Reginald D. Hough speaks up about construction-oriented concrete design

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"I have always felt that there was a great need in the concrete design and construction industry to guide architects, engineers, and contractors in specific areas of concrete construction practice, especially architectural concrete. This need is caused by the traditional conflict between the designer and the contractor.

"The contractor must construct a building from documents which the construction industry had, no direct part in developing. In most building building projects the construction input is introduced during the drawing preparation phase by the architect and engineer who have never actually been a part of the "business of contracting."

"For the construction of a concrete building, especially a building with a large amount of architectural concrete, the development of the construction sequence with respect to typical detailing is crucial to the scheduling, quality, and cost of the building. "The architect's details for concrete work must show exactly how it is to look when completed, but the details cannot be too specific in showing a method for achieving that result. In concrete construction this is a definite dilemma, as the quality of concrete is directly related to methods of construction, planning, and basic field techniques.

"The contractor, on the other hand, faces a different kind of problem. He doesn't have a tremendous amount of time in the bidding process. He doesn't have the time or budget to sit down and

down and do a construction study. He has days, sometimes only hours, to make his best judgment as to how long construction tasks are going to take and in what sequence.

"The good contractor also faces another dilemma. On certain jobs, especially architectural concrete, he knows that some of his competitors with limited experience will bid low out of ignorance or gamble to get the job. The good contractor knows what he has to do in order to do a good job. He faces the choice of either bidding the job at a competitive price and trying to do a good job within that price, risking ruining his good reputation, or else walking away from the job."

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The solution

"The pace of every project is determined by the efficiency with which the structural frame can be constructed. If the schedule of the structural frame is on track, everything else basically comes together on schedule. When the structural frame is also the visual architectural statement of the building, that makes it even more important.

"In support of this objective, what I like to do is address critical construction-oriented problems, using three-dimensional graphics, to generate construction-oriented dialogue and decision-making by the architect and engineer before the plans go out for bid, and to encourage the contractor to make critical bid decisions from **a** technical base instead of just **a** unit cost base.

"Concrete is more suited to this kind of construction-oriented analysis than steel framing or any other kind of construction simply because a cast-in-place concrete structural frame is manufactured from its basic materials right in the field. Therefore, there is a much broader scope of construction tasks which can be organized and made more efficient in the field. I try to give construction in- formation you would get from a working contractor, but with the sensitivity of knowing the problems of the architect and engineer.

"I try to define the critical areas of the work where the contractor may figure in big money in the bid because he has no time to develop a construction approach he is confident in. This gives the good contractor the confidence of knowing that the less experienced contractor is benefited by the same information. I feel this method reduces the "scare factor" in the more complicated, or complicated looking, portions of the work."

Three-dimensional drawings

"I found early on in my career that contractors reacted very favorably to three-dimensional drawings. On a traditional set of plans, the worker never sees how the whole building goes together. I think the workmen do **a** better job if they can see the picture in three dimensions. Not only the workmen, I think it helps everyone involved in the project if they can see and talk about it in three dimensions. You don't have to keep fumbling back and forth between the plan, elevation, and details of a particular portion of work. You can see the pieces as they will be constructed to make the whole.

"These drawings when issued to a contractor are almost always separate from the contract plans and specifications as "information-only" drawings. The drawings are not intended to tell the contractor how to

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construct the formwork or the sequence and method of placing the concrete, but to demonstrate that the architect and engineer consider these aspects of construction a vital part of achieving quality, and also to establish a method which will expand the contractor's own thinking and may be used as a basis for bidding.

"" do get a lot of contractors who are really afronted by these drawings, but only once. After I've worked with them through the initial stages, they appreciate the in- formation."

Conclusion

"I think the idea of the "renaissance" engineer/builder. One man who knows all aspects of producing a building from design through construction, just can't happen anymore. As our society continues to become more technically oriented, designers and contractors will become even more specialized than they already are.

"The key to the whole building process is communication and working together for a quality concrete product"

Reginald D. Hough, AIA
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