

CONCRETE BASICS

Admixtures

by John Albinger, IRMCA Technical Consultant

Historically admixtures have, no doubt, been a boon to our industry. Air entraining agents have made our concrete more durable. Water reducers have allowed us to produce concrete with lower water to cementitious ratios. High range water reducers, or superplasticizers, allow the contractor to place concrete with slumps of 6 to 8 inches. We can accelerate or retard setting times. There is no question, the use of admixtures has given our product a great deal of flexibility and allowed for the development of many new kinds of concrete, high performance, self compacting, high early strength, etc.

In the recent past, however, the chemistry of admixtures has become more sophisticated and the need for the concrete producer to become more knowledgeable has become more necessary. Following are some of issues related to the use of any admixture that the producer must be aware of.

ADMIXTURES WILL AFFECT: Air | Slump | Slump loss | Setting time | Strength, early and later

DOSAGE RATES

Never assume that the effects of an admixture are linear to the dosage. If you get 6% air with 4ozs. of air entraining agent that doesn't mean you will get 3% with 2ozs.. If 3ozs of a retarder retards the set 2 hours don't assume 6ozs will retard the set for 4 hours.

COMPATABILITY WITH OTHER ADMIXTURES

It is not uncommon to use two or more admixtures in a concrete mixture. (This is sometimes called stacking) Once again do not assume the same effect that you would get if only one admixture was in the mix. For example, a water reducer can have a dramatic effect on the effectiveness of an air entraining agent and don't assume that all water reducers affect the air the same way.

CEMENT AND OTHER CEMENTITIOUS MATERIALS

The physical and chemical characteristics of all cementitious materials can affect the performance of an admixture. Any time you change the source of cement, fly ash, or slag, you must check the air and run all other appropriate tests, strength, setting time, and/or slump.

CONCRETE TEMPERATURE

Typically, the effectiveness of any admixture increase as the concrete temperature decreases. This could be a consideration in cold weather when your heating capabilities cannot keep up with your rate of production.

WHEN AND WHERE THE ADMIXTURE IS ADDED

Admixtures can be added to the batch water, dispensed on the sand, or added after all the materials have been batched. Your admixture representative can advise you so that the greatest benefits can be attained. If the admixture is added on the job a typical dosage at the plant may not yield the same results, since the cement has begun to hydrate.

You need to know all of the above and you need to test your concrete. Talk to your admixture representative and don't "stack" admixtures without his advice. The variables are many so don't assume anything. The problems you incur can be serious and costly.



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