SENTRIZONE™ CODE COMPLIANCE: AN ANALYSIS OF IFC 316.3 AND 316.5

By Jody Allen Crowe

INTRODUCTION

In recent years, tragic events around the country have continued to raise the issue of building occupancy safety. Building managers and owners are being driven to implement defensive tactics to counteract these incidents and keep their occupants safe.

Active shooter situations are unpredictable and evolve quickly. They last, on average, eight to twelve minutes, and several more minutes may pass before authorities arrive on the scene to resolve the situation. Most security measures — such as surveillance cameras, door locks, access controls, gunshot detectors and bulletproof glass — are passive attempts to protect occupants. Security guards can adapt and react to a situation; however, they are not perfect solutions either. Multiple fatalities and injuries to security guards have occurred in the past two decades.

In most active shooting cases, either the shooter ends the event by committing suicide or someone inside the building risks their life to stop the shooter. The amount of time they control the facility, their "reign of terror," can last minutes — 55 minutes in the case of the Washington Navy Yard shooter, or as long as three hours, in the case of the Pulse Nightclub shooting in Orlando. How can we shorten that reign of terror and give building occupants a way to maintain control of their building, as well as protecting in-house responders and first responders?

SOLUTION

Crotega SentriZone™ is an active solution to Deter, Disrupt and Delay™ a threatening situation within a building. SentriZone is an Active Threat Mitigation System (ATMS) providing an additional layer of security and protection by creating an invisible defensive safeguard deployed by in-house responders upon visual recognition of a threat.

SYSTEM ACTIVATION & EFFECTS

SentriZone is activated by a trained building administrator, employee, or authority as defined in the emergency management plan. SentriZone units are arranged in zones, concealed in the ceiling throughout "high-risk" areas in the building, such as main entrances, hallways and large meeting areas, or throughout the building as determined by the building owner.

When trained personnel identifies a potential threat, via security cameras or the naked eye, they deploy the SentriZone units in the zone where the threat is located. SentriZone units are deployed with a touchscreen control panel. An organic, nontoxic water-based solution called REPULS® is then sprayed from the SentriZone units onto the threat zone. The duration of spray is programmable, lasting 5, 10, or 15 seconds, up to a maximum of 30 seconds.

REPULS irritates the eyes, causing involuntary eye closure, has a pungent overwhelming smell, irritates the throat and lungs, and stings the skin, inhibiting the ability of the perpetrator to focus on targets until responders resolve the situation. Immediately following the deployment, responders and other building occupants can move through the zone of deployment with minimal irritation.

 Copyright © 2022 Crotega. All Rights Reserved.

OBJECTIVE

This document provides building owners and manufacturer reps a guide to introduce the Crotega SentriZone™ System to Authorities Having Jurisdiction (AHJ), such as building officials, law enforcement officials and fire marshals. Crotega representatives have met face-to-face with several regulatory officials and offices to determine what code issues might arise as building owners across the United States install SentriZone in their buildings. This document will discuss, specifically, SentriZone's compliance with International Fire Code sections 316.3 and 316.5.

Authorities Consulted in This Analysis

Minnesota State Fire Marshal

Minnesota State Fire Marshals have had a significant impact on the design of the Crotega SentriZone System. Following a 2014 meeting with seven officials from the fire marshal's office, Crotega founder Jody Allen Crowe used their guidance to advance the design of the System into its current configuration. A meeting at the Crotega Research Center with over a dozen deputy state fire marshals in June 2016 led to further advice, including seeking professional consultation on the process. Two codes were cited by these officials for further review: IFC 316.3 Pitfalls and IFC 316.5 Security Device. Crotega has kept the Minnesota State Fire Marshals apprised of progress, including the Product Safety Lab testing of the Crotega REPULS® product.

Minnesota State Building Code Officials

Crotega officials met with Minnesota State Building Code officials to ask if there were any building codes that would preclude installation of SentriZone. The officials were aware of our System and had already determined there was no Minnesota building code that would stop a building owner from installing it, and the only time they would be involved in a decision for installation in a school would be when the $100,000 threshold for state approval is reached. Their suggestion, if a local building official raises code concerns, is to have the building owner ask the local official to show them the code, which, according to the state officials, does not exist.

International Code Council Evaluation Services (ICC-ES)

In August 2016, three Crotega representatives, along with consultant Jay Peters, traveled to Los Angeles to meet with the International Code Council (ICC) President and two department heads, asking for an analysis of our System regarding current International Codes. Crotega was informed in that meeting there is no code in the International Building Codes concerning a System such as SentriZone. Crotega requested an ICC Evaluation Services Report that would provide guidance. After taking that question under consideration, Crotega received the following response from Michael Temesvary, P.E., ICC Evaluation Services, LLC:

> *"I discussed the Crotega System with ICC-ES engineering management staff. They concluded that with respect to IFC recognition, there was not a particular section that would clearly apply to this type of System and act as the basis for an ICC-ES Evaluation Service Report (ESR). The attached 2015 IFC code and commentary section 316.5 was cited as being a concern for the acceptance of this particular product."*

It is important to note that ICC-ES staff did not consider IFC 315.3 Pitfalls as applicable to SentriZone. ICC staff provided Crotega with a copy of IFC Code 316.5 and Comments that provides a summary of the reasoning for the code. The comment section is important to understanding the intent of the code.

Copyright © 2022 Crotega. All Rights Reserved.

IFC Code 316.5 and Commentary

The IFC code in question, 316.5 Security Device, reads as follows:

> **316.5 Security Device.** Any security device or System that emits any medium that could obscure a means of egress in any building, structure or premise shall be prohibited.
>
> **IFC Code Comment Section**
> *Security devices that, when activated, emit a medium such as smoke or other aerosols into a building could obscure exits or confuse occupants, thus creating an inherently dangerous situation for the public and responding emergency personnel. In cases of activation of these devises, armed criminal perpetrators could be trapped inside the buildings. Law enforcement personnel arriving on the scene could easily believe that a building is on fire and responding fire fighters could enter and be confronted by the perpetrator. Another danger is that false fire alarms could be transmitted automatically or by passersby because of the appearance of smoke in the building. See also the commentary to Section 1031.2 regarding the reliability of exits.*

Crotega's Analysis of IFC 316.5

Crotega interprets the use of the word "obscure" in this statute as "to hide, conceal or keep from being seen" the means of egress.

REPULS® is not a fog, nor an aerosol, pepper spray, OC or CS gas. It is not deployed automatically. The System only deploys when activated by trained personnel upon visual recognition of a threat inside the building. The System disperses water with irritating properties through pressurized nozzles in bursts of 5, 10, or 15 seconds, up to a total of 30 seconds. At no time is an exit pathway visually obscured, as would be if a fog were deployed or if a person set off a fire extinguisher in a room or hallway.

Egress may be delayed for up to 30 seconds, shorter than time that would elapse if a fire sprinkler head were open and spraying water for as long as there is pressure in the system (a process that lasts much longer than 30 seconds and could cause a great deal of confusion and water damage). With SentriZone™, egress is not obscured during or upon completion of the short burst or bursts of spray. A burst of REPULS does not hide, conceal, or otherwise keep from being seen any means of egress.

Crotega understands that a precedent for delaying egress has been established. IFC 1010.1.9.7 states egress can be delayed for a maximum of 30 seconds in approved settings (see Addendum). When a Minnesota deputy state fire marshal observed our beta site, he was clear in requesting that we keep the bursts to 30 seconds or less.

As soon as the spray burst is complete, a person can move through the zone of deployment (with minimal residual impact from the spray) in fewer than 30 seconds. This is contrary to the lingering strong effects of aerosol pepper spray, OC or CS gas, which can last for days if not properly cleaned off walls, ceilings and floors.

Federal Emergency Management Agency (FEMA) informs building occupants to Run, Hide, Fight. Building occupants are trained to go into lockdown during an active shooter or violent event. In lockdowns, building occupants are not permitted to exit or even access hallways, especially in the area of threat. In the most likely scenario of a SentriZone deployment during an active shooting or violent event, egress from the building will be denied by the authorities until permission is granted for controlled egress. At that time, any lingering effect of the deployment will not impede egress and authorities will most likely not allow any access to the area of threat for purposes of emergency response and protecting evidence.

In Crotega's analysis of the commentary for IFC 316.5, it appears the focus of the code is to prohibit the use of security smoke machines, a security strategy popular in Europe and one that is now becoming a reality in pharmacies in the United States. Smoke security devices are considered one of the more dangerous strategies in an emergency because of their persistent ability to delay, obscure and prevent egress. Crotega entirely agrees with IFC 316.5 regarding fog. Through testing of a fog device in a research facility setting, Crotega has found that fog may be an effective shielding strategy in an active shooting event, however visual recognition and egress would be obscured for up to 30 minutes or more.

Copyright © 2022 Crotega. All Rights Reserved.

IFC Code 316.3 and Commentary

ICC-ES staff, in response to Crotega's request, did not cite IFC 316.3 Pitfalls as a possible barrier for SentriZone™. Though the statute was cited as a possible barrier in a March 2016 email from a Minnesota deputy state fire marshal.

IFC 316.3 reads as follows:

> **316.3 Pitfalls.** The intentional design or alteration of buildings to disable, injure, maim or kill intruders is prohibited. A person shall not install and use firearms, sharp or pointed objects, razor wire, explosives, flammable or combustible liquid containers or dispensers containing highly toxic, toxic, irritant, or other hazardous materials in a manner that could passively or actively disable, injure, maim or kill a fire fighter who forcibly enters a building for the purpose of controlling or extinguishing a fire, rescuing trapped occupants or rendering other emergency assistance.
>
> **IFC Code Comment Section:**
> *This paragraph prohibits the use of 'booby-traps" in building, for whatever reason, if they could injure or disable the emergency responder during the performance of his or her duties.*

Crotega's Analysis of IFC 316.3

Crotega agrees with ICC-ES that the activation of SentriZone does not meet the definition of a "Pitfall" as defined in IFC 316.3. It is not a "booby-trap" since it is not automatic. Deployment of the System only occurs when activated by a trained building occupant or monitoring service upon visual recognition of a threat.

The code and comments explicitly focus on forcible entry into a building by fire fighters for purposes of controlling or extinguishing a fire, rescuing trapped occupants, or rendering other emergency assistance. In each of these cases, SentriZone would not activate upon forcible entry or in the event of a fire, thus not fitting the definition or intent of the code.

Business Implications

After successful integration and testing, Crotega is confident in the design and application of the SentriZone System. As with fire sprinklers, we hope this System never needs to be deployed. However active shooter events, like fires, are unpredictable. The additional occupant safety and security Crotega SentriZone System provides cannot be measure in lives alone. This System, paired with other security products, provides building managers and owners peace of mind, knowing they can safely control a dangerous situation.

SUMMARY

The Crotega SentriZone System meets the requirements of IFC 316.3 and IFC 316.5. It has been designed such that it does not pose significant impediment to ingress or egress of first responders and building occupants. Our testing confirms that the System meets our objectives of deterring, disrupting and delaying intruders with minimal impact on occupants.

As one fire chief told Crotega while observing the beta System in action: "We, as fire chiefs, are always analyzing risk versus reward. I see very little to no risk to my fire fighters, but a much greater reward for children, parents, and school folks."

ABOUT CROTEGA

Crotega employs technology to bring about a safer world. We empower law enforcement, individuals, and building owners to take control with advanced solutions that neutralize active threats while reducing the risks to the user. We aim to make public safety more humane, offer peace of mind, and ultimately, save lives. Learn more at **crotega.com**.

ABOUT THE AUTHOR

Jody Allen Crowe is the founder of Crotega. He is an educator who worked in high-risk schools and the author of "The Fatal Link," a book on school shooters.

Copyright © 2022 Crotega. All Rights Reserved.

ADDENDUM

IFC 1010.1.9.7 Delayed Egress

Delayed egress locking Systems shall be permitted to be installed on doors serving any occupancy except Group A, E and H in buildings that are equipped throughout with an *automatic sprinkler System* in accordance with Section 903.3.1.1 or an approved *automatic smoke or heat detection System* installed in accordance with Section 907. The locking System shall be installed and operated in accordance with the following:

1. The delay electronics of the delayed egress locking System shall deactivate upon actuation of the *automatic sprinkler System* or *automatic fire detection System*, allowing immediate, free egress.

2. The delay electronics of the delayed egress locking System shall deactivate upon loss of power controlling the lock or lock mechanism, allowing immediate free egress.

3. The delayed egress locking System shall have the capability of being deactivated at the *fire command center* and other *approved* locations.

4. An attempt to egress shall initiate an irreversible process that shall allow such egress in not more than 15 seconds when a physical effort to exit is applied to the egress side door hardware for not more than 3 seconds. Initiation of the irreversible process shall activate an audible signal in the vicinity of the door. Once the delay electronics have been deactivated, rearming the delay electronics shall be by manual means only.

Exception: Where approved, a delay of not more than 30 seconds is permitted on a delayed egress door.

5. The egress path from any point shall not pass through more than one delayed egress locking System.

Exception: In Group I-2 or I-3 occupancies, the egress path from any point in the building shall pass through not more than two delayed egress locking Systems provided the combined delay does not exceed 30 seconds.

6. A sign shall be provided on the door and shall be located above and within 12 inches (305 mm) of the door exit hardware:

6.1. For doors that swing in the direction of egress, the sign shall read: PUSH UNTIL ALARM SOUNDS. DOOR CAN BE OPENED IN 15 [30] SECONDS.

6.2. For doors that swing in the opposite direction of egress, the sign shall read: PULL UNTIL ALARM SOUNDS. DOOR CAN BE OPENED IN 15 [30] SECONDS.

6.3. The sign shall comply with the visual character requirements in ICC A117.1.

Exception: Where approved, in Group I occupancies, the installation of a sign is not required where care recipients who because of clinical needs require restraint or containment as part of the function of the treatment area.

7. Emergency lighting shall be provided on the egress side of the door.

8. The delayed egress locking System units shall be listed in accordance with UL 294.

Crotega, LLC ▪ 5448 Douglas Dr N, Minneapolis, MN 55429 ▪ 612.547.3207 ▪ crotega.com ▪ Copyright © 2022 Crotega. All Rights Reserved.