MARK YOUR CALENDAR FOR THESE OTHER UPCOMING EVENTS!

- **Thirsty Thursday – Glass Embedding**
  Jan 17, 2019
  1:00 pm ET

- **Annual Conference**
  Jan. 22-24, 2019
  Naples Grande Resort | Naples, FL

- **BuildingEnvelopeContractors (BEC) Conference**
  Mar. 3-5, 2019
  Caesars Palace | Las Vegas, NV

- **Glass Processing Automation Days - GPAD (co-sponsored by NGA)**
  March 26-28, 2019
  San Antonio, Texas

- **GlassBuild America 2019**
  September 17 - 19, 2019
  Georgia World Congress Center | Atlanta, Georgia

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Security Glazing for Schools

Urmilla Sowell,
Technical & Advocacy Director

December 13, 2018

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Now ONE, UNIFIED VOICE

Security Glazing for Schools

Thirsty Thursday Webinar

December 13, 2018

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Learning Objectives

• Identify threats to schools
• Understand the function of schools
• Identify test standards and code requirements for school security
• Understand current glazing options
• Update on industry activities

Background

• First recorded shooting was July 26, 1794
• Pontiac’s Rebellion School Massacre in the Greencastle, PA area
  • 10 killed
• Shootings are recorded globally
• School attacks are RARELY sudden and impulsive
• Others usually KNOW the attacker’s plan and idea BEFORE the attack

https://everytownresearch.org/gunfire-in-school/
Overview

• How many times per year does a gun go off in an American school?

• US Education Department reported that in the 2015-2016 school year, "nearly 240 schools ... reported at least 1 incident involving a school-related shooting."


• At least 53 new school safety laws were passed in states in 2018.

• Districts are spending millions of dollars to "harden" schools with new security measures and equipment.

• Children are spending class time on active-shooter drills.

• Parents are buying “bulletproof” backpacks.

https://www.childtrends.org/data-sources-make-it-difficult-to-know-whether-school-shootings-are-happening-more-often
Schools – not just for teaching

• Many schools are used as shelters, command centers, or meeting places in times of crisis.
• Schools are also used widely for polling and voting functions.
• Consequently, ensuring the safety of students, faculty, and staff in our schools, as well as the safety of the school buildings themselves, is critically important.

Identifying Potential Targets

• Potential school attackers typically choose their targets to maximize the impact of their attack and minimize the effort.
• Schools are usually perceived as easy targets where a successful attack might produce the greatest effect.
• This effect may involve anything from massive casualties or physical destruction intended to induce psychological shock to symbolic acts that demonstrate a community’s vulnerability and instill fear.
School Security

• Many Americans feel that schools should be the safest place our children can be, perhaps at times even safer than the homes in which they live.
• Security is not a standalone capability; it is a critical design consideration that should be continually reviewed and scrutinized from the design phase through construction or rehabilitation and into building use.

How secure are schools?

• Most US schools are around 40-50 years old (National Center for Educational Statistics-2011)
  • 28% built before 1950
  • 45% built 1950-1969
• ANSI Z97.1 – Voluntary Safety Glazing Standard
  • created in 1966
• CPSC 16 CFR 1201 – Federal Mandate for Safety Glazing
  • adopted in 1977
Chapter 24
Glass and Glazing

- **Safety Glazing** - minimize cutting or piercing injuries
  - Tempered or laminated glass
  - Wired glass not permitted
  - Consumer Product Safety Commission/ANSI Z97.1

- **Sloped Glazing and Skylights**
  - Laminated glass

- **Glass Railings**
  - Tempered or heat-strengthened laminated glass required

Building Codes

- **Walkways, elevator hoistways and elevator cars**
  - Laminated glass

- **No requirements for security glazing**
  - Only security glazing reference in IBC is for fire section 408.7
Designing a Safer School: FEMA Guidelines

- **First or Outer Layer** consists of natural or manmade barriers usually at property line or sidewalk/curb line.
  - Fence or engineered standoff
- **Second or Middle Layer** usually extends from the perimeter of the site to the exterior face of a school building.
- **Third or Inner Layer** starts at the building envelope and extends into the interior of the school building.

Well-lit classrooms are safer, and natural light does not depend on a power source.

Consider using burglary- and ballistic-resistant glazing in high-risk school areas.

Consider using laminated glass in place of conventional glass.
Designing a Safer School:
FEMA Guidelines

• Place windows away from doors so that, if the windows are broken, the door cannot be unlocked.
• Place horizontal windows 6 feet above the finished floor to limit entry.
• Consider using steel window frames securely fastened or cement grouted to the surrounding structure.

Safety vs. Security

• Safety Glazing
  • Protection against accidental human impact
  • Protection against falling glass due to natural causes of breakage
    • Hurricanes, tornado, earthquake, wind loads, etc.

Building code-driven applications
Safety vs. **Security**

- Security Glazing
  - Protection against forced entry
  - Protection against ballistics
  - Protection against blast

**Voluntary Standards**

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**Forced Entry Standards – Voluntary**

- ASTM F1233 – blunt and sharp impacts; thermal and chemical attacks
- ASTM F1915 – larger blunt and sharp impacts
- HP White – blunt and sharp impact **plus ballistics**
- UL 972 – burglary – ball drop
- ASTM E2395 – window and doors systems test – different tools on the framing and missile impacts on the glazing (3.75lb @34mph)
Bullet Resistance Standards – Voluntary

• UL 752 - Standard for Bullet Resisting Equipment
• NIJ 0108.01 Ballistic Resistant Protective Materials Test
• WMFL (formerly Walker, McGough, Foltz and Lyerla) – ballistics and forced entry

Blast Resistant Standards - Voluntary

• ASTM F1642 - Standard Test Method for Glazing and Glazing Systems Subject to Airblast Loadings
• ASTM F2248 - Standard Practice For Specifying An Equivalent 3-second Duration Design Loading For Blast Resistant Glazing Fabricated With Laminated Glass
• GSA
• DoD
• ISO – shock tube and arena
Protecting Against Multiple Threats with glazing

Additional Features
- Acoustical Performance
- Aesthetics
- Energy
- Solar Performance
- UV Protection

Security Glazing Configurations – Single safety tempered glass lite

Applications:
- Safety
- Daylighting
Security Glazing Configurations – Single lite with film/plastic

Applications:
- Forced-entry
- Blast
- Safety
- Daylighting

Film or Glass Clad plastics

Security Glazing Configurations – Laminated

Applications:
- Enhanced forced-entry
- Enhanced blast
- Enhanced safety
- Containment when broken
- Impact (containment)
- Enhanced Acoustical
- Daylighting
Security Glazing Configurations – Laminated IGU

Applications:
- Enhanced forced-entry
- Enhanced blast
- Enhanced safety
- Containment when broken
- Hurricane Impact
- Enhanced Acoustical
- Energy efficiency
- Daylighting

Security Glazing Configurations – Multiple Ply

Applications:
- Enhanced forced-entry
- Enhanced blast
- Enhanced safety
- Containment when broken
- Ballistics
- Hurricane/Tornado
- Enhanced Acoustical
- Daylighting
Public response to threats

- Security guards
- Police visits to schools
- Surveillance cameras
- Alarm systems
- Security glazing in doors and windows
- Physical barriers
- Arming teachers discussion
- Bullet resistant backpack inserts

Industry Initiatives

- **Focus on products for delaying entry**
  - giving first responders time
  - giving school time to react and lock down
  - Not just bullet resistant glazing
  - Also enhanced high performance laminated and filmed products are very effective in slowing down intruders

- Several NGA members have products
Standards, Codes and Association Initiatives

- **NFPA 3000** - Standard for an Active Shooter/Hostile Event Response (ASHER) Program
- **ASTM** Mitigation of Armed Aggressors in Educational Institutions (F12/E54)
  - 2nd Meeting in January 2019
- **ICC** Ad Hoc Committee on Building Safety and Security current building and fire code requirements as they relate to developing the necessary balance between building security and fire safety considerations.
- **Glazing Industry Code Committee**
  - Working through safety, fire and structural code consultants
- **NGA**
  - Glass Informational Bulletins
  - Presentations

NGA’s activities

- **Glass Magazine article**
- **Fabricating Committee – Annual Conference January 2019**
  School Security GIB Task Group to update glass informational bulletin
- **Architects Guide to Protective Glazing Series**
  May 2019 issue of Glass Magazine
- **Manuals/Glass Informational Bulletins/AIA Presentations**
  - [https://www.techstreet.com/gana/pages/home](https://www.techstreet.com/gana/pages/home)
  - Bullet Resistant Glazing GIB
  - Detention Facility Glazing GIB
  - Protective Glazing 101
  - Protective Glazing Manual
References

- Buildings and Infrastructure Protection Series: Primer to Design Safe School Projects in Case of Terrorist Attacks and School Shootings  
- NPR article  
- Everytown Research  
  https://everytownresearch.org/gunfire-in-school/  
- U.S. Department of Education’s Civil Rights Data Collection (CRDC)  
  - https://www2.ed.gov/about/offices/list/ocr/data.html

Conclusions

- School structure needs to be functional  
- School security threats and attacks are unpredictable  
- Security glazing of the exterior envelope is critical to help provide reaction time for occupants and first responders  
- Need for building codes to engage all stakeholders to ensure building is secure