ANNUAL REPORT 2009–2010

Thornton Tomasetti Building Solutions

Thornton Tomasetti provides engineering services to clients worldwide on projects of all sizes and complexity, from the tallest towers and the longest spans, to innovative building systems and materials. Our three complementary practices in Building Structure, Building Skin and Building Performance serve the entire building life cycle for a wide range of clients including architects, building owners, developers, building managers and others who serve the construction industry.

Our 550 engineers, architects and support professionals are committed to creating the best solutions through our technical ingenuity, our pursuit of excellence, and by anticipating client needs.

Services

Building Structure

Buildings Supertall Buildings Long-Span Structures Special Structures Specialty Analysis Project Delivery

Building Skin

Building Skin Specialty Skin Analysis Skin Systems Special Skin Structures Innovative Skin Materials Skin Sustainability

Building Performance

Forensics Emergency Response Building Envelope Building Assessment & Renovation Seismic Assessment & Rehabilitation Property Loss Consulting Sustainability

Sectors

Aviation & Transportation Commercial Cultural & Institutional Education Government Healthcare Hospitality & Gaming Mixed Use Residential Special Structures Sports & Entertainment

Cover: Tower B of Federation Tower in Moscow began occupancy in early 2009 and is now partially occupied. The shorter of the two towers, it tops out at 250 meters (820 feet). Plans call for Tower A, at left, to become the tallest in Europe at 360 meters (1,181 feet).

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PRACTICE AREAS Our three practice areas provide complementary services through the entire building life cycle. Our expertise in structural design informs our approach to the interface of structure and skin, and helps us solve complex problems in skin design. Likewise, our knowledge of building performance, which includes forensic investigation, building envelope design, repair and rehabilitation, continually enhances the quality of our new designs, while our knowledge of structural systems and the construction process enables us to design practical and cost-effective repairs to existing structures.

Building Structure	▲ Building Skin	Building Performation		
		s	cural solutions to meet th bes and sizes – for new f ersions. We focus on ach	, owners and builders to design elegant e demands of challenging projects of acilities as well as for renovations and ieving the optimal balance of multiple edule, sustainability, constructability
		c s r	ntional curtain walls to a oint-supported and cable ture architectural statem ng structure and skin, co	ctural systems extends from pplications of innovative materials -supported glass, which can provide ents. Our pragmatic approach of mbined with the application of new rs designers valuable opportunities is.
		H a r r r	performance regarding m oise control, and new cha ction, and pre- and post- enance regimes, guide c	s have ever-increasing expectations for oisture management, thermal comfort allenges such as sustainability, force event evaluation. We recommend wners through expansions, adaptive airs, and provide expert witness

Chairman's Message

Thomas Z. Scarangello, P.E.

It would have been easy this year to let the Great Recession have a paralyzing effect. As credit tightened, many of our active projects froze in their tracks. New projects, starved of capital, sometimes stopped at concept development. High-rise projects settled for lesser heights, and ambitious plans often yielded to more modest ones.

As engineers, we were not spared our portion of pain. Yet we viewed this crisis as a terrible thing to waste.

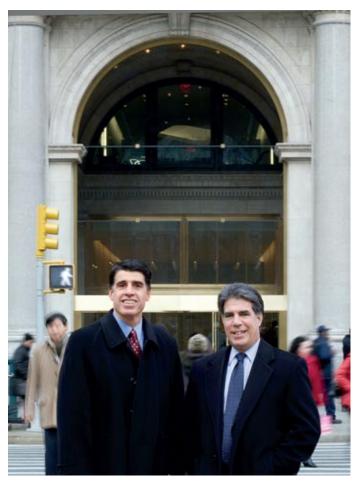
In February 2009, as the downturn took hold, our leadership invested in two days of shutting off their BlackBerries (well, almost) to look over the horizon and see where we need to be when economic recovery begins.

That strategic planning session produced Vision 2014, our five-year plan that calls for geographic expansion, broadening our service and practice offerings, and deepening our established expertise with strategic hiring.

For example, our offices in the United Arab Emirates, established in 2008, have brought us closer to our clients throughout the Middle East. We have expanded our operations in London and Shanghai, and we will soon be opening offices in Saudi Arabia and India.

A natural extension of our design services is our construction support services – assisting clients with steel and concrete detailing and erection engineering. As leaders in building information modeling, we continue to advocate for the benefits of sharing the model with the project team and making the model our deliverable.

Our Building Skin practice is winning enthusiastic support from clients, allowing us to bring our engineering expertise to bear on increasingly complex building skin designs, including modeling of nonlinear forms and forces and innovative applications of structural glass and ETFE, as well as conventional materials.



Tom Scarangello, left, and Dan Cuoco at 200 Fifth Avenue, New York (see page 15), a historic landmark building for which Thornton Tomasetti provided structural engineering, historic façade restoration, exterior wall consulting and engineering for the structural glass entrance.

The core skill we are now applying is our long-standing ability to build progressively upon our expertise. Forty years ago, when we designed our first high-rise, we were known as the guys who designed 13 pavilions at the 1964 World's Fair, and the innovative American Airlines hangars in California. After designing the structures for Petronas Towers, Taipei 101 and now Ping An Center (see page 13), we were known as the supertall firm. When we identified the cause of the Civic Center roof collapse in Hartford, Conn., or the collapse of the I-35 bridge in Minneapolis, we were more widely recognized as forensic experts. And based on our design of the new Meadowlands Stadium for the Jets and Giants (see page 19), Yankee Stadium and scores of other arenas and public assembly places, we assumed the mantle of being the sports guys.

Today we wear all these hats, bringing a mix of complementary skills and experience to every project.

The challenge in expansion is staying on our true path. Our new services, therefore, must always pass the "additive expertise test." We build on what we know, what we are good at and where we can clearly add value for our clients. As we realize Vision 2014, we'll continue to offer a greater diversity of services to more clients in more locations – grounded, as ever, in our enduring values of integrity and engineering excellence.

President & Chief Executive Officer's Message

Daniel A. Cuoco, P.E.

Despite the challenging economy in 2009, we continued to enhance and diversify our services, enabling us to end the year profitably and in a relatively strong position as the economic pendulum starts to swing upward.

Although credit markets remain tight, which constrains our clients' ability to finance their projects, our pragmatic creativity is helping our clients leverage the limited resources that they have available. We strive to continuously improve upon our core capabilities and maintain a high level of service to our clients, while preserving our fundamental values of integrity and technical excellence.

With increased competition for fewer projects in the marketplace, we have positioned ourselves to provide a greater diversity of services on the projects that we win, such as façade consulting, glass and specialty engineering, sustainability consulting and erection engineering. This has not only increased the scope of services that we provide to our clients, it has also helped differentiate us from the competition and enabled us to win more projects.

Our Property Loss Consulting services maintained impressive growth during the downturn, with our engineering expertise in demand by insurers, building owners and managers and legal counsel. We evaluate risk both before and after events like accidents, storms, earthquakes and fires (see page 13). Combined with our Building Performance practice, we are poised to respond to any emergency, anytime, anywhere. We have been able to cultivate opportunities in this challenging economic environment, from acquiring key high-level staff to establishing relationships with firms that will enable us to strengthen and further diversify our suite of services. Within our firm, we are proud of the future leaders we have recognized and supported through our leadership development programs.

We remain confident in our ability to make strategic investments to build our future. In February we acquired the 60-person San Francisco- and Oakland-based DASSE Design, which complemented our Southern California presence and increased our West Coast staff to 100 people. This strategic move gives us a solid foothold in the healthcare and education sectors in California, and we are leveraging this opportunity to expand into other market sectors in Northern California, as well as enhancing our global capabilities in healthcare and education.

I would like to acknowledge the many contributions of Joel Weinstein, a Managing Principal of Thornton Tomasetti, who will be retiring from the firm in 2010. Although Joel's accomplishments are too numerous to mention here, I cannot help but reflect upon his joining the firm in 1979, when he and I worked together on One Tampa City Center, which was our firm's first high-rise building and, upon completion in 1981, was Florida's tallest building. Joel will remain a close friend and a resource for the firm.

While many firms in our industry are in survival mode, we have remained nimble and flexible in adapting and responding to these changing times, and we will continue to plan strategically for the long term.



Transbay Transit Center

San Francisco, California

This new transit center, for which we are providing structural design services, is topped by a 5.4-acre public park and promises to centralize transportation for the region and transform the neighborhood of Mission and First streets. The objective of our performance-based design is for the structure to survive maximum earthquake shaking without major structural damage or significant loss of function. The center brings together nine transportation systems under one roof, including AC Transit, Caltrain, MUNI, Golden Gate Transit, Sam Trans, Greyhound, BART, WestCAT, and the future California High Speed Rail, which will connect San Francisco to Southern California.

Owner: Transbay Joint Powers Authority Architect: Pelli Clarke Pelli Architects Executive Architect: Adamson Associates Architects Completion Date: Phase I – 2014 Phase II – 2018

Aviation and Transportation

Anaheim Regional Transportation Intermodal Center (ARTIC), Phase One

Anaheim, California

We are providing structural design and façade consulting services for this iconic new transit center that will form a regional gateway to Orange County, and provide multimodal transit services for rail, bus and roadway. The program includes a 135,000square-foot terminal building with a Grand Hall, ticketing services and retail space beneath a soaring open lattice structure. A new bus station will be located beneath the Grand Hall, and provision will be made for future California High Speed Rail service. The transit center is being designed to achieve LEED Platinum certification.

Owners: City of Anaheim; Orange County Transit Authority (OCTA) Design Engineers and Architects: Parsons Brinckerhoff/HOK Architect: HOK

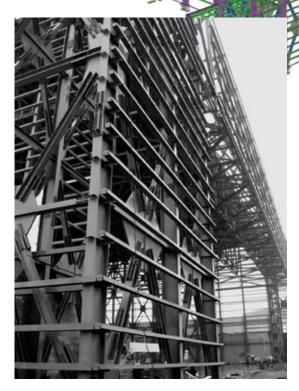
Estimated Completion Date: 2013



left, in Virginia (page 21). He is also working on several renovation projects at O'Hare International Airport in Chicago for both American Engineering in motion. In 2009, Thornton Tomasetti worked on more than 30 aviation and transportation projects. Rob Otani, Tom is principal in charge of structural design for ar Tennessee (page 6) and a helicopter maintenance hangar at Quantico Marine Corps Base Tom Poulos and Bruce Gibbons are members of our Aviation & Transportation design team. Bruce is principal in charge of the the escalator and moving walk replacements at LAX, and is Transbay Transit Center structural design (page 4). Anaheim Regional Transportation Intermodal Center (this page), Airlines and United Airlines, which include Terminals 1, 2 and 3. 4380 hangar for FedEx in Memphis, working with Rob on the

Building Structure	▲ Building Skin	Building Performance





FedEx Airbus Hangar Facility

Memphis, Tennessee

The new A380 hangar and support facilities at the FedEx's North American hub sit close to the New Madrid Fault Zone, the most active fault east of the Mississippi River. The hangar boasts a 400-foot main span, a 340-foot depth and 100 feet of clear height that accommodates four overhead bridge cranes with telescopic work platforms. The lateral force resisting system utilizes special concentrically braced frames, founded on ductile concrete moment frame foundations that efficiently resist seismic loads. The seismic loads are based on the 2003 International Building Code, which imposes standards twice that of the 1999 Southern Building Code.

Owner: Federal Express Architect: Ghafari Associates, LLC Completion Date: 2010

Aviation and Transportation

Building Structure A Building Skin Building Performance



Courtesy Rafael Viñoly Architect

Carrasco International Airport Roof

Montevideo, Uruguay

We worked closely with the architectural team to develop the structural design of the terminal's 1,000-foot curved steel truss roof for the largest airport in the country. The curved roof maintains a low profile on the landscape, helping its structure integrate into the surroundings. The roof has an irregular plan profile, with its width varying from 415 feet over the terminal building to 165 feet at either end. The 60-foot fully glazed curtain wall system extends from the base to the roof and wraps around the terminal building, creating transparency. The cantilevered roof design also brings natural light into the terminal and provides shade for the interior space. The three-story terminal opened in 2009 and is expected to serve up to 2.8 million passengers by 2010.

Owner: Puerta del Sur S.A. Architect: Rafael Viñoly Architects



Kaiser Permanente South San Francisco Cancer Treatment Center

South San Francisco, California

This 19,200-square-foot outpatient center opened its doors in May 2009. The facility features oncology vaults housing a CyberKnife and three linear accelerators, a CT scanner, a dosimetry area and 12 examination rooms. The structural design of the single-story building provides support and shielding for the leading-edge radiation oncology equipment, while admitting natural light into the treatment rooms and corridors. In addition to creating a more relaxing atmosphere for patients, extensive daylighting also contributes to the center's environmental sustainability. The center will serve as Kaiser's prototype for future cancer centers.

Owner: Kaiser Permanente Architect: Ratcliff Architects Completion Date: 2009

The University of Chicago, Gwen and Jules Knapp Center for Biomedical Discovery

Healthcare

Chicago, Illinois

Our collaborative approach yielded tangible benefits for the construction of this architecturally complex research facility. Upfront coordination on atypical elements – like the building's serrated west face, a feature that gives all offices a corner view – helped the design team meet an aggressive schedule. Our early involvement with the architect and exterior wall consultant streamlined the design process, and saved time and money during construction. To meet stringent motion-control requirements for modern lab equipment, we performed vibration modeling and worked closely with the project's vibration consultant to optimize performance while keeping material costs in check.

Owner: The University of Chicago Client/Architect: Zimmer Gunsul Frasca Architects LLP Completion Date: 2009

Building Structure

▲ Building Skin | ● Buildi

Building Performance



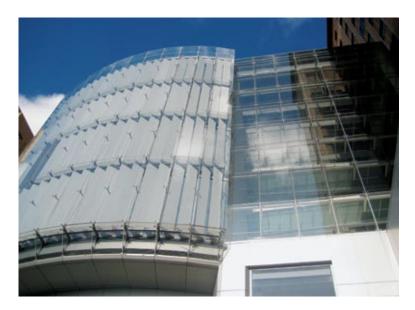


The Vivian and Seymour Milstein Family Heart Center

New York, New York

Thornton Tomasetti performed structural engineering services and design development for the signature specialty façade systems for this seven-level cardiovascular care center, constructed within a courtyard between two existing hospital buildings. The striking curved façade, a four-story, double-layer "climate wall" made entirely of glass (right), is supported by vertical tensioned cable trusses. A five-story atrium is enclosed by a glass wall using horizontal cable trusses that carry point-supported glazing and a glazed roof framed by architecturally-exposed steel plate beams. Three glass bridges link the new facility to the existing campus. The new space is designed around operating and procedure rooms, diagnostic facilities, catheterization laboratories, and an education and conference center.

Owner: New York Presbyterian Hospital Client/Architect: Pei Cobb Freed & Partners Completion Date: 2009





San Francisco (Free)bord of Health. Michael Hoppe, one of our engineers on the South San Francisco Cancer Treatment Center (page 8, bottom), keeps in shape by freebording. This up-and-coming sport is similar to skateboarding, but uses a six-wheeled board to simulate the sliding and edging action of a snowboard. Michael got hooked nine years ago as "a snowboarder looking to get that same fix in the summertime," he says. He also acts as an R&D consultant to a Bay Area manufacturer, a role that exercises his engineering skills. "We're working on some new wheels right now, and the board has gone through a °number of redesigns that I have been pretty involved in."



Christopher High School (Phase 1)

Gilroy, California

Christopher High School is a sustainable facility featuring state-of-theart learning spaces. Phase I of the new 161,000-square-foot campus includes four buildings housing classrooms, two gymnasiums, a theater and aquatic center, a kitchen and dining hall, and administrative and support services space. To provide the greatest level of security for students and staff, the structures are organized around a courtyard that serves as the social heart of the school. High-quality materials such as natural stone reflect the timeless architecture of the original Gilroy High School. The structures are steel braced frames clad with precast concrete panels. Long-span bowstring trusses form the gymnasium roof. The second phase of the project is scheduled for completion in 2011.

Architect: BCA Architects Completion Date: 2009

Building Structure A Building Skin

Building Performance

Saint Joseph's University Hagan Arena Expansion

Philadelphia, Pennsylvania

We performed structural design for additions and alterations to the existing field house at the Michael J. Hagan Arena for this Philadelphia university. The addition, called the Ramsey Basketball Center, includes coaches' offices, locker rooms and a Hall of Fame. The project also included removal of building end walls to increase seating capacity by 1,000 and the creation of a new concourse within the existing building.

Owner: Saint Joseph's University Client/Design Architect: Burt, Hill Architects Completion Date: 2009



Education

At the arena opening in October, from left, Thornton Tomasetti engineer David Kane with Bill Schaffer and Jeff Hunt of LF Driscoll, project construction manager.

Qatar Foundation Education City Northwestern College of Media and Communications

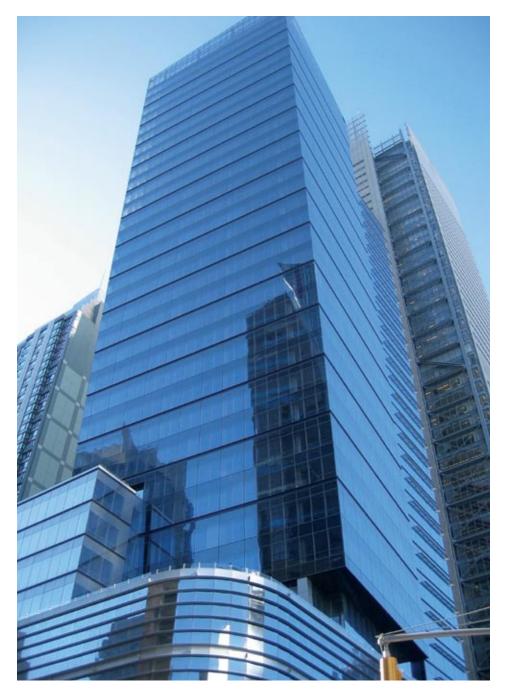
Doha, Qatar

Thornton Tomasetti is the structural engineer for the 25,000-square-meter (270,000-square-foot) Northwestern College of Media and Communications, located in the southeast quadrant of Education City. With a nonrepetitive column grid, nonconstant floor-to-floor heights and a variety of framing strategies for different combinations of spans and loads, the structure will require a wide range of materials and framing techniques, including concrete flat slabs, post-tensioned beams and slabs, sloping concrete columns, composite steel beams and possibly a glass roof with an exposed steel frame. Qatar's extreme temperature range and high water table also provide a challenge; however, the most demanding aspect of the structure will be the multistory cantilevered "beak" at the building's entrance.

Client/Architect: Antoine Predock Architect PC Executive Architect: Burns & McDonnell Completion Date: 2012



Commercial



11 Times Square

New York, New York

With a sloping glass façade and sculptural setbacks, 11 Times Square stands out aesthetically and is designed to perform as well as it looks – the 38-story office building is pursuing LEED Gold certification. The 975,000-square-foot tower was built with a spectrally-selective, Low-E glass curtain wall, exterior sunshades and a floor plan that allows extensive interior daylighting. The structure was also the first "core first" tower in New York City. Climbing "jump forms" were used to construct the concrete core ahead of the steel floor framing, which allowed for an efficient and well-organized structural design and faster construction.

Owner: SJP Properties Client/Architect: FXFowle Architects, P.C. Completion Date: 2009

Patrick Cudahy, Inc. Plant Fire Response and Recovery •

Cudahy, Wisconsin

A multidisciplinary team of structural, architectural and mechanical, electrical and plumbing (MEP) professionals evaluated damage at a 1.2-million-square-foot foodprocessing plant after a fire at the 120-year-old facility. Working for a consortium of insurance companies, we determined the scope of the damage to several buildings. Our Building Performance specialists coordinated the investigation, including material testing, and worked with consultants to evaluate process equipment and MEP components throughout the facility. We also developed schematic design drawings, specifications and a bid package to assist our client in developing a cost estimate for repairs to return the facility to full functionality.

Client: A consortium of insurance companies **Completion Date:** 2009



Rachel Autenrieth, senior engineer (left) and Abbes Yala, senior associate (center) contributed to the investigation.



Ping An International Finance Center ■ Shenzhen, PRC

Our engineering team, led by Managing Principal Dennis Poon, is using Performance Based Design (PBD) methodologies to design this new office tower, set to be the tallest in China at 648 meters. Because supertall structures behave differently than the shorter buildings that are the basis for standard building codes, PBD - where advanced analysis technology allows engineers to design a structure according to how it reacts to various conditions - allows our designers to create buildings that maximize both safety and efficiency. The selected structural system consists of a concrete core with steel outriggers connecting to eight super-columns. The project also includes an 11-story steel-framed podium with high-end shopping arcades, restaurants and rooftop cafés.

Owner: Ping An Life Insurance Company of China, Ltd. Client/Architect: Kohn Pedersen Fox Associates Completion Date: 2014

Building Structure 🛛 🔺 Building Skin 🗍 🔵 Building Performance

Federation of Korean Industries Headquarters Building

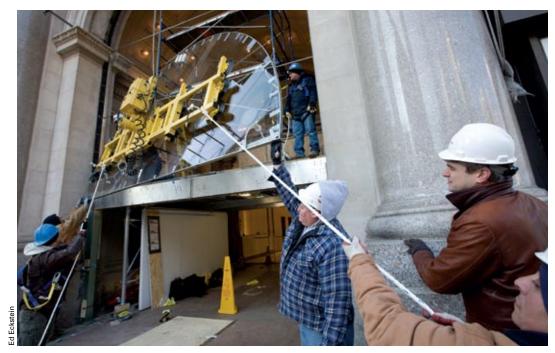
Seoul, Korea

Thornton Tomasetti performed schematic design for a 245-meter commercial tower. Our team, using Revit and Tekla software platforms, designed a structural system consisting of a reinforced concrete core with steel outrigger trusses and perimeter steel belt trusses. Spandrel panels on all floors support building-integrated photovoltaic panels that will reduce the tower's energy footprint. An adjacent three-level conference center will occupy an ornamental egg-shaped structure. Our Building Skin experts engineered and detailed its glazing system using Gehry Technologies' Digital Project. The team employed parametric modeling to develop a rationalized geometry for attaching panels to the curved exterior.

Owner: Federation of Korean Industries (FKI) Architect: Adrian Smith + Gordon Gill Architecture Completion Date: 2013 Local Structural Engineer: DongYang



Commercial



200 Fifth Avenue

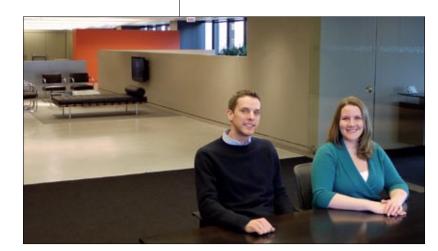
New York, New York

All three of our practice areas – Building Structure, Building Skin and Building Performance – were brought to bear in restoring and transforming this 750,000-square-foot, 14-story commercial property in Manhattan's historic Flatiron District. Here, Thornton Tomasetti Building Skin designer Will Laufs (right, brown jacket) observes the glass entry installation. We provided structural engineering, historic façade restoration, exterior wall consulting for a new glass curtain wall, and façade engineering for the structural glass entrance and canopy. Structural alterations included widening the existing courtyard at the lower floors to create a dramatic three-story lobby space. We also enclosed elevator lobbies in a structurally glazed façade with terra cotta louvers that overlook the courtyard. Our work introduced many sustainable design features to the 1912 structure, including a light-filled vertical garden in the courtyard that will provide insulation, conserve energy and reduce storm water runoff. As well, many building materials and components were locally manufactured and pre-assembled. This project is seeking LEED Gold certification.

Owner: L&L Holding Company Architect: Studios Architecture Completion Date: 2009

Building Structure A Building Skin Building Skin

Building Performance



LEED Gold, Chicago. When our Chicago office relocated, we drew on our in-house LEED consulting capabilities to achieve LEED Gold for Commercial Interiors rating. Three of our more than 180 LEED Accredited Professionals managed the certification process, earning a total of 37 points. "The threshold for gold is 32 points, and we purposely aimed above that," says Rachel Michelin (right), a senior engineer in Chicago, who worked with engineer Matthew Huizinga (left) and Director of Sustainability Wolfgang Werner to administer the project. LEED-Cl recognizes high-performance green workspaces that are healthful, productive places to work, less costly to operate and have a reduced environmental footprint.

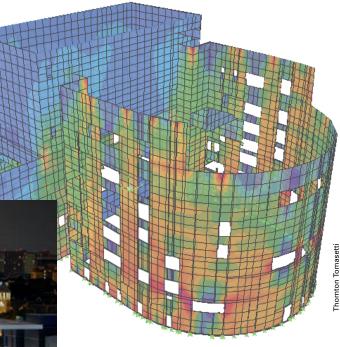
Margot and Bill Winspear Opera House

Dallas, Texas 🗖 🔺

The centerpiece of the new Dallas Arts District, this 2,200seat opera house is a classic horseshoe design, with 60-foot glass walls framed in steel and a 2,000-square-foot section that can be raised to create an indoor-outdoor walk-through. We served as engineer of record, collaborating with Buro Happold, and as curtain wall consultant. A 2.7-acre canopy supported on a grid of slender steel columns extends from the building, providing shelter for a public plaza. The canopy consists of thin louvers to block daylight while allowing views of the sky. The stress diagram (right), in which red denotes high stress, was used to design the concrete wall reinforcing.

Owner/Client: Dallas Center for the Performing Arts Design Architect: Foster + Partners Architect of Record: Kendall/Heaton Associates, Inc. Completion Date: 2009





Cultural and Institutional



Waddesdon Windmill Hill Archive Study Centre

Aylesbury, United Kingdom

We are providing structural engineering design for this development at a 19th century Rothschild estate. The project includes converting existing farm buildings and constructing new buildings for archive storage, conference facilities, and support for academic research and outreach programs at Waddesdon Manor.

The focal point of the 13,000-square-foot project is the reading room that provides study and conference space. Its signature structural feature is the stressed-skin timber truss roof, designed to create element-free ceiling space. Oak veneer glue-laminated members are used throughout to give a "furniture grade" finish. The archives buildings are designed as thermally massive "box within a box" structures to minimize heating requirements.

Owner: The Waddesdon Estate Architect: Stephen Marshall Architects LLP Completion: 2010

Building Structure A Building Skin Building Performance

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Statute of Concession, Name

Wild Beast Music Pavilion at California Institute of the Arts (CalArts)

Valencia, California

Thornton Tomasetti provided structural design services for this unique music pavilion on the CalArts campus. The 3,200-square-foot, single-story structure houses classrooms, performance space and storage areas, and features 20-foot-tall, 46-foot-wide hangar doors that open to transform the 100-seat indoor space into a 500-seat outdoor amphitheater. We collaborated closely with the architect to develop a special roof framing system that expresses the structural steel members and details, and allows the floating acoustical enclosure to be exceptionally thin. Four parallel arched flange sections achieve a 60-foot roof span. Frame action is utilized where the roof is curved, transitioning to composite action where the roof flattens out. The pavilion's slender form is clearly seen in the structural steel members and their connections, which are expressed both internally and externally.

Owner: California Institute of the Arts **Architect:** Hodgetts + Fung Design and Architecture **Completion Date:** 2009

Design-Build

Defense Information Systems Agency (DISA) Headquarters Facility

Fort Meade, Maryland

This \$390-million project, with an award-to-open schedule of just 29 months, will provide a LEED Silver-certified administrative complex with six interconnected buildings totaling 1,070,000 square feet. To meet the fast-track schedule – mandated by the 2005 Base Realignment and Closure Act – all members of the design team produced the project in Autodesk Revit, creating a consolidated model that improved coordination and allowed for early mill orders. The project's final deliverable will be a complete Building Information Model (BIM) for use in building operations and maintenance. Thornton Tomasetti also provided steel connection design and detailing services under a separate contract with the steel fabricator.

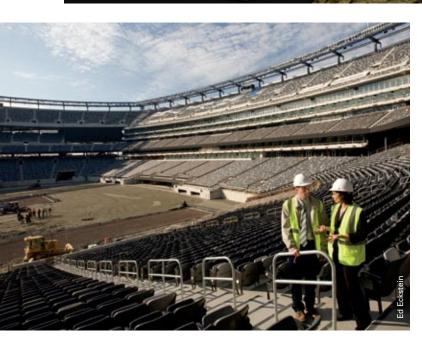
Owner: U.S. Army Corps of Engineers, Baltimore District **Client:** Hensel Phelps Construction Company and RTKL **Completion Date:** 2011



Forensic Information Modeling. Efe Karanci (left)and Elisabeth Malsch developed the forensic information model to better understand how a dumpster, which fell from the 53rd floor, damaged windows and a crane tie-back at One Bryant Park in New York. Our Building Performance team conducted the analysis for an insurance client. The model (far right) shows the debris field in gray, which widens where the dumpster hit the crane tie-back at the 16th floor. Green denotes damaged panels covered by insurance, yellow denotes where no glass was installed at the time of the accident and magenta shows damaged panels that required further investigation.







New Meadowlands Stadium

East Rutherford, New Jersey

Anjana Kadakia and Ron Garon (below left) were part of the Thornton Tomasetti team that engineered the structure of the 82,500-seat stadium, built to host the NFL's Jets and Giants franchises. The stadium opens in April 2010, concluding a fast-track design-build effort. Our collaborative approach and innovative use of BIM technologies helped to make this technically complex \$1.6-billion project a success. We delivered our Tekla-based BIM (above) to the fabricator, where it was used to generate early mill orders and create shop drawings. The Tekla model also clarified contractor responsibilities and improved coordination between the structural steel and other project systems, virtually eliminating field issues caused by unforeseen clashes, and drastically improving the schedule.

Owners: New York Jets and New York Football Giants Client: New Meadowlands Stadium LLC Design-Build Team: Skanska USA, 360 Architecture Inc., EwingCole Completion Date: 2010

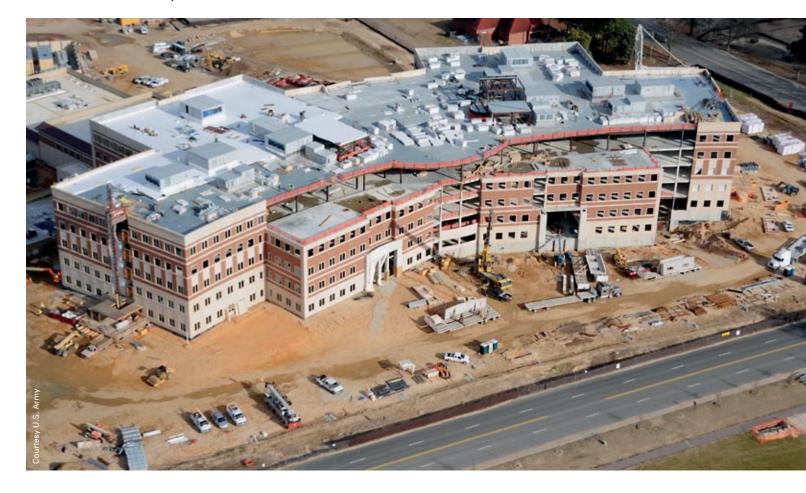
Building Structure A Building Skin Building Performance

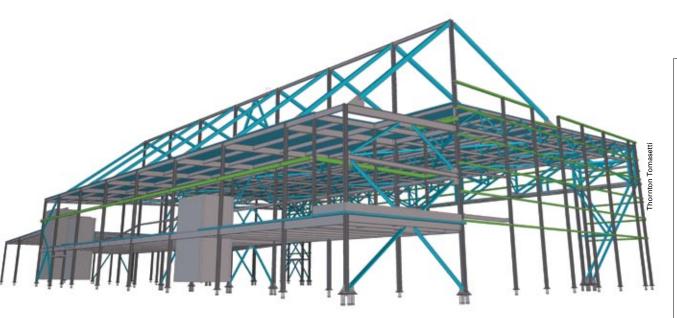
Army Forces Command (FORSCOM) and Army Reserve Command (USARC) Combined Headquarters

Fort Bragg, North Carolina

Our engineers took full advantage of the collaboration and flexibility offered by design-build delivery to streamline design for this new 700,000-square-foot, six-building complex. We teamed directly with the fabricator to accelerate steel procurement and worked closely with the precast supplier to develop a self-supporting façade system that decreased loads on the steel frame, reducing total steel tonnage. The complex – designated an essential facility – had to meet rigorous seismic requirements and strict force protection criteria. We performed a thermal analysis that determined that the 500-foot-long structure could be built without expansion joints, improving progressive collapse avoidance performance while simplifying construction detailing for multiple trades.

Owner: U.S. Army Corps of Engineers, Savannah District Lead Architect: Fentress Architects Associate Architect: Giuliani & Associates Architects Contractor: Hensel Phelps Construction Company Steel Design-Builder: SteelFab, Inc. Completion Date: 2011

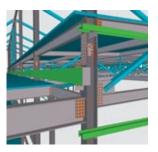




Quantico Marine Corps Base Greenside Hangar Complex

Quantico, Virginia

Thornton Tomasetti is expanding the traditional role of consulting engineers in our work on this \$27.8million design-build aviation complex. In addition to being structural engineer of record, we provided steel connection design and complete fabrication details for the 60,000-square-foot long-span structure. Our team created an integrated Tekla model to create both design drawings and structural steel fabrication drawings. Combining our construction support services and BIM capabilities with structural design streamlines project delivery by integrating construction thought processes into the design phase and resolves constructability conflicts in the office instead of in the field.



Owner: U.S. Marine Corps Project Manager: NAVFAC Washington Client: The Walsh Group (contractor), R.W. Armstrong (design manager), Rink Design Partnership (architect) Completion Date: 2011

Design-Build

Building Structure

▲ Building Skin | ● Building Performance



Outstanding Young Engineer. The Structural Engineers Association of Illinois (SEAOI) named Robert Stadler 2009's Outstanding Young for a young engineer. A licensed Professional Engineer and Structural Engineer, he has lectured at SEAOI Student Chapters and has been This award was a huge honor and I'm humbled to have been Engineer. Stadler, a senior associate and Greenside Hangar design team member, was recognized for surpassing typical expectations chosen," says Stadler, whose work also spans the residential, office, healthcare and education market sectors."I look forward to my continued involvement in some of the world's most interesting structures. a panelist on and written about seismic design and stadium renovations.

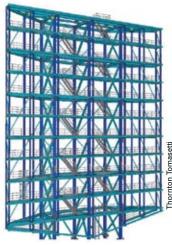


Kauffman Stadium Renovation and Improvements

Kansas City, Missouri

When the Kansas City Royals needed to update their 36-year-old ballpark, our engineers took to the field to perform a comprehensive condition assessment. We provided engineering design, construction support and full-time site observation services for a \$250-million face-lift to improve amenities and upgrade the concrete structure to last another 30 years. The renovation increased seating capacity, widened concourses, and expanded concessions, dining facilities and restrooms. The stadium gained a 360° outfield concourse and a new glass-walled administrative building. The project also included design and full detailing for the steel structure of a 140-foot-tall scoreboard (right) - the largest in Major League Baseball.

Owner: Jackson County Sports Complex Authority Architect: Populous Completion Date: 2009





Thornton Tomasetti

Our Revit model (above) was used to help plan and monitor the demolition sequence for the old Yankee Stadium.

Senior engineer Luis Valderruten (right) on-site at the old Yankee Stadium to verify that demolition work is carried out according to plan.



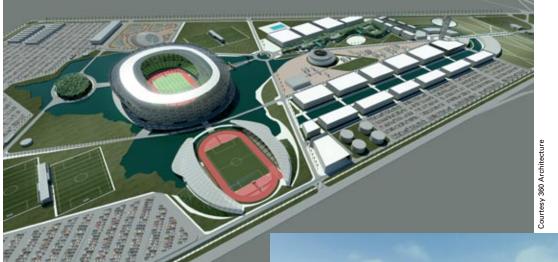
Old Yankee Stadium Deconstruction

Bronx, New York

Thornton Tomasetti drew upon an array of services and resources to devise a safe and environmentally responsible plan to dismantle this iconic ballpark. We prepared performance and planning documents for the engineered deconstruction and helped the team navigate a complicated New york City agency review and permitting process. We also provided construction support, assisting in the development of feasible approaches and submitting a general sequence plan for the work. Our 3-D Revit model aided analysis and visualization of multiple options. Continuing on-site responsibilities include field observation, as-needed engineering consulting, analysis of the deconstruction process, and assessment of the work's quality and timeliness for NYCEDC.

Owner: New York City Economic Development Corp. (NYCEDC) Client: Stantec Consulting Construction Manager: Turner Construction Completion Date: 2010

Sports and Entertainment



Basrah Sports City

Basrah, Iraq

Thornton Tomasetti mobilized an international team to design a \$500 million multipurpose sports complex that will host the Gulf Cup in 2013. Phase one of this fast-track, design-build contract to construct two soccer stadiums and associated structures is a collaborative effort involving our teams in Kansas City, New York, London and Abu Dhabi. This approach takes maximum advantage of the firm's expertise in sports design, BIM, building skin and use of innovative materials, and allows us to be responsive to the Iraq-based contractor around the clock. Our team is proud to bring new technologies and industry best practices from around the world to this developing region.

Owner: Iraq Ministry of Youth and Sport Lead Architect: 360 Architecture General Contractor: Abdullah A. Al-Jiburi Contracting Co.

Completion Date: 2013 Seating Capacity: Main Stadium: 65,000 Secondary Stadium: 10,000

Building Structure	Building Skin	Building Performance
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7-9 East 72nd Street •

New York, New York

Thornton Tomasetti's structural and exterior building envelope design teams are leading a comprehensive historic restoration and conservation campaign for the stone and brick façades, decorative iron and copper work, and slate roofs of two townhouses being converted into a single-family dwelling. Unique aspects of the program include excavation for an indoor pool, adding/modifying three passenger elevators, and restoring the slate roofs while preserving the ornate copper work. Wooden windows are being replaced with insulated custom units matching the originals. All work was approved by the city's Landmarks Preservation Commission.

Architect: RBSD Architects Completion Date: 2010

Residential and Mixed Use

■ Building Structure ▲ Building Skin ● Building Performance

Mentoring the next generation. Senior Associate Sergio Londono's diverse engineering background, which includes new design as well as structural design in support of historic preservation work at 7-9 East 72nd Street (above), equips him to cover a wide range of topics with ACE Mentor students from high schools in the Newark, New Jersey area. Here, Sergio and Senior Engineer Dave Fusco (seated) host a group of students learning about the tools used in structural design during a tour of our Newark office.





Shanghai Taipingqiao Lot 126 and 127 Development

Shanghai, China

Construction is under way on this 214,000-square-meter (2.3 million-squarefoot) commercial development, for which we are providing structural engineering services. The development comprises two 133-meter (436-foot) office buildings, two three-story retail podiums featuring green roofs, and a 54-meter (177-foot) pedestrian bridge. Two three-story tension cable curtain walls at the main entrance are supported by perimeter moment frames at both lots 126 and 127. The 27-story structure has a concrete shear wall core and perimeter moment frames. The development will seek LEED certification.

Client/Architect: Kohn Pedersen Fox Associates PC Architect of Record: Eastern China Architectural Design Institute Completion Date: 2013



2200 Pennsylvania Avenue A Washington, D.C.

Thornton Tomasetti is providing structural and building skin design for a mixed-use town center development at Square 54 that will include residential, office, garage and retail components. The 1.4-millionsquare-foot complex is being designed to meet LEED Silver sustainability criteria.

The 12-story structures will be built over six levels of below-grade parking and contain 29,483 square feet of retail. Located near the Foggy Bottom Metro station, the project involves coordination with transit officials.

Our building skin design encompasses two structural-glass vestibules enclosing an atrium that leads from the street to the courtyard garden. Stainless steel tension rods tie together point-supported glass panels held in custom-designed spider clamps.

Commercial Developer: Boston Properties, Inc. Design Architect: Pelli Clarke Pelli Architects Executive Architect: Hickok Cole Architects Completion Date: 2011

Residential and Mixed Use



443 Greenwich Street

New York, New York

For the adaptive reuse of this historic building in TriBeCa we are providing facade engineering, design coordination and documents for glass and steel specialty structures. The 215,000-square-foot building is being converted into a residential condominium and boutique hotel with a health spa, restaurants and retail. Highlighting the courtyard is an elliptical, walkable skylight over a swimming pool (below left). The 15- by 25-foot insulating laminated glass skylight is supported by an efficient, two-way tensegrity structure consisting of thin stainless steel rods spanning an outer elliptical compression ring. Two 107-foot-high all-glass enclosed exterior staircases provide access to the courtyard level. The project is seeking LEED certification.

Owner/Client: KAR Properties Architect: Costas Kondylis and Partners LLP Completion Date: 2010



Building Structure

Building Skin Building Performance

New Ring of Moscow

Moscow, Russia

Thornton Tomasetti is participating in the 15-year, 80-million-square-foot multi-functional residential development called New Ring of Moscow, undertaken by the City of Moscow to replace residential structures built in the 1950s and 1960s. We are providing complete structural engineering services for three projects totaling 5 million square feet (464,000 square meters), including project phase (schematic design and design development) and working documents phase (construction documents and shop drawings). Since the main construction material is high-strength reinforced concrete, we are using 3-D Advanced Concrete software to accelerate the working documents phase.

Owner: New Ring of Moscow/Moscapstroy Client/Project Manager: Interstroi Architect: Swanke Hayden Connell Architects



development at 2200 Pennsylvania

also supporting my

coworkers

to have my

fantastic

"When I found a new band after moving to D.C.,

eally made me feel welcome.

nusic, " he says. red

vears in Chicago.

three . (page 26, after

Avenue in Washington,

our

transfer

a number of colleagues came out to shows and that

top), Lee Fritz applies his mathematical chops to keeping time as a drummer. Lee

Music is also math. When he's not working on the structural design of the massive

At the GSA Headquarters, steel pipe truss-frames will support the glass façades of two new courtyard infill structures. 2

E DE

Courtesy Shalom Baranes Associates

Morgan Hill Courthouse

Morgan Hill, California

The project consists of a new courthouse and a new justice agencies office building totaling 79,000 square feet. The courthouse is a steel-framed two-story structure with partial basement, a secure bus sally port and a central day holding facility. There are six courtroom suites, a court clerk's office, jury assembly and deliberation rooms, and sheriff's department court security offices. The single-story, steel-framed justice agencies building houses offices for the district attorney and public defender.

Architect: Ross Drulis Cusenbery Architects Completion Date: 2009



General Services Administration Headquarters Modernization

Washington, D.C.

We are providing structural design services for a comprehensive renovation of an existing 665,000-square-foot structure and the addition of 134,000 square feet of new office space in the 1917 building's courtyards. The modernization will replace all building systems, modify the structure to comply with Americans with Disabilities Act regulations, and improve its environmental performance. In 2009, the renovation design was revised to incorporate additional sustainability features, including structural support for photovoltaic roof panels and a wastewater retention system. The project is pursuing LEED Gold certification.

Owner: General Services Administration Architect: Shalom Baranes Associates Estimated Completion Date: 2016



Government

Thornton Tomasetti Foundation

www.ThorntonTomasettiFoundation.org

Thornton Tomasetti Foundation Mission

Fund fellowships, scholarships and internships for undergraduate students, and those planning to pursue graduate studies in building engineering, design or technology.

Provide financial support for individuals and organizations pursuing philanthropic activities related to building engineering, design or technology.

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Highlights of commitments in 2009 include:

- Sponsorship for the exhibition at the Guggenheim Museum in New York of "Frank Lloyd Wright: From Within Outward."
- Scholarships for two NYU/Poly engineering undergraduates, Yasmina Khan and Sebastian Sztukowski, who plan to pursue careers in the design professions (page 31, bottom).
- A three-year program to support a pioneering engineering senior thesis program for Integrated Project Delivery (IPD) at Penn State University (below).
- Support for Duke University engineering students in their design and construction of a bridge near Obrajes, Bolivia to help transport people, crops and livestock from the rural communities of the Iruma River valley (right).
- In collaboration with Engineers Without Borders, we cosponsored with Cal Poly support for Cal Poly engineering students in their design and construction of a health clinic in Barrio Camilo Ortega, Nicaragua.



Our support of the engineering senior thesis program at Penn State University included a tour for Penn State students of the Thornton Tomasetti-engineered New York Times Building.

Courtesy Duke University

Our support helped Duke University engineering students design and begin construction of this bridge in the village of Obrajes, Bolivia, which will help farmers transport crops to market. Previously, farmers had to ford a river, which was impassable during the rainy season. Duke students worked in the field in the summer, completing the foundations and pouring lifts for the piers. A team composed of villagers and a local engineering group completed the bridge.





A blessing ceremony in January for the new bridge that our grant helped design and construct near Obrajes, Bolivia.



NYU/Poly students Sebastian Sztukowski and Yasmina Khan

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