



CABLE ANCHORING AND GROUTING



TOPICS

DISCUSSION OUTLINE

What is Cable anchoring?

Need of anchors

Types of anchors

Different methods for installation

What is grouting

Purpose

Types

PU injection grouting

WHAT IS CABLE ANCHORING?

CABLE:

A Cable is a flexible structural member that supports only tensile loading and offer no resistance when compressed or bent in a curved shape. Technically we can say cables have zero bending rigidity.

ANCHORING:

Anchoring is the process of securing an object or structure to a fixed point or surface to prevent it from moving or falling.

CABLE ANCHORING:

Combining the above two we can say that Cable anchoring is the process of securing high-strength steel cables to a structure to provide additional support and stability.




CABLE ANCHORING

Cable anchoring is commonly used in construction and engineering to reinforce structures like bridges, buildings, and towers.

Once the cables are anchored, they are then tightened to a specific tension, which helps to distribute the load and enhance the overall stability of the structure. Cable anchoring is an important safety measure that helps prevent structural damage and ensures the longevity of the structure.





NEED OF CABLE ANCHORING

Increased structural stability

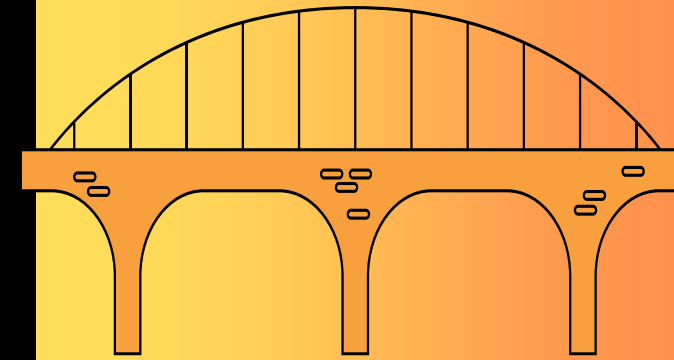
Cable anchoring provides additional support to structures such as bridges, buildings, and towers, which helps to improve their overall stability and prevent them from collapsing or being damaged by external forces.

Improved load distribution:

By anchoring cables to a structure, the load is more evenly distributed across the structure, reducing the stress on individual components and enhancing the overall strength of the structure.

Flexibility and versatility:

Cables are strong and flexible, making them ideal for use in a wide range of applications. Cable anchoring allows for more flexibility in the design of structures and enables them to withstand a variety of environmental conditions and stresses.



NEED OF CABLE ANCHORING

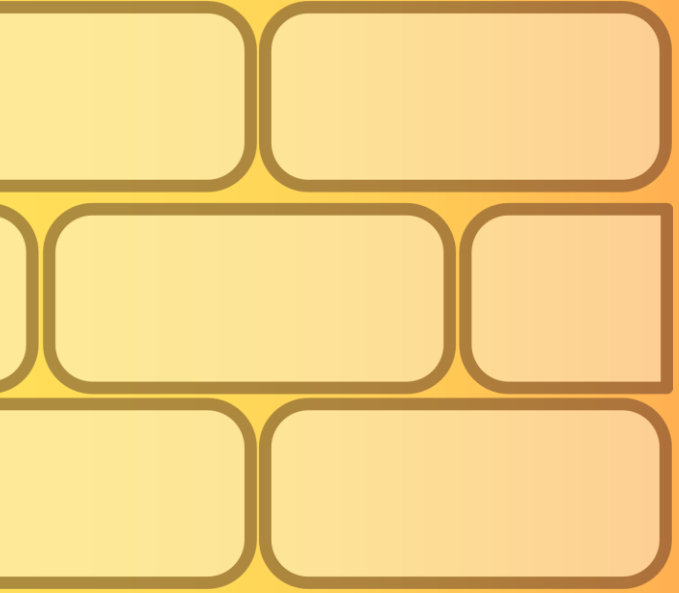
Cost-effective solution:

Cable anchoring can be a cost-effective solution compared to other methods of reinforcing structures. It allows for the use of lighter materials and can reduce the amount of material needed for construction.

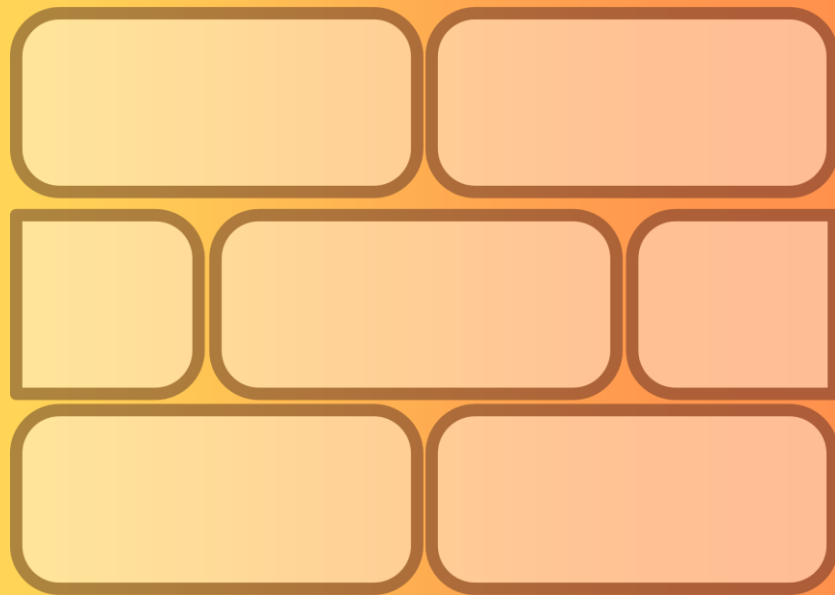
Safety:

Cable anchoring is an important safety measure that helps prevent structural failure and protects people and property from harm.





TYPES OF ANCHORS



► **Wedge anchors**

These are mechanical anchors that are used to secure cables to a solid surface such as concrete or masonry. They work by expanding inside the hole in which they are inserted, providing a secure grip on the cable.

► **Expansion anchors**

These are similar to wedge anchors, but instead of expanding inside the hole, they create a frictional grip by compressing against the sides of the hole. They are commonly used in concrete or masonry.

<https://youtu.be/jnxPLQLpyCU>



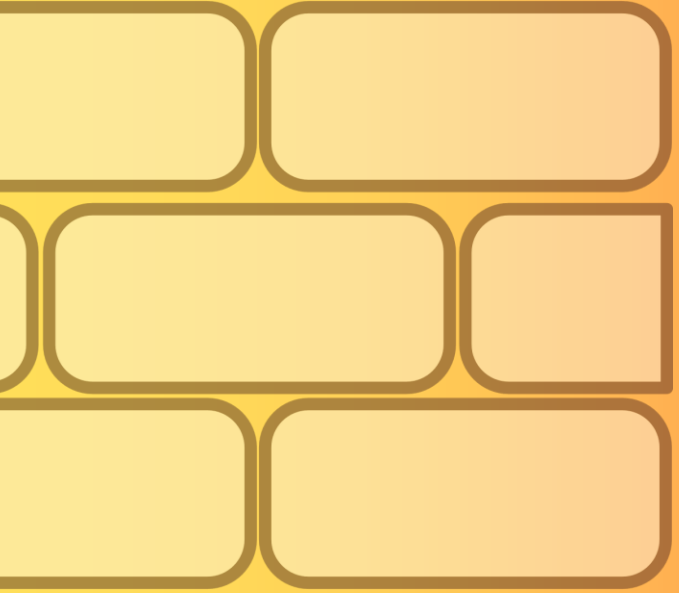
TYPES OF ANCHORS

► Tension anchors

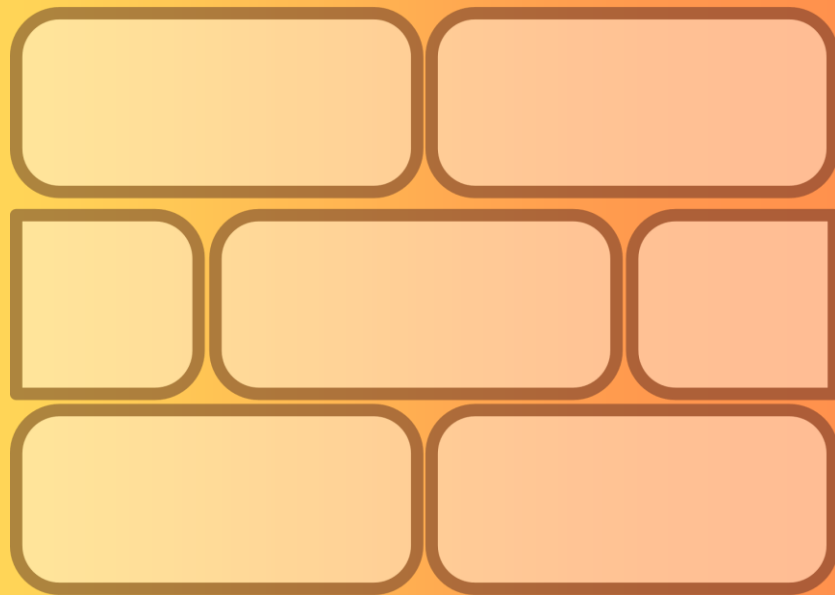
These are used to anchor cables that are under tension, such as in cable-stayed bridges. They consist of a large steel anchor block that is bolted to the structure, with cables attached to it at one end and the other end attached to the bridge deck.



<https://youtu.be/Cf5L7xCVGys>



TYPES OF ANCHORS



► Grouted anchors

These are similar to wedge anchors, but instead of expanding inside the hole, they are surrounded by grout or cement to provide a secure grip on the cable.



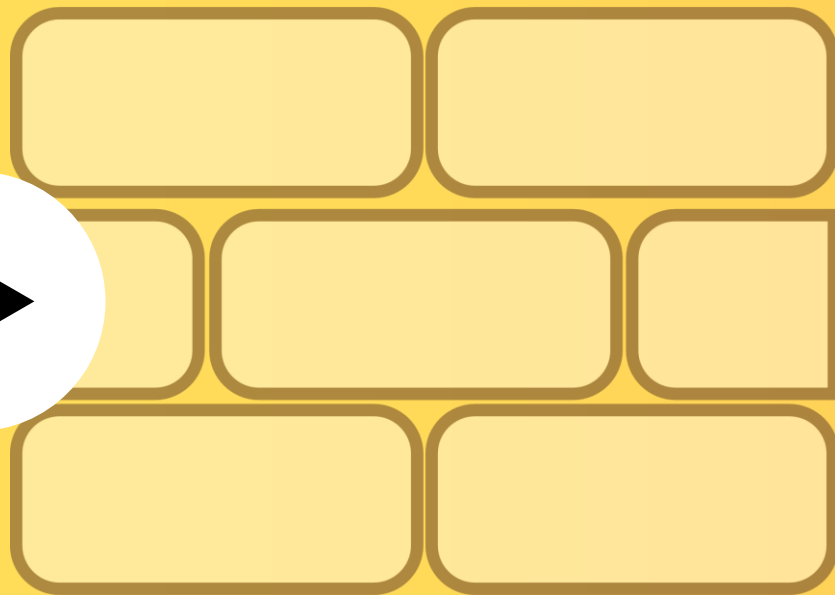
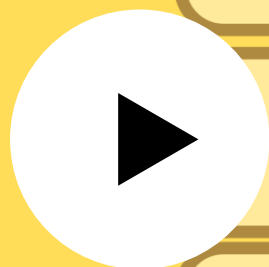
A Short Video



Installation of cable anchor

Link :

<https://youtube.com/shorts/bKeU6N5HWyw?feature=share>



DIFFERENT METHODS FOR INSTALLATION OF ANCHORS

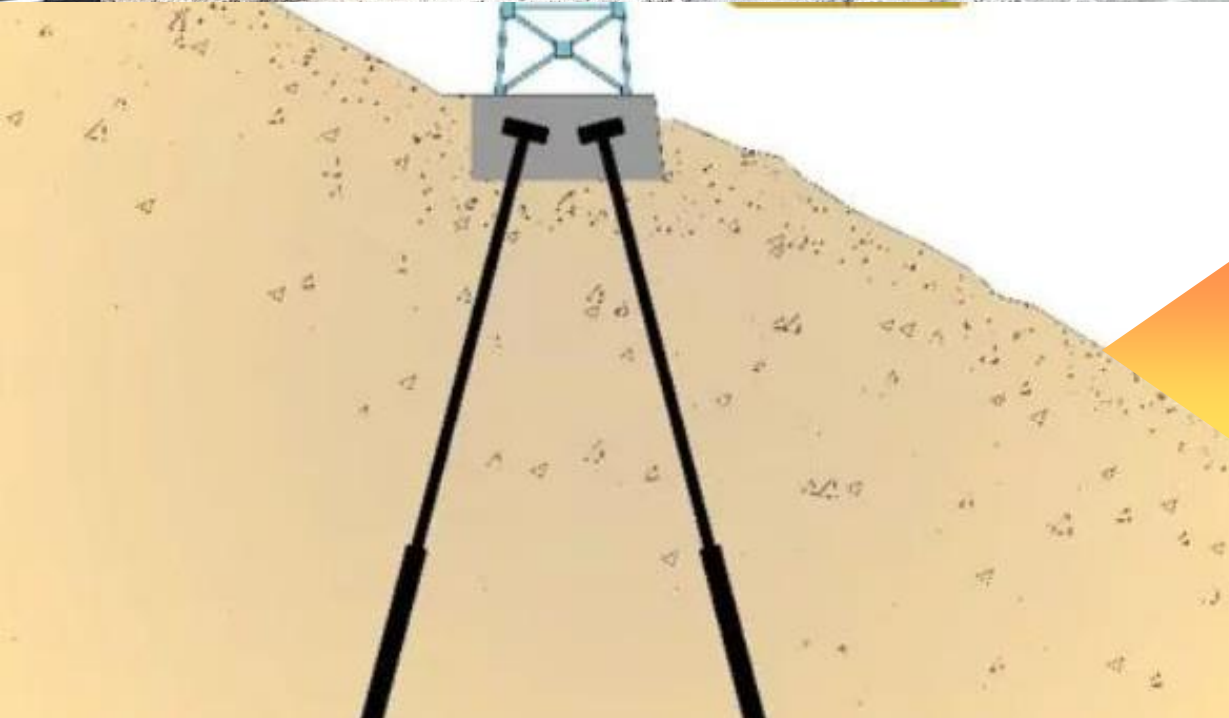


- ▶ **Drilling**
- ▶ **Embedment**
- ▶ **Casting**
- ▶ **Bolted connection**
- ▶ **Welding**
- ▶ **Tensioning**



DRILLING

For wedge anchors, expansion anchors, and grouted anchors, holes must be drilled into the structure or ground to insert the anchor. Drilling can be done manually or with a powered drill.



EMBEDMENT

For some deadman anchors, the anchor mass is placed directly into the ground or soil, with the cables attached before the surrounding material is backfilled.



CASTING

For some types of anchors, such as grouted anchors or embedded anchors, the surrounding material, such as cement or concrete, is cast around the anchor to provide additional stability and strength..



BOLTED CONNECTIONS

Some types of cable anchors, such as tension anchors, are bolted directly to the structure using large bolts.



WELDING

Eye anchors and other types of steel anchors can be welded directly to the structure.



TENSIONING

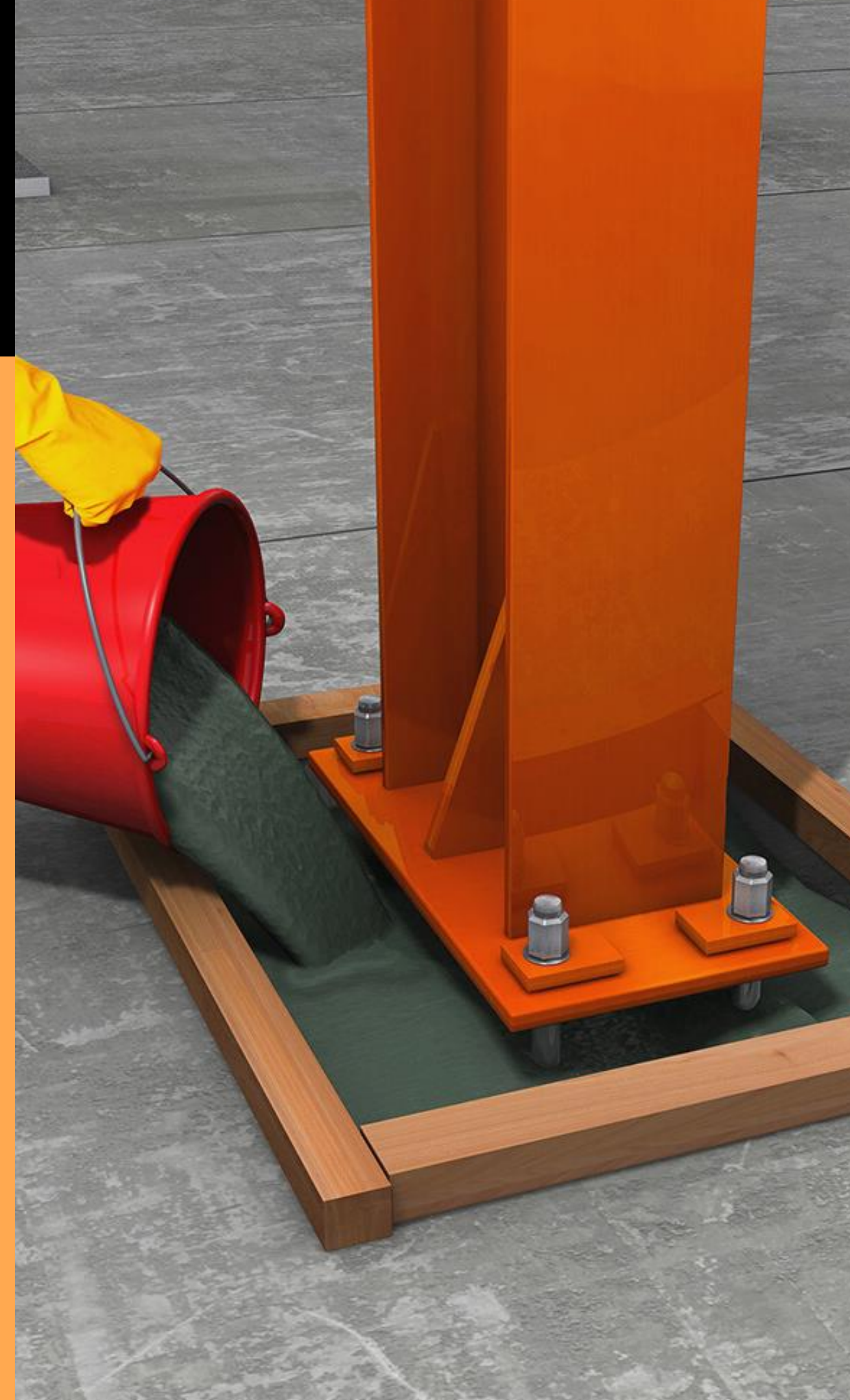
For some types of cable anchors, such as those used in cable-stayed bridges, the cables are tensioned after installation to ensure proper performance.



GROUTING

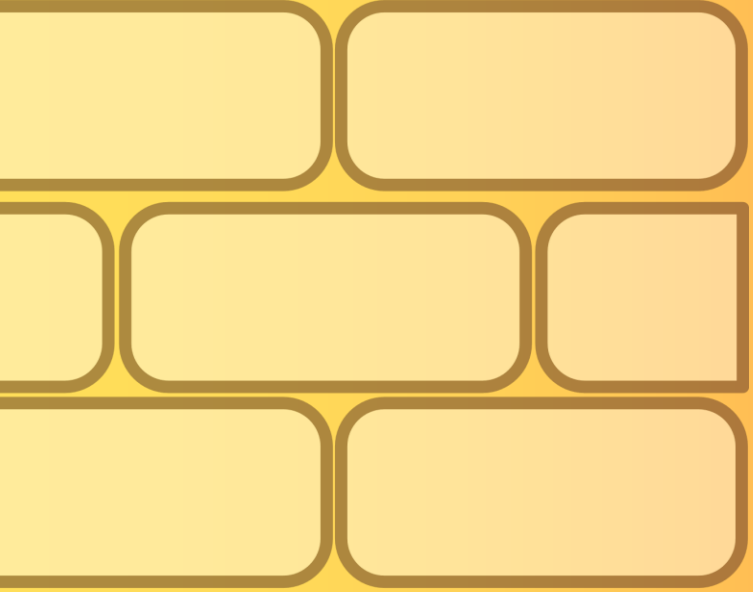
WHAT IS GROUTING ?

Grouting is the process in which materials are injected into cavities or cracks in concrete, masonry structure, soil, and rock mass to increase the structure's load-bearing capacity refer to grouting, and the material used for this process is called grout.

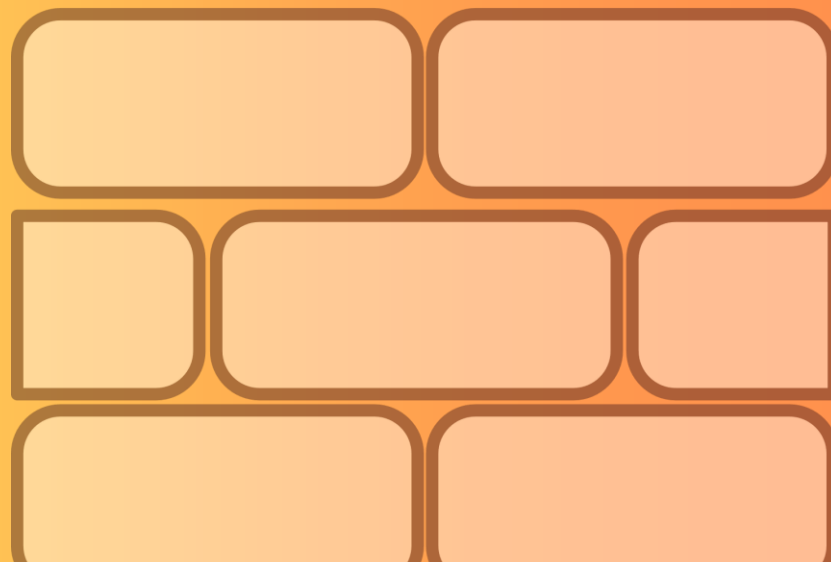


Purpose of grouting in construction

- **Grouting is done for repairing concrete cracks, filling gaps in the tiles, and waterproofing.**
- **The ground anchors for sheet pile walls, concrete pile walls, retaining walls, etc. can be fixed.**
- **Grouting is done for giving additional strength to the foundation of the load-bearing structure**



TYPES OF GROUTING



▶ **Cement
Grouting**

▶ **Compaction
Grouting**

▶ **Pressure
Grouting**

▶ **Chemical
Grouting**

▶ **Jet Grouting**

▶ **Bituminous
Grouting**



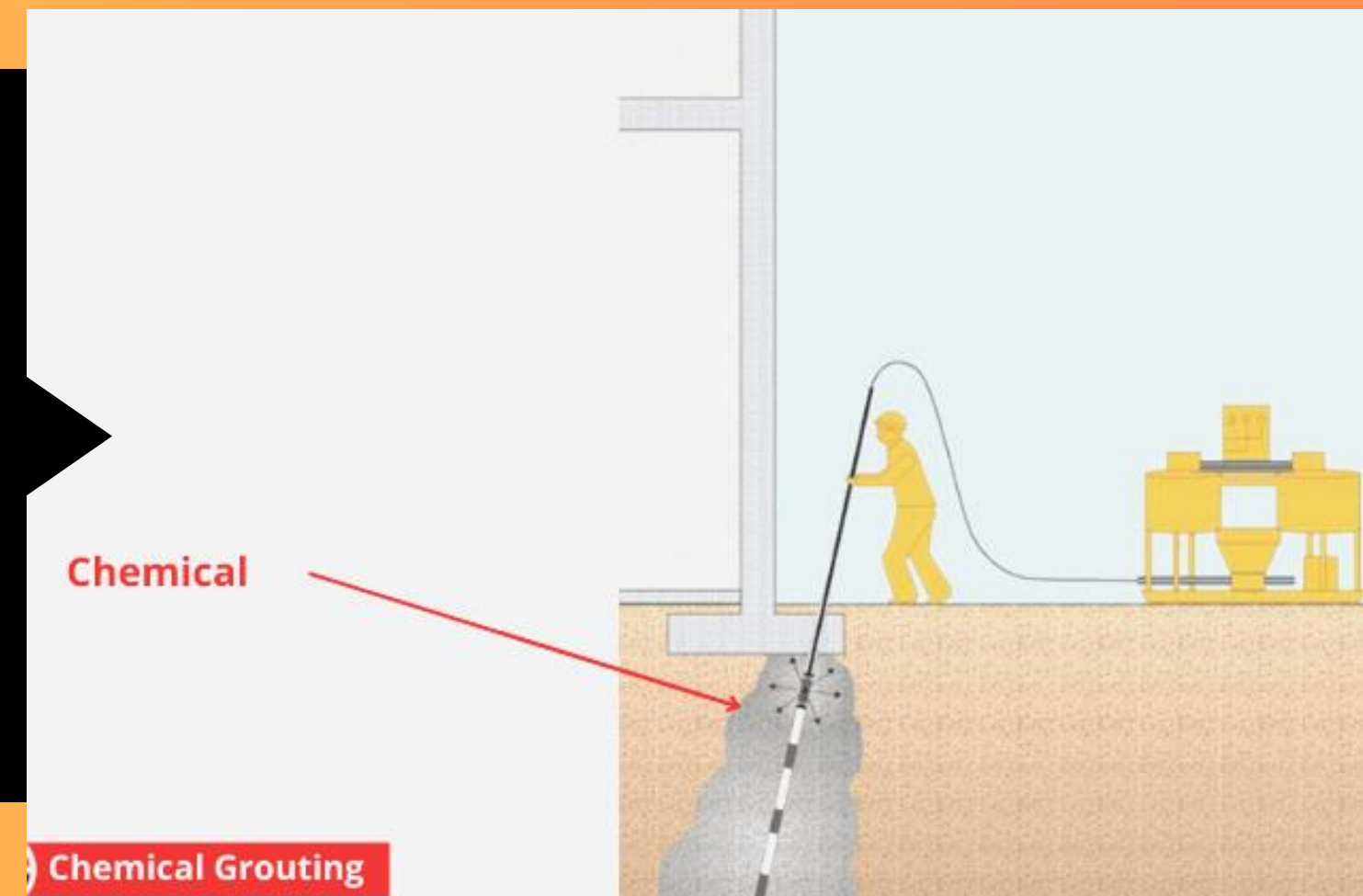
 Cement Grouting


CEMENT GROUTING

Cement grouting is the process of injection of cement or grout under pressure to fill voids or fractures in the soil, rock unit, or concrete structure. This helps in preconstruction site improvement, tackle foundation settlement, etc.

CHEMICAL GROUTING

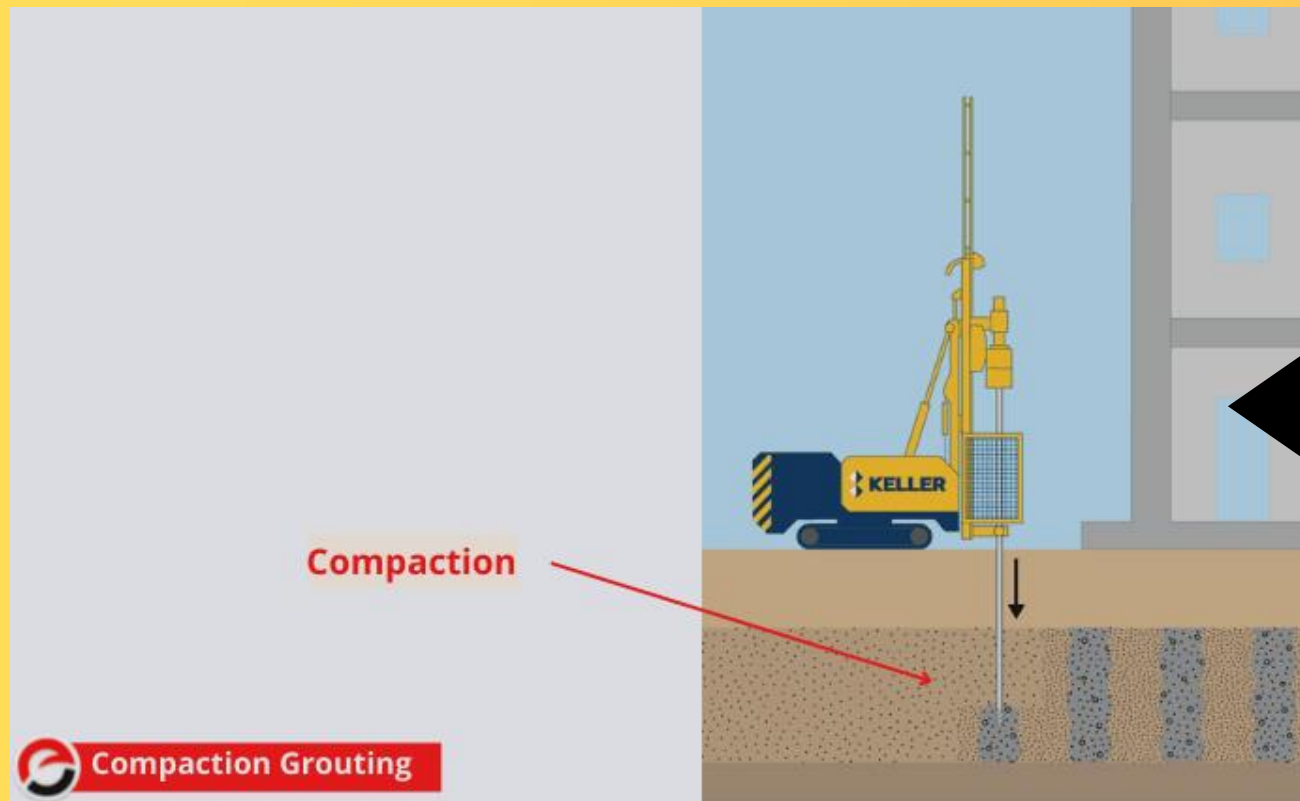
Chemical grouting is a form of permeation grouting in which the solutions used in the grouts are acrylamides, polyurethanes, acrylates, epoxies, and sodium silicates. The two types of chemical grouting are structural and water control grouting.



 Chemical Grouting

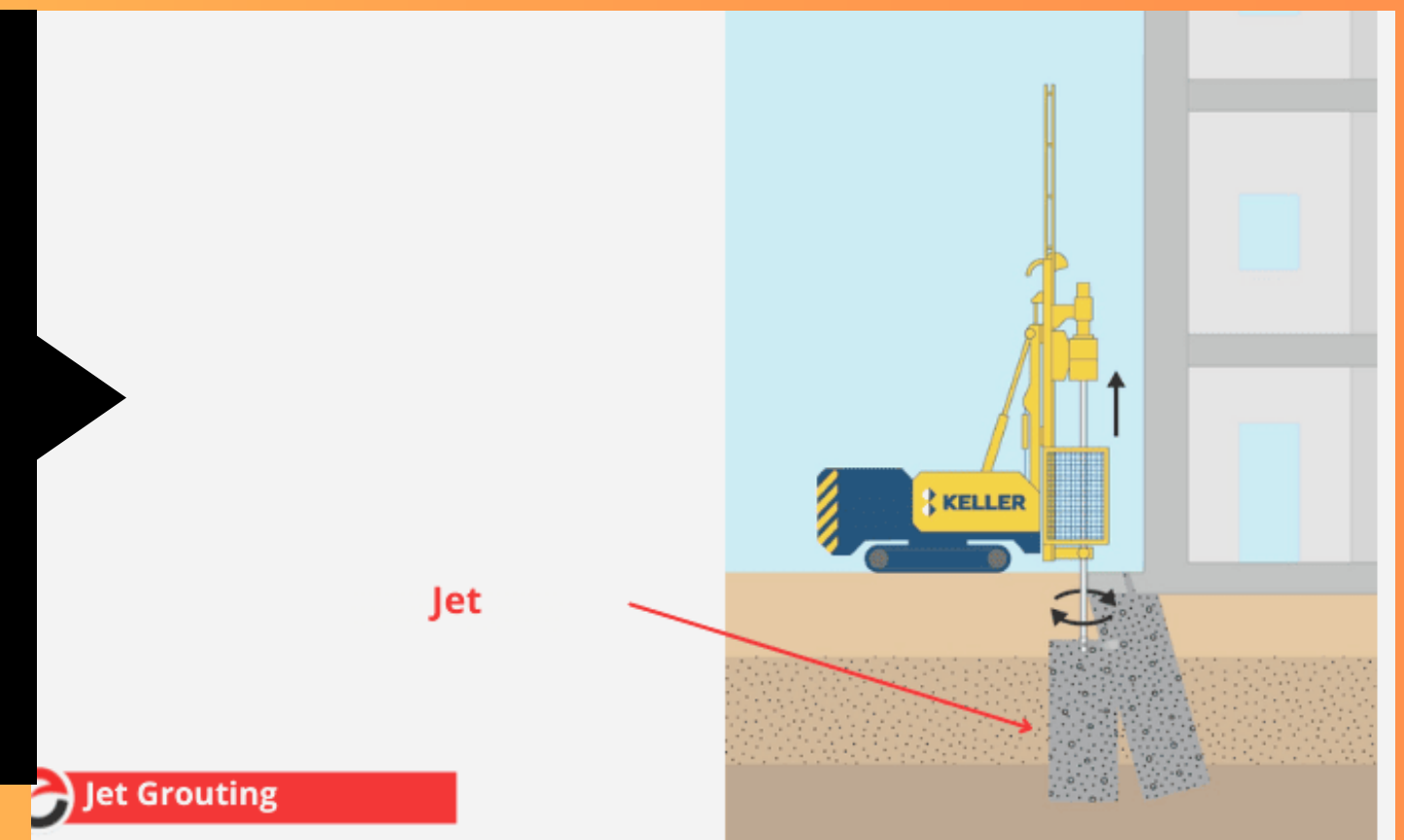
COMPACTION GROUTING

Compaction grouting is a cost-effective technique for re-compaction and stabilization of sub-soils to greater depths. This type of compaction grouting is used to reduce the damage of liquefaction of soils during seismic events.




JET GROUTING

Jet grouting is an in-situ construction technique that is used to improve the mechanical characteristics of soil, with the help of a grouting monitor which is attached to the end of a drill stem. This type of grouting is used in places where increased stability and bearing capacity or decreased permeability is required.



PRESSURE GROUTING



 Pressure Grouting

Under pressure, a combination of cement, sand, and water is injected into cracks, cavities, or fissures in the structural component or the ground. The foundations are given this treatment to avoid moisture penetration. These techniques are also used for repairing structures, consolidating ground to improve bearing capacity, forming water cut-offs to prevent seepage, etc.

BITUMINOUS GROUTING

Bituminous grouting is suitable for waterproofing above or below ground level as protective coatings. They also can be used for membrane waterproofing or bedding and filling the joints of brickwork. Either asphaltic or coal-tar pitch materials of damp proofing and waterproofing grade are used, together with mineral aggregates as coarse as sand.



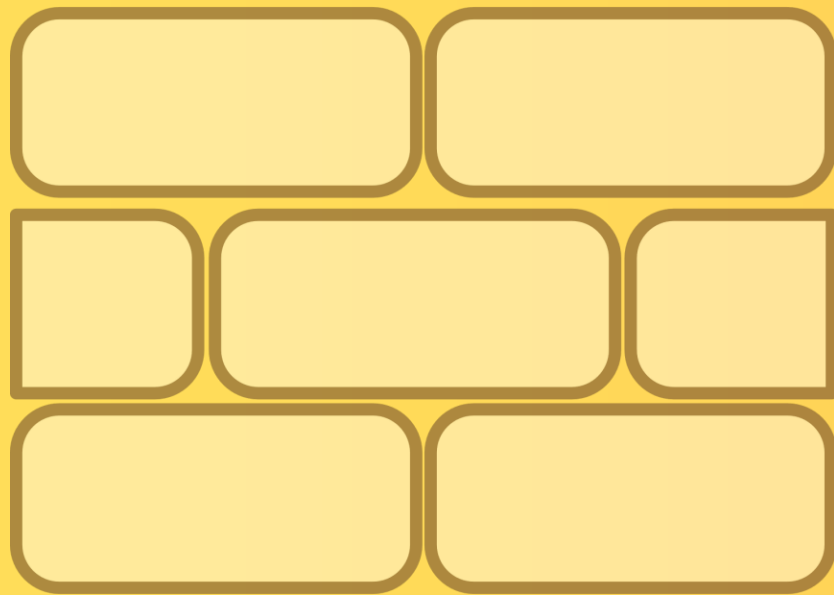
A Short Video



COMPACTION GROUTING

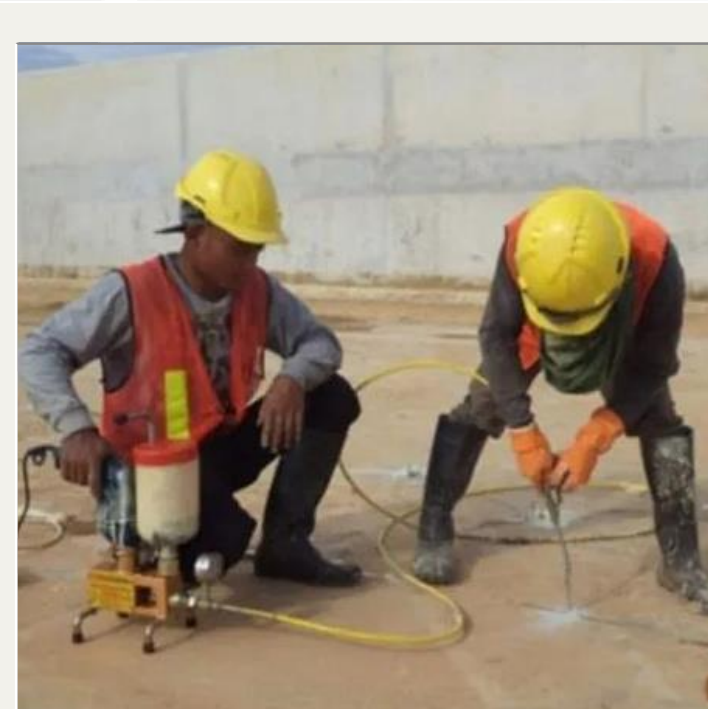
Link :

<https://youtube.com/shorts/O95vntegins?feature=share>



PU INJECTION GROUTING

PU injection grouting is also known as High-Pressure Polyurethane injection grouting is a process in which polyurethane is injected into the substrate with high pressure so that the cracks and voids in the substrate will be filled with waterproofing slurry to stop any potential water seepage. Commonly used waterproofing method to repair water leakages, generally through concrete substrates.



QNA

- 1. What are the needs of cable anchoring?**
- 2. Name different methods for installation of anchors.**
- 3. What is purpose of grouting?**
- 4. What are different types of grouting?**

THANK YOU



BUILDING CONSTRUCTION PLANNING

CRN
2014024
2014025
2014026
2014028