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Frederick County Public Safety Building - Case Study

The Frederick County Public Safety Building was designed as a two-story structure to house the county's Sheriff and Fire and Rescue Departments. The building includes space for the Emergency Communications Center and Emergency Operations Center, as well as associated support spaces. An Ancillary Building is located behind the Safety building in the secure portion of the site. The Public Safety Building is approximately 61,500 square feet and the Ancillary Building is approximately 7,980 square feet.

The PSB's exterior, proportions, details and window arrangements were developed in a modern architectural style. The building is rectangular, with the second floor matching the first floor footprint. The Emergency Communication Center portion of the building is shown on the exterior of the building by the curvilinear element located at the front corner of the structure. The low slope roof will drain to the rear of the building and a scupper system is used to remove rainwater from the roof.



The exterior building materials are precast concrete wall panels with two complimentary color panels. The panels consist of a taupe accent panel at the stairs and projected areas of the building. A gold colored precast panel is used for the base areas and accented with a white precast base and fascia. Each panel received two finishes, a fine sand blast finish on the projected areas and a medium sand blast on the recessed areas.

The structural system consists of precast double tees for floor and roof, including a nominal 4" topping on the second floor. The precast double tees bear on top of rectangular precast beams near the building centerline and the 8" thick structural precast wall panels at the perimeter. The precast beams span between 16" x 16" bull nosed architectural precast columns spaced no more than 32' on center. The main Operations Rooms for the Emergency Communications Center and Emergency Operations Center on the second floor required the slab to be dropped 8" by notching the double tee stems.

The Public Safety Building consists of 291 precast pieces and the Ancillary Building consists of 39 precast pieces.

In January 2006, the Shockey Precast Group (SPG), Howard Shockey & Sons (HSS), and Hayes, Seay, Mattern & Mattern, Inc. (HSMM) met to review the preliminary building sketches and overall building appearance for the Frederick County Public Safety Building. HSMM's project called for a tight schedule: from Notice to Proceed to Project Turnover, the project schedule was 17 months.

PROJECT DESCRIPTION

Specialty Precast Engineer

The Shockey Precast Group
Winchester, VA

Products Used

- 10DT32 with 2" flange
- 8" Interior wall panels
- 8" exterior load-bearing wall panels with architectural features and mixes
- Precast stair units
- 18" x 18" precast columns
- 18" x 36" ITB
- Architectural trim units (copings and cornices)

Owner

Frederick County, VA

General Contractor

Howard Shockey & Sons
Winchester, VA

Architect

HSMM, Inc.
Virginia Beach, VA

Engineer

HSMM, Inc.
Virginia Beach, VA



Upon review, SPG proposed to HSMM to use a total precast system rather than a steel and masonry system. HSMM accepted the proposal. SPG decided to utilize Tekla Structures' Precast, 3D BIM capabilities on the project, and created an initial 3D model for HSMM's review. The use of Tekla Structures' visualization tools facilitated early MEP design decisions, and provided a simple method for addressing changes as the building concept continued to evolve.

Following several meetings to review building panelization and precast color samples, it became apparent that the original anticipated start erection date of June 1 would be difficult to meet, and would require the majority of SPG engineering resources to meet the production/erection schedule.

By May 2006, SPG began production of the double-tee precast concrete pieces, and it became apparent that engineering was unable to supply information to the plant quickly

enough to maintain constant flow of production. Upon discussions with HSS, a revised erection start date of July 17, 2006 was established. By July 12th, SPG provided sealed 95% drawings and specifications to HSS, allowing HSMM to issue 95% construction drawings.

On July 17th Phase 1 erection began as planned, and continued until July 26th. On July 26th the crane was moved and began Phase 2 erection. Erection continued according to schedule, and on August 1st Phase 3 began.

By August 14th plumbing and electric follow-on trades began work inside the building footprint. The crane was moved on August 18th to begin Phase 5 of erection. Erection was completed on August 22, 2006 – three days ahead of schedule.

Key Benefits of Utilizing Total Precast System vs. Conventional Construction:

- **Reduced erection time** – The Frederick County Public Safety building was erected in 5 weeks. The use of a total precast system resulted in a savings of 2 months to the overall schedule, as compared to a masonry/steel building. The overall schedule savings also translated to a savings on General Conditions for the General Contractor.
- **Speed to market** – From Notice to Proceed to Project Turnover, the original project schedule was 17 months. By incorporating a total precast system and utilizing Tekla modeling, the actual project schedule was reduced to 12 months.
- **Increased safety** – The decision to use a total precast system rather than steel and masonry meant a reduction of man hours in the field, and an increase of man hours in a controlled manufacturing environment. Lower man hours in the field translated to a decrease in the risk of injuries and lost time on the project.
- **Sole source responsibility** -- By putting responsibility for the “superstructure” in the hands of a single precaster, the need for coordination of submittals between several trades was eliminated.
- **Speed to follow-on trades** – The rapid erection time associated with total precast systems meant that the Frederick County Public Safety Building was a totally enclosed structure ready for doors, windows, and follow on trades in just 5 weeks.