B A S E *Line*

The quarterly newsletter of BASE

Spring 2019

Not for the Weak or Faint-Hearted

Department of Defense Design-Build Work

The design-build delivery method has become more popular in recent years as project owners, particularly the Department of Defense (DoD), discover benefits that can include a more efficient design, faster schedule, and reduced cost. Design-build fosters teamwork, collaboration and innovation, but for projects to be successful members of the design team and the contractor must coordinate and optimize their efforts together. Over the past 19 years our creative approach to structural design and problem-solving has led to 53 DoD design-build projects across the U.S. and Guam, including these that are currently underway.

Army Reserve Center

ARLINGTON HEIGHTS, ILLINOIS

From charrette to completion of structural design: two weeks

This design-build project includes three separate buildings: a two-story Training Center, a one-story Organizational Maintenance Shop, and a one-story Unheated Storage building.

After notice to proceed was received in the fall of 2017, the project adopted a fast-track approach in order to start construction before freezing temperatures set in. This resulted in an aggressive schedule that only afforded two weeks to complete structural design of all three structures. In order to enclose the Training Center on time and maintain the critical path for the completion date it was also vital to get approval for the entire structural design so the construction of foundations could progress while shop drawings for precast and structural steel were still being completed.

Courtesy of FGM Architects.

Construction is progessing on the Army Reserve Center that is expected to be completed in spring 2019.

Owner: USACE, Louisville District
Architect: FGM Architects
Contractor: Blinderman Construction Company

BEHAVIORAL HEALTH/DENTAL CLINIC ADDITION

SCHOFIELD BARRACKS, HAWAII

Courtesy of Page Southerland Page.

Owner: USACE Honolulu District
Architect: Page Southerland Page
Contractor: Hensel Phelps

Creative antiterrorism design creates structural resiliency

This $75 million design-build, three-story behavioral health and dental clinic of approximately 77,000 SF connects to the existing lanai at the adjacent Building 673 via an exterior covered walkway.

As part of the DoD's antiterrorism requirements, this project must be designed to avoid progressive collapse. The three-story building exterior consists of stacked load-bearing precast concrete wall approximately 30 feet long and one-story tall. The innovative approach for this project is to hang the floors below from a precast concrete parapet beam that transfers the load to the adjacent intact precast wall panels. The design of this system involved creating FEM models to accurately predict the tensile forces in the panels for a loss of wall section in multiple worst case scenarios. The data from these models were then compiled to provide the most efficient reinforcing requirements for each panel. In most cases, the top level panel provided truss action to provide additional strength to the parapet beam.

P-601 Aircraft Maintenance Hangar
Andersen AFB, Joint Region Marianas, Guam

VE nets substantial cost savings without impacting schedule

Design-build of a 72,500 SF Type II Navy aircraft maintenance hangar with high bay spaces, crew and equipment spaces and administrative spaces that are designed with features to withstand Guam's severe wind, seismic, and corrosive environmental conditions.

Through value engineering it was determined that money could be saved by switching to steel fabricated in South Korea. Although the hangar was already completely designed with U.S. shapes (imperial units), BASE redesigned the entire hangar with new Korean (metric) shapes without disrupting the design and construction schedule. The change to Korean steel resulted in significant cost savings.


Courtesy of Jacobs.

Owner: NAVFAC Pacific Contractor: Hensel Phelps
Architect: Jacobs

P-714 Navy Unaccompanied Housing
Naval Station Great Lakes, Illinois


Courtesy of FGM Architects.

Owner: NAVFAC Mid-Atlantic Contractor: Clark Blinderman, JV
Architect: FGM Architects

Innovative progressive collapse avoidance

This new six-story, 166,000 SF bachelor enlisted quarters was procured under the design-build method and the structural design proceeded on a fast-track basis with the foundation and superstructure completed in only three months.

The structural system consists of a two-way cast-in-place concrete frame with perimeter masonry walls designed to meet the DoD's progressive collapse avoidance requirements. Innovative inset columns, set far enough back to remain intact during a blast, help support the cantilevered concrete slab. The perimeter masonry walls are connected to the slab with clip angles and are designed to be self-supporting using Vierendeel action. This solution helps the contractor achieve the benefits of a load-bearing masonry wall that is constructed after the self-supporting concrete frame is built. The masonry walls also act as shear walls for wind resistance.

Pierce Terrace Elementary School
Columbia, South Carolina

Fast track foundations accelerate construction

This design-build 77,000 SF facility replaces the existing Pierce Terrace School and meets the DoD Education Activity's criteria for "21st Century School Design" featuring clear span construction methods to allow easier reconfiguration to meet future educational needs. The school is expected to open in the fall.

With a targeted move-in date just 14 months after notice to proceed was given, foundation drawings were pushed ahead of the rest of the structural set to allow grading to begin prior to the complete design being finished. BASE worked closely with the architect, contractor, and subcontractors to quickly develop constructable designs that met the design intent and owner's requirements. Challenges confronting this fast-track project included design for blast effects in accordance with the DoD's antiterrorism and force protection standards and the high seismicity present in South Carolina.


Courtesy of Poettker Construction.

Owner: USACE, Savannah District
Architect: FGM Architects
Contractor: Poettker Construction