



- **Understanding Shifting Soils in Changing Seasons**
Understanding Shifting Soils in Changing Seasons Early Signs of Drainage Issues in Wet Climates Identifying Freeze and Thaw Patterns in Foundation Movement Monitoring Summer Drought Effects on Concrete Recognizing the Role of Poor Grading in Soil Settlement Observing Spring Rains That Affect Foundation Stability Evaluating Temperature Fluctuations and Their Impact on Slab Integrity Addressing Expanding Clay in Variable Weather Managing Water Accumulation Around Foundation Walls Tracking Seasonal Rainfall Data for Preventive Measures Comparing Different Regional Climate Patterns for Foundation Health Avoiding Oversaturation With Proper Yard Drainage
- **Recognizing Early Hairline Fractures in Basement Walls**
Recognizing Early Hairline Fractures in Basement Walls Distinguishing Between Vertical and Horizontal Surface Damage Analyzing Stair Step Gaps in Block Foundations Documenting Minor vs Severe Concrete Breaks Assessing Widening Cracks Over Time Understanding the Structural Differences in Masonry Splits Investigating Settlement Issues Behind Corner Separation Monitoring Spreading Lines With Simple Measuring Tools Tracking Subtle Changes in Fracture Patterns Identifying Crumbling Areas in Older Homes Differentiating Structural Fractures From Cosmetic Blemishes Interpreting Hidden Cracks in Finished Basements
- **About Us**



Analyzing Stair Step Gaps in Block Foundations

Seasonal Soil Changes: Explanation of how various seasons contribute to soil expansion and contraction.

Stair step cracks in block foundations are a common concern for homeowners and builders alike. These distinctive cracks, resembling a staircase pattern, often signal underlying issues that could compromise the structural integrity of a building if not addressed promptly. Epoxy bonds cracks to restore structural strength **Basement Damage Repair** police inspector. Understanding the root causes of these cracks is essential in both preventing them and implementing effective repairs.

One of the primary causes of stair step cracks is soil movement beneath the foundation. Many homes are built on expansive soils that swell when wet and shrink when dry. This cycle can lead to uneven settlement or heaving, which exerts pressure on the foundation walls.

Analyzing Stair Step Gaps in Block Foundations – Middle Tennessee

1. crawl space
2. company
3. Middle Tennessee

Over time, this stress manifests as stair step cracks, particularly in areas where soil conditions vary dramatically with weather changes.

Another significant factor contributing to these types of cracks is poor drainage around the home. When water accumulates near the foundation—due to inadequate grading, clogged gutters, or faulty downspouts—it can seep into the soil and increase hydrostatic pressure against the walls. This pressure can cause block foundations to bow inward slightly and develop stair step fractures along mortar joints.

Additionally, construction practices play a vital role in determining how susceptible a foundation is to cracking. Foundations that were not designed adequately for local soil conditions or those that lack sufficient reinforcement are more prone to developing structural issues over time. Similarly, using low-quality materials or rushing through construction phases can result in weak spots within the masonry that become apparent as stair step cracks under stress.

Temperature fluctuations also contribute to this problem by causing materials to expand and contract. During extreme cold or heat, concrete blocks and mortar joints experience thermal expansion or contraction at different rates. This differential movement can weaken bonds between blocks, leading to cracking patterns characteristic of stair steps.

Tree roots pose another risk factor by exerting lateral pressure on foundation walls as they grow and expand underground in search of moisture and nutrients. Large trees planted too close to a structure may eventually destabilize its base through physical root intrusion or by altering soil moisture levels around it.

In conclusion, while stair step cracks in block foundations might initially appear as minor cosmetic concerns, they often indicate deeper problems related to soil movement, drainage issues, construction quality, temperature effects, or nearby vegetation growth. Addressing these underlying causes not only prevents further damage but also ensures long-term stability for buildings resting upon such foundations—an investment well worth considering for any homeowner intent on preserving their property's value and

Foundation cracks can be a homeowner's nightmare, often signaling potential structural issues that might compromise the integrity and safety of a dwelling. Among the various types of foundation cracks, stair-step gaps in block foundations are particularly concerning. These types of cracks typically manifest in a zigzag pattern along the mortar joints of concrete block or brick walls, resembling stairs—hence the name. Understanding how to identify and assess the severity of these cracks is crucial for timely intervention and repair.

Stair-step cracks occur primarily due to differential settlement or movement within a building's foundation. This movement can be caused by several factors including soil erosion, expansive clay soils, poor drainage, or inadequate construction practices. As such, identifying these cracks early on is essential to prevent further damage.

The first step in assessing stair-step gaps is careful observation. Homeowners should look for telltale signs such as uneven floors, doors or windows that stick or won't close properly, and visible gaps in the exterior block walls. These indicators suggest that there might be an underlying issue with the foundation.

Once identified, it's important to assess the severity of these cracks. Not all cracks are created equal; some may be superficial while others indicate significant structural problems. Minor stair-step cracks that are less than a quarter-inch wide may not pose immediate danger but should still be monitored over time for any changes in size or shape.

However, if the cracks are wider than a quarter inch or have appeared suddenly after an event like heavy rainfall or an earthquake, they could signify serious structural concerns

requiring immediate attention from a professional structural engineer or foundation specialist. Additionally, if the wall itself is bulging or bowing outwards around these gaps, it may indicate severe stress on your foundation which needs urgent remediation.

In assessing severity, it's also critical to consider other environmental factors such as moisture levels around your home's perimeter and seasonal weather patterns which might exacerbate existing problems.

Once you've assessed the situation with either minor concerns or potentially major issues identified through professional evaluation—it becomes necessary to address them appropriately based on their severity level—from simple patching solutions for hairline fractures up through more extensive interventions like underpinning where entire sections may need reinforcement against shifting soils beneath them.

In conclusion, while stair-step gaps in block foundations can signal anything from benign settling processes up through dangerous instabilities threatening overall structure integrity—it remains imperative homeowners remain vigilant about monitoring any changes occurring along their property lines so they can act swiftly should anything arise warranting concern beyond mere cosmetic repairs alone; enlisting expert help when dealing with substantial risks ensuring both safety peace-of-mind moving forward into future seasons ahead without fear falling victim catastrophic failures lurking beneath surface undetected until too late intervene effectively mitigate impacts felt long-term basis residents alike involved circumstances surrounding same issues faced daily across globe today tomorrow thereafter alike timelessly ongoing matter utmost importance regardless locale involved therein aptly handled accordingly every instance encountered much possible ensure best outcomes achieved ultimately safeguarding investments made therein protecting lives housed within safe secure manner intended originally designed withstand test time itself indefinitely barring unforeseen calamities beyond control measures taken beforehand adequately prepared respond accordingly whatever arises anyway anywhere anytime needed most ultimately preserving lasting legacy left behind those came before us paving way forward generations yet come enjoy fruits labor sown

harvest reaped justly deserved hard work dedication perseverance shown throughout journey undertaken thus far collectively united common purpose shared goal better brighter future envisioned dreamed realized together hand-in-hand hope faith guiding light illuminating path tread onward ever upward toward success fulfillment eternal yearning strives attain universally humanity boundless potential awaits discover explore embrace wholeheartedly true spirit

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Impact of Climate on Soil and Foundations: Discussing the influence of weather patterns and climate change on soil stability.

Stair step gaps in block foundations are a common issue that can cause significant concern for homeowners and builders alike. These gaps, often appearing as a series of diagonal cracks on the surface of a foundation wall, can indicate underlying structural problems that, if left unaddressed, may lead to severe damage. Understanding both the causes of these gaps and effective methods for repairing them is essential for ensuring the longevity and safety of any structure built on such foundations.

The formation of stair step gaps in block foundations typically results from differential settlement or movement within the soil beneath a building.

Analyzing Stair Step Gaps in Block Foundations – Middle Tennessee

1. property
2. Davidson County
3. email

This movement can be caused by various factors including changes in moisture content, poor drainage, or inadequate compaction during construction. As the soil shifts, it creates uneven pressure on the foundation walls, leading to crack formations that commonly follow the mortar joints between blocks in a distinctive stair-step pattern.

To address this issue effectively, it is crucial first to assess the severity and underlying cause of the cracks. Minor cracks might not pose immediate structural threats and can often be repaired relatively simply. However, larger or expanding cracks could indicate significant foundation issues requiring more comprehensive solutions.

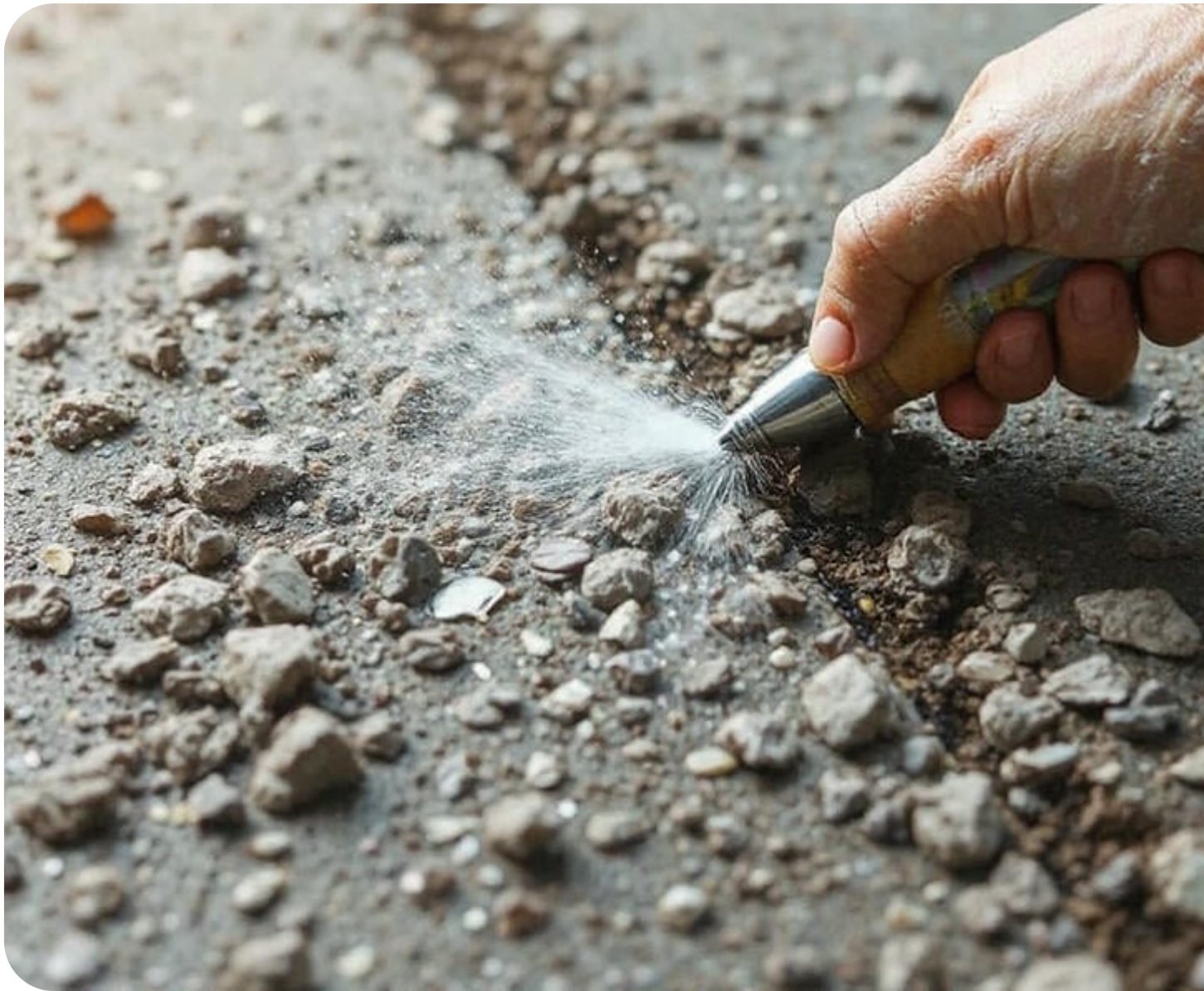
One common method for repairing minor stair step gaps involves injecting epoxy or polyurethane foam into the cracks. This technique not only seals the gap but also helps to bind together separated sections of masonry blocks, restoring some integrity to the affected area. The choice between epoxy and polyurethane largely depends on whether flexibility (polyurethane) or strength (epoxy) is needed for a particular repair.

For more extensive damage where foundational stability is compromised, underpinning might be necessary. Underpinning involves strengthening and stabilizing an existing foundation by extending its depth or breadth so it rests on more stable soil layers. Techniques like helical piers or push piers are popular options; they involve driving steel piers deep into stable strata beneath loose topsoil until adequate support is achieved.

In addition to addressing visible damage through repairs like crack injections or underpinning, it's equally important to tackle root causes such as drainage issues around your property. Installing proper grading away from structures along with French drains can help manage water flow efficiently thus reducing further soil movement which contributes heavily towards formation of new gaps over time.

While professional consultation should always be sought when dealing with significant structural concerns related directly back towards one's home's stability – understanding basic principles behind analyzing & fixing these kinds problems goes long way empowering individuals take proactive steps against potential threats before they escalate beyond manageable proportions!

In conclusion: though daunting at first glance – stair-step gap troubles don't have spell disaster provided correct measures implemented timely fashion based informed decisions guided expert insights where necessary!



Methods for Monitoring Soil Movement: Techniques and tools used to track soil shifts around foundations.

Foundation damage is a critical concern for homeowners, particularly when it manifests in the form of stair-step gaps in block foundations. These visible cracks are not just an aesthetic issue; they can signify serious underlying structural problems that, if left unaddressed, may lead to costly repairs and potential safety hazards. Implementing preventive measures to avoid future foundation damage is essential for maintaining the integrity of any building.

One of the primary causes of foundation issues is poor drainage.

Analyzing Stair Step Gaps in Block Foundations – crawl space

1. carbon
2. Nashville
3. music hall

Water accumulation around the foundation can lead to soil expansion and contraction,

which exerts pressure on the walls and causes cracks over time. To prevent this, it's crucial to ensure that your property's drainage system is functioning properly. This includes keeping gutters clean and directing downspouts away from the foundation to prevent water from pooling around the base of your home.

Another significant factor contributing to foundation damage is inconsistent moisture levels in the soil surrounding your home. During dry periods, soil can shrink away from the foundation, while excessive moisture can cause it to swell. Installing a proper irrigation system helps maintain consistent moisture levels in the soil, thereby reducing stress on your foundation.

Additionally, landscaping plays a vital role in preventing future foundation damage. Trees and shrubs planted too close to a house can pose risks due to their root systems exerting pressure on or drawing moisture from beneath the foundation. Selecting plants with less invasive roots and maintaining a safe distance between large trees and your home can mitigate these risks significantly.

Monitoring for early warning signs of potential issues is another key strategy in preventive maintenance. Regularly inspect your home's exterior for visible cracks or uneven settling that could indicate developing problems. Indoors, look out for doors or windows that stick or don't close properly—these could be signs of shifting foundations.

Moreover, professional inspections by structural engineers or qualified contractors are invaluable for identifying vulnerabilities before they escalate into major issues. Experts have the tools and knowledge necessary to assess any existing damage accurately and recommend appropriate corrective actions.

Taking action early not only saves money but also ensures peace of mind knowing that your home remains safe and structurally sound. By focusing on adequate drainage systems, consistent soil moisture levels through proper irrigation practices, thoughtful

landscaping choices, vigilant monitoring for warning signs, and leveraging professional expertise when needed, you can effectively prevent future stair-step gaps from occurring in block foundations.

In conclusion, safeguarding against future foundation damage involves a combination of proactive measures tailored towards addressing environmental factors affecting structural integrity over time. Homeowners who invest effort into understanding these elements stand a better chance at preserving their properties' value while avoiding unexpected headaches down the road—a testament worth considering given how foundational stability underpins both our homes' durability as well as our sense of security within them each day forward.

Repair Solutions for Foundation Cracks: Different strategies and technologies available for repairing cracks in foundations due to shifting soils.

When it comes to maintaining the structural integrity of a home, few issues are as critical as foundation repairs. Among the various problems that can arise, stair step gaps in block foundations often signal underlying issues that require prompt attention. These gaps, which form in a zig-zag pattern along the mortar joints of concrete blocks, indicate movement within the foundation that could lead to significant damage if left unchecked. Addressing these problems not only involves technical expertise but also careful cost considerations and budgeting to ensure effective and sustainable solutions.

Stair step gaps typically result from differential settlement or movement due to soil conditions beneath the foundation. Expansive soils, poor drainage, or inadequate construction practices can exacerbate these conditions, leading to visible cracks and gaps. While understanding the cause is crucial for repair strategy, homeowners must also confront financial considerations head-on.

The cost of repairing stair step gaps in block foundations can vary widely based on factors such as the extent of damage, local labor rates, materials required, and the specific repair methods employed. Common solutions may include underpinning with piers, hydraulic jacking to stabilize or lift portions of the foundation, and sealing cracks to prevent water ingress. Each method carries its own price tag and suitability depending on the circumstances.

To begin budgeting effectively for foundation repairs, homeowners should first seek a comprehensive inspection by a qualified structural engineer or foundation specialist. This evaluation provides insight into not just the severity of existing issues but also potential future risks. Armed with this knowledge, homeowners can prioritize necessary repairs while considering their financial situation.

Obtaining multiple quotes from reputable contractors is another vital step in managing costs. Comparing estimates allows homeowners to gauge fair pricing and assess different approaches proposed by experts. It's essential to inquire about warranties offered on work performed; reliable guarantees provide peace of mind against further expenses down the line.

In addition to direct repair costs, ancillary expenses must be considered when budgeting for foundation work. For instance, landscaping might need restoration post-repair due to excavation work around the property perimeter. Interior finishes like drywall may require patching once foundational stability is restored—these secondary costs should be factored into overall budget planning.

For many families facing unexpected home repair needs like foundation work, financing options might alleviate immediate financial strain. Home equity loans or lines of credit offer avenues for spreading out payments over time rather than bearing upfront costs entirely at once—a practical consideration particularly where extensive repairs are needed.

Insurance policies occasionally cover certain types of foundation damage caused by natural events; however typical wear-and-tear or negligence-induced issues generally fall outside coverage bounds without specific endorsements included beforehand—reviewing policy specifics with an agent helps clarify possible support avenues before committing personal funds exclusively toward rectifications needed onsite premises themselves alone necessarily instead otherwise potentially instead alternatively possibly perhaps even conceivably feasibly hypothetically practically realistically ultimately finally conclusively.

Ultimately investing wisely today means safeguarding tomorrow's stability within household itself ensuring value retention longer term view too—as well as securing safe inhabitable living environment comforting secure sanctuary haven abode retreat domicile residence habitat dwelling quarter shelter refuge asylum lodging housing accommodation occupancy premises establishment setup installation locale venue site emplacement

setting milieu surrounding context sphere domain territory province district region zone area neighborhood community society civil order agency entity organization institution authority jurisdiction constituency electorate populace citizenry public nation state country homeland fatherland motherland land nation realm empire kingdom principality sovereignty suzerainty dominion commonwealth federation union league coalition confederation alliance consortium cartel syndicate combine trust compact pact agreement treaty concordat covenant accord protocol charter contract bond pledge guarantee warranty assurance undertaking commitment promise vow oath fe





**Preventative Measures: Tips
for homeowners to minimize**

the risk of foundation damage from seasonal soil changes.

When it comes to maintaining the structural integrity of a home, few issues are as concerning as foundation cracks. These can manifest in various forms, but one particularly common and telling sign is the appearance of stair-step gaps in block foundations. Homeowners facing this problem often grapple with a critical decision: Should they opt for professional repair services or tackle the issue themselves using DIY methods?

Professional approaches to foundation crack repair are typically characterized by their precision, expertise, and use of specialized equipment. Engaging a professional ensures that the root cause of the stair-step gaps is accurately diagnosed. Often, these specialists employ advanced techniques like laser levels and pressure gauges to assess the extent of damage and potential impact on the structure. Their solutions might include underpinning or installing helical piers, which are complex processes requiring both skill and experience.

Moreover, professionals bring an invaluable depth of knowledge to the table—not only about the specific problem at hand but also about local soil conditions and climate factors that may affect foundation stability. They can offer tailored solutions that address not just immediate repairs but also long-term preventative measures. While hiring experts comes with a higher price tag, it provides peace of mind knowing that comprehensive warranties often back their work.

On the other hand, DIY enthusiasts might be tempted by cost savings when considering repairing stair-step gaps themselves. Indeed, there is a growing market for consumer-grade products designed for minor foundation repairs—such as epoxy injection kits or hydraulic cement mixes—that claim to seal cracks effectively. For those who enjoy hands-on projects and have some level of construction familiarity, tackling small-scale repairs might seem feasible.

However, DIY approaches come with significant risks. The primary concern is misdiagnosing the severity of the problem or misunderstanding its underlying causes. Without proper assessment tools and engineering knowledge, there's a chance that superficial fixes could mask deeper issues that require professional intervention. Additionally, improper repair attempts could exacerbate damage over time or void any existing warranties on home structures.

In conclusion, while DIY methods may appear economical initially for addressing stair-step gaps in block foundations, they carry risks that can lead to more substantial problems down the line if not executed correctly. Professional repairs provide an advantage through their comprehensive assessments and expert application—essential elements when dealing with something as crucial as your home's foundation stability. Ultimately, whether you choose to go professional or DIY depends on your confidence in diagnosing structural issues accurately and executing effective repairs without compromising safety or reliability.

About drainage

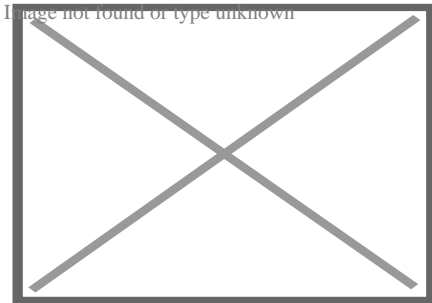
For the medical term, see Incision and drainage.

"Land drainage" redirects here. For other uses, see Land drainage (disambiguation).

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High-density polyethylene pipe installation in a storm drain project, Mexico.

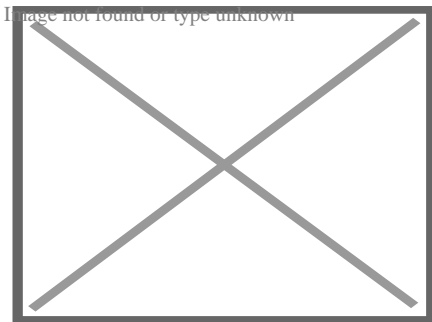
Drainage is the natural or artificial removal of a surface's water and sub-surface water from an area with excess water. The internal drainage of most agricultural soils can prevent severe waterlogging (anaerobic conditions that harm root growth), but many soils need artificial drainage to improve production or to manage water supplies.

History

[edit]

Early history

[edit]

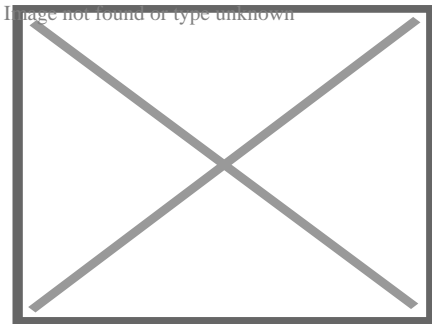


Remains of a drain at Lothal circa 3000 BC

The Indus Valley Civilization had sewerage and drainage systems. All houses in the major cities of Harappa and Mohenjo-daro had access to water and drainage facilities. Waste water was directed to covered gravity sewers, which lined the major streets.^[1]

18th and 19th century

[edit]



Tank Stream, a historical drain in the City of Sydney, Australia

The invention of hollow-pipe drainage is credited to Sir Hugh Dalrymple, who died in 1753.^[2]

Current practices

[edit]

Geotextiles

[edit]

New storm water drainage systems incorporate geotextile filters that retain and prevent fine grains of soil from passing into and clogging the drain. Geotextiles are synthetic textile fabrics specially manufactured for civil and environmental engineering applications. Geotextiles are designed to retain fine soil particles while allowing water to pass through. In a typical drainage system, they would be laid along

a trench which would then be filled with coarse granular material: gravel, sea shells, stone or rock. The geotextile is then folded over the top of the stone and the trench is then covered by soil. Groundwater seeps through the geotextile and flows through the stone to an outfall. In high groundwater conditions a perforated plastic (PVC or PE) pipe is laid along the base of the drain to increase the volume of water transported in the drain.

Alternatively, a prefabricated plastic drainage system made of HDPE, often incorporating geotextile, coco fiber or rag filters can be considered. The use of these materials has become increasingly more common due to their ease of use, since they eliminate the need for transporting and laying stone drainage aggregate, which is invariably more expensive than a synthetic drain and concrete liners.

Over the past 30 years, geotextile, PVC filters, and HDPE filters have become the most commonly used soil filter media. They are cheap to produce and easy to lay, with factory controlled properties that ensure long term filtration performance even in fine silty soil conditions.

21st century alternatives

[edit]

Seattle's Public Utilities created a pilot program called Street Edge Alternatives Project. The project focuses on designing a system "to provide drainage that more closely mimics the natural landscape prior to development than traditional piped systems".^[3] The streets are characterized by ditches along the side of the roadway, with plantings designed throughout the area. An emphasis on non-curbed sidewalks allows water to flow more freely into the areas of permeable surface on the side of the streets. Because of the plantings, the run off water from the urban area does not all directly go into the ground, but can also be absorbed into the surrounding environment. Monitoring conducted by Seattle Public Utilities reports a 99 percent reduction of storm water leaving the drainage project.^[3]

Drainage has undergone a large-scale environmental review in the recent past^[when?] in the United Kingdom. Sustainable urban drainage systems (SUDS) are designed to encourage contractors to install drainage system that more closely mimic the natural flow of water in nature. Since 2010 local and neighbourhood planning in the UK is required by law to factor SUDS into any development projects that they are responsible for.

Slot drainage is a channel drainage system designed to eliminate the need for further pipework systems to be installed in parallel to the drainage, reducing the environmental impact of production as well as improving water collection. Stainless steel, concrete channel, PVC and HDPE are all materials available for slot drainage which have become industry standards on construction projects.

In the construction industry

[edit]

The civil engineer is responsible for drainage in construction projects. During the construction process, they set out all the necessary levels for roads, street gutters, drainage, culverts and sewers involved in construction operations.

Civil engineers and construction managers work alongside architects and supervisors, planners, quantity surveyors, and the general workforce, as well as subcontractors. Typically, most jurisdictions have some body of drainage law to govern to what degree a landowner can alter the drainage from their parcel.

Drainage options for the construction industry include:

- Point drainage, which intercepts water at gullies (points). Gullies connect to drainage pipes beneath the ground surface, so deep excavation is required to facilitate this system. Support for deep trenches is required in the shape of planking, strutting or shoring.

- Channel drainage, which intercepts water along the entire run of the channel. Channel drainage is typically manufactured from concrete, steel, polymer or composites. The interception rate of channel drainage is greater than point drainage and the excavation required is usually much less deep.

The surface opening of channel drainage usually comes in the form of gratings (polymer, plastic, steel or iron) or a single slot (slot drain) that run along the ground surface (typically manufactured from steel or iron).

In retaining walls

[edit]

Earth retaining structures such as retaining walls also need to have groundwater drainage considered during their construction. Typical retaining walls are constructed of impermeable material, which can block the path of groundwater. When groundwater flow is obstructed, hydrostatic water pressure buildups against the wall and may cause significant damage. If the water pressure is not drained appropriately, retaining walls can bow, move, and fracture, causing seams to separate. The water pressure can also erode soil particles, leading to voids behind the wall and sinkholes in the above soil. Traditional retaining wall drainage systems can include French drains, drain pipes or weep holes. To prevent soil erosion, geotextile filter fabrics are installed with the drainage system.

In planters

[edit]

Drainage in planters refers to the implementation of effective drainage systems specifically designed for plant containers or pots. Proper drainage is crucial in planters to prevent waterlogging and promote healthy plant growth. Planter Drainage

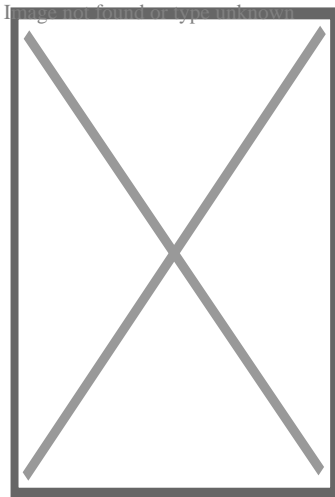
involves the incorporation of drainage holes, drainage layers, or specialized drainage systems to ensure excess water can escape from the planter. This helps to prevent root rot, water accumulation, and other issues that can negatively impact plant health. By providing adequate drainage in planters, it supports optimal plant growth and contributes to the overall success of gardening or landscaping projects.^[4]

Drainage options for the planter include:

- Surface drains are typically used to manage runoff from paved surfaces, such as sidewalks and parking lots. Catch basins, which collect water and debris, are connected to underground pipes that carry the water away from the site.^[4]
- Subsurface drains, on the other hand, are designed to manage water that seeps into the soil beneath the planting surface. French drains, which are gravel-filled trenches with perforated pipes at the bottom, are the most common type of subsurface drain. Trench drains, which are similar but shallower and wider, are also used in some situations.^[4]

Reasons for artificial drainage

[edit]



An agricultural drainage channel outside Magome, Japan after a heavy rain. Protuberances create turbulent water, preventing sediment from settling in the channel.

Wetland soils may need drainage to be used for agriculture. In the northern United States and Europe, glaciation created numerous small lakes, which gradually filled with humus to make marshes. Some of these were drained using open ditches and trenches to make mucklands, which are primarily used for high-value crops such as vegetables.

The world's largest project of this type has been in process for centuries in the Netherlands. The area between Amsterdam, Haarlem and Leiden was, in prehistoric times, swampland and small lakes. Turf cutting (peat mining), subsidence and shoreline erosion gradually caused the formation of one large lake, the Haarlemmermeer, or lake of Haarlem. The invention of wind-powered pumping engines in the 15th century permitted some of the marginal land drainage. Still, the final drainage of the lake had to await the design of large steam-powered pumps and agreements between regional authorities. The lake was eliminated between 1849 and 1852, creating thousands of km² of new land.

Coastal plains and river deltas may have seasonally or permanently high water tables and must have drainage improvements if they are to be used for agriculture. An example is the flatwoods citrus-growing region of Florida, United States. After periods of high rainfall, drainage pumps are employed to prevent damage to the citrus groves from overly wet soils. Rice production requires complete water control, as fields must be flooded or drained at different stages of the crop cycle. The Netherlands has also led the way in this type of drainage by draining lowlands along the shore and pushing back the sea until the original nation has been greatly enlarged.

In moist climates, soils may be adequate for cropping with the exception that they become waterlogged for brief periods each year, from snow melt or from heavy rains. Soils that are predominantly clay will pass water very slowly downward. Meanwhile, plant roots suffocate because the excessive water around the roots eliminates air movement through the soil.

Other soils may have an impervious layer of mineralized soil, called a hardpan, or relatively impervious rock layers may underlie shallow soils. Drainage is especially

important in tree fruit production. Soils that are otherwise excellent may be waterlogged for a week of the year, which is sufficient to kill fruit trees and cost the productivity of the land until replacements can be established. In each of these cases, appropriate drainage carries off temporary flushes of water to prevent damage to annual or perennial crops.

Drier areas are often farmed by irrigation, and one would not consider drainage necessary. However, irrigation water always contains minerals and salts, which can be concentrated to toxic levels by evapotranspiration. Irrigated land may need periodic flushes with excessive irrigation water and drainage to control soil salinity.

A typical drain in Bankstown, New South Wales

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A typical drain in Bankstown, New South Wales, Australia

See also

[edit]

- Surface drainage of the land
 - Drainage system (geomorphology), pattern of natural drains, streams, rivers, etc.
 - Land drainage in the United Kingdom – a legal and operational term in the UK to define a range of functions and responsibilities of drainage boards.
 - Surface runoff, surface runoff of excess rainfall from the land
 - Drainage system (agriculture), land forming or land shaping to enhance the drainage from the soil surface in agricultural land

- Contour plowing, controlling runoff and soil erosion
- Subsurface (groundwater) drainage
 - Horizontal drainage by pipes and ditches
 - Tile drainage
 - Vertical drainage by wells
 - Well drainage
 - Watertable control

Otherwise:

- Bar ditch
- Building construction
- Deep drainage
- Drain commissioner
- Drain (plumbing)
- Drainage basin or watershed
- Drainage divide or watershed
- Drainage equation
- Drainage research
- Geomorphology
- Hydrologic Evaluation of Landfill Performance
- Hydrology
- John Johnston, who introduced land drainage to the United States.
- Plumbing
 - Potable cold and hot water supply
 - Septic systems
 - Sewage traps, drains, and vents
- Rain gutter
- Retaining wall
- Sewage collection and disposal
- Soil salinity control by subsurface drainage
- Storm drain
- Stormwater
- Trench drain

- Trencher (machine)
- Urban exploration



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[edit]

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2. ^ "Broadside eulogy dedicated to Patrick, Earl of Marchmont, Sir Hugh Dalrymple, and others". National Library of Scotland Digital Gallery. 1705. Retrieved 5 April 2015.
3. ^ **a b** "Street Edge Alternatives (SEA Streets) Project". Seattle.gov. Archived from the original on Dec 5, 2008.
4. ^ **a b c** "4 Expert Tips for Perfect Planter Drainage". drainservice.org. 15 April 2023. Archived from the original on June 30, 2023. Retrieved July 1, 2023.

External links

[edit]

-  Media related to Drainage at Wikimedia Commons
-  The dictionary definition of *drainage* at Wiktionary
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Agricultural water management

Irrigation

- Surface irrigation
- Drip irrigation
- Tidal irrigation
- Irrigation statistics
- Irrigation management
- Irrigation environmental impacts

**Subsurface
drainage**

- Ditch
- Tile drainage
- Drainage equation
- Drainage system (agriculture)
- Watertable control
- Drainage research
- Drainage by wells
- Contour trenching

**Surface
water/runoff**

- Hydrological model
- Hydrological transport model
- Runoff model (reservoir)
- Groundwater flow
- Groundwater energy balance

Groundwater

- Groundwater model
- Hydraulic conductivity
- Watertable
- Acid sulphate soils

Problem soils

- Alkali soils
- Saline soils
- Hydrology (agriculture)

**Agro-hydro-
salinity
group**

- Soil salinity control
- Leaching model (soil)
- SaltMod integrated model
- SahysMod polygonal model: Saltmod coupled to a groundwater model

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topics**

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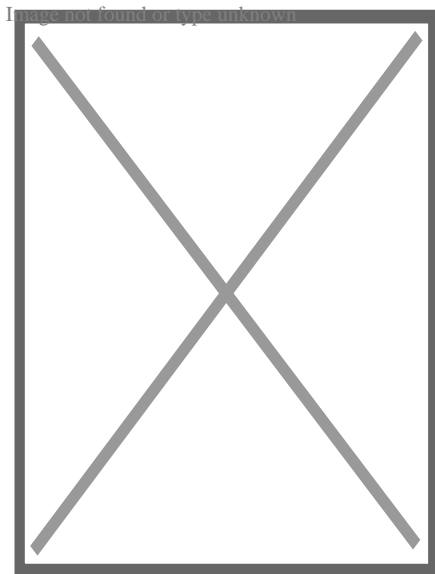
- Bridge
- Canal
- Causeway
- Dam
- Drainage
- Footbridge
- Interchange
- Levee
- Overpass
- Pipeline
- Road
- Skyway
- Storm drain
- Tunnel
- *See also:* Architecture
- Arena
- Civil engineering
- Construction
- Playground
- Public
- Stadium
- Theater
- Urban park

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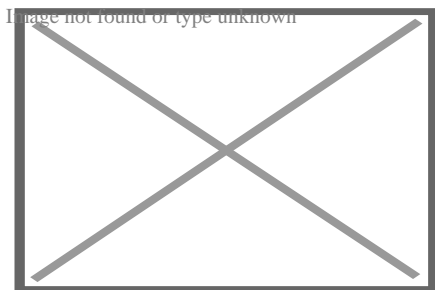
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About Water damage

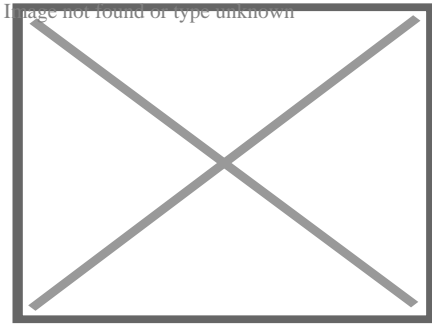
The examples and perspective in this article **may not represent a worldwide view of the subject**. You may improve this article, discuss the issue on the talk page, or create a new article, as appropriate. *(March 2011) (Learn how and when to remove this message)*



Interior of part of a damaged home in New Orleans after Hurricane Katrina



Family photographs damaged by flooding



A smaller and more minor water spot caused by rainwater leaking through a roof

Water damage describes various possible losses caused by water intruding where it will enable attack of a material or system by destructive processes such as rotting of wood, mold growth, bacteria growth, rusting of steel, swelling of composite woods, de-laminating of materials such as plywood, short-circuiting of electrical devices, etc.

The damage may be imperceptibly slow and minor such as water spots that could eventually mar a surface, or it may be instantaneous and catastrophic such as burst pipes and flooding. However fast it occurs, water damage is a major contributor to loss of property.

An insurance policy may or may not cover the costs associated with water damage and the process of water damage restoration. While a common cause of residential water damage is often the failure of a sump pump, many homeowner's insurance policies do not cover the associated costs without an addendum which adds to the monthly premium of the policy. Often the verbiage of this addendum is similar to "Sewer and Drain Coverage".

In the United States, those individuals who are affected by wide-scale flooding may have the ability to apply for government and FEMA grants through the Individual Assistance program.^[1] On a larger level, businesses, cities, and communities can apply to the FEMA Public Assistance program for funds to assist after a large flood. For example, the city of Fond du Lac Wisconsin received \$1.2 million FEMA grant after flooding in June 2008. The program allows the city to purchase the water damaged properties, demolish the structures, and turn the former land into public green space.^[citation]

Causes

[edit]

Water damage can originate by different sources such as a broken dishwasher hose, a washing machine overflow, a dishwasher leakage, broken/leaking pipes, flood waters, groundwater seepage, building envelope failures (leaking roof, windows, doors, siding, etc.) and clogged toilets. According to the Environmental Protection Agency, 13.7% of all water used in the home today can be attributed to plumbing leaks.^[2] On average that is approximately 10,000 gallons of water per year wasted by leaks for each US home. A tiny, 1/8-inch crack in a pipe can release up to 250 gallons of water a day.^[3] According to *Claims Magazine* in August 2000, broken water pipes ranked second to hurricanes in terms of both the number of homes damaged and the amount of claims (on average \$50,000 per insurance claim^[citation needed]) costs in the US.^[4] Experts suggest that homeowners inspect and replace worn pipe fittings and hose connections to all household appliances that use water at least once a year. This includes washing machines, dishwashers, kitchen sinks, and bathroom lavatories, refrigerator icemakers, water softeners, and humidifiers. A few US companies offer whole-house leak protection systems utilizing flow-based technologies. A number of insurance companies offer policyholders reduced rates for installing a whole-house leak protection system.

As far as insurance coverage is concerned, damage caused by surface water intrusion to the dwelling is considered flood damage and is normally excluded from coverage under traditional homeowners' insurance. Surface water is water that enters the dwelling from the surface of the ground because of inundation or insufficient drainage and causes loss to the dwelling. Coverage for surface water intrusion^[5] to the dwelling would usually require a separate flood insurance policy.

Categories

[edit]

There are three basic categories of water damage, based on the level of contamination.

Category 1 Water – Refers to a source of water that does not pose substantial threat to humans and classified as "**clean water**". Examples are broken water supply lines, tub or sink overflows or appliance malfunctions that involves water supply lines.

Category 2 Water – Refers to a source of water that contains a significant degree of chemical, biological or physical contaminants and causes discomfort or sickness when consumed or even exposed to. Known as "**grey water**". This type carries microorganisms and nutrients of micro-organisms. Examples are toilet bowls with urine (no feces), sump pump failures, seepage due to hydrostatic failure and water discharge from dishwashers or washing machines.

Category 3 Water – Known as "**black water**" and is grossly unsanitary. This water contains unsanitary agents, harmful bacteria and fungi, causing severe discomfort or sickness. Type 3 category are contaminated water sources that affect the indoor environment. This category includes water sources from sewage, seawater, rising water from rivers or streams, storm surge, ground surface water or standing water. Category 2 Water or Grey Water that is not promptly removed from the structure and or have remained stagnant may be re classified as Category 3 Water. Toilet back flows that originates from beyond the toilet trap is considered black water contamination regardless of visible content or color.[⁶]

Classes

[edit]

Class of water damage is determined by the probable rate of evaporation based on the type of materials affected, or wet, in the room or space that was flooded.

Determining the class of water damage is an important first step, and will determine the amount and type of equipment utilized to dry-down the structure.[⁷]

Class 1 – Slow Rate of Evaporation. Affects only a portion of a room. Materials have a low permeance/porosity. Minimum moisture is absorbed by the materials. **IICRC s500 2016 update adds that class 1 be indicated when <5% of the total square footage of a room (ceiling+walls+floor) are affected **

Class 2 – Fast Rate of Evaporation. Water affects the entire room of carpet and cushion. May have wicked up the walls, but not more than 24 inches. **IICRC s500 2016 update adds that class 2 be indicated when 5% to 40% of the total square footage of a room (ceiling+walls+floor) are affected **

Class 3 – Fastest Rate of Evaporation. Water generally comes from overhead, affecting the entire area; walls, ceilings, insulation, carpet, cushion, etc. **IICRC s500 2016 update adds that class 3 be indicated when >40% of the total square footage of a room (ceiling+walls+floor) are affected **

Class 4 – Specialty Drying Situations. Involves materials with a very low permeance/porosity, such as hardwood floors, concrete, crawlspaces, gypcrete, plaster, etc. Drying generally requires very low specific humidity to accomplish drying.

Restoration

[edit]

See also: Convectant drying

Water damage restoration can be performed by property management teams, building maintenance personnel, or by the homeowners themselves; however, contacting a certified professional water damage restoration specialist is often regarded as the safest way to restore water damaged property. Certified professional water damage restoration specialists utilize psychrometrics to monitor the drying process.^[8]

Standards and regulation

[edit]

While there are currently no government regulations in the United States dictating procedures, two certifying bodies, the Institute of Inspection Cleaning and Restoration Certification (IICRC) and the RIA, do recommend standards of care. The

current IICRC standard is ANSI/IICRC S500-2021.[⁹] It is the collaborative work of the IICRC, SCRT, IEI, IAQA, and NADCA.

Fire and Water Restoration companies are regulated by the appropriate state's Department of Consumer Affairs – usually the state contractors license board. In California, all Fire and Water Restoration companies must register with the California Contractors State License Board.[¹⁰] Presently, the California Contractors State License Board has no specific classification for "water and fire damage restoration."

Procedures

[edit]

Water damage restoration is often prefaced by a loss assessment and evaluation of affected materials. The damaged area is inspected with water sensing equipment such as probes and other infrared tools in order to determine the source of the damage and possible extent of areas affected. Emergency mitigation services are the first order of business. Controlling the source of water, removal of non-salvageable materials, water extraction and pre-cleaning of impacted materials are all part of the mitigation process. Restoration services would then be rendered to the property in order to dry the structure, stabilize building materials, sanitize any affected or cross-contaminated areas, and deodorize all affected areas and materials. After the labor is completed, water damage equipment including air movers, air scrubbers, dehumidifiers, wood floor drying systems, and sub-floor drying equipment is left in the residence. The goal of the drying process is to stabilize the moisture content of impacted materials below 15%, the generally accepted threshold for microbial amplification. Industry standards state that drying vendors should return at regular time intervals, preferably every twenty-four hours, to monitor the equipment, temperature, humidity, and moisture content of the affected walls and contents.[⁶] In conclusion, key aspects of water damage restoration include fast action, adequate equipment, moisture measurements, and structural drying. Dehumidification is especially crucial for structural components affected by water damage, such as

wooden beams, flooring, and drywall.

See also

[edit]

- Indoor mold

References

[edit]

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About United Structural Systems of Illinois, Inc

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Things To Do in Cook County

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Millennium Park

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Willis Tower

4.5 (21504)

Photo

Navy Pier

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WDR Museum

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Chicago's Chinatown Gateway

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Glessner House

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Driving Directions in Cook County

Driving Directions From AMC South Barrington 24 to United Structural Systems of Illinois, Inc

Driving Directions From Country Inn & Suites by Radisson, Hoffman Estates, IL to United Structural Systems of Illinois, Inc

Driving Directions From dr. Joanna Pozdal to United Structural Systems of Illinois, Inc

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Reviews for United Structural Systems of Illinois, Inc

United Structural Systems of Illinois, Inc

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Sarah McNeily

(5)

USS was excellent. They are honest, straightforward, trustworthy, and conscientious. They thoughtfully removed the flowers and flower bulbs to dig where they needed in the yard, replanted said flowers and spread the extra dirt to fill in an area of the yard. We've had other services from different companies and our yard was really a mess after. They kept the job site meticulously clean. The crew was on time and friendly. I'd recommend them any day! Thanks to Jessie and crew.

United Structural Systems of Illinois, Inc

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Jim de Leon

(5)

It was a pleasure to work with Rick and his crew. From the beginning, Rick listened to my concerns and what I wished to accomplish. Out of the 6 contractors that quoted the project, Rick seemed the MOST willing to accommodate my wishes. His pricing was definitely more than fair as well. I had 10 push piers installed to stabilize and lift an addition of my house. The project commenced at the date that Rick had disclosed initially and it was completed within the same time period expected (based on Rick's original assessment). The crew was well informed, courteous, and hard working. They were not loud (even while equipment was being utilized) and were well spoken. My neighbors were very impressed on how polite they were when they entered / exited my property (saying hello or good morning each day when they crossed paths). You can tell they care about the customer concerns. They ensured that the property would be put back as clean as possible by placing MANY sheets of plywood down prior to excavating. They compacted the dirt back in the holes extremely well to avoid large stock piles of soils. All the while, the main office was calling me to discuss updates and expectations of completion. They provided waivers of lien, certificates of insurance, properly acquired permits, and JULIE locates. From a construction background, I can tell you that I did not see any flaws in the way they operated and this an extremely professional company. The pictures attached show the push piers added to the foundation (pictures 1, 2 & 3), the amount of excavation (picture 4), and the restoration after dirt was placed back in the pits and compacted (pictures 5, 6 & 7). Please notice that they also sealed two large cracks and steel plated these cracks from expanding further (which you can see under my sliding glass door). I, as well as my wife, are extremely happy that we chose United Structural Systems for our contractor. I would happily tell any of my friends and family to use this contractor should the opportunity arise!

United Structural Systems of Illinois, Inc

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Dave Kari

(5)

What a fantastic experience! Owner Rick Thomas is a trustworthy professional. Nick and the crew are hard working, knowledgeable and experienced. I interviewed every company in the area, big and small.

A homeowner never wants to hear that they have foundation issues. Out of every company, I trusted USS the most, and it paid off in the end. Highly recommend.

United Structural Systems of Illinois, Inc

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Paul Gunderlock

(4)

The staff was helpful, very nice and easy to work with and completed the work timely and cleaned up well. Communications faltered a bit at times and there was an email communications glitch which was no fault of anyone, but no big deal and all ended up fine. We sure feel better to have this done and hope that is the end of our structural issues. It does seem like (after talking to several related companies), that it would be great if some of these related companies had a structural engineer on staff vs using on the job expertise gained over years – which is definitely valuable! But leaves a bit of uncertainty – and probably saves money for both sides may be the trade-off? So far, so good though! Thank you.

Analyzing Stair Step Gaps in Block Foundations [View GBP](#)

Frequently Asked Questions

What causes stair step cracks in block foundations?

Stair step cracks usually occur due to differential settlement or shifting of the foundation. They can be caused by soil movement, poor drainage, tree roots, or inadequate construction techniques that lead to uneven pressure distribution on the foundation.

How serious are stair step cracks in terms of structural integrity?

The seriousness of stair step cracks depends on their size, location, and whether they are active (continuing to widen). Small hairline cracks may not pose an immediate threat but should be monitored. Larger or growing cracks could indicate significant structural issues requiring professional assessment and repair.

What methods are used to repair stair step gaps in block foundations?

Common repair methods include underpinning to stabilize the foundation, using epoxy injections for crack sealing, installing helical piers or wall anchors for additional support, and improving drainage around the foundation to prevent future soil movement. Consulting a structural engineer is recommended for determining the best repair strategy.

United Structural Systems of Illinois, Inc

Phone : +18473822882

City : Hoffman Estates

State : IL

Zip : 60169

Address : Unknown Address

Google Business Profile

Company Website : <https://www.unitedstructuralsystems.com/>

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