

Rethinking Expansion Joints In the Face of Quakes and Hurricanes

By Lester Hensley, President
 EMSEAL Joint Systems Ltd

Expansion joints can be said to be among the most critical aspects of design in relation to building performance under geological and weather extremes.

In the wake of the recent earthquake, hurricane Irene, and tropical storm Lee, those of us on the East Coast are being given repeated reminders of a

universal truth that storms and shakes need to be considered at the baseline for our structural design.

No matter where you are in the world, now is a logical time to reflect on design practice as it relates to expansion joint sizing and product selection in relation to earthquakes and storm-force-wind driven rain.

Our **AIA/CES seminars** presented in your firm provide a collaborative

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ENGINEER'S CORNER

No. 6 Heating Oil Is on Its Way Out

By Peter Varsalona, PE
 RAND Engineering & Architecture, PC
 info@randpc.com



Photo: RAND Engineering & Architecture, PC

Interruptible systems burn both gas and No. 2 oil using a dual-fuel burner (red).

No. 6's days are numbered. A recent DEP rule change requires New York City buildings using No. 6 heating oil to switch to a cleaner fuel by 2015. The options: No. 4 oil (good until 2030), No. 2 oil, natural gas, or a dual-fuel system that burns oil and gas. If a boiler's operating permit expires before 2015, however, owners will have to convert even earlier.

Conversion Options

Buildings using No. 6 oil can switch to No. 4 oil first, which involves using up the No. 6 oil, cleaning the tank, adjusting burner settings, and making minor modifications to the oil pump and oil lines. The DEP estimates the conversion will cost approximately \$10,000.

Buildings using No. 6 or No. 4 oil also have the option of converting to either No. 2 oil or gas, or to a dual-fuel (interruptible) system. In an interruptible system, gas is used approximately 95 percent of the time. When gas demand peaks on a very cold day, Con Ed may temporarily shut off the supply and require buildings with interruptible systems to burn No. 2 oil until gas usage subsides.

The switch from No. 4 oil to No. 2 is a bit easier and less expensive than switching from No. 6 because pre-heating equipment isn't needed to decrease the viscosity of heavy No. 6 oil. If they are

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Photo: George Constantinou

Thank You for Your Support!

For the third consecutive year, Skyline Restoration held its Annual Golf Outing Benefiting Smile Train, on July 19th, at The Village Club of Sands Point. The winning foursome: (L-R) Rygo Foss of Skyline Restoration, Alan Arker of The Arker Companies, John Wagner and Stephen Wagner of Global Indemnity.

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Skyline Restoration Inc. - 1120 37th AVE, LIC, NY 11101 - T: 718.937.5353 - F: 718.937.5784 - skyline@SkylineRestoration.com - www.skylinerestoration.com - MEMBERS OF:

							
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approach to 3-D expansion joint problem solving.

A new line of breakthrough expansion joint products means you can specify, independently-tested, extreme protection built into a single product installation with solutions for walls, floors, solid and split slabs.

Sizing in Relation to Product Capability

Proper sizing of joint gaps in relation to stiffness, height, geology, and thermal exposure extremes are among the considerations in sizing the distances needed between structures and/or structural elements within buildings.

But just sizing the gap for anticipated movements is only half of the equation.

Among the most frequent communication disconnects in the design process is the structural engineer's responsibility for sizing the gap and the architect's responsibility in selecting a product to seal it. These must be reconciled against the movement capability of the product to seal the gap. Usually this means the joint-gap needs to be wider than calculated without consideration of an expansion joint system installed in to the joint opening to seal it.

What Are You Sealing In or Out?

What you desire to seal against will in part determine a products' movement capability. A looped membrane or simple rail-and-rubber strip seal may seal out typical falling rain and would likely handle even seismic movement.

But, what about wind-driven rain, or worse, hurricane or tornado driven rain?

What about air-pressure differentials between the inside and outside of the building?

What about thermal insulation in respect to heating and cooling containment?

What about sound attenuation?

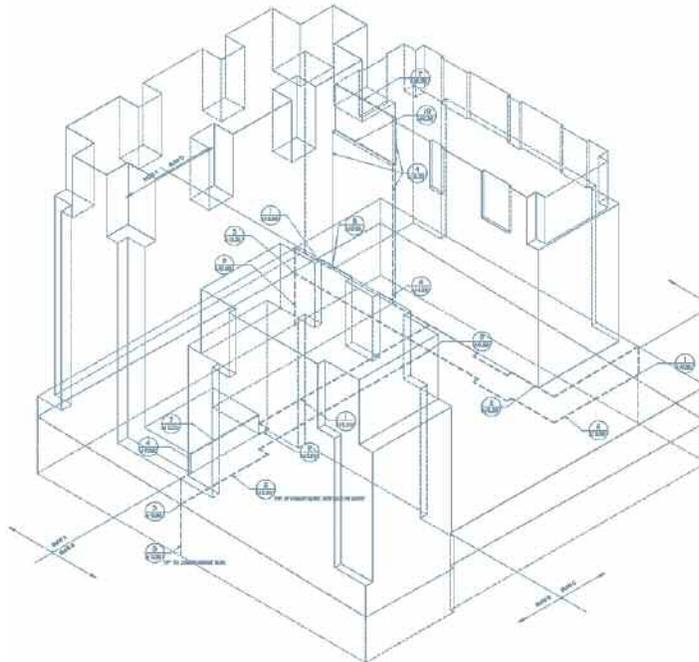
What about fire and smoke?

Looped membranes and strip seals will not provide any protection against any of these.

The Ideal Product

So the ideal product would be one that provides protection against all of these performance demands. Sounds too good to be possible, doesn't it?

Yet after more than 30 years in the busi-



Expansion joint locations.

Among the most frequent communication disconnects in the design process is the structural engineer's responsibility for sizing the gap and the architect's responsibility in selecting a product to seal it.

ness of focusing our company strictly on the sealing of expansion joints, EMSEAL has evolved its product line and broken some remarkable paradigms to bring to market the **EMSHIELD** family of products. Not only do these products perform in all of the conditions mentioned above, they have been independently tested to prove it.

Independent Tests Confirm Performance Claims

UL 2079 proves the products' ability to handle thermal, sway and seismic cycling frequency. It also proves the products fire resistance in configurations to provide up to 3 hours of fire protection.

ASTM E283, E330, and E331 prove the products' performance in excess of ABAA guidelines and at positive and negative pressures to match hurricane force winds and wind driven rain.

ASTM C518-04 confirm the products' insulation R-Values.

ASTM E-90 reveals STC and OITC sound attenuation performance as high as 62 and 52 respectively--in standard depth configuration.

FTIR and DSC analysis proves the absence of wax in our products and is a cornerstone of our claims that EMSEAL will not

bleed at temperatures up to 185-degF while simultaneously compressed to the minimum of our stated movement ranges.

Oh, and all of these tests were run on the products at the full extent of their claimed movement ranges. This means the products were in arguably their most vulnerable configuration. Which means that the tests are conservative but relevant to real life conditions that could exist at the extent of your design and our claims.

Specify Quality Base your specifications and submittals on EMSEAL and demand in the spec that all others to provide the same independent testing to meet the performance standards that suit field conditions. Some products look the same, some are claimed to be the same, but unless the lab results prove it--they are not the same.

Walls, Floors, Decks, and Split Slabs

The **EMSHIELD** line is comprehensive and features joint solutions, with built-in fire ratings for walls, floors, solid-slab decks, and even split-slab decks.

Local, Regional, National Help

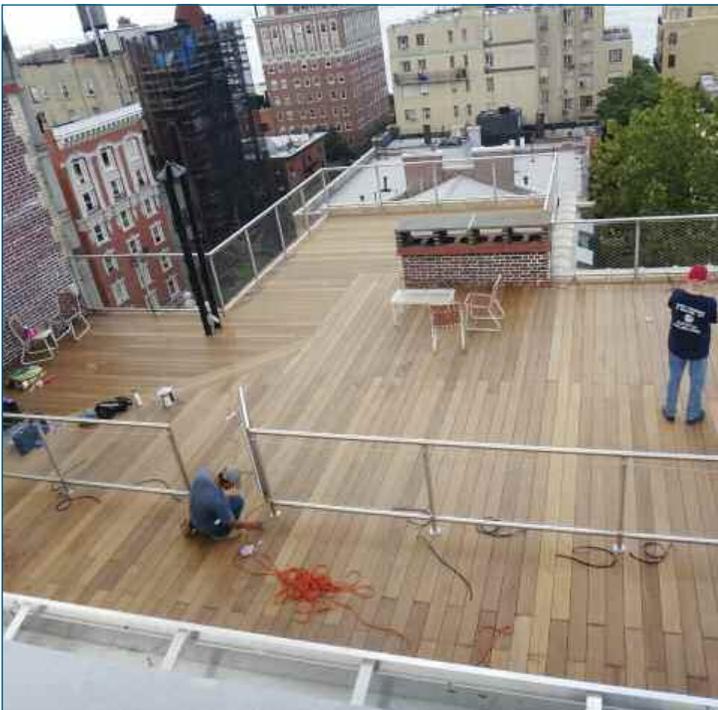
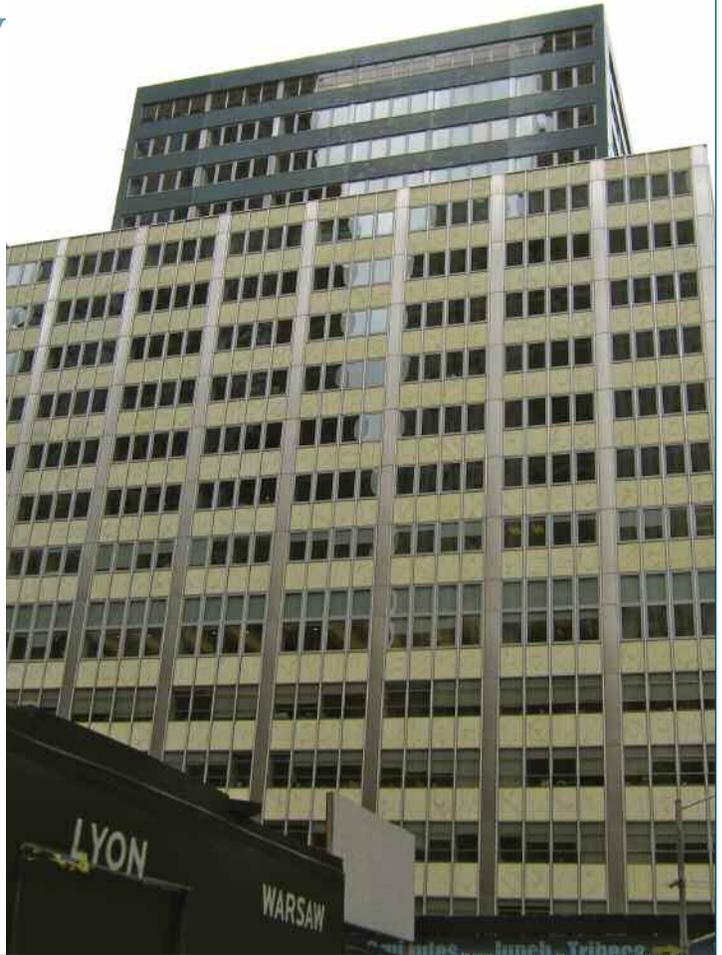
EMSEAL's technical **service**, problem solving, and specification development assistance is available locally, regionally, nationally, and internationally.

100 Church Street, New York, NY

100 Church Street is located in the financial district and two blocks from City Hall. This 21-story premier property is adjacent to the future Freedom Tower and the recently opened 7 World Trade Center. The building is within walking distance to the new Goldman Sachs World Headquarters building and TriBeCa. Skyline Restoration recently completed the restoration project as required by the Cycle 7 façade inspection and safety repair and maintenance program.

Owner: 100 Church Owner LLC
Property Manager: SL Green Realty Corp.
Engineer: Consulting Associates of New York
Contract: \$1.45 M
Scope of work: Cycle 7 façade inspection and safety repair and maintenance program

- Steel column brick encasement demolition and rebuilding
- Steel beam concrete encasement patching, coating application and copper flashing replacement
- Exposed structural steel and dunnage coatings application
- I beam web channel reinforcing and flange plate reinforcing
- Masonry repair anchors, spiral and driven-in types
- Brick replacement
- Mortar joint repointing
- Parapet coping replacement, cross-joint resealing and patching
- New cut-in vertical control joints
- Parapet rebuilding
- Corner rebuilding
- Shelf angle and spandrel rehabilitation
- Shelf angle steel replacement



200 Hicks Street, Brooklyn, NY

Skyline Restoration recently completed restoration work at 200 Hicks Street. This pre-war co-op building is located steps from Montague Street in Brooklyn Heights and offers a fabulous common roof deck with spectacular skyline views.

Owner: Casino Mansions Co.
Property Manager: Advanced Management Services Ltd.
Engineer: LPE Engineering PC
Contract: \$338,000.00
Scope of work: Main roof replacement, Public terrace roof replacement, wood deck and fence replacement

- Removal and replacement of main roof and gutter assemblies
- Removal and replacement of skylights
- Installation of metal cladding at bulkhead
- Removal and replacement of public terrace roof and gutter assemblies
- Removal of railing and replacement of damaged copings
- Installation of stainless steel balustrade and cable mesh railing assemblies
- Installation of Ipe wood deck

Skyline Restoration's Third Annual Golf Tournament to Benefit Smile Train Raised Sixty-Eight Thousand Dollars in donations



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Smile Train provides free cleft surgery to children from desperately poor families, giving them not just a new smile, but also a new life. To date, Smile Train has performed over 650,000 surgeries.

By Eva Hatzaki, Skyline Restoration Inc.

For the third consecutive year, Skyline Restoration held its Annual Golf Outing Benefiting Smile Train, on July 19th, at The Village Club of Sands Point.

The \$68,000 raised during the event surpassed the proceeds of the two previous years, thanks to the generosity of the sponsors, golfers and friends of Smile Train and Skyline Restoration.

On this 96-degree day, over 120 golfers participated in the tournament on the grounds of the historic Guggenheim estate, and more friends arrived later for the celebratory dinner.



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(LEFT TO RIGHT) 1. Robert Toth, Chief of Operations and Brian Dearth, Senior Vice President and Chief Marketing Officer of Smile Train. 2. Vincent DiPalma, Sean Johnston, Dan Bocard (of Package Paver) and Vito Pela, of Extech Building Materials. 3. Brett Steinberg, Corrin Bittner, Brian Kelly and Seth Baum, of Kemper System America. 4. Joe Ruffino, Zach Gilbert, Stas' Kotula and Gabe Colon, of DeWalt.

More photos at <http://smiletrain.skylinerestoration.com>

Registration started at 10:00 am while brunch was being served at the Grille. Upon Tee-Off, team scoring was broadcast live on the Internet by eGolf Score.

By 6:00 pm the winning foursome and the winners of the other competitions received their trophies and awards while cocktails and dinner were served at the Mansion.

Robert Toth, Chief of Operations and Brian Dearth, Senior Vice President and Chief Marketing Officer of Smile Train addressed the organizers and the participants and thanked them for their support. As Mr. Dearth put it, "Skyline Restoration restores buildings and

Smile Train restores smiles".

This year we were thrilled to be joined by three talented actors: Crystal Starr, Geno Henderson and Barry Pearl, all of the Broadway musical "Baby it's you!", who participated in the tournament, presented the raffles and made us laugh with their humorous approach.

Skyline Restoration wants to thank all of the sponsors and participants, manufacturers, suppliers, financiers, architects, engineers, property managers and owners, who made this event the most successful ever, as well as all the companies that donated to the raffle and gift-bag items.

ENGINEER'S CORNER

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in good condition, the existing boiler and oil tank can still be used, but a dual-fuel burner will have to be installed for an interruptible system. A heating system that burns only gas—known as a firm gas system—will also require a new burner.

Gas Requirements

Both interruptible and firm gas systems require new equipment. Even if the building uses gas service for cooking, a larger gas main may be needed for heating. New gas piping may have to be installed from the gas main to the boiler room, as well as a gas booster pump to ensure adequate supply to the burner. Gas-based heating systems also require a dedicated gas-meter room.

Fuel Costs

The relative prices of the three grades of oil should remain consistent, with No. 2 the most expensive and No. 6 the least. The price of natural gas, however, has fluctuated and is currently less expensive than No. 2. An interruptible system gives buildings the flexibility of burning either No. 2 oil or gas, depending on the price of each.

An interruptible system, however, requires a dual-fuel burner and other equipment not needed in a system burning only No. 2 oil. Firm gas systems also require new equipment, but utilities typically offer less expensive rates for firm gas than for interruptible systems. Con Edison and NYSERDA offer rebate programs to defray the signifi-

cant upfront costs of switching from oil to firm gas or to an interruptible system.

Heating Survey

Before converting, owners should hire an engineering firm to survey the building's heating system. The survey should determine the building's existing heating requirements and fuel usage, project the new oil and/or gas load, calculate the costs for new service and equipment, and estimate the annual savings and expected payback time for the conversion. Keep in mind projected savings and payback periods will change with the fluctuating costs of home heating fuels.

For more information: www.randpc.com/No.6oil