SECURITY RATING & CERTIFICATION of FENESTRATION

Program Status Review

Rich Walker, President and CEO
American Architectural Manufacturers Association
SECURITY RATING AND CERTIFICATION of FENESTRATION

Program Overview (1 of 3)
MISSION STATEMENT:

To develop and maintain a fair, accurate and credible rating and certification program that identifies the security performance of fenestration products as incorporated in the building envelope.
Program Overview (2 of 3)

SCOPE:

• Security from man-made hazards including blast, ballistic, and physical attack

• Security from natural hazards including severe wind, rain, seismic events and forced entry

• New construction and alterations

• Marking to identify escape and access for fire and rescue personnel
Program Overview (3 of 3)

GOALS:

• Provide a method to assist in selecting appropriate fenestration products for intended security uses
• Develop and disseminate credible information to owners, designers, builders, insurers, fire marshals and other users
• Serve as an educational resource
• Support the use, development and adoption of security standards and specifications, ratings, certifications and code provisions
SECURITY RATING AND CERTIFICATION of FENESTRATION

AAMA STRUCTURE IN PLACE

- Technical – Certification Policy Committee (CPC)
- Rating – CPC, Hazard Mitigation Task Group
- Communication and Education – Marketing Steering Committee
- Technical Interpretation Policy – Document Management Committee
- Certification and Labeling – CPC, Labeling Subcommittee
SECURITY RATING AND CERTIFICATION of FENESTRATION

Guide Specification for BLAST HAZARD MITIGATION for FENESTRATION SYSTEMS

Objective:

Create a document that will roadmap tests, testing protocols and reporting standards for use by architects, spec writers and manufacturers
SECURITY RATING AND CERTIFICATION of FENESTRATION

Guide Specification for BLAST HAZARD MITIGATION for FENESTRATION SYSTEMS

Committee Participants:

Approximately 25 members, representing,

- Government (Army Corps, GSA, DOD)
- Product Manufacturers
- Blast and Ballistic Consultants
- Blast Testing laboratories
- Academia
- Industry Associations
SECURITY RATING AND CERTIFICATION of FENESTRATION

Guide Specification for BLAST HAZARD MITIGATION for FENESTRATION SYSTEMS

Document Contents:
1. Forward and preface explaining the scope
2. Definitions
3. Reference standards
4. Inter-agency security criteria
5. Minimum test sizes & configurations
6. GSA Certifications
AAMA SECURITY HAZARD MITIGATION CERTIFICATION PARAMETER PRIORITY

- **Available:**
  - Forced Entry
  - Blast
  - Hurricane (Impact)
  - Ballistics

- **Under Discussion:**
  - Installation
  - Retrofit
  - Collateral Damage

- **In Development:**
  - RFI Attenuation
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Anchoring Windows for Blast Design

by Rich Walker

Photo: B. Basile/Photos/Finley/Manning

WITH TERRORIST ATTACKS AND OTHER POSSIBLE THREATS INCREASINGLY BEING TAKEN INTO ACCOUNT, BLAST-HAZARD MITIGATING DESIGN OF HIGH-RISK BUILDINGS IS BEING REQUISITED BY MANY GOVERNMENT AGENCIES, PRIVATE BUILDING OWNERS, AND ARCHITECTS/ENGINEERS. FRAMES, WINDOWS, AND DOORS ARE AMONG THE WEAKEST LINKS IN ANY ENCLOSURE'S ABILITY TO WITHSTAND EXTERIOR FORCES—INCLUDING EXPLOSIONS. THEREFORE, DESIGN METHODOLOGY PRIORITIZES FENESTRATION CONSIDERATIONS.

While comprehensive protection against the range of all possible threats may be cost-prohibitive, an appropriate level of protection intended to lessen the risk of injuries and casualties can be provided for building occupants at a reasonable cost. However, balanced design is critical. The hierarchy of criteria for blast-hazard-mitigating (often erroneously referred to as "blast-resistant") design of fenestration systems is:

1. The glass should remain intact—broken, but not blown out.
2. The glass should remain in the frame.
3. The frame must stay attached to the structure.
4. The structure must remain intact to hold the frame.

Statistics show some 80 percent of the injuries in a bomb attack are caused by airborne shards of glass from broken windows, which can fly toward at speeds greater than 219 km/h (136 mph). Given such high risk, the obvious first step in mitigating the postulated hazard is to ensure the fenestration glazing stands up to the force of the blast.

However, as important as blast-hazard-mitigating glazing is, the entire window system design must be "balanced." In other words, if any one part of the system fails, the entire assembly fails. This means the frame and anchorage must be able to survive the design blast leading to the target level of protection, as well as the glass.

If the window unit has a higher capacity than its anchorage or supporting structure, the entire unit is likely to be propelled into the building as a single object—a failure mode even more hazardous than airborne glass fragments alone. Therefore, it is preferable the glass fail first, provided the design produces fragments and a dispersal pattern that minimizes injuries. The parameters of the glass thus define the design basis for the entire fenestration unit and its installation.

Standards define protection levels and testing protocols.

Government design criteria generally specify either the threat or the postulated blast load in terms of the initial positive pressure and impulse for which blast-mitigating windows must be designed. Blast shock wave design pressure levels vary...
Understanding Blast Mitigation for Fenestration

by John Lewis, MBA

The architect and specifier’s mission to protect building occupants has traditionally focused on providing fire safety, mitigating natural disasters, and achieving societal goals such as energy conservation and access for people with special needs. However, after the terrorist attacks of September 2001, the mission now encompasses a concentration on protection from intentional attack, particularly with explosive devices.

The design objective is not to prevent damage under all circumstances, but to mitigate the effects of a blast, diminishing severity of destruction and potential for injury and death. Blast mitigation revolves around three considerations:

- maximizing standoff distance by site planning and/or incorporating physical barriers;
- preventing building collapse, which can be achieved by a number of structural approaches; and
- minimizing hazardous flying debris, particularly in fenestration—statistics show about 80 percent of bomb attack injuries are caused by flying shards of glass typically traveling between 110 to 220 km/h (68 to 136 mph).
Counterterrorism

Tougher fenestration standards strive to reduce casualties

By Rich Walker

explosive terrorist attacks during the last 15 years have made counterterrorism a national priority. Protection goes beyond the high-profile news of

detonation, interception and military action. The mission of protecting civilians from building hazards has officially expanded from fire safety and mitigation of natural disasters to

include intentional attacks, particularly with explosive
devices.

The force of blast and their threat to structural

integrity often represent the

The force of blast and their threat to structural

integrity often represent the

major source of injury in an

explosive attack. It mitigating

this hazard first ensure

that the building has a balanced window system,

meaning that the glazing, frames, anchors and

structural components must all survive blast load-
ing. Otherwise, the weakest link will cause the

whole system to fail.

The government's response

This mission has led federal government officials to require blast resistant and blast mitigating design for new federal facilities within the United States and overseas. One of the initial steps was the January 1997 publication of the U.S. General Services Administration's "Security Criteria" for government buildings, addressing risk from window glass fragments.

The Interagency Security Committee, comprised of 26 member agencies, set out to adapt GSA's criteria for all federal agencies. The result was the May 2001 release of the ISC's "Security Design Criteria for New Federal Office Buildings and Major Modernization Projects." It applied to all federal buildings except those under Depart-
Tackling Tornadoes
Success of hurricane impact standards spur interests in window standard for tornadoes

In late February, a tornado outbreak spread across areas of the South and Midwest, leaving 13 people dead in Kansas, Missouri, Illinois and Tennessee. In some areas, almost nothing was spared: 230 homes and more than 70 businesses were damaged in the small town of Harrisburg, Ill., just 48 hours later, another line of storms that stretched from Mississippi to the Ohio River Valley produced 155 reported tornadoes, resulting in 17 fatalities.

March and April also had their share of devastating storms. One hundred twenty-four tornadoes touched down across the country in March. And in early April, a tornado outbreak spread across a portion of the Dallas-Fort Worth, Texas, area damaging more than 1,000 homes and leaving nearly 360 of them completely destroyed.

Due to the increasing frequency of severe weather events, interest has grown in tornado-mitigating fenestration products, says Greg McKeever (Kinnear Co., Inc.), member of American Architectural Manufacturers Association’s (AAMA) Tornado Hazard Mitigation Task Group.

Dennis Kelly (Graham Architectural Products), also a member of AAMA’s Tornado Hazard Mitigation Task Group, believes there has been a keener awareness of protecting inhabitants since the publication of hurricane impact standards, which have been proven successful, as well as blast mitigation standards.

Adequate protective construction standards do exist, notably in the Federal Emergency Management Agency’s (FEMA) 361 (2008), Design and Construction Guidance for Community Safe rooms, and the Interrelated International Code Council (ICCS) 500-08, Standard for the Design and Construction of Storm Shelters. While these standards specifically address designated storm shelters, many experts recommend that “essential” (International Building Code Occupancy Category A) facilities, such as hospitals, fire/ rescue stations, etc., should be built to these storm shelter standards.

While a windowless concrete bunker likely would stand up well, the architect’s challenge is to include storm protection without eliminating glass or other claddings that enhance the building’s aesthetics. FEMA 361 and ICC 500 allow for windows, so long as they are tested for structural integrity and debris impact at tornado wind speeds and are shielded by barriers or other protective devices. However, these requirements do not address all window performance aspects for a functional building.

In response to the challenges, and in keeping with ongoing AAMA collaboration with National Institute of Building Sciences’ Building Enclosure Technology and Environmental Council (BETEC) to develop security-related fenestration test methods and standards, AAMA has published AAMA 512-11, Voluntary Specifications for Tornado Hazard Mitigating Fenestration Products.
Storm Protection

New AAMA Standards

Window Standard Tackles Tornadoes

Alabama, Oklahoma and Kansas suffered record numbers in 2011, with over 900 tornadoes touching down in Oklahoma and more than 2000 buildings destroyed by EF4 tornadoes with wind speeds exceeding 200 mph.

The challenge is to include protection without eliminating glass or cladding

Adequate protective construction standards do exist, notably in FEMA guidance. Design and Construction Guidelines for Windows and Doors, and the American Society for Testing and Materials (ASTM) Standard for the Design and Construction of Storm Shelters. However, these standards are typically applied to existing structures, and do not cover the design and construction of new buildings.

AAMA, the National Association of the Architectural and Building Products Industry, in collaboration with the Architectural Glass and Metal Association, Inc. (AGMA) and the Construction Specifications Institute (CSI), has introduced a new standard: AAMA 350-13: Standard for the Design and Construction of Storm Protection Systems for Windows and Doors.

The standard covers a wide range of storm protection systems, from simple hurricane shutters to more advanced systems that incorporate specialized glass and glazing techniques. It is intended to provide a comprehensive guide for designers and builders, ensuring that new buildings are equipped with the necessary protection against tornadoes and other severe weather events.

New AAMA Standards

Technology and Wind Engineering Council (TWEC) and development security-related fenestration testing methods and standards. AAMA has published AAMA 350-13, a standard for specifying storm protection systems for windows and doors. This standard provides a comprehensive approach for specifying and installing storm protection systems to ensure maximum safety and durability.

Although AAMA standards are not directly applicable to the design of a building, they can be used to inform the selection of products and systems that comply with the requirements of local building codes and standards.

In response to the challenge, AAMA has collaborated with the Building Enclosure Council to develop a new standard for storm protection systems. The standard includes detailed specifications for the design and installation of storm protection systems, and provides guidance for selecting the appropriate products and systems for different types of buildings.

The standard is intended to help building designers and builders to specify storm protection systems that are effective and reliable, and that meet the needs of their clients. It is hoped that the new standard will be widely adopted by the industry, and will become a valuable tool for architects and engineers working on projects in areas prone to severe weather.
Disaster Preparedness 2011: New wind-damage-resistant windows

Tue, 2011-12-13 04:53 PM
By: Ganttt Miller

The word tornado came from the Spanish word "tronada" which means a thunderstorm. Also known as a twister, a tornado is a violent spiral-shaped storm with a rapidly rotating column of air rising upward, forming a vortex. The vortex has relatively low pressure at the center and is shaped like a funnel.

Tornadoes that occur over oceans are called waterspouts, which are usually weaker than tornadoes. Tornadoes are nature's most violent storms, sometimes reaching ground wind velocities of more than 200 mph, compared with typical hurricane velocities of under 150 mph.

This April, more than 300 people died in more than 600 tornado-velocity storms -- the worst month for U.S. tornadoes, smashing the previous record of 267 set in 1974, according to the U.S. Weather Service. Alabama alone suffered more than 200 fatalities from storms that centered around Tuscaloosa. In late May, Joplin, MO, was devastated by a twister that took another 125 lives in that city of 50,000.

Evolving window technology, testing and certification

Window technology has evolved over the years to the point where windows can be selected not only for their aesthetic qualities, but also for their protective performance capabilities. For example, windows can be
Designing Windows for Hurricane Resistance

by Dean Lewis
All images courtesy: AAMA

As attractive as coastal living is, it is not without risk. The boom in oceanfront construction virtually guarantees storm damage in these areas will increase significantly in both severity and cost.

According to the U.S. Census Bureau, while the country’s overall population grew by 72 percent from 1960 to 2010, counties bordering the Gulf and Atlantic seacoasts rose by almost 91 percent. Those along the Gulf grew especially rapidly, gaining 148 percent over the same period. Along both sides of the Florida peninsula, population influxes of up to 300 percent have occurred since 1960. The National Oceanic and Atmospheric Administration (NOAA) estimates 53 percent of Americans live within the narrow coastal regions comprising only 17 percent of the Lower 48’s land area. By the year 2025, nearly 75 percent of Americans are expected to live in coastal counties.

With more homes and condominiums near the water, the impact of storms has become even more significant. After adjusting for inflation, hurricanes making landfall in the United States were responsible for:

* an annual average of $1.6 billion between 1950 and 1986
* $2.2 billion between 1990 and 1995; and

Catastrophe modeling indicates losses should be expected to double roughly every 10 years because of increases in the number of structures and changes in their characteristics. Due to exposure growth, research shows the one-in-100-year industry loss grew from $60 billion in 1995 to $110 billion a decade later; it will likely grow to more than $200 billion during the next 10 years.

Beginning with Hurricane Andrew’s 1992 wake-up call, and further spurred by the devastating 2004 (Iran) and 2005 (Katrina) hurricane seasons, codes and jurisdictions along the entire U.S. Gulf and Atlantic...
Accredited for 1 LU/HSW through the American Institute of Architects (AIA) since 2008

Students are provided an understanding of:

• Blast Hazards
• Blast Mitigation Design
• Blast Resistant Products and Installation
• Blast Mitigation Requirements/Applications
• Acceptable Test Methods
• AAMA 510 Guide Specification for Blast Hazard Mitigation
• Blast Product/Project Certification
SECURITY RATING AND CERTIFICATION of FENESTRATION

Certification Procedural Guide Contents:

1. FORWARD
2. GENERAL
3. REFERENCED DOCUMENTS
4. DEFINITION OF TERMS
5. ELIGIBILITY
6. BLAST HAZARD MITIGATION PRODUCT QUALIFICATION
7. INSPECTION AND VERIFICATION
8. ARCHITECTURAL TESTING RESPONSIBILITIES
9. LICENSEE RESPONSIBILITIES
10. PROGRAM LABELS
11. CERTIFIED PRODUCTS LISTING
12. WAIVER OF RETEST
13. MANUFACTURER LITERATURE
14. CHALLENGE PROCEDURE
15. RENEWAL
SECURITY RATING AND CERTIFICATION of FENESTRATION

**Future Challenges**

- Limited number of Blast Testing laboratories
- Targeted Marketing
- Support of Industry Associations
- Expansion to other “security”