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# Reinforcement

\* Carbon Fiber Strip Installation Process: A Step-by-Step Guide

## \* Understanding Foundation Problems in Residential Structures.

Understanding Foundation Problems in Residential Structures: Exploring the Function of Steel I Beams in Reinforcement

Discussing financing options helps homeowners budget for foundation repair service [professional foundation repair service](#) gypsum drywall.

Okay, so you've got a house. Hopefully, it's not sinking into the earth like some kind of architectural swamp thing. But seriously, foundation problems are a homeowner's worst nightmare. Cracks, uneven floors, sticking doors – these can all be warning signs that something's amiss down below. And that's where steel I beams sometimes enter the picture.

Think of your foundation as the skeleton of your house. If the skeleton is weak, the whole structure suffers. Now, imagine you've got a weak spot, a section prone to bowing or cracking. This is where reinforcement comes in. Steel I beams, those strong, "I" shaped metal beams, can be strategically installed to shore up these vulnerable areas.

The beauty of an I beam lies in its design. That "I" shape provides incredible strength and resistance to bending, especially when loaded vertically. When integrated into a foundation, these beams act like internal braces. They distribute the load of the house more evenly, preventing further cracking and bowing. They kind of act like a splint on a broken bone, preventing further movement and allowing the foundation to stabilize.

Now, it's not like every cracked foundation needs an I beam. A professional needs to assess the situation and determine the root cause of the problem. Is it soil erosion? Poor drainage? Or just good old-fashioned settling? But when the problem stems from structural weakness or significant soil pressure, I beams can offer a robust and relatively cost-effective solution to reinforce the foundation and keep your house from succumbing to the forces of nature. They're basically a superhero for your house's undercarriage.

## \* How Steel I-Beams Provide Structural Support and Stabilization.

Okay, so you're looking at a building, a bridge, maybe even just a really big shelf, and you're wondering, "What's holding this thing up?" Chances are, if it's got serious weight to bear, steel I-beams are playing a major role. They aren't just random hunks of metal; they're cleverly designed to provide incredible structural support and stabilization.

Think of the "I" shape. It's not just for looks. The top and bottom flanges, those horizontal parts, are wide and strong. They resist bending forces, like when you put a heavy load in the middle of the beam. The web, that vertical part connecting the flanges, keeps them from buckling or twisting. It's like the spine of the beam, holding everything together.

What's cool about I-beams is that they're incredibly efficient. They provide a lot of strength with a relatively small amount of material. This means less weight overall, which is important for things like bridges where you don't want a structure collapsing under its own mass.

Beyond just holding things up, I-beams contribute to stabilization. They're often connected to other structural elements, like columns and walls, creating a rigid framework. This framework helps to distribute loads evenly and prevent things from swaying, shifting, or even collapsing during strong winds or earthquakes.

Basically, steel I-beams are the unsung heroes of much of the built world. They're the silent, strong backbone that keeps everything standing tall and secure. They're a testament to smart engineering, making sure we can live, work, and travel safely in the structures around us.

### **\* The Process of Installing Steel I-Beams for Foundation Reinforcement.**

Okay, so we're talking about sticking steel I-beams into the ground to make sure a foundation doesn't, well, fall apart. Think of it like this: your house is a cake, and the foundation is the bottom layer. If that bottom layer is crumbly, the whole thing is going to be a mess. Now, sometimes that "cake layer" needs a little extra support. That's where those I-beams come in.

The process itself isn't exactly like baking. It's more like serious surgery for your house. First, you gotta figure out *\*where\** the foundation is weak. Then, you excavate down to the footing – that's the very bottom part of the foundation that sits on the soil. Next, these big, heavy I-beams, which look exactly like you'd imagine, a capital "I" made of steel, get driven into the ground alongside the foundation. They're anchored deep – sometimes many feet – to get to stable soil that *\*isn't\** causing the problem. Finally, the I-beams are connected to the existing foundation, often with brackets and bolts, effectively tying the weak foundation section to the strong, new steel support.

It's not a quick fix, and it definitely isn't a DIY job. It involves heavy machinery, precise measurements, and a whole lot of engineering know-how. But the end result? A foundation that can handle the load, and a house that stays put. It's like giving your cake a super-strong, steel skeleton underneath, making sure it stands tall for years to come. Basically, I-beams are the superheroes of foundation repair. They're not glamorous, but they get the job done.

### **\* Advantages and Disadvantages of Using Steel I-Beams.**

Okay, so we're talking about steel I-beams, right? Those iconic, ubiquitous shapes you see holding up buildings and bridges. They're practically synonymous with strength and durability, but like anything, they've got their good sides and their not-so-good sides. Let's break it down.

On the "advantages" side, it's hard to argue with their sheer power. I-beams are designed to handle enormous loads. The shape itself, that "I" section, is brilliant. It distributes weight efficiently, minimizing bending and maximizing strength while using relatively little material. That makes them cost-effective in the long run. Plus, steel is incredibly strong in both tension and compression, meaning it can handle being pulled and squeezed with equal ease. This versatility makes I-beams suitable for a wide range of applications. Another big win is steel's durability. Provided they're properly maintained and protected from corrosion, steel I-beams can last for decades, even centuries. And, since steel is recyclable, it's a relatively sustainable choice compared to some other building materials.

Now for the flip side. Steel, as tough as it is, is vulnerable to corrosion. Rust can weaken the beam over time, compromising its structural integrity. This means regular inspections and protective coatings are necessary, adding to the overall maintenance costs. Another potential downside is fire resistance. Steel loses strength at high temperatures, which can be a major concern in building design. Fireproofing measures, like applying intumescent coatings, are often required, again adding to the expense. Finally, the weight of steel I-beams themselves can be a factor. They're heavy! This can make transportation and installation more challenging and might require specialized equipment.

So, there you have it. Steel I-beams: incredibly strong, durable, and versatile, but also susceptible to corrosion, vulnerable to fire, and undeniably hefty. The key is weighing these advantages and disadvantages carefully in the context of the specific project to determine if they're the right choice. It's all about finding the right tool for the job, even if that tool is a giant piece of steel.

#### **\* Cost Considerations for Steel I-Beam Installation.**

Let's be real, when we're talking about reinforcing structures with steel I-beams, we're not just daydreaming about architectural marvels. We're also staring down the barrel of a budget. Cost considerations aren't some afterthought; they're woven right into the fabric of the decision-making process when you're figuring out if an I-beam is the right solution.

First off, the steel itself. We're talking about a commodity market here. Prices fluctuate based on global demand, trade agreements, and even the weather. A sudden surge in construction projects halfway across the world can nudge up the cost of your I-beam. Then there's the grade of steel. Higher strength steel, naturally, comes with a higher price tag. Choosing the right grade isn't about being extravagant; it's about finding the sweet spot where the beam provides the necessary reinforcement without breaking the bank.

Fabrication is another big piece of the pie. Are we talking about standard, off-the-shelf beams, or something custom-cut and drilled? The more specialized the work, the higher the cost. Think about it – specialized cutting, welding, and any protective coatings all add to the final bill.

And let's not forget the logistics. Getting those hefty I-beams to the job site is no small feat. Transportation costs can vary wildly depending on the distance, the size and weight of the beams, and the availability of specialized equipment. You might need a crane just to unload them, which is another expense to factor in.

Then there's the installation itself. Skilled labor isn't cheap. You need experienced professionals who know how to properly position, secure, and weld these beams into place. Mistakes can be costly, both in terms of rework and potential structural issues down the line. Permits and inspections also add to the overall cost.

Finally, think about long-term maintenance. While steel is durable, it's not invincible. Rust and corrosion can weaken the beams over time, especially in harsh environments. Regular inspections and protective coatings might be necessary to ensure the longevity of your investment.

So, when you're exploring the function of steel I-beams in reinforcement, don't just focus on their strength and reliability. A thorough understanding of the cost implications is crucial for making informed decisions and ensuring that your project stays on track. Ignoring these considerations is like building a house on a shaky foundation – it might look good at first, but it's only a matter of time before problems arise.

#### **\* Case Studies or Examples of Successful I-Beam Reinforcement Projects.**

Let's be honest, when we talk about steel I-beams, the immediate image that pops into most minds probably isn't some glamorous architectural marvel. It's more likely a gritty construction site, maybe a bridge under repair, or even that slightly unsettling feeling you get walking under an overpass. But behind that utilitarian facade lies a world of ingenious engineering and problem-solving. And nowhere is that more evident than in the successful reinforcement projects that utilize these workhorses of the construction world.

Think of it like this: sometimes, buildings, bridges, or even tunnels, need a little extra muscle. Maybe they're aging, maybe they're facing increased loads, or maybe the original design just wasn't quite up to snuff. That's where I-beams step in, often as unsung heroes.

One compelling example that comes to mind is the reinforcement of older bridges. Many bridges built decades ago are now handling traffic volumes and vehicle weights far beyond what they were initially designed for. Instead of completely demolishing and rebuilding these vital arteries, engineers often opt to reinforce them. This frequently involves strategically welding or bolting I-beams to existing structures, essentially adding a skeleton of steel

strength to the existing framework. It's a cost-effective and time-saving solution that allows these bridges to continue serving their purpose safely and efficiently.

Another interesting case involves the reinforcement of buildings that have undergone alterations or expansions. Adding extra floors or significantly changing the interior layout can place unforeseen stresses on the existing structure. Again, I-beams can be used to distribute the new loads and prevent structural failure. Imagine a historical building being carefully retrofitted with steel I-beams, hidden within the walls, preserving its original charm while ensuring its long-term stability.

These projects, and countless others like them, highlight the versatility and effectiveness of steel I-beams in reinforcement. They're not just about adding steel for the sake of steel; they're about understanding the forces at play, strategically applying the right materials, and ensuring the safety and longevity of the structures we rely on every day. So, the next time you see an I-beam, remember it's not just a piece of metal - it's a testament to human ingenuity and a crucial element in the infrastructure that surrounds us.

### **\* Selecting the Right Steel I-Beam Solution for Specific Foundation Issues.**

Okay, let's talk about steel I-beams and how picking the right one can be a lifesaver when your foundation's acting up. I mean, foundations are the unsung heroes of our homes, right? They're down there, quietly doing their job, until suddenly...cracks. Bowing. Uneven floors. Cue the panic.

That's where steel I-beams come in. Think of them as the strong, silent types that can step in and provide some serious structural support. But here's the thing: not all I-beams are created equal. You can't just grab any old piece of steel and expect it to magically fix your foundation woes. Selecting the \*right\* I-beam is absolutely crucial.

We're talking about understanding the specific problem your foundation's facing. Is it bowing inwards due to soil pressure? Are there vertical cracks indicating settling? Maybe it's a combination of issues. Different problems call for different beam solutions. Some might need a wider flange (the top and bottom parts of the "I") for increased surface area against the wall. Others might require a thicker web (the vertical part of the "I") for greater resistance to bending. The length of the beam, the type of steel used, even the way it's installed – all of it matters.

Choosing the wrong beam can be like using a band-aid on a broken leg. It might offer a temporary illusion of support, but ultimately, it's not addressing the underlying problem and could even make things worse.

That's why it's so important to consult with a qualified structural engineer. They can assess the damage, analyze the soil conditions, and determine the precise specifications for the I-beams needed to stabilize your foundation. They'll consider factors like the load-bearing capacity required, the spacing between beams, and the best method of attachment to the existing foundation.

Ultimately, selecting the right steel I-beam solution isn't just about buying a piece of metal; it's about investing in the long-term stability and safety of your home. It's about ensuring that your foundation, that unsung hero, can continue to do its job for years to come. And trust me, peace of mind when it comes to your foundation is absolutely priceless.

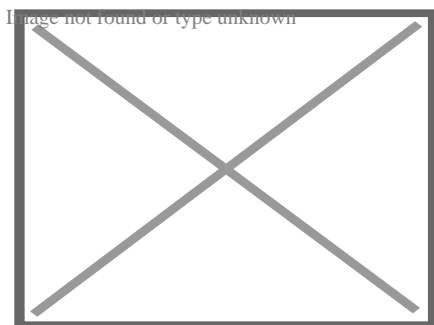
## About soil compaction

For soil compaction in agriculture and compaction effects on soil biology, see soil compaction (agriculture), for natural compaction on a geologic scale, see compaction (geology); for consolidation near the surface, see consolidation (soil).

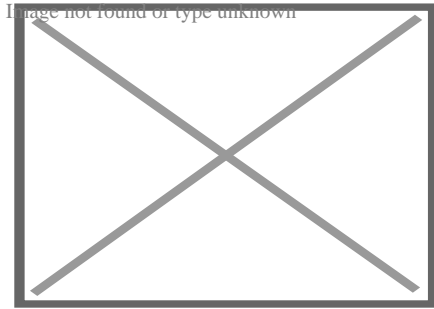
In geotechnical engineering, **soil compaction** is the process in which stress applied to a soil causes densification as air is displaced from the pores between the soil grains. When stress is applied that causes densification due to water (or other liquid) being displaced from between the soil grains, then consolidation, not compaction, has occurred. Normally, compaction is the result of heavy machinery compressing the soil, but it can also occur due to the passage of, for example, animal feet.

In soil science and agronomy, **soil compaction** is usually a combination of both engineering compaction and consolidation, so may occur due to a lack of water in the soil, the applied stress being internal suction due to water evaporation<sup>[1]</sup> as well as due to passage of animal feet. Affected soils become less able to absorb rainfall, thus increasing runoff and erosion. Plants have difficulty in compacted soil because the mineral grains are pressed together, leaving little space for air and water, which are essential for root growth. Burrowing animals also find it a hostile environment, because the denser soil is more difficult to penetrate. The ability of a soil to recover from this type of compaction depends on climate, mineralogy and fauna. Soils with high shrink–swell capacity, such as vertisols, recover quickly from compaction where moisture conditions are variable (dry spells shrink the soil, causing it to crack). But clays such as kaolinite, which do not crack as they dry, cannot recover from compaction on their own unless they host ground-dwelling animals such as earthworms—the Cecil soil series is an example.

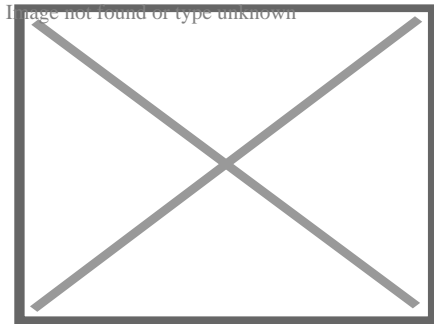
Before soils can be compacted in the field, some laboratory tests are required to determine their engineering properties. Among various properties, the maximum dry density and the optimum moisture content are vital and specify the required density to be compacted in the field<sup>[2]</sup>



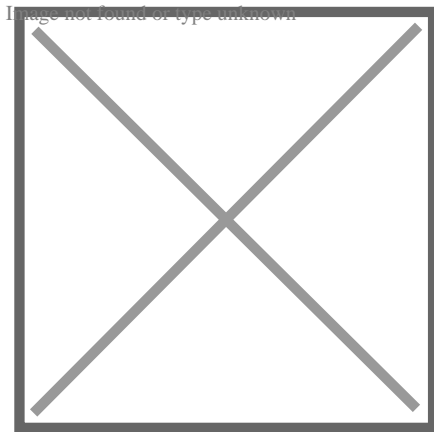
A 10 tonne excavator is here equipped with a narrow sheepfoot roller to compact the fill over newly placed sewer pipe, forming a stable support for a new road surface.



A compactor/roller fitted with a sheepfoot drum, operated by U.S. Navy Seabees



Vibrating roller with plain drum as used for compacting asphalt and granular soils



Vibratory rammer in action

## In construction

[edit]

Soil compaction is a vital part of the construction process. It is used for support of structural entities such as building foundations, roadways, walkways, and earth retaining structures to name a few. For a given soil type certain properties may deem it more or less desirable to perform adequately for a particular circumstance. In general, the preselected soil should have adequate strength, be relatively incompressible so that future settlement is not significant, be stable against volume change as water content or other factors vary, be durable and safe against deterioration,



and possess proper permeability.[<sup>3</sup>]

When an area is to be filled or backfilled the soil is placed in layers called lifts. The ability of the first fill layers to be properly compacted will depend on the condition of the natural material being covered. If unsuitable material is left in place and backfilled, it may compress over a long period under the weight of the earth fill, causing settlement cracks in the fill or in any structure supported by the fill.[<sup>4</sup>] In order to determine if the natural soil will support the first fill layers, an area can be proofrolled. Proofrolling consists of utilizing a piece of heavy construction equipment to roll across the fill site and watching for deflections to be revealed. These areas will be indicated by the development of rutting, pumping, or ground weaving.[<sup>5</sup>]

To ensure adequate soil compaction is achieved, project specifications will indicate the required soil density or degree of compaction that must be achieved. These specifications are generally recommended by a geotechnical engineer in a geotechnical engineering report.

The soil type—that is, grain-size distributions, shape of the soil grains, specific gravity of soil solids, and amount and type of clay minerals, present—has a great influence on the maximum dry unit weight and optimum moisture content.[<sup>6</sup>] It also has a great influence on how the materials should be compacted in given situations. Compaction is accomplished by use of heavy equipment. In sands and gravels, the equipment usually vibrates, to cause re-orientation of the soil particles into a denser configuration. In silts and clays, a sheepfoot roller is frequently used, to create small zones of intense shearing, which drives air out of the soil.

Determination of adequate compaction is done by determining the in-situ density of the soil and comparing it to the maximum density determined by a laboratory test. The most commonly used laboratory test is called the Proctor compaction test and there are two different methods in obtaining the maximum density. They are the **standard Proctor** and **modified Proctor** tests; the modified Proctor is more commonly used. For small dams, the standard Proctor may still be the reference.[<sup>5</sup>]

While soil under structures and pavements needs to be compacted, it is important after construction to decompact areas to be landscaped so that vegetation can grow.

## Compaction methods

[edit]

There are several means of achieving compaction of a material. Some are more appropriate for soil compaction than others, while some techniques are only suitable for particular soils or soils in particular conditions. Some are more suited to compaction of non-soil materials such as asphalt. Generally, those that can apply significant amounts of shear as well as compressive stress, are most effective.

The available techniques can be classified as:

1. Static – a large stress is slowly applied to the soil and then released.
2. Impact – the stress is applied by dropping a large mass onto the surface of the soil.
3. Vibrating – a stress is applied repeatedly and rapidly via a mechanically driven plate or hammer. Often combined with rolling compaction (see below).
4. Gyrating – a static stress is applied and maintained in one direction while the soil is subjected to a gyratory motion about the axis of static loading. Limited to laboratory applications.
5. Rolling – a heavy cylinder is rolled over the surface of the soil. Commonly used on sports pitches. Roller-compactors are often fitted with vibratory devices to enhance their effectiveness.
6. Kneading – shear is applied by alternating movement in adjacent positions. An example, combined with rolling compaction, is the 'sheepsfoot' roller used in waste compaction at landfills.

The construction plant available to achieve compaction is extremely varied and is described elsewhere.

## Test methods in laboratory

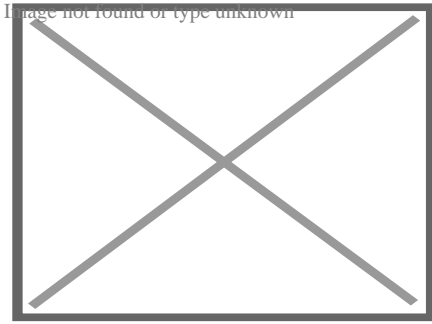
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Soil compactors are used to perform test methods which cover laboratory compaction methods used to determine the relationship between molding water content and dry unit weight of soils. Soil placed as engineering fill is compacted to a dense state to obtain satisfactory engineering properties such as, shear strength, compressibility, or permeability. In addition, foundation soils are often compacted to improve their engineering properties. Laboratory compaction tests provide the basis for determining the percent compaction and molding water content needed to achieve the required engineering properties, and for controlling construction to assure that the required compaction and water contents are achieved. Test methods such as EN 13286-2, EN 13286-47, ASTM D698, ASTM D1557, AASHTO T99, AASHTO T180, AASHTO T193, BS 1377:4 provide soil compaction testing procedures.<sup>[7]</sup>

### See also

[edit]

- Soil compaction (agriculture)
- Soil degradation
- Compactor
- Earthwork
- Soil structure
- Aeration
- Shear strength (soil)



Multiquip RX1575 Rammax Sheepsfoot Trench Compaction Roller on the jobsite in San Diego, California

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[edit]

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3. ^ McCarthy, David F. (2007). *Essentials of Soil Mechanics and Foundations*. Upper Saddle River, NJ: Pearson Prentice Hall. p. 595. ISBN 978-0-13-114560-3.
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5. ^ **a b** McCarthy, David F. (2007). *Essentials of Soil Mechanics and Foundations*. Upper Saddle River, NJ: Pearson Prentice Hall. p. 602. ISBN 978-0-13-114560-3.
6. ^ Das, Braja M. (2002). *Principles of Geotechnical Engineering*. Pacific Grove, CA: Brooks/Cole. p. 105. ISBN 0-534-38742-X.
7. ^ "Automatic Soil Compactor". *cooper.co.uk*. Cooper Research Technology. Archived from the original on 27 August 2014. Retrieved 8 September 2014.





















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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
  -  Inclinator
  -  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

## Forces

- Effective stress
- Pore water pressure
- Lateral earth pressure
- Overburden pressure
- Preconsolidation pressure

## Mechanics

### 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

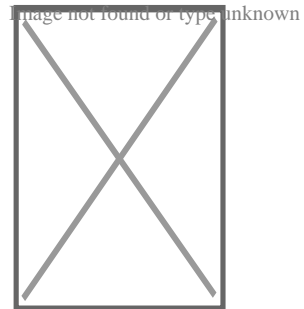
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Soil science

- History
- Index

**Main fields**

- Pedology
- Edaphology
- Soil biology
- Soil microbiology
- Soil zoology
- Soil ecology
- Soil physics
- Soil mechanics
- Soil chemistry
- Environmental soil science
- Agricultural soil science





## **Soil topics**

- Soil
- Pedosphere
  - Soil morphology
  - Pedodiversity
  - Soil formation
- Soil erosion
- Soil contamination
- Soil retrogression and degradation
- Soil compaction
  - Soil compaction (agriculture)
- Soil sealing
- Soil salinity
  - Alkali soil
- Soil pH
  - Soil acidification
- Soil health
- Soil life
- Soil biodiversity
- Soil quality
- Soil value
- Soil fertility
- Soil resilience
- Soil color
- Soil texture
- Soil structure
  - Pore space in soil
  - Pore water pressure
- Soil crust
- Soil horizon
- Soil biomantle
- Soil carbon
- Soil gas
  - Soil respiration
- Soil organic matter
- Soil moisture
  - Soil water (retention)

- **v**
- **t**
- **e**

## Soil classification

### World Reference Base for Soil Resources (1998–)

- Acrisols
- Alisols
- Andosols
- Anthrosols
- Arenosols
- Calcisols
- Cambisols
- Chernozem
- Cryosols
- Durisols
- Ferralsols
- Fluvisols
- Gleysols
- Gypsisols
- Histosol
- Kastanozems
- Leptosols
- Lixisols
- Luvisols
- Nitisols
- Phaeozems
- Planosols
- Plinthosols
- Podzols
- Regosols
- Retisols
- Solonchaks
- Solonetz
- Stagnosol
- Technosols
- Umbrisols
- Vertisols

### USDA soil taxonomy

- Alfisols
- Andisols
- Aridisols
- Entisols
- Gelisols
- Histosols
- Inceptisols
- Mollisols
- Oxisols

## **Applications**

- Soil conservation
- Soil management
- Soil guideline value
- Soil survey
- Soil test
- Soil governance
- Soil value
- Soil salinity control
- Erosion control
- Agroecology
- Liming (soil)

## **Related fields**

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

## **Societies, Initiatives**



- Australian Society of Soil Science Incorporated
- Canadian Society of Soil Science
- Central Soil Salinity Research Institute (India)
- German Soil Science Society
- Indian Institute of Soil Science
- International Union of Soil Sciences
- International Year of Soil
- National Society of Consulting Soil Scientists (US)
- OPAL Soil Centre (UK)
- Soil Science Society of Poland
- Soil and Water Conservation Society (US)
- Soil Science Society of America
- World Congress of Soil Science


## Scientific journals

- *Acta Agriculturae Scandinavica B*
- *Journal of Soil and Water Conservation*
- *Plant and Soil*
- *Pochvovedenie*
- *Soil Research*
- *Soil Science Society of America Journal*

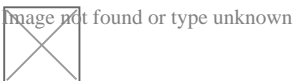
## See also

- Land use
- Land conversion
- Land management
- Vegetation
- Infiltration (hydrology)
- Groundwater
- Crust (geology)
- Impervious surface/Surface runoff
- Petrichor

-  Wikipedia:WikiProject Soil
-  Category:soil
- Category soil science
-  List of soil scientists

**Authority control databases:** National  Germany  Czech Republic  Edit this at Wikidata

## 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

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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 Cook County

## Photo

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## Things To Do in Cook County

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Photo

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**Sand Ridge Nature Center**

**4.8 (96)**

Photo

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**River Trail Nature Center**



4.6 (235)

Photo

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**Palmisano (Henry) Park**

4.7 (1262)

## Driving Directions in Cook County

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Driving Directions From Palmisano (Henry) Park to

Driving Directions From Lake Katherine Nature Center and Botanic Gardens to

Driving Directions From Navy Pier to

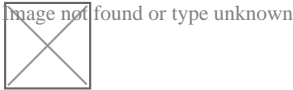
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## Reviews for

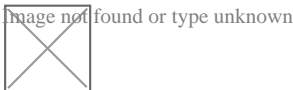
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**Jeffery James**

**(5)**

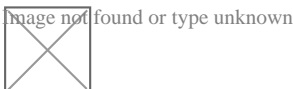
Very happy with my experience. They were prompt and followed through, and very helpful in fixing the crack in my foundation.



**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.

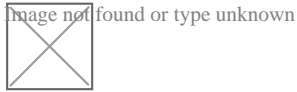


**Jim de Leon**

**(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),

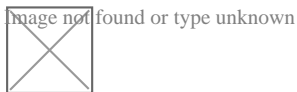
the amount of excavation (picture 4), and the restoration after dirt was placed back in the pits and compacted (pictures 5, 6 & 7). Please notice that they also sealed two large cracks and steel plated these cracks from expanding further (which you can see under my sliding glass door). I, as well as 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!



**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



**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.

Exploring the Function of Steel I Beams in Reinforcement [View GBP](#)

**Check our other pages :**

- [Addressing Wall Bowing with Specialized Bracing Systems](#)
- [Understanding the Role of Push Piers in Foundation Repair](#)
- [Adhering to Safety Protocols on Residential Job Sites](#)
- [Recognizing Liability Concerns in Construction Zones](#)
- [Incorporating Reinforced Footings in Existing Structures](#)

United Structural Systems of Illinois, Inc

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### **Google Business Profile**

Company Website : [\*\*https://www.unitedstructuralsystems.com/\*\*](https://www.unitedstructuralsystems.com/)

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