

Commercial Building Executive Summit

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**Understanding Trends in Commercial
Roofing/Industry Update**

presented by

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What is the best roof system?

One that is:

- Properly designed
- Made from quality materials
- Properly installed
- Maintained



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Roof product/system choices



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Roof Warrantees



- Product/material warrantees
- Roof system warrantees
- Wind warrantees

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Contractor issues

Is the roofing contractor you hire the one who will install your roof?

- Contractor's crews
- Subcontract some portions of work:
 - Plumbing (roof drains)
 - Mechanical systems (HVAC equipment)
 - Electrical (rooftop wiring)
- Subcontracted labor:
 - Roof removal
 - New roof system installation



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Roofing industry issues

- Roof system performance
- Changing building/energy code requirements
- Lightweight structural concrete roof decks

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Roof system performance

We are currently experiencing the longest period without a major roof system-related failure mechanism in the history of the U.S. roofing industry.

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Prescriptive insulation requirements

Insulation entirely above deck roof assembly configuration

Climate Zone	IECC 2006	IECC 2009	IECC 2012*	IECC 2015*
1	R-15ci	R-15ci	R-20 ci	R-20 ci
2		R-20ci		R-25 ci
3			R-25 ci	R-30 ci
4		R-20ci		
5	R-25 ci	R-25ci	R-30ci	R-35 ci
6				
7				
8				

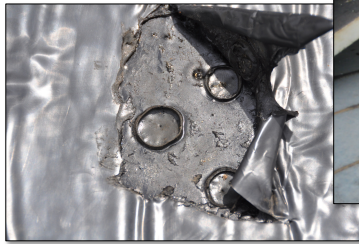
* Applies to roof replacement projects
ci = continuous insulation

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Problems associated lightweight structural concrete


Retained water from the concrete infiltrates the roof system and causes deterioration



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NRCA Industry Issue Update August 2013

www.nrca.net


INDUSTRY ISSUE UPDATE

NRCA Member Benefit

Moisture in Lightweight Structural Concrete Roof Decks

Concrete Moisture Presents Challenges for Roofing Contractors

NNRCA Technical Services Section is receiving an increasing number of inquiries relating to the application of roof systems over concrete roof decks. These inquiries can be separated into two general questions: When is a concrete roof deck dry enough to apply a roof covering? And why is a roof system applied over a concrete roof deck showing signs of moisture infiltration when the roof covering isn't leaking?

CONCRETE BASICS
There are three general types of concrete: normal-weight structural concrete, lightweight structural concrete and lightweight insulating concrete.

Normal-weight structural concrete is what most people think of as concrete; it has a density of about 150 pounds per cubic foot (pcf). Lightweight structural concrete has structural load-carrying capabilities similar to normal-weight structural concrete; it has a density in the range of 85 to 120 pcf. Lightweight insulating concrete, which many roofing professionals are familiar with as an insulating, slope-to-drain deck topping, typically has a density in the range from 20 to 40 pcf.

Structural concrete—normal-weight structural concrete and lightweight structural concrete—is produced by mixing large and small aggregates, Portland cement, water and, in some instances, admixtures such as fly ash or various chemical additives. Admixtures can add strength to the concrete, accelerate concrete's curing, retain concrete's excess moisture and/or lengthen concrete's finishing time. Use of admixtures typically is not visually identifiable in the field; microscopic analysis usually is needed for post-application identification of admixtures.

The primary difference in the composition of normal-weight structural concrete and lightweight structural concrete is the large aggregate type. Normal-weight structural concrete contains normal-weight aggregates such as stone or crushed gravel, which are dense and typically will absorb no more moisture than about 2 percent by weight. Lightweight structural concrete uses lightweight,

porous aggregates such as expanded shale, which will absorb about 5 to 25 percent moisture by weight. Lightweight aggregate needs to be saturated with moisture—it's often stored in ponds—before mixing. As a result, lightweight structural concrete inherently contains much more water than normal-weight structural concrete.

Lightweight structural concrete is used in roofing-related applications for cast-in-place concrete roof decks using removable form composite roof decks where a metal form deck remains in place and as a deck topping material, such as a concrete topping surface over precast concrete planks or tees.

Once poured, lightweight structural concrete typically cannot be easily distinguished from normal-weight structural concrete.

Visual identification is possible using magnification, typically a microscope used by a trained technician.

REPORTED PROBLEMS
The problems reported to NRCA associated with lightweight structural concrete roof decks include the following:

- **Moisture accumulation.** Excessive moisture from a concrete deck can be pressure-differential driven into and condensed within a roof system.
- **Adhesive loss.** The presence of moisture can result in deterioration of moisture-sensitive roofing materials and adhesive bond loss between adhered material layers.
- **Adhesive issues with some closed and low-moisture organic compounds.** Excessive moisture can affect adhesive curing and drying rates. Also, moisture can result in adhesive "re-wetting," resulting in bond strength loss.
- **Metal and fastener corrosion.** Excessive moisture can contribute to and accelerate metal component's corrosion, including fastener corrosion.
- **Insulation R-value loss.** The accumulation and presence of moisture in most insulation products will result in reduced thermal performance (lower effective R-value).
- **Aluminum growth.** The presence of prolonged high-moisture



Closing thoughts

- Roofing isn't a commodity item purchase
- Warrantees differ...and provide only limited coverage
- Make sound roof purchasing decisions
- Ask for assistance

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