

Precast Concrete Distinguishes Courthouse Design

Excerpted and adapted from an article in *AAJ Journal* by Jeanne Chen, AIA, and Robert Dolbinski, AIA, LEED AP
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SUMMARY



The new U.S. Federal Building and Courthouse in Fresno, Calif., is a downtown landmark and the largest addition to Fresno's skyline in several decades.

Designed by Moore Ruble Yudell Architects &

Planners, the building demonstrates the capabilities of precast concrete. The architects were concerned with the monolithic scale common of this type of structure and designed a structure on a human scale with ample light and an articulated elevation.

DESIGNING WITH CONCRETE

Moore Ruble Yudell credits the success of the concrete panels used in the courthouse design to a collaborative effort between the material manufacturers and the project's general contractor. The team worked to minimize cost and maintain quality while the architect ensured a superior design.

The precast paneling became a defining element of the courthouse's design. The variation of the concrete surface and its interaction with natural light gives the building a sense of ruggedness that connects it to the natural landscape of the region.

Precast concrete is not a common material for civic buildings, but the architect wanted to use it in an innovative way while taking advantage of its economy and material characteristics, including

- Blast resistance, which is required for federal government buildings
- Acoustical barrier to block surrounding sounds from nearby railroad lines
- Durability and low maintenance
- Speed of installation to quickly provide exterior closure
- Quality control

PANEL DESIGN

The patterning of the precast panels gives a human scale to the courthouse's large, potentially imposing building mass. To create a seemingly random pattern with depth, scale, and rhythm, they designed a few different panels that, when used together, create surface variety and add depth, scale, and rhythm. They studied pattern and texture with physical models, computer models, and full-scale precast mockups to refine and finalize each panel. In the end, 1,260 individual concrete panels were used in the courthouse construction.

Pattern articulation used standard precast panel depth with a maximum projection and indentation of 1 inch. Panels were placed at 0-degree and 180-degree rotation, and panel start points were varied within the same form for more variety. All joints between panels, and reveal joints within panels, were consistently 1-inch wide, with vertical panel joints staggered to create a monolithic appearance.



SUCCESSFUL COLLABORATION

The success of the precast panels is due to a collaborative design team, planning, and high quality standards. The design of the panel system involved extensive collaboration with fabricator Clark Pacific beginning early in the design process. The teamwork of Moore Ruble Yudell, Gruen Associates, and Clark Pacific continued with the general contractor, Dick Corporation/Matt Construction, and allowed for creative solutions to construction challenges. By understanding the material's properties, the architects developed the language of

the building and incorporated a few time-saving and quality-control measures in the design and construction process that added to the success of the project:

- Use of very large panels, limited by the size that could be transported by truck, reduced cost and erection time.
- Minimizing panel types shortened production time.
- Panels were fabricated and inspected off site for quality control.



LESSONS LEARNED

The architects cite a few key decisions as being integral to the project's success:

- Consult early with a qualified precast fabricator so the design is informed by material properties, including sizes, clearances, support requirements, textures, colors, and surface finishes.
- Specify mockups in stages starting with smaller 12" x 12" color samples and continuing with full-size mockups in the field for quality control and building-envelope testing.
- Specify white cement; although it generally costs more, it allows richer and more intense color choices.
- Confirm required joint widths, and identify possible problem areas early in the design process. Waiting until construction may limit choices and compromise the design intent.
- Specify a mockup for precast repairs. Inevitably, some panels will be damaged during shipping or installation, and proposed repair methods should be approved before damage occurs.

About the Contributor

Jeanne Chen, AIA, is a principal with Moore Ruble Yudell Architects & Planners, in Santa Monica, CA and Bob Dolbinski, AIA, LEED AP, is an associate with the firm. With partner John Ruble, FAIA, they led the design team's efforts from early design through construction for the U.S. Courthouse in Fresno, Calif., which has recently received numerous awards including the General Services Administration Design Excellence Honor Award, AIA Academy of Architecture for Justice Citation, Chicago Athenaeum Award for American Architecture, and a Precast Concrete Institute Design Award.

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All photos of the U.S. Federal Building and Courthouse, Fresno, Calif., courtesy of Tim Griffith.

RESOURCES

For More Information on This Topic

See also "Building Design," by Richard McElhiney, AIA, and Joseph A. Demkin, AIA, *The Architect's Handbook of Professional Practice*, 13th edition, Chapter 18, page 563. *The Handbook* can be ordered from the AIA Bookstore by calling 800-242-3837 (option 4) or by sending an e-mail to bookstore@aia.org.



More Best Practices

The following AIA Best Practices provide additional information related to this topic:

- 14.03.02 Benefits of a Satisfaction Fee in Public Architecture
- 18.11.10 Energy Modeling and Daylighting Analysis
- 18.03.12 Preventing Moisture Problems in Building Envelopes

Key Terms

- Building performance
- Materials
- Concrete
- Precast concrete