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Updates & Information from Klepper, Hahn & Hyatt

Local Landmarks Benefit from Building Envelope Expertise

Richard L. Applebaum, P.E., SECB, is the Principal-in-Charge of the KHH Building Envelope Systems Division, and manages the masonry and facade projects. Toby Nadel, A.I.A., is the BES Division Manager and directs the roofing projects. Between them, they have more than 80 years of project experience.

What do a 119-year-old College of Fine Arts, a 100-year-old Court House, and a 75-year-old Art Deco office building have in common?



The 1907 Onondaga County Court House

These structures are three of the most widely-recognized landmarks in Syracuse, New York, and all are benefitting from the expert knowledge of historic building envelopes provided by Klepper, Hahn & Hyatt.

Syracuse University's Crouse College of Fine Arts underwent a three-year project to restore the masonry facade, stained glass and double-hung windows, and the copper gutter system. KHH joined with the notable architecture firm of Mesick Cohen Wilson Baker, of Albany, for the gutter restoration. The facade restoration was completed in 2003, helping to preserve the 1888 brownstone building from deterioration. The project

earned an award for masonry restoration from the American Concrete Institute's Central New York chapter. Interior repairs included reinforcing one of the fabulous timber trusses in the auditorium (which are actually tied rafters referred to as Queen-Post Braced-Rafter Frames) and restoration of the wood spiral stair leading to the auditorium. Reinforcing was accomplished using steel plating that is in plain sight yet invisible to the eye.

Now the focus is on two significant downtown buildings: the 1907 Onondaga County Court House, and the National Grid "NiMo Building," constructed in 1932. For all three projects, KHH has teamed with the local firm of Crawford & Stearns, Architects and Preservation Planners. The court house project also involved the design skills of Bell & Spina Architects, who assisted with the flat

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The NiMo Building, constructed in 1932



Special Inspections Improve the Quality of Masonry Construction

James A. D'Aloisio, P.E., SECB, LEED-AP, is a Principal of Klepper, Hahn & Hyatt, and a USGBC LEED® Accredited Professional. He has 25 years of engineering experience, 20 of them with KHH.

The KHH Inspection Services Division Manager, Robert J. Larosche, P.E., SECB, has more than 20 years of experience in the design and construction of concrete, masonry and steel buildings. An Associate at Klepper, Hahn & Hyatt, he is responsible for project engineering and management of a variety of educational, institutional and industrial projects.

As a provider of construction inspection services through our KHH Inspection Services Division, we have recently seen indications that reinforced masonry Special Inspections are working. We haven't lately had to cut open, repair, or demolish any masonry walls that have been questionably built. Having a qualified inspector present, and in communication with the contractors from the beginning, eliminates the likelihood of this unfortunate scenario.

Although area masons in general are skilled and experienced, and the materials are good, lack of any jobsite feedback over the years on structurally important quality issues has led them to follow practices that are not always in accordance with Building Code requirements.

The aspects of reinforced masonry that most frequently require our intervention are:

- **Excessive grout pour heights**
Low-lift grout pours can be up to five feet high. High lift grouting, which requires cleanouts in the face shells at the base, can be up to 24 feet high, but may be limited by grout penetration, bar length and tie spacing, and length of the vibrator.
- **Inadequate positioning of vertical reinforcing bars**
We specify bars be secured at least 200 bar diameters on center, and at splices. This means that for low-lift grouting, vertical bar positioners into which the bars can be threaded down after erection and PRIOR to grout placement, can be no more than 4'-8" on center. With high-lift grouting, the long bars can be inserted after wall erection and tied at the cleanouts at the base of each pour. In all cases, the

splice length of the bar should extend above the top of the grout pour.



Threading rebar positioners for low-lift grouting

- **Improper preparation of grout cavities**
No interior mortar fins can extend more than one-half inch into a grouted cavity. Larger fins can be knocked off with a bar, but must be cleaned out of the cavity prior to grouting. There needs to be adequate space for the grout (based on American Concrete Institute requirements), as well as a pencil vibrator. For high-lift grouting, cleanouts must be provided at the base of the pour that are adequate to remove the debris from all of the grouted cores.
- **Inadequate consolidation of grout**
All grout lifts higher than 12 inches must be consolidated during placement with a vibrator, extending down the full height of the pour, and reconsolidated after each lift. High-lift grouting must be done in six-foot lifts, consolidated and reconsolidated 5 to 10 minutes after placement, with a final topping-off of the last lift of grout, to account for settlement.
- **Excessively stiff grout**
Frequently, 28-day cylinder break strengths are submitted as if they were



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concrete, with water reducers to achieve a high slump while minimizing water to assist with strength gain. But grout is not concrete: much of the water in the mix is absorbed by the masonry units prior to hydration, so concrete cylinder tests are not appropriate. In fact, grout specified by the Proportion method in ACIC 476 need only comply with the proportion limitations - no further strength information is needed. And high water/cementitious

ratios (which can include fly ash) are not a problem for grout, which needs a slump of 8 to 10 inches for proper flow.

Reviewing these and other issues at a pre-installation meeting allows the contractor to develop an acceptable work plan with no surprises during production. Feedback from the inspector during construction helps to ensure structurally acceptable work and to keep construction flowing smoothly - like grout.

-James A. D'Aloisio, P.E. SECB, LEED-AP

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roof design and detailing. This project is completing its first year of construction, while the NiMo Building is at the start of design.

The Onondaga County Court House

Like Crouse College, the Onondaga County Court House was designed by renowned architect Archimedes Russell. The Court House, which opened January 1, 1907, was unique for the incorporation of a built-in vacuum sweeping system, concealed wiring and telephone lines, and five hydraulic elevators. The building was listed on the National Register of Historic Places in 1980 as part of the Montgomery Street-Columbus Circle Historic District.



While the Board of Directors originally wanted to clad the building in granite, replicating the appearance of the Albany Capitol building, they compromised for the sake of economy. The upper portion of the building is sheathed in Indiana Buff Ooletic limestone from Bedford, Indiana. Limestone could be cut and carved by machine without handwork. More expensive Gray Granite was used for the base, entry stairs and platforms.

Roofing elements are varied and unique. They consist of copper-clad domes of

The "Spirit of Light" graces the south facade of the NiMo Building.

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Workshops Provide Hands-On Experience



Jamie Trevvett, left, practices an application of torch applied roofing during the Roofing Workshop at the Henderson Johnson facility on Canal Street in Syracuse. Watching him at right is Richard Colson, a project manager at Bell & Spina Architects. Below, Janice Medina, Jamie Trevvett and Neil Garry, P.E., apply liquid roofing onto reinforcing felts on a roofing mockup.

Staff members from Klepper, Hahn & Hyatt participated in two workshops associated with the Onondaga County Court House project, gaining some hands-on experience during the day-long lectures and demonstrations.

A Masonry Workshop sponsored by Driscoll Masonry taught both designers and masons how to properly install natural cement. Ken Uracius of Masonry Restoration in Holden, Massachusetts, conducted the workshop. As part of their understanding of natural cement, which is a softer mortar, participants learned about natural cement products, their history and the process to develop them, and their uses and applications. They mixed burnt lime, called quick lime, in test dishes to make lime putty, experimenting with its properties and consistency, and then used some of it to point a masonry wall.



A Roofing Workshop held at Henderson Johnson Company was co-sponsored by Soprema, a roofing manufacturer, and CNA Associates. Participants learned about both liquid applied roofing and torch applied (modified bitumen) roofing, working on test applications of each type to experience working with the product.



Janice Medina, left, shows an area of wall to which she applied mortar during the Masonry Workshop in Skaneateles Falls. Rich Applebaum, right, carefully practices his pointing skills with the natural cement.



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diverse sizes, arched clay tile roofs and low-sloped asphaltic roofs. The building was re-roofed in 1956 and again in 1980.

KHH principal Richard L. Applebaum, P.E., enlisted the services of Dr. Marion E. Bickford, a research professor in Syracuse University's Department of Earth Sciences, to help determine the cause(s) for the



The main dome and satellite domes of the Onondaga County Court House prior to the start of roofing work.

exfoliation of the granite base. The ensuing geologist's report showed that the original machining and cutting of the granite resulted in stresses to the stone that have been aggravated by a century of environmental influences. This determination assisted in the selection of the best methods of repair.

Painstaking preparation of the building elevations will help to assure that the work performed can be documented accurately, said Mr. Applebaum. Meticulous tracing over the original elevation drawings, as well as thorough photo documentation, combined to accurately portray the facade details for CAD elevations.

Experience with historic structures has led Mr. Applebaum to elect some specific remediation processes for the Court House. One is the

choice of Rosendale Natural Cement for the ledges and water tables of the granite base.

"We are using natural cement due to its ability to withstand exposure to wet environments over long periods of time," said Mr. Applebaum. "This is the same type of mortar which was used for the Erie Canal."

KHH is also employing novel detailing to extend the life of horizontal skyfacing stone joints. Those joints "have a very short life expectancy before they begin to leak," said Mr. Applebaum. "We will, for instance, use a liquid roofing to protect those joints where they are not visible from the ground," since liquid roofing does not match the building facade in color.

"At the ground level, we will use caulked joints with rope weeps below. The idea is to evacuate the moisture as quickly as possible once the caulking fails." Moisture infiltration is one of the principle causes of building facade failures.

The roofing restoration presents some singular challenges in the variability and types of roofing, according to Toby Nadel, A.I.A. Mr. Nadel is the manager of the KHH Building Envelope Systems Division and has decades of roofing experience. The Court House roof consists of four elevator towers, five copper domes (one large central dome and four smaller satellite domes) and two "very unusual" clay tile domes.

"The copper is the most visually significant element," Mr. Nadel said. "Most roofs nobody ever sees; this one is highly visible."

A number of roof areas have "significant deterioration," he said, but he pointed out that all of the original materials will be replaced.



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After all, they have lasted 100 years.

The cupola has been removed from the main dome, and the domes have been cloaked in a self-adhering membrane that is considered a full roof in itself. The membrane protects the dome elements for the duration until the building is re-clad in copper.

A brief search uncovered the original molds for the clay tile roofing, which were manufactured by Ludowici-Celadon, originally of Alfred, New York, now located in Chicago. The tiles will be re-manufactured for the new roof application.

Due to the antiquity of the copper dome on the Court House, the Copper Development Association requested samples for national research studies on patination (how copper ages as it is exposed to the elements.) County Executive Nicholas J. Pirro and Manuel Barbas, Deputy Commissioner of Facilities Management, granted permission to furnish samples from each of the quadrants to ship to the association in Philadelphia. This will help to advance the knowledge and the applications of the metal.

The NiMo Building

The exuberant design of the NiMo Building (also known as “The Electric Jewel” and “The Cathedral of Light”) has earned it national recognition as an outstanding example of the Art Deco style. The design was a collaboration of two prominent architectural firms of the period, Melvin L. King (Syracuse) and Bley & Lyman (Buffalo). Klepper, Hahn & Hyatt conducted a study which showed that the facade and exterior structure appear to be in good condition, but there are a number of remediation items that should be addressed for safety, structural integrity, aesthetics and the preservation of an important edifice.

The building, known as SOC “A” (Syracuse Office Complex Building A) by National Grid USA Service Company, is significant both historically and architecturally. It was constructed in 1931-1932 for the Syracuse Lighting Company as part of the newly formed Niagara Hudson Company. The latter was a national pioneer in electricity production and



View of the north clay tile dome on the roof of the Onondaga County Court House.

distribution across the state in the early 20th century, and the building was designed to reflect the potentialities of progress and the phenomenon of electricity. The Hudson Niagara Power Company was restructured and became the foundation of the Niagara Mohawk Power Company in 1950. Niagara Mohawk was absorbed into the National Grid organization in 2001.

The NiMo Building is notable architecturally for its innovative design and massing, inventive use of materials such as cast stone, terra cotta, aluminum cladding, Vitrolite, molded glass, stainless steel (called CN or chrome nickel steel) and neon/helium exterior lighting, plus its overall futuristic appearance. It was planned as both an office building and a showroom and promotion center for electric power.

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As work begins on the court house roof, the cupola is removed from the main dome.

According to historic records the CN steel used on the building was developed for use in the United States by Crucible Steel of Syracuse and used here before its application on other important Art Deco buildings such as the Chrysler Building in New York City. Incorporated into the imaginative design of the NiMo Building, the most prominent feature of the facade is the 28-foot-tall chromium nickel steel sculpture named the “Spirit of Light” or the “Goddess of Light” (or locally as “Iron Mike.”)

Among the remediation items that will be undertaken by the KHH team is the replacement of a majority of the roofs. There are 20 separate roofed areas comprising a total of approximately 20,000 square feet. For the facade restoration, the list of priority items includes replacing deteriorated cast stone elements, removal and replacement of coping

stones to allow installation of proper flashings, repairing deteriorated sections of parapet walls, and removing all caulking, sealants, and older repair materials which prevent moisture from escaping from the walls. National Grid has also elected to replace all the windows with historic replications to provide more energy efficient units as well as restore the original appearance to the building. In all, the work is expected to require about two years to complete.

Other notable historic projects presently in design or construction include the historic Walkkill Penitentiary (1932), Poughkeepsie Armory (1891), Albany Hampton Plaza (circa 1900), St. Joseph’s Church in Albany (1860), entry stair reconstruction at Syracuse University’s Hall of Languages (1873), Huntington Hall at Syracuse University (1875), and Colgate University’s Alumni Hall (1859) and Spear House (1835).



The court house domes are clad in protective self-adhering membranes until they are ready to be re-covered in new copper.



NEW AND NOTEWORTHY

Catherine Savage Appointed Human Resources Manager

Catherine Savage has joined Klepper, Hahn & Hyatt in the new position of Human Resources Manager. Cathy was formerly a managing partner of Tizzy's Antiques in Cazenovia. She has more than 10 years of experience in the benefits and human resources field. Among the positions she had held was Senior Human Resources Coordinator for Dow Pharmaceutical Sciences in Petaluma, California.

Cathy received a Bachelor of Arts in

Management, Organizational Theory and Human Resources from Sonoma State University in Rohnert Park, California. She and her husband live in Cazenovia.



Catherine Savage

Kyle Oberdorf Joins KHH from Penn State

Kyle Oberdorf has joined KHH as an Engineer-in-Training for Structural Services. Kyle is a 2007 graduate of The Pennsylvania State University, having completed a five-year Bachelor's of Architectural Engineering, Structural Systems Option.

While at Penn State, Kyle was selected for the Sede di Roma Study Abroad Program and the Leeds University Study Abroad Program.

At KHH he is involved in the structural design of hospitals, schools and residences, along with other projects. He lives in Liverpool.



Kyle Oberdorf



Jack Nesbitt

Jack Nesbitt Hired for Inspection Services

Klepper, Hahn & Hyatt has hired Jack Nesbitt as a Special Inspector in the KHH Inspection Services Division. Following a four-year tour of duty with the U.S.

Army, Jack spent most of the past 19 years in construction services. For the past seven years, he has been employed as a civil

engineer technologist for Management Engineering Corporation in Bridgeville, Pennsylvania, and for CME Tech in Cicero.

As a Special Inspector, Jack works with other inspection and testing agents to provide services for concrete, masonry, and reinforcing steel on a variety of projects. These services are required by the Building Code of New York State.

Jack earned a Bachelor of Science in Civil Technology from Fairmont State College in Fairmont, West Virginia. He resides in Manlius.



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