Nationwide®, a member of the Insurance Institute for Business & Home Safety, is proud to present you with valuable IBHS loss control resources.

Roof Protection Begins at the Edge

EVERY YEAR HURRICANE SEASON PUTS BUSINESSES ALONG THE ATLANTIC AND GULF COASTS ON HIGH ALERT FOR DAMAGING STORMS, BUT HIGH WIND EVENTS ALSO OCCUR THROUGHOUT THE YEAR IN ALL PARTS OF THE COUNTRY. TORNADOES, SEVERE THUNDERSTORMS, POWERFUL STORM FRONTS, AND DERECHOS ALL CAN CAUSE SIGNIFICANT DAMAGE TO COMMERCIAL BUILDINGS, OFTEN STARTING WITH OR RESULTING FROM THE LOSS OF ROOF COVER.

In order to demonstrate how businesses can reduce wind damage to their commercial building's roof cover system, the Insurance Institute for Business & Home Safety (IBHS) conducted a commercial high wind test in July 2012 at its state-of-the-art Research Center. The test compared "common" versus "stronger" construction practices for small retail/service masonry structures. The exact same materials were used to construct both buildings; however, the focus was on how these materials were chosen and installed.

Modest reinforcement of the walls, as well as creating a continuous load path by tying the roof to the walls and the walls to the foundation, added approximately five percent to the cost of the "stronger" building – an amount that is less than the sales tax in many states. This relatively small investment in tying the structure together – starting with the roof – paid great dividends, with the cost of repair 90 percent less for the "stronger" building than for the "common" construction building ($4,680 vs. $44,709 respectively—not taking business interruption losses into account).

This article focuses on one important aspect of the stronger commercial building – the edge flashing, used in roof/wall connections.

IBHS testing of common versus stronger construction practices for small retail/service masonry structures. To see the complete test and for more information on the IBHS commercial high wind demonstration, visit www.disastersafety.org/high_winds/commercial-high-wind-test-resources/.

METAL EDGE FLASHING INSTALLATION ON LOW-SLOPE ROOF SYSTEMS

Most low-slope and flat roofs have roof cover systems that terminate under the edge flashing system. As shown in the photo above, the edge flashing (finished in blue) can be found where the roof meets an exterior wall.

Metal edge flashing can be found along the perimeter of a building where the roof meets an exterior wall, and includes a metal fascia that extends down the wall several inches. This is where the roof cover terminates at the edge of the building, and is the roof cover's first line of defense against wind damage.

- Securement of the edge flashing is critical to keeping the roof cover intact during high winds. Loose flashing will allow wind and rain to get underneath the roof cover where wind action will add to uplift pressure on the roof system. This can be like un-tucking bed sheets from a bed, allowing wind and wind-driven rain to get underneath the cover.

- High winds can peel back loose fascia and tear away the entire edge flashing system.

- The roof cover system also can peel away from the edge if the flashing fails. This is a common failure point that can result in partial or total loss of a roof cover system.

- In addition, water entry due to loose flashing can create moisture problems within the roof cover system and inside the building.

While most roof covers terminate under the flashing system, some single-ply membrane roof covers and buildings with perimeter parapets may include a cover system that terminates at the edge of the roof near the base of the parapet. This is attached using metal termination strips with mechanical fasteners and plates, or a similar method. However, it is still very important to ensure the edge flashing system, including parapet walls, is well secured to avoid any water intrusion and building damage.

INSTALLATION QUALITY MATTERS

There is relatively little difference in the cost of a non-wind rated metal edge system, compared to one that is approved to meet high wind requirements. However, installation is another important factor in correctly-functioning flashing. Typically, when the metal edge system is not installed correctly, it is due to poor workmanship. Proper installation guidelines are discussed in the "Replacement Best Practices" section later in this article.

INSPECTION GUIDELINES

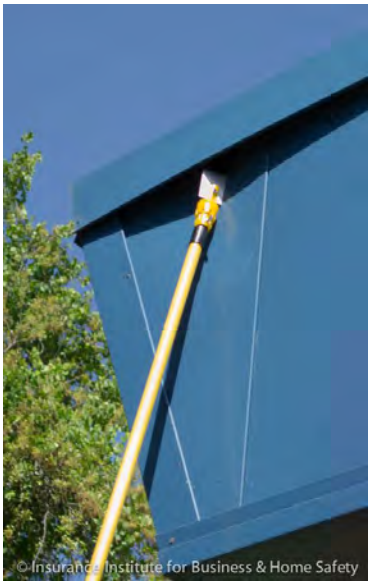
Metal edge flashing securement should be inspected periodically by qualified personnel. In hurricane-prone areas, flashing should be checked at the beginning and end of each hurricane season. Post-storm inspections are equally important. If you are inspecting edge flashing while on the roof, always use appropriate safety precautions and personal protective equipment. When conducting the inspection, spot-check multiple sections of flashing and pay particular attention to corner areas, as they are most vulnerable to damage. As you gently pull the flashing up and out away from the wall at each location, look for the following:

- Can you pull the bottom edge of the fascia flashing more than 1 ½ inches or so away from the wall? If yes, the flashing is not well-installed and may need to be repaired or replaced.

- Did you find any areas where the bottom edge of the flashing was not tightly crimped over a continuous or intermittent cleat or was there no sign of a cleat? If yes, the flashing is not well-installed and may need to be repaired or replaced.

- Are the seams between sections of the flashing where it overlaps not closed or tight? If yes, the joints may need to be resealed.

While it's best to conduct a physical inspection of the flashing system from the top, roof access is not always possible. One alternative is a simple method developed by IBHS for checking edge flashing securement from the ground, using a telescoping pole with a piece of 1 ½ in. wide metal on the end that can be used to test the tightness of the fascia by rotating the pole (*shown on the next page*). If the fascia pulls out when the metal piece is turned between the fascia and the wall, the flashing probably is loose and may need to be replaced.



A flashing inspection tool developed by IBHS allows an inspector to physically check the flashing from the ground.

Other things to look for when inspecting edge flashing from the ground include the elements outlined below:

- Gaps, bowing or waviness between the fascia metal (the part of the edge flashing running down the face of the wall) and the wall, as shown in the following photo.

Look for gaps between the flashing and the wall when inspecting edge flashing.

- Signs the attachment of the fascia metal to the wall is not made with a continuous cleat (this will be indicated by the fascia metal pulling tight against the wall at certain locations and bowing out between these points).

- Gaps of more than 2 feet between the external fasteners that anchor the fascia metal to the wall, indicating that the flashing is not well-attached.

For a full description of metal edge flashing, installation, inspection methods, and assessing securement, please see IBHS' Evaluating Wind Resistance of Metal Edge Flashing guide available at http://www.disastersafety.org/wp-content/uploads/Evaluating-Flashing-Attachment-for-Wind-Resistance_IBHS.pdf.

REPAIR OPTIONS

Post-storm surveys have shown that flashing performs best when the lower portion of the fascia is attached directly to the building using screws spaced 12 inches to 24 inches on center.

If you have no plans to replace or re-cover a damaged roof cover system, repairing the fascia with exposed fasteners is a cost-effective option in lieu of replacing the entire edge flashing system.

- If mechanical fastening is the preferred option, ensure the screws penetrate approximately 1 inch to engage a structural part of the wall or a properly secured wood nailer.

- The type of exposed fastener will depend on the type of substrate and may require the use of stainless steel self-tapping concrete, sheet metal, or wood screws. Pre-drilling for metal anchors may be needed in some cases.

- To prevent leaks and the contact of dissimilar metals, use fasteners with an EPDM gasket.

- The fasteners should be spaced closer together and no more than 12 inches apart in the corners of the building. One potential drawback to fascia attachment using mechanical fasteners is "oil canning" or waviness to an otherwise flat fascia surface. To reduce "oil canning," pre-drilled holes should be slightly larger than the screw to allow for thermal movement of the metal. Also ensure that the gasket completely covers the holes and does not allow any leakage.

REPLACEMENT BEST PRACTICES

If you plan to replace or re-cover a low-slope membrane roof cover system, request that your roof contractor install an edge system (as well as the roof cover system) that is approved for the local design wind speeds by FM Approvals or Miami-Dade County. Another option is installation in accordance with one the following:

- ANSI/SPRI/FM4435/ES-1, "Wind Design Standard for Edge Systems Used with Low Slope Roofing Systems"
- Florida Building Code Roof RAS 111
- NRCA Roofing Manual, Sections – "Membrane Roofing Systems" and "Architectural Metal Flashing"

NOT JUST A COASTAL CONCERN

Poorly secured edge flashing can come loose in winds as low as 40-50 mph. Many parts of the country experience these wind speeds throughout the course of a typical year. In fact during the first five months of 2013, there were 370 preliminary tornado reports, and 3,305 preliminary severe wind reports in the U.S. Several recent "derecho" storms (see box) provide good examples of the exposure of commercial property to high winds that can occur with little warning, and the need for proper roof cover edge securement, starting with the edge flashing.

Proper termination of the roof cover at the edge and its transition to the wall is an important and relatively inexpensive investment in reducing property damage and business interruption, and inspecting and maintaining this investment is well worth the time and effort.

THE DAMAGING EFFECTS OF A DERECHO

A derecho is a widespread and long-lived windstorm that is associated with a rapidly-moving complex of thunderstorms and high winds that travel in excess of 250 miles. The majority of observed wind reports are usually between 50 and 70 mph; however, wind gusts can reach speeds of 80-100 mph. Derechos typically occur in the Midwest region of the United States, but once mature, can travel several hundred miles, impacting areas far away from their place of origin.

As recently as July 10 of this year, roughly 300 reports of either wind damage or high winds (greater than 58 mph) were received in the Ohio and Tennessee Valleys. Columbus, Ohio, had a reported wind speed of 71 mph, wind speeds in Sidney, Ohio, clocked in at 86 mph, and parts of Pennsylvania and Indiana experienced 80+ mph winds. Gusty winds blew out a wall at a Regional Transit Authority station and blew off part of the roof of the Cleveland city hall in Ohio. Property damages and power outages were reported in Indiana, Ohio, Kentucky and Pennsylvania.

In June 2013, two derechos occurred in different regions of the country. On June 13, the first derecho caused extensive damage throughout the Midwest, central Appalachians, and Mid-Atlantic states. A second, more widespread and intense derecho occurred on the following day and traveled across the southeastern United States, resulting in major wind damage throughout North Carolina, Virginia, and Maryland. Over an 18-hour span, the two storms covered approximately 1,100 miles with a total of 295 severe thunderstorm and tornado warnings issued, according to the National Weather Service's Storm Prediction Center (SPC). Ultimately, the storms caused extensive damage in 18 states – resulting from significant straight-line winds and isolated tornadoes – from Iowa to South Carolina.

In June 2012, a derecho resulted in more than 600 damaging wind reports and traveled roughly 12 hours from northern Indiana to the southern mid-Atlantic coast. Wind gust reports during the storm at the Fort Wayne International Airport in Indiana reached 91 mph (equal to a Category 1 Hurricane).

IBHS is a non-profit applied research and communications organization dedicated to reducing property losses due to natural and man-made disasters by building stronger, more resilient communities.

Insurance Institute for Business & Home Safety
4775 East Fowler Ave.
Tampa, FL 33617
(813) 286-3400
DisasterSafety.org