

A New Standard for Parking Facilities—Maximizing the Value of Precast for Increased Sustainability in Design and Construction

— Rachel Yoka, LEED AP BD+C, CNU-A

Parking Matters to Sustainability

Parking is often the critical link to our mobility—the connection between where we are and where we want to go. As an industry, parking may not be top of mind as far as sustainability goes, but it should be. Parking and transportation professionals know exactly how important their operations are, linking land use and transportation and crossing the lines between buildings and our roads, bridges, and transit systems.

The International Parking Institute¹ (IPI) is the leading association of parking professionals and the parking industry; members are parking and transportation professionals in the municipal, university, airport, healthcare, and corporate sectors and the business partners that serve them.

IPI recognizes the critical importance of the precast concrete industry to the design and construction of parking facilities. As a result, IPI has partnered with PCI to create advanced educational, networking, and strategic business opportunities tailored to the needs of each organization's membership. These opportunities include collaborative webinars, educational opportunities at annual conferences, and a precast pavilion designed just for PCI members at IPI's upcoming annual Conference and Expo in Las Vegas, Nev., June 29 to July 2, 2015. To learn more about the precast pavilion, contact Brain Miller at bmiller@pci.org.

IPI Creates Sustainability Framework

IPI conducted a landmark survey of its membership to form the basis of a formal sustainability framework in 2011, asking for feedback from parking professionals across all sectors to identify the most relevant and impactful sustainability strategies as an industry. The survey targeted critical strategies that would form a set of guidelines and identified two essential concepts: green building and high-performing building standards for parking structures, and parking facility operations supporting alternative transportation modes.



— Rachel Yoka is vice president of Program Development for the International Parking Institute. Rachel has authored and edited several publications including the first of its kind publication on sustainability and parking design titled “Sustainable Parking Design and Management: A Practitioner’s Handbook.” She served as the certification chair and board member of the Green Parking Council and led the development of the first industry-specific rating system for sustainability in parking structures.

IPI’s *Framework on Sustainability for Parking Design, Management, and Operations*², outlines industry-wide goals and action items that provide education, incentives, and forums for sustainable parking solutions. This document identifies primary strategies that include:

- Make informed decisions based on long-term environmental effects related to material and technology selection.
- Use effective natural resource management and reduce waste.
- Increase education and information sharing and promote the use of rating systems and benchmarking tools such as the *Certified Green Garage Standard* for new and existing parking assets.
- Encourage alternative energy sources and energy savings technology, reduce reliance on fossil fuels, and accommodate alternative fuel vehicles.
- Gather data, conduct research, and document case studies to create a body of knowledge about sustainability in parking.

*Sustainable Parking Design & Management: A Practitioner’s Handbook*³ addresses the complex relationship of sustainability, parking, and transportation. Written by more than 30 experts and peer-reviewed by thought leaders and practitioners in the parking industry, this reference includes chapters on materials, technologies, lighting, and rating systems, including the new Green Garage Standard.

A New Standard Designed for Parking

The Green Parking Council (GPC)⁴, an affiliate of IPI, is an organization that seeks to change the nature of parking. Driven by a vision of parking as part of a solution, the GPC provides leadership and oversight for the conversion of parking facilities to more sustainable, environmentally responsible assets.

“Green Garage Certification will be transformational for our industry. With so many state-of-the-art parking facilities well on the way to certification, we know that these structures will reap rewards from energy and operational efficiencies. New structures can apply the standard to planning, design, and construction—creating better buildings that minimize environmental impacts and maximize mobility across the industry.”

Liliana L. Rambo, CAPP, director of Parking Services, Houston Airport System and chair, International Parking Institute, Alexandria, Va.

Parking professionals acknowledged the importance of the U.S. Green Building Council's LEED ratings system to the sustainability movement. The system has been applied to parking structures in certain circumstances⁵. LEED does not, however, capture the unique attributes of the parking structure building type, in particular with regard to linkages between transportation, parking, and mobility. To fill the gap, GPC developed the *Certified Green Garage Standard*—a new certification and rating system designed specifically for parking structures by parking and transportation professionals who understand the opportunities and challenges these facilities pose.

The *Green Garage Certification Program Guide*⁶ defines an eligible garage as:

A structure designed for the primary purpose of storing vehicles, including multistory stand-alone garages as well as mixed-use structures with a minimum of one supported level above or below grade. Both existing buildings and new construction are eligible for certification. All facilities that participated in the Green Garage Certification BETA or the GPC Demonstrator Site Program are eligible for certification.

The system applies to both proposed/new construction projects as well as existing buildings, including renovation and retrofit for existing facilities. Owners and operators across all sectors have reaped the rewards of energy efficiency measures, saving on energy costs and reducing emissions and pollution from that energy use.

Subject matter experts for each measure reviewed the standard. The Green Garage Certification BETA version (or pilot) of the standard was lauded by reviewers from all relevant disciplines: architecture, engineering, property management, sustainability, energy-efficiency, academia, technology, and urban land management, among others. This process ensured that the program would be applicable and achievable, as well as stringent and meaningful.

This process was enhanced by the BETA program, which had two primary and complementary goals:

- To review and refine the standard by benchmarking it against more than 40 of the most progressive structured parking facilities in the United States and Canada.
- To test the standard against existing garages of varying ages and examine each measure in detail, reviewing objectives, benchmarks, and strategies.

The information and review feedback during this process guided the refinement of the standard prior to its release in June 2014. GPC and IPI are currently partnering with the Green Building Certification Institute (GBCI), the certification arm of the U. S. Green Building Council (USGBC), to promote and implement the Standard. This partnership will enhance not only Green Garage Certification, but sustainability throughout the real estate, parking, and transportation industries.

Essentials of the Standard

Garages can pursue a maximum of 248 points in the 48 program measures. To encourage a balanced approach to sustainability, facilities must achieve a minimum threshold of 20 points in each of the three main categories, described below. Green Garage Certification recognizes garages at Bronze, Silver, and Gold certification levels. Bronze level is awarded at 110 or more certification points; Silver between 135 and 159 points; and Gold at 160 or more.

The measures are organized in three major categories that provide a range of choices with multiple compliance paths, as well as a fourth category for innovation:

- Category A: The Management category focuses on operational decisions that maximize the use of a parking asset while limiting waste. Key considerations in this category include leadership, staff education, and physical and infrastructure needs. Measures of particular relevance include proactive operational maintenance, cleaning procedures, construction waste management, regional and recycled materials, and life-cycle assessment.
- Category B: The Programs category supports new revenue sources, increases customer service, and provides greater marketability. These measures address ingress/egress, alternative mobility solutions, and opportunities for community involvement. Key considerations include garage functionality, Transportation Demand Management (TDM), transportation choices, vehicle choices, patrons, and factors that affect all who interact with the facility.
- Category C: The Technology and Structure Design category addresses the physical attributes that increase energy efficiency, decrease waste, and support mobility. Key considerations include energy sources, energy efficiency, water use and reuse, and technology and materials choices. Measures of particular relevance include coatings, paints, and sealants; ventilation systems; roofing systems; and design for durability.
- Category D: The Innovation category is a provision to address strategies not yet included within the program. This category awards additional points for strategies not specifically included, extraordinary successes in existing measures, and creativity in new technologies, materials, and programs.

The certification program is contained in two primary documents. The *Green Garage Certification Program Guide* contains application procedures, program requirements, and a breakdown of criteria by certification level. Available as a free download, it is frequently updated and provides an introduction to those who seek basic information about certification.

The *Green Garage Certification Standard* is a technical reference document that outlines performance measures and documentation requirements. It draws heavily on the relative experience of LEED, Green Globes, and other ratings systems and applies some of the same relevant and accepted standards. Each measure contains objectives, point values, compliance paths, best practices, and short case studies. At this time, it does not contain prerequisites or mandatory measures. These documents are supplemented by in-person training sessions for Green Garage Assessors and workshops offered to train parking and transportation professionals, as well as design and construction professionals.

Relevant Measures for the Precast and Parking Industries

Each of the measures was included in the standard due to its specific relevance to the asset type. Highlighted here are a few selected strategies to illustrate how the standard approaches the certification process and particularly how precast concrete can contribute to certification.

Six Ways to Get up to Speed Fast on Green Garage Certification:

1. Get a free subscription to *The Parking Professional* magazine. Send an email to membership@parking.org and request a six-month subscription as a PCI member.
2. Download the free Green Garage Certification Program Guide at www.greenparkingcouncil.com/freeCERT.
3. Find a trained Green Garage Assessor to certify facilities. Or become one yourself! Details at www.greenparkingcouncil.com/gga.
4. Invest a few dollars in a copy of the standard—you will need this essential reference to certification. www.greenparkingcouncil.org/certified-green-garages/green-garage-certification-standard/
5. Sign up for the IPI Insider and GPC newsletter at www.parking.org/publications/ipinsider-e-newsletter/subscribe-to-the-ipinsider.aspx and www.greenparkingcouncil.com/news.
6. Attend IPI in Las Vegas, Nev., and participate in the PCI member-only Precast Concrete Pavilion. Contact Bonnie Watts at watts@parking.org.

Measure A1: Parking Pricing. Listed first in the standard, the “parking structure charges for the use of parking spaces, allowing for economic and market conditions to impact patrons’ decisions on mode of travel.” This measure has significant transportation effects; any pricing affects travel choices. There are many best practices to maximize both the environmental and economic effects of this measure.

Measure A11: Regional Materials for New Construction, Rehabilitation, or Retrofit. This measure is intended to encourage the use of regional materials, which limit the transportation effects of obtaining materials from farther distances that generate increased carbon emissions, fuel use, and pollution. Additionally, this practice supports the local/regional economy. Materials that are manufactured within 300 miles of the project site can earn the facility three or six points. Precast concrete typically makes up a considerable portion of the materials used in garage construction, allowing for many facilities to earn these points through the use of precast concrete alone.

Measure A14: Third-Party Sustainability Certification. Facilities that have achieved a third-party sustainability certification, including LEED and Green Globes, will receive high points under this measure. Structures that achieve greater ratings are awarded the highest point values on a weighted scale. To ensure widespread applicability, it allows for two points under Energy Star Portfolio Manager and the Urban Land Institute (ULI) Greenprint Performance programs. Under each of these programs, using precast concrete in garage construction can add point value toward third-party certification. For example, under LEED for New Construction, points earned for roofing systems contribute to certification, which can then be applied under the roofing systems measure described below.

Measure C5: Electric Vehicle (EV) Charging Stations.

This measure is intended to facilitate EV infrastructure to advance adoption of EVs. This measure allows multiple choices to accommodate Level I, Level II, and DC Fast Charging. Point values range and increase as charging times decrease. Facilities that provide EV charging to customers for free garner an extra point. Best practices include integrating charging stations with on-site renewable energy generation or renewable energy purchase programs to link EVs to clean energy.

Measure C15: Roofing Systems: This measure aims to incentivize roofing systems that provide greater environmental benefit. Options include green roof systems, blue roof systems, cool roofing materials, photovoltaic arrays, and high Solar Reflectance Index (SRI) value materials. For most parking operations, the roof of the structure is used for parking cars, making high SRI values the simplest and most cost-effective compliance path. Precast concrete can add considerable value here, merely by specifying a high SRI value concrete mix at the roof level, to combat urban heat island effect.

These measures demonstrate how the standard approaches sustainability and adapts to the unique opportunities in parking garage design and construction, including the benefits afforded by precast concrete toward certification.


Advancing Sustainability

The garages in the planning phases now extend far beyond standard industry practice today. The *Green Garage Certification Standard* is designed to innovate, advance these benchmarks, and provide guidance in the design and construction of new facilities. Precast concrete plays a pivotal role in the certification process. To learn more about the standard, and download the handbook, please visit www.greenparkingcouncil.org.

“Nationally, over half of parking structures are constructed of structural precast concrete. Precast concrete is recognized by and can contribute points under Green Garage Certification. Green Garage Certification recognizes and promotes smart use of precast concrete elements, and parking facilities can earn Certification points for employing sustainable precast practices. Anyone planning a new garage or expansion should pay close attention to the Green Garage Standard.”

Paul Wessel, executive director, Green Parking Council

References

1. www.parking.org.
2. <https://www.parking.org/knowledge-center/sustainability.aspx>.
3. <http://www.parking.org/publications/green-book.aspx>.
4. <http://www.greenparkingcouncil.org/>.
5. Per the Minimum Program Requirements and Supplemental Guidance to the Minimum Program Requirements published by USGBC under the LEED rating system, parking garages are not and were not intended to be certified under LEED. For more information, please reference www.usgbc.org.
6. <http://www.greenparkingcouncil.org/downloads/GGCPProgramGuide.pdf>. 

For more information on these or other projects, visit www.pci.org/ascnt.

Making the Most, of a Second Chance

Timothy Haahs has designed parking and mixed-use structures to revitalize neighborhoods after he was given his own second chance

— Craig A. Shutt



Timothy Haahs, PE, AIA

Timothy Haahs, PE, AIA, started his design firm in 1994 with the goal of using parking and mixed-use designs to create more active, sustainable, and walkable “people places.” His company encourages sustainable design and employee growth, revitalizing everything from the planet to the individual. Haahs established these goals after a life-changing event. He passed out behind the wheel of his car at a speed of 75 mph, a near-tragedy that revealed he suffered from a life-threatening illness.

Haahs had established a successful career in the parking-design industry, becoming a principal at Walker Parking Consultants over the course of the previous 10 years. Following his car accident, he discovered he had cardiomyopathy, a virus that had permanently damaged his heart muscles. Two years of trying multiple procedures, including pacemakers, defibrillators, and various medications, failed to improve his condition. He ultimately was admitted to the hospital and spent six months there awaiting a heart transplant. The chances of finding an appropriate donor and successfully transplanting the heart left his long-term survival potential at about 25%.



The Annapolis Towne Centre Garage provides dedicated spaces that help support the wide variety of uses for the facility, including banking, retail, condominiums, apartments, luxury hotel, fitness center, office space, and restaurants. Photo: TimHaahs.

“I spent a lot of time thinking, reading the Bible, and reviewing my life,” he says. “When I finally did receive my transplant, I was given a second chance. I decided to start a new company of my own and try to give a second chance to others.”

His interest in parking structures developed during his years at the University of Pennsylvania, where he obtained his Bachelor’s and Master’s degrees in engineering. After several years working in the nuclear power-plant industry, he was intrigued by the opportunity to work at a parking-design firm.

“In college, we’d studied transportation, environmental issues, and structural design at the same time to encourage us to consider all aspects of engineering,” he explains. “I was interested in how I could integrate them. I saw parking structures as the

perfect combination of all three.”

His illness also proved to be one of the catalysts for the founding of Timothy Haahs & Associates, Inc. in Blue Bell, Pa. The firm’s mission statement (“We exist to help those in need”) manifests itself through its support of a variety of medical, religious, and charitable organizations. He also co-founded Calvary Vision Church in 1996. In 1998, he was installed as one of the pastors, and the church currently has more than 200 parishioners. (For more on the company’s employee programs, see the sidebar.)

Parking’s Key Role

When Haahs entered the parking field, the industry showed great potential for improvement, since it tended to be considered more of an afterthought, he notes. “At the time, it was assumed parking had to be an ugly,

functional aspect of a project, added after the rest of the building program was designed. But it doesn't have to be isolated and treated that way. It should be considered part of the living space, which will lead to making it more attractive and integrated."

'Parking is never the ultimate destination for those using it, but it's the first and last impression they have.'

Parking plays a key role in attracting visitors and setting the tone, he says. "Parking is never the ultimate destination for those using it, but it's the first and last impression they have. I wanted to capitalize on that interaction and integrate parking with other functions. It was important to convince owners of that significance and to ensure parking designers are invited to work with planners from the beginning."

An example of the role parking plays can be seen at the Philadelphia Zoo Centennial District Intermodal Facility, a four-story, 683-space parking structure built at America's first zoo. The \$24-million project at the landmark facility, which attracts 1.2 million visitors per year, improved traffic flow and created a plaza near the main stair tower. The total-precast concrete structure features a "teardrop" shaped concrete seating wall and curved concrete seating to create a community space. The zoo partnered with the city's Mural Arts Program to create colorful, animal-themed murals on the structure's side.

The facility incorporates a pedestrian ramp along its exterior that offers families a convenient and more interesting experience to reach the ground floor. The structure was designed to incorporate retail spaces to further enhance ground-level activity, but the recession curtailed those plans. "It's still possible to include it if they want that in the future," says Haahs.



Large murals decorate the façade of the new precast concrete parking structure at the Philadelphia Zoo Centennial District Intermodal Facility. The project added parking while improving traffic flow and creating a community-centric plaza. Photo: Steve Wolfe Photography.

Great Aesthetic Versatility

Although parking designs in the past maintained a traditional look, those limitations have been relaxed in recent years, he notes. "Parking offers great versatility, because their designs are totally open." Housing, he argues, is limited, because it has to resemble housing and be economical. "As a result, most housing designs look the same. So do offices. Whereas parking can have a traditional look to blend in, or it can be wild, to stand out. We're seeing more contemporary designs. It's a very exciting time."

Urban facilities create particular design challenges. "Parking structures in urban areas need to be more creative. It's important to make those designs attractive and integrate them with the other uses." But hiding the function doesn't always provide the most effective approach. "In many cases, you need parking to look like parking to ensure users recognize it for its function and can be directed to its entrance."

An example is the Annapolis Towne Centre Garage, where developers of the mixed-use facility wanted an attractive "downtown" look that minimized the facility's mass. A wide palette of precast concrete colors and sandblast finishes were used in conjunction with ornamental metal accents, providing a warm, low-scale, and residential feel.

"The garages are integral to the success of this specialized mixed-use development," he says. The center incorporates banking, retail, condominiums, apartments, luxury hotel, fitness center, office space, and restaurants. "The garages includes dedicated areas for these groups, separating the residential parkers from employees and visitors."

Redevelopment Catalyst

Parking facilities can go beyond providing an attractive, functional facility to being a pivotal part of revitalizing a neighborhood. "Many designers give no thought to the foot traffic that a parking structure generates," he says. "In fact, parking can be the catalyst for redevelopment." Many times, attempts to revitalize an area fail because not enough thought was put into providing sufficient parking facilities, which visitors require to frequent a development. "Parking has to integrate with retail areas, or the retail won't succeed."

The Channelside District parking structure in Tampa, Fla., is an example of how parking can encourage growth. Officials at the Tampa Port Authority recognized the need to provide more parking infrastructure as the district's popularity as a dining and entertainment center grew. The design-build project, a \$13.39-million horizontal



High performance and durability were requirements for the Channelside District parking structure in Tampa, Fla., situated along a Tampa Bay inlet. The facility was designed to encourage more visitors to come to the popular dining and entertainment district.

expansion of existing facilities, continues the original aesthetic design while enhancing the streetscape with textured screening over the precast concrete structure, plus vibrant lighting features and landscaping.

Aiding the versatility of parking designs is the way in which precast concrete can be shaped and blended with other materials to create exciting, durable structures. "Designers in the Northeast are very big on precast concrete due to the short construction season and durability of the material" he says. "It's faster to build with precast concrete."

Haahs has tried a variety of new techniques, including corrosion inhibitors and carbon-fiber reinforcement.

But precast concrete's durability already is a plus. "Precast concrete provides high strength due to the fabrication process. We commonly find compressive strengths of 6,000-psi, or higher whether we need it or not. That creates a very durable structure. With cast-in-place concrete, we often fight to reach 4,000 psi."

As the industry evolves, so does his firm. It opened its first regional office in Miami in 2005, followed by two more openings in Atlanta, Ga., and New Brunswick, N.J., four years later. A Jacksonville, Fla., office opened in 2014. In 2012, the firm expanded its international practice with work in China, South Korea, and the Middle East.


Haahs' Best Practices

TimHaahs was first named one of The Best Places to Work by *Structural Engineer* magazine in 2007, and its programs to encourage growth among employees have grown since then. They include:

- TimHaahs University, which offers required and elective courses to employees on key issues.
- Pathway to Principal, a mentoring program that promotes leadership qualities in employees.
- Tuition reimbursement for relevant classes at local universities.
- The Extra Mile Award for outstanding service.
- Annual company retreat.
- TimHaahs Improvement Memo (T.I.M.) program, which ensures suggestions receive quick resolution and implementation.
- A variety of charitable-donation programs and support for various organizations.

Haahs also has spoken to a variety of groups, including the United Nations Economics and Social Commission for Asia and the Pacific.

"Our expansion is a direct result of what I went through," says Haahs, who had to undergo a second heart transplant in 1997 ("a perfect match"). "I learned I had to keep moving and growing, so when opportunities arose I took them. The new offices opened when clients told us they wanted us to work in those areas."

No matter where the industry moves in the future, Haahs will continue to focus on improving cities through educating his clients that parking should remain a key part of the planning. "The widespread success of town centers today is attributable to their ability to provide people with an exciting place to live, work, and play," he says. "Parking has and will continue to play a critical role in that success, providing essential infrastructure while creating a vibrant sense of community that so many people desire." 

For more information on these or other projects, visit www.pci.org/ascent.