

Abstract

Designing and constructing safe, secure and cost-effective buildings has always been the goal of architects, engineers, developers and community officials. However, in light of recent tragic events, urban security design has become a major concern for both public and private building owners as the threat of terrorism attacks becomes more evident. Modern research and technology have provided a means to counter some of these threats, but there is little doubt that the need for physical security design will continue to increase as long as there are conflicting social, religious, and political agendas in the world. Parallel to this trend, the desire for aesthetically pleasing structures and architecture which pushes the envelope of typical building design make designing a secure, blast and fire resistant building a challenge, as many protective measures clash with the desires of architects. As a result, development of construction materials and technologies with respect to security is on the rise and there is a need for comprehensive solutions.

Research into the behavior of stainless steel may prove it to be an elegant and efficient solution to a secure structural design which does not compromise a building's architecture. As a material that is often chosen for its aesthetic appeal, it also exhibits excellent ductility and high stress-strain rates, allowing it to absorb large amounts of energy from blasts before fracturing, compared to carbon steel. Stainless steel also exhibits superior fire-resisting qualities and can perform similarly to carbon steels without unsightly added fire protection. Using stainless steel for elements which have been identified as vulnerable to attack, such as a major column or transfer girder, or elements which can protect the rest of structure from a blast, such as a blast wall, can be an efficient component of a comprehensive urban security design. The challenges associated with the use of stainless steel, which has kept its use in structural design to a minimum, such as higher costs, availability, or special welding procedures, are minimal and will be easily overcome as the use of stainless steel in structure increases and designers and fabricators become more familiar with the material.