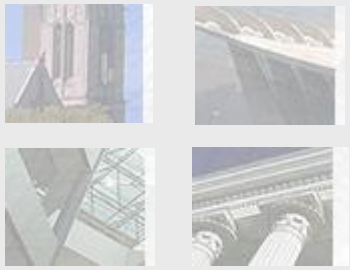

Decision-Making Process for Green Options in Reroofing

NRCA 2011 International Symposium
September 7-9, 2011
Washington, D.C.

Presented By:

Steven P. Bentz, P.E., R.R.C.

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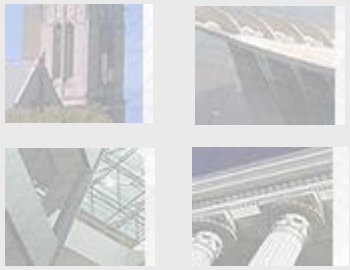


Presentation Outline

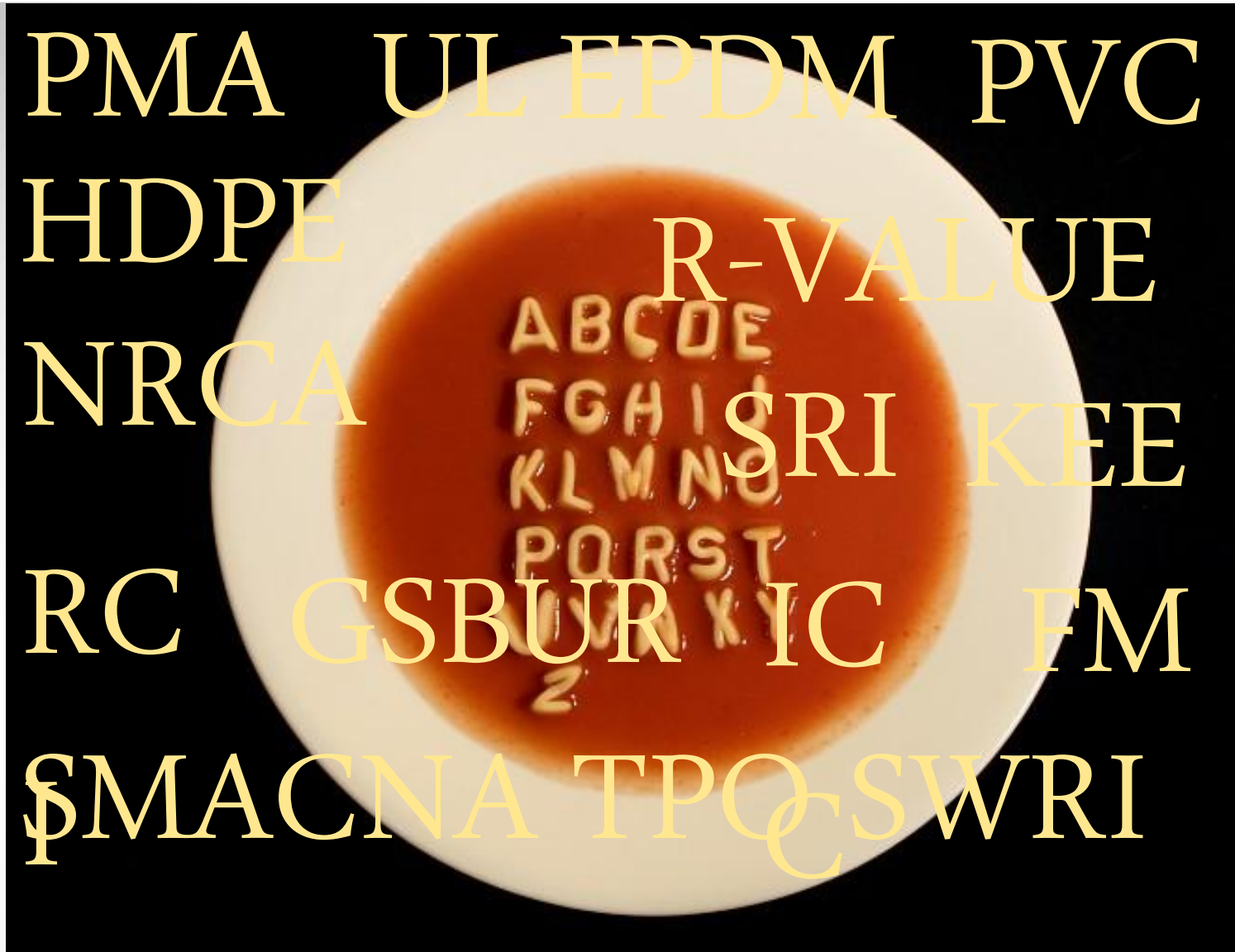
- Public Speaking 101
- Purpose of the Paper
- Seven Factors for Good Roof Design
- Loads on the Roof System
- Summary

Public Speaking 101

- Know your Audience
  - We're obviously not this crowd.....

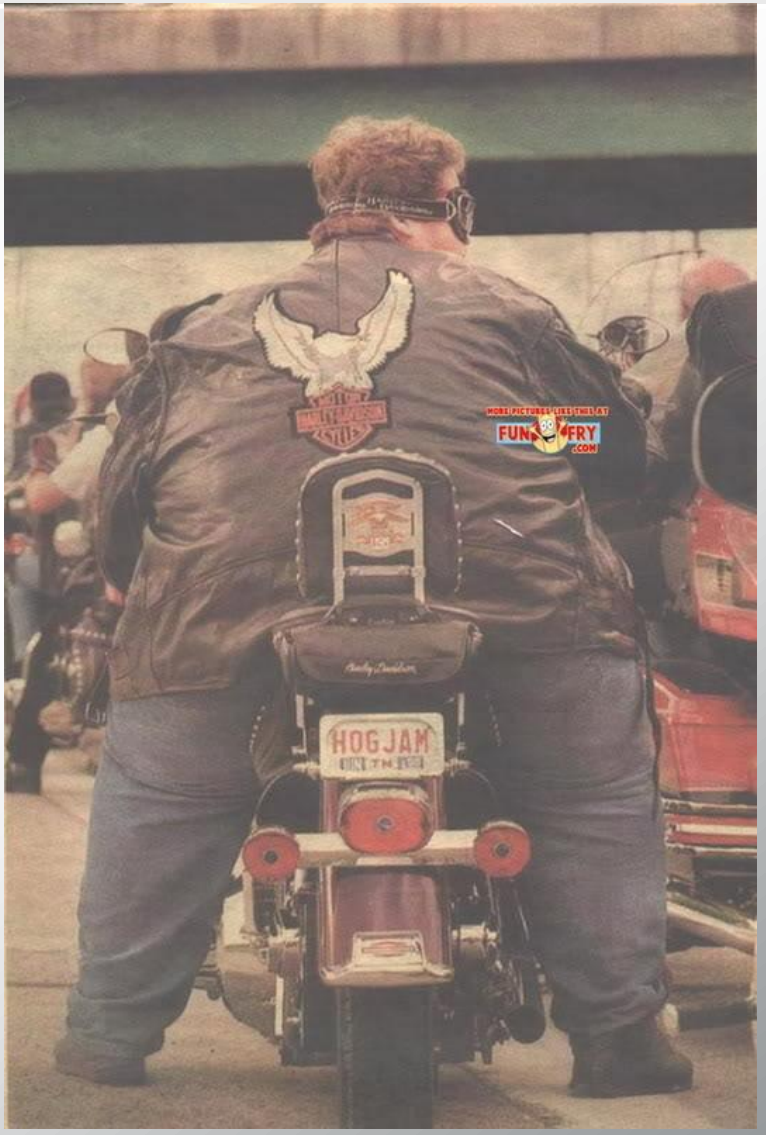
  - But we're just as excited...right?

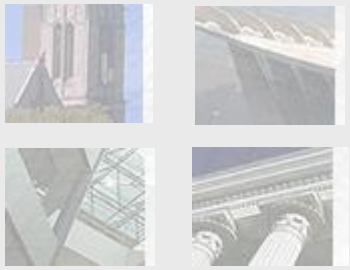
- **Public Speaking 101**
  - **Know your Material**



Public Speaking 101

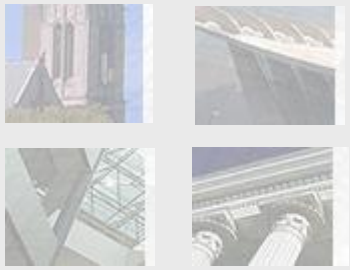
- Know your Limits
  - It's about timing
  - And squeezing it all in





❖ Purposes of the Presentation

- To illustrate the various forms of “green” options for reroofing.
- To demonstrate that good roof design can be broken down to seven fundamentals that we can all apply to our everyday practice.



- **Green Roofing is:**
  - **Vegetative Roofing**
  - **High Solar Reflectance Index (SRI) Roofing**
  - **Minimizing Heat-Island Effect**
  - **Re-roofing or recovery with recycling in-mind**
  - **Maximizing re-use of materials**
  - **Less impact on the environment and the public**
  - **Maximizing Expected Useful Life (EUL)**

Green roofing?

- **Green roofing?**
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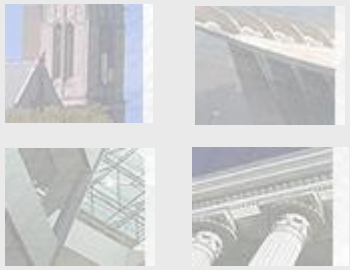
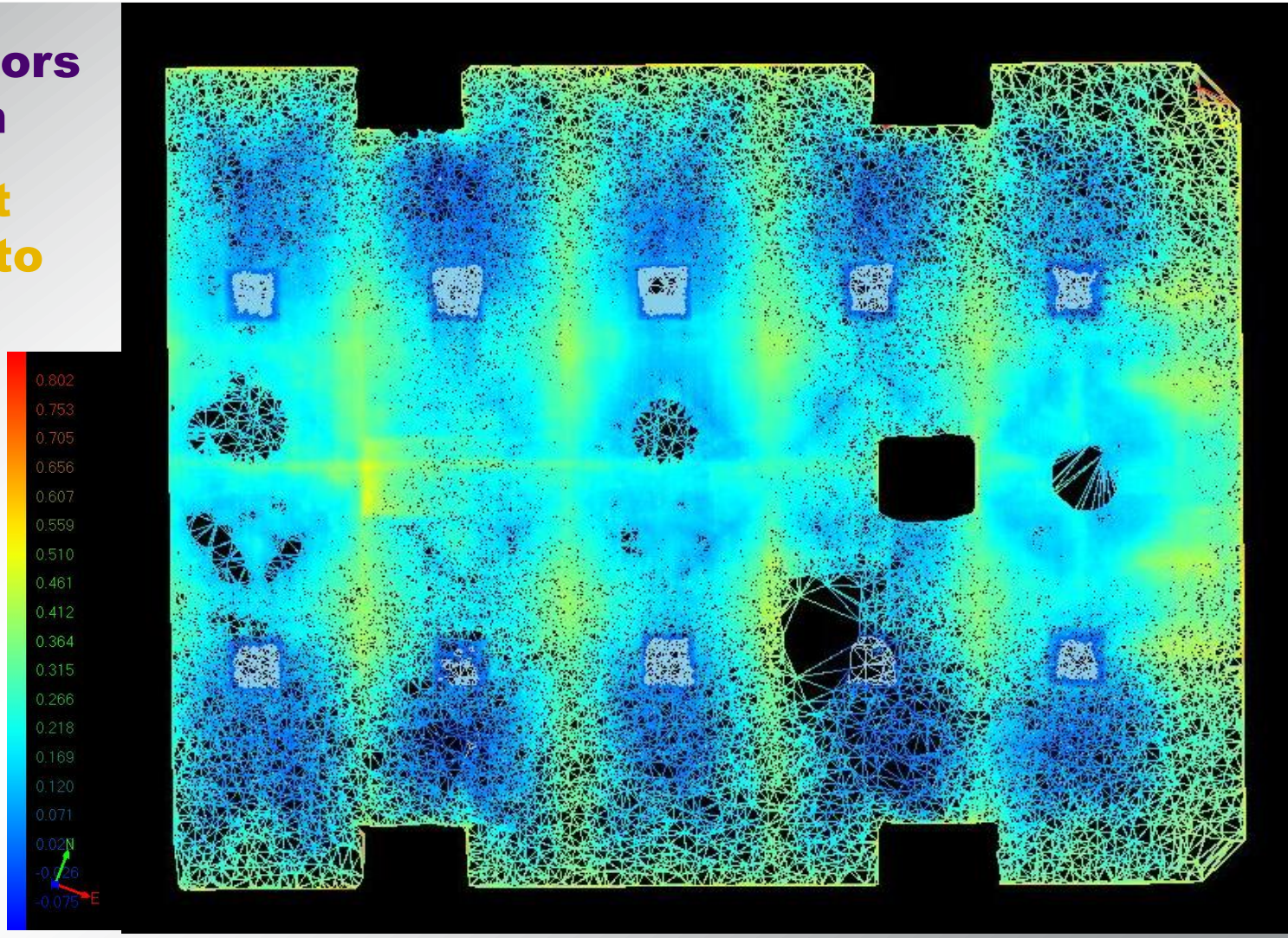


Seven Factors in Roof Design

- Slope – get the water to the drains
- Drainage – get the water off the roof
- Attachment – hold the roof down
- Durability – material properties
- Constructability – how we build it
- Maintenance – how we make it last
- Sustainability – the “green” factor

❖ Seven Factors in Roof Design

- **Slope – get the water to the drains**



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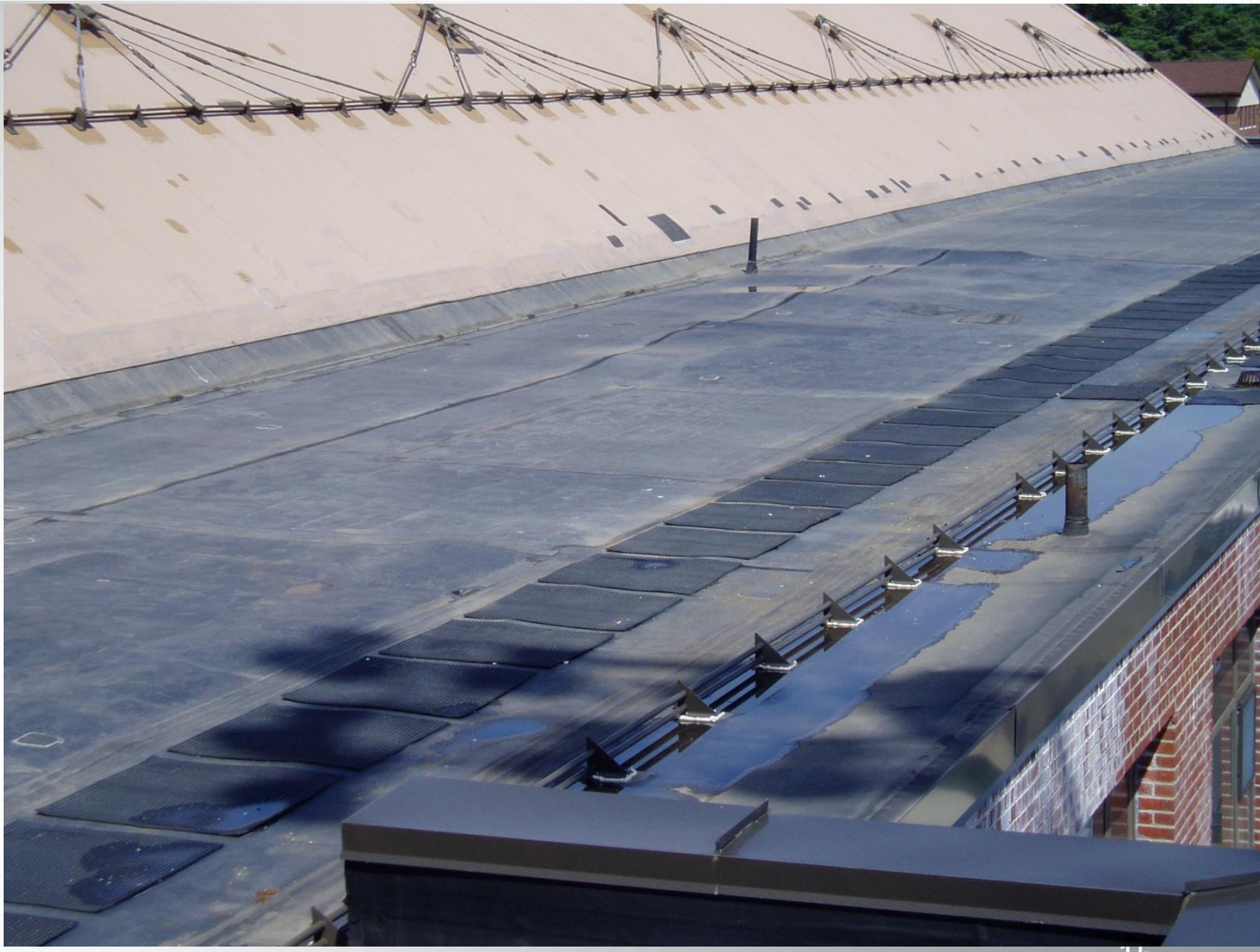
❖ Seven Factors in Roof Design

- **Drainage – get the water off the roof**

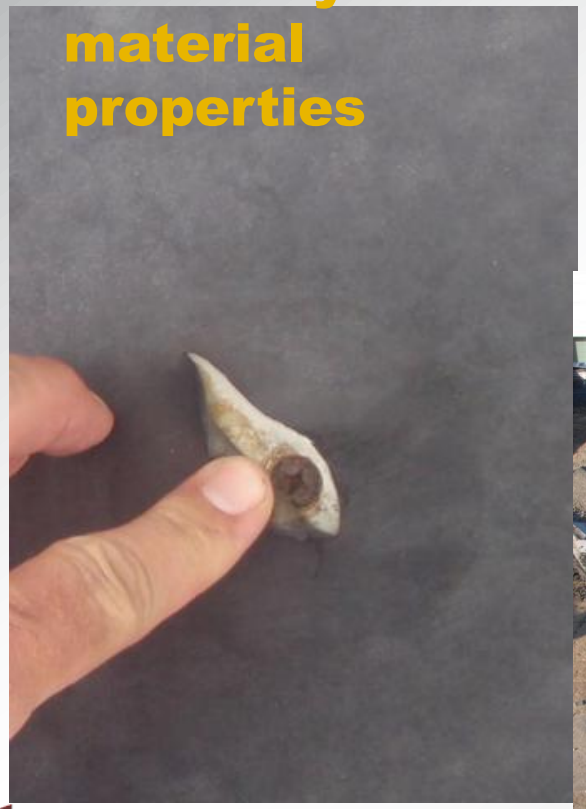
❖ Seven Factors in Roof Design

- **Attachment – hold the roof down**



❖ Seven Factors in Roof Design

- **Durability – material properties**



❖ Seven Factors in Roof Design

- **Constructability – how we build it**

❖ Seven Factors in Roof Design

- **Maintenance – how we make it last**

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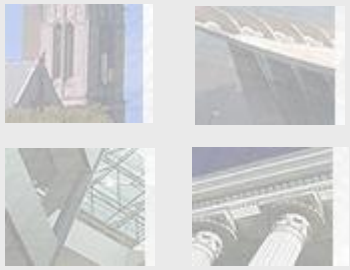
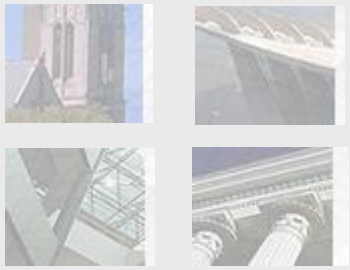
❖ Seven Factors in Roof Design

- **Sustainability – the "green" factor**



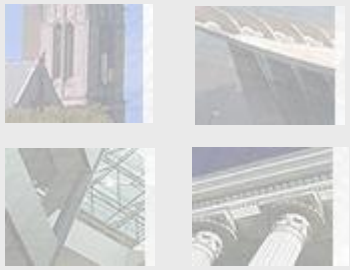
❖ Loads on the Roof System

- **Pre-Construction**
  - Manufacturing
  - Storage
  - Shipping
  - Delivery
- **Construction**
  - Insulation Installation
  - Construction Traffic
  - Wind Uplift
  - UV Radiation
  - Membrane Installation
- **Service Loads**
  - Heat Transfer
  - Vapor Drive
  - Leak Migration
  - Live Load
  - Dead Load
  - Roof Traffic
- **Reroofing Loads**
  - Ballast Removal
  - Membrane Removal
  - Reroofing



Summary

- Slope of ¼ per foot to direct water to drains
- Drainage and overflow protection per code, ++
- Attachment appropriate and proven for each deck type
- Durability as appropriate to use, access, and life-cycle cost
- Constructability that fits each roof
- Maintenance of the membrane can be difficult if the membrane is protected.
- Sustainability is meeting or exceeding the expected useful service life…among other factors.



Questions?