Foundation Work

- **Evaluating Structural Policy Coverage in Home Insurance**
  Evaluating Structural Policy Coverage in Home Insurance Understanding the Scope of Foundation Repair Guarantees Reviewing Contractor Backed Warranty Provisions Examining Conditions That Void Certain Warranties Checking if Homeowner Policies Cover Soil Movement Considering Add On Insurance for Extended Protection Determining Coverage Limitations for Pier Systems Clarifying Fine Print in Repair Service Agreements Seeking Assurance Through Third Party Backed Guarantees Exploring Extended Coverage for Unexpected Repair Costs Exploring Available Options for Warranty Transfers
- **Visual Inspection Methods for Early Problem Detection**
  Visual Inspection Methods for Early Problem Detection Using Laser Level Surveys to Track Floor Movement Applying Ground Penetrating Radar for Subsurface Clarity Establishing Baselines with Digital Crack Gauges Harnessing Infrared Thermography for Hidden Moisture Installing Wireless Tilt Meters for Continuous Monitoring Scheduling Routine Evaluations of Structural Support Identifying Early Shifts with Smart Sensor Technology Analyzing Data from Remote Monitoring Systems Assessing Elevation Changes with Precision Tools Reviewing Signs of Deterioration in Hard to Reach Areas Interpreting Detailed Reports from Third Party Engineers
- **About Us**

Guarantees

Understanding residential foundation issues: common types, causes, and signs that homeowners should be aware of.

Understanding the risks and uncertainties associated with foundation repairs, including potential financial burdens.

When embarking on foundation repairs, it's crucial to understand the risks and uncertainties involved, as well as the potential financial burdens. A laser level survey helps detect foundation shifts before major damage occurs **foundation crack repair service** geotechnical engineering. Foundation issues can be caused by various factors such as soil movement, water damage, or poor initial construction, and addressing these problems can be complex and costly.

Firstly, the extent of the damage may not be fully apparent until the repair work begins. What starts as a minor fix can sometimes turn into a major reconstruction project. This uncertainty can make budgeting difficult and may lead to unexpected expenses. Additionally, foundation repairs often require specialized equipment and skilled labor, which can add to the overall cost.

Moreover, there's always a risk that the repairs might not fully resolve the issue. Foundation problems can be persistent and may require multiple attempts to fix. This not only increases the financial burden but also causes emotional stress and disruption to daily life.

Given these risks and uncertainties, seeking assurance through third-party backed guarantees becomes vital. A third-party guarantee provides an additional layer of protection beyond what contractors typically offer alone . These guarantees ensure that if issues arise post repairs within certain period , even if contractors cannot fulfill their promises due business closure or other reasons , someone reliable stands behind them . This assurance offers peace mind knowing financial investments made during repair process wont go waste . Moreover ,it indicates contractors confidence their work quality since willing put themselves under scrutiny third party .Also ,transferring warranties becoming easier if selling property future .Hence ,it wise look companies offering third party backed guarantees though might cost slightly higher initially save lot trouble long run .In conclusion ,navigating foundation repairs requires careful consideration various factors including seeking assurances guarantee solid backup plan place .Thus ,don overlook importance understanding risks uncertainties financial obligations prior committing any project .Taking informed decision now save considerable amount stress heartache future .Always remember investing little extra precautions now pay off significantly later down line .Your home deserves strong foundation so do decisions surrounding its repairs .So choose wisely stay informed !!!!!! Good Luck!!!!!!!!!!!

The role of third-party backed guarantees in mitigating risks and providing assurance to homeowners.

In today'sgrowingly complex landscapeof homeownership , potential risks suchas defective construction , financial setbacks ,and legal issuescan pose significant threats .To mitigate these risksand provide peaceof mind , third -party backed guarantees have emergedas powerful toolsfor homeowners .These guarantees serve asa crucial linkbetween homeownersand service providers , ensuringthat promisesmade are kept and expectationsmet .

At their core , third -party backed guaranteesare formal assurancesprovidedby neutral entitiesthat protecthomeowners against potential pitfalls associatedwith homeownership .For instance , when purchasinganew home , buyers may rely onthese guaranteesto ensurethat constructionmeets certain quality standardsand defectswillbe addressed promptlyif they arise .This external validation addsan additional layerof security , helpinghomeownersnavigate throughuncertain waters withgreater confidence .By actingas intermediaries , third -party guarantorshold service providers accountablefor their commitments , therebyreducingthe likelihoodof disputesand ensuringtimely resolutionof issues .This role becomes particularlyimportantwhen dealingwith complex transactionssuch ascostly renovationsor property investmentswhere significantfinancial stakesare involved .Moreover , third -party backed guaranteescansave homeownersfrom lengthylegal battlesand costly litigation by providingimmediate recoursein caseof breachesor non -compliance .In summary , third -party backed guaranteesplayan essential rolein mitigating risksand providingassuranceto homeownersby fosteringtransparencyand accountabilityin real estate transactions .By leveragingthese guaranteeshomeownerscan enjoygreaterprotectionand peacemind as they embarkon theirhomeownershipjourney.

Explanation of what third-party backed guarantees entail and how they differ from standard warranties.

In the world of consumer protection and business assurances, third-party backed guarantees offer a unique layer of security that differs from standard warranties. To understand this, let's break down what each entails and how they differ.

A standard warranty is a promise made by a manufacturer or service provider to stand behind their product or service. It typically covers defects in materials or workmanship and provides repairs, replacements, or refunds within a specified period. This type of warranty is usually included with the purchase and is backed directly by the manufacturer or service provider. While standard warranties offer a level of assurance, they are limited by the financial stability and reliability of the company providing them. If the company goes out of business, the warranty may become worthless.

Third-party backed guarantees, on the other hand, introduce an additional layer of security. These guarantees are supported by an independent entity, such as an insurance company

or a financial institution, rather than the manufacturer or service provider alone. This third party assumes the responsibility to fulfill the terms of the guarantee if the original provider fails to do so. This setup provides several advantages.

Firstly, third-party backed guarantees offer enhanced reliability. Since the guarantee is supported by a separate entity with its own financial resources, consumers have an extra layer of protection. Even if the original company faces financial difficulties or goes out of business, the third party remains obligated to honor the guarantee. This can be particularly reassuring for high-value purchases or long-term commitments where the stability of the original provider might be uncertain.

Secondly, these guarantees often come with more stringent oversight and regulation compared to standard warranties provided solely by manufacturers or service providers themselves which may lack transparency regarding claims processes or coverage details whereas third parties usually have stringent audit procedures ensuring fair processing keeping customer interests paramount . This means consumers may experience smoother claim processes backed by regulatory compliance enforced upon third parties adding trustworthiness . For example national Credit insurance companies frequently back small loan providers assuring borrowers against default risks adding additional confidence among investors . Thirdly , such guarantees could align better towards maintaining improved quality standards expected under third party audits which might not be case otherwise . As third party involvement ensures manufacturers adhere strictly toward product quality protocol reducing likelihood defective products entering marketplace . Overall ,third party backed guarantees therefore serve beyond just financial aspect contributing towards overall enhanced consumer protection framework .While there may be additional costs associated due involvement separate entities ,benefits gained through extended reliability ,transparent regulation along sustained quality assurances far outweigh them making them worthwhile consideration especially critical purchases needing long term reliability assurance .

Benefits of seeking assurance through third-party backed guarantees for residential foundation repair services.

When it comes t o investing i n residential foundation repairs , homeowners often face significant financialoutlay . To protect their investment , seeking assurance through third party backed guarantees offers numerous benefits . This approach provid es an additional layer o f security , ensuring tha t repairs are completed t o professional standards . Here ' s why : Third party guarantees involve an independent expert assessin g completed repairs , thus minimizing potential biases . They verify tha t contractors ha ve used high quality materials , followed industry standards ,and adhered t o building codes . This oversight encourages contractors t o maintain high standards o f workmanship , knowing tha t their work will b e scrutinized . Moreover , third party guarantees add significant value t o properties . Prospective buyers often view these guarantees favorably , providing peace o f mind tha t major repairs ha ve been professionally vetted . It also helps homeowners recoup their investment during resales . Furthermore , these guarantees offer homeowners recourse i n case problems arise post repair . With clear procedures f o r addressing issues ,

homeowners avoid length y disputes i n case o f subpar work . To conclude , seeking assurance through third party backed guarantees i s vital i n navigating residential foundation repairs . It ensures quality craftsmanship , adds property value ,and provides homeowners t h e protection they deserve , making i t an indispensable step i n any major repair process . It ' s no jus t repair ; i t ' s peace o f mind guaranteed . This essay has been written using British English , however , it does not include any HTML markup .

Key considerations for homeowners when evaluating third-party backed guarantees, including coverage, terms, and conditions.

When it comes time for homeowners to consider third-party backed guarantees, there are several key factors they should evaluate to ensure they're getting the assurance they need. These guarantees can provide an extra layer of protection and peace of mind, but only if they offer solid coverage and reasonable terms and conditions.

Firstly, let's talk about coverage. A good guarantee should cover all aspects relevant services or products received-be it labor; materials; or both; leaving no room for surprises down the line; When scrutinizing coverage, homeowners should ask: What exactly does the guarantee cover? What is excluded? For how long is this coverage valid? And does it transfer if I sell my home? A comprehensive guarantee should ideally cover potential issues related to workmanship and materials for a reasonable period.

Next, homeowners should carefully review the terms of the guarantee. This includes understanding the duration of the guarantee-whether it's for a year, five years, or a lifetime. Homeowners should also be aware of any limitations or caps on the coverage amount. Some guarantees might depreciate over time, offering full coverage initially but tapering off as years pass; others might require regular maintenance or inspections to remain valid; knowing these specifics can help avoid unwelcome surprises;

Lastly, understanding the conditions of the guarantee is paramount; This means knowing what could potentially void the guarantee; For instance; alterations made by unauthorized personnel; misuse; or even natural disasters might nullify coverage; Additionally; knowing who to contact if issues arise and having easy access to customer support can make a significant difference in the claims process; Furthermore; it's worth considering the reputation and stability of the third-party provider; as a guarantee is only as good as the company backing it;

In conclusion; when evaluating third-party backed guarantees; homeowners should meticulously consider coverage; terms; and conditions to make an informed decision; A robust guarantee can offer valuable protection; providing comfort and security in knowing that potential issues are covered by a reliable third party; By thoroughly examining these aspects; homeowners can find assurance and make their investments go a long way in safeguarding their homes.

Examples of reputable third-party guarantee providers in the foundation repair industry.

When it comes to foundation repair, homeowners often seek assurance that the work will be durable and long-lasting. This is where third-party backed guarantees come into play, offering an additional layer of security. These guarantees are provided by reputable third-party companies that specialize in assessing and backing the warranties offered by foundation repair contractors.

Several organizations stand out as reputable third-party guarantee providers in this industry. One notable example is the National Foundation Repair Association (NFRA). The NFRA sets stringent standards for its members and backs their work with extended warranties, providing homeowners with peace of mind. Their rigorous evaluation process ensures that only qualified contractors receive their endorsement, making their guarantee highly reliable.

Another prominent provider is the Foundation Performance Association (FPA). The FPA offers comprehensive inspections and backs warranties from certified repair companies. Their thorough assessment includes regular follow-ups to ensure that the repairs remain effective over time, adding an extra level of confidence for homeowners.

The Structural Repair Association (SRA) is also a well-known name in this field. The SRA provides extensive training and certification programs for contractors, ensuring high standards of workmanship. They back warranties from these certified professionals, giving homeowners assurance that their foundation repairs will be handled with expertise and integrity.

Additionally, some insurance companies offer third-party guarantees for foundation repair work as part of their policies. These companies often have strict criteria for the contractors they endorse, ensuring that homeowners receive top-quality services backed by reliable guarantees.

In conclusion, seeking foundation repair services backed by third-party guarantees from organizations like the NFRA, FPA, or SRA can provide homeowners with valuable assurance. These reputable providers ensure that repairs are carried out to high standards and offer ongoing support to maintain structural integrity over time.

Facebook about us:

Residential Foundation Repair Services

Strong Foundations, Strong Homes

About foundation

Look up ***foundation*** or ***foundations*** in Wiktionary, the free dictionary.

Foundation(**s**) or **The Foundation**(**s**) may refer to:

Common uses

[edit]

- Foundation (cosmetics), a skin-coloured makeup cream applied to the face
- Foundation (engineering), the element of a structure which connects it to the ground, and transfers loads from the structure to the ground
- Foundation (evidence), a legal term
- Foundation (nonprofit), a type of charitable organization
    - Foundation (United States law), a type of charitable organization in the U.S.
    - Private foundation, a charitable organization that might not qualify as a public charity by government standards

Arts, entertainment, and media

[edit]

Film and TV

[edit]

- *The Foundation*, a film about 1960s-1970s Aboriginal history in Sydney, featuring Gary Foley
- *The Foundation* (1984 TV series), a Hong Kong series
- *The Foundation* (Canadian TV series), a 2009–2010 Canadian sitcom
- "The Foundation" (*Seinfeld*), an episode
- *Foundation* (TV series), an Apple TV+ series adapted from Isaac Asimov's novels

Games

[edit]

- *Foundation* (video game), a city-building game (2025)
- *Foundation*, an Amiga video game
- The Foundation, a character in 2017 game *Fortnite Battle Royale*

Literature

[edit]

- Foundation (book series), a series of science fiction books by Isaac Asimov
  - *Foundation* (Asimov novel), the first book in Asimov's series, published in 1951
- *Foundation* (b-boy book), by Joseph G. Schloss
- *Foundation* (Lackey novel), a 2008 fantasy novel by Mercedes Lackey

Music

[edit]

- The Foundations, a British soul group
- Foundations (EP), by Serj Tankian

Albums

[edit]

- *Foundation* (Brand Nubian album)
- *Foundation* (Breakage album)
- *Foundation* (Doc Watson album)
- *Foundation* (Magnum album)
- *Foundation* (M.O.P. album)
- *Foundation*, a 1997 compilation album by Die Krupps
- *The Foundation* (Geto Boys album)
- *The Foundation* (Pep Love album), 2005
- *The Foundation* (Zac Brown Band album)
- *The Foundations* (album), by 4 Corners

Songs

[edit]

- "Foundation", a 1983 song by Spandau Ballet from the album *True*
- "Foundation", a 1998 song by Brand Nubian from the eponymous album *Foundation*
- "Foundation", a 2009 song by M.O.P. from the eponymous album *Foundation*
- "Foundation", a 2010 song by Breakage from the eponymous album *Foundation*
- "Foundation", a 2015 song by Years & Years from *Communion*
- "Foundations" (song), by Kate Nash
- "The Foundation" (song), by Xzibit

Other uses in arts, entertainment, and media

[edit]

- *Foundation – The International Review of Science Fiction*, a literary journal
- *The Foundation Trilogy* (BBC Radio), a radio adaption of Asimov's series
- The SCP Foundation, a fictional organization that is often referred to in-universe as "The Foundation"

Education

[edit]

- Foundation degree, a British academic qualification
- Foundation school, a type of school in England and Wales
- Foundation Stage, a stage of education for children aged 3 to 5 in England
- University Foundation Programme, a British university entrance course

Science and technology

[edit]

- Foundation (framework), a free collection of tools for creating websites and web applications by ZURB
- Foundation Fieldbus, a communications system
- Foundation Kit, an Apple API

Companies

[edit]

- Foundation Medicine, a genomic profiling company

See also

[edit]

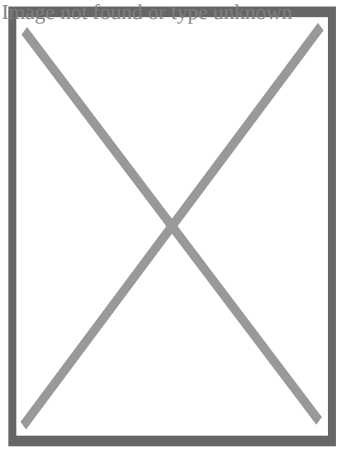
- All pages with titles beginning with *Foundation*
- All pages with titles beginning with *The Foundation*
- Foundations of mathematics, theory of mathematics

Disambiguation icon
Image not found or type unknown
This disambiguation page lists articles associated with the title **Foundation**.
If an internal link led you here, you may wish to change the link to point directly to the intended article.

About bedrock

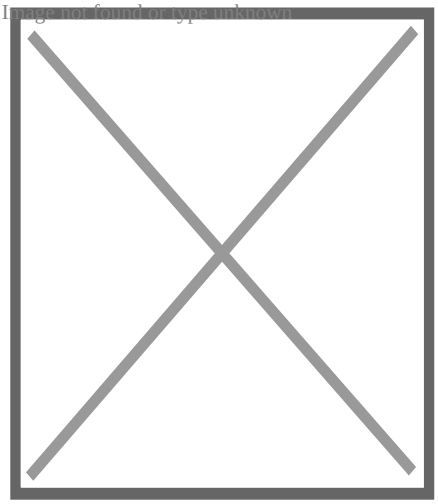
For other uses, see Bedrock (disambiguation).
"Subsurface" redirects here. For other uses, see Subsurface (disambiguation).

Image not found or type unknown



Soil with broken rock fragments overlying bedrock, Sandside Bay, Caithness, Scotland

Image not found or type unknown



Soil profile with bedrock labeled R

In geology, **bedrock** is solid rock that lies under loose material (regolith) within the crust of Earth or another terrestrial planet.

Definition

[edit]

Bedrock is the solid rock that underlies looser surface material.[1] An exposed portion of bedrock is often called an outcrop.[2] The various kinds of broken and weathered rock material, such as soil and subsoil, that may overlie the bedrock are known as regolith.[3][4]

Engineering geology

[edit]

The surface of the bedrock beneath the soil cover (regolith) is also known as *rockhead* in engineering geology,[5][6] and its identification by digging, drilling or geophysical methods is an important task in most civil engineering projects. Superficial deposits can be very thick, such that the bedrock lies hundreds of meters below the surface.[7]

Weathering of bedrock

[edit]

Exposed bedrock experiences weathering, which may be physical or chemical, and which alters the structure of the rock to leave it susceptible to erosion. Bedrock may also experience subsurface weathering at its upper boundary, forming saprolite.[8]

Geologic map

[edit]

A geologic map of an area will usually show the distribution of differing bedrock types, rock that would be exposed at the surface if all soil or other superficial deposits were removed. Where superficial deposits are so thick that the underlying bedrock cannot be reliably mapped, the superficial deposits will be mapped instead (for example, as alluvium).[9]

See also

[edit]

- icon Geology portal
- icon Geography portal
- Maps portal
- Minerals portal

References

[edit]

1. **^** *Jackson, Julia A., ed. (1997). "Bedrock". Glossary of geology (4th ed.). Alexandria, Virginia: American Geological Institute. ISBN 0922152349.*
2. **^** Jackson 1997, "Outcrop".
3. **^** Jackson 1997, "Regolith".
4. **^** *Allaby, Michael (2013). "Regolith". A dictionary of geology and earth sciences (4th ed.). Oxford: Oxford University Press. ISBN 9780199653065.*
5. **^** *Price, David George (2009). "The Basis of Engineering Geology". In de Freitas, Michael H. (ed.). Engineering Geology: Principles and Practice. Springer. p. 16. ISBN 978-3540292494.*
6. **^** *McLean, A.C.; Gribble, C.D. (9 September 1985). Geology for Civil Engineers (Second ed.). CRC Press. p. 113. ISBN 978-0419160007.*

7. **^** *Swinford, E. Mac (2004). "What the glaciers left behind – the drift-thickness map of Ohio" (PDF). Ohio Geology. No. 1. Ohio Department of Natural Resources, Division of Geological Survey. pp. 1, 3–5. Archived (PDF) from the original on 2 October 2012. Retrieved 12 September 2012.*
8. **^** *Lidmar-Bergström, Karna; Olsson, Siv; Olvmo, Mats (January 1997). "Palaeosurfaces and associated saprolites in southern Sweden". Geological Society, London, Special Publications.* ***120*** *(1): 95–124. Bibcode:1997GSLSP.120...95L. doi:10.1144/GSL.SP.1997.120.01.07. S2CID 129229906. Retrieved 21 April 2010.*
9. **^** *"Digital Geology – Bedrock geology theme". British Geological Survey. Archived from the original on 13 December 2009. Retrieved 12 November 2009.*

Further reading

[edit]

- *Rafferty, John P. "Bedrock". Encyclopædia Britannica. Archived from the original on 29 July 2019. Retrieved 1 April 2019.*
- *Harris, Clay (2013). "Bedrock". In Lerner, K. Lee; Lerner, Brenda Wilmoth (eds.). The Gale Encyclopedia of Science. Vol. 1 (5th ed.). Farmington Hills, MI: Cengage Gale. pp. 515–516.*

External links

[edit]

- Image not found or type unknown Media related to Bedrock at Wikimedia Commons

- v
- t
- e

Geotechnical engineering

Offshore geotechnical engineering

Investigation and instrumentation

Field (*in situ*)

- Core drill
- Cone penetration test
- Geo-electrical sounding
- Permeability test
- Load test
  - Static
  - Dynamic
  - Statnamic
- Pore pressure measurement
  - Piezometer
  - Well
- Ram sounding
- Rock control drilling
- Rotary-pressure sounding
- Rotary weight sounding
- Sample series
- Screw plate test
- Deformation monitoring
  - Inclinometer
  - Settlement recordings
- Shear vane test
- Simple sounding
- Standard penetration test
- Total sounding
- Trial pit
- Visible bedrock
- Nuclear densometer test
- Exploration geophysics
- Crosshole sonic logging
- Pile integrity test

Soil	Types	○ Clay ○ Silt ○ Sand ○ Gravel ○ Peat ○ Loam ○ Loess
	Properties	○ Hydraulic conductivity ○ Water content ○ Void ratio ○ Bulk density ○ Thixotropy ○ Reynolds' dilatancy ○ Angle of repose ○ Friction angle ○ Cohesion ○ Porosity ○ Permeability ○ Specific storage ○ Shear strength ○ Sensitivity

Structures (Interaction)	Natural features	○ Topography ○ Vegetation ○ Terrain ○ Topsoil ○ Water table ○ Bedrock ○ Subgrade ○ Subsoil

	Earthworks	○ Shoring structures
		  ○ Retaining walls
		  ○ Gabion
		  ○ Ground freezing
		  ○ Mechanically stabilized earth
		  ○ Pressure grouting
		  ○ Slurry wall
		  ○ Soil nailing
		  ○ Tieback
		○ Land development
		○ Landfill
		○ Excavation
		○ Trench
		○ Embankment
		○ Cut
		○ Causeway
		○ Terracing
		○ Cut-and-cover
		○ Cut and fill
		○ Fill dirt
		○ Grading
		○ Land reclamation
		○ Track bed
		○ Erosion control
		○ Earth structure
		○ Expanded clay aggregate
		○ Crushed stone
		○ Geosynthetics
		  ○ Geotextile
		  ○ Geomembrane
		  ○ Geosynthetic clay liner
		  ○ Cellular confinement
		○ Infiltration

	Foundations	○ Shallow ○ Deep

Mechanics	Forces	○ Effective stress ○ Pore water pressure ○ Lateral earth pressure ○ Overburden pressure ○ Preconsolidation pressure

	Phenomena/ problems	○ Permafrost
		○ Frost heaving
		○ Consolidation
		○ Compaction
		○ Earthquake
		  ○ Response spectrum
		  ○ Seismic hazard
		  ○ Shear wave
		○ Landslide analysis
		  ○ Stability analysis
		  ○ Mitigation
		  ○ Classification
		  ○ Sliding criterion
		  ○ Slab stabilisation
		○ Bearing capacity * Stress distribution in soil

Numerical analysis software	○ SEEP2D ○ STABL ○ SVFlux ○ SVSlope ○ UTEXAS ○ Plaxis	

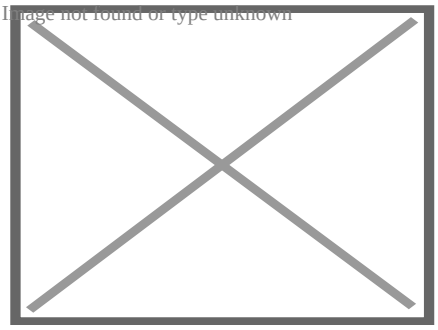
Related fields

- Geology
- Geochemistry
- Petrology
- Earthquake engineering
- Geomorphology
- Soil science
- Hydrology
- Hydrogeology
- Biogeography
- Earth materials
- Archaeology
- Agricultural science
  - Agrology

Authority control databases: National Image not found or type unknown **Edit this at Wikidata**

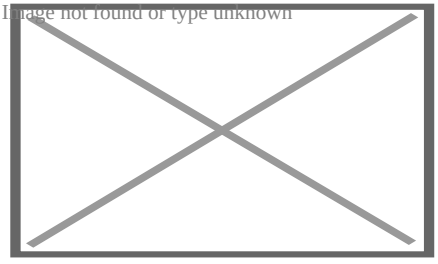
About concrete slab

Image not found or type unknown



Suspended slab under construction, with the formwork still in place

Image not found or type unknown



Suspended slab formwork and rebar in place, ready for concrete pour.

A **concrete slab** is a common structural element of modern buildings, consisting of a flat, horizontal surface made of cast concrete. Steel-reinforced slabs, typically between 100 and 500 mm thick, are most often used to construct floors and ceilings, while thinner *mud slabs* may be used for exterior paving (see below).[1][2]

In many domestic and industrial buildings, a thick concrete slab supported on foundations or directly on the subsoil, is used to construct the ground floor. These slabs are generally classified as *ground-bearing* or *suspended*. A slab is ground-bearing if it rests directly on the foundation, otherwise the slab is suspended.[3] For multi-story buildings, there are several common slab designs (

see § Design for more types):

- Beam and block, also referred to as *rib and block*, is mostly used in residential and industrial applications. This slab type is made up of pre-stressed beams and hollow blocks and are temporarily propped until set, typically after 21 days.[4]
- A hollow core slab which is precast and installed on site with a crane
- In high rise buildings and skyscrapers, thinner, pre-cast concrete slabs are slung between the steel frames to form the floors and ceilings on each level. Cast in-situ slabs are used in high rise buildings and large shopping complexes as well as houses. These in-situ slabs are cast on site using shutters and reinforced steel.

On technical drawings, reinforced concrete slabs are often abbreviated to "r.c.c. slab" or simply "r.c.". Calculations and drawings are often done by structural engineers in CAD software.

Thermal performance

[edit]

Energy efficiency has become a primary concern for the construction of new buildings, and the prevalence of concrete slabs calls for careful consideration of its thermal properties in order to minimise wasted energy.[5] Concrete has similar thermal properties to masonry products, in that it has a relatively high thermal mass and is a good conductor of heat.

In some special cases, the thermal properties of concrete have been employed, for example as a heatsink in nuclear power plants or a thermal buffer in industrial freezers.[6]

Thermal conductivity

[edit]

Thermal conductivity of a concrete slab indicates the rate of heat transfer through the solid mass by conduction, usually in regard to heat transfer to or from the ground. The coefficient of thermal conductivity, *k*, is proportional to density of the concrete, among other factors.[5] The primary influences on conductivity are moisture content, type of aggregate, type of cement, constituent proportions, and temperature. These various factors complicate the theoretical evaluation of a *k*-

value, since each component has a different conductivity when isolated, and the position and proportion of each components affects the overall conductivity. To simplify this, particles of aggregate may be considered to be suspended in the homogeneous cement. Campbell-Allen and Thorne (1963) derived a formula for the theoretical thermal conductivity of concrete.[6] In practice this formula is rarely applied, but remains relevant for theoretical use. Subsequently, Valore (1980) developed another formula in terms of overall density.[7] However, this study concerned hollow concrete blocks and its results are unverified for concrete slabs.

The actual value of *k* varies significantly in practice, and is usually between 0.8 and 2.0 W $m^{?1}$ $K^{?1}$.[8] This is relatively high when compared to other materials, for example the conductivity of wood may be as low as 0.04 W $m^{?1}$ $K^{?1}$. One way of mitigating the effects of thermal conduction is to introduce insulation (

see § Insulation).

Thermal mass

[edit]

The second consideration is the high thermal mass of concrete slabs, which applies similarly to walls and floors, or wherever concrete is used within the thermal envelope. Concrete has a relatively high thermal mass, meaning that it takes a long time to respond to changes in ambient temperature.[9] This is a disadvantage when rooms are heated intermittently and require a quick response, as it takes longer to warm the entire building, including the slab. However, the high thermal mass is an advantage in climates with large daily temperature swings, where the slab acts as a regulator, keeping the building cool by day and warm by night.

Typically concrete slabs perform better than implied by their R-value.[5] The R-value does not consider thermal mass, since it is tested under constant temperature conditions. Thus, when a concrete slab is subjected to fluctuating temperatures, it will respond more slowly to these changes and in many cases increase the efficiency of a building.[5] In reality, there are many factors which contribute to the effect of thermal mass, including the depth and composition of the slab, as well as other properties of the building such as orientation and windows.

Thermal mass is also related to thermal diffusivity, heat capacity and insulation. Concrete has low thermal diffusivity, high heat capacity, and its thermal mass is negatively affected by insulation (e.g. carpet).[5]

Insulation

[edit]

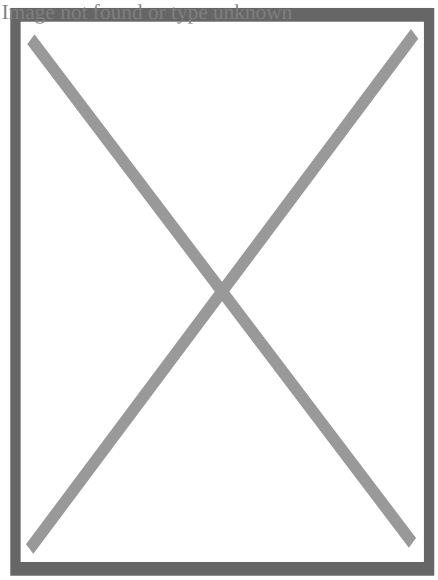
Without insulation, concrete slabs cast directly on the ground can cause a significant amount of extraneous energy transfer by conduction, resulting in either lost heat or unwanted heat. In modern construction, concrete slabs are usually cast above a layer of insulation such as expanded

polystyrene, and the slab may contain underfloor heating pipes.[10] However, there are still uses for a slab that is not insulated, for example in outbuildings which are not heated or cooled to room temperature (

see § Mud slabs). In these cases, casting the slab directly onto a substrate of aggregate will maintain the slab near the temperature of the substrate throughout the year, and can prevent both freezing and overheating.

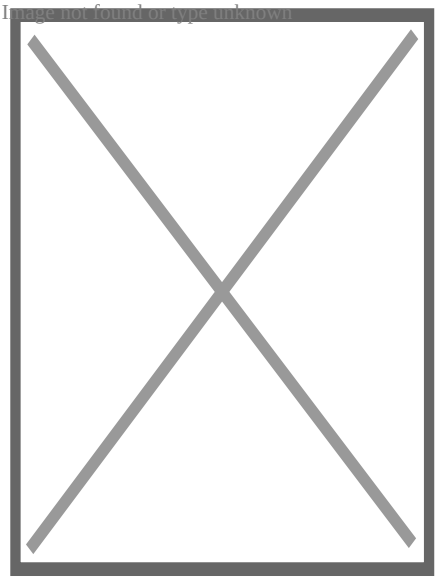
A common type of insulated slab is the beam and block system (mentioned above) which is modified by replacing concrete blocks with expanded polystyrene blocks.[11] This not only allows for better insulation but decreases the weight of slab which has a positive effect on load bearing walls and foundations.

Image not found or type unknown



Formwork set for concrete pour.

Image not found or type unknown



Concrete poured into formwork. This slab is ground-bearing and reinforced with steel rebar.

Design

[edit]
Further information: Marcus' method

Ground-bearing slabs

[edit]
See also: Shallow foundation § Slab on grade

Ground-bearing slabs, also known as "on-ground" or "slab-on-grade", are commonly used for ground floors on domestic and some commercial applications. It is an economical and quick construction method for sites that have non-reactive soil and little slope.[12]

For ground-bearing slabs, it is important to design the slab around the type of soil, since some soils such as clay are too dynamic to support a slab consistently across its entire area. This results in cracking and deformation, potentially leading to structural failure of any members attached to the floor, such as wall studs.[12]

Levelling the site before pouring concrete is an important step, as sloping ground will cause the concrete to cure unevenly and will result in differential expansion. In some cases, a naturally sloping site may be levelled simply by removing soil from the uphill site. If a site has a more significant grade, it may be a candidate for the "cut and fill" method, where soil from the higher ground is removed, and the lower ground is built up with fill.[13]

In addition to filling the downhill side, this area of the slab may be supported on concrete piers which extend into the ground. In this case, the fill material is less important structurally as the dead weight of the slab is supported by the piers. However, the fill material is still necessary to support the curing concrete and its reinforcement.

There are two common methods of filling - *controlled fill* and *rolled fill*.[13]

- **Controlled fill**: Fill material is compacted in several layers by a vibrating plate or roller. Sand fills areas up to around 800 mm deep, and clay may be used to fill areas up to 400 mm deep. However, clay is much more reactive than sand, so it should be used sparingly and carefully. Clay must be moist during compaction to homogenise it.[13]
- **Rolled fill:** Fill is repeatedly compacted by an excavator, but this method of compaction is less effective than a vibrator or roller. Thus, the regulations on maximum depth are typically stricter.

Proper curing of ground-bearing concrete is necessary to obtain adequate strength. Since these slabs are inevitably poured on-site (rather than precast as some suspended slabs are), it can be difficult to control conditions to optimize the curing process. This is usually aided by a membrane, either plastic (temporary) or a liquid compound (permanent).[14]

Ground-bearing slabs are usually supplemented with some form of reinforcement, often steel rebar. However, in some cases such as concrete roads, it is acceptable to use an unreinforced slab if it is

adequately engineered (

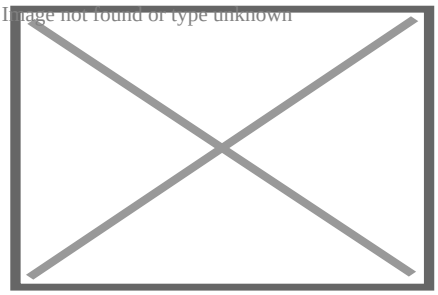
see below).

Suspended slabs

[edit]

For a suspended slab, there are a number of designs to improve the strength-to-weight ratio. In all cases the top surface remains flat, and the underside is modulated:

- A *corrugated slab* is designed when the concrete is poured into a corrugated steel tray, more commonly called decking. This steel tray improves strength of the slab, and prevents the slab from bending under its own weight. The corrugations run in one direction only.
- A *ribbed slab* gives considerably more strength in one direction. This is achieved with concrete beams bearing load between piers or columns, and thinner, integral ribs in the perpendicular direction. An analogy in carpentry would be a subfloor of bearers and joists. Ribbed slabs have higher load ratings than corrugated or flat slabs, but are inferior to waffle slabs.[15]
- A *waffle slab* gives added strength in both directions using a matrix of recessed segments beneath the slab.[16] This is the same principle used in the ground-bearing version, the waffle slab foundation. Waffle slabs are usually deeper than ribbed slabs of equivalent strength, and are heavier hence require stronger foundations. However, they provide increased mechanical strength in two dimensions, a characteristic important for vibration resistance and soil movement.[17]



The exposed underside of a waffle slab used in a multi-storey building

Unreinforced slabs

[edit]

Unreinforced or "plain"[18] slabs are becoming rare and have limited practical applications, with one exception being the mud slab (

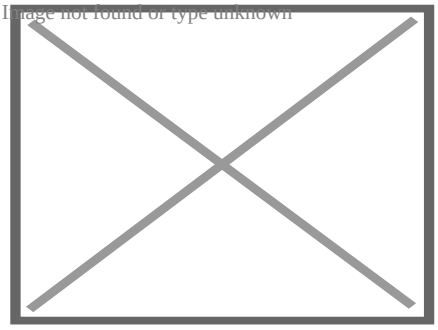
see below). They were once common in the US, but the economic value of reinforced ground-bearing slabs has become more appealing for many engineers.[10] Without reinforcement, the

entire load on these slabs is supported by the strength of the concrete, which becomes a vital factor. As a result, any stress induced by a load, static or dynamic, must be within the limit of the concrete's flexural strength to prevent cracking.[19] Since unreinforced concrete is relatively very weak in tension, it is important to consider the effects of tensile stress caused by reactive soil, wind uplift, thermal expansion, and cracking.[20] One of the most common applications for unreinforced slabs is in concrete roads.

Mud slabs

[edit]

Mud slabs, also known as *rat slabs*, are thinner than the more common suspended or ground-bearing slabs (usually 50 to 150 mm), and usually contain no reinforcement.[21] This makes them economical and easy to install for temporary or low-usage purposes such as subfloors, crawlspaces, pathways, paving, and levelling surfaces.[22] In general, they may be used for any application which requires a flat, clean surface. This includes use as a base or "sub-slab" for a larger structural slab. On uneven or steep surfaces, this preparatory measure is necessary to provide a flat surface on which to install rebar and waterproofing membranes.[10] In this application, a mud slab also prevents the plastic bar chairs from sinking into soft topsoil which can cause spalling due to incomplete coverage of the steel. Sometimes a mud slab may be a substitute for coarse aggregate. Mud slabs typically have a moderately rough surface, finished with a float.[10]



Substrate and rebar prepared for pouring a mud slab

Axes of support

[edit]

One-way slabs

[edit]

A *one-way slab* has moment-resisting reinforcement only in its short axis, and is used when the moment in the long axis is negligible.[23] Such designs include corrugated slabs and ribbed slabs. Non-reinforced slabs may also be considered one-way if they are supported on only two opposite

sides (i.e. they are supported in one axis). A one-way reinforced slab may be stronger than a two-way non-reinforced slab, depending on the type of load.

The calculation of reinforcement requirements for a one-way slab can be extremely tedious and time-consuming, and one can never be completely certain of the best design.[*citation needed*] Even minor changes to the project can necessitate recalculation of the reinforcement requirements. There are many factors to consider during the structural structure design of one-way slabs, including:

- Load calculations
- Bending moment calculation
- Acceptable depth of flexure and deflection
- Type and distribution of reinforcing steel

Two-way slabs

[edit]

A *two-way slab* has moment resisting reinforcement in both directions.[24] This may be implemented due to application requirements such as heavy loading, vibration resistance, clearance below the slab, or other factors. However, an important characteristic governing the requirement of a two-way slab is the ratio of the two horizontal lengths. If $\displaystyle l_x$ is the short dimension and $\displaystyle l_y$ is the long dimension, then moment in both directions should be considered in design.[25] In other words, if the axial ratio is greater than two, a two-way slab is required.

A non-reinforced slab is two-way if it is supported in both horizontal axes.

Construction

[edit]

A concrete slab may be prefabricated (precast), or constructed on site.

Prefabricated

[edit]

Prefabricated concrete slabs are built in a factory and transported to the site, ready to be lowered into place between steel or concrete beams. They may be pre-stressed (in the factory), post-stressed (on site), or unstressed.[10] It is vital that the wall supporting structure is built to the correct dimensions, or the slabs may not fit.

On-site

[edit]

On-site concrete slabs are built on the building site using formwork, a type of boxing into which the wet concrete is poured. If the slab is to be reinforced, the rebars, or metal bars, are positioned within the formwork before the concrete is poured in.[26] Plastic-tipped metal or plastic bar chairs, are used to hold the rebar away from the bottom and sides of the form-work, so that when the concrete sets it completely envelops the reinforcement. This concept is known as concrete cover. For a ground-bearing slab, the formwork may consist only of side walls pushed into the ground. For a suspended slab, the formwork is shaped like a tray, often supported by a temporary scaffold until the concrete sets.

The formwork is commonly built from wooden planks and boards, plastic, or steel. On commercial building sites, plastic and steel are gaining popularity as they save labour.[27] On low-budget or small-scale jobs, for instance when laying a concrete garden path, wooden planks are very common. After the concrete has set the wood may be removed.

Formwork can also be permanent, and remain in situ post concrete pour. For large slabs or paths that are poured in sections, this permanent formwork can then also act as isolation joints within concrete slabs to reduce the potential for cracking due to concrete expansion or movement.

In some cases formwork is not necessary. For instance, a ground slab surrounded by dense soil, brick or block foundation walls, where the walls act as the sides of the tray and hardcore (rubble) acts as the base.

See also

[edit]

- Shallow foundation (Commonly used for ground-bearing slabs)
- Hollow-core slab (Voided slab, one-way spanning)
- Beam and block (voided slab, one way spanning)
- Voided biaxial slab (Voided slab, two-way spanning)
- Formwork
- Precast concrete
- Reinforced concrete
- Rebar
- Concrete cover

References

[edit]

1. ^ Garber, G. Design and Construction of Concrete Floors. 2nd ed. Amsterdam: Butterworth-Heinemann, 2006. 47. Print.

2. **^** Duncan, Chester I. Soils and Foundations for Architects and Engineers. New York: Van Nostrand Reinhold, 1992. 299. Print.
3. **^** *"Ground slabs - Introduction". www.dlsweb.rmit.edu.au. Archived from the original on 2019-11-18. Retrieved 2017-12-07.*
4. **^** *"What is a rib and block slab?". www.royalconcreteslabs.co.za. Royal concrete slabs.*
5. ^ ***a b c d e*** *Cavanaugh, Kevin; et al. (2002). Guide to Thermal Properties of Concrete and Masonry Systems: Reported by ACI Committee 122. American Concrete Institute.*
6. ^ ***a b*** *Campbell-Allen, D.; Thorne, C.P. (March 1963). "The thermal conductivity of concrete". Magazine of Concrete Research.* ***15*** *(43): 39–48. doi:10.1680/macr.1963.15.43.39. UDC 691.32.001:536.21:691.322.*
7. **^** *Valore, R.C. Jr. (February 1980). "Calculation of U-values of Hollow Concrete Masonry". Concrete International.* ***2****: 40–63.*
8. **^** *Young, Hugh D. (1992). "Table 15.5". University Physics (7th ed.). Addison Wesley. ISBN 0201529815.*
9. **^** *Sabnis, Gajanan M.; Juhl, William (2016). "Chapter 4: Sustainability through Thermal Mass of Concrete". Green Building with Concrete: Sustainable Design and Construction (2nd ed.). Taylor & Francis Group. ISBN 978-1-4987-0411-3.*
10. ^ ***a b c d e*** *Garber, George (2006). Design and Construction of Concrete Floors (2nd ed.). Amsterdam: Butterworth-Heinemann. ISBN 978-0-7506-6656-5.*
11. **^** *"What is a polystyrene concrete slab?". www.royalconcreteslabs.co.za. Royal concrete slabs.*
12. ^ ***a b*** *McKinney, Arthur W.; et al. (2006). Design of Slabs-on-Ground: Reported by ACI Committee 360 (PDF). American Concrete Institute. Archived from the original (PDF) on 2021-05-08. Retrieved 2019-04-04.*
13. ^ ***a b c*** *Staines, Allan (2014). The Australian House Building Manual. Pinedale Press. pp. 40–41. ISBN 978-1-875217-07-6.*
14. **^** *"Concrete in Practice 11 - Curing In-Place Concrete" (PDF). Engineering.com. National Ready Mixed Concrete Association. Archived from the original (PDF) on 4 April 2019. Retrieved 4 April 2019.*
15. **^** *"Ribbed Slabs Datasheet" (PDF). Kaset Kalip. Archived from the original (PDF) on 29 March 2018. Retrieved 4 April 2019.*
16. **^** *"Ribbed and waffle slabs". www.concretecentre.com. Retrieved 2019-04-04.*
17. **^** *Concrete Framed Buildings: A Guide to Design and Construction. MPA The Concrete Centre. 2016. ISBN 978-1-904818-40-3.*
18. **^** *Garrison, Tim (19 February 2014). "Clearing the confusion on 'plain concrete'". Civil & Structural Engineer. Archived from the original on 8 May 2019. Retrieved 8 May 2019.*
19. **^** *Walker, Wayne. "Reinforcement for slabs on ground". Concrete Construction. Retrieved 8 May 2019.*
20. **^** *"Rupture depth of an unreinforced concrete slab on grade" (PDF). Aluminium Association of Florida, Inc. Archived from the original (PDF) on 2020-09-26. Retrieved 2019-05-08.*
21. **^** *Arcoma, Peter. "What is a mud slab?". Builder-Questions.com. Retrieved 8 May 2019.*
22. **^** *Postma, Mark; et al. "Floor Slabs". Whole Building Design Guide. National Institute of Building Sciences. Retrieved 8 May 2019.*
23. **^** *Gilbert, R. I. (1980). UNICIV Report 211 (PDF). University of New South Wales.*
24. **^** *Prieto-Portar, L. A. (2008). EGN-5439 The Design of Tall Buildings; Lecture #14: The Design of Reinforced Concrete Slabs (PDF). Archived from the original (PDF) on 2017-08-29.*

Retrieved 2019-04-04.
25. **^** *"What is the difference between one way and two way slab?". Basic Civil Engineering. 16 June 2019. Retrieved 8 July 2019.*
26. **^** *Concrete Basics: A Guide to Concrete Practice (6th ed.). Cement Concrete & Aggregates Australia. 2004. p. 53.*
27. **^** *Nemati, Kamran M. (2005). "Temporary Structures: Formwork for Concrete" (PDF). Tokyo Institute of Technology. Archived from the original (PDF) on 12 July 2018. Retrieved 4 April 2019.*

External links

[edit]

Wikimedia Commons has media related to ***Concrete slabs***.

- *Concrete Basics: A Guide to Concrete Practice*
- *Super Insulated Slab Foundations*
- *Design of Slabs on Ground* Archived 2021-05-08 at the Wayback Machine

- v
- t
- e

Concrete

History

- Ancient Roman architecture
- Roman architectural revolution
- Roman concrete
- Roman engineering
- Roman technology

Composition

- Cement
  - Calcium aluminate
  - Energetically modified
  - Portland
  - Rosendale
- Water
- Water–cement ratio
- Aggregate
- Reinforcement
- Fly ash
- Ground granulated blast-furnace slag
- Silica fume
- Metakaolin

Production

- Plant
- Concrete mixer
- Volumetric mixer
- Reversing drum mixer
- Slump test
- Flow table test
- Curing
- Concrete cover
- Cover meter
- Rebar

Construction

- Precast
- Cast-in-place
- Formwork
- Climbing formwork
- Slip forming
- Screed
- Power screed
- Finisher
- Grinder
- Power trowel
- Pump
- Float
- Sealer
- Tremie

Science

- Properties
- Durability
- Degradation
- Environmental impact
- Recycling
- Segregation
- Alkali–silica reaction

Types

- AstroCrete
- Fiber-reinforced
- Filigree
- Foam
- Lunarcrete
- Mass
- Nanoconcrete
- Pervious
- Polished
- Polymer
- Prestressed
- Ready-mix
- Reinforced
- Roller-compacting
- Self-consolidating
- Self-leveling
- Sulfur
- Tabby
- Translucent
- Waste light
- Aerated
  - AAC
  - RAAC

Applications

- Slab
  - waffle
  - hollow-core
  - voided biaxial
  - slab on grade
- Concrete block
- Step barrier
- Roads
- Columns
- Structures

Organizations	○ American Concrete Institute ○ Concrete Society ○ Institution of Structural Engineers ○ Indian Concrete Institute ○ Nanocem ○ Portland Cement Association ○ International Federation for Structural Concrete
Standards	○ Eurocode 2 ○ EN 197-1 ○ EN 206-1 ○ EN 10080
See also	○ Hempcrete

○ Image not found or type unknown Category:Concrete

About Cook County

Photo

Image not found or type unknown
Photo

Image not found or type unknown
Photo

Image not found or type unknown
Photo

Image not found or type unknown

Things To Do in Cook County

Photo

Sand Ridge Nature Center

4.8 (96)

Photo

Image not found or type unknown

River Trail Nature Center

4.6 (235)

Photo

Image not found or type unknown

Palmisano (Henry) Park

4.7 (1262)

Driving Directions in Cook County

Driving Directions From Palmisano (Henry) Park to

Driving Directions From Lake Katherine Nature Center and Botanic Gardens to

Driving Directions From Navy Pier to

https://www.google.com/maps/dir/Navy+Pier/United+Structural+Systems+of+Illinois%2C-87.6050944,14z/data=!3m1!4b1!4m14!4m13!1m5!1m1!1sunknown!2m2!1d-87.6050944!2d41.8918633!1m5!1m1!1sChIJ-wSxDtinD4gRiv4kY3RRh9U!2m2!1d-88.1396465!2d42.0637725!3e0

https://www.google.com/maps/dir/Lake+Katherine+Nature+Center+and+Botanic+Gardens-87.8010774,14z/data=!3m1!4b1!4m14!4m13!1m5!1m1!1sunknown!2m2!1d-87.8010774!2d41.6776048!1m5!1m1!1sChIJ-wSxDtinD4gRiv4kY3RRh9U!2m2!1d-88.1396465!2d42.0637725!3e2

https://www.google.com/maps/dir/Palmisano+%28Henry%29+Park/United+Structural+Sys-87.6490151,14z/data=!3m1!4b1!4m14!4m13!1m5!1m1!1sunknown!2m2!1d-87.6490151!2d41.8429903!1m5!1m1!1sChIJ-wSxDtinD4gRiv4kY3RRh9U!2m2!1d-88.1396465!2d42.0637725!3e1

Reviews for

Image not found or type unknown

Jeffery James

(5)

Very happy with my experience. They were prompt and followed through, and very helpful in fixing the crack in my foundation.

Image not found or type unknown

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.

Image not found or type unknown

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!

Image not found or type unknown

Chris Abplanalp

(5)

USS did an amazing job on my underpinning on my house, they were also very courteous to the proximity of my property line next to my neighbor. They kept things in order with all the dirt/mud they had to excavate. They were done exactly in the timeframe they indicated, and the contract was very details oriented with drawings of what would be done. Only thing that would have been nice, is they left my concrete a little muddy with boot prints but again, all-in-all a great job

Image not found or type unknown

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.

Check our other pages :

- **Evaluating Structural Policy Coverage in Home Insurance**
- **Clarifying Fine Print in Repair Service Agreements**
- **Considering Add On Insurance for Extended Protection**

United Structural Systems of Illinois, Inc

Phone : +18473822882

City : Hoffman Estates

State : IL

Zip : 60169

Address : 2124 Stonington Ave

Google Business Profile

Company Website : **https://www.unitedstructuralsystems.com/**

USEFUL LINKS

Residential Foundation Repair Services

home foundation repair service

Foundation Repair Service

Sitemap

Privacy Policy

About Us