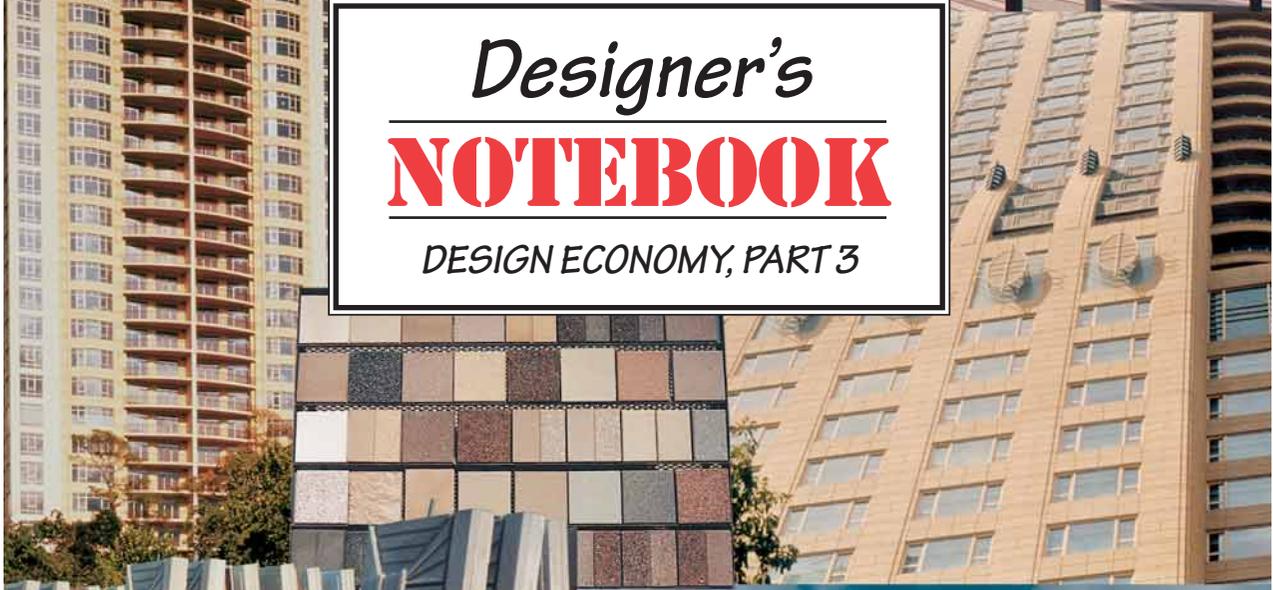




Designer's
NOTEBOOK
DESIGN ECONOMY, PART 3



Design Economy – Article XII (Part 3)

PCI's Architectural Precast Concrete Services Committee offers insight on the architectural precast manufacturing process to help achieve design goals and control costs

With architectural perspective by Kevin Cantley, President and CEO, Cooper Carry

Douglas County Courthouse, Douglasville, Ga.



The new Douglas County Courthouse in Douglasville, Ga., unified the county's administrative and judicial spaces in a single facility for the first time in the county's 127-year history. A monumental project for the community, the client desired a dignified facility with rich materials and architectural details at the pedestrian level to give the building a more elegant character.

Accomplished through traditional architecture, the design incorporates architectural precast concrete with true classical proportioning systems such as columns, cornices, and pediments. The detailing of fine architectural features and forming of unusual shapes were accomplished through the use of architectural precast concrete. Tapered, fluted columns create a feature focal point at the main entrance, a 40-foot diameter rotunda that separates and unifies the administrative offices and court facilities. — Kevin Cantley, Cooper Carry

Design Options

Design options are literally endless. Employing these options intelligently adds a great deal of design interest to a project with only minimal cost increases. The following design strategies can cost from pennies per square foot to a few dollars per square foot.

1. Incorporate multiple colors throughout a building façade.
 - a. Panels can contain more than one concrete face mix.
 - b. Panels can be produced with multiple finishes. The combination of finish methods will determine the cost impact.
2. Add a special shape to one distinct building area.
 - a. Design an appendage to an existing form. Doing so will cost less than adding a full form, yet will provide a nice building detail.
 - b. Set windows back from the building's face at one or two column bays or at certain levels.
 - c. Add a few small ornate pieces at the entrance or as site walls. The small panels will be more expensive per square foot, but a few of them amortized over the entire project will add a minimal additional charge (\$15,000 increase/30,000 square feet = \$.50 premium).
3. Apply a partial facing material to the precast at the plant. Brick, tile, terra cotta or natural stone accents can be added in limited number at minimal cost.

Architectural Precast Economies Versus Other Materials



Coca-Cola Parking Structure
Atlanta

SunTrust Parking Structure
Atlanta

4. On steel-frame structures, gravity and lateral support brackets (for precast connections) should be in the structural steel fabricator's scope of work and should be shop-welded to the structural-steel columns rather than field-welded. It is much less expensive to shop-fabricate and shop-weld them than to hoist and field-weld heavy support brackets.

In most cases, design interest can be enhanced without increasing price by using more complex precast in one area and offsetting the cost premium by economizing in another area. For example, trade some details for more repetition. Eliminate small column covers at one level and place more ornate ones at the entrance.

Architectural precast offers many cost advantages over other cladding materials. Precast is produced all year round in a controlled, cost-efficient production environment. In addition, precast can be installed year round even in harsh winter conditions. This eliminates the need for costly winter weather protection and contributes significantly to compressing the overall building schedule.

Architectural precast can enclose the project quicker than any other cladding material. Typically, more than 1,000 square feet can be installed each day (10 pieces per day at 100 square foot each). Precast's installation speed can shave months from a construction schedule, thus reducing construction financing cost.

Precast spandrel panels commonly are used as a vehicle-impact restraint in parking structures in addition to providing a perimeter design feature. Doing so eliminates the need for an upturned cast-in-place concrete beam or a cable system.



Cooper Carry has recently completed two parking facilities in Atlanta using architectural precast concrete as the primary building material. The Coca-Cola Parking Facility, an 825-car, five-story deck located at the company's headquarter complex, is constructed of precast concrete panels on a cast-in-place concrete structure. The SunTrust Parking Deck, a 750-car, eight-level parking facility located on an urban site, used architectural precast panels, textured-coated concrete and brick.
— Kevin Cantley, Cooper Carry

Architectural precast panels can span great distances (20 to 60 feet) and be connected directly or adjacent to structural columns. This advantage allows the designer to control the gravity loads to reduce the structural-framing costs.

Precast can be stacked onto a foundation. This way all precast gravity loads of a multistory building can be transferred vertically through each panel and ultimately onto the foundation. Where this design is used, the structural-steel frame resists precast's wind loads only, permitting the frame steel to be lighter and less expensive. This design must allow for building drift.

In high-rise construction, vertical precast panels can span multiple floors. Multiple vertical floor spans of precast panels require gravity loads to be supported at only one floor per panel (every two or three floors.) That way, the majority of the floors can be designed without the need to support the gravity loads of the exterior skin, reducing the overall structure's cost. This approach may not be practical in high seismic zones due to drift requirements.



*Scientific Atlanta
Corporate Headquarters,
Lawrenceville, Ga.*

Located in Lawrenceville, Ga., the new corporate headquarters for Scientific Atlanta is a campus development of four office buildings oriented around a centrally located entry pavilion. Each office building is four levels and 150,000 square feet and is interconnected by enclosed bridge structures. The campus also includes two parking decks that accommodate 2,200 cars.

The headquarters development, completed in two phases over a three-year time frame, is designed with smooth and retarded finish architectural precast concrete and low-E insulating vision glass. The efficient, rectangular design of the office buildings allowed spans of 30-foot precast concrete panels to be used, which was an economical design solution. The circular form of the entry pavilion was formed with architectural precast to provide a contrasting element that identifies the entrance to the campus and complements the design of the office buildings. Alternating precast finishes provided a clean architectural vocabulary that is aesthetically pleasing in its natural environment.

During the early stages of design, precast was recognized as providing durability, ease of maintenance and a cost-effective solution to the building skin. — Kevin Cantley, Cooper Carry

Routinely, precast panels provide support for gravity and wind loads of other material, such as windows, curtain walls, storefronts and sometimes even brick. This capability reduces the framing cost of these adjacent cladding materials and reduces structure costs.

More expensive traditional materials can be replaced with cost-efficient architectural precast. Precast can be colored and textured to mimic natural stone (granite, marble,

State Farm
Insurance Companies
Operations Center
Duluth, Ga.



Cooper Carry served as the architect in the design-build delivery approach to provide a new operations center for the State Farm Insurance Companies. The four-story, 135,000-square-foot center is located on nine acres in John's Creek Technology Park, which contains primarily low-rise, brick buildings in Duluth, Ga. Completed on a fast-track schedule, the project used architectural precast concrete panels because the panels could be manufactured while the structural frame was under construction. As soon as the structural frame was complete, large components of the exterior precast concrete skin were put in place, ready to receive the window framing system. — Kevin Cantley, Cooper Carry

limestone, sandstone or slate). Or, these materials can be cast integrally into the exterior face of precast panels. This latter fabrication method reduces the contractor's financial risk by assigning the stone responsibility to the precast manufacturer. In addition, time-consuming and costly on-site stone installation costs are completely eliminated.

More and more, brick-faced precast panels are being substituted for field-laid masonry for many reasons: cost savings, brick material shortages, qualified mason shortages, owner's schedule requirements and winter construction.

Summary

Early in the design phase, the designer should evaluate all the factors influencing the economics of a particular architectural precast concrete project. To arrive at an optimized solution, the designer will need to seek early consultation with a local precaster. The precaster should be challenged to suggest options for creating a good economical design that also satisfies the designer's aesthetic requirements.

If possible, the designer should visit manufacturing plants, as well as projects under construction. This way the designer can become familiar with the manufacturing and installation processes. Such tasks as mold fabrication, challenges to casting and finishing specific designs or shapes, relative material costs, handling methods at the plant and jobsite, and approaches for connecting panels to a structure are important to fully understand in order to optimize the cost of the precast concrete.