



Decision Guideposts Lead to PARKING SUCCESS

Creating the best parking garage for the site users, and budget requires a careful balance of elements and a logical plan from start to finish. From the initial commitment when marketing and size basics are decided until the parking garage opens, a host of choices must be made that will affect the final design and success of the project. This guide, created by the Precast/Prestressed Concrete Institute, shows the critical path that owners must take to create a successful project.

The timeline points out the dramatic difference the precaster can make if the firm is brought into the construction team at the beginning planning stages rather than at a later date. This expertise and input can help minimize cost and time needed to erect the finished project. By bringing the design professionals and precaster together, owners can ensure maximum efficiency, speed, and use of funds.

THE DESIGN TEAM AT WORK

The precast professional's expertise goes far beyond material production. Bringing the precast specialty contractor into the design team at the beginning of the planning stages provides a host of benefits that can be overlooked until seen first-hand. Creating a strategic partnership that includes the precaster allows communication to flow easily and ensures that owners get the best-looking, best-used, and most cost effective structure possible.



COMMITMENT

NUMBER OF CARS NEEDED
BUDGET
FINANCING

DEVELOP DESIGN AND BUILD TEAM

DESIGN DISCIPLINES: ARCHITECT/ENGINEER
TRAFFIC, PRECASTER/SPECIALITY CONTRACTORS/CONTRACTOR



Owners first must decide that a parking garage makes economic and aesthetic sense for their project—and more and more they are doing so. As space becomes more limited, owners are realizing that a well-designed garage can serve their tenants and neighborhoods and pay back its cost in a short period.

The next consideration is the number of spaces needed. This must take into account such factors as future growth and additional traffic that may be drawn to the site by an eye-catching garage providing weather protection and security. A sharp eye to your layout and design are required to insure that you do not build more structure than is needed.

Owners also must examine their available funds and possible financing sources.

Creating a design team that includes all of the major project contributors ensures that each element of the process is considered from every angle. This partnering concept maximizes communication and improves efficiency throughout the channel. This further enhances cost effectiveness and sharpens the focus on problem solving and heightened constructability. Bringing the precast specialty contractor into the team during the early planning stages benefits every contributor, by allowing them to tap into his technical expertise, engineering competence, and manufacturing experience.



The precaster can take the mystery out of many design parameters, including performance characteristics, durability requirements, life cycle needs, and cost potentials. When the entire team understands the performance capabilities that can be reached and each option that can achieve those, the proper solutions become apparent.

Precast concrete, for instance, can provide extremely high-performance mixes that offer considerably longer life spans at a relatively low cost for parking decks and bridges. These mixes also can offer higher strength, making it easier to design long spans and fewer columns, which provide new and innovative options. But they must be considered before design decisions are finalized.



SITE SELECTION

- ACCESS TO LOCAL FEEDERS
- TRAFFIC IN AREA
- INFRASTRUCTURE AVAILABLE

SET BUDGET

- GUARANTEED MAXIMUM PRICE

DESIGN ELEMENTS

- STRUCTURAL CONSIDERATIONS
- FRAME ANALYSIS AESTHETICS
- CODE COMPLIANCE

Choosing the proper location and alignment for a structure on a larger site requires consideration of a variety of factors. Key points will include access to local feeder lanes and how cars will approach the garage and rejoin surrounding traffic. These must be designed smoothly to prevent back-ups that disrupt flow inside the garage or outside in

Sometimes, setting a construction budget can be as much an art as a science, with many variables difficult to pin down until construction begins. Precasters can be invaluable in this process by providing years of experience in establishing materials budgets that take into account a host of variables and other factors. They can assist the owner in

When it comes to the design elements basic to every parking garage, precasters can aid owners and engineers in a host of ways. These include:

Structural considerations, including the design of the ramp configuration, number of levels needed, how to place columns and beams, and how many structural supports will be needed. Many garages today are designed to be as open as possible to enhance security needs, making these critical components. The precaster can offer experience and perspective on the options for span clearances and openings to the surrounding environment.

Frame analysis, which has become more expansive recently with new seismic considerations and other new approaches to designing the basic garage framework. Many cost-effective designs are becoming popular, and precasters can explain the state-of-the-art ideas now being used around the country.

Aesthetics, which are vital if the structure must match surrounding building styles or create its own design statement to attract users. Garages can meet any aesthetic challenge thanks to precast's ability to mimic expensive stones, such as granite and limestone, plus the capability to produce a wide range of textures and colors.

Code compliance. Precasters can supply immediate expertise in meeting structural and fire codes, especially as they relate to the latest approaches to seismic conditions. These codes have been changing in recent years due to more studies and information from earthquakes and other natural disasters, and precasters are up to date on how best to meet the more-stringent needs now incorporated into codes.

Security can be achieved in a building's design by planning for open space, eliminating nooks and crannies where someone could hide, and allowing plentiful amounts of daylight to stream into the interior and brighten the space. These and other considerations can be worked out with the precaster to ensure users are reassured not only by mechanical



on-going traffic. This may mean including ramps or access lanes leading up to the garage rather than building it adjacent to the traffic lanes.

Owners must also examine the existing infrastructure and determine how much will have to be added to accommodate the new structure. This includes not only drainage and electricity but also possible space for access lanes and traffic lights to alleviate congestion.

creating a guaranteed maximum price that contractors can assure will not be breached. This assistance can be especially useful in parking structures where the precast specialty contract may involve as much as 50% to 70% of the total project. Careful cost monitoring along the way helps ensure a profitable project that operates as designed. Close partnering among the design team, including the precaster, ensures long-term success.



Photo: Grant R. James

and personnel aids but by the intrinsic design scheme as well.

Proper lighting reassures users that the structure is secure, and it also projects a warm, inviting atmosphere that impacts marketing as much as functional need. In addition, planning this system in conjunction with graphics and stair access ensures user friendliness. The precaster can provide considerable input into the design of components and floor plans to ensure structural elements maximize illumination needs in a cost-effective manner.

Drainage remains a critical component of every project, for water that is allowed to pond or stagnate will not only create a dowdy image but will also cause corrosion and higher maintenance costs. Precasters can ensure that drainage systems are designed to maximize the material's advantages in replication of components and joint locations.

Traffic must flow smoothly from level to level. This will depend on the space available, layout of the floor, and other decisions based on desired flow. In addition, exits and

entrances must be designed to make it clear how they operate and steer users to the proper locations. All of these can be designed into the initial look with the precaster's expertise.

Cashiering options, including paying before or after retrieving the car, the use of cards with magnetic strips, or monthly payments with passes, affect how the garage is designed and flows. The decision also impacts how effectively the structure works for its users.

Durability, is inherent within a precast structural system providing safeguards that will prevent corrosion and provide a long service-life. Precast manufacturers routinely use type III high early-strength cements as well as extremely low water cement ratios in their casting processes. This results in 3,000-5,000 psi design strengths overnight, which translates into 7,000-9,000 psi routinely in field applications. The inherent attributes of precast and prestressed manufacturing deliver built in durability and performance resulting in reduced maintenance costs.

COST CONTROL

- SECURITY
- PROPER LIGHTING
- DRAINAGE
- TRAFFIC
- CASHIERING
- DURABILITY
- MONITOR PRICE
- CODE OPTIONS
- ALTERNATIVES VALUE ENGINEERING

Once a budget is set, controlling the unseen and unpredictable elements becomes a critical component to success for the project. Precasters excel at this element, due to their ability to control casting in the factory. This means that material production can begin before site preparation is finished, which speeds construction. It also ensures that components can be created and erected even if the weather turns harsh, thus eliminating one category of cost overages.

In addition, precasters can provide careful price monitoring as components are produced and erected, ensuring budgets were estimated correctly and remain on target.

They also can be sure that all code options are used effectively, keeping the project safe and secure while minimizing



budget concerns. Precasters can provide alternatives to such components as toppings, stone inserts, and other aesthetic and maintenance needs.

Value engineering by the precaster can ensure the owner has made the proper choice. This approach estimates the costs for other potential materials or designs, ensuring that other options have not been overlooked that would save time or money.



CONSTRUCTABILITY

SITE RESTRICTIONS
OWNER REQUIREMENTS
SITE LOGISTICS

SCHEDULING

PROJECT MANAGEMENT

SERVICE LIFE OPTIONS

MAINTENANCE PROGRAMS
MONITORING

WARRANTY



Scheduling, to ensure each trade has access to the needed spaces when those crews have been scheduled to be there.

Project management, which focuses on bringing all the elements together rather than keeping each construction-team member focused on a specific element of design, construction, materials, or systems. The goal must be to create a structure that works together as an efficient and cost-effective whole.

The owner's needs – and costs – don't end once the garage is constructed. Maintenance programs are a major part of any parking garage budget, and they should be considered from the beginning. Once the structure is built, the precaster can help the owner create a maintenance timetable that ensures the garage remains in top condition throughout its service life.

Such a program includes a monitoring schedule that allows the owner's representa-

Once the site is selected and the design is approved from structural, aesthetic, and budgetary aspects, there are additional considerations before the project can be built. These include:

Site restrictions, including nearby buildings that will require special efforts to bring in materials or erect components.

Owner requirements, including minimal disruption to the site so business can continue to be conducted or customers can access adjoining locations, matching existing styles and scales of architecture, or working during off-peak hours.

Site logistics, including the need to close off streets or avoid damage to a wooded location.



Photo: Gabriel Benzur, 1995



tives to inspect the structure quickly and thoroughly. This is made easier with precast concrete, because it provides flexural component joints. With this flex provided from the beginning, the joints offer a precise and easily inspected source for any maintenance problem, unlike other materials that could crack at any point as freeze/thaw conditions cause flex.

Precasters often can supply detailed information on how to maintain the structure, including information on when to inspect joints and sealants, and how often to update caulks or toppings. In some cases, precasters even will offer a warranty to assure owners that the materials used in construction will meet the goals, provided maintenance is performed as scheduled.