

Risk and Responsibility in Performance Specifications

ACI's Committee on Responsibility in Concrete Construction (1) reports that *"Construction has now reached a level of complexity that makes design input from constructors and subcontractors desirable and sometimes essential. This input, whether submitted as value engineering proposals, responses to performance requirements or design alternatives, has a legitimate place in concrete construction."* But, in the case of a conversion to performance specifications, taking this *"legitimate place"* will entail some redistribution of risk and responsibility. RCC goes on to cite the *"over-riding principle...that responsibility and authority must be congruent."* This suggests that if the concrete producer and contrac-

tor are to be held ultimately responsible for concrete performance, then it is reasonable to give them freedom of action to provide a product that meets the demanding performance requirements developed by the design professional. In one sense this means that the producer-contractor will take on additional responsibility in return for the added freedom to select and proportion materials, and to plan means and methods of construction. Viewed another way, on many current projects the concrete producer and contractor are already heavily responsible for concrete behavior, even when following prescriptive specifications. For many producer and contractors, the principle of *"congruency of authority and responsibility"*

under a performance specification might simply mean getting the freedom that comes with the *current* level of responsibility. However, under a prescriptive specification based on sampling at the truck chute, responsibility for end-result concrete problems frequently tends to gravitate toward the concrete producer. Under a clear performance specification with at least some in-place testing of hardened concrete, the contractor's joint responsibility for in-place concrete performance may become more visible.

Under a performance specification design professionals will have a clearer responsibility to articulate exposure conditions and performance characteristics. However, committing



to a discrete list of explicitly required concrete performance criteria introduces the risk that an unspecified, long-term performance problem may develop. For example, if the stated performance criteria included strength, shrinkage, permeability and frost resistance, but did not specifically require immunity to ASR, who is responsible if ASR develops sometime later? This is not to suggest, however, that the responsibility for a problem like ASR is necessarily clear under a conventional prescriptive specification that does not include explicitly stated requirements for special ASR-related testing.

Another interesting issue is raised in the RCC document by first stating that “it can be appropriate [for the design professional] to delegate certain aspects of engineering design to specialty engineers working for the contractor or subcontractors. When any of this design work involves engineering (as opposed to simply detailing), it should be done under the control of an engineer who is licensed in the state of the project and who takes responsibility for such work.” Many concrete materials engineers would agree that concrete mixture design and proportioning is in fact “engineering.” RCC’s

report also raises the issue of the design professional’s responsibility to review mix submittals: “The Design Professional should review the mixture proportions and submittals concerning materials, procedures and testing data, but the Contractor remains responsible for compliance with the requirements of the Contract Documents. If approval is required, the Contract Documents should state so specifically.”

At the top of the performance specification pyramid, the owner gains the opportunity for clarity of expected performance, but along with the design professional the owner has to accept the risk associated with a finite list of those quantifiable objectives. Under current specifications there is a tendency to seek relief from the contractor for a wide range of longer-term performance problems, some of which may come from unstated exposures or unspecified service conditions. Pinning these down puts most of the cards on the table. In a related issue, the performance criteria selected have to be indicative of the concrete’s ability to meet the owner’s functional needs. When the UK Highways Agency studied the risks of adopting performance specifications, one of its concerns as owners of the highway network and as buyers of construction services was “inappropriate application of performance measures resulting in a situation whereby suppliers can meet targets without achieving the desired outcome.” A related concern was “Mismatches between contract performance requirements and client objectives.” If the performance criteria are over-specified relative to the owner’s needs, the product is unduly expensive and if the criteria are underspecified the result can be “poor operational performance, excessive maintenance and premature replacement.”

(1) ACI Committee On Responsibility In Concrete Construction (RCC), “Guidelines for Authorities and Responsibilities in Concrete Design and Construction,” Concrete International, Vol. 27, No. 4, April 2005, pp. 33-39.

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