The importance of roof drain height

Coordination and communication are essential to achieve a properly draining roof system

by Mark S. Graham

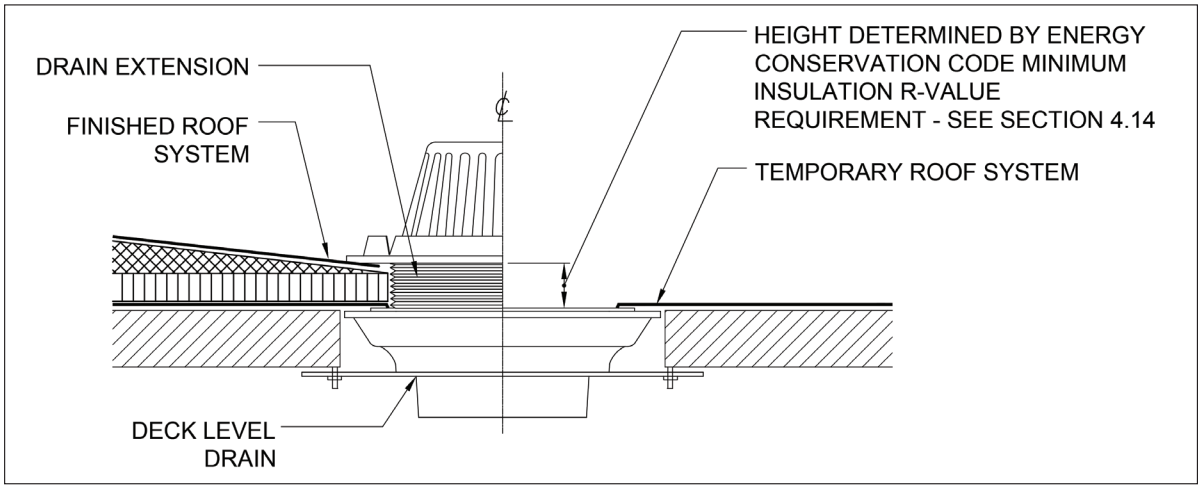
Proper roof drain height above a roof deck is an important design consideration and integral part of properly draining a roof system's surface.

For a new construction project, roof drain placement usually is identified to the plumbing contractor in the construction document's plumbing drawings, and the specific roof drain intended is identified in the plumbing specifications. Unfortunately, when designing plumbing systems, plumbing system designers and plumbing contractors usually have little knowledge of a building's specific roof system design and the intended thickness of any above-deck roof insulation. Unless the topic of roof drains specifically is raised in a project construction meeting, the plumbing contractor usually places roof drains based on his or her previous experience. This may result in unintended conditions for the roofing contractor to address in the field.

Following are some considerations and NRCA's recommendations for proper height positioning of roof drains above a roof deck's surface.

Considerations

Left without specific direction in construction documents or other project communication, a plumbing contractor likely will place a roof



Flashing a roof drain with extension

drain about 1 inch above the roof deck's surface. For cast-in-place concrete roof decks, roof drains sometimes are flush with a roof deck's top surface.

Before the recent editions of energy codes, this minimal above-deck drain placement height was adequate for many roof system designs. The codes' above-deck thermal insulation requirements usually resulted in a minimal insulation thickness at roof drains, and any additional roof insulation thickness above the roof drain easily could be field-tapered, or shaved, by the roofing contractor to create a drain sump.

More current energy codes now require increased building energy efficiency, which has resulted in the installation of thicker above-deck insulation, usually in multiple layers. Insulation thicknesses of about 3½ to 6 inches or more may be necessary to comply with current energy codes in specific regions. As a result, placing roof drains further above a roof deck is necessary for some roof system designs.

Thicker insulation also may result in more complex configurations of tapered insulation to provide a drain sump. In most cases, field shaving insulation no longer is feasible to accommodate drain height differences.

NRCA's recommendations

Good communication is needed among a building's primary designer, roof system designer and roof drainage system designer, who typically is the plumbing system designer.

To properly design a piped roof drainage system, the roof drainage system designer needs to be aware of the following:

- Specific roof system type
- Intended locations of roof drains and piped overflow drains
- Whether the roof system is an above-deck roof insulation configuration
- Thicknesses of the roof insulation at the roof drains and any piped secondary drains
- Any scuppers

Building designers and roof system designers should provide the roof drainage system designer with this information on a project-specific basis.

Roof drain and any secondary drain locations should clearly be delineated in plumbing drawings so the plumbing contractor is aware of the designers' intents. Also, roof drain and secondary drain heights above the roof deck should clearly be indicated on plumbing drawings and account for insulation thicknesses at these locations.

I encourage plumbing designers to consider specifying roof drains with height extension accessory options. For example, a commonly used roof drain is the Zurn Z100 model roof drain manufactured by Zurn Industries, Erie, Pa. The company offers three extension accessory options: a static extension with a 1- to 4-inch extension height, an adjustable extension assembly with a 2⅛- to 3½-inch extension height and an adjustable extension assembly. Zurn Industries also allows multiple, specific extensions to be combined to achieve a drain extension height up to about 6 inches.

Similarly, for the Josam 21500 Series roof drain manufactured by Josam Co., Michigan City, Ind., an adjustable extension allows for a 1½- to 4-inch extension height.

Other roof drain manufacturers offer similar extension capabilities.

Use of roof drains with properly installed drain extension hardware can accommodate varying insulation thicknesses at roof drains and situations where roof drains were inadvertently placed too low.

Also, for new construction roof systems over concrete roof decks, I recommend designers specify roof drains with accessory extensions. This allows for positioning a roof drain at a concrete roof deck's top surface, which allows the deck to be used as a substrate for a temporary roof system. Then, once the roof system is ready to be installed, appropriate extensions can be added to the roof drains to accommodate the insulation thickness. An illustration of this configuration is shown in the figure.

Additional information about roof drains is provided in *The NRCA Roofing Manual: Membrane Roof Systems—2019*.

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NIOSH awards $1.8 million grant for ladder safety research

The National Institute for Occupational Safety and Health has awarded a $1.8 million grant to a University of Pittsburgh professor to develop safer ladder designs and explore individual risk factors for ladder falls, according to constructiondive.com. The grant was awarded to Kurt Beschorner, associate professor of bioengineering at the University of Pittsburgh's Swanson School of Engineering, and will help determine what constitutes a safe ladder.

Falls are one of the most common types of job-site injuries in the U.S., and the Centers for Disease Control and Prevention reports that among U.S. construction workers, an estimated 81% of fall injuries treated in hospital emergency rooms involve ladder use.

The new research will focus on measuring friction and its role in influencing slip and fall risks on ladders. Beschorner says if friction is too low between a ladder rung and an individual's shoe or boot, the individual's foot can slip off of the ladder, leading to a fall.

"A slip happens when there is insufficient friction between the shoe surface and ladder rung, but little is known about how ladder design or an individual's body affects slip and fall risk," Beschorner says.

The study will consist of human participant testing and mechanical testing. The human participant testing will examine different ladder climber populations (male vs. female, obesity groups, height groups). The mechanical testing will allow researchers to determine how rung design influences friction. The team will combine human participant data and mechanics data to predict when a slip will occur.

To access National Institute for Occupational Safety and Health ladder safety information and resources, go to professionalroofing.net.

Previous work from students in the school's Human Movement & Balance Laboratory found older adults, inexperienced climbers and people with less body strength are at increased risk of ladder falls. The new study will build on the preliminary findings and extend the lab's previous work regarding friction between shoes and walking surfaces to ladder slipping.

Past research has shown the angle of a ladder influences the risk of slipping. Researchers also found fall risk after a simulated foot slip was higher for females than males, an effect explained by differences in upper-body strength. Beschorner says these preliminary results suggest ladder design influences fall risk, and current ladders may be inappropriately designed for certain groups of ladder users.

Core launches skills-matching construction jobs app

Palo Alto, Calif.-based Core has launched a construction jobs app designed to better connect workers and their skills with construction companies that are hiring, according to constructiondive.com. The Crews by Core app uses algorithms to produce a "match score" between workers' actual skills and companies' open positions.

Core CEO Di-Ann Eisnor says the company's mission is to address the ongoing labor shortage in the construction industry.

"We don't want people scrolling through lots of irrelevant positions," says Eisnor. "Instead, we want to give [users] a few of the best jobs available using that match score, which requires a lot of heavy lifting on the technology side."

The company joins an increasingly crowded field of technology firms trying to solve the challenge of connecting tradespeople looking for work with construction companies. But Eisnor says the problem of construction hiring is so large there is plenty of market share for multiple construction-specific job placement apps.

Crews by Core files workers' certifications, licenses and references, which are manually verified by Core staff. An algorithm pairs job seekers and open positions, and the data is accessed via a QR code, which can be scanned on a job site.

Eisnor personally interviewed more than 1,500 construction workers to develop Core and its offerings. She noticed construction workers are often better at doing their jobs than promoting their capabilities.

"In tech, people are good at using the right buzzwords to talk about what they're good at," Eisnor says. "But in construction, a lot of times workers' resumes don't do their abilities justice. We need to work a little harder to bring out the skills in the trades."

To do so, Core's technology is paired with human engagement and a global team to scale referrals, deploy talent and grow construction careers.

Crews by Core is available in the Apple App Store and Google Play. Additional information is available at bycore.com.