


NRCA Regional Conference
Denver, CO
October 15, 2014

Technical issues and update

Mark S. Graham
Associate Executive Director, Technical Services
National Roofing Contractors Association


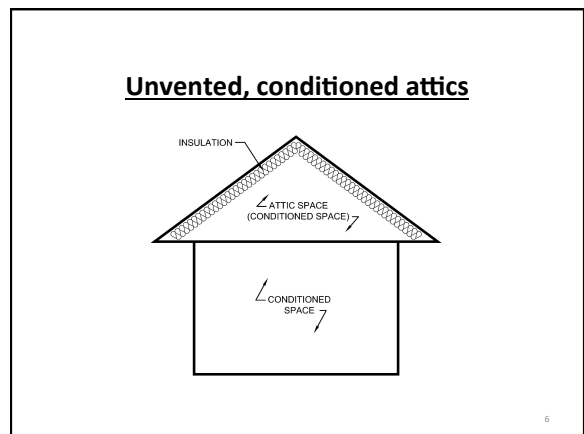
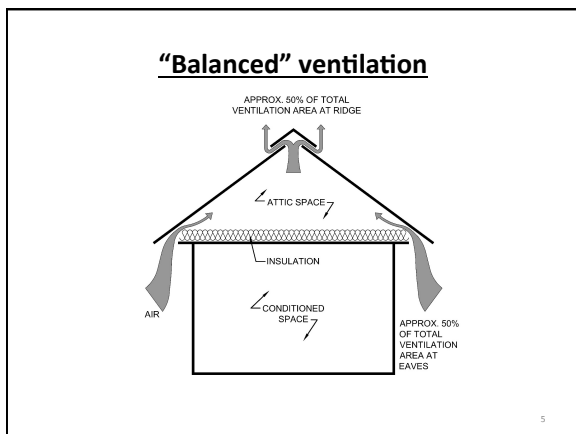
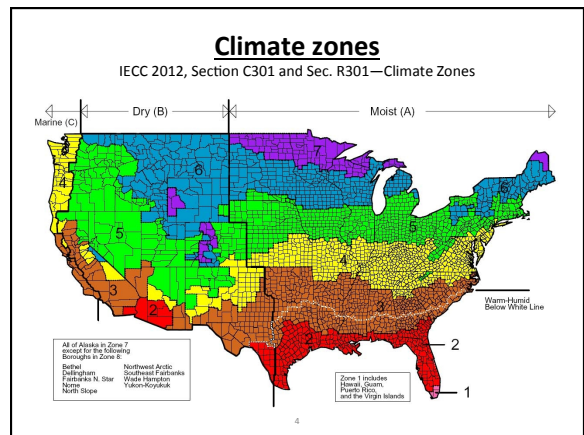
Topics

- Update on technical issues
- NRCA products and programs




Attic ventilation

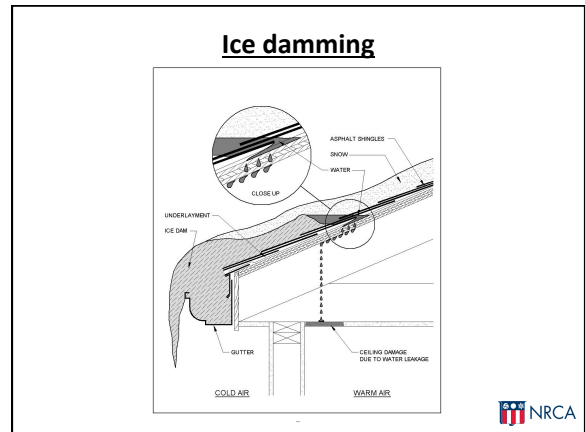
- 1:150 rule
- 1:300 exception
 - IBC 2012:
 - 50 to 80% NFVA at or near the ridge, or
 - Vapor retarder on the warm-in-winter side
 - IRC 2012:
 - 40 to 50% NFVA at or near the ridge, or
 - In Climate Zones 6, 7 and 8, a vapor retarder on the warm-in-winter side

Additional information
Attic ventilation

- *The NRCA Roofing Manual: Architectural Metal Roofing, Condensation and Air Leakage Control, and Reroofing—2014*, pages 216-220
- *Professional Roofing*, “Tech today,” Sept. 2014
- *Professional Roofing*, “Tech today,” Oct. 2014






Ice damming
Code requirements

IBC 2012:

- For asphalt shingles, roll roofing, slate, metal shingles, and wood shakes and shingles
- “...history of ice forming along eaves...”
- 24 inches inside exterior wall line

IRC 2012:


- Similar to IBC 2012 except...
- Instead of “...history...”, see IRC 2012, Table R301.2(1)—Climate and Geographic Design Criteria

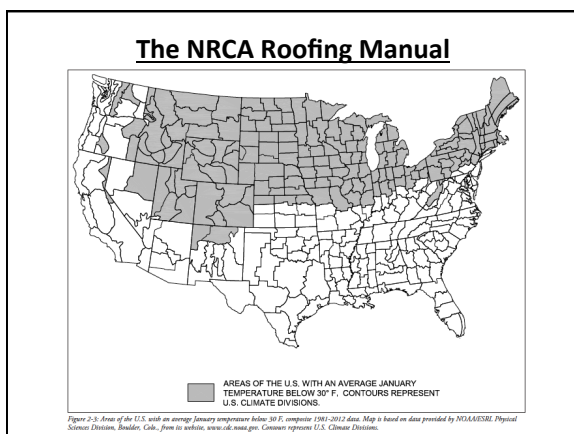


Ice damming
The NRCA Roofing Manual

NRCA guidelines:

- For all steep-slope water-shedding roof systems (including tile and architectural metal panels)
- Include anytime “...the January mean temperature is 30 F or less...”
- ASTM D1970 self-adhering underlayment
- Extending upslope a minimum of 24 inches—measured in the horizontal plane—from the inside of a building’s exterior wall line





Professional Roofing
November 2014

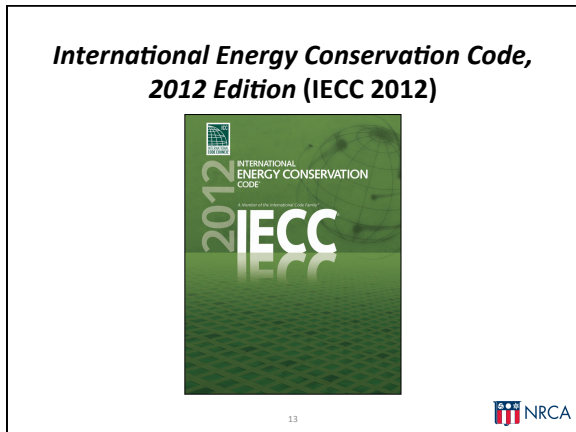
TECH TODAY

Ice damming season
Proper roof system design can prevent leakage following freeze-thaw cycles

by Steve S. Grotzke







Federal Register, May 17, 2012

Key points:

- US DOE has determined IECC 2012 will achieve greater energy efficiency in low-rise residential buildings than IECC 2009
- States must certify by May 17, 2014 their energy code meets or exceeds the levels of IECC 2012

This triggers most states to update their state energy code

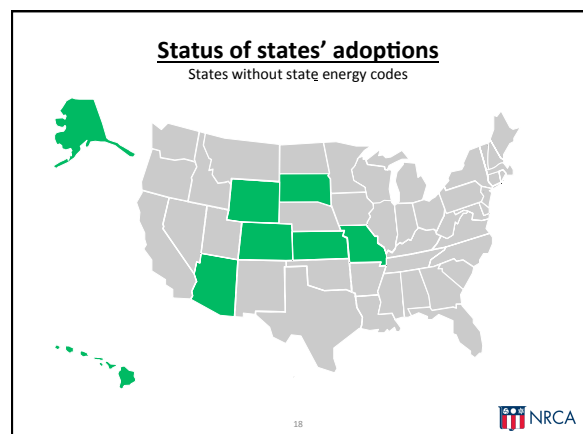
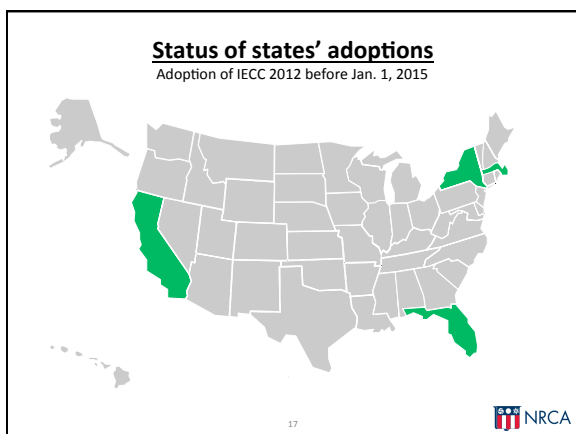
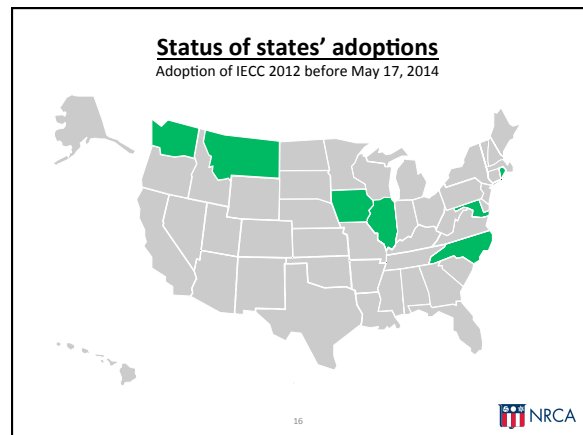
14

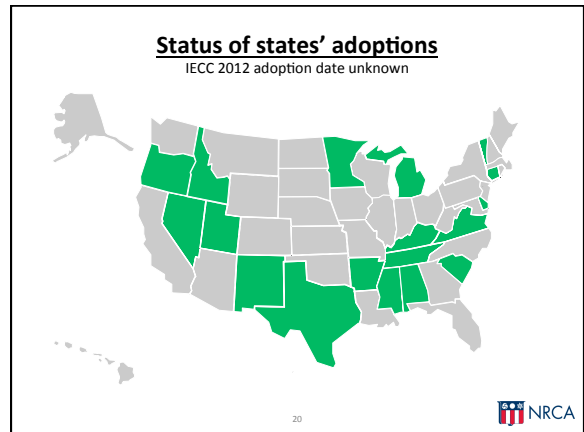
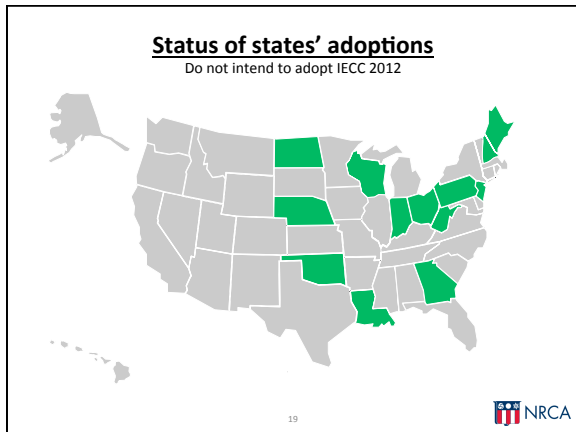
International Energy Conservation Code, 2012 Edition

Status of states' adoptions

www.nrca.net/Technical/EnergyCodes

15





So....

- Do increased R-values make sense?
- Is there a realistic payback?

...we've done some calculations

In a mixed heating/cooling climate
10,000 sq. ft. single-story building in Denver, CO

R-value increase	Annual Btu savings	Payback time
R-10 to R-15	52,120,379 Btu	12.1 years
R-15 to R-20	28,732,017 Btu	25.1 years
R-20 to R-25	16,526,782 Btu	40.5 years
R-25 to R-30	11,646,024 Btu	88.2 years

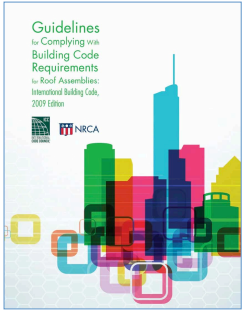
EnergyWise Roof Calculator
energywise.nrca.net

- Developed by NRCA in cooperation with the Roofing Industry Alliance for Progress
- Determine R-value requirements:
 - IECC 2006, IECC 2009 and 2012
 - IgCC 2012
 - ASHRAE 90.1-99, -04, -07, -10 and -13
 - ASHRAE 189.1-09
- Calculates heating/cooling costs
- Verifies proper vapor retarder placement
- Over 8,000 projects

Guidelines for Complying with Energy Code Requirements for Roof Assemblies: International Energy Efficiency Code, 2009 and 2012 Editions

Contact NRCA Customer Service:
1-888-ASK-NRCA (275-6722)
or shop.nrca.net

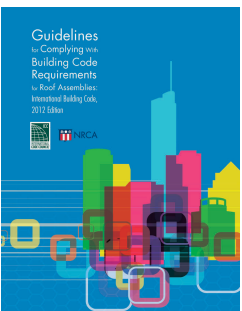
Building Codes Manual (2009 Codes)



- Based on 2009 I-codes:
 - IBC 2009
 - IRC 2009
 - IECC 2009
 - IPC 2009
 - IFC 2009
- Includes roofing-related code text and NRCA commentary on each section
- Co-branded with ICC; NRCA promotes to industry and ICC promotes to code officials

25

Building Codes Manual (2012 Codes)




- Based on 2012 I-codes:
 - IBC 2012
 - IRC 2012
 - IECC 2012
 - IPC 2012
 - IFC 2012
- Includes roofing-related code text and NRCA commentary on each section
- Co-branded with ICC; NRCA promotes to industry and ICC promotes to code officials

26

Polyisocyanurate insulation

- LTTR implementation
- Dimensional stability issues

27



New minimum LTTR values

PIMA Quality Mark™ program (minimum values)

Revised LTTR values		
Thickness (inches)	New LTTR values per inch thickness	New LTTR values per thickness
1	5.6	5.6
2	5.7	11.4
3	5.8	17.4
4	5.9	23.6

"Tech today," Professional Roofing, August 2013


28

Thickness/layers for R-value

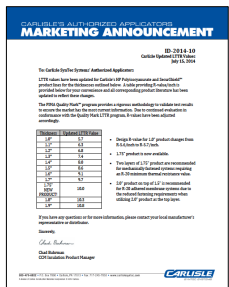
Required R-value	Layers/Thicknesses
R-20 ^{1,2}	2 layers of 1.8 inch
R-25 ³	2 layers of 2.2 inch
R-30 ⁴	2 layers of 2.6 inch
R-35 ⁵	2 layers of 3.1 inch

¹ IECC 2009, Climate Zones 2-6
² IECC 2012, Climate Zones 1-3
³ IECC 2012, Climate Zones 4-5
⁴ IECC 2012, Climate Zone 6
⁵ IECC 2012, Climate Zone 7-8

29




July 2014 LTTR changes



Updated LTTR values:

- 1.0 inch: 5.6 to 5.7
- 1.75 product available
- Mechanically-attached:
 - (2) 1.75 inch for R-20
- Adhered:
 - 2.0 inch top layer
 - 1.5 inch bottom layer


30



Does it really matter?

Consider allowable manufacturing tolerances

- ASTM C1289:
 - Board length and width: $\pm\frac{1}{4}$ inch
 - Thickness tolerance: "...shall not exceed $\frac{1}{8}$ in. (3.2 mm), and the thickness of any two boards shall not differ by more than $\frac{1}{8}$ in (3.2 mm)..."
- Equivalent LTTR of thickness tolerance: ± 0.7
- Equivalent LTTR of 0.1-inch-thickness: 0.56

 31

NRCA recommends designers specify polyisocyanurate insulation by thickness

– not R-value or LTTR.

 32

Dimensional stability issues


- Board growth
- Board shrinkage
- Board cupping
- Board bowing

 33

Polyiso. facer sheets

ASTM C1289, Type II:


- Class 1 (cellulose/glass fiber facers):
 - Grade 1 – 16 psi
 - Grade 2 – 20 psi
 - Grade 3 – 25 psi
- Class 2 (coated glass facers):
 - Grade 1 – 16 psi
 - Grade 2 – 20 psi
 - Grade 3 – 25 psi
- Class 3 (uncoated glass facers)
- Class 4 (high density):
 - Grade 1 – 80 psi
 - Grade 2 – 110 psi
 - Grade 3 – 140 psi

 34

Additional information

Polyisocyanurate insulation

- *The NRCA Roofing Manual: Membrane Roof Systems–2011*, pages 62-64
- NRCA Industry Issue Update: Polyiso’s R-value, Jan. 2014
- *Professional Roofing*, “A question of accuracy,” May 2014
- *Professional Roofing*, “Tech today,” March 2013

 35

Steel roof decks

We now know the rationale for FM Approval’s 2013 classification changes

 36

SDI bulletin

- Decks designed for joist spacing between 5' and 6' 8" o.c.
- Steel decks designed for uniform loading
- Seam-fastened single-ply membranes are a concern

Membrane seams across deck flutes

SDI: 3.8 X moment (deck); 2 X load (joists)

Membrane seams in deck flute direction

SDI: 12 X bending moment and shear (deck)

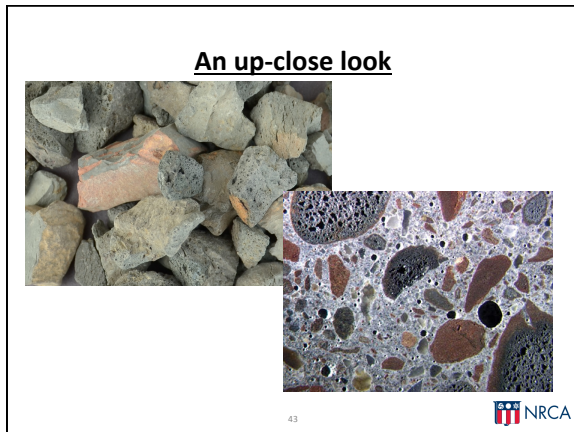
SDI bulletin -- Conclusion

“...SDI does not recommend the use of roofing membranes attached to the steel deck using line patterns with large spacing unless a structural engineer has reviewed the adequacy of the steel deck and the structural supports to resist to wind uplift loads transmitted along the lines of attachment. Those lines of attachment shall only be perpendicular to the flutes of the deck.”

NRCA interim recommendations

- Beware of the situation
- NRCA is investigating further...

Moisture-related concerns with lightweight structural concrete roof decks



Conclusions

- Concrete roof decks – normal weight and light-weight structural – present challenging moisture-related considerations.
- Further complicated by the use of admixtures and method of finishing.
- NRCA does not support the 28-day drying period or the plastic sheet test

44

Conclusions - continued

- Roofing contractors can only visually assess the dryness of the concrete’s top surface
- Roofing contractors cannot readily assess any remaining free moisture within concrete or its likely release

Roofing contractors are not privy to and may not be knowledgeable about the information necessary to make “...when to roof...” decisions

45

NRCA Industry Issue Update, August 2013

INDUSTRY ISSUE UPDATE

NRCA's Member Benefit

Moisture in Lightweight Structural Concrete Roof Decks
Concrete Moisture Poses Challenges for Roofing Contractors

NRCA Technical Service Section is issuing an advisory notice of potential problems in the installation of roof decks on concrete slabs. These problems can be experienced even when contractors follow the concrete and slab manufacturer's instructions. They are caused by the moisture in the concrete and the way it is released during the curing process. The moisture in the concrete is released during the curing process, and the moisture in the concrete is released during the curing process. The moisture in the concrete is released during the curing process, and the moisture in the concrete is released during the curing process.

CONCRETE SLABS There are three general types of concrete: normal weight concrete, lightweight structural concrete and high-strength concrete. Normal weight concrete is a mix of cement, sand, gravel and water. Lightweight structural concrete is a mix of cement, sand, gravel and water, with a lightweight aggregate. High-strength concrete is a mix of cement, sand, gravel and water, with a high-strength aggregate.

CONCRETE MOISTURE Concrete moisture is the water in the concrete. It is released during the curing process. The moisture in the concrete is released during the curing process, and the moisture in the concrete is released during the curing process.

CONCRETE FINISHING The moisture in the concrete is released during the curing process, and the moisture in the concrete is released during the curing process. The moisture in the concrete is released during the curing process, and the moisture in the concrete is released during the curing process.

46

Glass-faced gypsum board

- Product standard is ASTM C1177
- Two primary manufacturers:
 - GP “DensDeck”
 - USG “Securock Glass-mat Roof Board”
- Product generally performing well
- Problem reports:
 - Adhered designs
 - Blistering and facer-sheet delamination

47

Calcination
Glass-mat-faced gypsum board


“...Calcination in gypsum boards is the process whereby gypsum’s crystalline structure breaks down and chemically bound water is driven out. This weakens the compressive and structural strengths of the boards. Calcination begins to occur when the gypsum board is exposed to temperatures higher than about 130 F...”

-The NRCA Roofing Manual: Membrane Roof Systems-2011

48


NRCA recommendations
Glass-faced gypsum boards

- NRCA does not recommend hot bitumen application
- Exercise caution in torch applications
- Use caution in fully-adhered designs using dark-colored roof coverings

49 


Fiber board insulation

- Product standard is ASTM C208:
 - ASTM C208, Type II, Grade 1: “normal density”
 - ASTM C208, Type II, Grade 2: “high density”
- Reports of corrosion of steel roof decks and metal fasteners
- Problem reports from South (LA, MS, TX), southeast (FL, SC, NC) and New England
- Appears related to bagasse fiber (sugarcane or sorghum stalks)
- Appears limited to Knight-Celotex, LLC product manufactured in Marrero, LA from 2001 to about 2009

50 

NRCA recommendations
Fiber board insulation

- Structural integrity of roof decks and uplift resistance are concerns.
- Review file information; contact suppliers
- Some product has product markings, other product known not to have product markings
- Bagasse fiber board generally visually exhibits courser, irregular fiber material
- Make your field personnel aware

51 

Tech today, March 2012
Professional Roofing

TECH TODAY

A concern with fiberboard insulation
Corrosion of metal components poses safety and performance issues
by Mark S. Gordon

NRCA has issued several reports of concern of metal components with the degradation of fiberboard insulation. Reports have been received from several jurisdictions and are being reviewed by the NRCA Technical Committee. The reports indicate that the insulation is made of bagasse fiber (sugarcane or sorghum stalks) and is not marked with the appropriate markings. The reports also indicate that the insulation is being used in applications where it is not intended to be used. The reports also indicate that the insulation is being used in applications where it is not intended to be used. The reports also indicate that the insulation is being used in applications where it is not intended to be used.


NRCA recommendations

Reports of corrosion of metal components with the degradation of fiberboard insulation. Reports have been received from several jurisdictions and are being reviewed by the NRCA Technical Committee. The reports indicate that the insulation is made of bagasse fiber (sugarcane or sorghum stalks) and is not marked with the appropriate markings. The reports also indicate that the insulation is being used in applications where it is not intended to be used. The reports also indicate that the insulation is being used in applications where it is not intended to be used. The reports also indicate that the insulation is being used in applications where it is not intended to be used.


52 

Torch application safety

53 



- Established by MRCA in 1986
- Joint agreement with NRCA beginning in 2003
- Over 1,600 trainers
- Over 22,500 applicators
- Substantially improved fire safety record

54 


Future CERTA classes

Train the trainer:

- October 23, 2014, Chicago, IL area
- February 23, 2105, New Orleans, LA

Trainer re-authorization:

- October 24, 2014, Chicago, IL area

55 


Future CERTA classes

Train the trainer:

- October 23, 2014, Chicago, IL area
- February 23, 2105, New Orleans, LA


Trainer re-authorization:

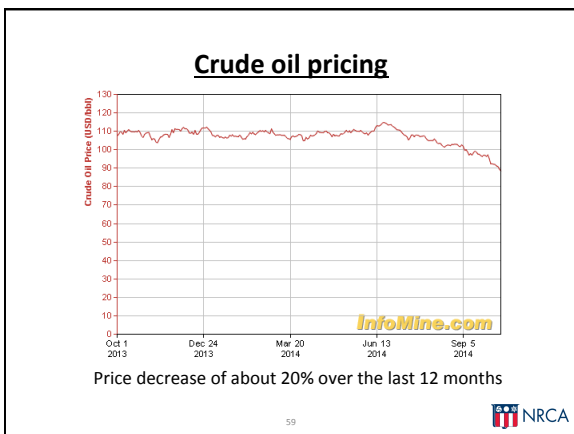
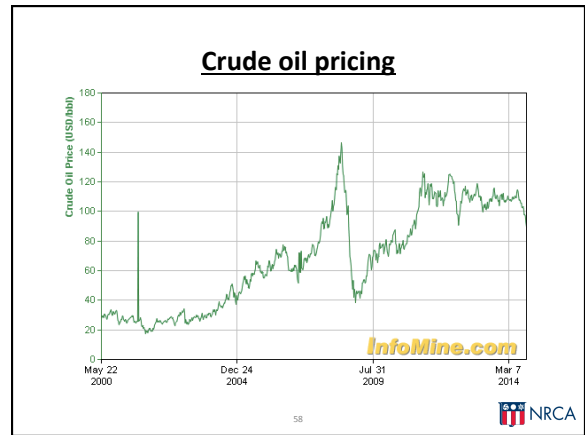
- October 24, 2014, Chicago, IL area

56 

Material/product pricing volatility


- Pricing is a complex, dynamic equation
- Shipping/trucking costs play an important role
- Closely tied to crude oil pricing

57 



Some recommendations

- Be cautious of contractually committing yourself to long-term pricing guarantees
- Include a material/product price increase (and availability) clause in Contracts
- See NRCA Special Report and NRLRC for example clause language

60 

How to keep yourself informed

- Read *Professional Roofing*
- Use The NRCA Roofing Manual and NRCA's related technical publications and programs
- Watch for NRCA's *Industry Issue Updates* and *Special Reports*
- Be an active NRCA member
- Call NRCA... share information and ask for NRCA's help when needed

61



Mark S. Graham

Associate Executive Director, Technical Services
National Roofing Contractors Association
10255 West Higgins Road, 600
Rosemont, Illinois 60018-5607

(847) 299-9070
mgraham@nrca.net
www.nrca.net

Twitter: @MarkGrahamNRCA
Personal website: www.MarkGrahamNRCA.com

62