



Concerns with roof drains

Recent code changes may affect roof drainage system design for low-slope roof systems

by Mark S. Graham

Recently, changes have been made to the current model building and plumbing codes that may affect roof drains and roof drainage system design for low-slope roof systems. You should be aware of how these changes can affect your new construction and reroofing work.

Historical methods

The design of roof drainage systems, including roof drains, scuppers and gutters, traditionally has been addressed in the applicable plumbing code and generally is considered to be the responsibility of plumbing designers. For example, in the International Code Council's (ICC's) International Plumbing Code® (IPC), sizing of roof drains, scuppers and gutters—and any related conductors and leaders (drain piping, downspouts)—are addressed in Chapter 11-Storm Drainage.

Through the 2012 edition of the IPC, the sizing of roof drainage systems primarily was based on designing vertical conductors and leaders to accommodate a 100-year hourly rainfall rate or another rainfall rate determined from local weather data approved by the code official or



other authority having jurisdiction. The IPC includes maps indicating the 100-year hourly rainfall rates expressed in inches.

In the International Building Code® (IBC), a statement is made in Chapter 15-Roof Assemblies and Rooftop Structures indicating the design and installation of roof drainage systems shall comply with the IPC.

Some jurisdictions may not adopt the same editions of the IPC and IBC. Other jurisdictions may adopt plumbing codes other than the IPC. Both scenarios can create difficulties and potential conflicts between the building and plumbing codes as they

relate to roof drainage system design.

Recent changes

Beginning with the publication of the 2009 I-Codes and continuing to the current edition (2018 I-Codes), additional roof drainage requirements were added to the IBC's Chapter 15, including provisions requiring secondary drainage and for scuppers when they are used as secondary drainage. Secondary roof drains or scuppers are required when the roof perimeter extends above the roof surface in such a manner that water will be entrapped if the primary roof drains are clogged.

Because the IBC's provisions for reroofing require roof system re-cover and replacement comply with the same Chapter 15 requirements

as for new construction (except minimum roof slope), it may be interpreted secondary roof drainage provisions need to be added in reroofing projects when the existing roof system does not already include secondary drainage.

Review of the code change proposal (ICC Code Change FS167-06/07) that added these provisions to IBC 2009's Chapter 15 shows applicability to reroofing situations was not intended.

“Designers need to clearly define the extent and sizing of any intended roof drainage system methods”

In IBC 2015, a provision was added to Chapter 15's reroofing requirements indicating secondary drains or scuppers are not required to be added if they were not already present for roofs that do not pond water. This provision also appears in IBC 2018.

Also, beginning with IPC 2015, the method for sizing roof drainage systems now is determined by roof drain manufacturers' published flow rates based on a head (height) of water above the roof drain. The flow rate for conductors and leaders shall be based on the maximum anticipated ponding height at the roof drain.

What it means

The method for designing roof drainage systems has changed notably with the recent editions of the I-Codes. Generally, these changes

result in the need for higher capacity roof drainage systems than those designed using historical methods.

Also, I-Codes' roof drainage design provisions related to reroofing situations is subject to possible misinterpretation.

NRCA has reviewed roof drain and drain insert manufacturers' product literature for their published flow rates and has surveyed manufacturers for design information necessary for complying with the current editions of the plumbing codes. Few (if any) manufacturers currently provide the information necessary for strict compliance with IPC 2015 or IPC 2018.

As a part of its ongoing code development process, ICC is considering a number of code change proposals intended to clarify and revise requirements for roof drainage system design. If accepted by ICC's membership, the revisions would first appear in the 2021 I-Codes.

Until the roof drainage provisions contained in the latest editions of the I-Codes can be appropriately clarified or revised, designers of roof drainage systems need to clearly define the extent and sizing of any intended roof drainage system work. Given the codes' current requirements and manufacturers' lack of code-compliant design information, performance-based statements simply indicating a design intent to comply with the applicable codes clearly are inadequate.

Designers of roof drainage systems can consult with the plumbing code official or the authority having jurisdiction for the code official's interpretation of the necessary requirements for roof drainage systems. 🌱🌱

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Employees have mixed feelings about AI in the workplace

A recent survey conducted by The Workforce Institute at Kronos Inc. shows four out of five employees believe artificial intelligence (AI) in the workplace will make work more empowering and engaging; however, they also think employers' reluctance to discuss the topic is causing fear and concern, according to www.constructiondive.com.

The “Engaging Opportunity: Working Smarter with AI” survey polled 3,000 workers in eight countries and found 58 percent of organizations haven’t discussed AI’s possible effects on the workforce with their employees. Eighty-two percent of survey respondents said AI is an opportunity to improve their jobs. Thirty-four percent are concerned the technology could someday take their jobs—a viewpoint held by 42 percent of Generation Z employees (those born between the mid-1990s and early 2000s). Two-thirds of workers surveyed said they would be more comfortable with the use of AI in the workplace if employers were more transparent about the future integration of the technology.

Sixty-four percent of respondents said they would welcome AI if it simplified or automated internal processes and helped balance their workloads. Some researchers are using AI to uncover ways to protect workers, such as University of Waterloo researchers in Ontario who are using AI to gain insight regarding how skilled laborers can reduce wear-and-tear injuries. The outcomes of such research likely would benefit many workers within the construction industry.

From robots in construction and manufacturing to algorithms in employee data analysis, AI is moving into all aspects of the workplace. Employers must be transparent and show workers where AI already is being used in their organizations and where the technology could be used or expanded. Realistically, employees likely won’t be replaced immediately, but workers should be informed about which jobs will use AI in the future so they can increase their skill sets or choose different careers to prepare for the changes.

For now, many readings regarding AI are only projections. A Gartner study predicts AI could bring in 2.3 million more jobs to offset the 1.8 million jobs it replaces; however, the new jobs are expected to require higher-level or specialized skills.

The construction industry is preparing for AI as the technology continues to advance. A January 2018 Midwest Economic Policy Institute report used 2017 employment statistics from the Bureau of Labor Statistics and estimates from McKinsey & Company to predict automation will displace nearly 3 million construction workers during the next 40 years. And the momentum is expected to continue as more companies develop robotics and AI systems geared toward addressing the industry’s productivity issues.

Many small-sized construction companies do not plan to invest in tech

Less than 35 percent of small-sized construction companies plan to make investments at some level this year in technologies that could help their businesses, a recent customer survey from small-business funding site Kabbage revealed, according to www.constructiondive.com.

More than 65 percent of contractors who responded to the survey indicated they do not have a plan to invest in tools such as big data solutions or mobile technologies. The same percentage of respondents also are either neutral, against or not likely to spend more than 20 percent on social media advertising.

The survey also revealed less than 40 percent of small-sized construction firms plan to invest in cyber security despite the threat of cyberattacks and other computer crimes. However, more than 50 percent of contractors said they plan to streamline their operations during 2018 by eliminating paper and manual processes.

In general, the construction industry is moving forward with the adoption of technologies, but surveys such as the one conducted by Kabbage indicate there are contractors who remain resistant to technology despite the benefits or protections it could provide.

Companies of all sizes can be victims of cyberattacks, and even companies with a low level of technology integration—such as those with employees who use tablets or smartphones to conduct business—can be vulnerable. To better protect company data, attorney Michelle Schaap of Chiesa Shahanian & Giantomasi, West Orange, N.J., says contractors should keep their firewalls and anti-virus software up to date, as well as partition information so if one device is attacked, the rest of a company’s devices and digital technologies will not be affected.

ARMA completes energy-efficiency research project

The Asphalt Roofing Manufacturers Association (ARMA) has completed an eight-year research project designed to help researchers compare the energy efficiency of reflective and highly insulated low-slope roof systems.

ARMA partnered with the EPDM Roofing Association and the Polyisocyanurate Insulation Manufacturers Association to sponsor the analysis of a reroofing project at the Onondaga County Correctional Facility in Jamesville, N.Y. During a seven-year period, roof temperature and indoor temperature data were recorded every 15 minutes from the following roof systems on four buildings with identical roof layouts at the facility:



Aerial view of campus

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Using the collected data, ARMA researchers could examine the effects of roof insulation R-values, roof reflectance values and vegetative roofing on roof systems' energy-efficiency performance in a northern climate.

"This study presented the perfect opportunity to evaluate how a cool roofing system compared to vegetative roofs and highly insulated roofing options in terms of energy efficiency," says Michael Fischer, ARMA's vice president of codes and regulatory compliance. "Not only were we able to gauge a cool roof's performance, but we also gained valuable insight into how all four roofing systems performed in a northern climate over time."

To learn more about the Onondaga County Correctional Facility research project, contact ARMA at www.asphaltroofing.org/contact-us.