



2019 Annual NRLRC Luncheon Program
February 11, 2019 – Nashville, Tennessee

2018's technical issues

Presented by



Mark S. Graham
Vice President, Technical Services
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Moisture in concrete roof decks

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Moisture in concrete roof decks

Moisture in concrete roof decks
Current testing and drying time for different roof systems
by Mark S. Graham

Feb. 2010

The importance of using appropriate measurement units
Mark S. Graham, Ph.D., PE
Mark S. Graham, Ph.D., PE
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Sept. 2011

Concrete deck dryness
Alternative approaches are needed to determine when concrete decks are dry
by Mark S. Graham

Dec. 2012

Moisture in Lightweight Structural Concrete Roof Decks
Current Moisture Testing Challenges in Building Construction

Aug. 2013

A troubling issue
Moisture in lightweight structural concrete prevents concrete
by Mark S. Graham

Dec. 2013

Moisture in concrete roof decks
Mark S. Graham and lightweight structural concrete
by Mark S. Graham

Sept. 2017

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**PORTLAND CEMENT ASSOCIATION
RESEARCH AND DEVELOPMENT LABORATORIES**
Development Department • Bulletin D39

Table 1 Drying time in days, at 73 F and 50% relative Humidity
for a 4-inch-thick specimen to reach 3 lbs/1,000 sq. ft./24 hrs.

Water-Cement Ratio	Bottom Sealed	Bottom Exposed to Water Vapor	Bottom in Contact with Water
0.4	46	52	54
0.5	85	144	199
0.6	117	365	>>365
0.7	130	>>365	>>365
0.8	148	>>365	>>365
0.9	166	>>365	>>365
1.0	190	>>365	>>365

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Concrete Floors and Moisture (2008) Howard Kanare

A concrete slab will reach a 75% RH

- Normal weight structural concrete
 - Less than 90 days
- Lightweight structural concrete
 - Almost 6 months

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RESEARCH+TECH



Are admixtures the answer?
Moisture in concrete roof decks continues to be problematic
by Mark S. Graham

NRLCA's Technical Service Section has been receiving inquiries regarding the use and effectiveness of specific concrete mix additives and typical moisture measurements to address moisture-related concerns with concrete roof decks. Such admixtures formerly are referred to as moisture vapor reduction admixtures (MVRAs) or primarily moisture-reducing admixtures. NRLCA provides some recommendations regarding their use.

NOTE:
Concrete admixtures marketed as MVRAs are specific chemicals added during concrete's batching and mixing to provide an additional chemical reaction during the concrete's hydration and curing process. MVRAs are the concrete mix's water meter and thermostat to create a cellular structure (pores) within the concrete. The pores tend to fill the small pores and capillary openings in curing concrete, reducing the concrete's ability to pass and release moisture vapor. The gel is intended to be persistent and integral throughout the concrete's entire life-cycle.

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[Link](#)

Professional Roofing December 2018

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Moisture vapor reduction admixtures (MVRAs)

Some examples:

- Barrier One
- ISE Logik MVRA 9000
- SPG VaporLock

*NRCA still has not seen an MVRA perform
successfully in concrete roof deck applications*

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***The roofing industry needs to re-think
the concept of concrete roof deck "acceptance"***

Whose moisture is it in the concrete?

***Why should we take responsibility (or incur liability)
for someone else's moisture?***

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The screenshot shows the NRLRC website interface. At the top left is the NRLRC logo. To the right, there is a banner for the 40th Anniversary Seminar held from September 19-21, 2019, at the New York Hilton Midtown, NYC. Below the banner is a navigation menu with links for About NRLRC, Membership, Legal Help Line, Education/Programs, Legal Library, and Members Only. The main content area features a sidebar with 'NRLRC News' and a main article titled 'Contract provision addresses installation of roof system over concrete deck'. The article text discusses the risks of installing a roof over a wet concrete deck and includes a highlighted section: 'Assessing moisture content in roof deck: Roofing Contractor is not responsible for the effects of moisture migration originating within the roof deck or substrate, including concrete decks, or due to moisture vapor drive from within the building. Residual moisture within the roof deck, particularly structural concrete decks, can adversely affect the properties and performance of roofing materials, regardless of additives or concrete admixtures that may be included in the concrete mix. Roofing Contractor's commencement of roof installation indicates only that the Roofing Contractor has visibly inspected the surface of the deck for visible defects prior to commencement of roofing and the surface of the deck appeared dry. The 28-day concrete curing period does not signify the deck is sufficiently dry. Roofing Contractor is not responsible to test or assess the moisture content of the deck or evaluate the likelihood of condensation from moisture drive within the building. Roofing contractor recommends that roofing not commence until probes in concrete decks show moisture content is no greater than 75% relative humidity when there is no organic content within the roofing materials. Wood fiberboard, perlite and organic paper facers on polyisocyanurate insulation will generate mold with relative humidity as low as about 65-70%.'

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NRCA Technical Operations Committee:
Technical programs and issues

Tuesday, February 12, 2019 – 9:30 to 11 a.m.
Room 205 ABC

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Other issues...

- Fires

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Other issues...

- Fires
- Roof collapse/roof drain blockage
- Polyiso. thickness/density/facers
- Low VOC and water-based adhesive
- Liquid-applied membrane/roof coatings
- Mod. bit. seams – hot-air welded
- Manufacturers' installation instructions and applicator agreements

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What's in store for 2019...?

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Mark S. Graham

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