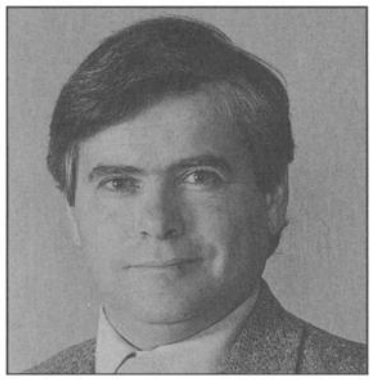
EDITORIAL
Computer Literature Searches and Lost Knowledge



R. Doug Hooton

At the recent American Concrete Institute meetings in Denver, at the dinner to honor Bryant Mather, George Hoff mentioned the fact that in my last editorial, I had referred to Bryant as the human CD-ROM of concrete literature searches. While my first thought was amazement that someone had actually read my editorial, later it reminded me of the broader issue of concrete knowledge in the literature versus what is found in computer literature searches. We work in an industry where the most important research and knowledge base precedes by several decades the current mid-1970's-to-present computer literature search capabilities. That is not to say the concrete industry has been stagnant, far from it. One might point to the use of superplasticizers and silica fume, and the advances in high-strength (HSC) and high-performance (HPC) concretes as examples of concrete's great leaps forward (my apologies to the former Chairman Mao). While the two aforementioned materials have helped make it easier to produce HSC and HPC, the basic knowledge to make either HSC and HPC had been there since the work of Duff Abrams (Lewis Institute Bulletin 1, 1918) and the monumental publications of Powers and Brownyard (PCA Bulletin 22, 1948) and later by Feldman and Sereda (Materials and Structures, No. 5, Nov./Dec. 1968). The main issue raised in these references is to reduce porosity to make high strength and make the capillary pores discontinuous, both through initial control of unit water content, *W-C* (or *W-CM*) and by maximizing the achievable degree of hydration (that is, by curing). The other great achievements include the work of Lerch and also Thorvaldson on the role of C_3A for sulfate resistance and the work of Powers, Helmuth, Klieger, and Philleo on the role of entrained air on freezing and thawing resistance; Stanton on alkali-silica reaction; and Glanville and Powers on permeability.

I'm sure there are many more and I could be accused of being too parochial with my paucity of overseas citations. But the point is that the major references pre-date those available in current computer searches. Of course the recent papers should cite the original references, but I have read numerous papers and even Ph.D. theses where, for example, the authors have attributed the findings of Powers to a recent reference by a relative unknown author (I will call him Fred) who did cite Powers but the new author cited Fred's paper since it was found in a computer search. Also, there is a tendency to cite textbooks rather than the original references used to generate the knowledge imparted by the textbook. This is partly due to the fact that some of the popular textbooks on concrete technology are poorly referenced themselves. As an educator, I like to provide a well-referenced text for project work, since I want the students to be able to chase down the original references. (By the way, Adam Neville's fourth and final edition of *Properties of Concrete* came out in late 1995.)

Even my university library, although one of the largest in North America, and having on-line and CD-ROM searches available, doesn't help this cause since all pre-1975 journals have been removed to inaccessible dungeons guarded by fearsome beasts.

I think one of the reasons I see so many papers re-inventing the wheel is the lack of effort to search out the old references and all too often, the apparent lack of knowledge that these old references even exist. This struck me a few years ago when an eminent cement researcher stood up at a meeting and announced that he had just found an amazing data base for the research he was doing; he had discovered Bulletin 22.

Several years ago I had a student ask me where the tolerances for planeness of ends and allowable non-parallelness of ends of concrete cylinders in ASTM C 39 came from. I thought it was an easy question but could not find the answer, so again I called the friendly neighborhood human CD-ROM and I was directed to a 1925 Lewis Institute paper (Bulletin 14) by H. F. Gonnerman, and sure enough, the data for tolerances that are still in C 39 were generated there.

When I first took a serious interest in concrete materials 22 years ago, my supervisor (R. H. Mills) armed me with Neville's text, F. M. Lea's book on Chemistry of Cements and PCA Bulletin 22. Of course, there were no computer searches then, but I gained an appreciation of the work of the original contributors. Don't get me wrong, I am not a total dinosaur, I use computer searches and use the ACI Quick Search on CD-ROM. But I don't assume that everything I read is new or original.

While I have built up a large personal library of key articles and books (filed geologically around my office), I can't help but think that our knowledge base will be diminished as the human CD-ROMs retire and leave us to the mercy of second-hand references and computer CD-ROMs.

On an unrelated issue, there is no truth to the rumor that the recent obsession with delayed ettringite formation by some litigious parties, is the cement and concrete industry's version of Cold Fusion. It is imperative that we get all the evidence on the table as soon as possible, but this issue seems to continue to advance by litigation, which is unfortunate as it does not allow the scientific community to get all the facts and to put it in perspective. Until that happens, we will continue to be subject to rumor and partial information. This does the entire industry a disservice.

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