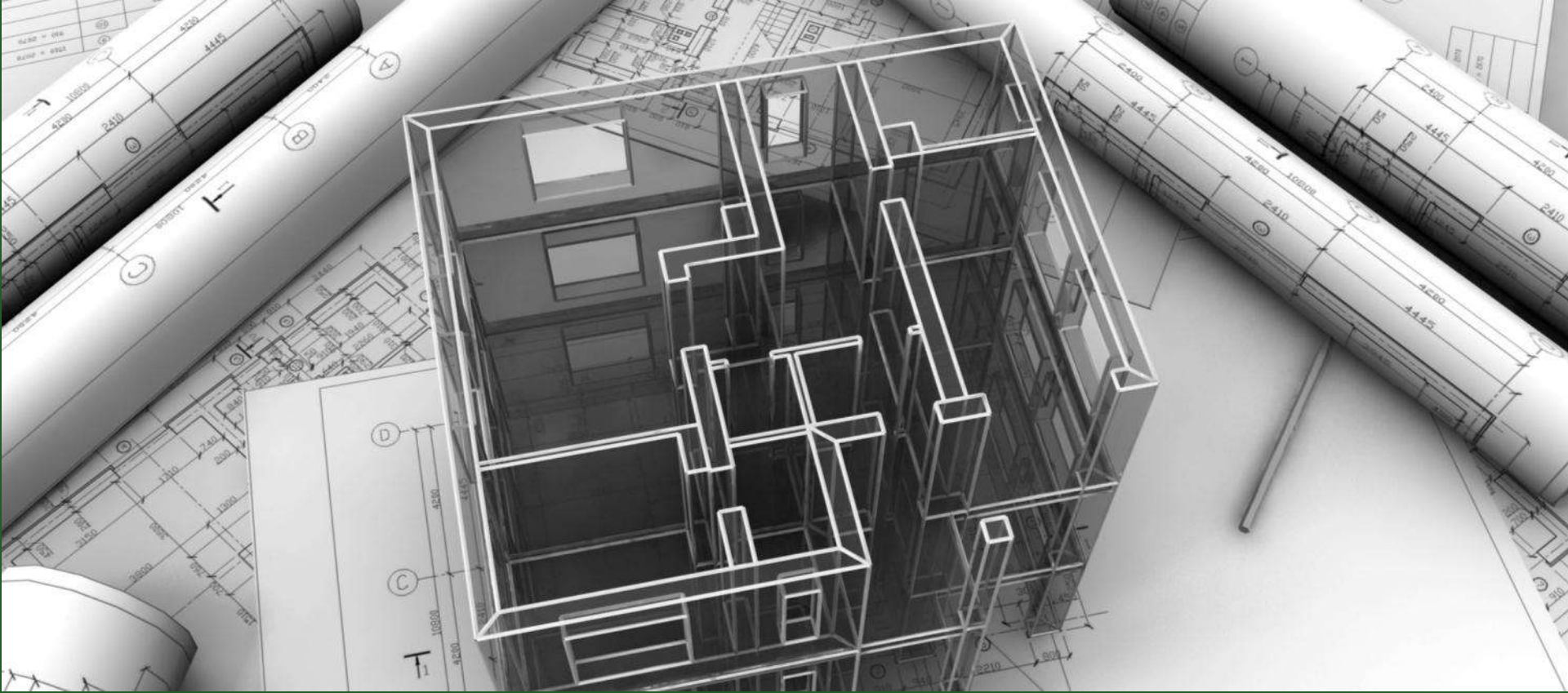




THE USE OF PRECAST IN PUBLIC FACILITIES

Bob Scott
W S Atkins

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e.construct
FZ-LLC

ATKINS



- Introduction
- Stake holders
- Pre cast in public facilities
- Atkins and precast
- Case studies
- Possible developments
- Conclusion
- Q&A

- Involvement of supplier in the design at early stage
- Architecturally designed to suit precast
- Considering construction logistics
- Services integration
- Elevation treatment

- The Client
- The Consultant
- The Precast supplier
- The Main contractor
- The Authority

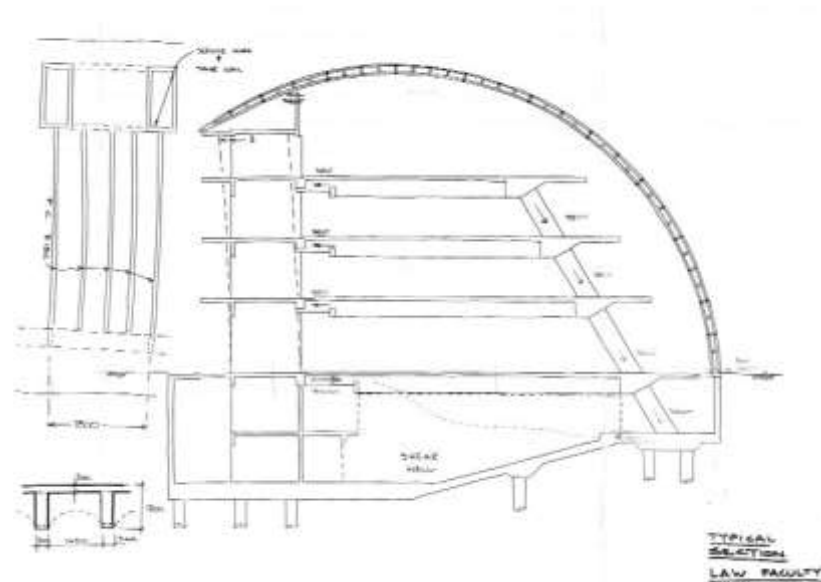


- The Client
 - Cost effectiveness
 - Speed of construction
 - Price certainty
 - Unique building
 - Durable building

Early decisions are essential to maximise the above

- The Consultant
 - Design support
 - Opportunities for better aesthetics and shapes
 - Early finishing of design with support from precast supplier
 - Better quality control
 - Durability
 - Design integration

Design for Precast



- The Precast supplier
 - Design support
 - Standardisation – slabs, beams, columns, walls, foundations
 - Use of tried and tested expertise
 - Innovation
 - Special structures



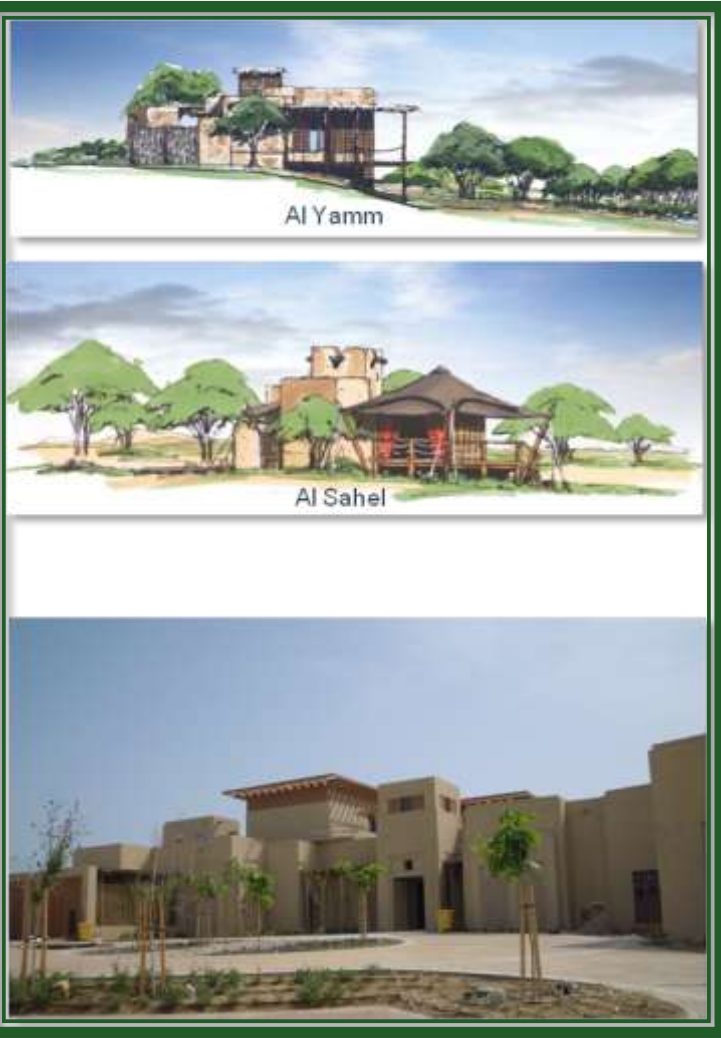
- The Main contractor
 - Integration with other trades
 - Early appointments of specialists / sub contractors
 - Improved health and safety
 - Early project completion
 - Less site waste
 - Better quality control
 - Logistics

The Authority

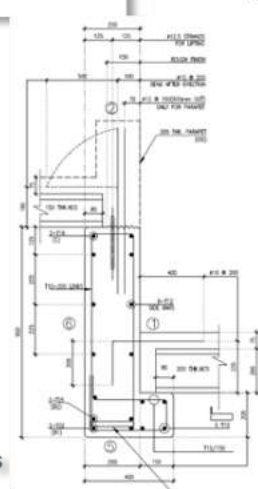
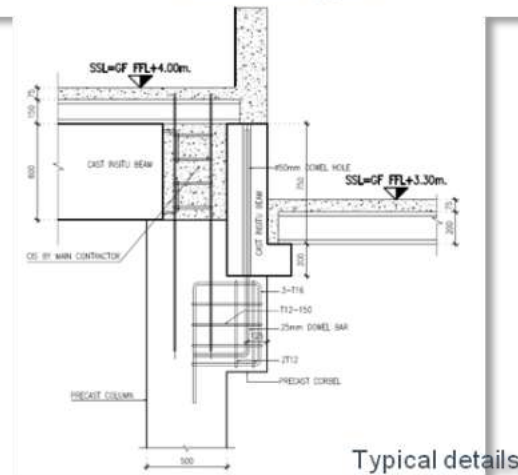
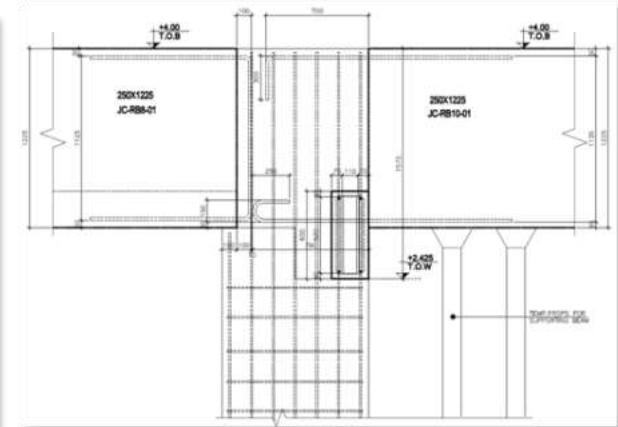
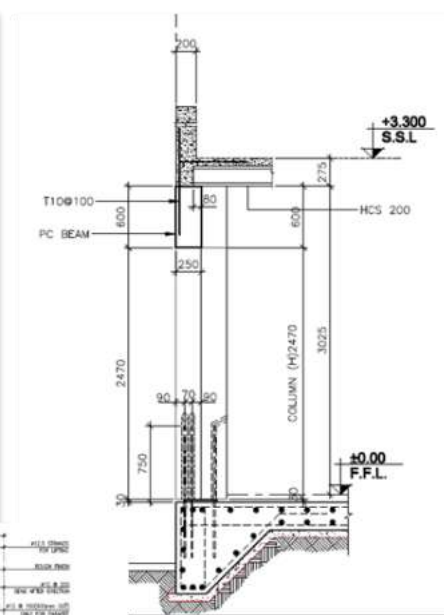
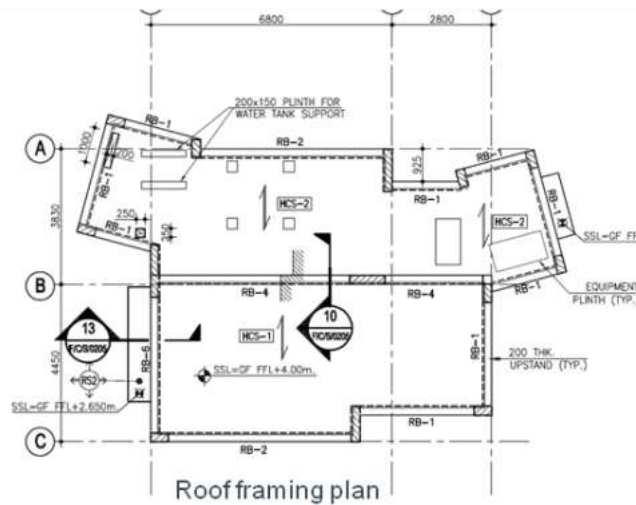
- Suppliers easier to control in terms quality compared to on site operations
- Less hindrance to infrastructure
- Better quality of construction

- Schools
 - Shopping malls
 - Hospitals
 - Car parks
 - Mosques
 - Hotels
-
- Opportunity for repetition – modularization & floor by floor
 - Early occupation
 - Economy

- Public facilities
 - School, community housing (Baniyas), car parks and universities
- Special projects
 - Dubai metro, light house
- High rise buildings
 - 21st century tower, A22A Marina, Millennium
 - Tower, Chelsea tower, Creekside apartments



- Project in remote island of Sir Bani Yas
- 4 Key components
 - Al Sahel development
 - Al Yamm development
 - Conference centre
 - Water sport centre
- 30 Chalets and 4 public buildings
- Logistics challenge – 7 km away from nearest port
- Architectural layout was improvised to suit prefabrication
- Mix of prefabricated and on site components used
- Precast columns, precast beams & hollow core slabs
- Main contractor: ASTCC
- Precast contractor: United Precast Concrete
- Key issues: Coordination, corbel projection



Chalets for Al Yamm development

Development at Sir Bani Yas Chalets for Al Yamm development



Other project components



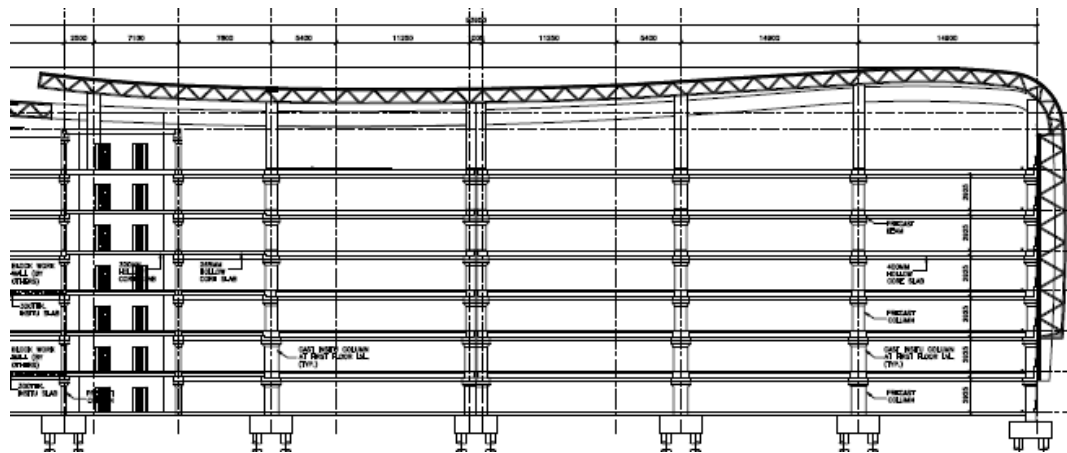
Al Yamm Chalet



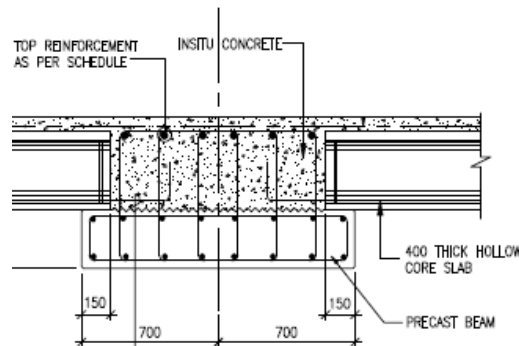
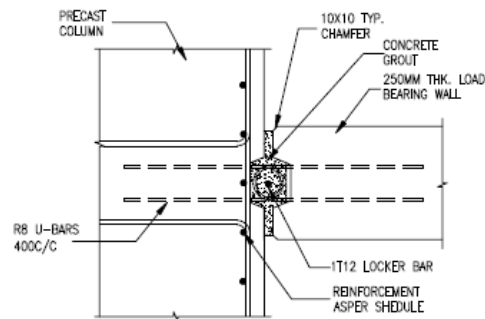
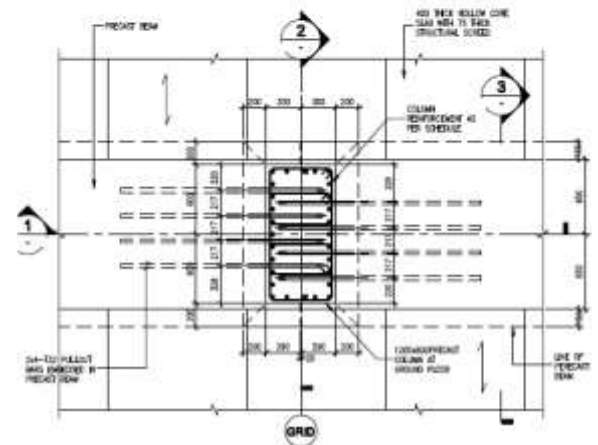
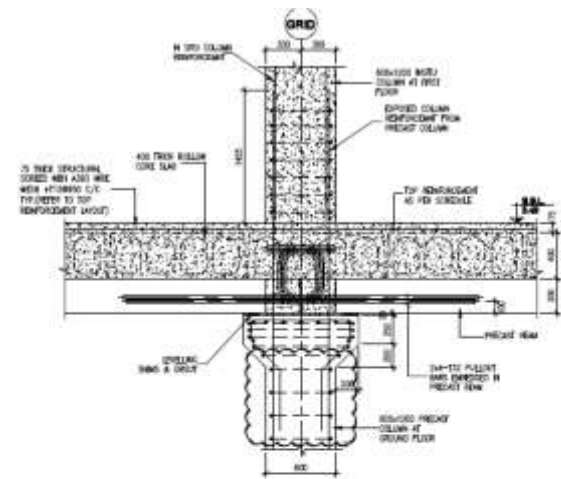


Dubai Metro Car park, Nakheel Harbour & Tower

- Dedicated parking facility for Dubai metro passengers
- 6 storey high, 176m x 95m plan dimension
- 2,800 parking spaces
- Precast columns, beams, hollowcore slab, stairs and wheel stoppers
- Cladded facade and steel roof
- Contractor: Dubai Rapid Link Consortium
- Precast: Dubai Precast



Section



Details

Dubai Metro Car park, Nakheel Harbour & Tower

Dubai Metro Car park, Nakheel Harbour & Tower

CASE STUDY



Dubai Metro Car park, Nakheel Harbour & Tower

CASE STUDY



Carnival Building UK



Carnival Building UK

CASE STUDY



Carnival Building UK

CASE STUDY





Special Pre cast – free form?

Outside the Box –Fabric Forms



Other projects

- 21st Century tower
- A22A Dubai Marina
- Al Salam tower
- Bright start tower
- Creekside apartments
- Dubai Metro

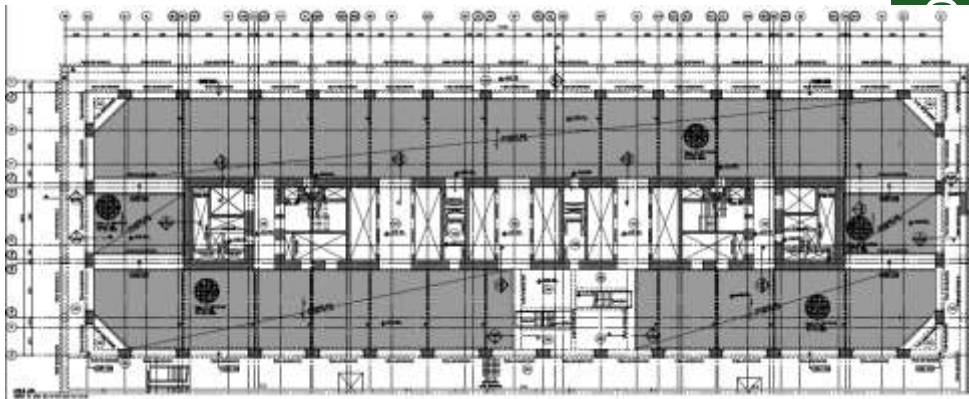




ATKINS







Possible development

Using variety of architectural finishes or combination of them

Exposed aggregate with different finishes

Form Liners

Facing Tiles or bricks

Possible development

Using variety of architectural finishes or combination of them

Exposed aggregate with different finishes

Form Liners

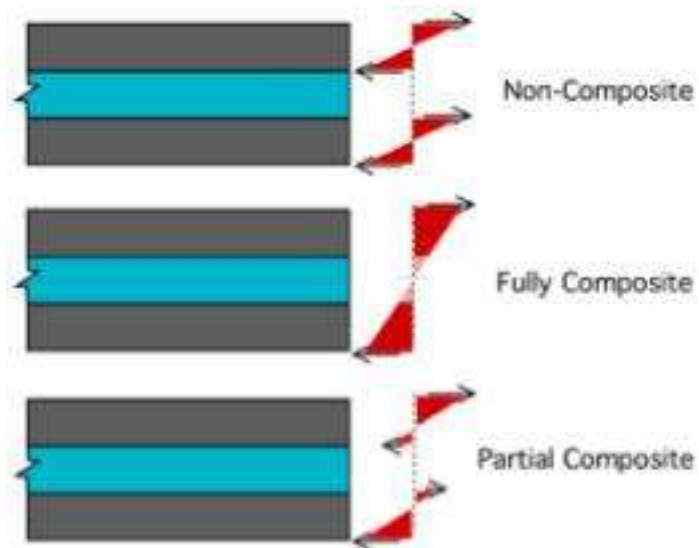
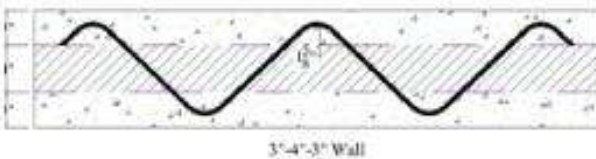
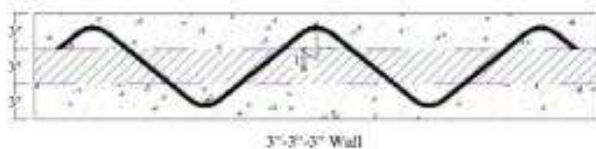
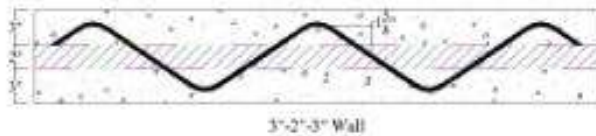
Facing Tiles or bricks

Possible development

Increase the efficiency of the external walls by using:
FRP connectors while
Maintaining composite action



NU Ties – courtesy Aslan FRP



St. Francis School - N. Dakota

Use of combination of form liners, Brick cladding and colored concrete



University of Nebraska Car Park – Omaha- NE

Use of Brick cladding with fair face concrete



Creighton University Car Park – Omaha NE

Use of Brick cladding with fair face concrete



003 Lancaster County Jail – NE

Use of form liners with Grey Concrete



Marina Mosque – Abu Dhabi

Full structure in Precast White Concrete exposed Aggregate



Delhi Private School – Gardens – Jabal Ali

First Part of the school was built in 2002

Extension 2010

Sports Facility 2011



DPS – Gardens



DPS GARDENS – SPORTS FACILITY



DPS Gardens – Sports Facility



DPS Gardens – Sports Facility



DPS – Sharjah – New Campus



DPS – Sharjah – New Campus



ENVIRONMENTALLY FRIENDLY

As public members of the community, schools must minimize their environmental impact while providing comfortable and healthy buildings in which to learn and work. Precast concrete systems provide these benefits in many ways:

Environmental friendliness

Precast meets many of the rating criteria used by the new Leadership in Energy & Environmental Design (LEED) standards. For instance, the material typically is produced locally, generates no job-site waste, has no outgassing, and can incorporate fly ash to reduce the amount of cement used. Precast concrete panels offer high durability, which means fewer chemicals are needed to keep it clean and maintained.

Energy efficiency

The use of insulated sandwich wall panels provides high energy efficiency. The wall's fabrication process ensures the insulation cannot shift during or after construction, leaving no gaps in thermal protection. Precast's high thermal mass also minimizes energy consumption, naturally offering a concrete advantage that drops right to the bottom line. This is especially significant for large spaces, such as gym and pools.

*Lynwood High School
Lynwood, Calif.
Photo ©1997 Wayne Thomas*



Lincoln's North Star High School, Lincoln, Neb.

Indoor air quality

Precast concrete ensures that building users will have a safe and healthy environment. Its minimal water-penetration points ensure no dampening mold growth will occur, and it offers no outgassing that can cause deteriorated air quality.

Efficient HVAC use

Because precast panels eliminate worries about moisture penetration, administrators can reduce HVAC usage when the school is unoccupied for long periods without risking mold growth or creating bad indoor air quality.

Sound absorption

Precast's mass and insulation create better acoustical performance, producing a quieter, less disruptive environment, particularly in two-story structures that use hollow-core slabs for flooring. Its absorptive qualities also reduce vibration, ensuring running feet, gymnasium equipment or mechanical systems don't distract easily distracted students.

FINAL GRADE . . . A+

Precast concrete systems provide sustainable design that meets the growing need for environmentally friendly facilities. Its durability and classic appearance ensure the building will continue to return these benefits for many generations.

HIGH QUALITY

Casting components under controlled, factory conditions provides an unsurpassed level of quality assurance.

A+

Certified Quality

PCI-Member precast plants must a stringent quality-control program encompassing the plant, materials and personnel. Each plant undergoes two unannounced inspections each year. More than 120 areas are inspected and tracked over time. PCI certification meets JBC requirements and eliminates the need for special inspections, saving direct costs incurred with masonry.

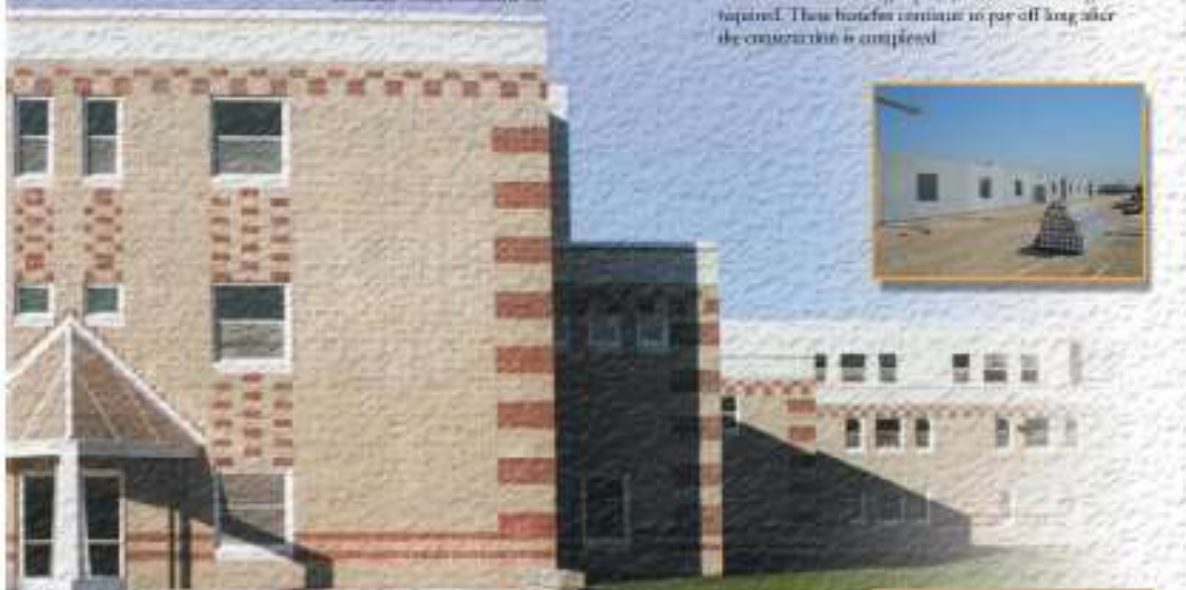
Designer control

Designers exert more control over the final appearance using precast concrete thanks to finish and range samples as well as mockup panels. The architect and owner can view the precast plant to monitor progress, ensuring no surprises occur on the site.

Ornamentation

Precast panels with thin brick allow the option to design greater levels of detail at reduced cost. Additional ornamentation can be achieved by leaving brick off areas of a panel — to create banding, modulation or the appearance of cast stone columns around fenestration.

Monk's Head, Danbury, CT



Long-term quality

When using precast wall panels, several tools and materials are eliminated from the construction process. The impermeable wall structure eliminates moisture migration, a real problem with typical masonry construction that results in eventual moisture, mold and mildew concerns. These problems often are neglected with tight maintenance budgets, potentially causing a degradation in indoor air quality.

Single-source provider

As the single source for so many architectural and structural components, brickwork or other finishes, the precast works closely with the construction team to ensure satisfaction.

FINAL GRADE: ...A+

No material can match precast concrete's combination of ambience when a high-quality, economical design is required. These benefits continue to pay off long after the construction is completed.

SAFETY & SECURITY

Safety tops officials' concerns today when planning new school facilities, and precast concrete components can help meet that need. Its attributes make the school not only a safe haven for teachers and students but also for the wider community during extreme conditions.

Fire safety

Precast concrete is a noncombustible material that meets all fire-code provisions with no additional design or insulating material required. This resistance speeds construction, eliminates added trades from the site and provides an inherent passive level of protection that doesn't need to be activated at the time of a fire. It won't give off lethal smoke and maintains its structural integrity even when subjected to the most intense heat, unlike wood or steel structures. Designing with a total-precast system maximizes the time for detection, containment and suppression.

Weather protection

The sturdy construction and mass provided by precast concrete components allow it to withstand severe weather making the school a secure site. Yet in aesthetic capabilities, the facility can produce any needed architectural expression.

Seismic requirements

Precast concrete panel and systems meet any seismic code's requirements. And new construction techniques that help re-rigger buildings after a seismic event can ensure that buildings reopen quickly afterward to serve students and the community.



Joseph Quincy Upper School, Decatur, AL



Jack Britt High School, Fayetteville, NC

Worker safety

The off-site fabrication of precast concrete components enhances safety during construction. It provides a controlled fabrication environment and eliminates trades from the site. Safety begins even before the first school bell rings.

FINAL GRADE . . . A+

As communities rely more on their school buildings for a wider array of functions, precast concrete helps ensure those spaces are safe, secure and flexible enough to meet community needs.

UNLIMITED APPEARANCE OPTIONS

School administrators want their facilities to project a strong, secure image with traditional appearance that relates well with existing campus buildings or scale of the neighborhood. Precast concrete components can achieve this in a cost-efficient way with added benefits no other material can match.

A+

Brick

Using true thin-brick techniques on precast's panelized system can create the look that many school districts seek. Precast's inset brick eliminates the long scheduling needed for laid-up brick while removing several trades from the site. It ensures a high-quality, even-spaced appearance that is difficult to achieve with actual brickwork — while eliminating on-site inspections.

Using traditional brick as the building enclosure can lead to a congested work site, waste of materials, added time and construction materials, problems with blocked work holes from falling mortar, inconsistent labor expertise, weak mortar joints, efflorescence and discoloration due to bad weather. All of these quality concerns and time delays are eliminated with precast concrete systems.

Contemporary

Precast concrete panels offer a plasticity in shapes, curves and geometries that can create any desired look. They interface smoothly with glass and other modern materials.

Colors/Tints

Precast's capability to tint concrete and provide several coats by using various surface treatments within one panel allow designers to specify any color they want. A wide range of finish combinations and textures can be achieved easily.

Stone replication

Special mold and finish techniques are used on panels to create limestone, granite and any other type of stone desired. The finishes are produced far more economically than real stone can be laid, and they can be erected much quicker. Form lines can replicate unusual pieces such as cut stone or slate.

Matching existing campuses

With its ability to replicate such a wide range of materials, precast concrete panels ensure new buildings blend with existing ones. This is particularly true if the original buildings also were made of precast concrete, as previous mixes often can be reproduced.

Embellishments

School turtles, children and other custom touches can be embedded into panels, creating unique accents at an attractive cost.

FINAL GRADE . . . A+

Precast's plasticity and variety of finishes make it an outstanding choice no matter what style of architecture is desired. Schools benefit by turning to precast concrete to realize their aesthetic needs.





The speed with which precast concrete components can be fabricated and erected provides a compelling advantage for meeting tight schedules.

A+

MEETING DEADLINES



*Beverly High School, Beverly, MA
Photo: Don F. Wong*



Spring Union, East Hampton, N.Y.

Design speed

It takes significantly less time to design a precast concrete school building than one built of masonry due to the lessened detail required in precast's panelized system and the ability to quickly replicate components on each floor or wing. Precasters offer a high degree of engineering expertise and assistance to speed the process, more.

Fabrication speed

Precast components can be fabricated while permitting and foundation work progress. Precast components typically can begin erection as soon as the site is ready and foundations are complete. And, as the single-source supplier precasters help maintain the critical-path scheduling required to meet deadlines.

Erection speed

Foundations can be placed one day and precast load-bearing or nonload-bearing panels can be erected the next day. Wall panels, double tees, and hollowcore planking also erect quickly, often cutting weeks and months from the schedule, allowing construction to get into the dry quicker. Interior masonry then begins work earlier. The fast enclosure lessens weather or material damage during erection, reducing the contractor's risks — and costs.



The need for more school facilities is being exacerbated by the deterioration of "temporary" facilities. Total public and private elementary and secondary school enrollment has grown steadily, from 46.4 million in 1990 to 53.4 million in 2003. It is not expected to drop off again as it did following the original Baby Boom period of the 1970s, according to a report from the National Center for Education Statistics.

A+



Lincoln North Star High School, Lincoln, Neb.

TOTAL PRECAST CONCRETE SYSTEMS Meet Schools' Total Lifetime Needs

As the children of Baby Boomers grow up, school districts nationwide need to expand learning facilities. Often, these needs must be met rapidly, as budget and approval processes don't take into account that school doors must open when the school bell rings each fall — or summer. Being one-month late is not an option.

To meet this fast-track need while providing a variety of other key benefits, more schools are being designed using architectural and structural precast, prestressed concrete components. The components include:

- Both nonload- and load-bearing precast concrete panels, often with an interior sandwiched layer of insulation.
- Hollowcore and double-tee floor/ceiling planks.
- Precast columns and beams.
- Double-tee roofing components.

When these components are joined in a total precast concrete system, the synergy produces unmatched advantages — in total cost effectiveness, reduced construction time and improved quality and durability. A school building designed from the start with a total precast system provides the best design possible.

Designers also are using precast concrete modular systems to create finished spaces even quicker. These projects — featuring precast ceilings, walls and floors — are delivered to the site and simply connected together. Bathroom modules can be completely outfitted at the precaster's plant prior to delivery.

PRECAST CONCRETE

Head of the Class

COST

A+

Precast concrete provides fast construction, eliminates trades and lowers lifetime maintenance.

TIME

A+

Precast components meet tight deadlines - fast design, fabrication and erection speed.

QUALITY

A+

PCI members produce certified high-quality components to meet your design requirements.



Conclusion

- Early involvement of all stake holders in absolutely necessary in implementing good precast solutions.
- Public facilities offer plenty of opportunities for pre cast.
- Precast is not restricted rectilinear forms.
- Design integration
- Atkins and e.construct has significant contribution in promoting precast in the UAE.



THANK YOU



SPONORS



CO SPONORS

