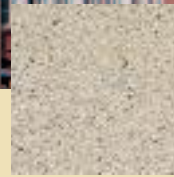


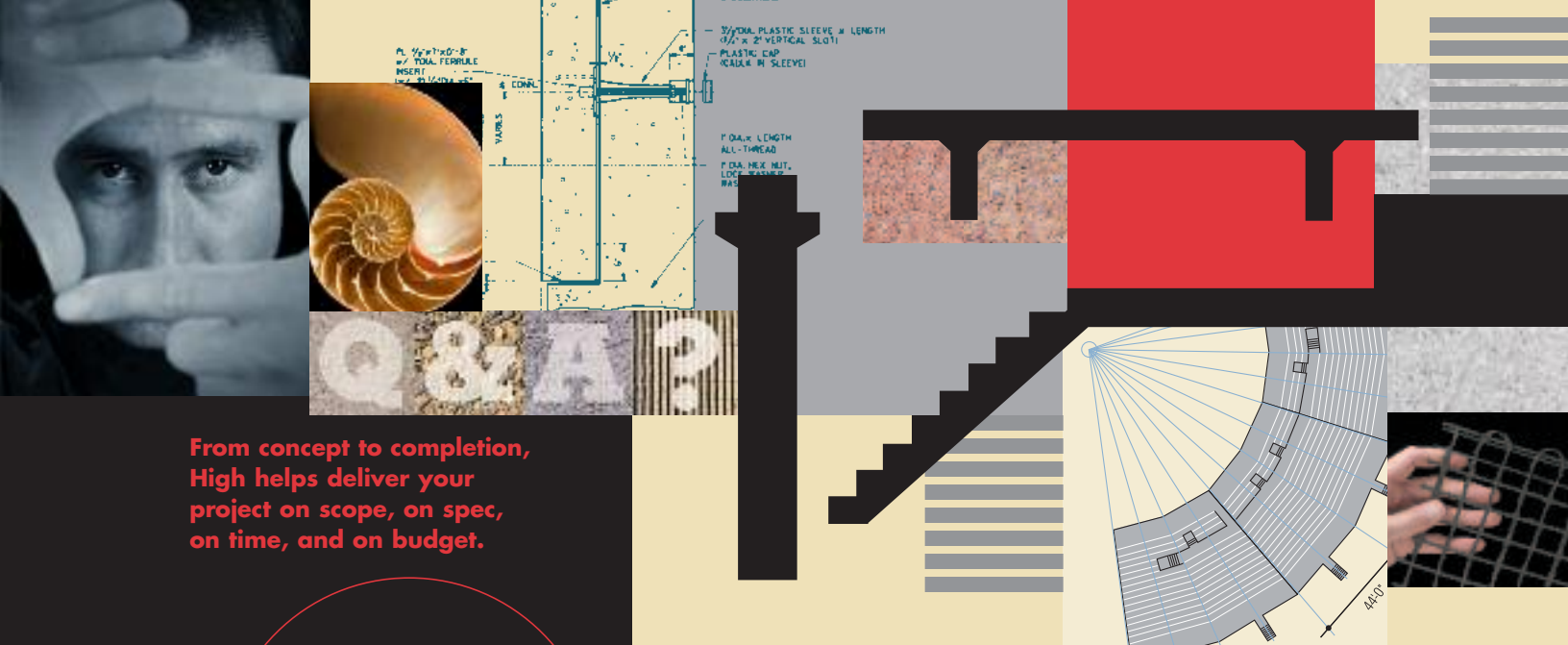
HIGH PRECAST STADIUM AND ARENA SYSTEMS



INNOVATIONS & ANSWERS[®]

CONCRETE

 **HIGH CONCRETE GROUP** LLC
An Affiliate of High Industries Inc.



From concept to completion, High helps deliver your project on scope, on spec, on time, and on budget.



Precast Stadium and Arena Systems from High Concrete	3
High Performance Stadiums and Arenas	4
Precast Is the Leader for Performance, Quality, and Versatility	5
The All-Precast Stadium	6
High Rises to the Challenge: Stairs and Stadium Risers	7
High Precast Components Go the Distance	8
Cladding Panels: Put Your Best Foot Forward	9
The Surprisingly Green, LEED-Friendly Building Material	10
High Concrete Accessories	11
Across the Spectrum: Colors, Textures, and Finishes	12
Appearance and Cost Guide	14
High Stadium and Arena Systems Detail Gallery	14-17
High Stadium and Arena Systems Project Gallery	18-19





High Precast Facade Panels realize any design treatment, from ultra-modern to historically accurate

Precast Stadium and Arena Systems from High Concrete Group LLC

Whether for indoor or outdoor facilities, High precast stadium and arena systems score big with architects, owners, and fans alike. For half a century, High precast has provided exceptional aesthetic and structural versatility, speed of enclosure, and durability. No other material provides the combination of range of shapes, colors, and textures, fire-resistance, acoustical insulation, weather-tightness, long-term durability, low maintenance, and rapid, IAQ-friendly enclosure. Now, the newest innovation in precast, CarbonCast® using C-GRID® carbon fiber grid in lieu of steel mesh, enables facade cladding to be lighter, better insulating, and more durable—making precast even more ideal for cladding or enclosing stadiums and arenas.

When it comes to stadiums and arenas, High Concrete is the clear first choice. Since 1957 we've provided precast products for more than 5,000 buildings. High will give you our undivided attention to the details that make the difference in the successful fulfillment of your design. It's our attention to detail at every step that has won us, and the customers we serve, numerous national awards from PCI, ACI, and AIA.

From concept to completion, High Concrete Group will provide extensive design and specification assistance, connection detailing, construction scheduling and erection planning, samples, mock-ups, assembly testing, field erection, field-finishing and caulking, as well as other services to ensure a streamlined, high quality installation.

That's the High Advantage.



Put the High design and performance advantage to work for you.

HIGH PERFORMANCE STADIUMS AND ARENAS

Stadiums and arenas for the 21st century are more than just a place to watch the event. These large and impressive structures offer a total experience for the fan and family alike.

Precast concrete components are integral to most of the major stadiums and arenas in the nation, providing durability, efficiency, comfort, and cost-effectiveness. Precast also offers a vast range of structural and architectural shapes for unmatched design flexibility.

Precast prestressed concrete is the overwhelming choice for stadiums and arenas because of its

- Unlimited design options
- High strength and impermeability
- Superior quality and durability
- Speedy, all-weather construction
- Lower cost than cast-in-place concrete
- Low maintenance requirements

Outstanding Performance

High precast stadium and arena systems are extremely high performing, delivering

- **Greater impermeability and strength**
 - Concrete mixes with low water/cement ratios are enabled by factory-controlled batching and immediate placement of concrete to yield higher strength mixes—averaging 7,000 psi or more
 - Precisely controlled air entrainment also results in minimal expansion and contraction and reduced cracking and surface scaling
- **Safety** Inherently superior fire resistance
- **Security** Excellent impact/blast resistance and great structural strength/durability from reinforcing, pre-stressing, or post-tensioning

- **Environmental friendliness** High thermal efficiency; recyclable materials
 - **Economy** Low maintenance and life cycle costs
- When corrosion-resistant CarbonCast® products are used, performance can be enhanced even more.

Superior Quality

High precast is manufactured under carefully controlled factory conditions that enable concrete mixes with higher strengths, corrosion-inhibiting admixtures to protect steel reinforcing, and consistently high quality.

- **Consistent results** Computerized batching and enclosed PCI-certified factory fabrication under controlled conditions that exceed PCI's Plant Certification requirements
 - Superior to cast-in-place or tilt-up construction

Optimum Durability

Precast leads the way for durability and ease of maintenance. Because it is so impermeable and corrosion resistant, it retains its original appearance for many years with minimal maintenance.

- **Abuse resistant** Superior resistance to the ravages of man and nature such as impact, chlorides, and dirt
- **Mold and mildew resistant** Weather tight enclosures form larger impermeable components that have fewer joints to caulk

Faster and Lower-Cost Fast-Track Construction—In All Weather

Factory-cast and factory-cured components are manufactured year-round and installed in almost any weather, which results in fewer schedule delays and faster occupancy.

Construction costs may also be reduced by

- **Single-source fabrication and erection**
 - Means less on-site labor with its associated congestion, cost, and schedule delays, and fewer quality problems due to manpower shortages
 - Eliminates the usual delays caused by multiple trades
- **Just-in-time delivery**
 - Reduces site disruption by requiring fewer trades on site and reducing on-site storage, and often allows erection within the structure's footprint
- **Rapid installation**
 - Allows simultaneous erection of structural elements and enclosure
- **Use of MEGA-Tees for deck areas**
 - Means fewer, larger components go up faster with fewer joints
 - Requires fewer columns and footings
- **Earlier project delivery and occupancy**
 - Reduces general conditions, construction financing, and other carrying costs
 - Speeds realization of revenue

Unrestrained Design Freedom

Designing with precast gives you ultimate design freedom and smart ways to solve problems. On a constrained site, for example, you might choose a parking garage to address traffic flow and contribute to sustainable design. Precast systems provide peace of mind you won't find with other construction options.

High precast = peace of mind...with expert design assistance, rapid installation, early project completion, and longer-long-term durability. Guaranteed!



PRECAST IS THE LEADER FOR PERFORMANCE, QUALITY AND VERSATILITY

Whether you're building for baseball, football, hockey, basketball, soccer, auto racing, horse racing, or any other entertainment, precast offers infinite appearance options. High Concrete will work with you to develop the structure and the details to bring your vision to life, on time and on budget.

Precast Beats Cast-In-Place

Precast concrete exceeds cast-in-place with more consistent results, greater impermeability and strength, and faster and lower-cost fast-track construction. High-strength precast concrete is virtually impermeable and it resists damaging moisture penetration. Prestressing enables even more efficient structural design by allowing smaller, higher strength, and stronger members and keeping concrete in constant compression to reduce or prevent cracking.

Post-Tensioning for Exceptional Performance

Post-tensioning can allow precast to form complex cantilever arm and ring beam construction to support the roofs of arenas and stadiums. Post-tensioning can also reinforce cantilevered raker beams which carry seating and provide unobstructed views of the playing field. Precast stadiums and arenas can be designed to achieve any code-required fire rating, depending on concrete thickness and connection details.



- When no fire rating is required, thin-flanged tees and exposed steel bearing and connection details can be used
- Where two-hour ratings are required, thick-flanged tees and all-concrete bearing and grouted or concrete-covered connection details will be used

A new method to improve building stability and prevent collapse from wind or seismic forces involves casting plastic sleeves into shear walls. Prestressed strand is then fed through the sleeves and post-tensioned.

Studies have shown this to be an effective way to increase structural stability—at a cost lower than conventional methods.

Call 1.800.PRECAST for details.

Precast Takes the Heat

Precast stadiums and arenas can be designed to achieve any code-required fire rating, depending on concrete thickness and connection details.

- When no fire rating is required, thin-flanged tees and exposed steel bearing and connection details can be used
- Where two-hour ratings are required, thick-flanged tees and all-concrete bearing and grouted or concrete-covered connection details will be used

Small Stadium Construction Phases and Time Line



Use of repetitive components leads to optimal cost effectiveness and construction speed.



THE PRECAST STADIUM

High Concrete offers a variety of standard features and options to support your design needs. Crowd-pleasing, easy-to-use precast stadium components from High Concrete include

- Risers
- Tees
- Vomitory walls
- Architectural facades
- Raker beams
- Stairs and elevator enclosures
- Columns
- Flooring systems
- Insulated walls
- Parking garages

Pedestrian ramps, concessions, rest rooms, and dressing room areas can all be framed and constructed with precast elements.

Precast Plays Well with Others

Stadiums can be all-precast, precast with cast-in-place or precast/steel—or any combination.

An all-precast exterior is the most economical choice because precast can serve a dual function—both structure and enclosure. But a precast stadium or arena can also be clad in whole or in part with other materials, such as glass curtainwalls, stainless steel screened panels, aluminum louvers, and even hand-laid brick veneers.

Often, exterior precast structural stair towers are enclosed with materials such as transparent glass or metal panels, for user security and/or striking visual effect. With such a versatile construction material, the choice is yours.

We'll Help You Find the Best Seat in the House

Mass-produced precast seating units can be manufactured in a variety of configurations and spans to provide quick installation and long-lasting service.

Based on overall seating height and the number of rows required, single, double, or triple riser units may be utilized. Triple riser units offer the fewest construction joints and pieces to erect, but single and double units are useful in transition areas.

Working with High from a design's inception can help maximize use of standard forms to save money and expedite construction.

High Is On Your Team

With High as a player on your design team, you'll have access to design and specification help, connection detailing, and support from the initial planning phase of a project through construction. We'll show you how to develop a project to fit your budget.

In addition to coordination of component size, connections, schedules, and aesthetics, High will help you plan

- Pedestrian traffic flow
- Span clearances
- Seating arrangements
- Drainage
- Lighting
- Maintenance schedules

As an active design-build partner, High can even provide engineer-of-record services for the structure above the foundation.





Precast offers a variety of flooring finishes to create safe walkways for pedestrians.



HIGH RISES TO THE CHALLENGE: STAIRS AND STADIUM RISERS

Virtually all stadiums designed today use precast concrete for seats and risers. Precast risers are

- Most cost-effective
- Quickest to erect
- Most structurally sound
- Best for longest spans

Risers can be single, double, or triple. Double and triple risers are the most common because they

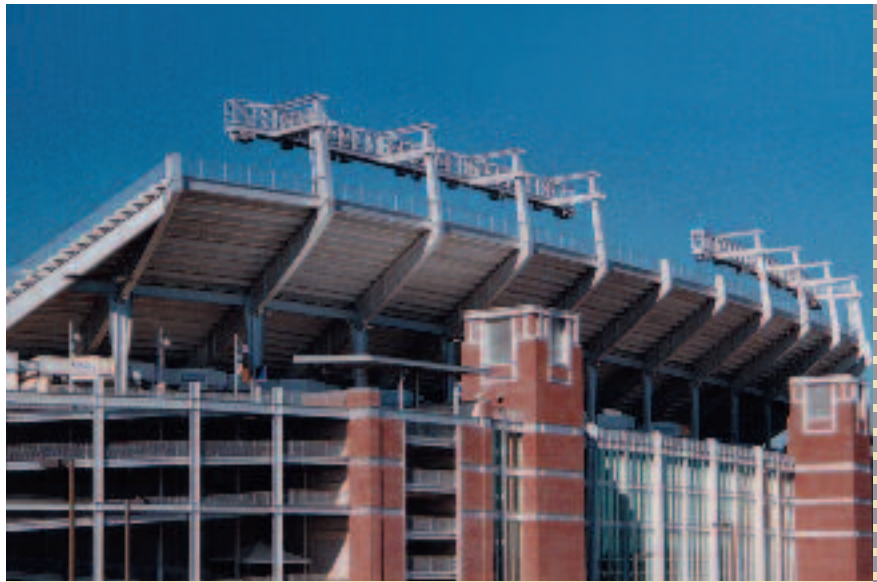
- Minimize crane picks
- Reduce caulk joints
- Increase durability

Consult with High to determine which of the various riser options is best for your project.

Precast Helps Keep your Footing

Pedestrian safety is important in stadiums, where large numbers of people move in and out in a short time period. Other materials only offer a single walking surface finish. Precast offers a wide range of finishes to maximize safety and flexibility

- Smooth trowelled
- Blasted
- Light broomed
- Form finish
- In-laid treads



Any precast structure can be built from the same basic "kit of parts."



HIGH PRECAST COMPONENTS GO THE DISTANCE

Raker Beams

Raker beams are long, narrow stepped pieces, similar to stringers in staircases.

Raker beams

- Support seats and other pieces
- Contribute to structural integrity
- Can be manufactured to the unique specification of your project

With High's help in designing the optimum sized raker beams, you can significantly increase speed of construction. Once delivered and erected, raker beams create the template onto which other components can be efficiently installed.

Spandrel Panels

These important structural elements may be used as part of the stadium's overall stability system. They can also add distinctive architectural flair. Available in custom sizes and finishes, spandrel panels can help give a stadium an immediate, iconic visual identity when seen from a distance.

Vomitory Panels

Vomitory panels are used to frame spectator entrances and exits. They can be load-bearing for seat sections.

- Eliminating other supports to save on material and structural costs
- Contributing to speed of erection

Vomitory panels are available in a range of finishes.

- Smooth
- Textured broom
- Custom architectural designs

MEGA-Tees and Double Tees

Double Tees create expansive, economical, durable floor systems for concourse areas and allow for fewer columns, more open plans, and brighter interiors, especially in parking garages

- 15'-wide standard; 12'-16'-wide available
- Floor spans up to 75'
- Roof spans up to 100'

- May have penetrations for MEPSC* systems
- Tee depths: 30" standard (18", 22", 24", and 34" available)
- Topping can be factory- or field-applied

Slabs/Hollowcore Planks

Precast slabs or hollowcore planks provide economical framing for

- Vomitory floors
- Concourse floors
- Handicap-accessible platforms

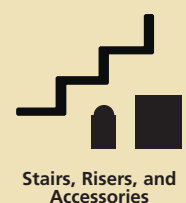
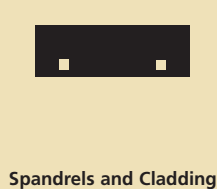
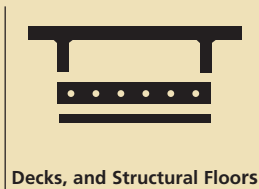
They can help meet requirements for providing accessibility for the disabled, which often require non-typical framing in many areas of the structure. Solid slabs and hollowcore planks can easily accommodate framing requirements.

*MEPSC: Mechanical, Electrical, Plumbing, Security & Communication

The Stadium and Arena "Kit of Parts"

Our easy-to-use precast concrete stadium and arena components include

- Tees
- Spandrels
- Wall Panels
- Girders
- Columns
- Stairs





CLADDING PANELS: COST EFFICIENT, EASY TO MAINTAIN, AND SAFE

Precast Wall Panels: Cost-Effective and Efficient

Precast panels from High can be the most efficient way to clad your stadium or arena. Panel shapes that can be replicated many times will cut costs and expedite the construction process. And ultra-thin, ultra-light, ultra-corrosion resisting, and ultra-insulating CarbonCast® panels can maximize the benefits of precast panels even more and lighten superstructures to reduce cost.

Durable, high quality precast panels can create a variety of looks including thin brick at a fraction of the cost of masonry.

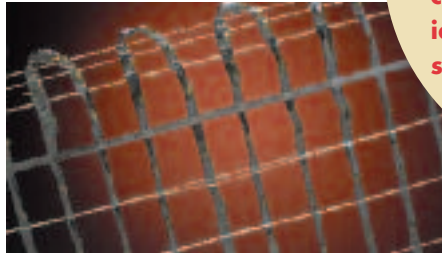
High precast panels can also be used in high-seismic zones, where other types of masonry design would be problematic. And precast panels can be designed in a variety of finishes, to blend smoothly with existing neighborhoods, including using different finishes on different sides of the stadium. Precast can also be used to visually decrease the mass of a stadium.

The Next Generation: Carbon Fiber Reinforced Precast Panels Outperform the Rest

CarbonCast® technology can reduce the weight of architectural cladding panels by up to 66 percent, offering improved durability and insulation values up to steady-state R-30 for wall panels. CarbonCast architectural panels and structurally composite high-performance sandwich wall panels weigh less and are more thermally efficient than conventional precast and many other wall assemblies, offering:

- Lower weight
- Superior resistance to the effects of the environment; termite resistance
- Reduced structural and foundation costs due to lighter weight or structural capacity
- Reduced shipping and erection costs
- Low environmental impact; LEED® certification contribution

For more information about the CarbonCast line of products, visit www.altusprecast.com



CarbonCast® carbon fiber mesh reinforced precast is lighter—perfect for stadium cladding panels. Because it's corrosion-resistant, it's also ideal for adjacent parking structures.

Keep in Shape with Proper Maintenance

Precast concrete requires very little maintenance—a major plus for structures such as municipal stadiums which may rely on city crews with limited budgets to keep them repaired.

However, a regular and systematic maintenance regimen such as provided by High Concrete's StructureCare™ program will extend the life and good looks of your stadium. This consists of periodic inspections and attention to three types of maintenance

- **Housekeeping** e.g. cleaning, restriping, and fixture maintenance
- **Preventive Maintenance** including twice-yearly washdowns and maintenance of sealants/caulking and roofing
- **Repairs** such as patching cracks and spalls



Accessories Integrate Building with Environment

High Concrete offers a full line of accessories that seamlessly integrate with our precast systems



Screen walls

- Hide any unsightly view on the ground or on the roof

Bollards

- For traffic control and security or decoration
- Can be made ready for lights



Benches and planters

- To further beautify the structure and add comfort to its surroundings

Sculpted walls

- For aesthetic reliefs not available with other materials
- Signs,

THE SURPRISINGLY GREEN, LEED-FRIENDLY, BUILDING MATERIAL

Concrete is a key solution to modern concerns about energy efficiency, protecting the environment and using our resources wisely with many environmental advantages throughout its manufacture and use. And because old concrete can be reused, the energy savings accrue indefinitely, making concrete one of the oldest and most environmentally-friendly construction materials currently available.

Natural and Recycled Materials

Some building materials rely on scarce or nonrenewable resources. In contrast, concrete is made from three commonly available ingredients

- Water
- Aggregate (stone, sand, and gravel)
- Portland cement (a fine gray powder)

A growing list of recycled materials can complement these basic ingredients. Aggregates may contain safe industrial by-products, such as steelmaking's slag. Portland cement can be supplemented by materials such as fly ash, a discard of coal burning power plants. Even cement's manufacturing process uses recycled materials. Each year, a single cement kiln can safely burn one million old tires, conserving fossil fuels and reducing landfill.

Stronger, Lasts Longer

Since precast concrete is strong, virtually impermeable, and resists fire, water, and weather, it has a longer service life than other construction materials. Concrete's durability reduces maintenance and reconstruction, conserving resources. Use of CarbonCast® with C-GRID® carbon fiber grid reinforcing in double tees increases the longevity of a deck or parking structure even more, especially in areas where salt can exacerbate corrosion. And at the end of its service life, crushed concrete can be reused as aggregate for pipes, foundation and road beds (more on page 13).

LEED points with Precast

Precast can help supply LEED® credit in five of the six LEED categories. For example, choice of color in precast can affect both light reflectivity and thermal performance. Light colors help reduce the heat island effect and keep rooms comfortable. Albedo ratings of .3, with ratings up to a highly reflective .7 are possible with many common mix designs, and especially those that employ white cement.

Year-Round Energy Efficiency in Mixed Use Applications

Use of precast for the non-parking sections of a mixed-use design will result in year-round energy savings because the thermal mass of a concrete building reduces temperature swings. A concrete building

- Requires cooling mainly during off-peak times, when power is produced more efficiently
- Can cost less to heat than a comparable structure made of different materials

Using precast panels allows you to design each facade differently to help manage the solar gain or heat loss conditions unique to each orientation. For instance, thick panels, panels designed for deep window recesses, or integrally cast shading devices can be used on the south to manage solar heat gain, while on the north side, shallow recesses can be used to maximize daylighting. Insulation values can also be varied when CarbonCast panels are used.

LEED® PROJECT CHECKLIST: PRECAST CONCRETE POTENTIAL POINTS

LEED Category	Credit or Prerequisite Title	Points Available	
		LEED NC v2.2	LEED 2009
Sustainable Sites	SS Credit 5.1: Site Development: Protect or Restore Habitat	1	1
	SS Credit 7.1: Heat Island Effect: Non-Roof	1	1
	SS Subtotal	2	2
Energy and Atmosphere	EA Prerequisite 2: Minimum Energy Performance	Required	Required
	EA Credit 1: Optimize Energy Performance	1–10	1–19
	EA Subtotal	10	19
Materials and Resources	MR Credit 2.1: Construction Waste Management: Divert 50% From Disposal	1	1
	MR Credit 2.2: Construction Waste Management: Divert 75% From Disposal	1	1
	MR Credit 4.1: Recycled Content: 10% (post-consumer + pre-consumer)	1	1
	MR Credit 4.2: Recycled Content: 20% (post-consumer + pre-consumer)	1	(1)
	MR Credit 5.1: Regional Materials: 10% Extracted, Processed, & Manufactured Region	1	1
	MR Credit 5.2: Regional Materials: 20% Extracted, Processed, & Manufactured Region	1	1
MR Subtotal	6	6	
Indoor Environmental Quality	EQ Credit 3.1: Construction Indoor Air Quality Management Plan: During Construction	1	1
	EQ Subtotal	1	1
Innovation and Design Process	ID Credit 1.1: Innovation & Design: Provide Specific Title	1*	1
	ID Credit 1.2: Innovation & Design: Provide Specific Title	1*	1*
	ID Credit 1.3: Innovation & Design: Provide Specific Title	1*	1*
	ID Credit 1.4: Innovation & Design: Provide Specific Title	1*	1*
	ID Credit 1.5: Innovation & Design: Provide Specific Title	–	1*
	ID Credit 2: LEED® Accredited Professional	1	1
ID Subtotal	1	2	
Project Totals		20	29

* Up to 4 additional points can be earned, must be submitted and approved (not included in total).
LEED NCv2.2: LEED Certified = 26 points LEED 2009: LEED Certified = 40 points
() Current calculations insufficient, obtained in ID.

LEED-friendly attributes available from High:

- Lightweight CarbonCast® products
 - Less weight means less mass, less embodied energy, and reduced superstructure mass and cost
- Recycled materials
 - EcoMix™ uses recycled water* and pozzolans made from waste products (e.g. slag, silica fume, and fly ash), which reduces cement content in concrete

*Structural products only

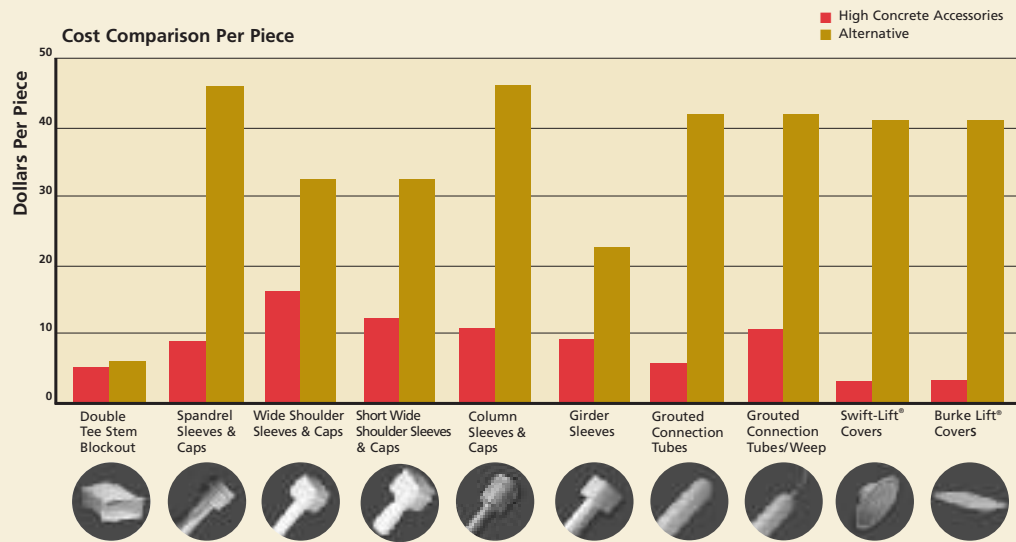


HIGH CONCRETE ACCESSORIES

Estimate how much you can save on your next job using High Concrete Accessories by visiting www.highconcreteaccessories.com and clicking on the Savings Calculator.



Cost Comparison Per Piece

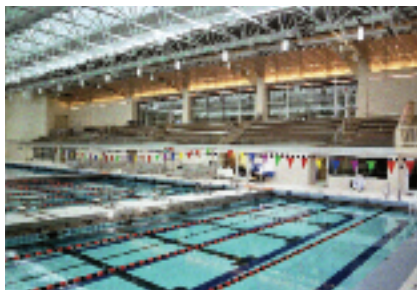


High Concrete Accessories are engineered to eliminate makeshift embedments cobbled together from scrap materials. Noncorrosive and nonreactive, these components install quickly, easily, and securely in any weather, and eliminate grouting, to save time and money

- **Double Tee Stem Blockouts** provide through openings for conduits in double tee stems or legs
- **Spandrel Sleeves** are designed to facilitate through-bolted connections between spandrels and columns on the inboard side
- **Wide Shoulder Sleeves** facilitate through-bolted connections between columns and spandrels on the inboard side
- **Column Sleeves** are appropriate for through-bolted connections between columns and spandrels on the outboard side

- **Girder Sleeves** are used for anti-roll connections between precast column haunches and precast girders
- **Grouted Connection Tubes** facilitate panel-to-panel connections or connections to cast-in-place foundations and also riser to riser connections
- **Swift-Lift® Covers** cover round lifting devices used on precast components
- **Burke Lift® Covers** are designed to fit oval-shaped holes made by Burke Lifters

High Concrete Accessories is always innovating and expanding its line. Visit www.highconcreteaccessories.com for new product updates.



The industry's widest selection of additives, mixes, colors, and finishes offers total design flexibility.



Pigmented architectural precast



Thin brick



Light gray architectural precast with light sandblast



Gray precast with form finish



ACROSS THE SPECTRUM: COLORS, TEXTURES, AND FINISHES

The plain, functional sports arena is a thing of the past. Today, sports complexes are designed to reflect the character of the surrounding community and to offer a complete recreational experience for the whole family. Precast gives you the aesthetic flexibility to create an attractive venue.

A stadium built by High Concrete can be designed using an almost limitless palette of natural colors and finishes that can blend into any environment—whether modern or historic, formal or rustic—in addition to a variety of concrete mix designs to match the performance requirements of your project. With such a versatile, visually rich material, you can choose color, form, and texture to express a unique and particular design vision by choosing from a variety of

- Aggregates
- Pigments
- Mixes
- Finishes
- Veneers
- Shapes and Reveals

High Concrete will work with you from the beginning of a project to choose the finish with the aesthetic and functional attributes you need. And all components will be manufactured by High under factory-controlled conditions to ensure uniform high quality.

Precast concrete is also a great interior finish option—especially in large public spaces like stadiums, gymnasiums, and natatoriums—or in buildings such as schools, warehouses, manufacturing facilities, and dormitories where impact-resistance and low-maintenance durability are required.

Color in Concrete

Color is achieved through a combination of white or gray cement, coloring agents, or pigments, and fine or coarse aggregates added to the mix. High is expert in matching color to existing buildings. Matching caulk colors, stains, and paint are also available.

Mix Designs for Beauty and Strength

Environmentally friendly “green” mix design, including High’s innovative EcoMix™—concrete reinforced with pozzollans made from waste products—can improve initial appearance and long-term performance by reducing shrinkage and temperature-induced cracking. Mixes that incorporate these recycled materials can improve concrete’s properties including resistance to moisture and impact, load-carrying capacity, and even component size.

Consult High Concrete to design a mix and finish that fits your budget while maintaining optimum strength and durability and giving the visual appearance you desire.

To Seal or Not To Seal

Breathable sealers are used to keep a finish clean and reduce rain or dew-induced shadowing by resisting or preventing liquid moisture penetration. While sealers are not required to “waterproof” high-strength precast concrete, they

- Prevent streaking caused by runoff from glazing systems
- Resist surface mold growth

Sealers can also guard against corrosion in steel mesh-reinforced double tees and other components exposed to chlorides. Sealers can be integral to the concrete mix or surface-applied. The two

basic kinds of surface-applied sealers are penetrating sealers and face-filling film sealers. Face filling film sealers prevent moisture absorption but need to be reapplied at regular intervals. Some sealers may affect color or finish appearance; integral sealers affect mix design.

Color-Matched Caulks Protect Against Moisture

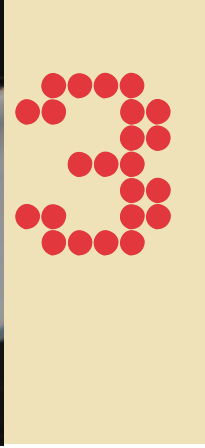
A wide array of color matched silicone or polyurethane joint sealants—also known as caulks—are available. Silicone sealers usually have the highest initial cost, but are resistant to ultraviolet rays, and break down more slowly than polyurethane sealants. Polyurethane sealants bond well to concrete, aluminum, etc. and have additives to improve their resistance to breakdowns caused by ultraviolet rays. Both types of sealants can be obtained with 5- and 10-year warranties

Two-part polyurethane or silicone formulated for adhesion to concrete is recommended, along with an appropriate primer.

Aggregates

Many color and texture options are possible by varying aggregate type and color, size, finishing process, and depth of exposure. Combining color and texture accentuates the natural beauty of aggregates.

Aggregate colors range from white to pastel to red, black, and green.



Finishes

Precast concrete is cast in forms made of wood, steel, concrete, or rubber. A smooth form finish highlights the natural mottled look of concrete as well as any imperfections in the form. As a result, it's usually desirable to use an applied finish to achieve a more uniform appearance and to bring out the full color, texture, and natural beauty of the aggregates. Finish options include

- **Acid etch** Reveals a smooth, sand-textured surface resembling natural stone
- **Water washed** Brings out the color and texture of natural stone
- **Blasted** Creates light, medium, or heavy exposure of aggregate
- **Exposed aggregate** Creates a near-full exposure of the aggregates nearest the surface
- **Honed or Polished** Yields a finish resembling granite or limestone
- **Form-liner finishes and reliefs** Use molds to create textures and patterns
- **Form finish** Exposes natural color variations and surface imperfections intact
- **Field paint or stain** Can be applied for economical visual impact, although on-going maintenance is required

Veneers

Brick and stone veneers set in precast achieve the look of hand-laid masonry or stone cladding with greater construction efficiency, safety, and water tightness. Veneers include

- Thin brick
- Half brick
- Standard brick
- Oversized brick
- Honed or polished concrete block
- Tile (ceramic and terra cotta)
- Stone (granite, limestone, and marble)

Limestone, marble, and granite veneers (e.g., 1½"–2" thick) can be drilled, fitted with stainless steel pins, and cast into rigid precast backers to provide large, full- or partially-veneered panels. Stone-veneered precast panels can be an efficient way to clad high-rise buildings. For economy, natural stone veneers are often used on lower levels of buildings with matching custom-mixed all-precast panels on the upper levels.

These veneers also eliminate the fireproofing required to protect steel-framed curtainwall assemblies. To ensure best quality, and to speed installation, sealing between stone joints can be done in the

factory, leaving only the sealing between panels to be completed in the field.

Form-Lined Shapes

Using plaster, rubber, grained wood, rope or other material as a liner in the casting form can offer finishes, reliefs, textures, shapes, and patterns limited only by your imagination.

Finishing Stadium Structural Components

All components are finished to PCI Commercial Grade standards. Pigments, aggregates, and textures can all be used to achieve a dramatic appearance on walls and cladding (see page 14). Structural components in fully enclosed spaces typically receive a finely textured trowel finish. A light broom finish is used on surfaces subject to foot traffic.

For more detailed information about color, texture, and finish in concrete, see High's *Precast Concrete Colors and Finishes Guide*.

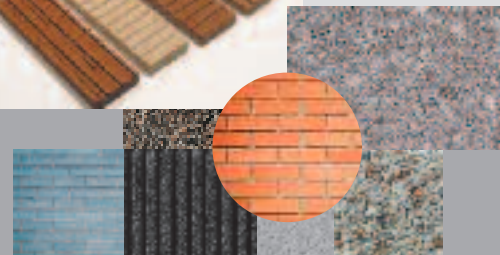
Cast-in thin brick replicates the look of full-depth brick but is more impervious and economical than full-depth brick veneers.



Thin brick is highly impervious compared to full or half-bricks due to its molding process and because an impervious precast panel backer replaces traditional pervious "mortar" joints. Water will not get behind a thin brick-veneered precast panel and cause bricks to pop off. Thin bricks are modular and course dimensions are fixed, so designs should take this into account to avoid excessive cutting to achieve the desired look.



Thin brick keyways help lock into precast concrete. No repointing required.



HIGH STADIUM AND ARENA SYSTEMS DETAIL GALLERY

Stadium and Arena System Components **15-16**

Spandrels and Slabs **17**

Project Gallery **18-19**

Following are schematic details. Many applications require custom details. High Concrete will do all the final shop drawings and engineer all precast concrete connections. Get standard or custom CAD details by calling us at 1.800.PRECAST. For schematic details for Parking Garages, see the High Precast Parking Systems brochure.

Shape, Size, Accent, and Finish Options—Appearance and Cost Guide

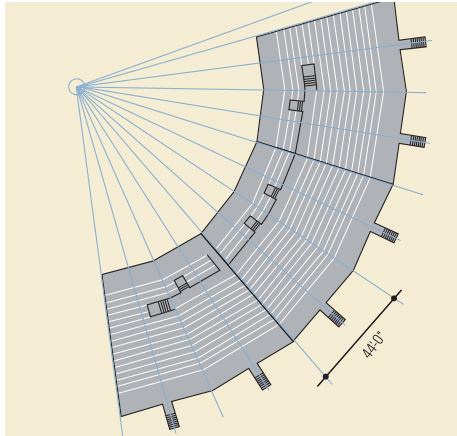
	Appearance Uniformity	Relative Cost		Appearance Uniformity	Relative Cost
Shapes			Accents		
Perimeter—4 sides	■	\$	Plain (no reveals)	■	\$
Perimeter—5 or more sides	■	\$\$—\$\$\$\$	Shallow Reveals (3/4" or less)	■	\$\$
Non-Rectangular	■	\$\$—\$\$\$	Deep Reveals	■	\$\$\$
Curved Shapes/Surfaces	■	\$\$\$\$\$	Reliefs (repetitive)	■	\$\$\$
Punched Shapes (openings)	■	\$\$	Precast Trims and Projections	■	\$\$\$\$\$
Returns	■	\$\$\$	Finishes		
Sizes			Form Finish	■	\$
Small Pieces	■	\$\$\$\$\$	Paint/Stain/Stucco	■	\$\$
Large Pieces	■	\$	Light Blast	■	\$\$\$
Thick Panels (up to 2 hour rated)	■	\$	Medium or Heavy Blast	■	\$\$
Colors			Acid Etched	■	\$\$
Standard Mixes (where available)	■	\$	Retarded (exposed aggregate)	■	\$\$\$
Custom Mixes	■	\$—\$\$	Surface Sealer (optional)		\$\$
Grey Cement	■	\$	Standard High-Repetition Form Liner (ribs, molded brick, stone, etc.)	■	\$\$\$
White Cement	■	\$\$	Custom or Low Repetition Form Liner	■	\$\$\$—\$\$\$\$\$
Light Pigments	■	\$\$	Acrylic Brick (where available)	■	\$\$\$—\$\$\$\$\$
Dark Pigments—high dosage	■	\$\$\$—\$\$\$\$\$	Thin Brick or Tile	■	\$\$\$\$—\$\$\$\$\$
Locally-Sourced Aggregates	■	\$	Stone Veneer (stone by others)	■	\$\$\$
Quartz & Marble Aggregates	■	\$\$—\$\$\$\$\$	Honed or Polished (where available)	■	\$\$\$\$\$
Granite Aggregates (non local)	■	\$\$—\$\$\$\$\$	Form-Finished Edges	■	\$
Two Mix Colors per Piece	■	\$\$\$—\$\$\$\$\$	Other Edge Finishes	■	\$\$

■ Low ■ Medium ■ High

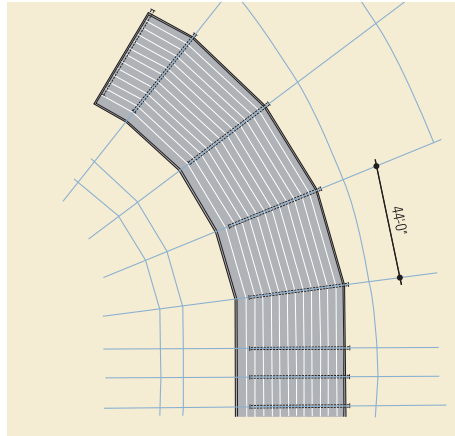
NOTE: Concrete is made from natural materials which vary in the colors they yield over time. Samples will represent a color in the range of colors produced by a mix design. Older samples should only be used as a guide for initial color and finish selection. Fresh 12" x 12" samples should always be used to make near-final color and finish selections. As with natural stone, mock-ups, produced near to the time of actual production, should be used for final color and finish selections. For samples, call 1.800.PRECAST and ask for the name of the sales representative nearest you.



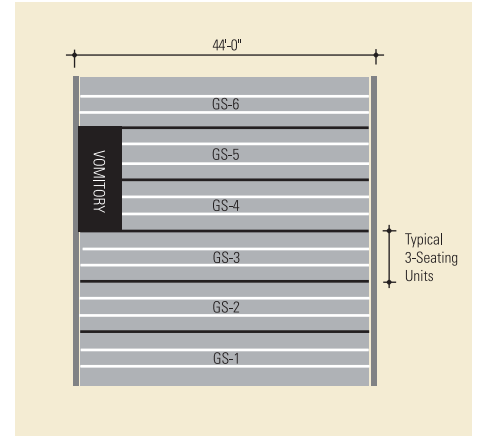
STADIUM AND ARENA SYSTEMS COMPONENTS



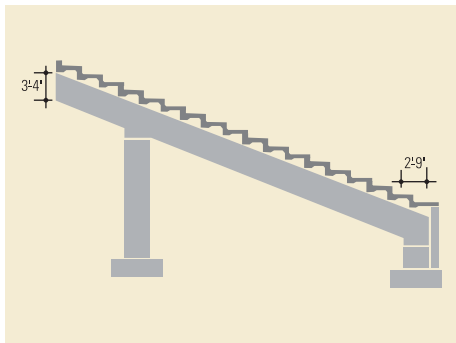
Grandstand Layout



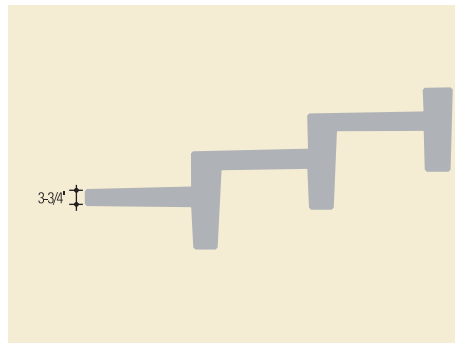
Radial Grandstand Layout



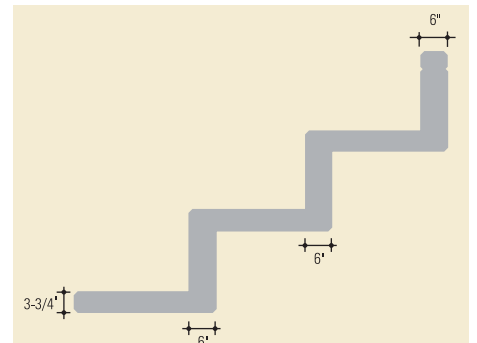
Grandstand Layout



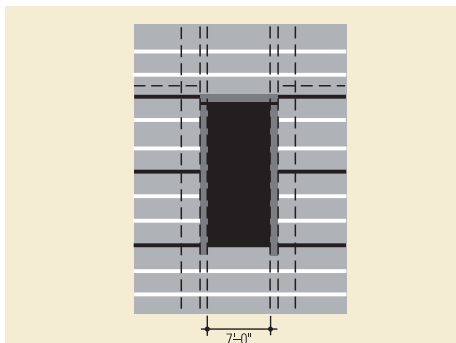
Riser Section



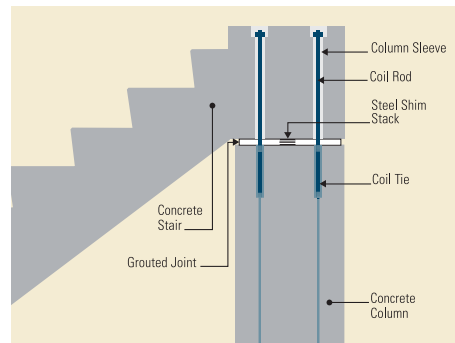
Typical Grandstand Section - Type A



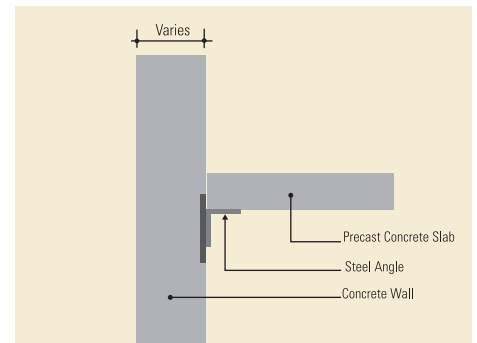
Typical Grandstand Section - Type B



Vomitory

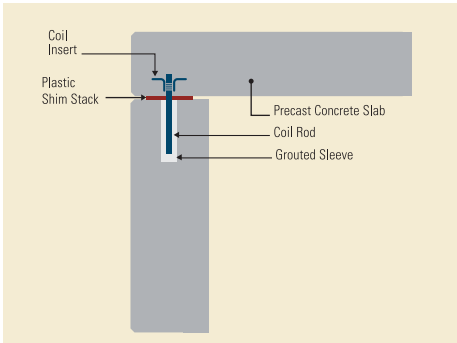


Raker Beam to Column

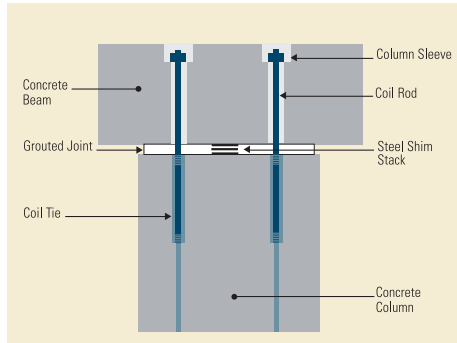


Concrete Wall to Slab

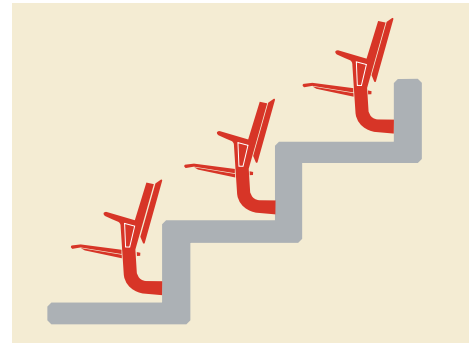
STADIUM AND ARENA SYSTEMS COMPONENTS



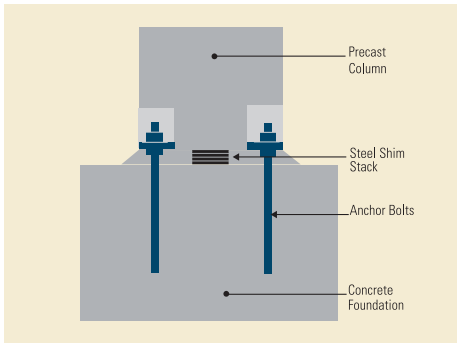
Grandstand to Grandstand



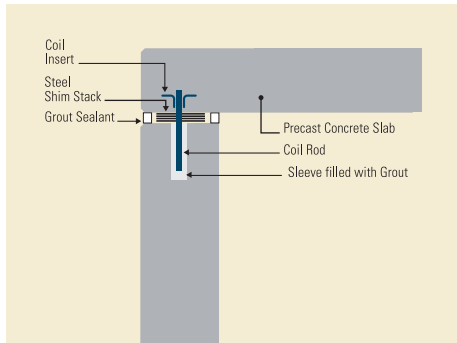
Raker Beam to Column Connection



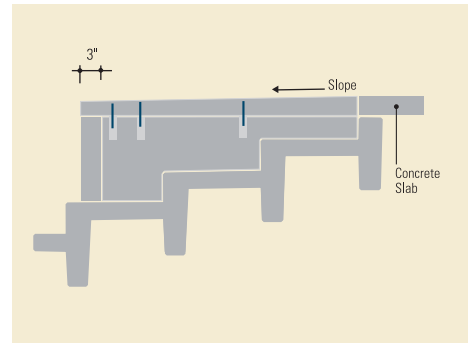
Stadia Triple Tread



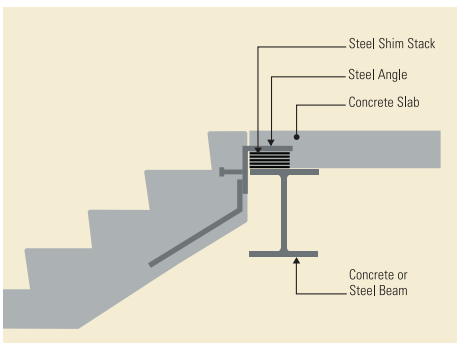
Column Anchor Bolt Detail



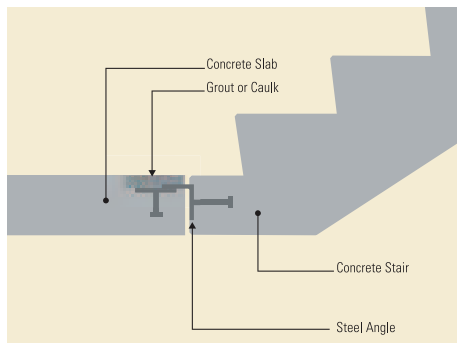
Grandstand to CIP Wall Connection



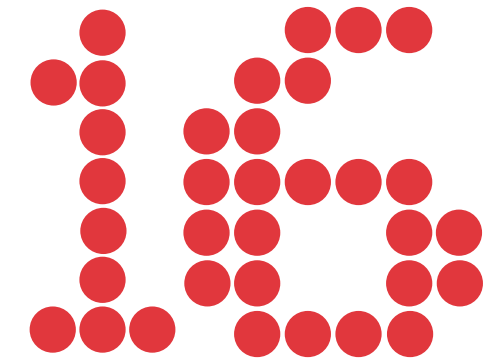
ADA Slab to Triple Seat



Top of Stair Connection

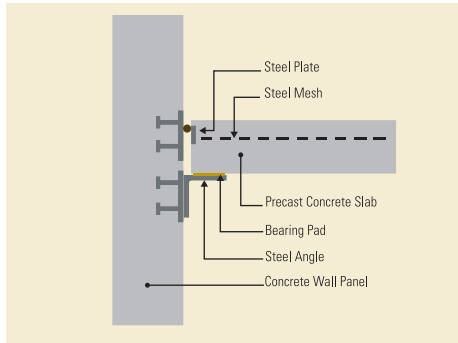


Bottom of Stair Connection

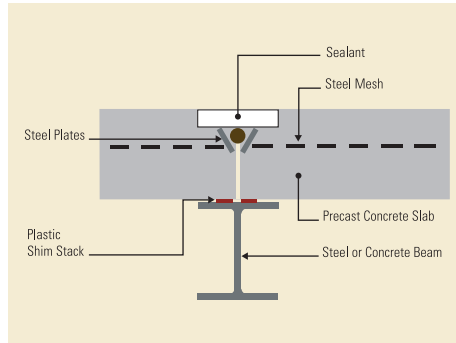




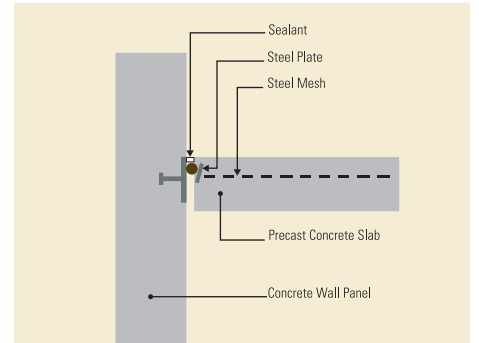
SPANDRELS AND SLABS



End Spandrel to Landing



Slab to Slab Connection at Support



Slab to Wall Connection



PROJECT GALLERY



18

HIGH CONCRETE

1.800.PRECAST WWW.HIGHCONCRETE.COM

Opposite page:
Lucas Oil Stadium,
Indianapolis, In.
This page top:
Citi Field, New York, NY
Center and Bottom:
Prudential Center
Newark, NJ



Eric Okurowski



Adam Pantozzi for Prudential Center

The High Advantage: State-of-the-Art Technical Expertise; Unsurpassed Precast Construction Experience

High Concrete Group combines innovation, proven technology, more than three-quarters of a century's experience as a building products company, and more than 50 years as a precaster to give you the first-rate service, technical support, and precast products you need to bring your designs to life. We provide the Concrete Innovations & Answers® you need at every stage of your project, together with the high-quality, high-value precast concrete solutions to meet your specific design, cost, schedule, and lifecycle performance requirements.

Our precast products, including the CarbonCast® line of C-GRID® carbon fiber reinforced precast, are manufactured at PCI-certified precasting facilities that serve Southern New England, the Mid-Atlantic, the Ohio Valley, and the Midwest. Our full line provides the exceptional design flexibility required—and superior durability and value—to meet the diverse challenges you face.

We are a leading producer of architectural and structural wall panels, and the nation's largest producer of precast concrete parking structures. We've provided structure and enclosure systems, components, and accessories for virtually every kind of project including corporate, cultural, government, educational, institutional, and multi-unit residential buildings, sports stadiums and arenas, retail, industrial, correctional facilities, and warehouse structures—including some exceptionally complex buildings you'd never imagine could be done with precast.

We are your single source for the highest quality precast components, systems, and service that keeps your projects on time, on spec, and on budget. We are at your service whenever you need us. Call toll-free 1.800.PRECAST or email concrete.answers@high.net. Visit us online at www.highconcrete.com to download technical information, guide specifications, and details, including CAD drawing files.

Simply put, High Concrete is your best resource for **Concrete Innovations & Answers.**



An Affiliate of High Industries Inc.

High Concrete Group LLC

www.highconcrete.com
1.800.PRECAST (800.773.2278)
concrete.answers@high.net

125 Denver Road
Denver, PA 17517
717.336.9300
717.336.9301 (fax)

344 Pancoast Mill Road
Buena, NJ 08310

95 Mound Park Drive
Springboro, OH 45066

100 Technology Lane
Paxton, IL 60957



Meet High—We provide
Concrete Innovations & Answers®

Need more information?

Ask your sales representative about these brochures:

- High All-Precast Building Systems
- High Architectural Facade Systems
- High Precast Parking Systems
- High Hollowcore Plank
- High Performance Wall Systems

A complete list of information products including brochures, specifications, details, project profiles, and CAD drawings is available online at www.highconcrete.com.



See us in Sweets in section 03450/HIG. AltusGroup® and CarbonCast® are registered trademarks of AltusGroup, Inc.

C-GRID® is a registered trademark of Chomarat North America.

Concrete Innovations & Answers®, SpecIFacts®, StructureCare®, Eco-Mix™, Swift-Lift®, Burke Lift®, Mega-TEE®, High® and the lower case "h" logo are trademarks of High Concrete Group LLC.

LEED® is a registered trademark of the US Green Building Council.

All other trademarks are the property of their respective owners.

©2009 High Concrete Group LLC

Printed in the United States of America. 01-09