

# Architecture Speaker Series

Arlington, Virginia

Balancing Building  
Security & Openness in  
Civic Architecture

SECURITY DESIGN

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**Barbara A. Nadel, FAIA**

Barbara Nadel Architect, NYC

BarNad@aol.com 718-793-7106





# KNOWLEDGE AGENDA

1. Elements of Security Planning & Design
2. Achieving Transparent Security
3. Codes & Standards
4. Liability Issues

*In a time of turbulence and change, it is more true today than ever that knowledge is power.*

**John F. Kennedy (1917-1963)**  
*35th U.S. President*



# **Building Security Threats**

- **Terrorism**
- **Natural Disasters**
- **Emergencies: Fires, Explosions, Power Outages, Hostages**
- **Chemical and Biological Agents**
- **Crime**
- **Workplace Violence**

# Security Planning: Establish Long Term Goals

1. Prevent loss of life
2. Minimize injury
3. Protect critical assets
4. Minimize loss of operations
5. Deter terrorism, crime, workplace violence
6. Prepare for disaster planning and response



**Pentagon, 2001 and 2002**  
Photos: AMEC Construction

# Identify Potential Targets

1. Economic symbols of democracy
2. National icons, local landmarks
3. Civic buildings, courts, hospitals, government facilities
4. International groups, businesses, embassies
5. Infrastructure & utilities
6. Transportation buildings
7. Civic venues



US Courthouse, Islip, NY, GSA  
Richard Meier & Partners,  
Architects/The Spector Group



# Threat Assessment

- **Involve owner's team, consultants, and law enforcement as needed**
- **Prioritize assets to be protected**
- **Not every solution requires an architectural or design response**
- **Technology, staffing, operations, and policies may be appropriate**

# Vulnerability Analysis

- **Assess weaknesses in facilities, infrastructure**
- **Ensure access for first responders**
- **Identify potential targets: landmarks, events**
- **Determine when & where visible security is needed**
- **Prioritize needs vs. costs**
- **Plan disaster response**



Rodeo, Reliant Stadium, Houston  
Crowd control and security  
Pres. Bush 41 attended  
Photo: HOK S+V+E

# **Security Planning: Requires A Multidisciplinary Team**

- 1. Architect**
- 2. Attorneys**
- 3. Blast Engineer**
- 4. Building owner or landlord**
- 5. Chemical, Biological,  
Radiological Specialist**
- 6. Client project manager**
- 7. Code officials**
- 8. Construction Manager**
- 9. Cost Estimator**
- 10. Electrical Engineer**
- 11. Facility managers**
- 12. Fire Protection Engineer**
- 13. Government personnel**
- 14. Interior Designer**
- 15. Landscape Architect**
- 16. Local law enforcement**
- 17. Mechanical Engineer**
- 18. Planners**
- 19. Security client reps**
- 20. Security Operations  
Specialist/Consultant**
- 21. Structural Engineer**
- 22. Technical Security  
Specialist**
- 23. Telecommunications  
Engineer**
- 24. Tenants/tenant groups**
- 25. Traffic Engineer**

# SECURITY DESIGN 101

## 1. LEARN from past

- Terrorism events
- Natural disasters

## 2. INTEGRATE

- Design
- Technology
- Operations

## 3. BALANCE

- Security
- Openness
- Design Excellence



**World Trade Center, NYC**

**9-11- 2001 at 9:03 AM**

Photo: Bruce Eisenberg, AIA



# **Case Study: Lessons Learned from 9/11 for High-Rise Design**

- 1. Wider exit stairs for occupants and first responders**
- 2. Stairs & elevator shafts encased in concrete**
- 3. Air intakes above grade**
- 4. Full sprinkler systems**
- 5. Detailed evacuation plans and routes**
- 6. Stairwells at opposite ends of bldg**
- 7. Elevators for evacuation or emergency response**
- 8. Prevent progressive collapse**
- 9. Photo luminescent strips at exit stairs and corridors**
- 10. National code groups; NYC Local Law 26**

# **BUILDING SECURITY:**

## ***Design***

- 1. Site Planning**
- 2. Landscape Design**
- 3. Architecture-  
Egress, lobbies,  
glazing**
- 4. Engineering:  
Structural, MEP**
- 5. Interior Design**



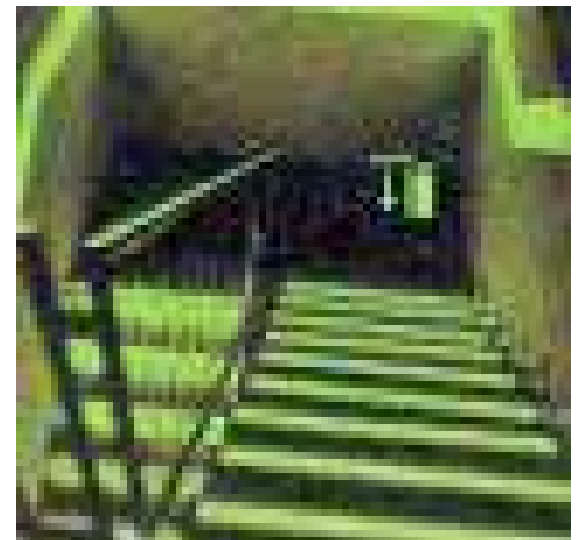
**Lloyd D. George U.S. Courthouse  
Las Vegas, Nev. US GSA  
US GSA. Arch: Cannon Design/Harry  
Campbell Assoc.**

**GSA Design Excellence Program  
Balancing Security and Good Design**

# **BUILDING SECURITY:**

## ***Design: Egress***

- **Emergency systems are operational**
- **Occupants are familiar with exiting procedures**
- **Direct egress to the outside from stairs**
- **Photoluminescent strips on stairs**

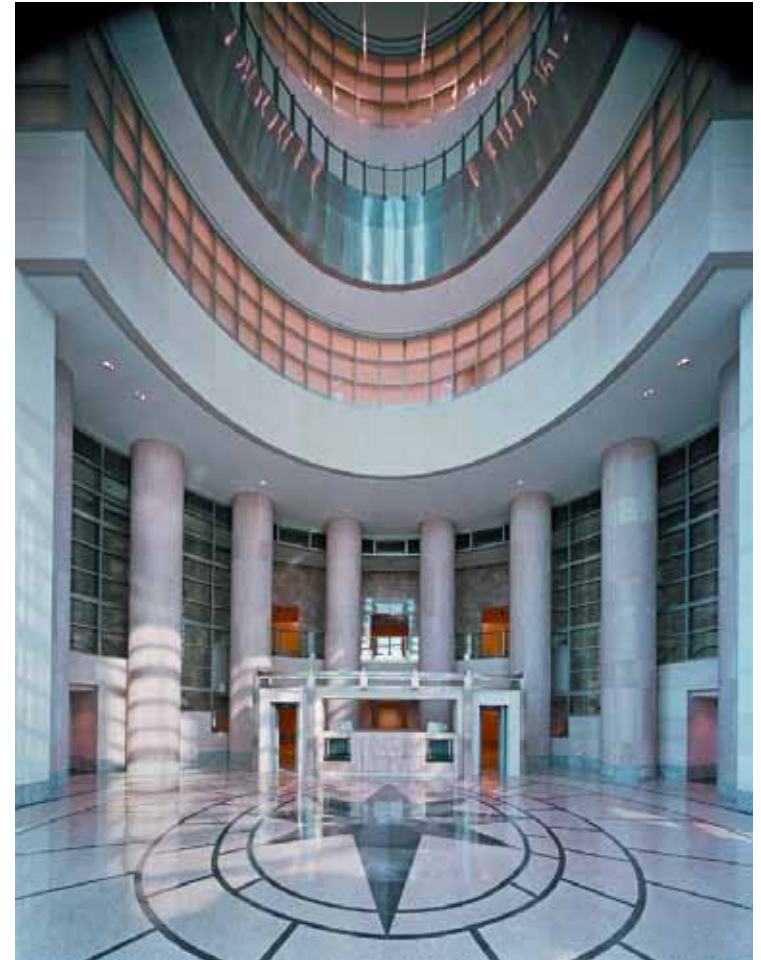


# **BUILDING SECURITY:**

## ***Design: Lobbies***

- **First impressions of a building and organization**
- **Organize screening, access and exit process for efficient queuing and circulation**
- **Design lobby amenities and screening equipment as circulation control elements.**

**Lobby, Federal courthouse, St. Louis, MO.  
Owner: US GSA Architect, photo: HOK**



# **BUILDING SECURITY:**

## ***Structural & MEP Engineering***

### **Protective Design:**

- **Standoff, setback from street**
- **Redundancy to prevent progressive collapse**
- **Hardening to enhance walls, stairwells, loading docks, windows, mail rooms**

### **HVAC:**

- **Fire protection**
- **Redundant building systems**



**Petronas Tower Kuala Lumpur, Malaysia. Structural Engineer: Thornton Tomasetti Group  
MEP: Flack + Kurtz**

# Progressive Collapse

## Case Study: OKLAHOMA CITY, OK, 1995 Bombing



**Alfred P. Murrah Federal Building**

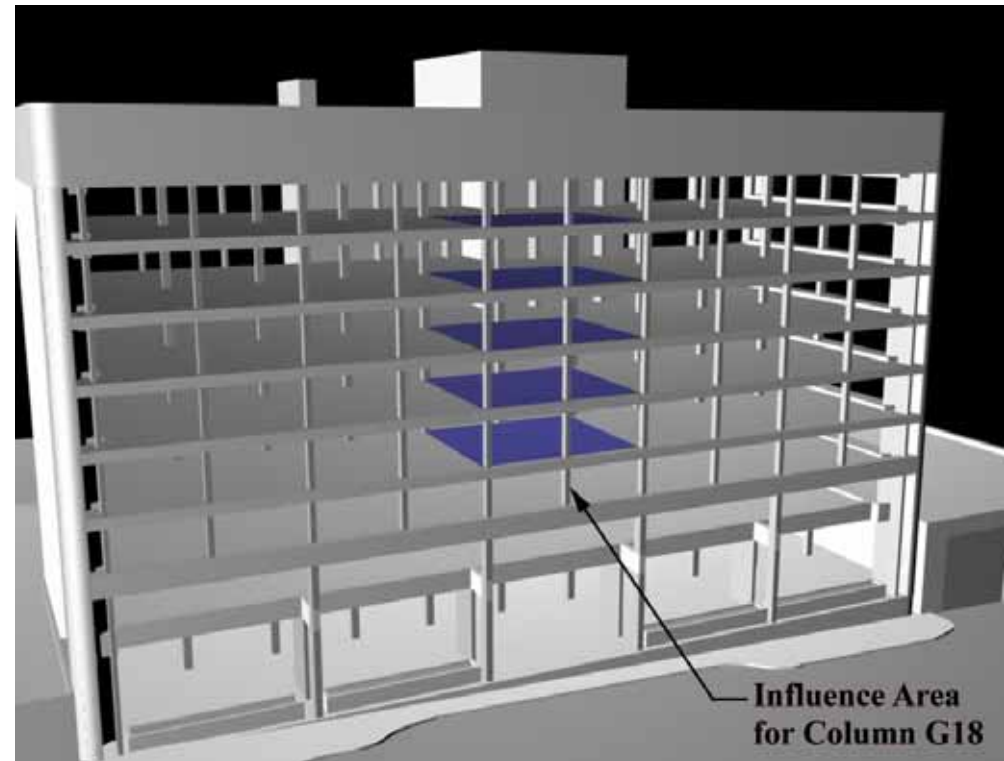
- **Most fatalities were attributed to collapse & flying glass shards**
- **Pre-stressed concrete floors**
- **Reinforced concrete columns/shear strength**
- **Transfer girders at lower levels to open lobby**

Source:  
Thornton-Tomasetti Group

# **BUILDING SECURITY Design:** ***Avoiding Progressive Collapse***

**A situation in which “local failure of a primary structural component leads to the collapse of adjoining members which, in turn, leads to additional collapse.”**

**- *The U.S. General Services Administration***



**Alfred P. Murrah Bldg, Oklahoma City. Influence area of columns.**

**Image: Thornton-Tomasetti Group**

# **SITE PERIMETERS: First Line of Defense**

- **Standoff—maximize distance of bldg envelope from roads**
- **Hardened exteriors**
- **Landscaping**
- **Public art integrated with bollards and street furniture**



# STREETSCAPE SECURITY: Design Opportunities

1. Benches
2. Bollards
3. Doors, Walls
4. Window Grilles
5. Stairs

Javits Federal Plaza, NYC,  
1990s, not engineered to  
resist vehicle threats

Martha Schwartz, Landscape design  
Photos: Martha Schwartz Inc.



# STREETSCAPE SECURITY: Design Opportunities

6. Fences

7. Gates

8. Guard Booths

9. Planters

10. Turnstiles



Guard booth, historic district,  
Washington, DC .  
Photo: National Park Service

# **BUILDING SECURITY:**

## ***Technology***

- **Biometrics: hand, iris, facial**
- **Electric Fences**
- **Access control card readers, locks**
- **Metal detectors**
- **CCTV, monitors, wireless cameras**
- **Alarm systems**



**Biometric hand scanner,  
Iris retina scanner**  
Photos: V-Flex, CRB

# **BUILDING SECURITY:**

## ***Operations - Disaster Response***

- **Review policies and procedures**
- **Assign indoor and outdoor spaces for trauma**
- **Plan business recovery**
- **Appoint media spokesperson for crisis management**
- **Prepare and drill for threats: fire, blast, power outage, hostages, others.**



**NYU Downtown Hospital, 9/11/01  
Treatment in converted cafeteria  
Photo: NYS Dept of Health,  
NYU Downtown Hospital**

# TRANSPARENT SECURITY

1. Invisible to the eye
2. Integrates design, technology, operations
3. Avoids fortress mentality
4. Owners establish when visible security is needed



Lower Manhattan, NYC  
Photo: Mark Ginsberg, FAIA

# Rings of Defense for Site and Building Security

1. Site perimeter
2. Building setbacks
3. Building envelope
4. Building systems
5. Lobbies
6. Access points
7. Safe interior areas
8. Safe havens

PLANNING

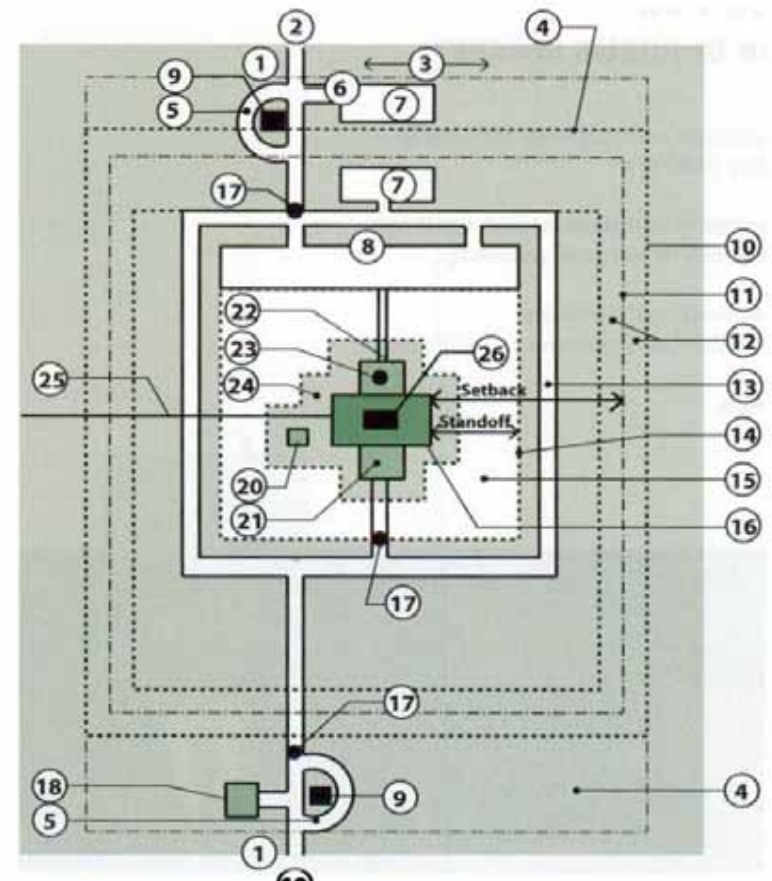


Image: RTKL

# Achieving Transparent Security

1. Master Planning
2. Site planning, landscape design
3. Building Envelope: window systems, glazing types
4. Building Systems-MEP, HVAC, Fire Protection, Structural
5. Redundant systems



Govt. Bldg, Haifa, Israel  
Blast windows  
Photo: Oldcastle-Arpal

# Achieving Transparent Security

6. Interior Planning: lobbies, circulation
7. Technology
8. Operations: Policies, disaster planning
9. Life Safety Codes & Industry Standards
10. CPTED: Crime Prevention Through Environmental Design



**Mechanical Control Systems  
Gaylord Entertainment Center  
Nashville, Tenn.  
Architect: HOK Sport+Venue+Event**

# Top 10 Security Costs

Not ranked by magnitude; depends on scope

1. Perimeter security
2. Road improvements
3. Vehicle standoff
4. Site & bldg access
5. Building systems
6. Exterior wall systems
7. Windows & glazing
8. Structural systems
9. Technology
10. Equipment



*Set priorities: What you risk reveals what you value.*



# **Codes & Standards**

- **No single security code**
- **Industry guidelines, best practices, case studies**
- **Agency recommendations**
- **Revised NYC Building Code, Local Law 26**
- **Post-9/11 issues: egress, emergency response building systems, materials**
- **First responder ability to enter buildings as occupants exit**
- **Stay current on security standards**

# **LIABILITY ISSUES:**

## **Owners & design professionals**

- **The standard of care after 9/11 is evolving**
- **Verify terms of insurance policies re terrorism and catastrophic events**
- **Document consultant security recommendations and those implemented by owners, *in writing to create paper trail***
- **Store documentation off site**
- **Remain current on security design via seminars, books, magazine articles**

# Good Samaritan Laws

States providing immunity for volunteer architects and engineers during emergency response\*

1. California
2. Colorado
3. Connecticut
4. Florida
5. Georgia
6. Kentucky
7. Louisiana
8. Maryland
9. New Mexico
10. North Carolina
11. North Dakota
12. Oregon
13. Virginia
14. Washington

\*As of 2005, subject to change

Source: *Building Security: Handbook for Architectural Planning and Design*, by Barbara A. Nadel, FAIA (McGraw-Hill, 2004), chapter by Zetlin & DeChiara, LLP



# **SUMMARY**

- 1. Comprehensive security integrates design, technology, operations**
- 2. Transparent security enhances the built environment**
- 3. Remain current on codes, standards and life safety guidelines**
- 4. Be aware of liability risks**

Thank you, Arlington!

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