

The State of the Concrete Repair Industry

By Kelly M. Page



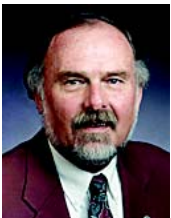
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The theme of this issue of the Bulletin is “The Business of Concrete Repair,” so we thought we would go to a panel of members to get their opinions on the subject. All of the people interviewed are Past Presidents of ICRI, and they represent a cross section of the industry: engineer/consultant, distributor, contractor, and government. Here is what these long-time ICRI members had to say about the state of the industry:

Page: How many years have you been in the construction business and, more specifically, the concrete repair business?

Currence: Twenty-six years total and about 12 years in the concrete repair business.

Craig: I have been involved with concrete and concrete repair for the past 30 years.

Emmons: 33 years in the concrete repair business.

McDonald: 42 years in concrete, 30 specifically in repair.

The Past

Page: How has the business (for example, technology and standards) changed since you began?

Currence: There have been diverse changes across the board, and some areas of the industry that have gone through several cycles of changes. We have had periods of poor specifications for concrete repair to a time of very broad acceptance of ICRI and other repair standards. From important values placed on the brand names, to quick acceptance of new companies and products into the market. We have gone from strong influence of the engineer to almost dominant influence of the contractor. Technology has brought many new ideas. However, this technology has sometimes had a difficult time being accepted because of the lack of project history. It continues to be difficult to take a chance on products they have not used before, but it is kind of tough to get history from new products.

Craig: There have been tremendous advances in both materials and material sciences. We have a much better understanding and reference base today of the direct and indirect issues that can affect the success of repair techniques or procedures. We also today have far more materials that are engineered for specific needs or purposes.

Emmons: When I began there was nothing—there was not a defined “concrete repair industry,”

except for some manufacturers that had a few products for repair. The people doing repair work often made up their own repair mix. It was very unstructured, therefore, the quality and consistency varied greatly from one project to another. Power tools were not used to chip around the reinforcing bars—we were using chipping hammers and people looked at us like we were crazy. Our first few jobs, we didn’t even chip behind the bars, we just wire brushed them. Five or 6 years later, after we saw some of our repairs failing, we realized we had to chip behind the bars. Also, when I started, most of the manufacturers were making epoxies, for epoxy-oriented repairs, and much of that material was not appropriate for the work we were doing—it was good for epoxy injection, the coatings were good, but spall repairs with thick sections of epoxy mortar often failed.

McDonald: There was no ICRI. There was really no organization to the industry—even ACI Committee 546, Repair of Concrete, was not formed until 1969, and ACI Committee 364, Rehabilitation, was later than that (1979). There was some controversy about even forming a repair committee within ACI because some people in the industry did not want to admit that concrete needed to be repaired. There was just no guidance on specifications or selection of materials. Like Peter said, when you thought about repair, you really thought about epoxy—that was the main repair material.

Page: What one thing has had the greatest impact on the repair industry? On your business specifically?

Currence: I think overall, the education that is available to installers. Organizations like ICRI (this is no commercial) have been influential in educating large numbers of installers of repair products. In my business of distribution, the greatest impact in a negative sense has been the lack of focus and trust of vendors.

Craig: ICRI ranks high on my impact list. Having an organization devoted solely to concrete repair has provided a structured opportunity for those in the repair industry to meet, present, and exchange ideas. The information and contacts I have gained through ICRI have had a very positive impact on my business.

Emmons: ICRI being formed because prior to ICRI forming, there was not much there—even ACI

material on repair was more general information; it really wasn't specific, like the ICRI Guidelines are. For instance, ICRI's first Guidelines, like the one on chipping behind the reinforcing bars—that set a standard that at that time was not established. So, I would also say the most important quality improvement was the realization by engineers and specifiers that you had to chip behind the bars to get a quality repair, and this was driven by the ICRI Guidelines. To me, getting information like this out in a document, from both a quality standpoint and making the repair industry more professional, was the reason I joined ICRI and got excited about it. It is now a community; a repair community has developed, and certainly ICRI has been in the center of a lot of that. When we started, there were not a lot of specialized contractors focusing on repair; jobs were mostly done by general contractors. Engineering firms were also not specializing in repair. Over the last 20-some years, the industry has broken out into specialization, which has resulted in a much-improved quality of the industry because people now know what works best—their reputations are based on it.

McDonald: It is the development of the information and technology specifically related to repair that previously did not exist. From my perspective, a major event was the REMR (Repair, Evaluation, Maintenance, and Rehabilitation) Research Program that the U.S. Army Corps of Engineers had, beginning in 1985-86. The program ran about 14 years and cost over 70 million dollars. It covered all aspects of concrete repair—from foundations to the top of structures—and it developed a lot of the technology that forms the basis for a lot of the publications we see today.

Page: I know I have used the REMR database when I needed to research certain materials.

Emmons: That's a really good point—I know a lot of the basis for what worked and what didn't work—how to put a dowel in; bonding—all that came from the Corps. That's the foundation for a lot of the how we do things, such as bridge repair. This was that basic research that was done by the Corps.

Page: When they developed the program, was it because they saw a big need for this type of information?

McDonald: Exactly. Up until that point, the Corps was basically a construction agency, but they got to the point that they really weren't building any new structures. At the time we started the program, the average age of our locks and dams was about 40 years old, and they were designed for 50 years, so many of them needed to continue in service long beyond their design life. It became, "How do we maintain or rehab these structures so they will do that?"

Quality of the Repair Industry

Page: Have you seen an improvement in quality?

Currence: Overall there has been an improvement in quality. Why? Because of the competitive nature of the manufacturing industry which leads to so many copycat products. Reverse engineering is alive and well.

Craig: Without question, there has been a marked improvement in quality. As the repair industry has grown, so has the knowledge base of what works, what doesn't, and why. While the learning curve has often been painful, the experiences have led to material enhancements and research. The industry has also attracted many highly competent individuals and companies.

Emmons: Another thing that really happened, as a contractor, I know I learned a tremendous amount from material suppliers. Sinmast was the company that really introduced me to repair and using materials to repair things. The World of Concrete, with its seminar series on concrete repair that started back in the early 1980s, also contributed to quality improvements. The communication of what is right and what is wrong has definite good channels now. Between ICRI, World of Concrete, and other publications—the body of knowledge has grown tremendously. There is no excuse not to do things right today, for the most part.

Page: So you won't have to fix them again?

Emmons: Yes, the repair of the repair of the repair. I think there is less of that today than there was 15 years ago, which is a good indication that clients are willing to pay. That is another important event contributing to quality improvement. In the past, owners did not want to come forward with the dollars, as they didn't fully value what it was going to cost to do the work right, so their approach was to do it in a lowest-cost format. They didn't realize that often the lowest cost was just going to end up costing them more, so they had to go through some cycles in the '80s and even the '90s, where they took the low-cost approach and ended up needing to repair the repair. Today, most property owners realize that this approach does not work, and they will spend the money on proper engineering and application. The proper approach that can result in very expensive projects, but they know that is what is required. Owners basically recapitalize their structure, and they then have a valuable asset.

McDonald: Along the same line, I don't think people are repairing the symptom as much as they used to. They used to see a crack, and go out and repair the crack with no thought as to what the cause of the crack was.

Page: So, the evaluation aspect has also grown?

Emmons: Absolutely, it's the evaluation, the client's willingness to spend money, and the contractor's understanding of the process. All three of those things coming together have improved quality. It's the maturity of the industry.

Present

Page: What is the current state of the industry? How are the economic uncertainties affecting it?

Currence: The industry is relatively strong. There are really no dominant products or contractors in this market, even with some companies like SPS who are at the forefront of product applications. Economic uncertainties are definitely affecting our market. This is perhaps most felt in the highway funding deficits that relate to bridge and other types of repairs.

Craig: From my viewpoint, the repair industry remains very strong. Certainly some segments are, and will continue to be, weak, but on the whole, I believe that the repair industry will be less affected in this current economic climate than the new construction industry. We are at a point in time when so much of our infrastructure needs attention and simply cannot be ignored.

Emmons: This is my fourth recession in my career; there has been one every 10 years or so. When I first started out, it was during the oil embargo in the early '70s, which was a terrible recession. We went through one again in the early '80s and the early '90s. Now we find ourselves in the early 2000s in the same type of situation, and every time, the same thing has happened. I think the same thing is happening now, which is first, that the market tightens up. A lot of the maintenance work for concrete repair is discretionary, and it can be postponed, so it is postponed. And what work is done, you will see more bidders, so you have a more competitive marketplace, with more people who do not know what they are doing. Just last month there were 52 bidders that actually submitted a price for the LaGuardia Airport parking garage. That is an indication of what we are into right now—tremendous competitive pressure, people bidding on work that they don't really know how to do, and that has happened in every recession. The only thing we can hope is that the recession will end soon and things will go back to normal. There is plenty of work to go around for everybody that is qualified to do it, and that is the way the market has got to develop. And that work will continue, as there is plenty of concrete to repair, and if owners want to protect their assets, they have to invest in them.

McDonald: Of course, being more in research as I am, you are somewhat insulated from recession, but it does affect us. As a matter of fact, that is

the reason I went ahead and retired because it was getting more and more difficult the last couple of years to get the research funding for concrete and concrete repair projects. Concrete is not very "sexy" compared to some other things, and Congress kind of takes the attitude of "you ought to know everything there is to know about concrete by now. Why do you need more research money?"

Emmons: That brings up an interesting challenge. We did have all that money in the REMR Research Program, the Federal Highway Administration Program, and the SHARP program; and today, when you look at concrete, not just repair but all of concrete, the research money has dried up. We don't have the money flowing in to help us solve problems, so the money today for funding research has got to come from private industry to support industry issues. And that is harder to get.

Page: There have been tremendous advances in technology in the repair industry in the last 20 years. Do you think we will see less of that because of the lack of research funding?

Emmons: For repair, no. I think that commercial interests will prevail. Carbon fiber is a good example, as are the broader use of polyureas and other new technologies that have a benefit to the industry. Lack of research money won't limit that because it is driven by profits and companies that can bring products to the market. The research that has been lost is the basic scientific research and the basic applied research for solving everyday kind of problems that don't involve a lot of new technology. How do you optimize materials? What will last the longest?

McDonald: In the last couple of years, it has gotten where in the Corps of Engineers the most important question you had to answer as you were trying to get research funding was to explain why private industry would not do it. In other words, if there is a market there, if there is a big need for this, why won't private industry develop the material or the method? Why should we do it? The tactic we had to take was to show that there was something unique about the use on hydraulic structures, which is not a big commercial market, so outside companies would not do research on it. I do not think there is going to be anymore big government spending on research in the concrete repair industry.

Emmons: Like the research that was funded recently by the Corps to develop performance criteria for repair materials. That's the kind of research that is going to be lost, and that is still what is needed. What is the right test method? What is the right test value? We still need these types of programs. These programs do not make people money in an immediate sense, but they are allowing the client to make informed decisions which improves the quality of the industry.

New Technology

Page: Which new and emerging technologies are you excited about?

Currence: I do not see too much emerging technology in my business, but the products that I see good applications for are some of the rapid-setting products on the market. Also, the wide acceptance of decorative concrete systems is growing very rapidly.

Craig: Presently, I am excited more by the level of understanding that is emerging than I am by a specific technology. Certainly advances that have been made to reduce drying shrinkage in concrete slabs has been of great interest to me lately.

Emmons: I think there are a lot of evaluation tools coming out that are being refined, which are exciting. For example, tools for evaluating prestressed concrete and post-tensioned concrete, the level of corrosion, and things like that that are emerging. These are going to help evaluate structures and make our jobs easier. The ultrasonic and radar evaluation tools and the way they are being refined. They have been around a long time, some of them, but some of the software that is used with them is improving; for example, we are able to image things better. I think in the strengthening market there is the Steel Reinforced Plastic (SRP) technology, which is the next generation of carbon and glass, which will improve some of the applications. Fire-rated strengthening systems, more ductility, closer behavior to steel, all are big benefits for a lot of energy absorbing applications like seismic strengthening.

McDonald: Some of the advances in admixtures have had a big impact on the Corps—on how we build and repair. For example, anti-washout and self-consolidating have enabled us to do more underwater repair and construction. The two most recent lock and dam projects were built mainly in the wet, where we actually eliminated the need for a cofferdam. A lot of that is due to the improved techniques for underwater repair and construction.

Future

Page: What do you see for the future of the industry?

Currence: I see more and more consolidation. This includes contracting, engineering firms, and distribution. I see continued homogenization of products. Vendors will continue to create bottom line problems by acquiring products and companies without truly understanding where the synergies will come from.

Craig: I see the repair industry continuing to grow for many years. As long as we live in a “natural, low bid, build it cheap, get it up, get it open world,” the repair industry will always be strong.

Emmons: I think the industry is going to continue to improve its structure. We are in the process of improving the communication—like the 2nd Edition of the *Concrete Repair Manual* that is a compilation of many different organizations around the world. The world of repair is getting smaller at a global level, and we are combining what we know and are learning into consensus documents that form a body of knowledge that can be applied by more and more people. The industry will continue to get better, new technologies will come about on the materials and equipment side. I think we have a huge area of improvement on the repair materials side, in the ability for them to perform and not crack. This cracking issue is something that we started tackling back in the late 1980s. We made a lot of improvement over the last 15 years, but we are still not there. We still don't have what you could call true nonshrink materials. We are getting closer, but the majority of the repair materials on the market today are not great for their application because they develop too much tension in them in the curing process, which causes shrinkage. If there is one wish I would have, it is that 20 years from now we have materials that are easily installed, cost-effective, and that assume the stress of the structure and not the stress of the material, which would greatly improve the quality of repairs.

McDonald: I think there is a good chance that we will see that because the market for these materials will be there as the infrastructure is continuing to age, and we certainly do not have the funds to replace everything. There will be a big market for repair and rehabilitation, and I think that is what drives the manufacturers and suppliers. If they see the market is there, they will put more resources into developing these materials.

Emmons: My other wish is that we could develop a better removal process for concrete. Something like a laser that could surgically remove concrete around reinforcing bars, with high effectiveness, but low impact on the environment. We also have to continue to improve the conditions for the worker. The worker is subjected to repetitive motion—the chipping hammers are very hard on the body, hard on the hearing system. The dust that is generated from all the repair processes is significant, so the worker is subjected to all that. We have lots of safety, but we have to make it less noisy, less environmentally impacting to the surrounding public. The workers' breathing, eye hazards, stress on the bones in the body, because it is hard, heavy work, and we have to find ways to improve that.

Page: So, despite some bumps in the road, you all see a strong future for the concrete repair industry?

All: Yes!