



Texas Aggregates and Concrete Association

Position Statement #1

Proprietary Mix Designs

Performance, not Prescription to Insure Results

There has been a quiet, yet strong and steady movement has begun regarding mix design submissions. Many ready-mix concrete producers are no longer providing material proportions with submittal packages. All the material safety data sheets (MSDS), mill and product certifications, as well as historical and laboratory performance data are included, but no material proportions. While this may seem radically different to many within the specifying community, it is an idea whose time has come for several reasons.

First, material proportions give no indication of actual concrete performance. Historically, the weight of water and the weight of cement (water/cement ratio) was considered to be the most consistent method of predicting concrete performance. However, with the inclusion of numerous chemical admixtures, changes in cement, and the use of supplementary cementitious materials, in most cases the w/cm ratio is arbitrary at best as an indicator of actual performance. The relationship between total cementitious content and strength gain or ultimate strength is also subject to the same influences from advances in concrete technology. The only sure source of information on performance, is from the actual performance records and historical data.

Second, mix designs are intellectual property and should be protected. A ready-mix company makes business decisions as to how much money and resources should be devoted to the design and maintenance to its design and creation of concrete mix designs. Allowing the results of those investments to become publicly available by sharing proportions with all parties in the construction process, especially during the bidding phase. In fact, ASTM C94, Standard Specification for Ready-Mixed Concrete even allows for a performance based concrete design as supplied by the Producer, without the need to supply mix design proportions under Section 4.4, "...When the purchaser requires the manufacturer to assume responsibility for the selection of the proportions for the concrete mixture..."

Finally, if performance is the ultimate concern of any design, then it should be specified through performance criteria, not through prescriptive material minimums. There is no shortage of performance-based measurements that can be performed on concrete: compressive strength (ASTM C39), freeze-thaw durability (ASTM C666), permeability (ASTM C1202), shrinkage (ASTM C1202), and impact resistance to name a few. These are all well proven methods to indicate how a concrete design will actually perform, i.e. explicit requirements for design. Prescriptive design requirements are in truth only implicit design requirements.

The movement towards performance based specifications and proprietary mix designs is also strongly supported by the National Ready Mixed Concrete Association (NRMCA) in their P2P (Prescription to Performance) initiative. Producers see this is a manner in which to use the best available technologies in an effort to produce a product that meets explicit performance requirements. From a design perspective, there are advantages from the liability reduction standpoint, i.e. as long as there is a prescriptive portion of the specification, liability can be shared. If the specification is performance based, liability rests with the producer contracted to provide the performance as indicated in the contract documents.

This performance-based approach will not be applicable in all situations. However, a practical and judicious approach to proprietary mix design and performance specifications will result in a better and more efficient mix design that makes use of the best available technology and resources.

Change is never easy for the construction industry. The Texas Aggregate and Concrete Association feels that proprietary mix designs and performance specifications are a natural evolution of an industry that is being challenged every day with new methods, materials, and ideas.

This position statement from the Texas Aggregates and Concrete Association is presented for reader interest by the editors. The opinions expressed are not necessarily those of the "magazine". Reader comment is invited.

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