

# VISION 2020—BEFORE AND AFTER

BY K. NAM SHIU AND FRED GOODWIN

**C**oncrete is a construction material dating back many, many years. It is widely available and can be formed into different sizes and shapes. It has become one of the major construction materials used on Earth. However, it took time for concrete to slowly evolve from the first production of portland cement into a worldwide industry.

Because of concrete's physical properties and durability, people may have the false impression that this material can last forever with no maintenance ever needed. However, just like everything else, concrete structures age, deteriorate, and require routine maintenance and periodic repair. This brought forth the dawning of the concrete repair industry, which has since been growing at an accelerated pace, evolving quickly into an industry in its own right.

This article briefly reviews the development of the concrete industry and its quickened development through the strategic implementation of Vision 2020, "A Vision for the Concrete Repair, Protection, and Strengthening Industry."

## CONCRETE AS A CONSTRUCTION MATERIAL

It has been suggested that Joseph Aspdin "invented" portland cement when he filed a patent in 1824 for a burnt mixture of limestone and clay that could then be ground to a fine powder. The powder, called portland cement, could then be mixed with water to produce a material resembling the high-quality building stone found on the Island of Portland off the coast of England. However, there are many similar materials predating this patent filing.

Concrete is a nonhomogeneous material consisting of cement, water, and aggregates. It is a wonderful building material, as it is economical with a long service life and requires comparatively little to low maintenance. Unlike other materials, concrete does not rot, corrode, or decay. It is one of the few materials that can be molded or cast into almost any desired shape. Production can either be precast manufactured products, cast-in-place concrete elements, or shotcrete. Concrete is fire-safe and has the ability to withstand relatively high temperatures as compared to other materials, such as plastics. It is claimed to be the second most commonly used material (after potable water), and we consume 16 billion yd<sup>3</sup> (12 billion m<sup>3</sup>) per year globally. This corresponds to approximately 1 yd<sup>3</sup> (0.8 m<sup>3</sup>) of concrete per person per year in the

United States. More than 70 billion yd<sup>3</sup> (54 billion m<sup>3</sup>) of concrete have been placed in the United States since 1930, of which 13 billion yd<sup>3</sup> (10 billion m<sup>3</sup>) are more than 20 years old.

Concrete was used in ancient times and can last for hundreds or even thousands of years when properly designed and maintained. Examples of ancient concrete structures include floors in Yiftahel, Israel, made in 8000 BC; Nabataean cisterns in Syria dating to about 6500 BC; and the Pantheon in Rome, dated 125 AD. It should be noted that none of these structures contain metallic reinforcement.

In 1857, F. Joseph Monier filed a patent for using ferrous metal for reinforcement in concrete. Steel in concrete allows for a much wider application of concrete in construction. Today, our tallest buildings, longest bridges, and massive dams are constructed with reinforced concrete. Concrete has become the construction material of choice in our era.

To promote and to facilitate use of concrete, a number of professional organizations were formed:

- The American Concrete Institute (ACI) was founded in 1904;
- ASTM International formed Committee C9 for Concrete and Aggregates in 1914; and
- Other organizations were formed, including the Building Research Establishment in 1917.

Concerted efforts were devoted to and focused on improving concrete as a material, improving concrete construction, preservation of in-place concrete, and expanding long-term durability.

## EMERGENCE OF THE CONCRETE REPAIR INDUSTRY

Despite the superior physical properties of concrete, it is far from perfect. Concrete has low tensile strength (approximately 10% of compressive strength), low ductility, and a relatively low strength-to-weight ratio (that is, heavy with large unit weight). Concrete is also permeable, allowing ingress of deleterious materials and making it susceptible to chemical attacks (such as acids, alkali aggregate reaction, and sulfate attack), carbonation, and corrosion deterioration. Corrosion deterioration in concrete is costly to mitigate, resulting in concrete cracking, spalling, and eventual section loss.

As with any manmade product, concrete structures experience the slow aging process and time-dependent deterioration under weathering or adverse

and harsh working environments. As a result, concrete structures require regular and routine maintenance to maintain their anticipated service life. Unfortunately, only until recently, people have had the impression that concrete structures could last forever. The impact of deferred maintenance further accelerated the deterioration, significantly reducing the service life of concrete structures.

In addition, repair performance had been far from adequate or acceptable. In response, professional organizations were founded and established to facilitate concrete repair, protection, and strengthening work, while addressing identified issues and sharing the knowledge gained from proven successes.

The following list represents some of the key efforts made to advance the concrete repair industry since 1966.

- In 1966, the National Historic Preservation Act (NHPA) was legislated to preserve historical and archaeological sites in the United States. The Act created the National Register of Historic Places, the list of National Historic Landmarks, the State Historic Preservation Offices, and provided approved properties to have grants, loans, and tax incentives for maintenance and repair.
- In 1969, ACI Committee 546, Repair of Concrete, was formed to “develop and report information on means and methods of repair, rehabilitation, and strengthening of existing concrete and masonry structures.”
- In 1981, ACI Committee 364, Rehabilitation, was formed to “develop and report information on the analysis and design of repair, rehabilitation, and strengthening of existing concrete and masonry structures.” At the same time, an attempt to draft a Repair Code for concrete was initiated but was unsuccessful.
- In 1983, the U.S. Army Corps of Engineers began the Repair, Evaluation, Maintenance, and Rehabilitation (REMR) research program. The program was reported to have resulted in over \$400 million dollars of savings over 10 years.
- In 1983, the World of Concrete show started a series of concrete repair seminars that are still offered and popular today.
- In 1987, the Federal Highway Administration (FHWA) Strategic Highway Research Program (SHRP) program was initiated to develop and evaluate techniques and technologies to combat the deteriorating conditions of the nation’s highways and to improve their performance, durability, safety, and efficiency.
- In 1987, the Alberta Transportation Department published their Concrete Patch Evaluation Program.
- In 1988, the International Association of Concrete Repair Specialists (IACRS) was formed and later renamed in 1993 as the International Concrete Repair Institute (ICRI).

- In 1998, the ACI TAC Repair and Rehabilitation Committee (TRRC) was formed to coordinate the various ACI committee activities related to concrete repair and to demonstrate the depth of existing knowledge in this area. In addition, their scope was to identify gaps, overlaps, and conflicts in the knowledge base; promote industry cooperation; and establish incentives for timely publication of individual technical documents related to concrete repair and maintenance.
- In 1999, the National Institute of Standards and Technology (NIST) conducted a workshop “Predicting the Performance of Concrete Repair Materials.” Over 100 industry leaders, including contractors, engineers, material manufacturers, researchers, educators, owners, and industry association executives, participated in the workshop.
- In 2001, ACI Committee E706, Repair Application Procedures, and later named Concrete Repair Education, was formed to develop educational programs and instructional materials in the area of concrete repair.

## CHARACTERISTICS OF THE CONCRETE REPAIR INDUSTRY

The primary reason for such a long list of organizations to address industry issues is that the concrete repair industry is a diverse and fragmented industry, similar to the parent concrete industry. Concrete products involve multiple disciplines ranging from material chemistry to structural engineering to architectural design to production. In addition, the levels of expertise required at each stage of production vary from simple manual labor to highly sophisticated science and engineering. This suggests that the concrete repair industry is not a homogeneous and coherent industry but rather a diverse and fragmented one.

The repair industry has many names. In addition to repair, other names include restoration, rehabilitation, renovation, repurpose, renewal, protection, and strengthening. The many names also reflect the multi-facets and diversity of the industry.

The concrete repair industry has been growing rapidly and is going to be one of the biggest construction industries in the future. The three reasons for its rapid growth are:

1. Removal and replacement are not an option;
2. A large number of aging concrete structures; and
3. Sustainability and effective use of resources.

## REMOVAL AND REPLACEMENT NOT AN OPTION

As we build and our communities expand, the need to have bigger and better services from our existing infrastructure increases. In the beginning, whenever a structure outlived its effective use, the structure could be demolished, removed, and replaced with a newer and better one. This was the

general approach for decades. However, as buildings become taller, bridges become longer, and the infrastructure becomes more sophisticated, removal and replacement may no longer be a viable option for economic reasons.

Currently, it is much more economical to renovate and reuse existing facilities instead of building something from the ground up. The taller the building, the more difficult it is to demolish the building and then replace it with a taller one. During the demolition and rebuilding construction, current occupants would need to be displaced to a temporary alternate site. In contrast, renovation can take place in phases without shutting down and displacing existing functions and operations.

### LARGE NUMBER OF AGING CONCRETE STRUCTURES

The number of aging concrete structures is huge and ever-increasing. Eventually, new structures will be added to the pool of existing aging facilities. Unfortunately, many existing concrete structures are already in dire need of repair, restoration, and rehabilitation. The National Council on Public Works Improvements did an evaluation of the condition and performance of the existing infrastructure and assigned an average grade of “C” to the infrastructure in 1988 ([www.infrastructurereportcard.org](http://www.infrastructurereportcard.org)). The American Society of Civil Engineers (ASCE) started grading in 1998, with the latest estimates from their 2013 infrastructure report card even lower now with an overall grade of “D+”. To compound the issue further, the delay of repair and maintenance has exponentially increased repair needs.

To get an idea of the size of the repair industry, let us examine the amount spent annually on repair. In 2006, costs associated with restoration in the United States are estimated to be \$18 to 21 billion dollars per year ([www.icri.org/publications/2006/PDFs/julyaug06/CRBJulyAug06\\_EmmonsSordyl.pdf](http://www.icri.org/publications/2006/PDFs/julyaug06/CRBJulyAug06_EmmonsSordyl.pdf)). According to FHWS-RD-01-156 Corrosion Cost and Preventive Strategies in the United States (<http://www.nace.org/uploadedFiles/Publications/ccsupp.pdf>), the annual direct cost estimates for corrosion of bridges in the United States is \$8.3 billion, Indirect costs to users, such as traffic delays and lost productivity, were estimated to be as high as 10 times that of direct corrosion costs. In 2013, ASCE estimated that an investment of \$3.6 trillion dollars is needed by 2020 to restore the infrastructure quality to what it was in 1988. The costs and corresponding scope are definitely much greater now.

### SUSTAINABILITY AND EFFECTIVE USE OF RESOURCES

Reuse or repurpose of an existing structure are probably the most sustainable actions one can take

for the environment. Not only do we minimize the use of new materials, such as cement, but we also use the embodied energy and reduce the encapsulated carbon dioxide inside the existing concrete elements. In short, repair is a green initiative.

Nevertheless, the emerging and fast-growing repair, protection, and strengthening industry is facing steep challenges in the following areas:

- Lack of standards and codes;
- Lack of direction and focus in research on repair;
- Effective dissemination of information and knowledge; and
- Proper transfer of repair technologies and expertise.

### INCEPTION OF VISION 2020

To strategically face the challenges of a diverse and fragmented industry, all stakeholders needed to get involved. This was how Vision 2020 started. As a first step, stakeholders of the repair concrete industry were identified. They included representatives from interested professional practitioners (engineers, architects, and material scientists); academia; researchers; government agencies; material and product suppliers; and repair construction contractors.

Under the leadership of the Strategic Development Council (SDC) of the ACI Foundation, chaired by Peter Emmons from Structural Group, the following visioning meetings were held:

- March 2004 in Chicago, IL;
- May 2005 in Sedona, AZ; and
- September 2005 in Baltimore, MD.

The purpose of the meetings was to brainstorm on how the concrete repair industry could move forward coherently and strategically. The unified approach was to create synergy. Goals were identified, possible roadblocks listed, and different approaches and tasks discussed. The result was the formation of Vision 2020 for the concrete repair, protection, and strengthening industry.

*The mission of Vision 2020 is to provide a strategic plan for improvements in the concrete repair industry, making the industry more efficient, effective, green, safe, and fun by year 2020.*

Thirteen goals were identified. Within each goal was a list of strategic actions to be undertaken. For each action, appropriate parties, organizations, or individuals were suggested to be the leaders. In addition, tentative schedules for each task were set. The results were summarized in a document entitled “Vision 2020—A Vision for the Concrete Repair, Protection, and Strengthening Industry.” Figure 1 shows the cover page of the Vision 2020 document with identification of endorsing organizations.

Two new goals were added in 2010, making a total of 15 goals. A summary of the 15 goals is presented in Table 1.0. A detailed description of each goal is presented in the Vision 2020 document.

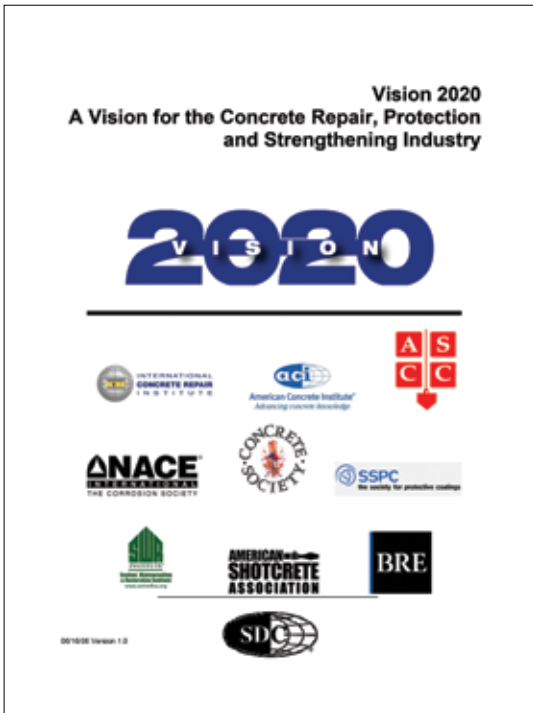


Fig. 1: Vision 2020 document, dated 6/16/2006

TABLE 1.0: 15 GOALS IDENTIFIED FOR VISION 2020

Goal	Description
1	Establish industry-wide cooperation
2	Means to accelerate creation and disseminate documents
3	Establish repair/rehabilitation code
4	Establish supporting reference repair/rehabilitation specifications
5	Repair material design and performance guide
6	Establish guidelines to protect repair construction-related injuries
7	Models validated by experience to predict repair system performance
8	Establish Strategic Repair Research Council
9	Recruiting and training for professionals in repair/rehabilitation
10	Contractual agreement between involved parties
11	Owner education to understand deterioration and life-cycle evaluation
12	New condition assessment technology
13 (on hold)	Develop specific repair system needs
14	Branding and promotion of concrete repair industry
15	Achieving durability and sustainability of concrete repair

To coordinate and implement the vision, a Vision 2020 Repair and Protection Council (Council) was formed. The Council is charged with promoting, monitoring, and coordinating the progress of identified goals and to identify and recommend assignments of specific tasks to appropriate individuals or committees. The initial Chair of the Council was Kelly Page of ICRI; the current Chair is K. Nam Shiu of Walker Restoration Consultants.

The Council is part of the Strategic Development Council (SDC) of the ACI Foundation. Through the Technology Management Committee (TMC) of SDC, Vision 2020 was identified as one of the Industry Critical Technologies (ICT), as shown in Fig. 2. Vision 2020 has been able to use the SDC platform to conduct brainstorming, visioning, and coordinating sessions. In addition, SDC has been providing many of the necessary resources to sponsor special workshops.

It should be noted that the Council does not necessarily lead or undertake the strategic tasks, although many who participated in the Council are actively involved. The primary role of the Council is to coordinate and to make sure specific goals are picked up by appropriate professional committees or key members so that progress can be made.

### VISION 2020 CONCRETE REPAIR COUNCIL ACTIVITIES

The Vision 2020 Repair and Protection Council (Council) has been active in identifying tasks and getting appropriate professional committees and interested parties to lead. Breakout sessions

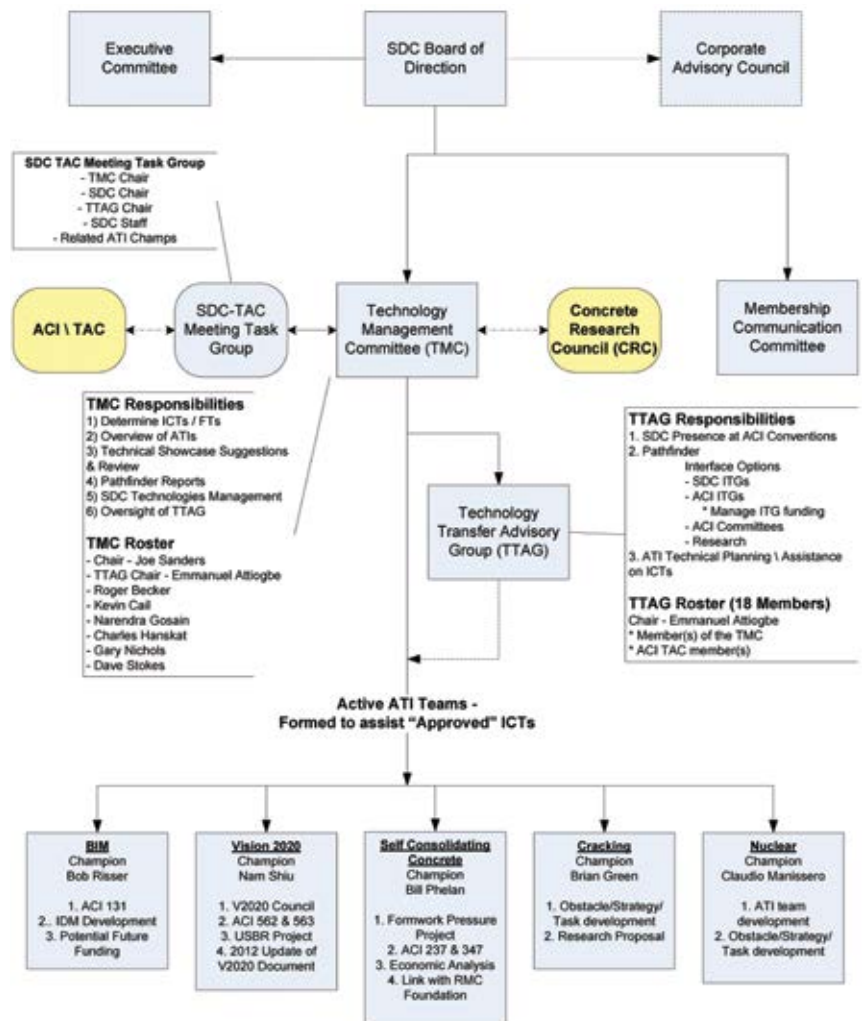


Fig. 2: Organization of SDC and ICT—Vision 2020



have been conducted at regular SDC meetings. In between SDC meetings, telephone conference calls are scheduled to track progress and collect input.

On some occasions, the Council sponsored special workshops, such as the workshop on sustainability in 2012 and the workshop on establishing a Strategic Repair Research Council (SRRC) on July 25, 2013, in Chicago, IL. Specific invitations were sent to interested parties and known stakeholders, such as government agencies and professional organizations. Most of these workshops were sponsored by key organizations such as ACI and ICRI. These workshops have been well-attended and well-represented, with the number of participants ranging from 30 to 80.

Because of the diverse nature of the industry, Vision 2020 has always been actively reaching out to all involved parties. Only then can the Council be able to perceive roadblocks better and understand pitfalls from a wide range of perspectives. It is imperative that industry issues be addressed holistically.

Table 2.0 presents a summary of the Council's sponsored activities in the past 3 years.

### CELEBRATING SUCCESSES

Since 2006, Vision 2020 has been instrumental in a number of key initiatives and advances.

As Table 3.0 shows, there have been a number of actions successfully undertaken in advancing the concrete repair industry in the past 7 years. The unified visioning process has been effective in providing direction and focus to meet the challenges facing the concrete repair industry. Highlighting

and calling attention to the prioritized strategic tasks draws attention and action to areas that have a big impact and significance to the industry. Table 3.0 also shows new strategic tasks as well as accomplished ones.

Some of the more prominent achievements are as follows:

1. Completion of Concrete Repair Code—ACI Committee 562, Evaluation, Repair, and Rehabilitation of Concrete Buildings;
2. Started working on concrete repair specifications—ACI Committee 563, Specifications for Repair of Structural Concrete in Buildings, and ICRI Committee 110, Guide Specifications;
3. Protocol to Evaluate Effectiveness of Concrete Corrosion Protection—U.S. Bureau of Reclamation with Tourney Consulting. Funding of \$250,000 was raised and consultants selected to develop the testing protocol. Research completed in 2013;
4. ICRI Technical Guideline No. 320.3R-2012, "Guide for Inorganic Repair Material Data Sheet Protocol"—ICRI Committee 320, Concrete Repair Materials and Methods; and
5. Formation of a Strategic Repair Research Council (SRRC)—Approval of SRRC as separate ICT by SDC in 2014.

### SUMMARY AND OUTLOOK

Vision 2020 has been effective in getting a diverse and fragmented concrete repair industry moving forward. The process has tried to involve all stakeholders and interested parties by having

**TABLE 2.0: VISION 2020 ACTIVITIES IN THE PAST 3 YEARS**

Year	Date	Location	Activities	Progress
2011	3/10	Niagara on the Lake, ON, Canada	SDC #29 Breakout Session	Update Goals 8, 9, 12, 14, 15, and Vision 2020 revision
	8/4		Conference call on Goal 14	Branding and promotion brainstorming
	9/20	Chicago, IL	SDC #30 Breakout Session	
2012	1/17		Conference call	Planning for second workshop in Chicago
	4/18		Webinar on Goal 15	Sustainability
	4/24	Scottsdale, AZ	SDC #31 Breakout session	
	7/25	Chicago, IL	Second workshop on Vision 2020	Goal 8—Research Council and Goal 12—New Technology Development
	9/6	Quebec City, QC, Canada	SDC #32 Breakout Session	Summary of two new goals; re-visiting Vision 2020
2013	3/5	Charleston, NC	SDC #33 Breakout Session	Established need for Strategic Repair Research Council
	7/2		Conference call	Revised Vision 2020 format; Goal Champions
	9/5	Indianapolis, IN	SDC #34 Breakout Session	Review summary of Goals 1 through 5
2014	8/5		Conference call	Discussed revised 2020 goals
	9/4	San Francisco, CA	SDC #36 Breakout Session	

**TABLE 3.0: SUMMARY OF THE ORIGINAL 13 VISION 2020 GOALS WITH ACCOMPLISHED AND NEW TASKS**

Goal	Accomplished tasks	New tasks
1. Industry-wide cooperation	<ul style="list-style-type: none"> <li>• Established Vision 2020 Repair and Protection Council</li> <li>• Joint ICRI/PTI Document on post-tensioned evaluation and repair: ICRI Technical Guideline No. 320.6-2012, “Guide for Evaluation and Repair of Unbonded Post-Tensioned Concrete Structures”</li> <li>• <i>Concrete Repair Manual</i>, fourth edition</li> <li>• ACI 302.2R-06, “Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials”</li> <li>• ICRI and SWRI: Horizontal Waterproofing Manual</li> </ul>	<ul style="list-style-type: none"> <li>• Update ICRI Technical Guideline No. 710.1-2004, “Guide for Design, Installation, and Maintenance of Protective Polymer Flooring System for Concrete” (Joint Document with SSPC/NACE)</li> <li>• International cooperation</li> </ul>
2. Accelerated industry documents	<ul style="list-style-type: none"> <li>• Established funding of \$250,000 with U.S. Bureau of Reclamation (USBR) for Evaluation Protocol for Corrosion Protection research</li> <li>• Internet portal for concrete repair                             <ul style="list-style-type: none"> <li>○ Fixconcrete.org</li> <li>○ Jointly owned by ACI and ICRI</li> </ul> </li> <li>• ACI 302.2R-06, “Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials”</li> </ul>	
3. Create repair code	<ul style="list-style-type: none"> <li>• ACI 562-13, “Code Requirements for Evaluation, Repair, and Rehabilitation of Concrete Buildings and Commentary,” published in 2013</li> </ul>	<ul style="list-style-type: none"> <li>• Guide to the ACI Committee 562 concrete repair code, to be completed in 2015 by ACI Committee 562 and ICRI Committee 150</li> <li>• ACI Subcommittee 562-E: educational seminars</li> </ul>
4. Create repair specifications	<ul style="list-style-type: none"> <li>• Formation of ACI Committee 563, Specifications for Repair of Structural Concrete in Buildings, and ICRI Committee 110, Guide Specifications</li> </ul>	<ul style="list-style-type: none"> <li>• ACI Committee 563: develop performance-based repair specifications</li> <li>• ICRI Committee 110: develop installation guide specifications</li> <li>• Update ICRI Technical Guideline No. 130.1R-2009, “Guide for Methods of Measurement and Contract Types for Concrete Repair Work”</li> </ul>
5. Improve repair materials	<ul style="list-style-type: none"> <li>• ACI 546.3R-14, “Guide to Materials Selection for Concrete Repair”</li> <li>• ICRI Technical Guideline No. 320.2R-2009, “Selecting and Specifying Repair Materials for Repair of Concrete Surfaces”</li> <li>• ICRI Technical Guideline No. 320.3R-2012, “Guide for Inorganic Repair Material Data Sheet Protocol”</li> <li>• EN1504 Products and Systems and ISO 16311</li> </ul>	<ul style="list-style-type: none"> <li>• Validate Service Life Model                             <ul style="list-style-type: none"> <li>○ ACI Life-365 Software</li> <li>○ Stadium Model derived from Summa Model</li> </ul> </li> <li>• USBR: develop standard test methods to evaluate repair materials</li> </ul>
6. Prevent repair construction injuries	<ul style="list-style-type: none"> <li>• Formation of ICRI Committee 120, Environmental Health and Safety; ICRI Technical Guideline No. 120.1-2009, “Guidelines and Recommendations for Safety in the Concrete Repair Industry”; and ICRI <i>CRB</i> column titled “Safety Solutions.”</li> <li>• ICRI Committee 120 white papers on silica, preserving hearing, and heat-related illness in the repair environment</li> <li>• Formation of Sustainability committees within ICRI and ACI</li> </ul>	

**TABLE 3.0, CONT.**

Goal	Accomplished tasks	New tasks
7. Predict repair system performance	<ul style="list-style-type: none"> <li>• USBR project                             <ul style="list-style-type: none"> <li>○ Funding of \$250,000 established</li> <li>○ Evaluation Protocol for Corrosion Protection Mitigation</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• ACI Committee 365 Life Model, Stadium Model, etc.</li> </ul>
8. Create Strategic Repair Research Council	<ul style="list-style-type: none"> <li>• Established Strategic Repair Research Council (SRRC) in 2012, approved as an ICT at SDC</li> <li>• Funding research through the USBR</li> </ul>	<ul style="list-style-type: none"> <li>• To be positioned with ACI Research Foundation</li> <li>• Collect and identify repair-related research topics</li> </ul>
9. Increase professionals, recruitment, and training	<ul style="list-style-type: none"> <li>• Concrete Industry Management (CIM) Undergraduate Program</li> <li>• CIM at different universities with scholarship program for attending ICRI and ACI conventions</li> </ul>	<ul style="list-style-type: none"> <li>• Universities to establish concrete-repair-related classes and post-graduate program</li> <li>• Repair industry workshop for professors</li> </ul>
10. Improve project relationship, contractual agreement	<ul style="list-style-type: none"> <li>• Established ICRI Committee 130, Procurement Methods and Relationship Arrangements</li> </ul>	<ul style="list-style-type: none"> <li>• Update ICRI Technical Guideline No. 130.1R–2009, “Guide for Methods of Measurement and Contract Types for Concrete Repair Work,” and develop ICRI Technical Guideline No. 130.2, “Procurement of Concrete Restoration Services”</li> </ul>
11. Educate owners	<ul style="list-style-type: none"> <li>• Established ICRI Committee 140, Life-Cycle Performance and Cost</li> </ul>	<ul style="list-style-type: none"> <li>• ICRI Committee 140 to develop “Life-Cycle Performance and Costs” guideline</li> <li>• ICRI Committee 210 to develop “Owner’s Guide to Inspection and Maintenance for Concrete and Masonry Buildings” guideline</li> </ul>
12. New condition assessment technology	<ul style="list-style-type: none"> <li>• Many guidelines developed for how to perform and use condition assessment, such as ACI 364.1R; SEI/ASCE 11-99; SEO/ASCE 30-00, and TCRP Report 157</li> <li>• Promotion of health monitoring with theme of “Structural Health Monitoring System” at Spring 2011 ACI Conference in Houston, TX</li> <li>• ICRI Technical Guideline No. 510.1–2013, “Guide for Electrochemical Techniques to Mitigate Corrosion of Steel for Reinforced Concrete Structures”</li> </ul>	<ul style="list-style-type: none"> <li>• Use of new technologies in condition assessment—for example, laser scanning</li> </ul>
13. Develop specific repair system needs		<ul style="list-style-type: none"> <li>• Research on noncracking concrete</li> <li>• Goal suspended</li> </ul>

strategic action plans prioritized and providing clear direction and focus in advancing the industry.

At the time the Council was formed, the goals appeared lofty and the strategic tasks daunting; however, after a lot of hard work, the results and benefits were equally rewarding. In just 7 years, the repair concrete industry has succeeded in putting together a repair code and has provided many good concrete repair resources, thereby expanding the concrete repair market segment in construction.

Vision 2020 is a living process. Updates and revisions are needed regularly to keep the process vibrant. Since starting in 2006, the Council has already passed the midpoint to year 2020. An effort to update and renew the goals has already started.

With that, two new goals (Goal 14, Branding and Promotion of Concrete Repair Industry, and Goal 15, Concrete Repair Durability and Sustainability) have been added to the original 13, making a total of 15 goals.

Participation of all stakeholders has been the key to the celebrated successes and will continue to be the key in the years to come. Vision 2020 would like to extend an invitation to all who would like to participate and contribute to this worthwhile cause. Please contact K. Nam Shiu for more information.

We look forward to continuing to nurture the emerging and fast-growing concrete repair industry while making our built environment more cost-effective, efficient, and sustainable.



**K. Nam Shiu** is a Senior Vice President and Director of the Restoration Resource Group at Walker Restoration Consultants. He has over 35 years of experience identifying contributing causes of noted distresses and construction-related defects. Shiu has worked with building owners, property management companies, insurance companies, healthcare facilities, and government agencies. Currently, he is focusing on façade and curtain wall evaluations; building leakage evaluations; distress investigation; expert witnessing; and repair design for corrosion-related deterioration. Shiu is a Fellow of ACI and ASCE and is actively involved in a number of ACI technical committees. He is currently serving on the Board of Directors of the Strategic Development Council (SDC) and Chairs the Vision 2020 Repair Council. He is also a member of ICRI.



**Fred Goodwin** is a chemist with over 30 years of experience in the construction chemicals industry, including cement manufacture, research, development, and technical support of grouts, adhesives, coatings, shotcrete, stucco, flooring, and concrete repair materials. He has been with BASF Construction Chemicals, currently as a Fellow Scientist in Product Development, and its predecessors for 25 years. Goodwin is an active member of ICRI, ACI, ASTM International, NACE, SDC, and SSPC. He is a Fellow of ACI and ICRI; an Honorary Member of ASTM Committees C1 and C9; current Chair of the ICRI Technical Activities Committee (TAC); ACI Committee 515, Protective Systems for Concrete; ASTM C09.41, Cement Based Grouts; and SSPC 8.3, Commercial Floor Coatings; and a member of ACI TAC. Goodwin is a guest lecturer for the Grouting Fundamentals short course at the Colorado School of Mines and was awarded the 2006, 2010, and 2012 Editors Award from JCPL as well as the ACI 2011 Delmar Bloem Distinguished Service Award. He is a NACE Corrosion Technologist; the inventor for four U.S. patents; was recently named as one of the top 25 Innovative Thinkers by Technology Publishing; and is a frequent speaker at ICRI, ACI, and SSPC national convention sessions.