TrusSteel Poised to Protect Lives Against Terrorism

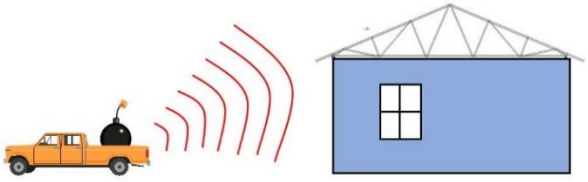
As a country we will never forget the horrific attacks of September 11, 2001. Not so familiar to many are prior bombings that targeted structures such as the Marine Barracks in Beirut, Lebanon, Alfred P. Murrah Federal Building in Oklahoma City and Khobar Towers in Saudi Arabia.

Out of the rubble of these terrorist attacks came new design criteria to fortify structures from massive destruction in the event of a bombing. The Unified Facilities Criteria (UFC) now defines and mandates specific antiterrorism design standards for new construction of Military and Department of Defense buildings. Today, certain private sector projects are utilizing this design approach as well.

UFC 4-023-03 outlines design procedures to reduce the potential of a progressive collapse failure from localized damage sustained from such a bombing. The methodology hinges on providing stability to the overall structure by transferring loads away from any locally damaged region (i.e. exterior wall) to adjacent regions capable of resisting those loads without the building collapsing.

In the case of a TrusSteel roof truss bearing over corridor walls, an alternate analysis requires one exterior wall to be entirely removed, effectively creating a large cantilever. The truss, connections and bracing system must continue to support specific design loads under this unsettling scenario.

UFC 4-010-01 expanded the design of these structures to include effects from the direct application of force (air blast) generated from the explosion. Trusses within Alpine's VIEW software program are designed for static loads – they do not move or change over time. "Blast Loads" are extremely complicated since they are dynamic in nature – moving and varying over time. Variables such as positive and negative phase impulse, standoff distances and blast weights are used to determine pressures inflicted on the structure.



Project specifications generally require a blast consultant to be hired to evaluate and assist on the design of the structure. Using highly sophisticated software programs, some of which require a background check to obtain, the consultant will determine *equivalent static loads* to be applied to the trusses. Special loads cases are then developed and incorporated into the overall design of the individual truss.

Minimum chord gauges may also be required to provide increased diaphragm connection capacity. To ensure web members yield rather than fail at connections to chords, mechanical fasteners are designed to transfer the lesser of 100% of the tensile capacity of the web member or 200% of the maximum axial load demand.

The Cold-Formed Steel Engineers Institute (CFSEI) has recently published TN-S100-16 which provides an outline of antiterrorism design requirements for cold-formed steel framing members. While the technical note focuses on wall design, the essence of the publication illustrates that cold-formed steel framing is a viable and acceptable product for buildings requiring blast analysis.

Cascade Mfg Co, with fabrication facilities in Cascade, IA and Tyler, TX, have supplied TrusSteel trusses on numerous blast load projects. The Soldier Family Care Clinic at Ft. Drum and Training Building at Bullville Army Reserve Center, both located in New York, are examples of two recent successful projects. Later this year, Cascade will be supplying trusses designed

with blast loads for a new school located in Guantanamo Bay, Cuba.

Douglass Colony Group, located in Commerce City, CO, has supplied TrusSteel on two projects, both located at Ft. Carson, CO – the 13th CAB Barracks in 2015 and the recently completed SOF Language Training Facility.

Gecko Steel Truss, located in Yuma, AZ, has also supplied trusses for projects at multiple military bases. Owner Dennis Smarra, an ex-marine himself, stated, "I am proud to provide extra peace of mind for our men and women in uniform." Two recent Gecko projects of note are the Guardian Angel Squadron Ops building at Davis Montham AFB in Tuscon, AZ and the still in progress Communication & Information Systems (CIS) building at Camp Pendleton in Oceanside, CA.

Designing and supplying these types of projects is not for the faint of heart. They are time consuming and difficult yet the pride of knowing, in a diminutive way, that you are helping fight the global war on terror is in and of itself extremely satisfying.

We hope a TrusSteel truss system, or any building component, never has be put to the ultimate test. It may come as a surprise to some that the underlying reason for these enhanced design procedures is *not* to save the building for future use. The building will more than likely be leveled afterwards. Protecting the lives of the building occupants, first responders and strategic assets is the underlying rational for these important design considerations.