

SUPREME COURT OF THE STATE OF NEW YORK
COUNTY OF NEW YORK

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In the Matter of :

DEVELOP DON'T DESTROY (BROOKLYN), :
INC., et al., :

Petitioners-Plaintiffs, :

For a Judgment Pursuant to Article 78 of the CPLR :
and Declaratory Judgment :

- against - :

URBAN DEVELOPMENT CORPORATION :
d/b/a EMPIRE STATE DEVELOPMENT :
CORPORATION, et al., :

Respondents-Defendants. :

Index No. 104597/07
IAS Part 11
Justice Madden

AFFIDAVIT
----- X

STATE OF CONNECTICUT)
 : ss.:
COUNTY OF NEW HAVEN)

JEFFREY D. VENTER, being sworn, states:

1. I am a principal of Ducibella Venter & Santore ("DVS"), a security consulting firm that has been retained by Forest City Ratner Companies, LLC ("FCRC") to provide security consulting services in connection with the Atlantic Yards project (the "Project"). I am an engineer by training and have been a principal of DVS since 1989. I have approximately 27 years of field experience in engineering and the evaluation and design of architectural and structural security criteria. My areas of professional specialization include the assessment of threats and risks associated with explosives, firearms, airborne contaminants,

arson and other crimes against persons and property, and the evaluation of building design components and architecture to address security concerns and develop security measures. My resume is attached hereto as Exhibit 1. I am the person at DVS who has had primary responsibility for our work for FCRC on the Project, but Robert Ducibella, a senior principal of DVS, also has been involved in DVS's work on the Project. Mr. Ducibella's resume is attached hereto as Exhibit 2.

A. Overview of DVS

2. DVS is one of the oldest and most renowned independent security consulting and engineering firms in the United States. It is based in North Haven, Connecticut. Founded in 1964, DVS has provided security consulting services to a vast range of governmental and private clients and has been involved in the design and implementation of security and counter-terrorism systems that are in place in hundreds of government, commercial and private-sector facilities throughout the world. DVS personnel consists of individuals with extensive experience in threat assessment and risk analysis, the development of site-specific and catastrophic security criteria, law enforcement, electrical and civil engineering, architecture, and construction supervision and field installation of physical security, electronic equipment and facilities management systems.

3. DVS's clientele is extremely diverse, with an overall list of projects that is equal to or exceeds other leading security industry consulting firms. This diversification of our client base allows our firm to draw upon the widest range of information and experience to develop solutions to particular risks and threats.

4. DVS's clients include numerous agencies of the United States Government, including various offices of United States Attorneys, the United States Marshals Service, the

Federal Protective Service, the Food and Drug Administration, the Social Security Administration, the Department of Justice and the Department of Transportation. DVS has assisted in designing security systems that are in place in numerous federal courthouses, including courthouses in New York State. DVS recently completed design and commissioning work for the United Nations Security Strengthening Project. It has provided services to the Kuwait Mission to the United Nations. DVS is currently under contract to design security for the United States Mission to the United Nations, and for the new headquarters building of the U.S. Department of Transportation in Washington, D.C.

5. DVS also has designed security systems and participated in risk assessments for numerous commercial buildings, including the New York Stock Exchange, the NASDAQ Stock Exchange Computer Center, and the 60-story Bank of America headquarters now in construction near Times Square. We also have provided risk assessment and security design services for the reconstruction of 7 World Trade Center and the construction of the Freedom Tower, and are under contract to establish security design criteria for Towers 2, 3 and 4 at the World Trade Center site.

6. DVS has performed similar work for multi-tenant buildings with commercial, retail, parking and other occupancies, including judicial components. We provided security consultation and engineering for Time-Warner Columbus Centre, a \$2.3 billion twin-tower high-rise mixed-use commercial and residential building at Columbus Circle in Manhattan, which contains the five-star Mandarin Oriental Hotel, exclusive residential space, Time Warner's world headquarters, and performance spaces for Jazz at Lincoln Center. Our work for FCRC at the \$650 million project known as 330 Jay Street/Metrotech in Brooklyn included the development of designs for the project's owner-operated commercial office space, and the

extremely secure space occupied by the Brooklyn Supreme and Family Courts. Our designs also protect the Renaissance Plaza high-rise in Brooklyn. This \$500 million project includes commercial office space, the highly secure Brooklyn District Attorney's offices, a Marriott Hotel, and several levels of parking. DVS also has provided security analysis and recommendations for the 2.1 million square foot 18,000-occupant Met-Life Tower at 200 Park Avenue in Manhattan, which includes numerous commercial office functions, three levels of retail space, and an adjacent parking structure, and which sees daily pedestrian traffic of over 200,000 people who walk through its lobbies, which are interconnected with Grand Central Station and 44th Street.

7. DVS also has provided security consulting services for a number of mass-transit facilities, including the Permanent PATH Terminal and Port Authority station at the World Trade Center site. DVS is under contract to provide such services for the Trans Harbor Express Tunnel from New Jersey to Penn Station.

B. Threat and Risk Assessment

8. The process of addressing the security issues included in a project consists, to a substantial degree, in the preparation and ongoing refinement of a "Threat and Risk Assessment," or "TARA." A TARA is a project-specific document that is used to assess and minimize security vulnerabilities for a particular property or project. Typically, a TARA is created at an early stage of the design process, and then is refined and revised on a continuous basis as the plans and specifications for the project proceed through the various successive stages of the design process, and in accordance with geopolitical events deemed pertinent to the project.

9. A TARA includes highly sensitive and confidential information relating to the identification of security design criteria that are used to establish a client's individual

property and people protection program. A TARA identifies physical (i.e., structural and architectural) and operational aspects of a proposed project, the unique risks and vulnerabilities associated with the project, and opportunities to enhance security and safety to defined project-specific design-based standards, which, if compromised, could have serious adverse consequences for a property, its surroundings and/or its occupants. Therefore, the public disclosure or dissemination of information contained in a TARA will place a property, its surroundings and its occupants at extreme risk. For this reason, it is standard industry practice to insure that a TARA is not disclosed to anyone other than critical design professionals, the owners of the property, and the relevant law enforcement personnel.

10. In creating a TARA, DVS considers the security criteria and design guidelines for the construction of facilities for the federal government, which have been established and published by the Federal Emergency Management Agency ("FEMA"), the Department of Homeland Security and the General Services Administration ("GSA"), and other pertinent standards based on the project's location, design and occupancy program. Some private projects incorporate industry standard security criteria, as adapted to the particulars of the specific private project, because the general consensus among industry professionals is that these standards are well-researched and responsive to contemporary security concerns. To provide a comprehensive TARA, Federal Government best practices principles and New York City criteria are used.

11. When DVS is retained to provide security consulting for a privately developed project, it forms a partnership with the owner or developer, the design team professionals and local law enforcement officials to create the TARA. Ultimately, the TARA

represents a consensus among DVS, appropriate government agencies, and these other professionals about the project's individual security design criteria.

C. Development of the TARA for the Atlantic Yards Project

12. DVS was retained by FCRC in the spring of 2005 to develop a TARA for Phase I of the Project, which includes construction of the arena and the buildings that will surround it. DVS will perform similar services in the future for Phase II of the Project. Prior to engaging DVS, FCRC had worked with another security firm, Safir Rosetti, which had been founded by former New York City Police Commissioner Howard Safir, to perform preliminary security-related work. This work was taken into consideration as part of the development of the TARA for the Project. In addition, FCRC personnel had considered security-related issues and had made some security-related decisions. All of these were reviewed in the course of DVS's work on the TARA for the Project.

13. A draft TARA for this "Arena Block" has been developed and will continue to be refined as the Project's design proceeds through the various design stages and is itself refined. The current draft of the TARA is the culmination of two years of planning, and more than 3,300 hours of work by the full team, particularly myself and Robert Ducibella of DVS, and two structural engineers, John Abruzzo, P.E., and Christopher P. Pinto, P.E. of Thornton Tomasetti, Inc., a preeminent structural engineering design and consulting firm engaged by FCRC to, among other things, perform analysis necessary for the development of the TARA. The resumes of Messrs. Abruzzo and Pinto, as well as information about Thornton Tomasetti, are attached hereto as Exhibit 3.

14. Once DVS had been retained by FCRC, I familiarized myself with the Project and the operational issues attendant to the Project by means of a series of intensive

meetings with representatives of FCRC, the Project's architects at Gehry Partners, LLP, the structural engineers from Thornton Tomasetti, and FCRC's consultants on arena design and operations, Global Spectrum, a Philadelphia-based subsidiary of Comcast Cable whose team for the Project included Mike Hassan, the head of security for the Wachovia Center, a major-league professional sports center in Philadelphia. Thornton Tomasetti has extensive experience in this sort of work on other projects, as does Global Spectrum.

15. With DVS's guidance, over the months that followed, Thornton Tomasetti engaged in extensive analyses of the potential design specifications and materials for the arena, the other buildings on the Arena Block, and the connections between the Arena Block and public transportation. On the basis of these analyses by Thornton Tomasetti, the structural design of the Arena Blocks and the buildings to be built on the block, and the specifications for building materials and glazing that are to be used, were refined and upgraded to enhance the buildings' security to a very high standard. In addition, during the same period, with DVS's guidance, FCRC and its designers and consultants developed operational protocols and systems for the arena and the Arena Block

16. In the period from December 2005 through January 2007, I participated in five face-to-face meetings with the New York City Police Department's elite Counterterrorism Bureau to discuss the TARA for the arena and the Arena Block. Among other things, NYPD's Counterterrorism Bureau provides comments on the design-based threats and security implications of the designs and operational arrangements for significant projects in New York City.

17. The purpose of our meetings with the NYPD Counterterrorism Bureau was to review the TARA and the design in their then current state, discuss potential threats and

risks in the light of the current state of security threat levels (locally, nationwide and worldwide), and obtain law enforcement community input from NYPD and recommendations to be incorporated in further risk assessment and the development of further strategies to address potential risks. In addition to senior personnel and staff from the Counterterrorism Bureau and me (and, at times, Mr. Ducibella), the participants at these meetings included senior executives of FCRC (James P. Stuckey, the President of FCRC's Atlantic Yards Development Group, and Jane Marshall, an FCRC Senior Vice President), the Project's senior staff architect from Gehry Partners, LLP (Tensho Takemori), a structural engineer (Mr. Abruzzo of Thornton Tomasetti), and other members of the FCRC design and operational teams. The meetings ranged in length from two to three hours and included presentations by DVS, Thornton Tomasetti and other members of the architectural and design team to apprise the NYPD of the progress that had been made in the design and in the TARA, the studies and analyses that had been performed, the results of those analyses, and the refinements in the Project's design and specifications, and in operational protocols, resulting from the team's work on the TARA. The meetings addressed a full range of security issues relevant to the arena and the Arena Block. The most recent of these meetings occurred in January 2007 and lasted approximately two hours.

18. The TARA for the arena and the Arena Block examines the structural design and proposed operations of the arena and the other facilities on the Arena Block, and identifies the facilities' vulnerabilities and the responsive criteria and measures that were developed by FCRC's team in consultation with the NYPD Counterterrorism Bureau. The TARA has been developed with the intention of providing recommendations for architectural and engineering designs and enhancements to address design-based threats, and to develop appropriate operational security measures and electronic security systems. In addition, the


TARA ultimately will be used to develop and implement a comprehensive security protocol for the arena and its surroundings. The TARA considers in detail the ability of the structures to resist progressive collapse or to otherwise fail in a manner that could compromise life or interrupt facility operations. The TARA also considers, among other things, the designs of the mechanical systems for the arena to address airborne contaminants, and also electronic counter-measure systems to address potential crimes against persons and property. The Project's design therefore reflects security-informed decisions that were made on the basis of the team's development of the TARA.

19. In the future, as part of the services provided to FCRC, DVS will continue to assist the FCRC design and operational teams to insure that the agreed-to security design features and systems remain responsive to the security program and operational concepts that have been developed.

D. Conclusion

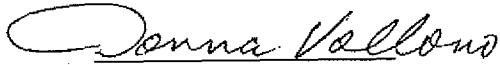
20. I understand that, in this lawsuit, the petitioners assert that the consideration of potential terrorist acts and counterterrorism measures should be part of a public review process under New York's environmental review statute, so that this information would be available to the public and even placed on the internet. However, the information that is developed and contained in a threat and risk assessment for a major development project is of a highly sensitive and inherently confidential nature. It has been widely reported that terrorist organizations have engaged in research and reconnaissance of potential targets, including searches for publicly available information on the internet. If information regarding the security design parameters and limits of a major project were to be disclosed to the public, the safety of the arena and surrounding area could easily be compromised. In my opinion, it is critical to the security of

the Arena Block, and to the safety of the arena's patrons and neighbors, that this information be maintained in strictest confidence and not be disclosed to anyone other than the owner, the design professionals involved in development of the Project, and appropriate law enforcement agencies.



Jeffrey D. Venter

Sworn to before me this
24th day of April, 2007.

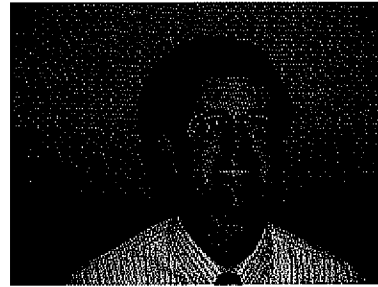

Notary Public

Donna L. Vollono
NOTARY PUBLIC
State of Connecticut
My Commission Expires 10/31/08

EXHIBIT 1

DUCIBELLA VENTER & SANTORE
SECURITY CONSULTING AND ENGINEERING SINCE 1964

JEFFREY D. VENTER
Principal



Professional Background:

1989 - Present: **Joseph M. Chapman, Inc., d/b/a
Ducibella Venter & Santore**
Principal

Notable projects include:

- William J. Clinton Presidential Center, Library & Campus, Little Rock, AR
- Hudson Yards, Hudson Yards Development Corporation, New York, NY
- US Mission to the United Nations, New York, NY
- United Nations Capital Master Plan, Security and Security Strengthening, NY, NY
- United Nations Emergency Preparedness Plan, New York, NY
- Bank of America Headquarters, One Bryant Park, New York, NY
- King's County District Attorneys Offices, Brooklyn, NY
- US Government, FDA Headquarters, Research Campus, Prince Georges County, MD
- Service Employees International Union, World Headquarters, New York, NY
- Federal Protective Service, Regional and National Monitoring Control Centers, Regions 2, 3, 5, 8, 10 (New York, Mid-Atlantic, Great Lake, Rocky Mountain and Pacific Northwest) and NCR (National Capitol Region)
- 330 Jay Street/12 Metrotech (Brooklyn Supreme Courts & Family Courts), Brooklyn, NY
- OCME DNA Laboratory, New York, NY
- US Government, Department of Transportation Headquarters, Washington, D.C.
- New York Public Library, Central Research Library, New York, NY
- United States Federal Courthouses, Albany, NY, Boston, MA, Cleveland, OH, Charleston, SC & Philadelphia, PA
- US Marshals, Nationwide Judicial, Electronic Security Procurement Criteria, Washington, D.C.
- Atlantic Yards, Brooklyn Arena, Brooklyn, NY
- Office of the Chief Medical Examiner, DNA Lab, New York, NY
- THE Tunnel, New Jersey Transit, Newark, NJ

Education:

University of New Haven, Electrical Engineering
Greater New Haven Technical College, Fiberoptics, Technical Writing
United States Naval Schools, Electrical A & B, Advanced Electronics, 400 CycleFire Fighting / Life Safety, Flight Deck Electronics

Areas of Professional Specialty:

- Development of threat and risk assessments, including areas of exposure associated with explosives, firearms, airborne contaminants, other contraband, arson, other crimes against persons and property, premises liability.
- Participation in liaison relationships and memorandums of understanding between client institutions and emergency response agencies, including law enforcement, fire department, EMS, private security, etc.
- Evaluation of building design components and architectural space programming to reduce security concerns and minimize electronic equipment installations and security staffing.
- Consultation and specification involving architectural and structural security criteria, including site lighting, areas of refuge, defensible space criteria, pedestrian entry/exit control, crime prevention through environmental design, vandalism and graffiti resistance, eavesdropping controls, penetration resistant materials specification, vehicular standoffs, and landscaping considerations.
- Evaluation and engineering of systems including:
 - Control Room and Central Station Consoles
 - RFI/EMI Shielded Spaces
 - Local and National Communication Networks
 - Local and Wide Area Security System Networks
 - Integration with NCIC and CJIS Systems
 - Video Alarm Networks
 - Radio System Networks, Local and National
 - CCTV, Access Control, Intrusion Protection, Perimeter Protection, Vehicular Control, Communications
 - Integration with existing and other new systems
- Evaluation and specifying security parameters for elevator controls. Engineering security/elevator interface circuitry
- Evaluation of central station monitoring operations, contracts, response
- Definition of security criteria involving other design principles:

Lighting	Mechanical Systems Distribution
Acoustics	Electrical Systems Distribution
Telephone & Data Communications Systems	
- Compliance with Industry Criteria:

Department of State Physical Security Standards	United States Marshal Service Standards
Federal Protective Service Standards	Public Building Service Standards
General Services Annunciation Security Standards	Insurance Carriers
Federal State and Local Building Codes, Criteria	NEC
American Association of Museums	IEEE
NFPA	UL
FM	ASIS
- Cost development and control for physical and electronic security measures

Skill Summary:

Systematic evaluation, design and project management, using 8 years of higher education, construction and field experience over a 27 year time frame, to bring to each project optimum finished product for client's desired usage, and within identified budgets.

EXHIBIT 2

DUCIBELLA VENTER & SANTORE
SECURITY CONSULTING AND ENGINEERING SINCE 1964

ROBERT W. DUCIBELLA
Senior Principal



Professional Background:

- 2000 - Present: **Joseph M. Chapman, Inc., d/b/a
Ducibella Venter & Santore**
President & Senior Principal
- 1997-2000: **Joseph M. Chapman, Inc., d/b/a
Chapman Ducibella Associates**
President & Senior Principal
- 1976-1997: **Joseph M. Chapman, Inc.**
Engineer, Associate, Senior Associate, Vice President & Principal

Notable projects include:

- The Freedom Tower (Tower 1 of the WTC Reconstruction), New York, NY
- 7 WTC Reconstruction, NY, NY
- Carnegie Hall, New York, NY
- Meyerson Symphony Center, Dallas, TX
- Kuwait Mission to the United Nations, New York, NY
- The InterAmerican Development Bank, Washington, D.C.
- Independence National Historic Park, 13 City Blocks, Philadelphia, PA
- The New York Stock Exchange, all buildings, New York, NY
Palo Alto, CA Washington, D.C. London, England
- Statue of Liberty & Ellis Island National Monuments, New York, NY
- 55 Acre, Southeast Federal Center, Security Master Plan, Washington, D.C.
- The NASDAQ Stock Exchange, Trumbull, CT
- IRS Customer Service Headquarters, Holtsville, NY
- The Brooklyn Museum of Art, Whitney Museum, & Pierpont Morgan, NY, NY
- Space Center Houston & Rocket Park, Houston, TX
- New Permanent PATH Terminal, New York, NY
- Saudia Arabian Monetary Agency, Jeddah, Riyadh, Mecca, Medina
- Social Security Administration Headquarters Campus, Baltimore, MD
- Brooklyn Bridge Parks (Manhattan and Brooklyn) Security Master Plan
- Port Authority of NY & NJ, World Trade Center Site Master Plan, New York, NY
- Cira Center @ 30th Street Station, Philadelphia, PA
- Battery Park City/World Financial Center & NYMEX, New York, NY
- Wall Street Financial District (8 city blocks) Security with NYSE & NYPD, NY, NY
- U.S. Mission to the United Nations, New York, NY
- 200 Park Avenue/MetLife @ Grand Central Station, New York, NY
- Hermes, Beverly Hills & Costa Mesa, CA, Atlanta GA, Las Vegas, NV, New York, NY
- One Penn Plaza @ 34th Penn Station, New York, NY
- AOL/Time Warner @ Columbus Centre, New York, NY
- Regent, Mandarin, & Marriott Hotels, New York, NY & Washington, D.C.
- Tribeca Bridge, New York, NY
- Lincoln Center for the Performing Arts, Security Master Plan, NY, NY

1975-1976: **Yale University**, Department of New Construction, New Haven, CT
Construction Supervisor, Project Manager

Provided construction management services at Yale University.

Projects included:

- Yale Psychiatric Institute, New Haven, CT
- Yale School of Nursing, New Haven, CT
- Yale-New Haven Hospital Renovations, New Haven, CT
- Yale University School of Organization & Management, New Haven, CT
- Yale New Haven Hospital Laboratory for Medicine and Pediatrics
- Yale New Haven Hospital, Brady Boardman Cancer Research

1969-1975: **George B. H. Macomber Co.**, Boston, MA
Field Engineer, Project Engineer, Superintendent, Project Manager

Projects included:

- Yale University Psychiatric Institute, New Haven, CT
- Yale Cross Campus Library, New Haven, CT
- Yale British Art Center, New Haven, CT
- Choate-Rosemary Hall Center for Performing Arts, Wallingford, CT
- Renovations to Yale University Art and Architecture, New Haven, CT
- Milford Jai-Alai, Milford, CT
- Oriental Masonic Gardens, Hamden, CT
- Bedford Styvesant Restoration Corporation, New York, NY

Education:

Tufts University, School of Engineering, BSCE 1973
Coursework at Harvard University and Boston Museum School of Fine Arts

Rensselaer Polytechnic Institute, Center for Construction Management, 1974

Softtech, Level 1, IDEF 0 diploma, 1976

Academic Awards:

Class Salutatorian, Tufts Engineering
Tau Beta Pi (National Engineering Honor Society, Tufts Chapter)
Boston Society of Civil Engineering Award
Ford College Round Table
Tufts Alumni Award
William Morris Scholarship
Selected as one of 10 Outstanding Seniors, Tufts Engineering
President, ASCE

Areas of Professional Specialty:

- Development of threat and risk assessments, including areas of exposure associated with explosives, firearms, airborne contaminants, other contraband, arson, other crimes against persons and property, premises liability.
- Participation in liaison relationships and memorandums of understanding between client institutions and emergency response agencies, including law enforcement, fire department, EMS, private security, etc.
- Evaluation of building design components and architectural space programming to reduce security concerns and minimize electronic equipment installations and security staffing.
- Consultation and specification involving architectural and structural security criteria, including site lighting, areas of refuge, defensible space criteria, pedestrian entry/exit control, crime prevention through environmental design, vandalism and graffiti resistance, eavesdropping controls, penetration resistant materials specification, vehicular standoffs, and landscaping considerations.
- Consultation in matters of security staffing, property management, and facility management staffing.
- Specification of central station monitoring criteria, as well as assistance in the development of policies and procedures for interaction with local emergency and law enforcement agencies.
- Development of policies and procedures for facility and security staff, client security system use programs and security policy, procedures, systems, and emergency preparedness operation manuals.
- Design and specification of physical security equipment, including door opening hardware, special security doors and frames, penetration resistant wall construction materials, forced entry protective designs, specialized bullet resistant and bullet resistant glazing, HVAC louvers, gratings/grilles, and ductwork, vehicle arrest devices, portals, turnstiles, mantraps and sallyports.
- Consultation, engineering and design of fire detection and protection systems including early warning incipient air sampling detection, conventional smoke detection systems, dry and wet pipe interlocked sprinkler systems, and gaseous suppression systems.
- Engineering and design of electronic security systems, including closed circuit television, access control, ID badging, communications, vehicular control, elevator control, asset protection, book removal detection, perimeter control, wireless artifact, object and asset protection; holdup and duress systems.
- In depth experience with design of specialized electronic and physical security for high value, complex display cases, exhibit environments, period rooms, exhibition displays, and historic sites and their structures.
- Industry compliance with federal, state, and local building codes, as well as GSA-ISC, FEMA, FTA, DOD, DOS, NEC, UL, IEEE, NFPA, FM, ASIS, ISO, and liability insurance guidelines.
- Assurance/compliance with AAM security related accreditation criteria.
- Assurance/compliance with cultural institution "Facility Reports" for borrowing artifacts.
- Construction administration, test, checkout, and commissioning function.
- Evaluation of contractor maintenance and service programs.
- Cost control and value engineering of physical and electronic security systems.
- Expert liaison between insurance providers and policies, including risk reduction recommendations.

EXHIBIT 3

John Abruzzo, P.E.

Principal

Education

- ▶ Ph.D., Lehigh University, Completion Pending
- ▶ M.C.E., Stevens Institute of Technology, 1989
- ▶ B.C.E., Villanova University, 1984

Registrations

- ▶ Registered Professional Engineer in Pennsylvania

Professional Activities

- ▶ Member and Past Vice President of Lehigh Valley Chapter, American Society of Civil Engineers
- ▶ Member, American Welding Society
- ▶ Past Member, Society of Experimental Mechanics
- ▶ Member, American Concrete Institute
- ▶ Member of the ASCE and AISC Committees for the design of blast and impact resistant structures
- ▶ Attended "Modern Force Protection" course offered at Penn State University, 2001

Honors and Awards

- ▶ **ACEC New York Gold Award** for Engineering Excellence for the Miller Park bearing replacement project, 2003.
- ▶ **ACEC National Diamond Award** for Engineering Excellence for the Ataturk Terminal Seismic Modernization, 2002.

Teaching

- ▶ Assistant Professor, Villanova University, 1996-1999

Mr. Abruzzo has extensive experience working with a wide variety of materials and design types including high-rise and long-span steel structures. He possesses specialized knowledge in assessing and predicting the behavior of steel and reinforced concrete connections, structural stability, blast analysis, non-linear analysis, materials testing, data acquisition and testing of structural elements.

Representative Project Experience

Forensic Experience

- **New York Post Printing Facility**, Bronx, New York. Investigated concrete cracks within the pile supported slab and elevated steel framed slabs. Investigated the design of the steel framing to support the elevated processing floor.
- **USPS Processing and Distribution Center**, Philadelphia, Pennsylvania. Investigated concrete cracks within the pile supported slab and elevated steel framed slab.
- **Beaver Stadium**, State College, Pennsylvania. Investigated the dynamic behavior of the stadium.
- **Safeco Field**, San Diego, California. Investigated the performance of the roof framing, support structure and the bearings supporting the moveable roof. Recommended remedial measures.
- **Scarborough Hospital**, Scarborough, Tobago. Performed an investigation of the hospital to determine the adequacy of the structure to resist seismic loads and hurricane force winds.
- **Tropicana Parking Garage**, Atlantic City, New Jersey. Investigated the cause of the partial collapse of the concrete garage structure. Investigated the structural integrity of the remaining building.
- **Rentschler Field**, University of Connecticut, East Hartford, Connecticut. Conducted peer review of the structural design of precast reinforced concrete Y-columns/rakers of this 40,000-seat stadium during construction.
- **Miller Park**, Milwaukee, Wisconsin. Investigated the performance of the bearings supporting the moveable roof and developed a bearing replacement plan. Designed the steel modifications needed to lift the roof to allow for removal of the existing bearings and installation of the new bearings. *This project was awarded the ACEC New York Gold Award for Engineering Excellence in 2003.*
- **Independence Harbor**, Edgewater, New Jersey. Investigated the adequacy of the steel and reinforced concrete framed structures to resist design loads and recommended remedial measures.

- **Newport Viaduct Pier Investigation**, New Jersey. Provided an analysis of a pier-caisson interface. Developed a consistent methodology to determine the strength of the interface.
- **Stroheim-Romann Building**, New York, New York. Provided engineering services to repair damaged beam-column joints for a three-story concrete frame building. Performed a non-linear analysis to determine effects of dynamic loads to the structural frame. The project included structural testing in the field.
- **Queens Midtown Tunnel**, New York. Structural review, including blast and hardening evaluation.
- **Ataturk International Airport Terminal Seismic Modernization**, Istanbul, Turkey. Investigated schemes to provide a seismic modernization to a concrete/steel frame structure during the construction phase. The modernization selected relied on base isolation provided by friction pendulum bearings with other mechanical devices. *This project was awarded a **Grand Award** from the American Council of Engineering Companies for the 2002 Engineering Excellence Awards as well as a **Diamond Award** from the New York Chapter of the American Council of Engineering Companies, also in 2002.*
- **Miller Park Crane Collapse**, Milwaukee, Wisconsin. Provided emergency response services and conducted a structural failure investigation and collapse analysis of a 500-foot tall mobile crane that collapsed during construction. Performed three-dimensional finite element analysis (linear, non-linear, and dynamic.)
- **Schoharie Creek Thruway Bridge Collapse**, Montgomery County, New York. Investigated the causes of the Schoharie Thruway Bridge Collapse for the New York Department of Health.
- **L'Ambiance Plaza Condominium Collapse**, Bridgeport, Connecticut. Investigated the collapse for the City of Bridgeport.
- **America West Arena**, Phoenix, Arizona. Investigated the steel roof structure to determine code compliance and strength for future upgrades.
- **Aurora Center Arena**, Grand Falls, North Dakota. Investigated the collapse of the steel-framed roof structure during construction.

Blast Mitigation Experience

- **Arena**, New York. Performed blast analysis services to establish design criteria and performance levels for anti-terror force protection.
- **United Airlines Terminal**, O'Hare International Airport. Performed a blast mitigation investigation for glazing of the existing terminal building and new construction.
- **New York Jets Stadium**, New York, New York. Performed blast studies and bollard studies for the design of the new stadium and rail platform

overbuild.

- **Rail Infrastructure**, New York, New York. Performed blast studies for various rail authority infrastructures.
- **High-rise #7 (confidential)**, Paris, France. Study of vulnerability to large blast effects on a concrete frame building. Developed a shield to provide protection to more vulnerable columns.
- **High-rise #6 (confidential)**, New York, New York. Study of blast effects on the glazing of this new high-rise, 50-story building.
- **High-rise #5 (confidential)**, New York, New York. Progressive collapse analysis, determination of blast loads, possible hardening schemes and effects on structural elements of this new 50-story building.
- **High-rise #1 (confidential)**, New York, New York. Determination of blast loads, possible hardening schemes and effects on structural elements of this 70-story, steel-frame building. A progressive collapse study was performed previously.
- **High-rise #2 and #3(confidential)**, New York, New York. Progressive collapse study, determination of blast loads, possible hardening schemes and effects on structural elements of steel-frame buildings.
- **Mid-rise #1 (confidential)**, New York, New York. Identification and subsequent report outlining possible threats from blast.
- **Mid-rise #2 (confidential)**, Stamford, Connecticut. Identification and subsequent report outlining possible threats from blast and fire.
- **Pier XX (confidential)**, New York, New York. Requires identification of possible threats and determining the performance of the existing and enhanced glazing.
- **High-rise #4 (confidential)**, New York, New York. Determination of blast loads, possible hardening schemes and effects on structural elements of this 50-story, steel-frame building.
- **Bachelors Enlisted Quarters**, MCBH Kaneohe, Hawaii. Peer review for progressive collapse per the GSA requirements. In this case, we recommended applying a dynamic load factor in the analysis.
- **Hickam Air Force Base**, Pearl Harbor, Hawaii. Determination of the blast loads and effects on structural elements, particularly the columns.
- **Queens Midtown Tunnel**, New York. Structural review, including blast and hardening evaluation.
- **UJA Building**, New York, New York. Progressive collapse analysis, determination of blast loads, potential hardening schemes and effects on structural elements for a steel and concrete framed building.

Design Experience

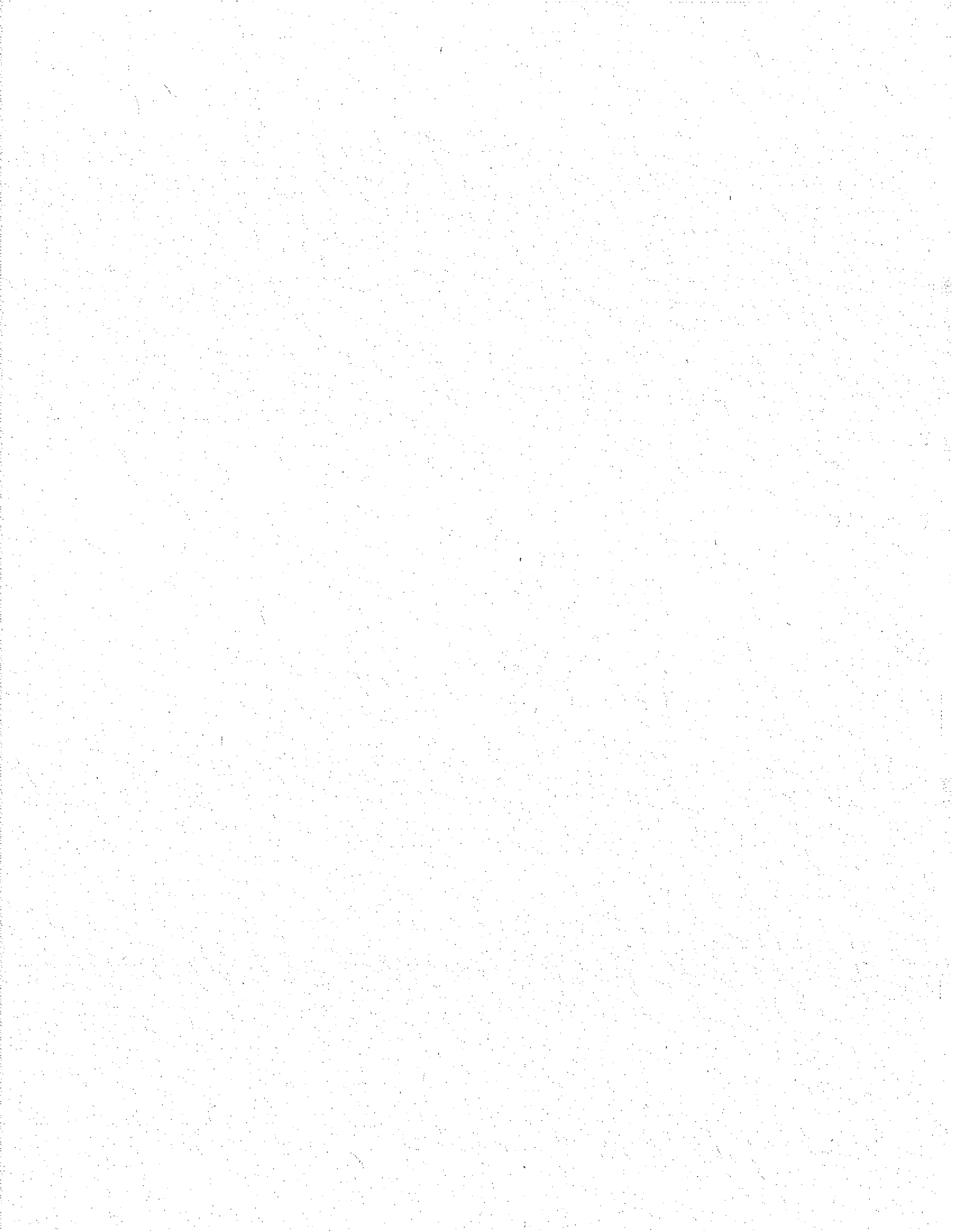
- **Southbridge**, Philadelphia, Pennsylvania. Structural design of a building conversion. The existing building is a 760,000 sq. ft. warehouse to be converted to residential with interior parking.
- **Soyak Tower**, Istanbul, Turkey. Provided seismic expertise and analysis to the TT design team. The building is a 30 story reinforced concrete office building to be constructed in a high seismic region.
- **University of Scranton Student Center**, Scranton, Pennsylvania. Structural design of a 40,000 sq. ft. student center. The project is steel framed with concrete composite slabs.
- **San Diego Padres Stadium**, San Diego, California. Designed the left field side of the stadium with massive scoreboard in a high seismic region. Also designed the glass rail at the balconies.
- **599 Lexington Avenue**, New York, New York. Designed a 51-story, 1-million SF office building for Boston Properties, Inc. including a new major subway connection.
- **One Liberty Place**, Philadelphia, Pennsylvania. Provided extensive design work and site observation for this 65-story office building containing 1.3-million SF.
- **Jersey City Tower**, Jersey City, New Jersey. Designed the wind-resisting system for this never-constructed, 44-story, steel-framed, perimeter-braced, secondary core-braced high-rise.
- **Americas Tower**, New York, New York. Designed this 50-story office building containing approximately 1-million SF above grade, and 3 levels below grade for the Americas Tower Partners.
- **Princeton Pool**, Princeton, New Jersey. Designed a new pool building, an underground connecting tunnel, new corridor addition and interior renovation within the existing Caldwell Building.
- **Discount Corporation Building**, New York, New York. Performed a restoration of the spandrel beams and columns for this 15-story, 100-year-old steel and cast-iron building.
- **NYNEX Office Building**, Orangetown, New York. Designed this low-rise semi-rigid steel-framed building.
- **Crown Center**, Independence, Ohio. Designed this 13-story office building containing approximately 304,000 SF.

Professional Papers, Lectures and Publications

- Co-Author, "A Study of Mitigation Strategies for Progressive Collapse of a Reinforced Concrete Commercial Building", Journal of Performance of Constructed Facilities, ASCE, November 2006.
- "The Role of the Structural Engineer in Risk Assessment for Privately Owned Buildings with Public Function in the USA," presented at the

International Conference on Structural Safety and Reliability, Rome, Italy, June 19-23rd, 2005.

- "Protective Design of Building Structure," Engineering, Architectural and Security Approaches in Protecting People and Buildings Post 9/11 Conference, April 26, 2005.
- "Protective Design of Building Structure," ASHAE, 2005.
- "Protective Design of Existing Building Structures After World Trade Center," ASCE, 2005.
- Co-Author, "Pivot Points", Modern Steel Construction, May 2004
- Co-Author, "Chapter 22: Protective Design of Structures," Building Security: Handbook for Architectural Planning & Design, Barbara A. Nadel, FAIA, ed., The McGraw-Hill Companies, Inc., 2004.
- Co-Author, "Miller Park Pivot Bearing Replacement", Proceedings of 3rd Forensics Congress, ASCE, 2003.
- Co-Author, "Reduce Damage, Increase Safety," The Military Engineer, September/October 2003
- Co-Author, "Owners Eye Vulnerability Analysis And Security Design," Real Estate Weekly, February 2002
- "Applications of Truss Models for Precast Concrete Connections," Rutgers University Department of Civil Engineering, 1999
- "The Izmit (Kocaeli) Earthquake & The Ataturk Airport Terminal Seismic Upgrade," ASCE Metropolitan Section, 2001
- "Blast Design and Collapse Analysis," Rutgers University Department of Civil Engineering, 2002
- "Responding to the World Trade Center Emergency," Delaware Valley Chapter of ACI, 2002
- Co-Author, "Discussion of Comparison of Installation Techniques for 1-1/4 Diameter A490 Bolts," AISC Engineering Journal, 1996
- Co-Author, "Comparison of Installation Techniques for 1-1/4 Diameter A490 Bolts," AISC Engineering Journal, 1994
- Co-Author, "Airport Features a Seismic Upgrade During Construction," Modern Steel Construction, AISC, August, 2000



Christopher P. Pinto, P.E.

Associate

Education

- ▶ M.S.C.E., 1998, Drexel University, Philadelphia, Pennsylvania
- ▶ B.S., Architectural Engineering, 1998, Drexel University, Philadelphia, Pennsylvania
- ▶ B.S., Civil Engineering, 1998, Drexel University, Philadelphia, Pennsylvania

Registrations

- ▶ Registered Professional Engineer in the State of New York

Professional Activities

- ▶ Associate Member, American Society of Civil Engineers
- ▶ Member, Structural Engineers Association of New York

Published Papers:

- ▶ Co-author, "Examining the Capitol Dome", Civil Engineering Magazine, ASCE, October, 2000
- ▶ Co-Author, "Pivot Points", Modern Steel Construction, May 2004
- ▶ Co-Author, "Accounting for Multi-Axial Movement during the Lifting of a Long Span Roof", ASCE Structures Congress, April 2005.
- ▶ Author, "Considerations for the Evaluation of a Long Span Moveable Roof", 3rd International Conference on Forensic Engineering, November 2005.

Teaching

- ▶ Adjunct Assistant Professor, Institute of Design and Construction, 2000-2002

Mr. Pinto has experience working on a wide variety of analytical, investigative and restoration projects. He is proficient in the static, dynamic, and nonlinear analysis and evaluation of such structures as space frames, domes, scaffolds, office and residential buildings, historic structures and parking structures under the effects of wind, seismic forces, vibration, and blast loads.

Representative Project Experience

Blast / Building Vulnerability Experience

- **Brooklyn Arena**, Brooklyn, New York. Determination of blast loads, possible hardening schemes and effects on the proposed arena and condominium tower complex. Preparing guidelines regarding the sizing of elements and connections to resist the design threats.
- **New York Sports and Convention Center**, New York, New York. Determination of blast loads, hardening schemes and effects on the proposed west side stadium to be constructed over a rail yard.
- **New Meadowlands Stadium**, Meadowlands, New Jersey. Determination of blast loads, hardening schemes and effects on the proposed stadium. Providing guidelines regarding the sizing of elements and connections to resist the design threats.
- **High-rise #1 (confidential)**, New York, New York. Use of advanced computer modeling tools to determine the performance of components of this 70-story steel framed building under blast loads. Designed hardening scheme and provided construction support services during installation.
- **High-rise #2 (confidential)**, New York, New York. Progressive collapse study, determination of blast loads and effects on structural elements of this 48-story, steel-frame building.
- **High-rise #3 (confidential)**, New York, New York. Determination of blast loads, possible hardening schemes and effects on structural elements of the lower stories of this 47 story steel framed building.
- **High-rise #4 (confidential)**, New York, New York. Determination of blast loads, possible hardening schemes and effects on structural elements for the 64 story steel and concrete framed building. Review of the effects of the deflagration of a fuel oil tank housed within the building.
- **High-rise #5 (confidential)**, New York, New York. Progressive collapse study and determination of strengthening schemes for the design of a new 50 story building. Determination of blast loads and effects on structure and the curtain wall system.
- **Bachelors Enlisted Quarters**, MCBH Kaneohe, Hawaii. Peer review of progressive collapse analysis.

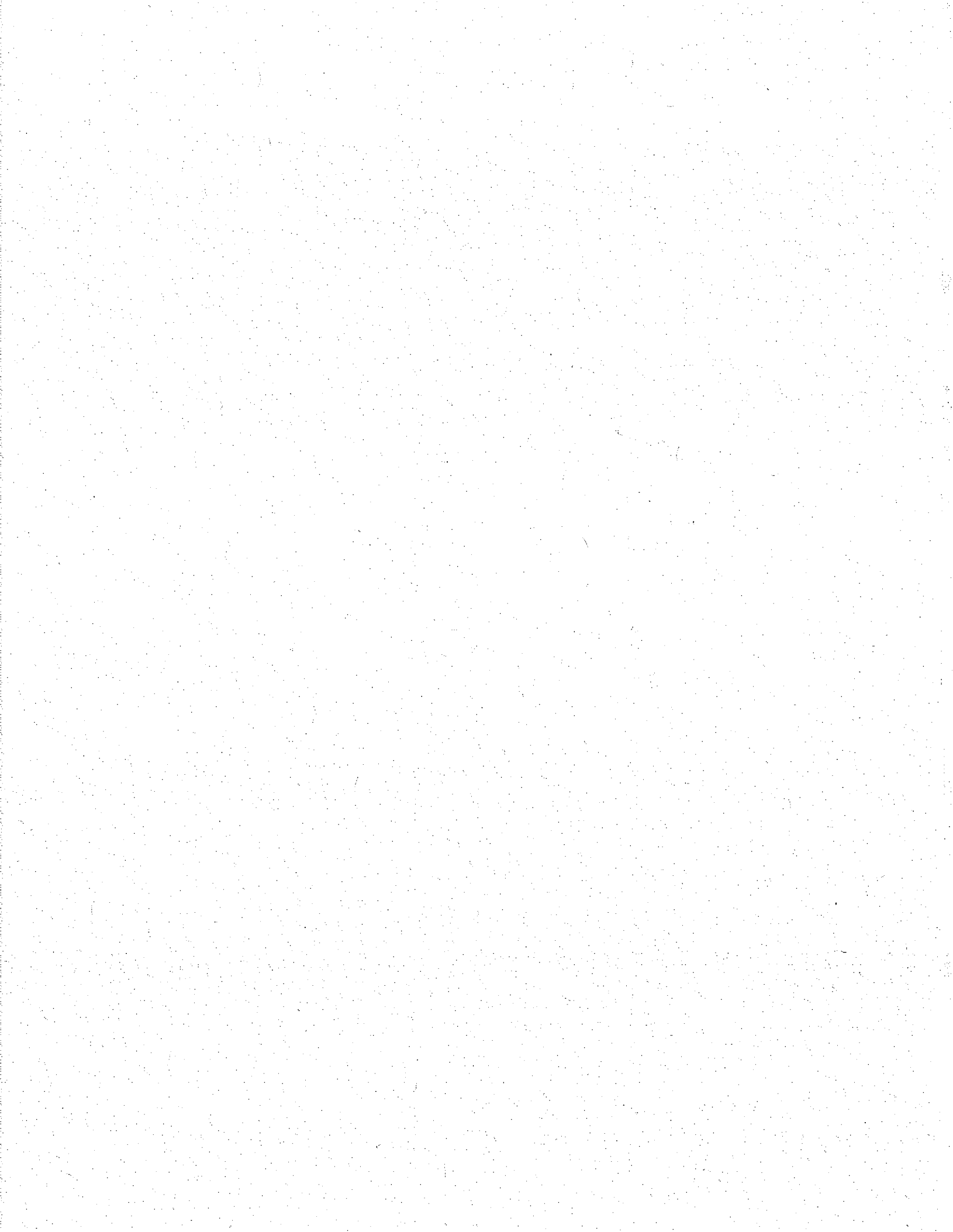
- **Hickam Air Force Base**, Pearl Harbor, Hawaii. Responsible for determining the blast loads and effects on structural elements.
- **CBX Tower**, Paris, France. Determination of blast loads, possible hardening schemes and effects on structural elements for a new concrete 30 story building.
- **UJA**, New York, New York. Progressive collapse analysis, determination of blast loads, potential hardening schemes and effects on structural elements for a 17 story steel and concrete framed building.
- **One World Financial Center**, New York, New York. Performed physical security review for the loading dock and parking garage ramps. Specified requirements for a retractable bollard system.
- **Times Square Tower**, New York, New York. Performed review of system of planters and monuments to determine their effectiveness as bollard systems.

Forensic and Structural Analysis Experience

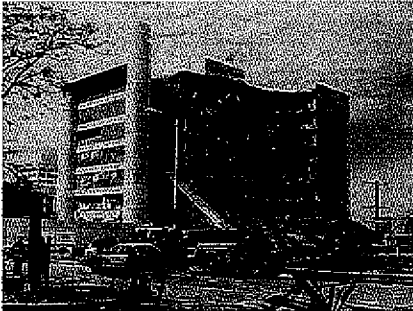
- **Miller Park**, Milwaukee, Wisconsin. Investigated the performance of the bearings supporting the 600-foot span moveable roof sections over the Milwaukee Brewers Baseball Stadium and developed a bearing replacement plan. Designed the steel modifications needed to lift the roof to allow for removal of the existing bearings and installation of the new bearings. *This project was awarded the ACEC New York Gold Award for Engineering Excellence in 2003.*
- **World Trade Center Disaster Response**, New York, New York. Performed visual condition assessment of various buildings around site in the wake of the September 11th terrorist attack. Analyzed existing structural elements for their capacity to support crane loads. Designed structural repairs and supports as required for construction. Directed teams of engineers as they observed selective demolition in the area.
- **U.S. Capitol Dome**, Washington, D.C. Performed structural analysis of the cast-iron dome. Designed repairs for damaged cast-iron components. Determined allowable loads for scaffolding the dome during the rehabilitation project.
- **Moveable Roof Analysis**, (confidential). Analyzed existing moveable roof structure to determine the cause of premature failure of drive system components. Performed three-dimensional non-linear finite element analysis of interaction between roof panels and support structures. Designed details for relocating the roof lock sockets.
- **Tropicana Parking Garage Collapse**, Atlantic City, New Jersey. Provided emergency response services after the partial collapse of a parking garage under construction. Conducted an investigation as to the cause and origin of the collapse.
- **Beaver Stadium**, State College, Pennsylvania. Conducted an evaluation

of the structural performance of the stadium, which has been substantially expanded over a 50 year period, under atypical crowd excitation.

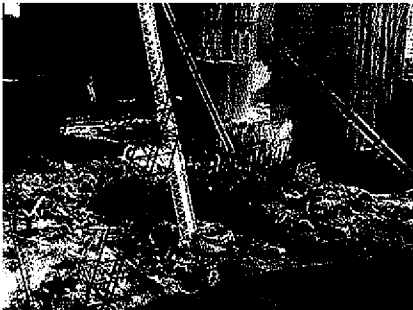
- **Baltimore Washington International Airport**, Baltimore, Maryland. Analyzed the original design of the space frame roof of the main terminal. Performed a nonlinear collapse analysis of the terminal roof.
- **Sherwood Hotel**, Tumon Bay, Guam. Conducted an evaluation of the structural design of a 50 ft. by 250 ft. twelve-story concrete frame hotel under both wind and seismic loads. Evaluated the adequacy of the Exterior Insulation and Finish System (EIFS) under wind loads.
- **4 Times Square Scaffold Collapse**, New York, New York. Conducted an investigation, material hoist assessment and emergency stabilization following a 40 story tall personnel hoist scaffolding collapse.
- **Miller Park Crane Collapse**, Milwaukee, Wisconsin. Provided emergency response services and conducted a structural failure investigation and collapse analysis of a 500-foot tall mobile crane that collapsed onto the seating bowl of Miller Park (Milwaukee Brewers' new baseball stadium) during construction. Performed three-dimensional finite element analysis (linear, non-linear, and dynamic).
- **Ataturk Airport Terminal**, Istanbul, Turkey. Structural investigation of terminal for seismic damage and provided recommendations for retrofit.
- **U.S. Postal Facility**, Northern New Jersey. Performed a vibration study of the perceptibility of vibrations and building movements caused by motorized vehicles operating within the facility.
- **107 Columbia Heights**, Brooklyn, New York. Analyzed existing reinforced concrete residence hall for seismic loads based upon NEHRP Guidelines. Designed reinforcement for lateral load resisting system.
- **Embraer Space Frame**, São Jose dos Campos, Brazil. Performed an analysis of the space frame roof structure.
- **Miller Park Roof Erection Procedure**, Milwaukee, Wisconsin. Evaluation of the roof erection sequence proposed by the erector.
- **Independence Harbor**, Edgewater, New York. Retained to provide litigation support services in reference to condominiums built on top of an existing podium. Performed nonlinear analysis of the podium structure.



Representative Vulnerability, Blast and Structural Hardening Projects



*Alfred P. Murrah Federal Office Building
Oklahoma City, Oklahoma*

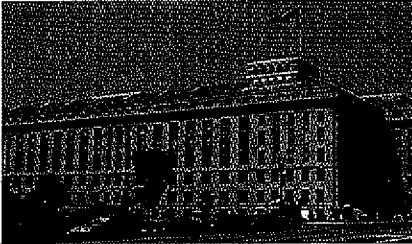


*World Trade Center disaster site
New York, New York*

- **Dallas/Fort Worth International Airport**, Fort Worth, Texas. Structural modifications to comply with new security requirements associated with post-9/11 FAA criteria.
- **World Trade Center Disaster**, New York, New York. Lead structural engineering firm, working with the search-and-rescue teams on a 24-hour basis to manage and direct structural and safety engineering efforts.
- **High-rise #1 (confidential)**, New York, New York. Determination of blast loads, possible hardening schemes and effects on structural elements of this 70-story, steel-frame building. A progressive collapse study was performed previously.
- **High-rise #2 (confidential)**, New York, New York. Progressive collapse study, determination of blast loads, possible hardening schemes and effects on structural elements of this 48-story, steel-frame building.
- **Mid-rise #1 (confidential)**, New York, New York. Identification and subsequent report outlining possible threats from blast.
- **Pier XX (confidential)**, New York, New York. Requires identification of possible threats and determining the performance of the existing and enhanced glazing.
- **GSA Federal Laboratories**, Beltsville, Maryland. Engineering services for new laboratories, buildings 1, 2A and 2B, layout drawings for blast-resistant windows.
- **High-rise #3 (confidential)**, New York, New York. Progressive collapse study, determination of blast loads, possible hardening schemes and effects on structural elements of this 50-story, steel-frame building.
- **High-rise #4 (confidential)**, New York, New York. Blast study, determination of blast loads, possible hardening schemes and effects on structural elements of this 47-story, steel-frame building.
- **High-rise #5 (confidential)**, New York, New York. Blast study, determination of blast loads, possible hardening schemes and effects on structural elements of this 48-story, steel-frame building.
- **Alfred P. Murrah Federal Building**, Oklahoma City, Oklahoma. Progressive collapse analysis and development of recommended guidelines for design of federal office buildings for FEMA.
- **Station Place, SEC Headquarters**, Washington, DC. Located adjacent to Union Station, the 2.2 million SF Station Place will include up to 10 stories over three below-grade parking levels, to be completed in three phases. Phase One incorporates progressive collapse analysis and blast resistant

Representative Vulnerability, Blast and Structural Hardening Projects

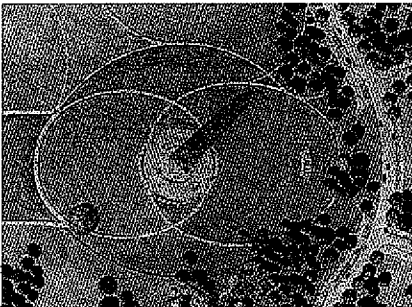
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*U.S. Department of Agriculture,
Washington, DC*



*Bachelors Enlisted Quarters, MCBH
Kaneohe, Hawaii*



*Visitor and security screening facility
Washington Monument,
Washington, D.C.*

design in compliance with General Services Administration security criteria.

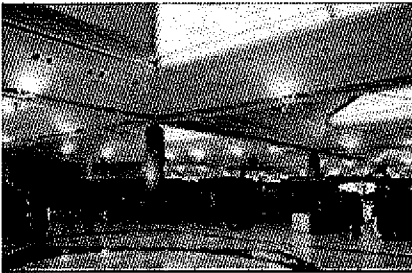
- **United States Department of Agriculture Security Upgrade and Renovation**, Washington, DC. New security measures for the South Building include progressive collapse analysis, wall design for blast, perimeter security improvements, and a security upgrade for the mailroom and loading dock.
- **Verizon**, New York, New York. Assessment of site hardening options for the lower floors of an existing 1920's era facility containing switching.
- **Bachelors Enlisted Quarters**, MCBH Kaneohe, Hawaii. Peer review for progressive collapse. This is a unique building system designed per the GSA Progressive collapse requirements. In this case, we recommended applying a dynamic load factor in the analysis.
- **Hickam Air Force Base**, Pearl Harbor, Hawaii. Responsible for determining the blast loads and effects on structural elements, particularly the columns.
- **Washington Monument Visitor and Security Screening Facility**, Washington, DC. Structural design and construction administration for permanent visitor and security improvements to the Washington Monument and its grounds including reconfiguration of walkways to incorporate low seating walls that will serve as barriers and establish the perimeter required to protect the monument from vehicles without detracting from the natural and historic landscape of the grounds; addition of a below-grade security screening facility with a tunnel connecting it with a new underground entrance to the monument, preventing screened visitors from coming into contact with unscreened pedestrians in the plaza above; and restoration of the Monument Lodge for use as the entrance to the underground facility.
- **L'Ambiance Plaza Building Collapse**, Bridgeport, Connecticut. Investigation of the progressive collapse of the L'Ambiance Plaza Building.
- **107 Columbia Heights**. Brooklyn, New York. Performed seismic evaluation of 15-story, reinforced concrete framed building. Provided recommendations for enhancement of building performance with the use of carbon fiber composites. Performed linear dynamic structural analysis utilizing FEMA guidelines for evaluation of existing facilities.
- **Sherwood Hotel**, Tumon Bay, Guam. Conducted structural evaluation of a 12-story reinforced concrete structure under the effects of wind loads (155-mph zone) and zone-3 seismic loads. Evaluated structure's performance under effects of 150 -mph winds generated by Super-Typhoon Paka. Designed retrofit of existing EIFS exterior wall system. Evaluated existing window glazing and mullion system. Performed three-dimensional finite element analysis and non-linear pushover analysis. Provided litigation support services.

Representative Vulnerability, Blast and Structural Hardening Projects

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*Disaster recovery facility at the Brooklyn Army Terminal for the NYC Economic Development Corporation
New York, New York*



*Ataturk Airport
Istanbul, Turkey*

- **New York City Economic Development Corporation – Disaster Recovery Facility**, Brooklyn Army Terminal, Brooklyn, New York. The NYC Economic Development Corporation recognized the value of this impressive building and engaged Thornton Tomasetti to work on the programming and design for its adaptive reuse in the commercial mark. The firm also programmed and designed a disaster recovery facility for NYC Economic Development Corporation incorporated in the Brooklyn Army Terminal Building.
- **NYC Off-Track Betting – Disaster Recovery Facility**, 53-06 Grand Avenue, Maspeth, New York. Design of approximately 60,000 SF data center located on the first and second floor of an existing three-story concrete frame manufacturing building. The new facility accommodates multiple functions, including printing, disaster recovery, administrative, computer and vehicle maintenance shops and archive records storage.
- **US Embassy Office Building**, Helsinki, Finland This project involved the performance of a blast upgrade feasibility study on the Chancery, EMR, and Annex Office Building to investigate the structural system and building envelope of the existing facilities in order to establish the level of effort necessary to improve the blast resistance capability of the compound. Conceptual schemes were developed to strengthen the structural framing and facade systems in order to reduce personnel vulnerability while preserving the original architectural characteristics of the buildings.
- **Queens Midtown Tunnel**, New York. Structural review, including blast and hardening evaluation.
- **UJA Building**, New York, New York. Progressive collapse analysis, determination of blast loads, potential hardening schemes and effects on structural elements for a steel and concrete framed building.
- **U.S. Department of Interior Modernization**, Washington, DC. This building occupies two city blocks. The project involves structural design services in support of a comprehensive building modernization with the goal of improving the infrastructure to conform to current health and safety standards, upgrading HVAC and M/E/P systems, replacing outdated fire protection & life safety systems, and conforming to ADA regulations by adding code-compliant exits and ramps. In 2002 the project was expanded to include a feasibility study for blast-mitigation windows and the design of associated supplemental framing.
- **Station Place, SEC Headquarters**, Washington, DC. Located adjacent to Union Station, the 2.2 million SF Station Place will include up to 10 stories over three below-grade parking levels, to be completed in three phases. Phase One incorporates progressive collapse analysis and blast resistant design in compliance with General Services Administration security criteria.
- **Ataturk Airport**, Istanbul, Turkey. Provided emergency response services and conducted failure investigation of a 500,000 SF transportation facility near Istanbul, Turkey that was damaged in the August 1999 Turkey earthquake. Performed three-dimensional finite

Thornton Tomasetti

Representative Vulnerability, Blast and Structural Hardening Projects

Page 4 of 4

element analyses and nonlinear pushover analyses to evaluate the structure's concrete moment frame and space frame roof structure.

- **Steel Tower Advanced Analysis**, New York, New York. Analysis of a 140-ft. steel-framed tower using advanced computer modeling tools to assist in determining the performance of the tower under blast loads, allowing us to refine the retrofit. As with most high-rise buildings, the lower level columns are fabricated from built-up plates and sections. Under the loads associated with blast, the connection between these elements may govern the strength of the member. Providing a practical retrofit may have been difficult without the use of these advanced modeling capabilities
- **Corporate Headquarters Building**, Location Confidential. Investigation of hazards due to fuel truck explosion or fire for a major corporation headquarters building in the United States. The study required the integration of combustion and heat flow models with blast effects to determine the structural response to blast load and high temperature in a dynamic environment.
- **Hartford Coliseum**, Hartford, Connecticut. Progressive collapse analysis of the space frame roof.
- **Design and analysis of hardened blast-resistant structures**, either from nuclear or conventional weapons explosions, as well as from accidental explosion at various sites including:

Naval Underwater Systems Center Building No. 1, Newport, RI.

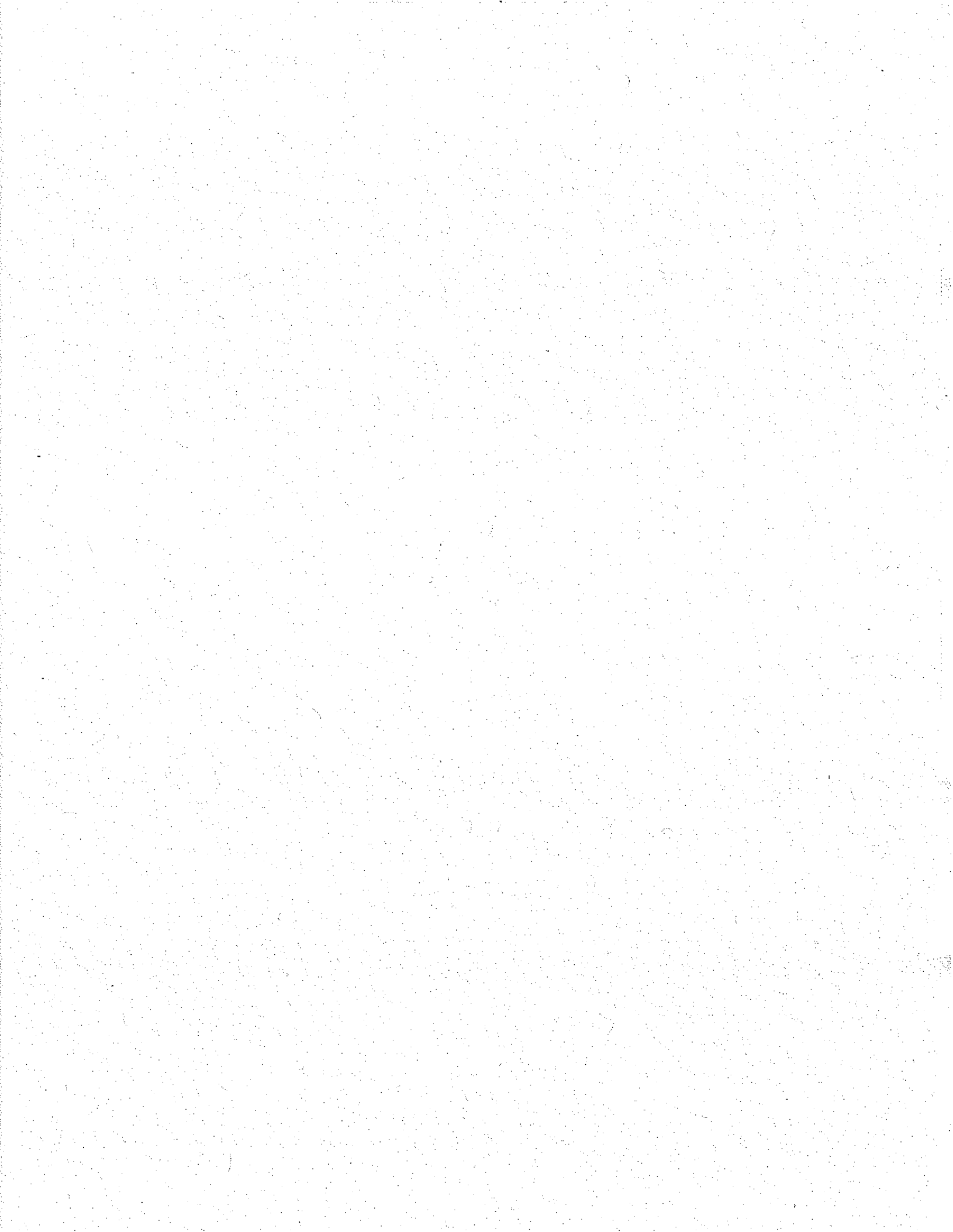
Social Security Administration Center, Baltimore, MD.

The Golden Eagle Project Communications/ Computer Center for the U.S. Corps of Engineers at a classified site.

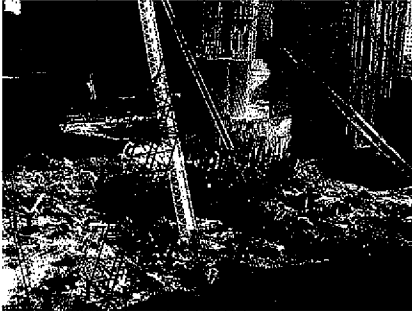
Fuel Cell Maintenance Facility, Westover Air Force Base, MA.

Chicago Board of Trade Addition, Chicago IL.

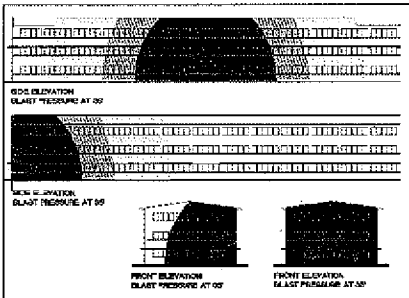
Swiss Bank Headquarters, Stamford, CT.



Building Vulnerability Assessment and Force Protection Design



After the terrorist attack on the World Trade Center in New York City, Thornton Tomasetti was hired by the City of New York as the lead structural engineering firm, working with the search-and-rescue teams on a 24-hour basis, to direct the demolition and assessment of structural stability and safety engineering efforts.



Thornton Tomasetti determined blast loads and effects on structural elements, particularly structural spandrel panels of Hickam Air Force Base in Honolulu, Hawaii.



Thornton Tomasetti acted as special consultant for the progressive collapse analysis due to blast events for the Bachelor Enlisted Quarters P-593 in Pearl Harbor, Hawaii.

Security and force protection have always been concerns to certain of our clients. However, due to recent events, many more of our clients are concerned with protecting their buildings from terrorist attacks and ensuring the safety and security of their employees. Thornton Tomasetti provides a full range of security management and force protection consulting services. The combination of our in-house expertise in the design and analysis of structures subjected to abnormal loads – such as blast loads – and our partnership with other recognized industry leaders gives our clients unprecedented access to experts in diverse fields such as security engineering, crisis management, fire engineering, disaster planning and emergency response.

Many of our clients are performing risk assessments of their existing and future facilities. Our in-house capabilities allow us to predict and assess the response of structures, structural elements, masonry and glazing to loads associated with blast or other threats. We frequently couple this assessment with a specialized study to determine the risk of progressive collapse. Lastly, we are at the forefront of the development of uses for new materials and innovative uses of familiar materials to mitigate risk. The combination of these skills provides our clients with practical and cost effective methods of mitigating hazards through hardening and ductility enhancement.

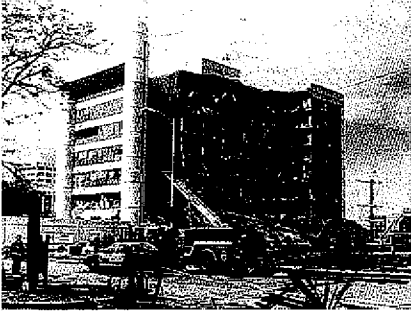
Our security and force protection design experience encompasses building types from high rise to low rise, and includes the analysis of stadiums and transit hubs. Within New York City we have met with the MTA regarding the force protection design of several transit hubs and rail yards, and with the NYPD as well. Before the project was terminated, we were involved in meetings with both of these agencies regarding the security of the West Side Stadium over the Hudson Rail Yards.

One of the world's leading engineering and design firms, Thornton Tomasetti is known for the creative and innovative design solutions. The firm is recognized worldwide for its practical approach to complex structural design concepts, particularly high-rise and long-span structures, and for its

Thornton Tomasetti

Building Vulnerability Assessment and Design

Page 2 of 2



Thornton Tomasetti was part of FEMA's Building Performance Assessment Team for blast analysis after the bombing of the Alfred P. Murrah Federal Office Building in Oklahoma City.



Thornton Tomasetti assessed the physical condition of the 90 West Street building, damaged as a result of the collapse of the World Trade Center, and developed an appropriate course of action to minimize future building deterioration.

multidisciplinary building investigations, failure and collapse analyses and detailed renovation and repair work, as well as its totally integrated, multidisciplinary A/E designs of nontraditional facilities.

Thornton Tomasetti has received international recognition for its emergency/disaster response efforts on conventional and unconventional threats and has consulted on some of the worst structural failures and construction accidents in the world.

Thornton Tomasetti has extensive experience in Forensic Engineering and Building Vulnerability, and the investigation, evaluation, and remediation of the built environment from exposure to natural, man-made, and technological hazards. With a staff of 500, offices around the country and affiliated offices internationally, our size and depth enable us to provide our clients with immediate access to a pool of experts, empowered to make key decisions regarding clients' particular needs and concerns, anywhere in the world.

Index No. 104597/07

SUPREME COURT OF THE STATE OF NEW YORK
COUNTY OF NEW YORK

In the Matter of

DEVELOP DON'T DESTROY (BROOKLYN),
INC., et al.,

Petitioners-Plaintiffs,

For a Judgment Pursuant to Article 78 of the CPLR
and Declaratory Judgment

- against -

URBAN DEVELOPMENT CORPORATION
d/b/a EMPIRE STATE DEVELOPMENT
CORPORATION, et al.,

Respondents-Defendants.

AFFIDAVIT OF JEFFREY D. VENTER

KRAMER LEVIN NAFTALIS & FRANKEL LLP
1177 Avenue of the Americas
New York, New York 10036
(212) 715-9100

FRIED, FRANK, HARRIS, SHRIVER & JACOBSON LLP
One New York Plaza
New York, New York 10004
(212) 859-8000

Attorneys For Forest City Ratner Companies, LLC

All communications should be referred to:
Jeffrey L. Braun