The roof system now

The steps you take following

by Thomas L. Smith, AIA, RRC

When a roof system blows off, there usually is a rush to reroof the building because an uncovered building is vulnerable to water infiltration. Although this urgency is understandable, a blown-off roof system should be treated similar to a crime scene, and your goal should be to investigate it before conditions are altered.

Photos provided by TLSmith Consulting Inc., Rockton, Ill.

This metal roof system failed because of extended over a canopy walkway, and connected to the foundation. The failure progressed into the roof's field.

blew off—what?

a roof system blow-off are critical

foundation failure. The metal panels the walkway columns were poorly columns and overhang lifted, and the

Investigating why a roof system blew off can help you address disputes in the future. Inadequate investigation and evaluation can result in a replacement roof system that possesses inadequate wind resistance, and it may blow off, as well.

Following are important steps that should be taken after a roof system blows off to minimize your liability and increase the probability that a replacement roof system will resist wind adequately.

The first steps

Be sure to notify your insurance company and roof system manufacturer immediately after wind damage has occurred. You may want to notify your attorney, as well, except in cases of minor, inexpensive damage.

In most cases, water infiltration caused by a blown-off roof system can be more costly than roof system damage. Depending on the value of a building's contents and number of stories, interior damage costs can range from 10 to 100 times the cost of roof system damage. In addition, there are business interruption costs, which easily can exceed the building damage costs. The party or parties found liable for a roof system blow-off may also find themselves liable for these damages.

If rain accompanies a windstorm or is forecast, emergency repairs should be performed as soon as possible to minimize further water infiltration. Although this conflicts with the goal of investigating an area before a scene is changed, if water is pouring in or a rainstorm is on the way, emergency repairs usually take precedence over preservation of the damage scene.

It generally is not advisable to attempt repairs until after severe weather has ceased because of the danger of high winds and possibility of lightning. Caution should be exercised when inspecting and making emergency repairs because storms may have made a damaged roof system extremely hazardous.

If emergency repairs have to take place before an investigation, the following should occur:

1. At least some minimal documentation, such as photographs, should be made before the scene is changed. All roof system debris should be retained on- or off-site for follow-up investigation.

2. To the extent possible, perform emergency repairs in a manner that will minimize changing the scene and facilitate a follow-up investigation. For example, if a roof membrane has peeled off, consider loose laying and temporarily ballasting an EPDM sheet rather than mop-applying two plies. With this approach, the repair work can be removed easily during the investigation and an investigator can inspect the membrane substrate.

Emergency repairs should minimize the likelihood that a subsequent windstorm will blow off remaining portions

The standing-seam metal panels on this building blew off after the overhang purlins failed.

of a roof system. Until more substantial or permanent repairs are made, a roof system or assembly will be vulnerable to high winds, but attempts should be made to secure the roof system or assembly so that it can accommodate modest winds while an emergency roof system is in place. Emergency repairs should include removal or emergency reattachment of loose flashings, as well as removal of loose debris.

The following publications provide additional information about emergency repairs: *Manual for Inspection and Maintenance of Built-Up and Modified Bitumen Roof Systems: A Guide for Building Owners*, published by NRCA and the Asphalt Roofing Manufacturers Association; *Manual of Roof Inspection, Maintenance and Emergency Repair for Existing Single-Ply Roofing Systems*, published by NRCA and SPRI; and *Manual for Inspection and Maintenance of Spray Polyurethane Foam-Based Roof Systems: A Guide for Building Owners*, published by NRCA and the Spray Polyurethane Foam Division of The Society of the Plastics Industry Inc.

Your investigation

Following a roof system blow-off, a two-stage investigation is recommended. Stage one should be performed by you and an experienced roofing worker as soon as possible after notification of the blown-off roof system. Stage two should be performed by an independent investigator.

Stage one's purpose is to obtain basic information about the magnitude of roof system and interior damage. It also determines whether adjacent property (e.g., other buildings, vehicles, landscaping) was damaged and anyone was injured.

During your investigation, try to take several high-quality, color photographs. Because these may be the only photographs taken before a scene changes, it is important to obtain thorough documentation.

Also, consider video documentation. When panning a video camera, it is important to pan slowly. When not panning, allow each shot to last several seconds. While shooting a video, it also is helpful to verbally describe conditions, such as direction of view. However, refrain from giving your analysis of a problem. Such assessments should be performed by a qualified investigator after collection of background data. Following these procedures will facilitate video analysis.

After completing your investigation, retain a qualified investigator to document and evaluate the damage.

The investigator

If your insurance company sends an investigator to the scene, be sure he is qualified. Although the person selected by the insurance company may have experience with failure investigations, if he has limited experience with roof systems or is not experienced with the type of roof system that blew off, it is doubtful he will be effective.

In this scenario, retain another investigator who is knowledgeable of the roof system being investigated,

Emergency repairs usually take precedence over preservation of the damage scene.

has substantial damage investigation and evaluation experience, and understands wind-engineering fundamentals. You then should ask the insurance company to use your selected investigator. If the insurance company insists on its chosen investigator, request the insurance investigator and your chosen investigator investigate the job site at the same time and coordinate efforts.

In addition, if the roof system manufacturer investigates the job, request the manufacturer's representative investigate the damage at the same time your investigator does.

Although one investigator representing all parties is possible, some investigators view their jobs as means for finding data that can be used to blame someone other than their clients for the failure. Also, many investigators lack the expertise to conduct a quality investigation, especially if unique conditions played a role in the blow-off. For these reasons, each party should retain an investigator rather than rely on the findings of an investigator retained by another party.

An investigator then can begin the second phase of investigation, which includes documenting roof system and interior damage and damage from wind-blown roofing debris to other property, such as cars; determining the failure initiation points and causes; and evaluating site-specific wind-building interaction characteristics.

Evaluation

After the field investigations, the next step for the investigator is to perform an evaluation. An evaluation should take into account the investigation findings, analyses of wind data and design documents (if available), and roof system history.

If a wind event did not exceed original design conditions, there was a problem with the original design, construction, materials, or published resistance of the system or its components. In this case, you should not install another system identical to the blown-off roof system.

The nailer to which the metal edge flashing was attached failed, which resulted in a massive peeling of this fully adhered single-ply membrane.

If only a small portion of a roof system blew off, it may be appropriate to perform repairs in just that area. However, if the evaluation indicated failure at less than the design conditions, the roof area that was not damaged is potentially vulnerable to a future storm. In this case, the undamaged area should be evaluated and upgraded if necessary. It is far less expensive to upgrade a weak area than reroof it after it, too, has blown off a building.

Because of the desire to reroof a building as quickly as possible, the critical evaluation stage often does not receive the attention it should. As a result, decisions can be made that result in the installation of a roof system that is no stronger (and sometimes weaker) than the blown-off one.

To avoid this, it usually is a good idea to install a temporary roof system after the investigation is complete. A temporary roof system can provide months of protection while a thorough evaluation is performed and appropriate reroofing design developed.

Summary

To prevent a roof system from blowing off, the best course of action is to take precautions during design and construction. But for weak roof systems that already exist and are not upgraded, if a blow-off occurs, it is important to minimize water damage, thoroughly investigate damage, and take steps during reroofing design and construction that decrease the possibility of the new roof system blowing off again.

The costs associated with wind damage can be high; therefore, careful steps need to be taken to limit your liability and avoid a reoccurrence of an unpleasant event.

Editor's note: *The information included in this article is the author's opinion. Views expressed are not necessarily those of NRCA.*

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