to Illinois, Roller Compacted Concrete.

All of these bits and bytes of market information represent market opportunities to you as a producer. And the price is right for many of them – free! All of these are available at the click of a mouse.

Knowing what you know now, I just hope that mouse doesn't put me out of work!

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## **BALLS: the dreaded “cement balls”**

By John Albinger

These balls, typically made up of cementitious materials, water, and sometimes sand, are most prevalent in transit, or truck, mixed concrete and higher slump mixes. The most common cause cited for these balls is when water or wet sand is allowed to come into direct contact with the cementitious materials, cement, flyash, slag (for the sake of simplicity I'll refer these materials as cements). Therefore the first solution suggested is adjusting the batching sequence, making sure cements and water are not being discharged at the same time. Although the batching sequence is a common cause for balls, it may not be the only reason balls are formed. There are, in fact, several contributing factors, many of which are never considered.

**Central and transit mix plants.** Balling is most prevalent in transit, or truck, mixed

plants. A ready mix truck is designed to be loaded with material, the material is mixed, and the resulting concrete mixture is hauled to the job. The sole function of a central, or wet, batch plant is to make concrete, and it does so in a much more energy intense manner than a truck mixer, thus not allowing balls to form. A lack of maintenance and the condition of the plant and truck are major factors affecting the quality of the concrete being produced.

**Batching sequence (suggested, not absolute).**

1. Start by discharging approximately 80% of the total added water (sometimes called the head water).
2. While the water is discharging begin discharging the aggregates.
3. The timing must be such that the cement must not begin discharging until the headwater is finished and there is enough aggregate left to go in with all of the cement.
4. After all of the aggregate is discharged the remaining 20%, or so, of the water (sometimes called tail water) can be discharged.
5. Admixtures should be added to the water or on to the aggregates as recommended by your supplier.

**High amount of water – high slumps.** The more head water used, the less effect aggregates have in preventing the formation of balls when the cement begins to be discharged into the truck. If a high water content is required, then an adjustment in the ratio of head to tail water may be beneficial (e.g., 60:40).

**Flow characteristics of the cement.** Different cements have different flow characteristics. These differences are most obvious when the cement is being pumped into the plant and where the time can range from 20 to 30 minutes. Similarly the time it takes to discharge the cement into the scale can vary, and ultimately the time it takes to empty the scale varies to the extent that the last of the cement may or may not be discharged simultaneously with the aggregate.

**Wet aggregate.** Excessive surface moisture on the fine or coarse aggregate can contribute to balling when it comes in contact with cement. The use of moisture probes and microwave technology can significantly help control aggregate moisture.

**Aggregate scale filling and emptying.** Commonly coarse and fine aggregates are accumulatively weighed in the same scale, the sand on top of the coarse aggregate. The positions of the bin gates above the scale will dictate how the material stacks in the scale and subsequently in what proportions the combined aggregates fall on to the belt. A consistent blend is best. As for aggregate gates, are there multiple gates? And if so, are they linked together or do they act independently? Are the throat openings wide enough so as to prevent bridging? And is the angle on the sloping side of the bin steep enough not to affect discharge? All of these can ultimately contribute to balling.

**Rate of feed.** Obviously loading time impacts efficiency, but not synchronizing the speed of the aggregate feed belt with the discharge of the cement can cause the

cement to be fed into the truck by itself which, again, can cause balling.

**Location of the cement feed inside the loading boot.** Bigger is not always better. Too big of a cement discharge pipe, or boot, can restrict the aggregate flow and cause the cement to discharge too fast. Reducing the size of the discharge pipe too much can, however, reverse the problem. The location of the pipe should be placed where it provides the least amount of restriction and maximum amount of comingling with the coarse aggregate.

**Size of load.** The smaller the load, the less confined the aggregate is, and once again, the less effective the coarse aggregate is in breaking up balls. Controlling the cement scale discharge and making sure the cement doesn't fall in one "clump" can help.

**Condition of the fins inside the truck mixer.** If the fins inside the truck mixer are worn or build up is allowed to accumulate, the materials are not dispersed uniformly throughout the load, the opportunity for raw cement to meet water is greater, and the inconsistency of the mix is less effective in preventing or breaking up balls.

**Conclusion.** As stated earlier, balling is generally related to truck mixed concrete and concrete with higher amounts of water, yet each of the aforementioned factors should be considered when balling occurs. Some of the computerized or automated plants may not have the memory capacity to individualize batching for each mix, so altering the sequence or timing of the discharge may have to be done manually. Talk to your plant manufacturer and batching system provider. They can undoubtedly provide suggestions to help eliminate the problem.