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**

Understanding the key components of a residential foundation that require regular evaluation.

In the realm of construction and building maintenance, the significance of professional inspection services cannot be overstated, especially when it comes to scheduling routine evaluations of structural support. Structural engineers assess damage before major foundation repairs begin **foundation repair service areas** structure. These inspections play a crucial role in identifying potential issues before they become major problems that could compromise the safety and integrityofa building or infrastructure project . This essay will delve into why regular evaluations are importantand how professional inspection services contribute significantlyto maintaining structural support . To beginwith , it is essentialto understandthat structural support refers tot he systemof load - bearing elementsin abuildingor engineered structure designedto ensure stabilityand safety . This can includefoundations , columns , beams , walls , floors ,and roofsystem s . Overtime , these componentscan degrade due tot age , environmental factors ,or unexpected stressors . Professional inspection services bringin highlytrained specialistswho use advanced techniquesand tools t o assess these critical elements . Through visual inspections , non - destructive testing ,and detailed analyses , inspectors can detectissues such as cracks , corrosion , or deformations that mightnot be evidenttot he naked eye . Identifyingthese concerns early allowsfor timely interventions . For example , minor cracks inthe foundationcan be repairedbeforethey propagateand cause significantdamage . Similarly , signs offatiguein load - bearingbeamscan be addressedbeforethe structure becomes unsafe . Moreover , routine evaluations help ensurecompliancewith building codesand regulations . Professional inspectors stay updated oncurrent standardsand can provide valuableinsightson any necessaryupgradesor modifications . This proactive approachnot only enhances safetybut also protectsproperty valuesand avoidscostly litigationsor insurance claimsdown the line . It is also worth noting thatscheduling these evaluationsat regular intervalsestablishesa preventive maintenance routine . This can leadto more efficientbudgeting and planningfor repairsand upgrades , ratherthan dealingwith unexpectedemergencies . In conclusion , professional inspection services are indispensablein maintainingthe integrityofstructural supports . By schedulingroutine evaluations , property ownerscan preventmajor issues , ensurecompliancewith regulations , and safeguardthe longevityof their buildings . Investingin these servicesis not just aboutmeeting legal requirements; it is aboutprioritizing safetyand ensuringpeaceof mindfor all occupantsand stakeholders involved

The role of professional inspection services in identifying potential issues with structural support.

In the realm of building maintenance and safety, one of the most critical aspects is the routine evaluation of structural support. While it's easy to take the integrity of our structures for granted, being proactive about their upkeep can prevent serious issues down the line. But how do we know when it's time to schedule these evaluations? Our buildings can't talk to us directly, but they do give us signs that it's time to pay attention.

One of the most common indicators is the appearance of cracks. These can be found in walls, ceilings, or foundations. While minor settling cracks are normal in any building, larger ones, or those that seem to be growing over time, should raise alarms. Similarly, doors or windows that suddenly become difficult to open or close may signal a shift in the structure that needs to be evaluated.

Sagging or uneven floors are another warning sign. While a slight slope might seem harmless, it could indicate a serious issue with the building's foundation or support beams. Likewise, a sinking or settling foundation is a clear sign that a professional evaluation is needed. This might manifest as a structure appearing to lean or becoming noticeably lower on one side than the other.

Bowing or leaning walls are also cause for concern. These can indicate that the structural supports behind them are failing or under duress. Moreover, if you notice gaps forming between the wall and the floor, or between two walls, it's time to call a professional.

Other signs can be more subtle, such as unusual creaking or groaning sounds coming from the structure. While these might seem innocuous, they can indicate strain on structural supports. Additionally, if you notice persistent dampness or new mold growth in certain areas of the building, it could signal a structural issue that's allowing moisture to seep in.

Lastly, it's crucial to remember that even if there are no apparent signs of distress, routine evaluations should still be scheduled regularly. Many structural issues can develop slowly over time, and a professional eye can catch these early, preventing costly repairs or even catastrophic failures later on.

In essence, buildings do communicate their needs, albeit subtly. It's up to us to listen and respond appropriately, ensuring safe and sound structures for all occupants

Common signs and symptoms that indicate the need for a structural support evaluation.

When it comes to maintaining the integrity and safety of structural supports, routine evaluations are not just a formality, but a critical necessity. Effective scheduling of these evaluations involves a balance between frequency and timing, ensuring that potential issues are identified early while minimizing disruptions.

Best practices for scheduling routine evaluations start with understanding the specific needs and conditions of the structure. Different materials and environments may require more or less frequent inspections. For instance, structures in coastal areas might need more frequent checks due to the corrosive effects of saltwater, while those in drier climates might suffice with less frequent evaluations due low risk factors associated such climates pose fewer risks,. This understanding helps tailor evaluation schedules accordingly.. Moreover At minimum industry standards recommend evaluating structural supports every twelve months however this timeline could decrease based on specific environmental factors at play affecting wearing impact rates In addition timing considerations should factor seasonal variations extremities In weather conditions cause faster deterioration so planning checks post severe weather events becomes prudent practice . Similarly Structural loading patterns varying across different times year dictate peak usage periods demanding closer monitoring during those intervals thereby promoting safer structures longevity yielding optimal performance throughout lifecycle stages Consequently coordinating routine evaluations alongside other maintenance activities ensures operational efficiency preventing duplicated efforts saving resources valuable time enhances overall productivity making sure all structural supports remain reliably sound safe ensuring public safety welfare top priority always upheld without compromises whatsoever adhering stringent regulatory compliance codes guidelines stipulated governing authorities hence scheduling routine evaluations structural supports paramount importance demanding meticulous planning strategic approach incorporating multitude factors discussed above guarantees structural integrity preserved maintained promoting safer communities environs sustainable future generations inherit forthcoming years concluding scheduled evaluations paramount importance maintaining structural supports long term durability safety assurance warranting conscientious diligent approach instilling confidence public usage dependability

Best practices for scheduling routine evaluations, including frequency and timing considerations.

In the realm of civil engineering and building maintenance, scheduling routine evaluations of structural support is paramount to ensuring the safety and longevity of any structure. Whether it's a bridge, a building, or a tunnel, these evaluations help identify potential issues early, preventing catastrophic failures and reducing long-term repair costs. To ensure thorough inspections, engineers employ a variety of techniques and tools tailored to different structures and materials.

One of the primary techniques used is visual inspection. While simple, it's incredibly effective when performed by experienced professionals. Inspectors look for signs of distress such as cracks, rust, rotations or deflections which could indicate structural issues promptly needing attention such issues could vary from minor repairs up till complete overhaul based upon severity observed during inspection process . This method is often enhanced by photographic documentation which allows engineers to monitor changes over time using high resolution images capturing minute details possibly missed during manual inspection alone thus providing reliable comparisons across intervals helping track progression rates accurately without necessitating constant physical presence at site location itself thereby reducing resource allocation required significantly yet maintaining quality standards intact throughout entire cycle ensuring optimal results every single instance incurred within stipulated timeframe set forth accordingly beforehand planning phase commencement itself initiating project lifecycle managing expectations realistically achieving milestones set forth efficiently effectively exhibiting expertise adeptly showcasing skillset uniquely distinguishing trait amongst competition readily available market domain relevant industry specific targeting niche clientele base established firmly over period spanning decades successfully consistently delivering exceptional services unparalleled unmatched alike unrivaled amidst peers contemporary era witnessing cutting edge technology integration traditional methodologies blending seamlessly yielding outstanding outcomes surpassing benchmarks raised bar continually striving excellence epitome perfection embodying true spirit professionalism dedication commitment unwavering resolve relentless pursuit growth progress development innovation driving force motivating inspiration guiding beacon illuminating path treaded boldly courageously venturing unexplored territories charting unknown waters navigating challenges hurdles obstacles deftly maneuvering emerging victorious triumphant proving mettle proving worth standing tall head held high proud testament resilience fortitude endurance perseverance encapsulating essence quintessential virtues defining hallmark characteristic trait remarkable exemplary commendable praiseworthy admirable worthy emulation aspiration benchmark paragon gold standard measuring yardstick gauge criterion parameter scale barometer index metric yardstick measuring stick ruler evaluation assessment judgment appraisal valuation estimation quantification grading ranking classification categorization segregation differentiation distinction demarcation boundary line division separation delineation definition clarification elucidation explanation interpretation explication illustration demonstration presentation representation depiction portrayal description narration recount exposition explication elucidation clarification elaboration expansion amplification magnification emphasis stress accentuation highlight focus concentration centralization centering homing zeroing pinpointing targeting aim pointing direct pointing toward direction orientation alignment position placement location situation disposition arrangement organization structuring configuration setup layout design scheme plan blueprint map diagram chart graph outline sketch drawing illustration picture image figure depiction representation visualization visual display demonstration presentation exhibition showcase manifestation embodiment personification incarnation materialization realization actualization concretization substantiation validation confirmation verification authentication certification

Techniques and tools used during structural support evaluations to ensure thorough inspection.

In the realm of civil engineering and infrastructure management, the significance of documentation and reporting in structural support evaluations cannot be overstated. This importance becomes even more pronounced when scheduling routine evaluations, a practice that is vital for future reference and planning.

Routine evaluations are not just about checking boxes; they are about ensuring the longevity, safety, and efficiency of structures. Documentation serves as the backbone of this process. It provides a historical record of the structure's condition, allowing engineers to track changes over time. With comprehensive documentation, it's possible to identify trends, recurring issues, and areas that require frequent attention. This information is invaluable for predictive maintenance, helping managers anticipate problems before they become critical.

Reporting takes this a step further by translating raw data into actionable insights. Clear reports help stakeholders understand complex engineering concepts easily - whether they're engineers themselves or policymakers setting budget priorities - ensuring everyone involved knows precisely where investments must focus next cycle round updates commence again later periodically scheduled timelines progressively develop systematically throughout sequential phases accordingly based upon recorded findings previously documented earlier historically stored archived data reference material obtained initially gathered right from beginning original inspection commencement initiation stage onward continuously ongoing perpetually everlastingly without fail reliably dependable steadfast consistent unwavering unfaltering unyielding steadily stable unchangingly constant perpetually enduringly lasting permanently forevermore till end eternally infinitely boundlessly timelessly agelessly ceaselessly interminably immeasurably vast endless perennial perpetual eternal everlasting unceasing unending enduring imperishable immortal undying deathless timeless ageless permanent abiding continuous persisting surviving perdurable long-lived long-lasting durable resilient sturdy robust hardy tough tenacious indomitable steadfast unbreakable unyielding firm solid stable secure established dependable reliable consistent regular steady uniform standard normal ordinary everyday common routine usual typical general universal widespread broad extensive comprehensive wide sweeping inclusive whole entire full complete overall total aggregate collective cumulative summative integrative holistic all-encompassing exhaustive thorough meticulous painstaking diligent conscientious careful scrupulous exact precise accurate detailed specific particular definite explicit clear evident obvious apparent manifest patent visible plain tangible palpable concrete real actual genuine authentic true factual verified valid confirmed proven substantiated corroborated supported backed verified authenticated certified validated documented recorded registered noted written logged catalogued archived filed stored chronicled entered posted listed tabulated indexed itemized enumerated classified categorized sorted grouped arranged organized ordered ranked rated graded evaluated assessed appraised estimated judged measured quantified calculated computed tabulated figured out reckoned counted numbered summed totalled added accumulated aggregated amassed assembled collected gathered compiled amalgamated combined merged blended mixed fused united joined linked connected tied bound attached affixed fastened secured anchored moored rooted grounded embedded implanted inserted lodged settled established fixed stabilized steadied balanced poised leveled aligned straightened adjusted calibrated tuned regulated governed controlled managed directed guided steered navigated piloted conducted led driven propelled moved transported conveyed carried transferred shifted relocated displaced positioned placed situated located stationed installed lodged housed

About structural failure

Redirect to:

- Structural integrity and failure

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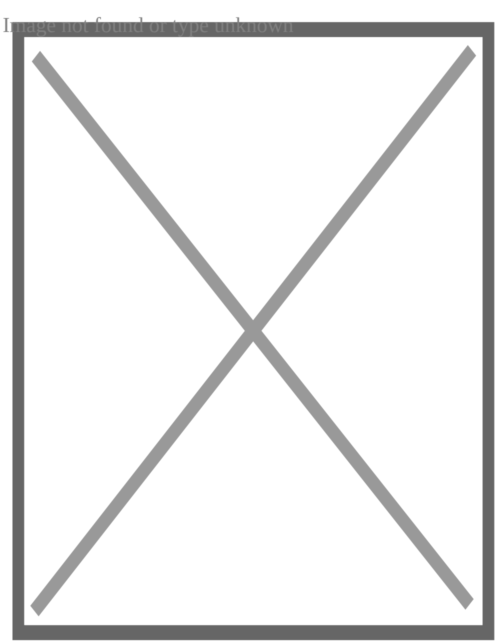
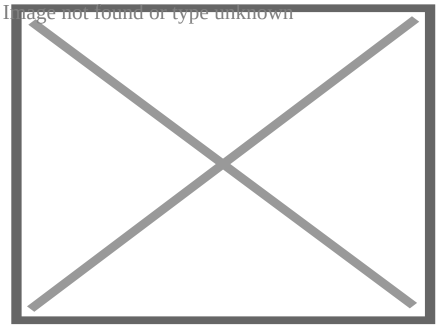
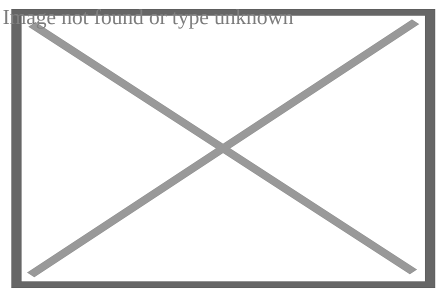
About geotechnical engineering



Boston's Big Dig presented geotechnical challenges in an urban environment.



Precast concrete retaining wall



A typical cross-section of a slope used in two-dimensional analyzes.

Geotechnical engineering, also known as **geotechnics**, is the branch of civil engineering concerned with the engineering behavior of earth materials. It uses the principles of soil mechanics and rock mechanics to solve its engineering problems. It also relies on knowledge of geology, hydrology, geophysics, and other related sciences.

Geotechnical engineering has applications in military engineering, mining engineering, petroleum engineering, coastal engineering, and offshore construction. The fields of geotechnical engineering and engineering geology have overlapping knowledge areas. However, while geotechnical engineering is a specialty of civil engineering, engineering geology is a specialty of geology.

History

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Humans have historically used soil as a material for flood control, irrigation purposes, burial sites, building foundations, and construction materials for buildings. Dykes, dams, and canals dating back to at least 2000 BCE—found in parts of ancient Egypt, ancient Mesopotamia, the Fertile Crescent, and the early settlements of Mohenjo Daro and Harappa in the Indus valley—provide evidence for early activities linked to irrigation and flood control. As cities expanded, structures were erected and supported by formalized foundations. The ancient Greeks notably constructed pad footings and strip-and-raft foundations. Until the 18th century, however, no theoretical basis for soil design had been developed, and the discipline was more of an art than a science, relying on experience.[1]

Several foundation-related engineering problems, such as the Leaning Tower of Pisa, prompted scientists to begin taking a more scientific-based approach to examining the subsurface. The earliest advances occurred in the development of earth pressure theories for the construction of retaining walls. Henri Gautier, a French royal engineer, recognized the "natural slope" of different soils in 1717, an idea later known as the soil's angle of repose. Around the same time, a rudimentary soil classification system was also developed based on a material's unit weight, which is no longer considered a good indication of soil type.[1][2]

The application of the principles of mechanics to soils was documented as early as 1773 when Charles Coulomb, a physicist and engineer, developed improved methods to determine the earth pressures against military ramparts. Coulomb observed that, at failure, a distinct slip plane would form behind a sliding retaining wall and suggested that the maximum shear stress on the slip plane, for design purposes, was the sum of the soil cohesion, $\displaystyle c$, and friction $\displaystyle \sigma \tan(\phi)$, where $\displaystyle \sigma$ is the normal stress on the slip plane and $\displaystyle \phi$ is the friction angle of the soil. By combining Coulomb's theory with Christian Otto Mohr's 2D stress state, the theory became known as Mohr-Coulomb theory. Although it is now recognized that precise determination of cohesion is impossible because $\displaystyle c$ is not a fundamental soil property, the Mohr-Coulomb theory is still used in practice today.[3]

In the 19th century, Henry Darcy developed what is now known as Darcy's Law, describing the flow of fluids in a porous media. Joseph Boussinesq, a mathematician and physicist, developed theories of stress distribution in elastic solids that proved useful for estimating stresses at depth in the ground. William Rankine, an engineer and physicist, developed an alternative to Coulomb's earth pressure theory. Albert Atterberg developed the clay consistency indices that are still used today for soil classification.[1][2] In 1885, Osborne Reynolds recognized that shearing causes volumetric dilation of dense materials and contraction of loose granular materials.

Modern geotechnical engineering is said to have begun in 1925 with the publication of *Erdbaumechanik* by Karl von Terzaghi, a mechanical engineer and geologist. Considered by many to be the father of modern soil mechanics and geotechnical engineering, Terzaghi developed the principle of effective stress, and demonstrated that the shear strength of soil is controlled by effective stress.[4] Terzaghi also developed the framework for theories of bearing capacity of foundations, and the theory for prediction of the rate of settlement of clay layers due to consolidation.[1][3][5] Afterwards, Maurice Biot fully developed the three-dimensional soil consolidation theory, extending the one-dimensional model previously developed by Terzaghi to more general hypotheses and introducing the set of basic equations of Poroelasticity.

In his 1948 book, Donald Taylor recognized that the interlocking and dilation of densely packed particles contributed to the peak strength of the soil. Roscoe, Schofield, and Wroth, with the publication of *On the Yielding of Soils* in 1958, established the interrelationships between the volume change behavior (dilation, contraction, and consolidation) and shearing behavior with the theory of plasticity using critical state soil mechanics. Critical state soil mechanics is the basis for many contemporary advanced constitutive models describing the behavior of soil.[6]

In 1960, Alec Skempton carried out an extensive review of the available formulations and experimental data in the literature about the effective stress validity in soil, concrete, and rock in order to reject some of these expressions, as well as clarify what expressions were appropriate according to several working hypotheses, such as stress-strain or strength behavior, saturated or non-saturated media, and rock, concrete or soil behavior.

Roles

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Geotechnical investigation

[edit]
Main article: Geotechnical investigation

Geotechnical engineers investigate and determine the properties of subsurface conditions and materials. They also design corresponding earthworks and retaining structures, tunnels, and structure foundations, and may supervise and evaluate sites, which may further involve site monitoring as well as the risk assessment and mitigation of natural hazards.[7][8]

Geotechnical engineers and engineering geologists perform geotechnical investigations to obtain information on the physical properties of soil and rock underlying and adjacent to a site to design earthworks and foundations for proposed structures and for the repair of distress to earthworks and structures caused by subsurface conditions. Geotechnical investigations involve surface and subsurface exploration of a site, often including subsurface sampling and laboratory testing of retrieved soil samples. Sometimes, geophysical methods are also used to obtain data, which include measurement of seismic waves (pressure, shear, and Rayleigh waves), surface-wave methods and downhole methods, and electromagnetic surveys (magnetometer, resistivity, and ground-penetrating radar). Electrical tomography can be used to survey soil and rock properties and existing underground infrastructure in construction projects.[9]

Surface exploration can include on-foot surveys, geologic mapping, geophysical methods, and photogrammetry. Geologic mapping and interpretation of geomorphology are typically completed in consultation with a geologist or engineering geologist. Subsurface exploration usually involves in-situ testing (for example, the standard penetration test and cone penetration test). The digging of test pits and trenching (particularly for locating faults and slide planes) may also be used to learn about soil conditions at depth. Large-diameter borings are rarely used due to safety concerns and expense. Still, they are sometimes used to allow a geologist or engineer to be lowered into the borehole for direct visual and manual examination of the soil and rock stratigraphy.

Various soil samplers exist to meet the needs of different engineering projects. The standard penetration test, which uses a thick-walled split spoon sampler, is the most common way to collect disturbed samples. Piston samplers, employing a thin-walled tube, are most commonly used to collect less disturbed samples. More advanced methods, such as the Sherbrooke block sampler, are superior but expensive. Coring frozen ground provides high-quality undisturbed samples from ground conditions, such as fill, sand, moraine, and rock fracture zones.[10]

Geotechnical centrifuge modeling is another method of testing physical-scale models of geotechnical problems. The use of a centrifuge enhances the similarity of the scale model tests involving soil because soil's strength and stiffness are susceptible to the confining pressure. The centrifugal acceleration allows a researcher to obtain large (prototype-scale) stresses in small physical models.

Foundation design

[edit]
Main article: Foundation (engineering)

The foundation of a structure's infrastructure transmits loads from the structure to the earth. Geotechnical engineers design foundations based on the load characteristics of the structure and the properties of the soils and bedrock at the site. Generally, geotechnical engineers first estimate the magnitude and location of loads to be supported before developing an investigation plan to explore the subsurface and determine the necessary soil parameters through field and lab testing. Following this, they may begin the design of an engineering foundation. The primary considerations for a geotechnical engineer in foundation design are bearing capacity, settlement, and ground movement beneath the foundations.[11]

Earthworks

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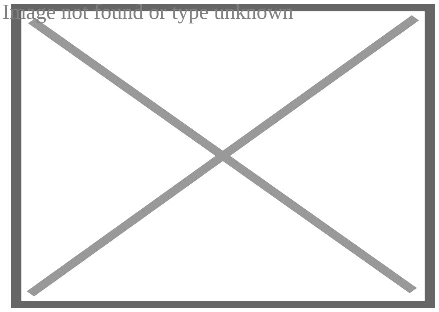

A compactor/roller operated by U.S. Navy Seabees

See also: Earthworks (engineering)

Geotechnical engineers are also involved in the planning and execution of earthworks, which include ground improvement,[11] slope stabilization, and slope stability analysis.

Ground improvement

[edit]

Various geotechnical engineering methods can be used for ground improvement, including reinforcement geosynthetics such as geocells and geogrids, which disperse loads over a larger area, increasing the soil's load-bearing capacity. Through these methods, geotechnical engineers can reduce direct and long-term costs.[12]

Slope stabilization

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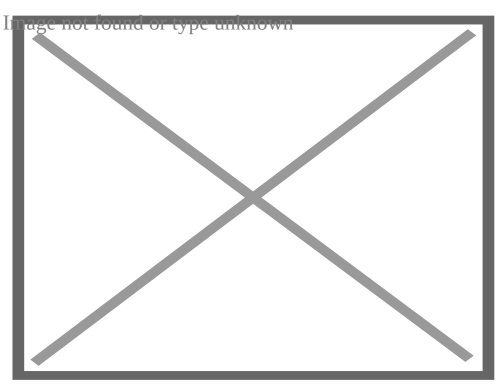

Simple slope slip section.

Main article: Slope stability

Geotechnical engineers can analyze and improve slope stability using engineering methods. Slope stability is determined by the balance of shear stress and shear strength. A previously stable slope may be initially affected by various factors, making it unstable. Nonetheless, geotechnical engineers can design and implement engineered slopes to increase stability.

Slope stability analysis

[edit]
Main article: Slope stability analysis

Stability analysis is needed to design engineered slopes and estimate the risk of slope failure in natural or designed slopes by determining the conditions under which the topmost mass of soil will slip relative to the base of soil and lead to slope failure.[13] If the interface between the mass and the base of a slope has a complex geometry, slope stability analysis is difficult and numerical solution methods are required. Typically, the interface's exact geometry is unknown, and a simplified interface geometry is assumed. Finite slopes require three-dimensional models to be analyzed, so most slopes are analyzed assuming that they are infinitely wide and can be represented by two-dimensional models.

Sub-disciplines

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Geosynthetics

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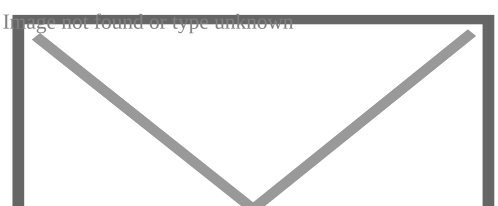
Main article: Geosynthetics



A collage of geosynthetic products.

Geosynthetics are a type of plastic polymer products used in geotechnical engineering that improve engineering performance while reducing costs. This includes geotextiles, geogrids, geomembranes, geocells, and geocomposites. The synthetic nature of the products make them suitable for use in the ground where high levels of durability are required. Their main functions include drainage, filtration, reinforcement, separation, and containment.

Geosynthetics are available in a wide range of forms and materials, each to suit a slightly different end-use, although they are frequently used together. Some reinforcement geosynthetics, such as geogrids and more recently, cellular confinement systems, have shown to improve bearing capacity, modulus factors and soil stiffness and strength.[14] These products have a wide range of applications and are currently used in many civil and geotechnical engineering applications including roads, airfields, railroads, embankments, piled embankments, retaining structures, reservoirs, canals, dams, landfills, bank protection and coastal engineering.[15]

Offshore

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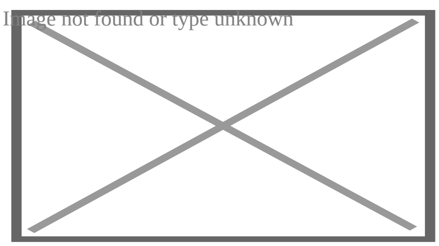
Main article: Offshore geotechnical engineering



Platforms offshore Mexico.

Offshore (or *marine*) *geotechnical engineering* is concerned with foundation design for human-made structures in the sea, away from the coastline (in opposition to *onshore* or *nearshore* engineering). Oil platforms, artificial islands and submarine pipelines are examples of such structures.[16]

There are a number of significant differences between onshore and offshore geotechnical engineering.[16][17] Notably, site investigation and ground improvement on the seabed are more expensive; the offshore structures are exposed to a wider range of geohazards; and the environmental and financial consequences are higher in case of failure. Offshore structures are exposed to various environmental loads, notably wind, waves and currents. These phenomena may affect the integrity or the serviceability of the structure and its foundation during its operational lifespan and need to be taken into account in offshore design.

In subsea geotechnical engineering, seabed materials are considered a two-phase material composed of rock or mineral particles and water.[18][19] Structures may be fixed in place in the seabed—as is the case for piers, jetties and fixed-bottom wind turbines—or may comprise a floating structure that remains roughly fixed relative to its geotechnical anchor point.

Undersea mooring of human-engineered floating structures include a large number of offshore oil and gas platforms and, since 2008, a few floating wind turbines. Two common types of engineered design for anchoring floating structures include tension-leg and catenary loose mooring systems.[20]

Observational method

[edit]

First proposed by Karl Terzaghi and later discussed in a paper by Ralph B. Peck, the observational method is a managed process of construction control, monitoring, and review, which enables modifications to be incorporated during and after construction. The method aims to achieve a greater overall economy without compromising safety by creating designs based on the most probable conditions rather than the most unfavorable.[21] Using the observational method, gaps in available information are filled by measurements and investigation, which aid in assessing the behavior of the structure during construction, which in turn can be modified per the findings. The method was described by Peck as "learn-as-you-go".[22]

The observational method may be described as follows:[22]

1. General exploration sufficient to establish the rough nature, pattern, and properties of deposits.
2. Assessment of the most probable conditions and the most unfavorable conceivable deviations.
3. Creating the design based on a working hypothesis of behavior anticipated under the most probable conditions.
4. Selection of quantities to be observed as construction proceeds and calculating their anticipated values based on the working hypothesis under the most unfavorable conditions.
5. Selection, in advance, of a course of action or design modification for every foreseeable significant deviation of the observational findings from those predicted.
6. Measurement of quantities and evaluation of actual conditions.
7. Design modification per actual conditions

The observational method is suitable for construction that has already begun when an unexpected development occurs or when a failure or accident looms or has already happened. It is unsuitable for projects whose design cannot be altered during construction.[22]

See also

[edit]

- icon
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- Civil engineering
- Deep Foundations Institute
- Earthquake engineering
- Earth structure
- Effective stress
- Engineering geology
- Geological Engineering
- Geoprofessions
- Hydrogeology
- International Society for Soil Mechanics and Geotechnical Engineering
- Karl von Terzaghi
- Land reclamation
- Landfill
- Mechanically stabilized earth
- Offshore geotechnical engineering
- Rock mass classifications
- Sediment control
- Seismology
- Soil mechanics
- Soil physics
- Soil science

Notes

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External links

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- Worldwide Geotechnical Literature Database

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Engineering

- History
- Outline
- List of engineering branches

	Civil	○ Architectural
		○ Coastal
		○ Construction
		○ Earthquake
		○ Ecological
		○ Environmental
		    ○ Sanitary
		○ Geological
		○ Geotechnical
		○ Hydraulic
		○ Mining
		○ Municipal/urban
		○ Offshore
		○ River
		○ Structural
		○ Transportation
		    ○ Traffic
		    ○ Railway

	Mechanical	○ Acoustic ○ Aerospace ○ Automotive ○ Biomechanical ○ Energy ○ Manufacturing ○ Marine ○ Naval architecture ○ Railway ○ Sports ○ Thermal ○ Tribology
Specialties and interdisciplinarity	**Electrical**	○ Broadcast ○ outline ○ Control ○ Electromechanics ○ Electronics ○ Microwaves ○ Optical ○ Power ○ Radio-frequency ○ Signal processing ○ Telecommunications

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Engineering education	◦ Bachelor of Engineering ◦ Bachelor of Science ◦ Master's degree ◦ Doctorate ◦ Graduate certificate ◦ Engineer's degree ◦ Licensed engineer
Related topics	◦ Engineer

Glossaries	◦ Engineering
	    ◦ A–L
	    ◦ M–Z
	◦ Aerospace engineering
	◦ Civil engineering
	◦ Electrical and electronics engineering
	◦ Mechanical engineering
	◦ Structural engineering

Other

- Agricultural
- Audio
- Automation
- Biomedical
  - Bioinformatics
  - Clinical
  - Health technology
  - Pharmaceutical
  - Rehabilitation
- Building services
  - MEP
- Design
- Explosives
- Facilities
- Fire
- Forensic
- Climate
- Geomatics
- Graphics
- Industrial
- Information
- Instrumentation
  - Instrumentation and control
- Logistics
- Management
- Mathematics
- Mechatronics
- Military
- Nuclear
- Ontology
- Packaging
- Physics
- Privacy
- Safety
- Security
- Survey
- Sustainability
- Systems
- Textile

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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

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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)

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	◦ Alfisols ◦ Andisols ◦ Aridisols ◦ Entisols ◦ Gelisols ◦ Histosols

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

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- Category soil science
- Image not found or type unknown List of soil scientists

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Geotechnical engineering

Offshore geotechnical engineering

Investigation and instrumentation

Field (*in situ*)

- Image not found or type unknown Core drill
- Image not found or type unknown Cone penetration test
- Image not found or type unknown Geo-electrical sounding
- Image not found or type unknown Permeability test
- Image not found or type unknown Load test
  - Static
  - Dynamic
  - Statnamic
- Image not found or type unknown Pore pressure measurement
  - Piezometer
  - Well
- Image not found or type unknown Ram sounding
- Image not found or type unknown Rock control drilling
- Image not found or type unknown Rotary-pressure sounding
- Image not found or type unknown Rotary weight sounding
- Image not found or type unknown Sample series
- Image not found or type unknown Screw plate test
- Deformation monitoring
  - Image not found or type unknown Inclinometer
  - Image not found or type unknown Settlement recordings
- Image not found or type unknown Shear vane test
- Image not found or type unknown Simple sounding
- Image not found or type unknown Standard penetration test
- Image not found or type unknown Total sounding
- Image not found or type unknown Trial pit
- Image not found or type unknown Visible bedrock
- Nuclear densometer test
- Exploration geophysics

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

<table>
<tr><td rowspan="2">Mechanics</td><td>Forces</td><td>○ Effective stress
○ Pore water pressure
○ Lateral earth pressure
○ Overburden pressure
○ Preconsolidation pressure</td></tr>
<tr><td>Phenomena/ problems</td><td>○ 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</td></tr>
<tr><td>Numerical analysis software</td><td colspan="2">○ SEEP2D
○ STABL
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○ UTEXAS
○ Plaxis</td></tr>
</table>

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

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Construction

Types	○ Home construction ○ Offshore construction ○ Underground construction ○ Tunnel construction
History	○ Architecture ○ Construction ○ Structural engineering ○ Timeline of architecture ○ Water supply and sanitation

Professions	○ Architect ○ Building engineer ○ Building estimator ○ Building officials ○ Chartered Building Surveyor ○ Civil engineer ○ Civil estimator ○ Clerk of works ○ Project manager ○ Quantity surveyor ○ Site manager ○ Structural engineer ○ Superintendent
Trades workers (List)	○ Banksman ○ Boilermaker ○ Bricklayer ○ Carpenter ○ Concrete finisher ○ Construction foreman ○ Construction worker ○ Electrician ○ Glazier ○ Ironworker ○ Millwright ○ Plasterer ○ Plumber ○ Roofer ○ Steel fixer ○ Welder

Organizations	○ American Institute of Constructors (AIC) ○ American Society of Civil Engineers (ASCE) ○ Asbestos Testing and Consultancy Association (ATAC) ○ Associated General Contractors of America (AGC) ○ Association of Plumbing and Heating Contractors (APHC) ○ Build UK ○ Construction History Society ○ Chartered Institution of Civil Engineering Surveyors (CICES) ○ Chartered Institute of Plumbing and Heating Engineering (CIPHE) ○ Civil Engineering Contractors Association (CECA) ○ The Concrete Society ○ Construction Management Association of America (CMAA) ○ Construction Specifications Institute (CSI) ○ FIDIC ○ Home Builders Federation (HBF) ○ Lighting Association ○ National Association of Home Builders (NAHB) ○ National Association of Women in Construction (NAWIC) ○ National Fire Protection Association (NFPA) ○ National Kitchen & Bath Association (NKBA) ○ National Railroad Construction and Maintenance Association (NRC) ○ National Tile Contractors Association (NTCA) ○ Railway Tie Association (RTA) ○ Royal Institution of Chartered Surveyors (RICS) ○ Scottish Building Federation (SBF) ○ Society of Construction Arbitrators
By country	○ India ○ Iran ○ Japan ○ Romania ○ Turkey ○ United Kingdom ○ United States
Regulation	○ Building code ○ Construction law ○ Site safety ○ Zoning

Architecture	◦ Style
	    ◦ List
	◦ Industrial architecture
	    ◦ British
	◦ Indigenous architecture
	◦ Interior architecture
	◦ Landscape architecture
	◦ Vernacular architecture

Engineering	◦ Architectural engineering
	◦ Building services engineering
	◦ Civil engineering
	    ◦ Coastal engineering
	    ◦ Construction engineering
	    ◦ Structural engineering
	◦ Earthquake engineering
	◦ Environmental engineering
	◦ Geotechnical engineering

Methods	◦ List ◦ Earthbag construction ◦ Modern methods of construction ◦ Monocrete construction ◦ Slip forming

Other topics

- Building material
  - List of building materials
  - Millwork
- Construction bidding
- Construction delay
- Construction equipment theft
- Construction loan
- Construction management
- Construction waste
- Demolition
- Design–build
- Design–bid–build
- DfMA
- Heavy equipment
- Interior design
- Lists of buildings and structures
  - List of tallest buildings and structures
- Megaproject
- Megastructure
- Plasterwork
  - Damp
    - Proofing
  - Parge coat
  - Roughcast
    - Harling
- Real estate development
- Stonemasonry
- Sustainability in construction
- Unfinished building
- Urban design
- Urban planning

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About Cook County

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Things To Do in Cook County

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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

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+Inc
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88.1396465!2d42.0637725!3e1

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.

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Sarah McNeily

(5)

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

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Jim de Leon

(5)

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

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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

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Dave Kari

(5)

What a fantastic experience! Owner Rick Thomas is a trustworthy professional. Nick and the crew are hard working, knowledgeable and experienced. I interviewed every company in the area, big and small. A homeowner never wants to hear that they have foundation issues. Out of every company, I trusted USS the most, and it paid off in the end. Highly recommend.

Scheduling Routine Evaluations of Structural Support**View GBP**

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- **Examining Conditions That Void Certain Warranties**
- **Evaluating Structural Policy Coverage in Home Insurance**

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Zip : 60169

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Google Business Profile

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

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home foundation repair service

Foundation Repair Service

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