

Facility Safety and Security Basics for Designers - Introduction

The built environment exists at the intersection of a client's requirements and the creative energies of a design team. The success or failure of a project is the cumulative result of all stakeholders having their voices heard and their ideas considered. Unfortunately, the adage of "we don't know what we don't know" is relevant to the subject of security. Owners as well as designers, code officials, contractors, and all others involved in design and construction, are operating on their most current level of training, doctrine, and career experience to the point of time when the facility is completed and occupied or put into use. Unfortunately, recent tragic events are challenging our understanding of design principles that can aid in providing increased security in our built environment.

The field of safety, security, and preparedness has traditionally been addressed through compliance with codes or specific requests from the owner. Members of the design team may occasionally suggest improvements to the overall resilience of a facility but unless these are approved by the owner and do not cause financial hardship, they may not make it into the final contract documents.

There is rarely a single point of failure as it relates to safety, security, or preparedness. Instead, small shifts in society, climate, economics, and politics have created conditions where many of the accepted and preferred design practices from just a few years ago may now be seen as requiring modification or a complete overhaul.

Safety, in this discussion, is best understood as an umbrella term that covers all aspects of protection from harm. This could include protection from weather, fire, emotional harm, occupational risk, etc. Said another way, safety is the feeling of being protected from the factors that cause harm.

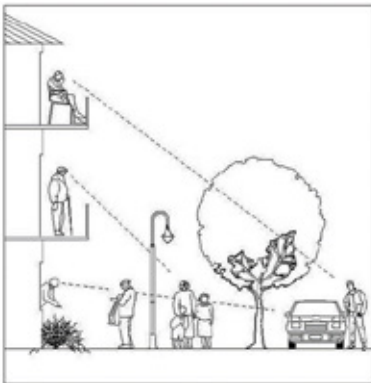
Security falls under the concept of safety but is more specific towards the protection of individuals, organizations, or assets against external threats and criminal activities directed towards them. Typically, security is focused directly on preventing deliberate actions intended to inflict harm towards these groups to include bodily harm of individuals as well as prevention of theft or loss of intellectual property.

Preparedness and resilience are concepts centered around proactive measures to mitigate or prevent damage from all hazards. These concepts can be applied to mitigating damage from natural disasters, cybersecurity attacks, energy scarcity, or loss of infrastructure just to name a few.

Crime Prevention Through Environmental Design (CPTED) was first used to describe defensible spaces in 1971. This concept has grown to encompass a system of principles and strategies that can be used to conceptualize an architectural design using an all-hazards approach mitigate external and internal threats.

The four primary principles of CPTED are:

1. Natural Surveillance
2. Natural or Mechanical Access Control
3. Boundary Definition or Territorial Reinforcement
4. Management and Maintenance



Natural Surveillance



Natural Access Control



Territorial Reinforcement

Although a design team cannot influence the owner's process and procedures after occupancy, they can play a role in enhancing the three preceding principles. Collaborative discussions with the client about security concepts from programming through design can lead to implementation of these principles. Staying actively engaged in emerging trends and technologies within the industry allows the effective designer to bring new ideas and concepts to the owner who would otherwise not be aware of the physical provisions that could help mitigate potential threats.

There are numerous resources available to architects and designers to gain the preliminary knowledge base required to successfully incorporate safety and security provisions in a design, including the vast world of CPTED, defensible space, FEMA's (Federal Emergency Management

Agency) THIRA/SPR (Threat and Hazard Identification and Risk Assessment/ Stakeholder Preparedness Review), just to name a few of the more prevalent tools and studies.

THEC developed design guidelines in partnership with the Tennessee Emergency Management Agency (TEMA) and the Tennessee Department of Safety and Homeland Security (TDOSHS), designed to be integrated into the designs of higher education projects, available for your review here (https://www.tn.gov/content/dam/tn/thec/bureau/fiscal_admin/safety/06052023_K12%20Best%20Practices%20FINAL%20COMBINED.pdf). The design principles presented in the guidelines advocate for a proactive mindset intended to futureproof facilities.

If only four initiatives are initially adopted for facility safety, these four are suggested as an optimal place to begin and are detailed extensively in the THEC Best Practices Guide:

1. Utilize the correct door hardware: although a hardware set may be called a classroom lockset, it often does not meet the recommendations from the department of homeland security for protecting vulnerable spaces. Short of using electronic access control, the best practice from door hardware is to allow for single motion locking from within the space without the need for a special tool (this includes a key). Exiting the space to lock the door should never be required.
2. Create a “hard corner” that is out of sight of the door and is large enough to provide standing room for the code-allowed occupant count should be provided. A “hard corner” should provide not only concealment but also cover. In other words, provide some amount (as determined in concept with the owner’s requirements) of ballistic protection from the two walls that define the corner instead of just preventing the occupants from being seen. Conventional drywall will not stop ballistic projectiles so it can only be seen as providing concealment.
3. It is encouraged that glazing be minimized wherever possible while still achieving the client’s goals. If the client is asking for wall-to-wall, floor-to-ceiling glass, the design team is urged to discuss the actual need for this with the client. Glass, while an incredible material in the right location, has become ubiquitous, and in the context of safety, security, and preparedness, it has these shortcomings:
 - a. Expansive areas of glass create environments where there may be little or no areas of refuge from active shooters.

- b. Glass at entryways and door areas are risks for forced entry and require reinforcement to reduce the risk.
 - c. It is difficult and expensive to achieve ballistic protection with glass. In retrofit applications, it may be structurally impossible to achieve ballistic protection due to the weight of the system. Despite the rumors in the media, there is no such thing as an applied bulletproof film. Forced entry deterrence CAN and often is achieved from an applied film system.
 - d. If forced entry is the primary threat and ballistics are not as great a concern, an overabundant amount of glass still creates a significant financial barrier.
 - e. Glass does not provide the same thermal performance as other material choices and can divert resources away from other improvements throughout the facility simply to create a picture wall that over time may become an attractive nuisance.
4. Secondary locking devices should be avoided and replaced with properly designed, code-compliant door hardware. These aftermarket systems often do not meet NFPA or ADA requirements.

This preliminary article is intended to be a conversation starter. The subjects and strategies are evolving along with the needs of society, emergency management, law enforcement and first responder methodology, and ongoing research into the most effective tactics available.

If further discussion is desired prior to a following article on this subject, please reach out to Patti Miller or Paul Marshall at the Tennessee Higher Education Commission for any discussion or request for a more in-depth exploration of this topic.

Additionally, the following documents may be of interest to those wishing to dive deeper into the subject themselves.

1. [International CPTED Association - www.cpted.net](http://www.cpted.net)
2. [Defensible Space - A theoretical overview - https://www.ojp.gov/ncjrs/virtual-library/abstracts/defensible-space-theoretical-and-empirical-appraisal](https://www.ojp.gov/ncjrs/virtual-library/abstracts/defensible-space-theoretical-and-empirical-appraisal)
3. [FEMA THIRA Process](#)
4. [Homeland Security Research and Development - Science and Technology Directorate](#)
5. [UL 752 for Ballistic Resistance Definitions - avoid manufacturer specific websites](#)