

Moisture Management in Basements

By Erika Lacroix



Installation of external, subsoil drainage system to prevent water from entering basement wall.

Photo courtesy of EZ Breathe Ventilation Systems

Basement moisture problems are one of the most common challenges in residential construction and remodeling. It's not uncommon that these issues lead to structural damage, health concerns, and costly repairs for homeowners. Today, these below-grade spaces are often expanded living spaces and are utilized in very different ways than they were decades ago.

Nick DiCello, owner of Ohio State Waterproofing, with almost five decades in the industry, has seen it all. DiCello understands that "much has changed in the way homeowners view their basements in the last 50 years. In today's market, buyers are looking for homes that are move-in ready and free of major issues. A waterproofed basement increases home market value by an average of 30%, enhancing the property's appeal to potential buyers."

DiCello continues, "For homeowners, investing in basement waterproofing not only means an expanding living space, but also a way to reduce future costs related to water damage, such as foundation repairs, mold remediation, and replacement of

damaged belongings."

For contractors, managing moisture in basements is a crucial aspect of building design, renovation, and long-term maintenance. This article provides a detailed overview of moisture management strategies, from identifying moisture sources to implementing effective solutions and offering increased value to customers.

Identifying The Source

Moisture intrusion in basements can occur through several pathways. It's essential to not only identify the sources of moisture but also the various states of matter in which water exists in order to better design and implement effective solutions. Andre Lacroix, vice president of EZ Breathe Ventilation Systems, points out "The industry is changing, more waterproofing contractors recognize the need to address moisture in all its forms in order to offer a comprehensive waterproofing solution." The main sources of moisture for a home include:

1. Groundwater Seepage: Water from the surrounding soil is one of the most common causes of basement moisture. Water from rainwater or

groundwater seeps through cracks, porous concrete, or poorly sealed joints in the foundation in its liquid state of matter.

- 2. Condensation:** Basements are subterranean environments surrounded by cool, moist soil. When the basement air meets the foundation walls there is often a temperature variation that causes condensation. This water, moisture in liquid form, can also occur in other areas where warm meets cool besides the concrete walls like on the metal pipes, duct work, hot water tanks, etc., leading to dampness, rust, and potential mold growth.
- 3. Plumbing Leaks:** Leaking pipes, whether from the HVAC system, plumbing fixtures, or the washing machine, can introduce unwanted moisture into the basement environment that can be both liquid water from leaks and water in its gaseous, vapor form due to evaporation.
- 4. Humidity:** Basements, by their very nature, experience higher humidity or water vapor, due to their location below the ground. This water



Complete installation of subsoil drainage system along exterior foundation.



Output from internal pump discharge lines to exterior storm line.

vapor, without proper ventilation, becomes trapped in the basement air increasing the risk of mold, mildew, and other moisture-related issues.

5. Improper Drainage Around the Foundation: If the ground surrounding the foundation is improperly graded, or if gutters and downspouts are blocked, liquid water may pool near the foundation and seep into the basement. This water intrusion can cause foundation decay, mold, dry rot and contribute to high humidity.

Best Practices for Prevention

Once the sources of moisture are identified, a comprehensive plan to manage and mitigate these issues can be implemented. The strategy for total basement moisture management is best divided into prevention methods, redirection mechanisms, and remediation measures. A comprehensive waterproofing solution must include all of these. (See Water Control vs. Waterproofing sidebar)

1. External Solutions: Preventing Water Entry

External moisture management

is critical for preventing water from entering the basement in the first place. The focus of the project should be on improving the home's exterior drainage and effective waterproofing.

- **Proper Grading:** Ensuring that the ground around the foundation slopes away from the home is one of the most effective ways to prevent water from pooling near the basement. The soil should slope at least 6 inches for every 10 feet of distance away from the foundation. Be sure that landscaping features, such as flower beds or retaining walls, do not interfere with proper grading.
- **Gutter and Downspout Maintenance:** Clogged gutters are a common culprit for water intrusion into basements. Regularly cleaning gutters and ensuring that downspouts are positioned to direct water at least 4 to 6 feet away from the foundation is a critical component to preventing water entry into the basement. Downspout extensions and splash blocks are useful tools in directing water further away from the home.
- **Exterior Waterproofing:** Applying a waterproofing membrane to the exterior foundation walls is a key

Water Control vs. Waterproofing – Why It Matters?

Water control means redirecting the water, not stopping it. Allowing an open penetration to the outside for water to enter the foundation and redirecting to a mechanism that gets the water out.

Waterproofing means stopping the water from ever entering the foundation. Opening up the outside walls, applying new membranes, sealing cracks, gaps, and otherwise protecting the foundation from water entering. Complete waterproofing systems utilize outside drains, gravel and pumps to collect the water from outside and move it away from the foundation to protect the basement from outside water ever entering.

DiCello explains the difference in a simple to understand analogy. "Ask yourself, if your roof was leaking, would you direct the water inside the roof, collect it there, and then pump it back outside, or would you rather repair the roof and prevent the water from entering the roof/home in the first place?"

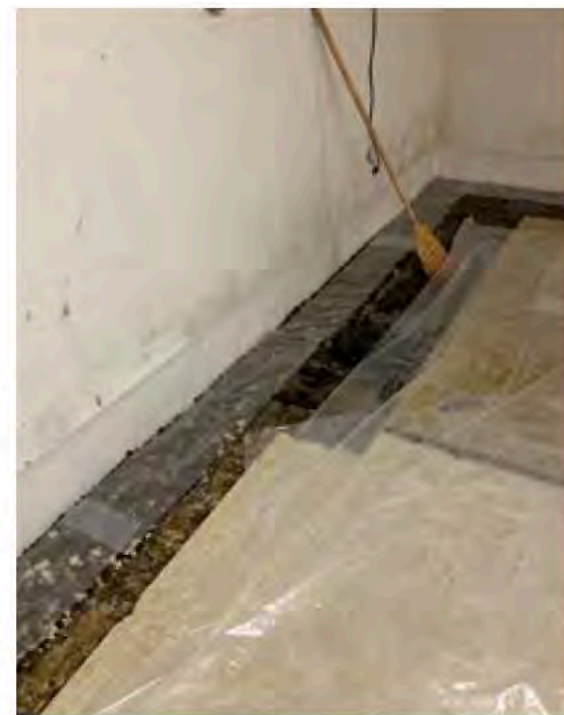
Bradley agrees, "After 24 years in this industry, I am not a fan of water control systems. They are the hardest to maintain and control a healthy environment as they are just hiding the problem, not fixing or preventing the problem. I might not be fighting the liquid water, but I am still fighting the moisture that can lead to mold, odors, rust, etc. because a water control system offers the water an entry point into the foundation." 💧



EZ Breathe Ventilation System and Radon Mitigation System.



Inside footer tile for under slab drainage.



Internal waterproofing system with vapor barrier prepped for concrete.

preventive measure creating a barrier that helps block water from seeping through the foundation. These membranes are liquid-applied or sheet-applied waterproofing products offering flexibility depending on the project's needs.

- **Gravel and Drains:** Installing both gravel and drains around the foundation is an effective way to manage groundwater. French drains are perforated pipes installed in gravel trenches that redirect water away from the foundation. It may be required by local codes to connect this kind of external system to a storm drain. This outside drainage strategy, when properly employed, is critical to keeping liquid groundwater from entering the basement.

2. Internal Solutions: Managing Liquid, Humidity & Condensation

Moisture enters through the walls and floor and can also accumulate in the basement due to condensation and high humidity levels. Lacroix explains, "The laws of thermodynamics are to blame because wet moves to dry. The moisture in the soil surrounding the basement walls gets absorbed into the relatively drier air space inside the basement." Water, in its vapor form, gets absorbed by the basement and is referred to as humidity. Humidity can be remediated by focusing

on ventilation, dehumidification, and insulation.

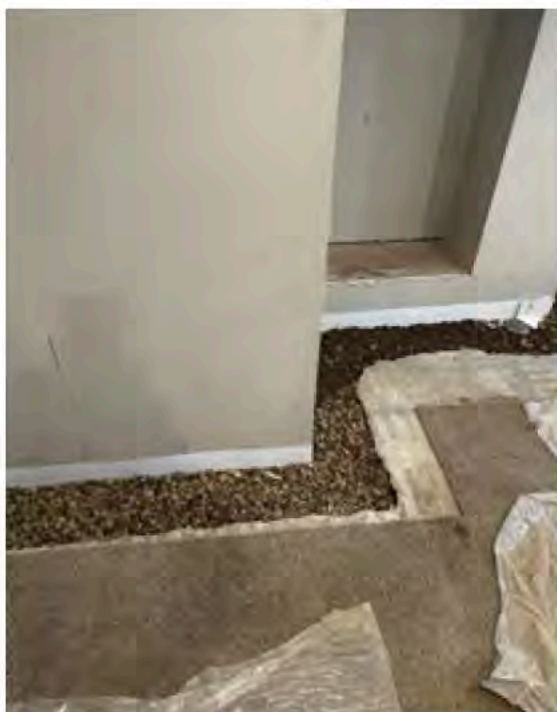
- **Internal Gravel and Drainage:**

Like the outside drainage system, internal French drains will allow any groundwater from under the walls and floor a pathway other than bubbling up through the walls or floor. Water will flow the path of least resistance into the drain and with the help of a sump pump, redirected up and away from the basement. There is quite the debate regarding sealing up/over these drains. However, allowing basement air to communicate with a drainage system is not a complete waterproofing solution as this allows moisture to enter the basement. (See more in the water redirection vs waterproofing sidebar) Chad Bradley, production manager for Ohio State Waterproofing explains, "Inside drains can be a great secondary protection method, especially when there is a high-water table to address the hydrostatic water pressure, but as a stand-alone system, it does not proof the basement from water."

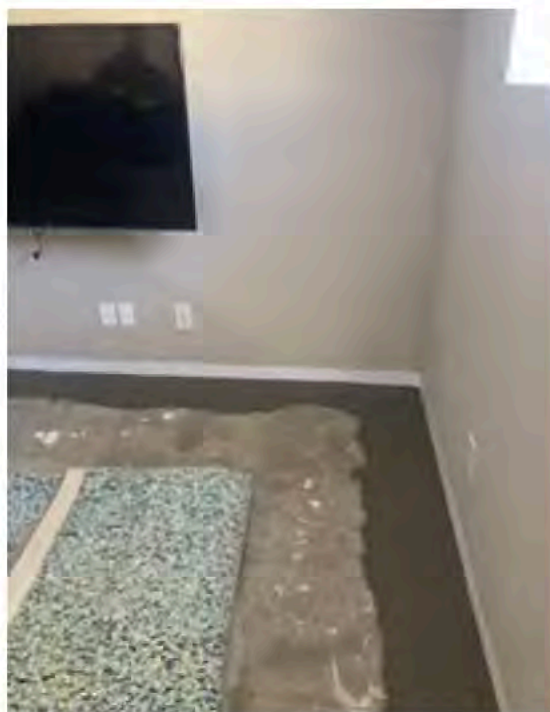
- **Ventilation:** Adequate ventilation is crucial for controlling moisture levels in the basement. Trapped basement air gets stale and damp in the below-grade environment. Ensuring proper venting to allow for the circulation

of fresh air is recommended by the US EPA. Andre Lacroix, adds "the EPA not only lists ventilation as a key strategy for combating polluted indoor air, but also suggests 6 to 8 air exchanges per day to combat indoor pollutants to create a healthier home." A mechanical ventilation system provides a path of escape for the stagnant basement air and removes the humid air from the basement creating the much-needed air exchanges in that space. Lacroix continues, "Ventilation is integral to a complete basement waterproofing solution as it addresses the removal of water in its vapor form along with other airborne toxins, pollutants, and allergens lurking in basements."

- **Dehumidifiers:** A basement dehumidifier can be an effective solution for controlling excess moisture in the air. Recommending a dehumidifier that is appropriately sized for the basement and suggesting regular maintenance to ensure the system continues to function properly is critical to the success of this solution. In some cases, a whole-house dehumidification system may be a better solution than single-room units.
- **Insulation:** Uninsulated basement walls are more susceptible to



Alternative vapor barrier for finished basement.



Completed interior waterproofing job.



Internal pumping system.

addressing poor grading or drainage systems. James Ketterer, president of Value Dry Waterproofing, says, "This can directly translate into a higher asking price when it's time to sell the home."

- **Sump Pump Installation:** Sump pumps are essential components for a complete waterproofing solution and for homes located in areas with high water tables and those prone to flooding. Sump pumps should always be installed in the lowest part of the basement floor, ensuring they have an adequate discharge path. Backup systems, such as battery-powered sump pumps provide additional protection in the event of a power outage.
- **Pipe Insulation:** Pipes in basements are often exposed to cold temperatures, which can cause condensation when warm, humid air comes into contact with the cold surfaces. Insulating pipes with foam or fiberglass insulation is an effective way to prevent this problem.

4. Long-Term Maintenance and Monitoring

Moisture management doesn't end once the basement is dry, emphasizing the importance of long-term maintenance, regular inspections, proper landscaping,

and timely repairs to plumbing and drainage systems can prevent moisture problems from recurring. Annual maintenance programs, Ketterer says, "are smart to maintain your dry basement peace of mind. It's amazing what we find in our annual maintenance inspections, bouncy balls, unplugged pumps, tripped breakers, covered drains, and more, that left unattended would wreak havoc for our systems and customers." Additionally, the installation of moisture sensors or a basement monitoring system can help homeowners detect potential issues before they become major problems.

Difference Makers Adding Value

Effective and comprehensive moisture management in basements is critical for protecting the structural integrity of a home and ensuring a healthy living environment. Ketterer adds, "Homes with waterproofed basements often benefit from lower insurance premiums due to the reduced risk of water damage, some lenders view waterproofed homes as safer investments, which can make obtaining a mortgage easier for potential buyers."

As a contractor, understanding the various sources of moisture and the strategies to manage them is vital to

delivering quality work and ensuring customer satisfaction. By implementing proper grading, waterproofing, ventilation, and plumbing solutions, contractors can help homeowners avoid costly repairs and preserve the long-term value of their property. Through proactive moisture management and ongoing maintenance, you play a crucial role in maintaining dry, healthy basements for your customers for years to come! ♦

Erika Lacroix is a member of the Indoor Air Quality Association and The Basement Health Association, a Customer Experience Executive, a self-proclaimed Indoor Air Quality Advocate, and President of EZ Breathe Ventilation Systems and EZ Breathe Healthy Home Solutions. She grew up alongside her father's foundation repair business in Cleveland, Ohio. Now, all grown up with a family of her own, improving people's homes is still in her blood. For the last 22 years, Erika has followed her passion of helping basement contractors grow their businesses with value-added products that improve the health of the home. Her unique skill set, coupled with a history of working with hundreds of basement contractors offers an educated perspective on basement waterproofing.