



U.S. Southern Command Headquarters (SOUTHCOM)

A unified command that consists of military and civilian personnel representing the U.S. Army, Navy, Air Force, Marine Corps, Coast Guard.

Design Build Team

Contractor – Hensel Phelps

Architect – HOK/BRPH

Owner

U.S. Army Corps of Engineers

Location

Miami-Doral, Florida

Construction Cost

\$278 million

Completion

2010

Project Highlights

- 2011 DBIA National Design Build Award
- 2011 Excellence in Construction Award – Mega Projects > \$200M, Associated Builders and Contractors
- 2010 ASCE Project of the Year Award, Miami-Dade branch
- Wind tunnel study to minimize natural hazard conditions
- Federal project
- Design-build
- LEED Gold
- Anti-Terrorism / Force Protection Design



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**Joe Giunta, Operations Manager,
Hensel Phelps Construction Co.**

Crosby Group Designs Hurricane-Defying U.S. Southern Command Headquarters

To help protect against hurricane damage, building codes in Southern Florida require that structures be able to withstand 146-mph winds. That’s already a structural design challenge, but the one Crosby Group had to meet in designing the U.S. Southern Command Headquarters (SOUTHCOM) was even stiffer. The requirement for SOUTHCOM was to design a building that would *remain fully functional* during the sustained 155-mph winds and 185-mph gusts of a Category 5 hurricane. To meet that challenge, Crosby Group conducted wind-tunnel tests; worked closely with the client, architect, and contractors; and designed solutions that struck the right balance between meeting code requirements and specifying a constructible, cost-effective building.

Leveraging Seismic Experience

A design-build project for the U.S. Army Corps of Engineers (USACE), SOUTHCOM is a 672,000-square-foot facility on a 55-acre site located in Doral, Miami-Dade County, Florida. It can accommodate 2,883 staff members. The facility contains work spaces, command control/operations centers, conference areas, and C4I/IT equipment rooms, as well as warehousing, a medical clinic, and a family support center. In parallel with the wind load and other coastal considerations for wave surge and scour,

SOUTHCOM had to meet Anti-Terrorism Force Protection (ATFP) requirements. The structural solutions for these two events oppose each other (breakaway exterior walls for flood vs. hardened walls for a blast event, for example). The seismic experience that Crosby Group brought was invaluable in guiding the design towards practical, sound solutions. They understand how buildings and their elements can be expected to perform under these short-term, multi-directional, high-energy loads.

In evaluating structural engineering firms, the contractor, Hensel Phelps Construction Co., looked for firms with experience meeting similar challenges. “I worked previously with Crosby Group on the Miami Airport, where they were a consultant on several challenging structural issues,” says Joe Giunta, Operations Manager, Hensel Phelps Construction Co. “Our vice president also worked with them on projects with seismic issues in Northern California. We both had good experiences with Crosby and liked their track record on federal projects as well, so we engaged them as the structural engineers on this project.”

Giunta credits Crosby Group with being good members of the design team from the beginning, especially because “they were open-minded and willing to listen,” he says. “Early in the project, we engaged a design-assist concrete subcontractor who has

performed a lot of work in Southern Florida and understood the wind requirements. Crosby listened to him, then brought back creative, detailed solutions on how the concrete and steel in the building could work together and remain flexible enough to deal with the wind loads without compromising the structure. Their willingness to listen, combined with their experience handling seismic issues in California, helped them develop solutions that worked for our project.”

Conducting Wind-Tunnel Tests to Find Innovative Solutions

To understand and measure wind loads, the design team did three wind-tunnel studies at different stages of the project. They did one during the proposal stage, which helped the contractor deliver a price estimate that would be accurate and competitive. After Hensel Phelps won the project, Crosby Group did a second study to fine-tune the design. Once the building designs had evolved to incorporate several changes in their final forms, Crosby Group and the team conducted a third one in order to deliver the most reliable and efficient structural design.

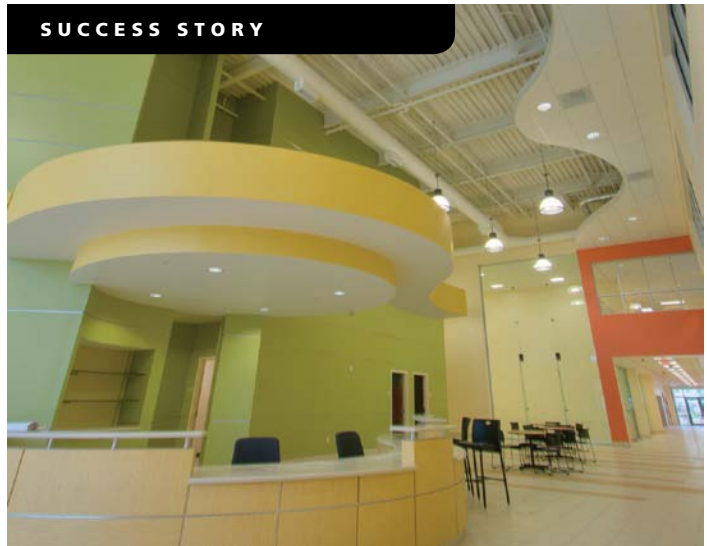
Giunta says the team learned a great deal from the wind-tunnel studies, which lessened the impact of the high-wind requirement. Still, foundations were larger than occur under normal wind-loading conditions. “Because of wind loads, it looked like they were going to have to be much larger than we had estimated and deeper into the water table,” says Giunta. “So we challenged Crosby to figure out how to get the foundations up high enough that we didn’t have to deal with significant amounts of water, which would have added a lot to the cost of the project. They came up with solutions that got us out of the water in 90 percent of the areas. And they did it with a good attitude—even though they had to do some rework to make it happen. They understood the importance and how much of an impact it would have on the cost.”

Comparing Crosby Group’s approach to that of other firms, Giunta says that “many structural engineers have a reputation for being too conservative, which can add cost to projects. Crosby Group struck the right balance between being conservative and realistic about the loads. This allowed our team to be cost-competitive.”

Meeting Deadlines Ensures Cost-Effectiveness

The SOUTHCOM project had an aggressive schedule—the Hensel Phelps team had 912 days from the time USACE got approval to proceed with the project until it had to be ready for occupancy. “That’s a very short timeframe for building something of this magnitude,” says Dennis Newell, client for the project and a Resident Engineer, Cape/Patrick Resident Office, USACE. “To meet that fast-track completion schedule, Crosby Group had to hit the ground running with their

SUCCESS STORY



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structural design, which they did. In a key way, that helps with cost-effectiveness: By getting their design documents completed and approved on time, they made it possible for project managers to get steel fabricated and delivered to meet the aggressive schedule.”

Contributing as a Team Member

Crosby Group is based in Northern California and the project was in Southern Florida, so the job clearly presented some travel challenges. “It’s important for structural engineers to be on site on a regular basis when their work is being performed,” says Giunta. “They need to walk the job and confirm that what we’re putting in place conforms with their documents. But according to Giunta, being on site at the right times was never an issue with Crosby Group. “When we needed them there for a meeting, they were there. They came at least monthly for a review when the work they designed was in progress, but in addition, they came for a half-dozen design meetings and some partnering sessions after the work was done. They exceeded my expectations in this regard.”

Evaluating Crosby Group’s overall performance on the project, Giunta says, “I’ve worked with a dozen structural engineering firms over the past ten years and I’d say they’re in my top three. Given their great attitude, commitment to teamwork, and sensible approach to not being too conservative, they were definitely the right choice.”



Crosby Group is an award-winning innovator in structural engineering and advanced seismic solutions—we go beyond convention to offer creative alternatives to design challenges. Our comprehensive design services include new/renovation design, seismic evaluation/retrofit, constructability/peer review, BIM modeling and LEED partnering for public and private clients. We have collaborated on over \$3 billion worth of design-build construction work, making us a leader in this project delivery method. Established in 1992, Crosby Group has experience in education, mission-critical, healthcare, justice, industrial, commercial, laboratory, and correctional sectors. We have worked on projects across the United States, and in the Middle East, Asia, Eastern Europe and Mexico.

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