

A Nudge to Change

The helm of ACI has been passed to its 64th president — a yearly ritual that has served the Institute well. Past President Walter E. Kunze presided over a financially strong and still growing goal-oriented society which the next president must guide and preserve. But is that so easily done? As vice president, I watched, firsthand, two past presidents apply their talents and I conclude the following:

ACI, or any other large group, is like a large ocean-going ship. The captain's nudge to his rudder to steer his ship on a new course is not observed until several miles later. The impact of what is done by an ACI president during his term in office is usually not observed until long after his departure. I suppose this could mean that if I do nothing, or make some mistakes this year, at least no one will know it for several years. Well, I do not intend to do nothing but I won't guarantee I won't make any mistakes. My grandfather, and maybe yours, too, told me that if I never made a mistake it meant I was not doing anything.

I will try to nudge the "rudder" of this ship — ACI — so that it will stay vibrant and serving to its membership and the world they serve. My first nudge will be quite simple — get ready to add a new way for ACI to disseminate information that is radically different than that used the last 82 years!

One thing that every ACI president brings to his term in office is the basic understanding of ACI's role in producing and disseminating high quality printed information. Whether it be a new standard practice that passes expert knowledge onto the user, a unique article on a new construction method or accomplishment, or a manual that guides a craftsman to produce a better quality product, ACI's goal is specialized information dissemination to a worldwide concrete industry audience. This is no small task.

ACI has been doing this since 1905. The printing press, of all vintages over the last 82 years, has been its right arm. But what if a new method replaces the more conventional press? When ACI depends very heavily on the sale of its printed publications, will a new medium be a threat or a benefit? Will ACI be ready?

I believe it has to be ready because, according to ACI engineering director Samuel J. Henry, a new method of communicating information as profound as the printing press is rapidly becoming available. It is here today

in an initial form — a device called the Compact Disc Read-Only Memory (CDROM). This is the new medium; unfortunately the acronym is not easy to pronounce. This is a single international standard metal disc (12 cm/4.72 in. in diameter) that is usable in any personal computer with simple equipment modification. Not every recipient of ACI information has a personal computer now but what about in five years?

Imagine the 1986 *Manual of Concrete Practice*, along with all other publications ever produced by ACI as well as annual updates, being available to the user, not in print, but on a single CDROM! Or the unabridged dictionary with voice pronunciation and pictures and in several languages? Or your book-of-the-month received on a CDROM but not just the new book but all of the books written by that author, all of the books written about the author, his family, his friends? The telephone directory? A snap: all of Tokyo with 17 million residents and all of Great Britain are on one CDROM each.

But this is not all. The CDROM also provides the user help in finding information. Assisting programs will search out keywords, dates, or numbers. They will create lists, sort data, make indexes, create references, and answer questions. Before long, pictures, drawings, and figures will be able to be included. You will be hearing about another new technology called artificial intelligence that will also affect the way ACI disseminates information — more about this in a later memo.

Those of you who were able to attend the splendid spring convention in San Antonio, Tex., benefited from the interaction with others in this concrete-related industry. Those who were unable to attend will also benefit due to ACI production of usable, printed information on concrete that eventually will play a role in work they perform whether they be educators, craftsmen, designers, architects, artists, etc.

With the development of CDROM and other technologies, will you benefit from future conventions unless ACI is nudged to begin preparing now?



T.E. Northrup

Quality control

Your article in the December 1986 edition entitled, "You can make money with quality control" will leave many readers convinced that no matter how hard you try there will always be defective work in concrete. Some could have even interpreted the graph to mean that 10 percent "defective work" is cost effective!

This is a superficial and false message and the Philip Crosby reference "Quality is Free" should have been read more thoroughly. He goes on to explain that quality means "conformance to requirements" if it is to be managed. If managers set requirements that cannot be met then it's not surprising if concrete contractors have little respect for them. I suspect your author was looking for "perfection" in concluding that infinite cost equates to zero percent defective work.

Your readers can make money with quality management by establishing achievable requirements and then meeting them all of the time. When accomplished at meeting requirements first time every time, the contractor (and designer) can compete on quality by marketing his new found capability to meet tougher requirements that are more demanding of his process. As the process is improved by solving the vital few problems, costs are reduced and competition is enhanced amongst similarly well managed concrete contractors. Other contractors will go bust in a businesslike environment where there is the utmost respect for the requirements of the customer.

In conclusion, we all know that the requirements can be met (with zero defects) at a price all are prepared to pay. When is the last time you drank a can of beer that failed to meet your requirements (except perhaps for another can!)?

John R. Broomfield
Harry Stanger, Ltd.
Elstree Herts, England

Response to reader

Mr. Broomfield's comments are most welcome! They expand on the basic premise of the ASCC Management Report that quality control saves money for those contractors who recognize its value by establishing an in-house quality control organization to supplement the controls of the specifier.

Mr. Broomfield takes our premise one additional step by stating, "Other contractors will go bust in the businesslike environment where there is the utmost respect for the requirements of the customer." We could not agree more! And, as does Mr. Broomfield, we also agree that quality control means "conformance to requirements" and not absolute perfection. The costs of absolute perfection (our definition for zero defects) is enormously expensive, generally not needed, and only rarely specified by experienced designers.

W. Burr Bennett, Jr.
Executive director
American Society for Concrete
Construction
Northbrook, Ill.

Two ACI Journals

I just received my *Materials Journal* (January/February, 1987) and was pleasantly surprised. Since joining the Institute in 1979, and as a structural engineer, I have primarily read design and concrete repair-oriented *Journal* papers as they pertained most closely with my area of specialization. I read about the decision to publish two *Journals* to allow the Institute to publish more papers and to target the subject matter to those interested in either the structural or materials field.

I must admit that, as I usually pay my Institute dues early, I looked upon the opportunity to get both *Journals* as "getting something for nothing." Was I surprised! I am now reading several articles in-depth. In prior years, I targeted the primary-interest papers (design and repair) and largely ignored the other papers in between. I can now concentrate on the materials-oriented papers without being drawn to the other areas. This is another benefit of splitting the *Journals*; I plan to subscribe to both *Journals* in the future.

Stephen H. Golden
Senior structural engineer
Pennoni Associates, Inc.
Philadelphia, Pa.

Column pressure

I am concerned about the possible effect of a factor in the research reported in the article, "Transfer of Column Pressure to Concrete Footings," by P. Soroushian, P. Ahmadi, F. Navas, and M. N. Haji, in *Concrete International*:

Design & Construction, V. 8, No. 12, December 1986, pp. 38-42.

In Fig. 3, p. 39, the photograph appears to show that there was incomplete support for the base of the test footing block. (Only the center band of the footing block is supported; 12 mm plywood cannot be perceived as "support.") This would certainly affect the development and patterns of stress within the specimen, and does not reflect the typical support for a footing in real conditions in soil. Some comment by the authors regarding this factor is in my view appropriate. The center support (a strip of steel plate?) would provide rectangular (partial) support to a square-in-plan footing, and this could be expected to influence the magnitude and distribution of stresses and hence the cracking pattern(s) and load magnitude at failure. If the authors have in fact examined the influence of this factor and found it not significant, this should be published. If they have not, they should be careful about the reliability which may be assigned to the conclusions which have been drawn from the work.

Adequate treatment of experimental details is critical to the validity of subsequently acquired data, and this point cannot be sufficiently stressed.

Robin W. A. Osborne
University of the West Indies
Trinidad

Author's reply

I appreciate Mr. Osborne's valuable comments on the potentially significant effect of the actual support conditions under the base of footing on its failure mode.

It has been emphasized in the paper that this topic requires further study. The test support conditions were designed to approximately reproduce the bearing pressure under an axially loaded rigid surface footing on a cohesionless soil. (Leet, K., "Reinforced Concrete Design," McGraw-Hill Book Co., 1982) In this condition, the bearing pressure near the edge of the footing might be reduced due to the escape of soil from under the base. The applicability of results to other support conditions should be investigated.

Parviz Soroushian
Michigan State University
East Lansing, Mich.

President's Memo

Keep It Rolling

In my opening memo (*Concrete International: Design & Construction*, May 1987), it was noted that the impact of an American Concrete Institute president is usually not evident until after he leaves office. The creation and activities of the Concrete Materials Research Council (CMRC) provide a prime example of this fact.

In his memo of October 1983, ACI President Norman L. Scott suggested that the Institute sponsor a Concrete Materials Research Council. In July of 1984, the ACI Executive Committee approved this recommendation as well as \$5,000 in seed money; final action was taken by the Board of Direction at the 1984 fall convention.

The Council's mission is to "advance the knowledge of concrete materials by soliciting and selecting research proposals, financing them, guiding the research, then publishing results, all in coordination with ACI technical committees." Charles F. Scholer (Purdue University) was selected as the council's first chairman with the task of increasing CMRC's funds and laying the groundwork for evaluation and selection of proposals that contribute to the Institute's distribution of information in the field of concrete.

In his memo of September 1986, President Walter E. Kunze called for industry support for such research. As of March 1987, the Council's general fund had grown to approximately \$37,000. During Charles' tenure, he successfully set the CMRC activities in motion — no small task — and the Board acknowledged this accomplishment at the recent San Antonio, Tex., convention

with a "job well done," the maximum salary bestowed on any ACI volunteer worker.

Now the Council leadership has been passed to Robert E. Philleo, a past president of the Institute, to keep the expansion of CMRC going. In support of his efforts, ACI's membership at large can contribute to this budding activity directly. Each annual dues form has a place for making a personal contribution. Or, contributions of any size can be made in the name of a company as several have already done.

Research proposals which are selected as being worthy of ACI support are financed through Council funds which may be supplemented by other sponsors. The Council will monitor the work as it is in progress and advise or render other assistance as appropriate. Proposed publications resulting from the research are reviewed critically by the Council and, if approved by its members, can carry CMRC's name in subsequent publications.

If you or your company have an area of concrete materials research that is of special interest, contact ACI headquarters for submission details. There appears to be much that can be done and Norm Scott's original proposal in 1983 is now starting to bear fruit.



T. E. Northrup



New ACI Certification Activities

In a continuing effort to achieve our purpose of "good concrete worldwide," the American Concrete Institute recently implemented two new certification programs: Concrete Construction Inspector Level II and Concrete Flatwork Finisher. Both programs were developed by the Educational Activities Committee and Committee E 902, Certification, to upgrade the quality of concrete construction, alleviate problems related to improper workmanship, and prepare the industry for possible future mandatory certification. While both programs address the same problems, each approaches the situation from a different perspective.

The new inspector program is seen as an "umbrella" program to cover inspection criteria for all basic areas of concrete construction, including:

- *Pre-placement activities such as formwork installation, reinforcement, embedments, and sampling and testing freshly mixed concrete.

- *Placement activities such as conveying, consolidation, and finishing.

- *Post-placement activities such as jointing, curing, protection, and formwork removal.

For an individual to qualify for Institute inspector certification, the requirements include a combination of education, work experience, and successful completion of a written examination.

At the other end of the spectrum, the new craftsman certification program, Concrete Flatwork Finisher, is designed to upgrade the craftsman's basic knowledge of concrete and its components as well as update his working knowledge of the tools and finishing procedures. Individual certification requires a combination of previous work experience, successful completion of a written examination, plus satisfactory demonstration of appropriate finishing skills.

These two new programs join the successful Grade I, Field Technician program, in operation since February 1983. This first ACI certification program has grown to the point where there are over 70 local groups currently sponsoring training and examination sessions in the

United States and Canada; approximately 9000 technicians are currently certified by ACI. Several federal, state, and local agencies now specify that certified technicians are required on their concrete construction projects, and there are certification requirements appearing in several new building codes and standards.

As to the future, certification has unlimited possibilities, but the Institute has and will continue to approach each phase on an "as needed" basis so that it will not be a financial burden to the Institute. Two additional programs - Concrete Laboratory Testing Technician, Grades I and II - are scheduled for implementation early next year. Some of the other programs that may possibly be considered for implementation in the near future are shotcrete nozzleman, concrete construction inspectors levels I and III, formwork designer/detailer, concrete field testing technician grade II, and concrete construction foreman.

Obviously, this ACI activity is not without its challenges. The Board of Direction, the Educational Activities Committee, and Educational Committee E902 have wisely chosen not to plunge blindly into the thicket. Each step has been cautiously taken, the need looked at from every vantage point, and the financial impact upon the Institute thoroughly reviewed. It has been a slow but steady undertaking; success has been proven and the future is promising.

All this, of course, is a part of ACI efforts to bring about "good concrete — worldwide" and our awareness that changing world conditions call for construction quality improvements.

Those directly involved on the job must have the training and skills necessary to produce a quality product. If you would like further information on any of these certification programs, contact Michael A. Clark, ACI's manager of certification.



T. E. Northrup

Specifiers: Get the SPECS ON CONCRETE,

Simplify Your Work With These Vital Publications

Whether you are a structural engineer, specification writer, architect, or a contractor — the information in these American Concrete Institute specifications will help you build better structures. Work smarter — not harder. If saving time and money are important to you: "Before You Build, Get the Specs"!

301-84 (85) Specifications for Structural Concrete for Buildings, Revised 1985. ACI members \$17.25 (\$23.25 nonmembers). The 301 specification in loose-leaf form for specifiers who prefer to bind 301-84 into their project specs. 50 copies per set - ACI members \$77.50 (\$99.75 nonmembers).

SP-15 (84) Field Reference Manual
This book contains 301-84 and some related ASTM and ACI material. The 301-84 spec requires that the contractor keep this book in his field office. ACI members \$29.25 (\$38.50 nonmembers).

336-1-79 (85) Standard Specification for End Bearing Drilled Piers, Revised 1985. ACI members \$3.25 (\$4.75 nonmembers).
346-81 Specifications for Cast-in-Place Nonreinforced Concrete Pipe. ACI members \$8.95 (\$12.50 nonmembers).

503-1-79 (86) Standard Specification for Bonding Hardened Concrete, Steel, Wood, Brick and Other Materials to Hardened Concrete with a Multi-Component Epoxy Adhesive. (Revised 1986) [Included with 503-1-79 (86)].
503-2-79 (86) Standard Specification for Bonding Plastic Concrete to Hardened Concrete with a Multi-Component Epoxy Adhesive. (Revised 1986) [Included with 503-1-79 (86)].

503-3-79 (86) Standard Specification for Producing a Skid Resistant Surface on Concrete by the Use of a Multi-Component Epoxy System. (Reapproved 1986) [Included with 503-1-79 (86)].
503-4-79 (86) Standard Specification for Repairing Concrete with Epoxy Mortars. (Revised 1986) [Included with 503-1-79 (86)].

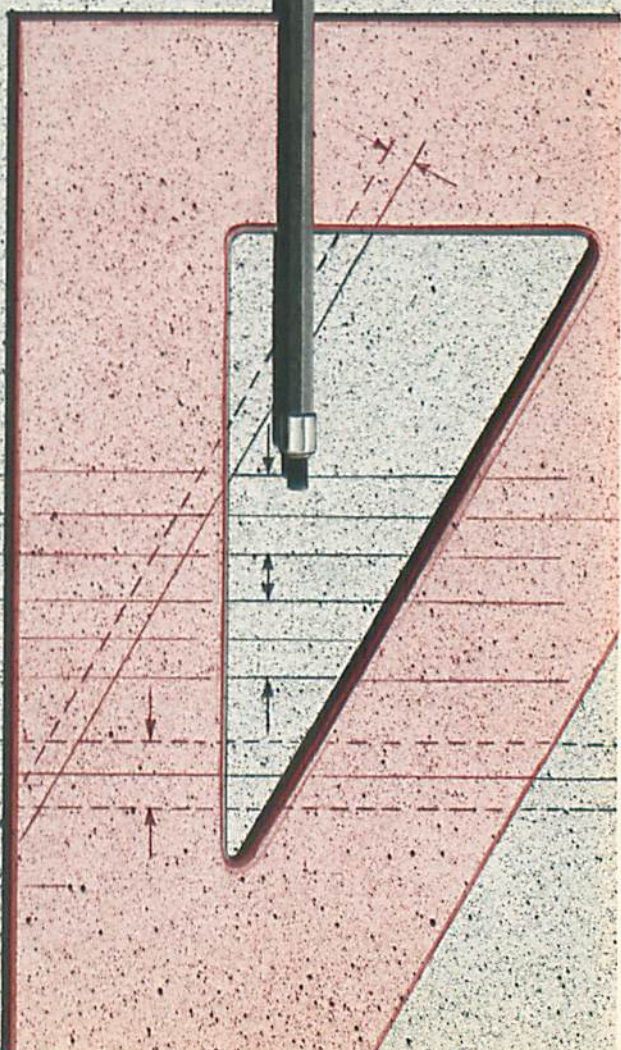
506-2-77 (83) Specification for Materials, Proportioning and Application of Shotcrete. (Revised 1983) ACI members \$3.25 (\$4.50 nonmembers).
531-1-76 (83) Specification for Concrete Masonry Construction. (Revised 1983) ACI members \$5.95 (\$7.95 nonmembers).

To order these, or any of our other publications, call or write:



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President's Memo

Rehabilitation?

Why Not Better in the First Place?

Life extension of concrete structures is a concept that is easy to grasp but one that should be viewed from two approaches: rehabilitating the structure so it lasts longer, or making it better in the first place. Both of these will extend a structure's life, but the latter more cost-effective approach has taken a back seat to the more glamorous rehabilitation fervor.

Life extension is currently a hot topic in the concrete industry where structures from the 1930s and 1940s are reaching the end of their design lives. A great deal of effort is going into assessing the various rehabilitation techniques available for extending the useful life of existing concrete structures. Meanwhile, new buildings are still being built with the mistaken belief that something made from concrete will last forever. With such a perception it is no wonder that very little attention is given in most construction specifications to providing the durability demanded for a long life.

The result of this attitude is that some concrete structures are deteriorating many years before they should. It would cost several hundred billion dollars to repair or replace the deteriorated structures in the U.S., according to the National Research Council. Since construction work in the U. S. exceeds \$300 billion each year, the cost of repairs probably exceeds at least one year's cost for new construction. This is a tragic waste of resources.

The National Research Council also reports that the nation's highway system, worth over \$1 trillion, is eroding away. Part of this problem is that an epidemic of bridge deck deterioration plagues the nation. Some 250,000 bridges are exhibiting damages related to deficiencies in concrete durability and 3500 more are added to this list each year. The estimated cost to repair this deterioration exceeds \$50 billion.

Last year while visiting a family graveyard dating back to the early 1800s I was struck by the maximum age reached by the oldest tenant—35 years! Since our average life expectancy is now in the seventies, life extension for people has been achieved. This life exten-

sion comes about through maintenance and rehabilitation since the improvements in the body's serviceability come from better foods, improved living conditions, and advances in medical treatment. Making the body better in the first place I must leave to a higher authority. Making structures better in the first place, though, is a goal we can do something about ourselves.

To encourage better structures, guarantees of durability should be required in construction specifications. This will precipitate a return to a detailed understanding of the basics that control concrete durability. There is no more basic a step than the proportioning of the concrete mix itself. We have the knowledge and the tools to specify concrete mixes to meet higher standards. The behavior of these mixes can be evaluated prior to construction and the impact that the environment will have on the finished structure can be evaluated long before any deterioration has occurred.

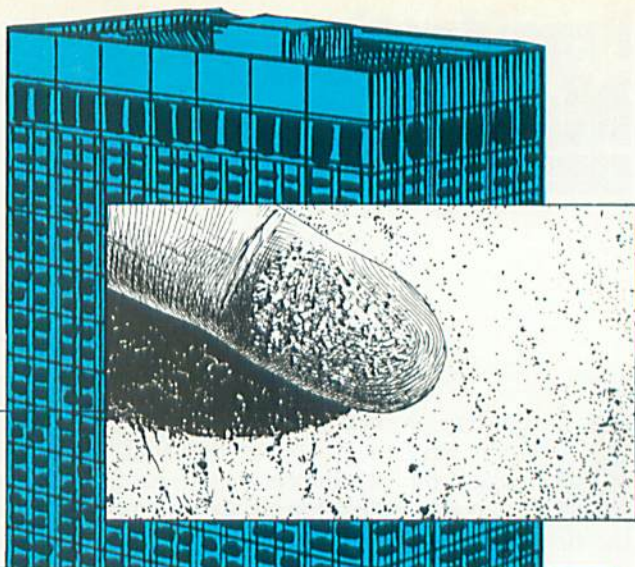
ACI is very active in this effort and will soon be providing data bases and computer software that will allow a better understanding of concrete mixes and the factors that affect durability. The National Bureau of Standards is also working to develop computer models that will improve the ability of designers and contractors to provide the right mix for a given application. Durability should be one of the most important parameters in these models.

With access to this wealth of data and these new computer assisted methods, maybe contractors would be receptive to the idea of posting durability performance bonds for a specified portion of the structure's lifetime. This would reflect their confidence that the need for rehabilitation can be pushed far into the future. This is the type of life extension that is truly appealing to everyone—making it better in the first place.



T. E. Northrup

GET THE ANSWERS FIRST HAND AT THESE SEMINARS

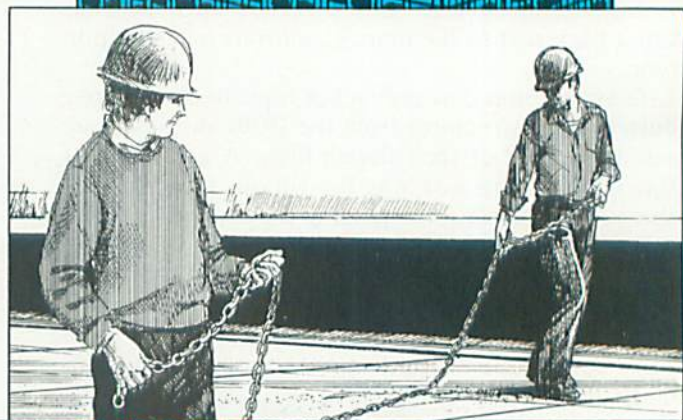


TROUBLESHOOTING CONCRETE PROBLEMS... AND HOW TO PREVENT THEM IN THE FUTURE

Designers, contractors, owners and ready mixed concrete suppliers will benefit from the experience of nationally prominent presenters as they address troubleshooting fresh and hardened concrete problems — with a look at how to prevent problems from occurring.

Determining the cause and extent of low compressive strength, cracking, honeycombing, scaling, deterioration, rebar corrosion, thin sections in slabs and misplaced rebars can be costly and time-consuming.

Topics to be covered include Troubleshooting Fresh Concrete, Low Strengths, Slabs on Grade, Formed Concrete, Precast and Prestressed Concrete, and Techniques Used in Troubleshooting Concrete.



HIGH STRENGTH CONCRETE

Gather with engineers, architects, contractors, material suppliers and testing personnel to find out why high strength concrete, over 6,000 psi and frequently in excess of 10,000 psi, is in wide use today in many geographical areas.

Intended to provide you up-to-the-minute information related to high strength concrete — now in wide use. Learn about changes that have occurred during the past several years, changes in materials selection, mix designs, code requirements and quality control procedures.

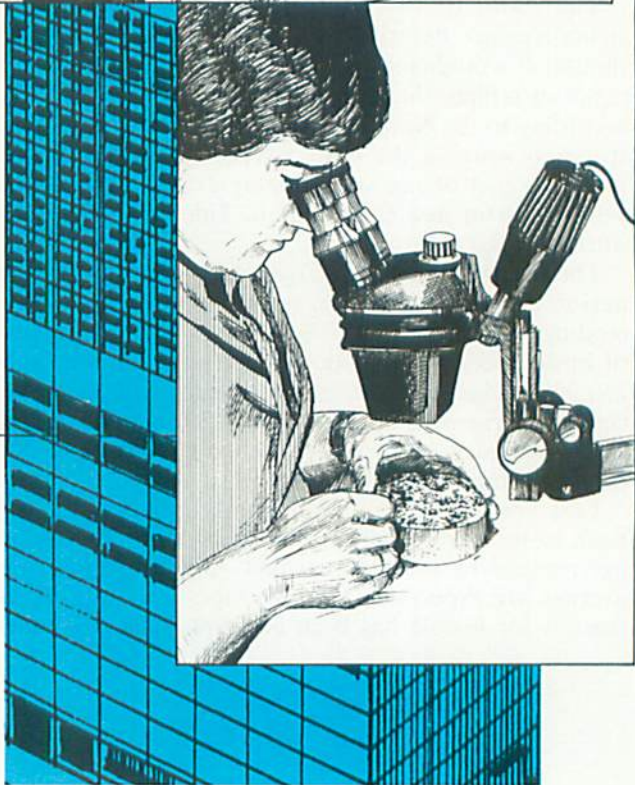
Led by recognized authorities, seminar presenters will guide you through actual case histories and provide examples of how to put high strength concrete to work for you. In addition, presenters will demonstrate the advantages and disadvantages of using high strength concrete, and supply you the latest information on design, materials, quality control, testing and construction.

REPAIR AND REHABILITATION OF CONCRETE STRUCTURES

This seminar is a must for designers, engineers, maintenance engineers, contractors and architects! By attending this seminar, you can acquire the technology and expertise to accomplish the necessary reconditioning of older buildings and for repair of newer buildings experiencing distress.

Seminar leaders will share with you experience and research related to identifying problems, the latest information on repair materials, selection of proper repair methods as well as systems to protect concrete from the elements. Case histories of actual repairs will be presented, including parking structures and bridges, building facades, fire damage and underground structures.

To be conducted in cities across the United States...Contact the ACI Continuing Education Department for details.



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President's Memo

Can You Really Not Afford to Attend?

As one who has attended American Concrete Institute conventions for many years, I have often wondered why some members don't participate in these twice-a-year meetings and benefit accordingly. I suppose the reasoning probably goes something like this:

"I pay my dues yearly, get the magazines, and buy a few publications now and then. Business is off and it's hard to justify the plane fare, the hotel rates, and all the other expenses. Besides, I can't afford to be away from the office for a whole week. And a convention is just a convention...probably a lot of social stuff and tours; will it really benefit me and my firm?"

These negative sentiments will be voiced by some members again as we approach the early November meeting in Seattle. Response to these arguments is difficult. Certainly, traveling can be expensive; attendance in Seattle for a member residing on the East Coast would probably require a minimum expenditure of \$1000. And sure, all of us with heavy work loads shudder at the thought of the paperwork piling up on our desks while we are away from the office.

So, how do we respond? How do we convey to fellow members that convention attendance is important to them professionally? That such meetings present an ideal learning experience — a chance to explore new ideas and bring ourselves up to date in the rapidly changing world of concrete technology? Perhaps the best response is from our convention attendees/members:

"ACI conventions are a great place to expand your knowledge about concrete technology. The world's leading experts on concrete are there!"

"...it was a great convention, one that I will always remember...It takes a multitude of small details that must work together to produce an effective meeting...the results could not have been better. My compliments to all."

"Those who attend...(ACI)...conventions are exposed to a vast source of information about what's happening in the world of concrete technology. Without a doubt, the knowledge gained at such conventions helps me and other attendees to do a better job when we get back home."

"The convention...was excellent in all respects. It was a job well done and I'm looking forward to Seattle."

"A very successful convention. Those who don't at-

tend ACI conventions don't know what they're missing!"

These are excerpts taken from some letters received at ACI headquarters following recent conventions. Only a few are cited here; there are many more indicating that those attending Institute conventions are quite satisfied with the week-long series of technical and educational sessions, seminars and forums, committee meetings, social events, and tours and other special events.

For those who have never attended an Institute convention, Seattle would be an excellent place to start. Not only is Seattle an exciting, colorful city but the area abounds with outstanding concrete structures such as the Lake Washington floating bridge and the Kingdome. The dates are November 8-13; the headquarters hotel is the Seattle Sheraton, located near the heart of the business district; and the convention theme is "Concrete In a Severe Environment." The program for Seattle is top grade; in fact it offers more sessions than any convention in Institute history. I'll mention only a few of the highlights on the agenda for Seattle — watch for the complete convention preview which will appear in the October issue of *Concrete International: Design & Construction*:

—"Contractor's Day," a day set aside for a program geared to those involved in this particular industry. Similar events at the recent meetings in Baltimore, Md., and San Antonio, Tex., were quite successful.

—A three-session symposium on the practical aspects of quality control and a dinner honoring Lewis H. Tuthill, ACI's oldest living past president.

—Technical sessions on shear and moment transfer, offshore structures, roller compacted concrete pavements, concrete foundations in a severe environment, rehabilitation engineering, epoxy techniques and applications, fatigue, cold weather concreting, and more.

And, of course, I also want to include about 200 technical and educational meetings, invaluable sources of information for those interested in specific areas of concrete materials and properties, design and construction practices, structural analysis, research, and special products and processes.

ACI has more than 110 technical and educational committees which welcome attendance by interested observers. If you're a first-time attendee, sit in on a few of these meetings and, if you desire a more active role,

(Continued on p. 6)

President's Memo

continued

inquire about committee membership. Also, take advantage of the fact that many of the world's foremost concrete technologists will be in Seattle during convention week; a few minutes of conversation in a hallway or a leisurely lunch with one or two of these experts could advance your knowledge immeasurably.

It promises to be an exciting, fun week with something for everybody — a "five-ring" educational event. I urge all to attend, especially those who have never done so previously. Make your plans now to be in Seattle and get involved in the various meetings and activities. And, bring your spouse to the Pacific Northwest; attendance by spouses has been on the increase and the Seattle program includes a luncheon cruise on Lake Washington, a dinner at Tillicum Village on an

island in Puget Sound, and other special events. Then, after the convention concludes, let us know your thoughts and share your ideas on possible improvements.

See you in Seattle in November!

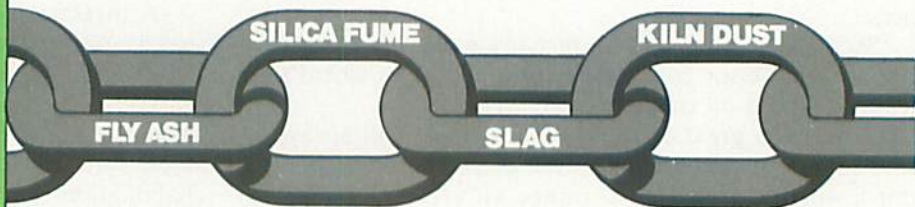
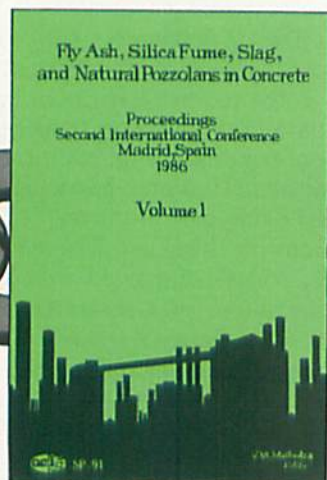
And, then in Orlando next spring. And don't forget Houston in the fall of 1988...after that...Atlanta and San Diego in 1989...

You'll soon discover, like I did, that ACI conventions can become habit-forming — pleasantly so!



T.E. Northrup

SP-91 THE EFFECTS OF MINERAL BY-PRODUCTS IN CONCRETE EXAMINING THE BEST POSSIBLE LINKS



A two-volume set containing 78 symposium papers, brings together the combined expertise of industry, government and university to present the latest advances in the use of fly ash, silica fume, slag and natural pozzolans in concrete. New technologies are explored to provide ways in which designers and builders can utilize these valuable mineral by-products. Case studies include: the effect of fly

ash on physical properties of concrete; evaluation of kiln dust in concrete; effect of condensed silica fume on the strength development of concrete, and the influence of slag cement on the water sorptivity of concrete.

SP-91, Fly Ash, Silica Fume, Slag, and Natural Pozzolans in Concrete, 1986, two volumes, soft cover, 1628 pages, ACI members \$92.95 (nonmembers \$134.75)



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President's Memo

Marketing of Computer Programs

—A New Service

Members of the American Concrete Institute can now take advantage of a new service which has been under consideration by the Board of Direction during the terms of several Institute presidents. This new service, details of which are outlined elsewhere in this issue, will make it possible for ACI members and others to obtain proprietary concrete-related computer programs directly from the Institute.

The implementation of a system to market proprietary computer programs has not been without problems or opposition. However, this new activity is in keeping with ACI's chartered goal of disseminating information about concrete and concrete technology. More and more, today's engineers are shifting from hardcover design aids to microcomputers in the preparation of project plans. Thus, the marketing of proprietary computer programs is in line with the Institute's objectives; ACI can be effective in serving as a liaison between the producer of programs and users. In this capacity, however, ACI will be serving as a clearinghouse; such computer programs will be serviced by the developers, not the Institute.

The marketing of computer programs resulted in numerous discussions concerning the Institute's potential liability and required much input from our legal counsel. The final result was that the Institute proceed within guidelines that minimize the risk from liability resulting from the use or misuse of the programs. Unfortunately, this requires the use of disclaimers by the Institute; purchasers will be required to acknowledge that the computer programs, as with any technical aid, must be used with engineering judgment. Such is the way of our current litigious society! As the programs are developed by others, the Institute can make no independent representation of the software being offered for sale.

There is a general feeling of the officers and the

Board of Direction that possible risks of this activity do not outweigh potential benefits to members. ACI is in the information service business for the good of its members and such service is always accompanied by risk, real or implied.

The Institute will be involved in the marketing of software programs of a medium size, roughly those within a price range of \$100 to \$1,000. Two programs being offered initially to members cover the design of reinforced concrete slabs and the statistical analysis of concrete tests.

The first program is an analysis and design aid for structural systems — flat plates, flat slabs, waffle slabs, flat plates with beams, and continuous beams. The second is a statistical data package for field testing of concrete and offers the user information on such variables as compressive strength, standard deviation, mixture temperatures, and slump. Both should be of incalculable aid to our members in accomplishing their design work.

Additional software programs are in various stages of preparation for marketing by the Institute and information about these will be published in future issues of *Concrete International: Design & Construction*. Since ACI members are not known for their bashfulness, the usefulness of this new service should be apparent in the very near future. If it is as favorable as anticipated, the Institute will expand on this activity, another valuable means of disseminating information on concrete and concrete technology worldwide.

And this is what the American Concrete Institute is all about!



T.E. Northrup

Letters

DIN flow table

In regard to, "The DIN Flow Table," by Avi Mor and Dan Ravina, *Concrete International: Design & Construction*, V. 8, No. 12, December 1986, pp. 53-56, the authors show the results of several papers relating to the initial slump or spread of concrete to the final flow after 15 drops on the DIN flow table. They then attempted to show that the dissimilarity of slumps could be reduced by bumping. They then attempted to show that bumping showed similarities between concretes or that dissimilarities could be overcome by bumping.

They refer to Dimond and Bloomer as concluding that the initial spread may be more sensitive to differences between mixes. They also say that: "The same data, however, may be interpreted differently. It can be deduced that concrete mixes with different static behaviour showed their real dynamic behaviour only after being bumped 15 times. They then exhibited similar dynamic properties." The authors pursue this approach and attempt to prove their

point with formulas relating slump and flow.

Surely, the real question is how all of this relates to workability. Is bumping 15 times a better test workability? If so, the authors then imply that initial slump or flow is equally good. When Dimond and Bloomer concluded that the initial spread may be more sensitive to differences between mixes, they gave the authors a lead that they might well have pursued.

I was reminded of a workability test for mortar I stumbled onto many, many years ago. I was doing routine testing of various mortars hoping to find a way of comparing the workability potential of various masonry cements. I watched many flow table tests and was intrigued by an emerging pattern. The mortars perceived to be more workable deformed more easily on the first drop. Because they were also cohesive, they spread no more than harsher mortars. By stopping the table, the flow after one drop was compared with the flow after the remaining 24 drops. More workable mortars had a flow after one drop that

was a higher percentage of the final flow. Thus, the move was made from percept to concept. I used this method to grade the workability potential of various masonry cements with good success.

There are two points I would like to make. First, with some trial and error, the DIN flow table should indicate which concretes are more workable. The authors say that a water reduced concrete of 76 mm slump is more workable than a non-water reduced concrete. The initial flow, flow after 1 or 2 bumps, and the flow after 15 bumps should tell something about workability.

My second, and perhaps more important point, has to do with the process of scientific discovery. Research that concentrates on attaining a specific answer misses many clues. More discoveries are made when questions are encouraged and answers deferred. Specific objectives, such as proving that the relationship between initial and final flow is a constant, stops the exploration of those backwaters where future discoveries lay waiting.

The question opens, the answer closes.

G. E. Munro
St. Lawrence Cement, Inc.
Mississauga, Ontario,
Canada

Cathodic protection

The article entitled "Cathodic Protection for Prestressed Concrete Structures," by Gee Kin Chou and Kenneth C. Hover, *Concrete International: Design & Construction*, V. 9, No. 1, January 1987, pp. 26-30, contained statements regarding concrete pipe that were inaccurate or incorrect.

I have been involved with the design, manufacture, installation, and operation of prestressed concrete pipes and pipelines for over 40 years, both in this country and abroad. There are over 100 million feet of prestressed concrete steel cylinder pipe in diameters from 16 to 252 in. in service in North America manufactured in accordance with AWWA Standard C301. Only a minuscule portion of this footage is under cathodic protection.

The authors' statement that "this is currently done on a routine basis by some pipe manufacturers," is based on a paper by Hausmann and Walker. The authors have misinterpreted the provisions to permit monitoring of the pipeline with the application of cathodic

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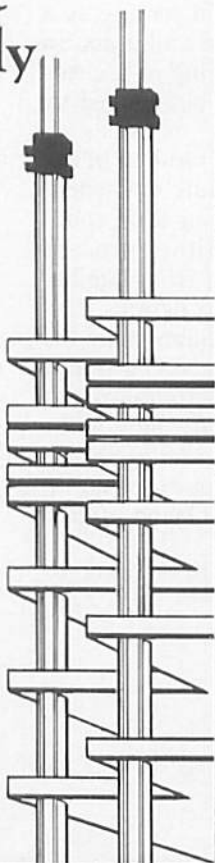


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President's Memo

1987—A Look at the Record

This year, the 83rd of the American Concrete Institute, is rapidly drawing to a close. In a few years, we will be observing the centennial of ACI's founding. My term as president is more than half concluded. And I find it almost unbelievable that the 21st Century is not far away.

Although final figures on income and expenses and other matters will not be available until ACI's ledgers are closed in early 1988, a general look at what took place during the year and what is anticipated in the near future might be of interest to the membership. A more detailed report to the membership will be published by the Institute early next year as has been traditional. There are several current ACI activities which, I believe, indicate that the Institute continues to be a viable, healthy society and will remain so in the future. These include:

—The year began with an innovative expansion of ACI's publications program. The old *JOURNAL* was divided into two periodicals: the *ACI Structural Journal* and the *ACI Materials Journal*. This allowed the Institute to publish more papers, more expeditiously. The two journals proved to be well accepted by members, with each member receiving *Concrete International: Design & Construction* and the option of one journal as part of his annual dues and the second by subscription at a nominal price. Early indications are that 50 percent of the members will subscribe to a second journal in 1988.

This expansion of ACI's publications program occurred without detriment to committee reports, standards, the *Manual of Concrete Practice*, and other documents published routinely. In fact, the number of special publications from ACI during 1987 is a record high: a total of 11 volumes with almost 6000 pages.

—The marketing of computer programs by ACI got underway in 1987 and two such software packages are now available for purchase. The number may increase to three or four by the end of this year. This is an indication that the Institute is in step with the current trend of computerization of concrete technology, a necessity for the Institute since it appears that the demand for printed documents may decrease as computerization increases in the future.

—Two new ACI certification programs — Concrete Construction Inspector Level II and Concrete Flatwork Finisher — are now operational. These were added to the existing Field Technician Grade I program which has over 10,000 persons with Institute certification. The Institute will continue efforts to upgrade the quality of concrete construction, alleviate problems resulting from improper workmanship, and prepare the industry for possible mandatory certification in the future.

—This past fall, ACI acquired a warehouse structure adjacent to its Detroit headquarters. This will not make Page 1 news anywhere but the acquisition will save the Institute money and speed up the task of filling publication orders. A major problem at headquarters in recent years has been the lack of storage space, a direct result of the Institute's expansion of programs and activities. Occupancy of the warehouse structure and the centralization of mailing room functions will improve the efficiency of filling publication orders. Also, a cost savings will be realized since the Institute no longer will be required to reimburse printers for the storage of recently printed publications.

—ACI's educational seminars, held around the nation with sponsorship of local chapters, continue to be well received and an important way to disseminate information about concrete technology. Attendance at the fall series has been very good and we are hopeful that this trend will continue into 1988.

Only a few of the highlights of 1987 activities are mentioned here. Others such as local chapters, technical activities, conventions, international relations, and publication sales will be covered in the printed report to be addressed to the membership in early 1988. But these few items are proof that the Institute continues to adhere to its motto of "progress through knowledge."

A Merry Christmas and Happy New Year to all! Let's make 1988 another memorable year in the annals of the American Concrete Institute!



T. E. Northrup

4 Publications forming one complete picture of concrete technology.

MATERIALS JOURNAL

The *ACI Materials Journal* is a bimonthly periodical containing archival type of articles and papers devoted to concrete materials research, properties, use and handling of concrete; and state-of-the-art reviews concerned with reinforced concrete materials. Edited for professional and technical personnel in engineering, construction, design, research, manufacturing and education. Offers topics such as: mix proportioning, creep and shrinkage, cracking and strain softening of concrete under compression and bearing strength and stiffness under reinforcing bars.



STRUCTURAL JOURNAL

The *ACI Structural Journal* is a bimonthly periodical containing archival type of articles and papers devoted to structural research, structural analysis, and state-of-the-art reviews concerned with reinforced and structural elements. Edited for professional and technical personnel in engineering, construction, design, research, manufacturing and education. Offers papers on topics such as: structural analysis of buildings and bridges, shear and torsion, reinforced concrete beam deflection, and effects of loads on deflection of flat slabs.

CONCRETE INTER- NATIONAL

Concrete International: Design & Construction is a world renown monthly, offering timely reports on construction, products and materials related to concrete. Features articles on architectural concrete, project construction descriptions, construction techniques and methods, practical "how-to" design and design aids, testing and inspection, business management, state-of-the-art reviews, and problem solving in the areas of concrete design and construction. Also covers general news involving ACI activities and members, industry news. The thrust of the magazine is practical in content and current in theme.

CONCRETE ABSTRACTS

This ACI bimonthly summarizes and indexes U.S. and international publications which report developments in concrete structural design and construction and concrete technology. General subjects include construction, design, materials, concrete products, equipment, and performance of concrete — all of this related to architecture, construction, structural, and civil engineering. Each article reviewed is covered by keywords and bibliographical data. Approximately 250-300 abstracts appear in each issue. Each issue is indexed and an annual index is published in the November-December issue. A translation section lists technical literature on cement and concrete that has been translated into English and other languages.

President's Memo

Our Local Ambassadors

At the recent fall convention in Seattle, Wash., ACI's Board of Direction and the Chapter Activities Committee approved the formation of two new Institute local chapters. One will include almost the entire state of Nebraska while the second will encompass the Tulsa, Okla., area. Thus, ACI's chapter growth continues; we now have 74 and are well on our way toward establishing chapters in the major domestic and international membership areas as called for in the Long-Range Plan.

The Institute's chapter activities began 30 years ago with the establishment of the Southern California chapter and now extend into Canada, Mexico, Central America, South America, the Far East, and the Middle East as well as throughout the United States. Even though we tend to think in terms of numbers and geographical areas, there is another facet to our chapters which should be emphasized more often. I refer here to the role of ACI's chapters with respect to service to local communities and local concrete industries. This, really, is what our chapters are all about — local service.

Several Institute chapters are deeply involved in our certification program; some joined this important activity at its inception. Chapters also participate in our educational seminar programs by sponsoring such courses, often with the help of other concrete related associations and colleges and universities in their areas; some even plan and stage such educational events on their own. Local chapters maintain libraries, many of which house comprehensive collections of literature on concrete technology; ACI encourages this and aids by providing chapters free publications for their libraries. Most chapters have regularly scheduled luncheon or dinner meetings at which guest speakers, many of them from the area's concrete industry, discuss various aspects of concrete and concrete technology. Several chapters publish newsletters on a regular basis; many such publications are quite attractive and contain helpful technical information regarding concrete. Some chapters conduct annual award programs for outstanding concrete projects in their areas; this appears to be of growing interest and the Chapter Activities Committee is exploring ways to persuade more chapters to get involved in such competitions and is drafting guidelines

that could be used by all chapters.

By serving as hosts, local chapters are indispensable in the planning and staging of ACI's twice-a-year conventions. During 1987, our chapters in San Antonio, Tex., and in Washington state did an outstanding job in hosting the two conventions and we have every reason to believe that the chapters in Orlando, Fla., and Houston, Tex., will do likewise in 1988.

Many chapters are extensively involved in methods to encourage student involvement in concrete technology studies. By working with local universities and colleges, several chapters have established scholarships for financial aid to those pursuing careers related to concrete. Student involvement takes a variety of forms. In some areas, ACI chapters participate with other organizations in sponsorship of concrete canoe races while others, such as the Delaware Valley chapter, offer concrete beam strength contests on an annual basis. Four of our local chapters oversee the operation of student chapters in their regions; hopefully, we can increase this number in the future.

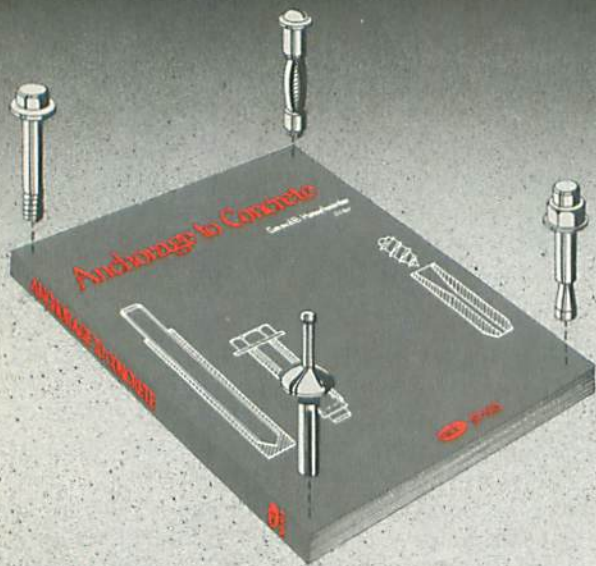
These are only a few of the activities conducted by chapters. All of these things are difficult to measure statistically but they do add up to a single total: membership involvement in their community. Our chapters and their members are interested in increasing concrete use, making better concrete, expanding knowledge about the material, and improving construction methods. The local chapters and their members are the ones on the firing line. They are, in effect, ACI's salesmen, local goodwill ambassadors; their importance to the Institute and to the concrete industry can not be emphasized enough. They provide the necessary field feedback to help make ACI's guides, standards, and codes the most respected concrete documents in the world.

Local chapters and their members deserve grateful appreciation and all the help that can be given to them. ACI's goal of "good concrete — worldwide" is obtainable only with such assistance and continued cooperation.



T.E. Northrup

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Order your copy today!

SP-103, *Anchorage to Concrete*, 1987, soft cover, 322 pages, available to ACI members for \$34.95 (nonmembers \$45.95).



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Our Shrinking Concrete World

A few months ago, a well-known ACI member traveled to Italy to attend the 25th Plenary Session of the Comité Euro-International du Béton (CEB). This was the second trip for W. Gene Corley of Construction Technology Laboratories, Inc., as an official Institute observer of meetings of the European concrete association. In a report to ACI's Board of Direction, Corley, a veteran member of Committee 318, Standard Building Code, noted that CEB is currently preparing a new European model building code, expected to be published in 1990. (The next edition of the ACI 318 Building Code will be released about the same time — in 1989.) Corley pointed out that CEB members "freely shared information and requested additional contacts with ACI committees." He also emphasized the importance of the deliberations of CEB and other similar groups to those of the American Concrete Institute and observed: "Through the sharing of information and opening of new contacts, development of future ACI documents will be enhanced."

Gene Corley's visit to Italy to witness CEB activities is just one of many examples of our Institute's efforts to maintain, on a continual basis, liaison and cooperation with other organizations in the concrete and construction fields. The importance of these efforts cannot be overstated. Whether we like it or not, our world is shrinking. Not physically, of course, but in terms of time. With all of the technology that comes with faster communications and quicker transportation methods, the world is much smaller now than 50 years ago, or even 20 years ago. There are few remote corners of the world anymore. (At least not geographically although there are some areas that are politically isolated.) There are permanent stations in Antarctica and a base (hopefully of concrete!) will probably be erected on the moon within the next 20 or 30 years. Thus, the Institute's chartered purpose of "disseminating information for the improvement of the design, construction, manufacture, use, and maintenance of concrete products and structures" can only be achieved if we keep pace with the means of communicating such technology. Timely, as well as accurate, information is a necessity in today's world.

The Institute's liaison and cooperative activities, nationally and internationally, take a variety of forms — Gene Corley's trip to Italy was just one of these. Another example of liaison has to do with ACI's sponsorship of an annual meeting of chief executive officers of the various U. S. concrete-related associations. These events, held in Detroit, were inaugurated by ACI Executive Vice President George F. Leyh and have been effective in developing cooperation and coordination

among groups in the concrete industry as well as avoiding duplication of efforts. The meeting last summer was followed by another session of staff personnel from these associations, held at ACI headquarters, to discuss mutual concerns relating to computerization.

We also maintain liaison with the elected officers of these associations. At our invitation, Ted J. Gutt, chairman of the Prestressed Concrete Institute, attended our Board of Direction meeting and recent convention in Seattle, Wash., and such observers are always welcome at ACI functions.

We also have cooperative efforts that resulted in joint technical committees on a wide variety of topics, including codes and standards. ACI currently has 11 such joint committees, 10 of them with the American Society of Civil Engineers and one with the American Society of Mechanical Engineers. These joint committees deal with such subjects as design of slabs, joints and connections, shell design and construction, concrete containments for nuclear reactors, masonry structures, and others.

The Institute's cosponsorship of technical symposia and workshops with other concrete and construction organizations is another form of liaison. The World of Concrete exhibition in Las Vegas, Nev., in February and the Second International Conference on Performance of Concrete in Marine Environment, scheduled for August in St. Andrews, New Brunswick, Canada, are two different examples of events that will take place this year with ACI cosponsorship. Often, this cosponsorship results in Institute publication of the proceedings; plans are already underway to produce an Institute special publication on the marine environment conference and this document should be available for distribution at the August event.

I could continue to elaborate on these and other forms of ACI liaison but I think the point is now obvious. This is an important endeavor and we need to expand upon all aspects of disseminating information about concrete and concrete technology. Our concrete world will continue to shrink and we need to prepare ourselves for the day when the dissemination of information will be reckoned in terms of minutes, not days. To cope with this, we need to maintain and improve upon our liaison, both nationally and internationally.



T. E. Northrup

Letters

Time to change

In regard to, "It's Time to Change from 150 mm x 300 mm to 75 mm x 150 mm Cylinders," published in the *ACI Materials Journal*, V. 84, No. 3, May-June 1987, my only comment on this topic is that, if we are thinking of making a change, then we should think of

standardizing with the rest of the world and adopt the 150 mm cube.

I think more thought should be given to adopting existing standards rather than inventing new ones.

D. E. O'Brien
Tucson, Ariz.

SP-1, Concrete Primer

It has recently been called to our attention that the curve of concrete strength shown in Fig. 5 of the last two (1973 and 1987) editions of ACI Special Publication 1, *Concrete Primer*, is based on the water-cement (W/C) ratio by volume not by weight as stated there for the abscissa values.

This curve is, as noted on the figure, from Duff Abrams' work with 1915 cements. This was reported in Fig. 1 of the 1923 revised edition of his famous 1918 Bulletin 1, which was first to announce the water-cement ratio-strength relationship. In those years, W/C was a volume ratio: a cubic foot of water to a 94 lb sack or to a cubic foot of cement was 1.00. This was correctly shown by F. R. McMillian (the original author of SP-1) as "Water-Cement Ratio — U. S. gallons per sack (94 lb.)" for Fig. 3 in his 1928 edition and for Fig. 4 in his 1958 edition of the *Concrete Primer*.

This should have been used in our 1973 and 1987 editions. Those having one of these latest two editions should correct the title of the abscissa in Fig. 5 to read as follows: "Water-Cement Ratio by Vol."

Lewis H. Tuthill
Concrete consultant
Sacramento, Calif.

Chicago placement

In your November, 1987, issue of *Concrete International: Design & Construction*, the news article (page 68) is not clear which record the new building in Chicago has broken. The article implies a record for size of a commercial mat placement; we question this claim.

The Four Allen Center mat placed in Houston, Tex., on April 24, 1982, to our knowledge holds the record of 13,308 cu yd being placed in a single placement. The mat was 8 ft, 6 in. thick.

James S. Notch
President, The Datum/Moore
Partnership
Irving, Tex.

Editor's note

The news article referred to by Mr. Notch notes that this was "a record placement of high strength concrete in Chicago." Those involved in construction of the 65-story building at 311 South Wacker Drive in Chicago made no claims of a record beyond the City of Chicago.

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- Increased freeze/thaw durability.

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President's Memo

ACI's Brier Patches

In the tales of American author Joel Chandler Harris, there is a charming story having to do with Br'er Rabbit, the sly old fox, and the brier patch. I'm not going to repeat the story here, but it is highlighted by Br'er Rabbit being tossed into the brier patch. Faced with the alternatives of death at the hands of the fox or the prickly thorns of the patch, the smart rabbit outfoxes the fox and chooses the latter. Like all fables, the Br'er Rabbit story has several morals, one of which is that life is filled with brier patches and sometimes being on a path with a few sharp thorns is still preferable to letting others dictate our fate.

What do Br'er Rabbit and the brier patch have to do with the American Concrete Institute? In a sense, the technical affairs of the Institute could well be described as brier patches and those who labor long and hard on ACI's technical committees are not unlike Br'er Rabbit. They can let others dictate their fate or they can avoid the fox and work among the barbs of the thickets to develop the best ways to make and use concrete to be competitive and to advance our standard of life both now and in the future.

The technical aspects of our society have consumed much of my time during the nearly 20 years that I have been a member of ACI. I have served or am serving on several technical committees. Somehow I even went through the TAC brier patch for 9 years, 3 as its chairman. Thus, TAC and ACI's more than 100 technical committees are of personal interest to me.

I hope no one gets the impression that I am underestimating the importance of such ACI programs as education, chapters, publications, conventions, and the wide variety of other activities. Each of these is essential in our overall attempts to expand the Institute's role of disseminating concrete technology worldwide. But I think that sometimes our general membership is not aware of the depth of the technical significance and the contributions of ACI in matters such as codes, standards, specifications, committee reports, and guides, all of which impact on the concrete community, the general public, and ACI's image as the world leader on matters involving concrete. I tend to feel that the average ACI committee members labor in the thickets, unnoticed; the appointment to a technical committee is probably akin to being tossed into the brier patch. I know from experience that it is not uncommon to free yourself from the brier patch only to have someone toss you right back in because of the problems that need to be solved.

At the very first convention of the National Cement Users Association, the predecessor of ACI, eight technical committees were formed to consider matters such as streets and sidewalks, testing of cement and concrete products, fireproofing and insurance, concrete blocks and machinery for their manufacture, and art and architecture. At that 1905 meeting in Indianapolis, one of the charter members stressed the need for such com-

mittees because of the "lack of reliable information as to the best methods of using cement in its relations to other structural materials and the lack of accurate data as to the strength and durability of such products." But what was driving the need? A closer look shows that the need for better concrete was primarily driven by the development of motorized transportation — the auto, truck, train, and plane. America was about ready to expand at a rate beyond belief.

Since that convention more than 80 years ago, ACI's technical committees have attempted to fill the voids in knowledge about designing and constructing with concrete to support the world's continuing expansion in transportation, buildings, water supply, and space exploration. Those original eight technical committees have evolved into more than 100 such groups with responsibilities covering nearly every aspect of concrete research and practice, materials and properties of concrete, construction techniques, structural design and analysis, and special products and special process. Since that first meeting in Indianapolis, ACI has become an international association with nearly 20,000 members in more than 100 nations. Volunteer committee members, past and present, who have given unselfishly of their time and talents in behalf of better concrete for more durable structures, i.e., doing it right in the first place, may not have been the sole reason for this advancement, but they certainly rank high on the list.

For those now devoting time and energy to ACI's committee work, I can only say thanks. For you, and those members and nonmembers not yet involved, I challenge all to be ready to be thrown into new brier patches. New developments are coming in nuclear and fusion power, nuclear and industrial waste disposal, water supply via desalination and, yes, even transportation involving space travel, magnetic trains, and automated highways. These new developing technologies will call upon concrete anew to meet unexpected demands, similar but yet different and even more exciting than those occurring since 1905.

My term as president has been a most enjoyable one and I certainly will remember the pleasant experiences and the courtesies shown to me by many members from all segments of the concrete and engineering community.

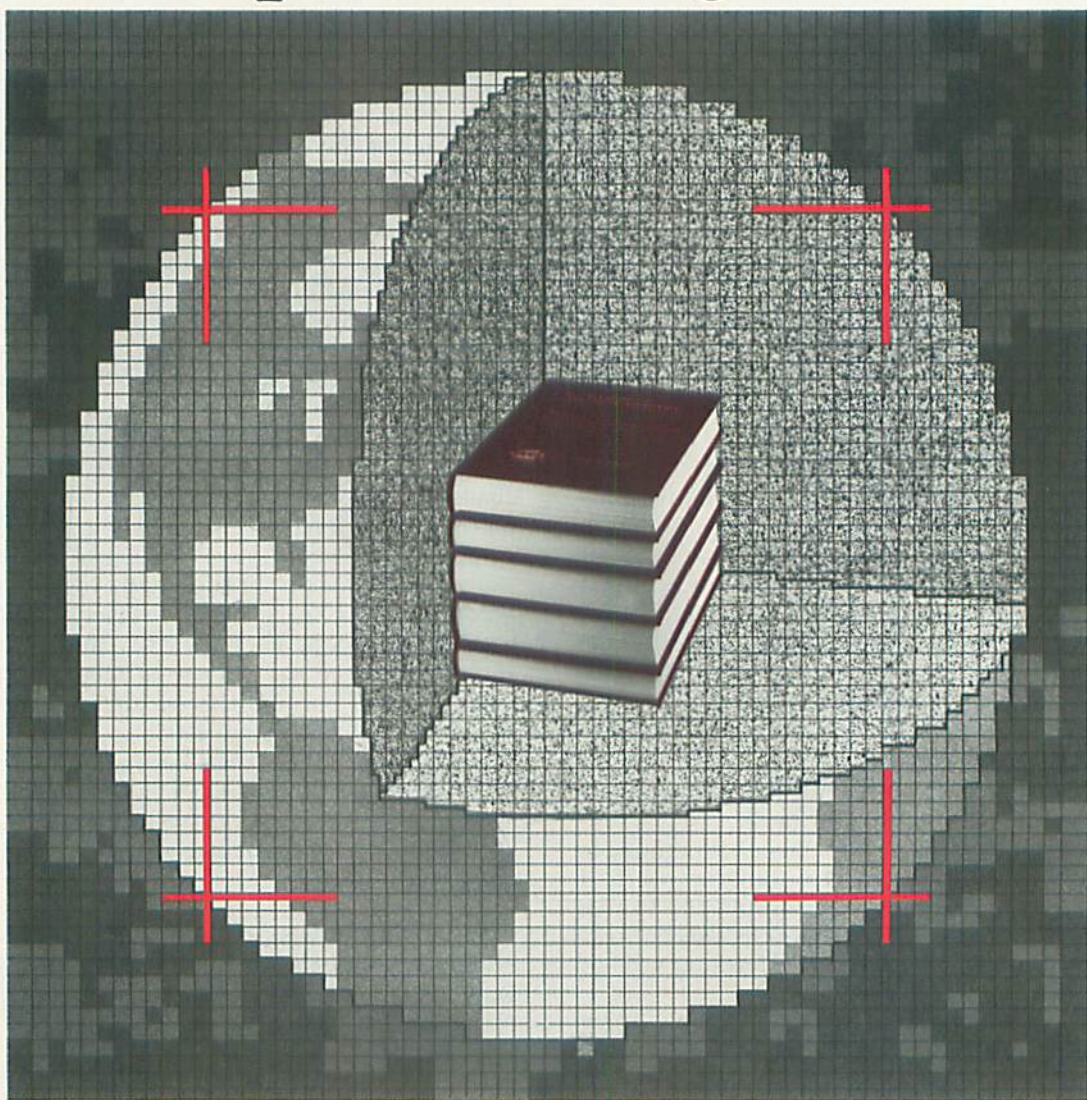
P.S. For those who don't recall the conclusion to this Uncle Remus tale, Br'er Rabbit manages to escape from the brier patch, presumably to return to the safety and warmth of his hole in the ground. For the rest of us ACI activists, there are more thorny problems to solve before such a goal is reached.



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parts 1 through 5.**



The core of concrete construction