


thirsty
THURSDAY

Quench your thirst for knowledge!

Security Glazing for Schools



Urmilla Sowell,
Technical & Advocacy Director

December 13, 2018

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

Building Envelope Contractors (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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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

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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/>

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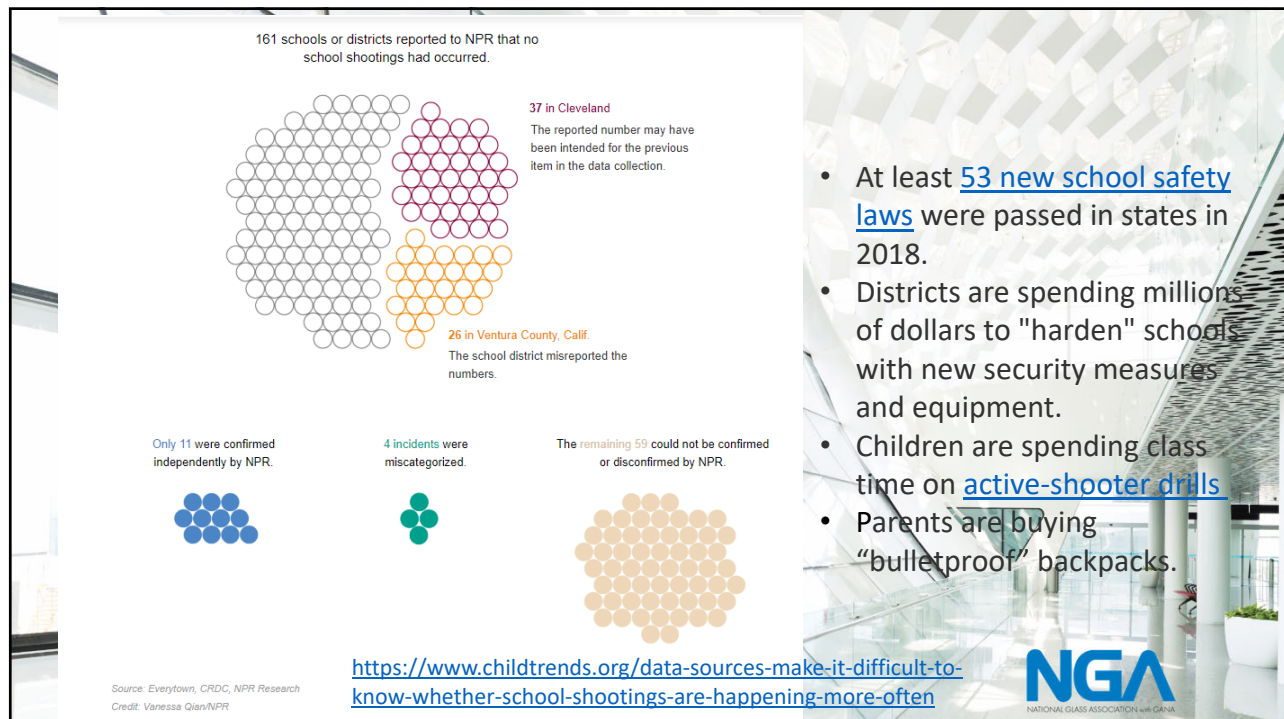
Overview

- 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."
- <https://www.npr.org/sections/ed/2018/08/27/640323347/the-school-shootings-that-werent>



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Schools – not just for teaching


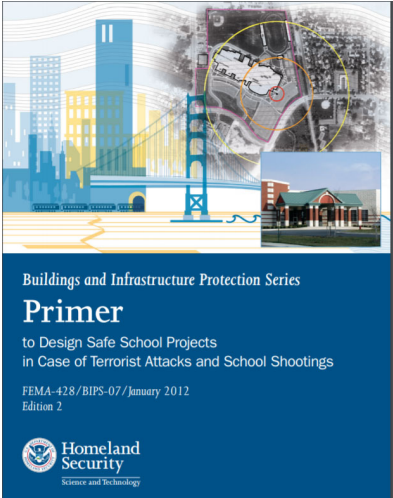
- Many schools are used as shelters, command centers, or meeting places in times of crisis.
- Schools are also used widely for polling and voting functions.
- Consequently, ensuring the safety of students, faculty, and staff in our schools, as well as the **safety of the school buildings themselves**,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



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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**.

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School Security

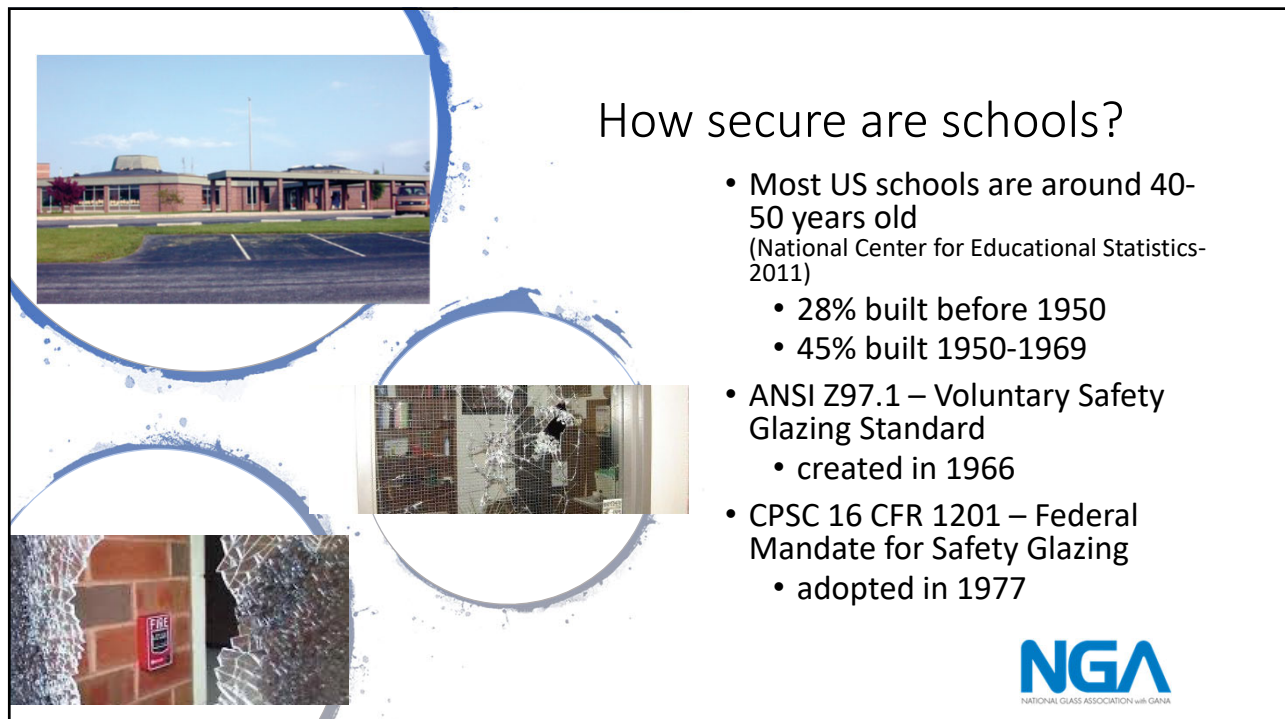
- Many Americans feel that **schools** should be the **safest place** our children can be, perhaps at times even safer than the homes in which they live.
- Security is not a standalone capability; it is a **critical design consideration** that **should be** continually reviewed and scrutinized from the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



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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



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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

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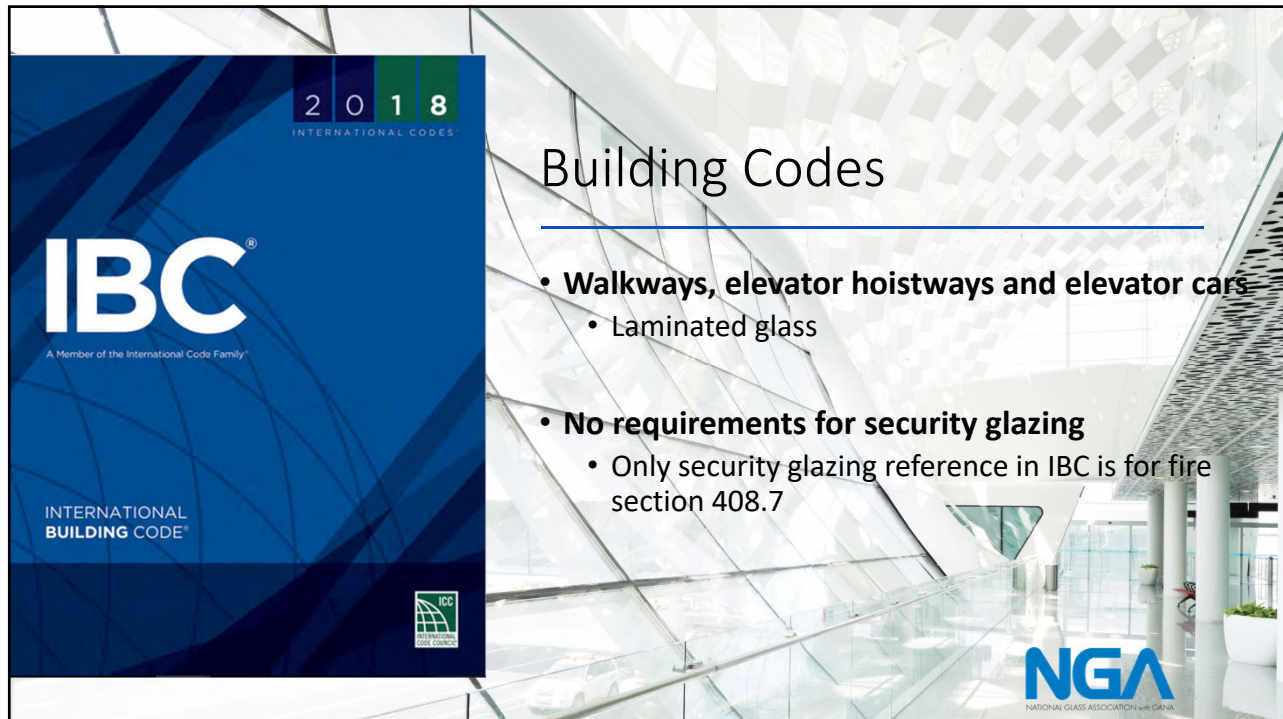
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Building Codes

- **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

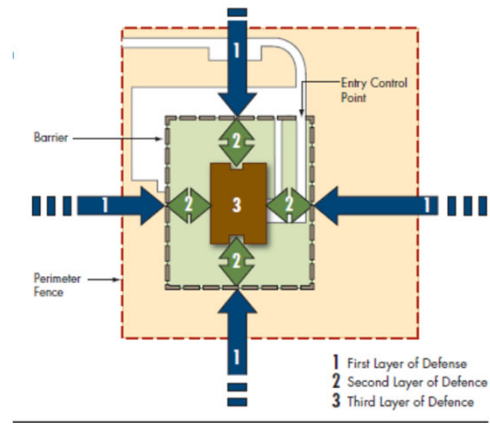
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Designing a Safer School: FEMA Guidelines

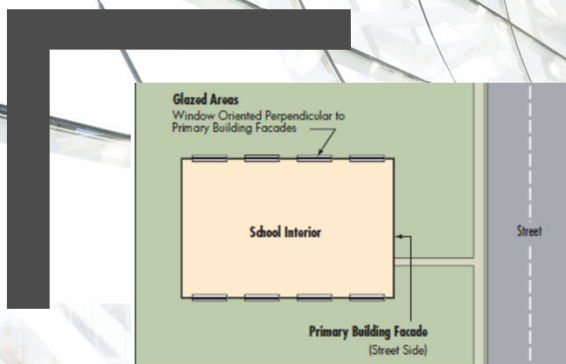
- **First or Outer Layer** consists of natural or manmade barriers usually at property line or sidewalk/curb line.
 - Fence or engineered standoff
- **Second or Middle Layer** usually extends from the perimeter of the site to the exterior face of a school building.
- **Third or Inner Layer** starts at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

Layers of Defense for Campus Sites



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Designing a Safer School: FEMA Guidelines



- 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.

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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.

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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



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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)



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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



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Blast Resistant Standards - Voluntary

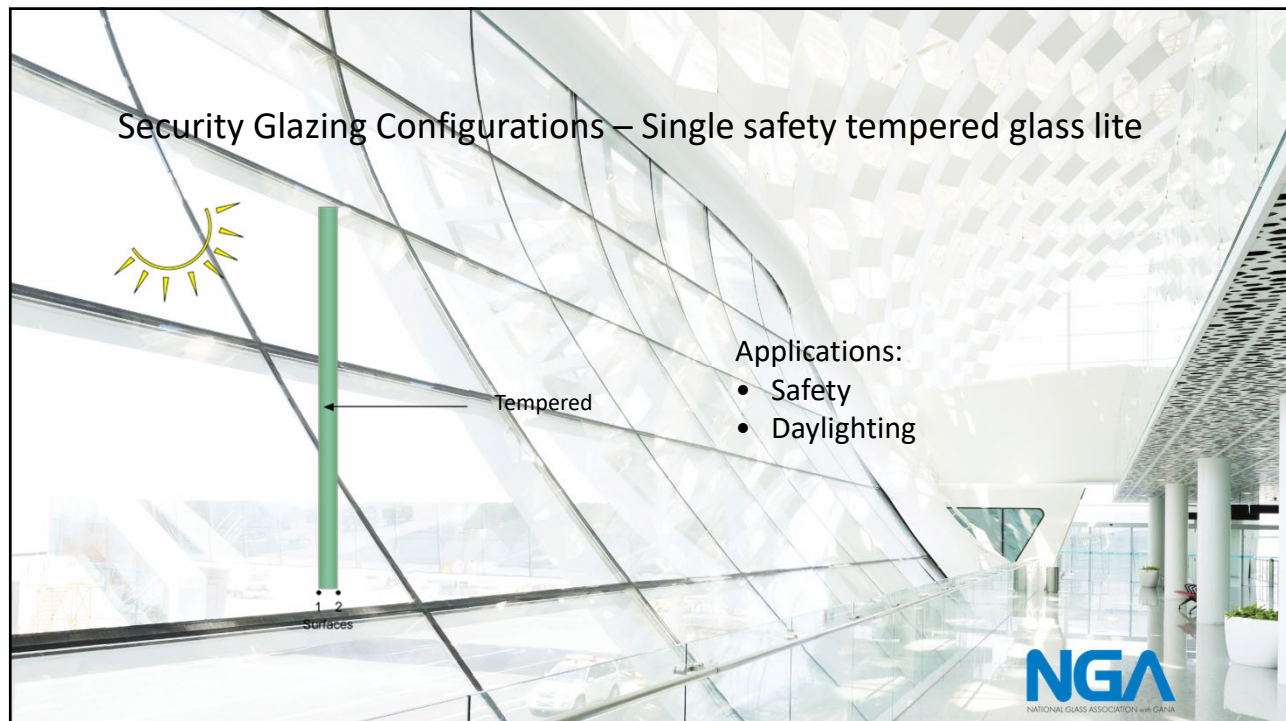
- ASTM F1642 - *Standard Test Method for Glazing and Glazing Systems Subject to Airblast Loadings*
- ASTM F2248 - *Standard Practice For Specifying An Equivalent 3-second Duration Design Loading For Blast Resistant Glazing Fabricated With Laminated Glass*
- GSA
- DoD
- ISO – shock tube and arena

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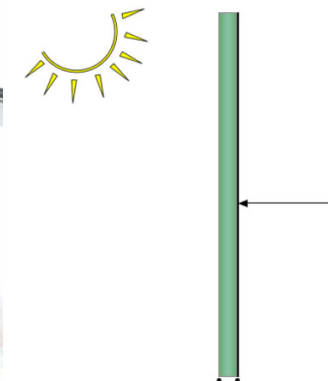


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Security Glazing Configurations – Single lite with film/plastic



Film or Glass Clad plastics

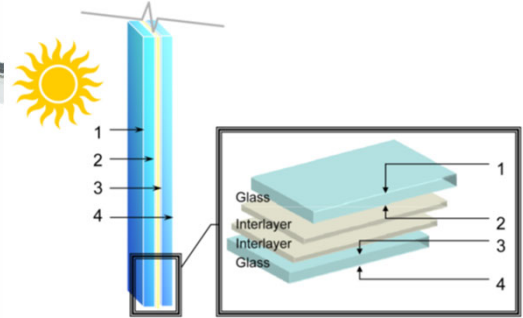
Applications:

- Forced-entry
- Blast
- Safety
- Daylighting

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Security Glazing Configurations – Laminated



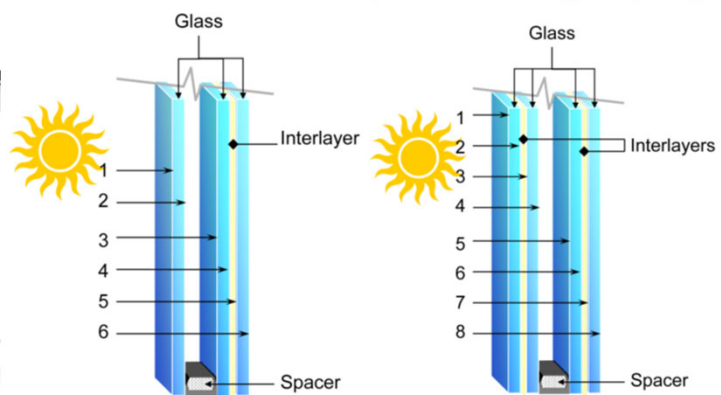
Applications:

- Enhanced forced-entry
- Enhanced blast
- Enhanced safety
- Containment when broken
- Impact (containment)
- Enhanced Acoustical
- Daylighting

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Security Glazing Configurations – Laminated IGU



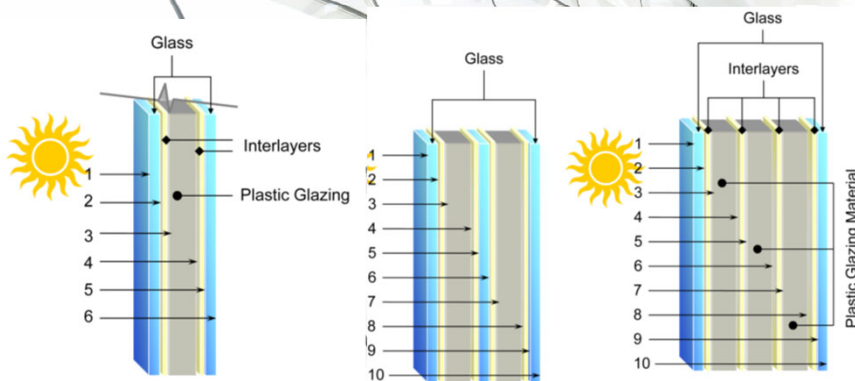
Applications:

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



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Security Glazing Configurations – Multiple Ply



Applications:

- Enhanced forced-entry
- Enhanced blast
- Enhanced safety
- Containment when broken
- Ballistics
- Hurricane/Tornado
- Enhanced Acoustical
- Daylighting



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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*
- *Hardening door/hardware/frame replacement*
- *Replacing windows/doors with enhanced glazing*
- *Add bars and grills to existing windows*
- *Add window films*



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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



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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



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NGA's activities

- **Glass Magazine article**
<https://glassmagazine.com/article/commercial/glass-metals-401-1311071>
- **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>
 - Bullet Resistant Glazing GIB
 - Detention Facility Glazing GIB
 - Protective Glazing 101
 - Protective Glazing Manual
 - Laminated Glazing Reference Manual



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References

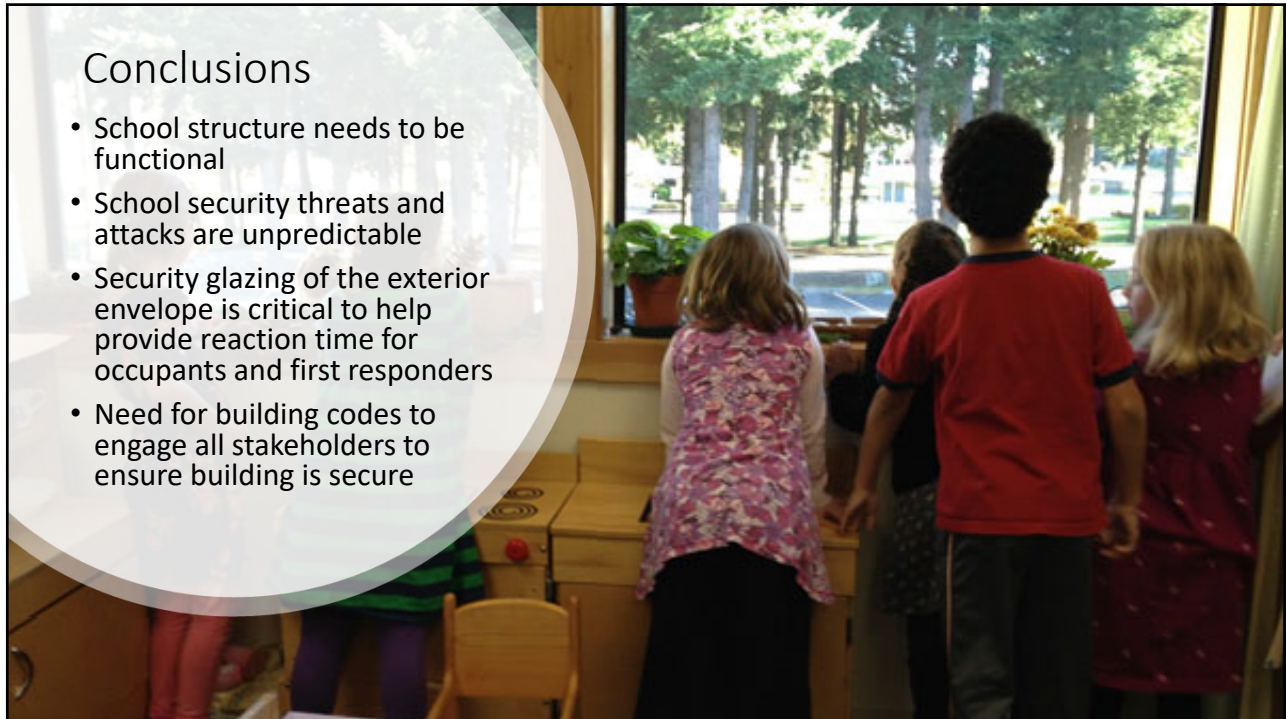
- Buildings and Infrastructure Protection Series: Primer to Design Safe School Projects in Case of Terrorist Attacks and School Shootings
https://www.dhs.gov/xlibrary/assets/st/bips07_428_schools.pdf
- NPR article
<https://www.npr.org/sections/ed/2018/08/27/640323347/the-school-shootings-that-werent>
- 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>



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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



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