



Resilient Roof Covers

Chuck Miccolis
Vice President, Commercial Lines
Insurance Institute for Business & Home Safety



IBHS Research Center





IBHS Mission

To conduct objective, scientific research to identify and promote effective actions that strengthen homes, businesses and communities against natural disasters and other causes of loss.

Common Failure Points in Natural Hazards

- Roof—first line of defense
- Openings—keep Mother Nature out
- Connections—details matter

The Roof – First Line of Defense



Preventing Damage

Roof – first line of defense

- Product selection
- Perimeter/Corner
 - Need additional securement!
- Installation details
- Flashing details



Roof Vulnerabilities Caused by Natural Weathering

- Product brittleness
- Loss of protective coatings
- Degradation of impact-resistant characteristics

How does climate impact these?

How does length of exposure impact these?



Preventative Maintenance

- Implement periodic roof inspection and repair plan
- Repair roof leaks/bubbles/wet insulation
- Check all penetrations
- Check roof-mounted equipment
- Remove loose objects
- Remove loose pea gravel
- Check drainage/gutters

Failure of Roof Components

- Flat/Low-slope roof cover & deck failures
 - Often begin at perimeter/corner
- Roof edge fascia/flashings
- Roof-mounted equipment
- Structural and load path failures



Photos courtesy of RICOWI Hurricane Ike Wind Investigation Report (2009)

Metal Edge Flashing

Why is it so important?

- Found on nearly all roof cover systems
- Encapsulates roof cover's termination
- Roof cover's first line of defense
- Failure of flashing can result in partial/total loss of roof cover
- Easy to identify if a problem and inexpensive to repair



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Openings and Connections – Details Matter



Consequences of Building Envelope Breach

Wind damage to building's main envelope can cause consequences including but not limited to

- Water intrusion
- Mold growth
- Structural stability issues
- Safety concerns
- Business downtime



Low-Slope Roof Covers Recommended Wind Ratings

Low-slope roofs

- FM Approvals



- Miami-Dade County Approved NOA



- Florida Product Approval

- Texas Dept. of Insurance, “Product Evaluation Index for Roof Coverings”

- ICC Evaluation Services



Steep-Slope Roof Covers Recommended Wind Ratings

Steep-slope roofs

- Attach deck with 2.0 safety factor and seal the roof deck

Asphalt shingle

- 110 mph = ASTM D3161 Class F; MDCA TAS 107; ASTM D7158 Class G or H
- 120 mph = ASTM D7158 Class G or H
- ≥ 130 mph = ASTM D7158 Class H

Concrete, clay tile

- Concrete and Clay Roof Tile Installation Manual by the Tile Roofing Institute (avoid mortar set installations)

Hail Impact–Resistance Ratings

Low-slope roofs

- FM Approvals Standard 4470, Class 1-SH
- UL 2218 Class 4 (Steep-slope/shingles)
- ASTM D3746 Standard Test for Bituminous Roofing Systems

How Much Would You Spend to Stay Open for Business[®]?

- Upgrades to a stronger building may cost less than 5% of total building construction cost
- In many areas of the country, 5% is less than cost of sales tax on building materials



Mitigation

\$6

**\$6 in savings for every \$1 spent
via federal mitigation grants**

According to 2017 NIBS Study

\$1



FORTIFIED

- Voluntary, superior construction standards designed to build and retrofit stronger, safer buildings that are more disaster-resistant
 - Grounded in 20+ years IBHS research
 - Technical standards (FORTIFIED Commercial™ and FORTIFIED Home™)
 - Inspection- and quality control-based

FORTIFIED Commercial: Eligible Buildings

- Chapter 3, Section 302 of the 2015 International Building Code
- NOT high hazard occupancies and low-value buildings (sheds)



FORTIFIED Commercial: Systems Evaluated

Hurricane



Roof System



Building Envelope and Electrical
Connections for Backup Power



Continuous Load Path; On-Site
Backup Power for Critical Utilities

High Wind & Hail



Roof System



Building Envelope Protection and
Optional Electrical Connections
for Backup Power



Continuous Load Path; On-Site
Backup Power for Critical Utilities

Location and design wind speed are key determining factors in deciding which standard(s) apply.



Thank You

Chuck Miccolis

813-675-1056 | cmiccolis@ibhs.org