ROCK ANCHORING

POST - TENSIONING

KGN
PRESTRESS

Quality Solution Unified with Modern Technology

ABOUT US

KGN is a specialist contractor with very high aspirations and ambitions. We strive to be the best in our field and we offer complete package of structural solution to our clients. Being a specialist in the field of pre-stressing, we are in a position to input the practical aspects of overall implementation concept. Such approach takes considerations of temporary, permanent and long-term behavior of structures. We are often involved in the preliminary stage of a building or civil engineering works, providing inputs on the methodology and sequence of construction works with a common objective of enhancing project build ability. We take pride in what we offer to our clients, and we aspire to complete undertaking to the at most satisfaction of our project partners.

Core Business

KGN technology is beds on the principal of Post - Tensioning where the presstress is permanently introduce into the structure after the concrete has hardened. This is achieved by the stressing of suitably arranged, high-strength pre-stressing tendons.

KGN Post-Tensioning generates favorable stress conditions in the structure, enabling efficient use of building materials while controlling deformations under service conditions.

Systems, products and technologies

- Post-Tensioning Systems
- Rock Anchoring Systems

Activities presentation Construction partner for

- Buildings
- Industrial Facilities
- Infrastructure

POST - TENSIONING SYSTEMS

Bonded Post-Tensioned concrete is the descriptive term for a method of applying compression after pouring concrete and the curing process (in situ).The concrete is cast around a plastic, steel or aluminum curved duct, to follow the area where otherwise tension would occur element. A set of tendons are fished through the duct and the concrete is poured. Once the concrete has hardened, the tendons, are tensioned by hydraulic jacks react against the concrete member itself. When the tendons have stretched sufficiently, according to the design specification, they are wedged in position and maintain tension after the jacks are removed, transferring pressure to the concrete. The duct is then grouted to protect the tendons from corrosion. Post-Tensioning is also used in the construction of various bridges, both after concrete is cured after support by false work and by the assembly of prefabricated section, as in the segmental bridge.

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Among the advantages of this systems over unbounded Post - Tensioning are:

- Large reduction in traditional reinforcement requirements as tendons cannot distress in accidents.
- Tendons can be easily “woven” allowing a more efficient design approach.
- Higher ultimate strength due to bond generated between the strand and concrete.
- No long terms issues with maintaining the integrity of the anchor/dead end.

Advantages of Post-Tensioned Slabs over conventional RCC slab:

- Flexibility - Internal layout flexibility is greatly increased, making it much easier to place or reposition partitions.
- With framework stripping and redeploying and with less steel and concrete construction is faster than R.C.C. Construction.
- Spans up to 50% longer than those using RCC can be constructed with fewer support columns.
- Offer resistance to cracking and water seepage due to limited deflection and highly compressive characteristics of prestressed concrete structure.

Why Post-Tensioned Slabs instead of Conventional RCC slabs?

- Early post - Tensioning allows the frame work to be stripped and redeployed quickly.
- Significant saving on material, up to 30% on concrete alone with longer spans, fewer columns & thinner slabs producing lighter overall structure reducing foundation cost.
- Joint free ground slabs up to 1000 sqmt and true & level floor ideal or automated ware housing and super markets.
- A facility to span over poor ground conditions with full resistance to mining subsidence.
- Water proof floors to eliminate unsightly staining of concrete fascias.
- Thinner slabs give more head room.

POST TENSIONING

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Multistand Post - Tensioning

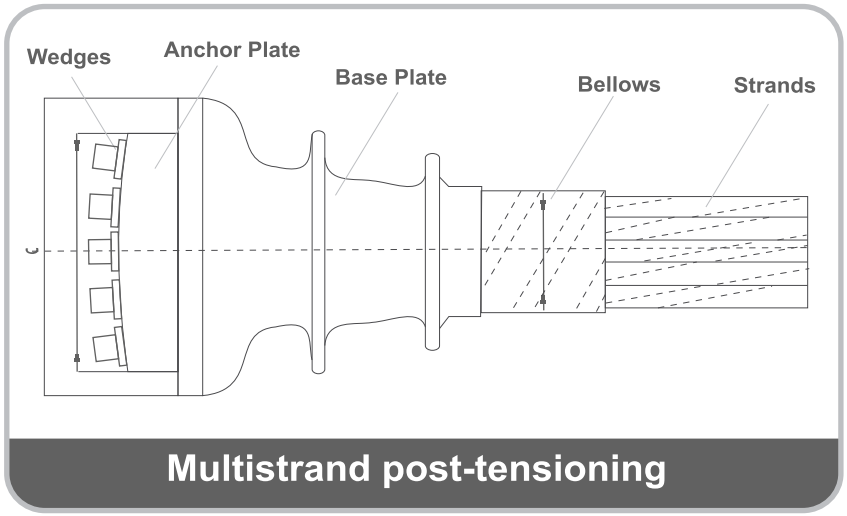
The KGN multistrand system is charaterized by standardized tendons units up to fifty 12.70 mm (0.5)" or 15.20 mm (0.6)" diameter strands with a wide selections of anchorage types. Ducts are G.I. or Plastic. Cements or other type of grouting are used. Tendons lenght in advance. Manufactured on - site or in factory with to determine tendon length in advance. Simultaneous stressing of all strands in a tendon applied, with individual locking of each strand at the anchorage point stressing is carried out in any number of phases with simple and reliable equipment for installation, stressing and grouting.

Bonded Slab Post - Tensioning

Today's building owner and designers need to provide a high level of structural flexibility to meet changing user requirements. Post-Tensing provides greater spans with reduced structural beam depths, resulting in large columns - free areas.

As a result, internal layout are not detected by tight column grids. Positive deflections and cracks control and if, if necessary, joint - free water - tight slabs, free designers from the limitation of traditional reinforced concrete structures.

KGN Post - Tensioning is more economical than other system, especially when fast construction cycles are envisaged. There less material handling on site and a reduced labour force, minimizing site congestions. Most importantly, there is the quality and service provided by KGN specialized highly efficient team. The KGN bonded post – tensioning slab system has been used in many prestigious buildings. The System uses up to five contained in flat – shaped ducting, and anchorages, Strands are individually stresses and gripped by wedge action. After stressing. The ducts filled with a cement grout that fully bonds the strands to the surrounding concrete.



Multistrand post-tensioning

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ROCK ANCHORING

KGN Anchors can be divided into two main categories - strendand bar anchors. The type of anchors used depends on whether it is rock soil, for temporary or permanent use, whether or not it is to be tensioned, and whether or not permanent corrosion protection is required.

KGN offers all of these alternatives and can support a full anchor material supply service (anchors and accessories) with back-up including design services, advice consultancy,
testing, installation, tensioning and site supervision.

The construction of the KGN strand anchors depends on the type of application. (rock or soil), the design, the corrosiveness of the environment, the presence of stray electrical currents and the intended service life, while temporary ground anchors require limited or no corrosion protection, permanent ground anchor (with a service life exceeding two or three years) need to have a comprehensive permanent corrosion protection system.

Rock Anchoring work is carried out in the following steps:-

1. Drilling
2. Homing
3. Primary Grouting (Fixed length grouting)
4. Stressing
5. Secondary Grouting

Drilling

As per the design requirement the location given on the drawing, drilling of the hole, vertical or inclined, is carried out using percussion DTH type drilling method. Drilling depth is taken as the fixed as the length plus free length plus extra depth of at least 300mm. If the wall of the hole is not standing by its own, a MS or PVC Casing is inserted in the Free length of the anchor and drilling of the fixed is then carried out. Hole should be flushed with water and compressed air, Hole should be checked for its depth.

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Homing

Fabricated anchor is then slowly lowered in to the hole. Precaution should be taken so that anchor should be remaining suspended at least 300 mm above the bottom of the hole. Anchor should be firmly secured at ground level with the help of clamp until the fixed length grouting is completed.

Primary Grouting (Fixed Length Grouting)

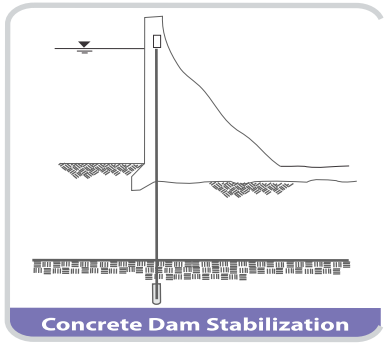
Primary Grouting or fixed length grouting is carried out with neat cement using water cement ratio of 0.4 Admixture may be added if client permits. Pre measured quantity is pumped through HDPE dummy pipe with the help of electrically operated grout pump.

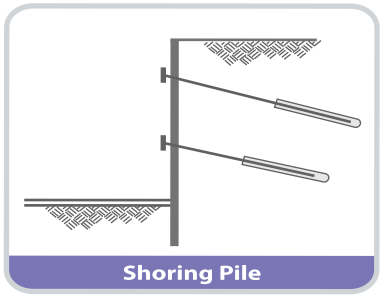
Stressing

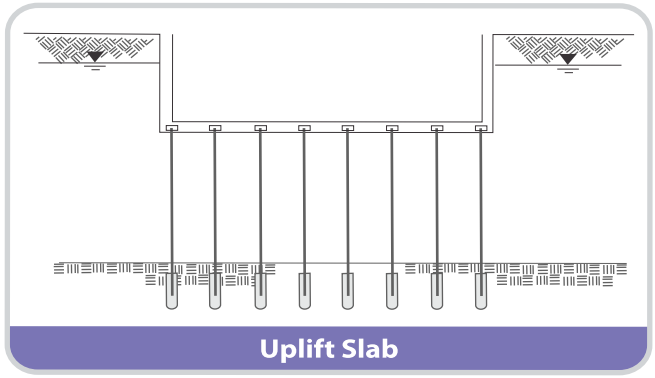
Stressing can be carried out only when grout has attained sufficient strength of 30 Mpa which normally achieved in 21 days. For earlier strength Conbextra GP2 can be used. Extra length of the anchor Kept for jacking is cleaned. Anchor plate is fixed on the cable.
Anchor is then stressed using hydraulic jack of required capacity and anchor is locked in the anchor plate.

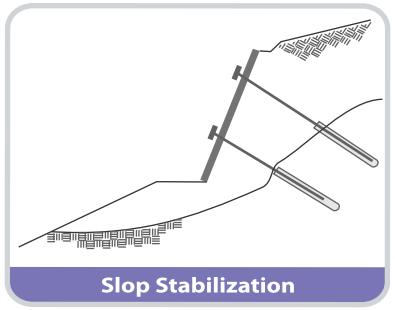
Secondary Grounting

The protruding length of HT strands are cut and the annular space of the anchor including the free length portion is then grouted.


Concrete Dam Stabilization


Shoring Pile


Uplift Slab


Slop Stabilization

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The anchorage is the combined system of anchor head, bearing plate, and trumpet that is capable of transmitting the prestressing force from the prestressing steel (bar or stand) to the ground surface or the supported structured. The unbounded length is that portion of the prestressing steel that is free to elongate elastically and transfer the resisting force bond length to the structures. A bond breaker is a month plastic sleeve that is placed over the end on in the unbounded length to prevent the prestressing steel from bonding to the surrounding grout. It enables the prestressing steel in the unbounded length to elongate without obstruction during testing and stressing and leaves the prestressing steel unbounded after lock-off. The tendon bond length is that length of the prestressing steel that is bonded to the grout and is capable of transmitting the applied tensile load into the ground. The anchor bond length should be located behind the critical failure surface. A prestressed grouted anchor is a structural element installed in soil or rock that is used to transmit an applied load into the ground. Ground anchors, referenced simply as ground anchors are installed in grout filled drill holes. Grouted anchors are also referred to as “tiebacks”

The basic components of a Rock Anchor includes the:

(a) Anchorage; (b) Free Stressing (Unbounded) length; and (c) Bond Length.

A) Based on the Anchorage Zone

Rock Anchors - Fixed length is anchored in the hard rock

Soil Anchors - Fixed length is anchored in the Soil

B) Based on Nature of Structure

Permanent Anchors - Permanent ground anchors have to guarantee their function during the lifetime of the structures to be anchored

Temporary Anchors - Prestressed anchors, which have to fulfill theirs function only for a limited time.

C) Based on How it is installed

Vertical Anchors - These anchors are provided vertically in to the ground

Inclined Anchors - These anchors are provided at an angle into the ground.

ROCK ANCHORING

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