



PRESS RELEASE

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Local Engineering Firm Gaining National Recognition in Designing Terrorist-Resistant Structures

While the FBI is warning of new threats that Al-Qaida has been planning another attack on the United States with the possible use of limousines, trucks and Chevrolet sedans packed with explosives, local Honolulu firm Baldrige & Associates Structural Engineering, Inc. has been developing terrorist-resistant structures – barricades and buildings.

The firm is gaining national recognition as a leader in designing these structures. Next month Steven Baldrige will receive a National Council Structural Engineers Association (NCSEA) award for Bachelor Enlisted Quarters (BEQ) P-593, now named Oklahoma Hall, at Pearl Harbor. This \$14.3 million project is a new five-story, 5,250 square meter BEQ that has 104 living units and can accommodate 208 sailors. Each unit features electronic card entry, central air conditioning and a kitchenette, amenities not typically found in most existing barracks facilities. To the typical enlisted soldier these conveniences are a “quality of life” enhancement. However, one of the most important features for ensuring the well being of the sailors living in this facility is a design element that, hopefully, never will be used. Hidden from view, the casual observer only sees the inviting Hawaiian architecture and never realizes the level of security built into the structural skeleton. Oklahoma Hall is the first residential building in Hawaii (and possibly the nation) designed to meet the Department of Defense (DoD) Antiterrorism/Force Protection (AT/FP) Construction Standards.

The main challenge was to create an economical structural system that met the AT/FP and progressive collapse criteria without significantly impacting the architectural and functional requirements of the project. At a minimum, the DoD Progressive Collapse Standards require that any one exterior load-bearing (vertical or horizontal) element be removed from the structure without disproportionate collapse. For this project the DoD required more stringent requirements. While specifics cannot be discussed, this included the removal of all elements with a prescribed distance from the structure exterior face of the building. The design-build team of Dick Pacific Construction, RIM Architects and Baldrige & Associates Structural Engineering evaluated several different structural systems. The most efficient scheme, dubbed the “BASE Hanger System” (“BHS”) is a “multi-hazard” solution providing not only progressive collapse mitigation, but also resistance to other hazards such as earthquakes and hurricanes.

By design the “BHS” is unobtrusively integrated into the functional layout of the building. Alternate load paths (in the case of a missing element) can develop because of the “special” detailing provided for the load bearing concrete walls between units. The interior demising walls are divided into two distinct vertical elements, an “exterior” and an “interior.” The separation between the two walls consists of a weakened (or “fuse”) section, a backup wall and a physical gap. However, at the top floor the interior and exterior portions of the wall are continuous. If the support at any level is lost due to an explosion, the continuous portion of the wall is designed to behave as a “hanger” or deep cantilever beam, carrying the weight of the unsupported walls below. On a fundamental level, the “BHS” can be visualized as a giant “hangman’s noose.”

Despite the stringent security requirements, the architect was not constrained by additional structural framing. As a result, the design of Oklahoma Hall promotes a sense of community as opposed to a barracks (or bunker) type atmosphere. The success of the design is best measured by the building’s residents. Seaman Brian Wallace was quoted as saying, “This is the first place I’ve lived as a Sailor. This is more like a hotel than a barracks.”
