

**Chamundi construction**

An Internship Report Submitted in partial fulfillment of the  
Requirement for the degree

Of

**Diploma (Civil Engineering)**

By

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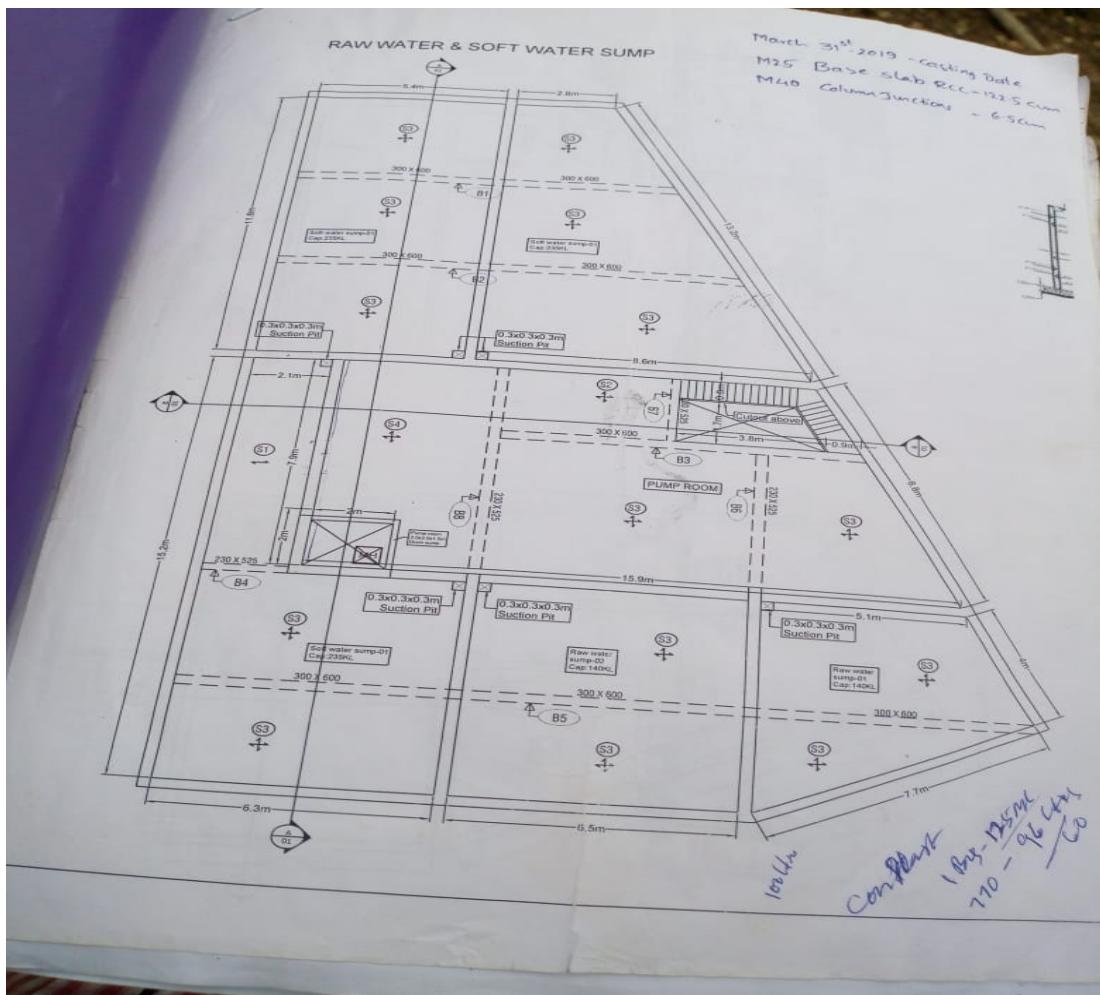
## **DETAILS OF THE SITE :**

My company name is **Chamundi construction**. And our site is near Hyderabad dist. and the total area of my land is 9Acres. On my site, there are 3BHK and duplex houses.

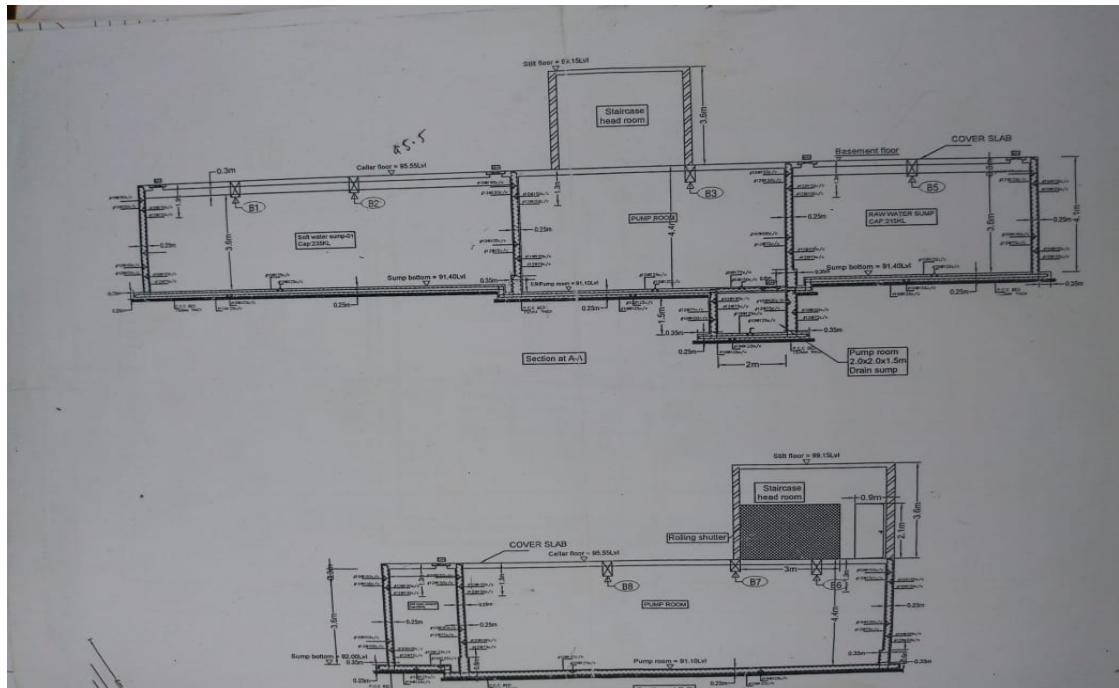
## SUMP :

A sump collects water that is building up underground so that it can be pumped away from a construction site or finished building. The source of water for a sump is normally groundwater, but wastewater generated from appliances can also be routed to a sump.

Sumps are emptied by pumping their contents to a sewer network using a sump pump. Sumps are used in both trenchless and conventional construction projects and applications and can be used during the dewatering of a construction site.



## Cross section:



## Flanges:

A flange can also be a plate or ring to form at the end of a pipe when fastened to the pipe (for example, a closet flange). A blind flange is a plate for covering or closing the end of a pipe. A flange joint is a connection of pipes, where the connecting pieces have flanges by which the parts are bolted together.



A **flange** is an external or internal ridge, for attachment to another object, as the **flange** on the end of a pipe, steam cylinder, etc. to pass water from one chamber to another chamber.

## **STARTER :**

As the name suggests, starter bars are reinforcing bars cast into a member to give a lapped connection to further reinforcement in another concrete element to be cast against it.



## SUMPPIT:

A temporary pit which is constructed to trap and filter water for pumping into a suitable discharge area. A perforated vertical standpipe is placed in the center of the pit to collect filtered water. The purpose of this practice is to remove excess water in a manner that improves the quality of the water.



## **Septic treatment plant:**

**Septic treatment plant** is the process of removing waste material from municipal water, containing mainly household sewage plus some industrial wastewater. Physical, chemical, and biological processes are used to

remove contaminants and produce treated wastewater that is safe enough for release into the environment. A by-product of sewage treatment is a semi-solid waste or slurry, called a septic treatment plant. The sludge has to undergo further treatment before being suitable for disposal or application to land is known as a Septic treatment plant



### **Sump walls:**

Sump Walls in buildings form a fundamental part of the superstructure or separate interior chambers of sump rooms, sometimes



to distribute the load from slab to foundation. The Purpose so the Wall Buildings Are support roofs, floors and ceilings the building. In addition, the wall may in sump various the load is transferred to the foundation through posts, columns or studs. Framed walls most often have three or more separate components: the structural elements, and finish elements or surfaces. M25 grade of concrete used.

### **GROUTING IN WALL:**

Grout is any viscous (thick and sticky liquid that does not flow easily), packable material that can be used to fill the space between two elements for bonding them or to create a water-tight seal.

Grout is generally a mixture of cement, sand, and water used to fill gaps. They are used in the repair of concrete cracks, filling seams and gaps in tiles, and sealing and filling gaps for waterproofing, and for soil stabilization. It is also used for giving extra strength to the foundations of load-bearing structures.

Grouts are used in a variety of applications such as the repair of cracks, water-stopping in submerged structures such as canals, tunnels, etc., filling seams between tiles, and



stabilizing soil. Here we have briefed about the types of grouts used in the repair of cracks.

Grouting is basically a process of injecting a pumpable material into a structure to change its physical properties.

Different types of grouting based on the material used are cement grouting, chemical grouting, and bituminous grouting. Sometimes resins are also used as grout material.

Grouting is generally used to fill the cracks and voids in soil or rock.

Also, it is used to strengthen the soil and make it impervious

### **HACKING:**

This is the process of roughening soil background before plastering, to provide bond or key.



## **WATER PROOFING FOR EXTERNAL WALL:**

There are cracks on the external walls through which rainwater is seeping inside the sump chamber and ruining inside the sump wall.



## **Cement plastering single coat of 12 mm thick:**

Screeds are developed with the help of plumb-bob to act as gauges to maintain uniform thickness of the mortar the mortar is dashed against the prepared surface between screeds.

Plastering is a process of covering tough surfaces and uneven surfaces with plastic material called plaster or mortar to obtain even, smooth, regular, clean & durable surface. Plastering is a process of covering tough surfaces and uneven surfaces with plastic material called plaster or mortar to obtain even, smooth, regular, clean & durable surface.



## **FORMWORK (SHUTTERING)**

Formwork (shuttering) is a temporary mold to provide support to fresh concrete when placed in structural member until the concrete has set. This helps the structural member to gain sufficient strength to carry its self-load and load from other members.

### **types of structural formwork or shuttering :**

Formworks are used in the construction of reinforced concrete foundations, columns, slabs, walls, etc., and these are named as follows:

- Footing Forms – Formworks for foundation
- Column Forms – Formwork for RCC Column construction
- Wall Forms – Formwork for RCC wall construction
- Floor Forms – Formwork for construction of RCC Slabs

### **SLAB FORMWORK:**

Shuttering material you use for making concrete form work, the main purpose of concrete form work is same that is temporary support cast in situ concrete including all live load. So the purpose of checking form work is that the form is capable enough to carry the load till concrete gets desired strength. Another purpose of concrete form is to give hardened concrete a shape without losing its quality. Although purposes of concrete form work are constant yet form work checklist is different for different shuttering materials used in concrete form.

## **Checklist of concrete formwork for slab-**

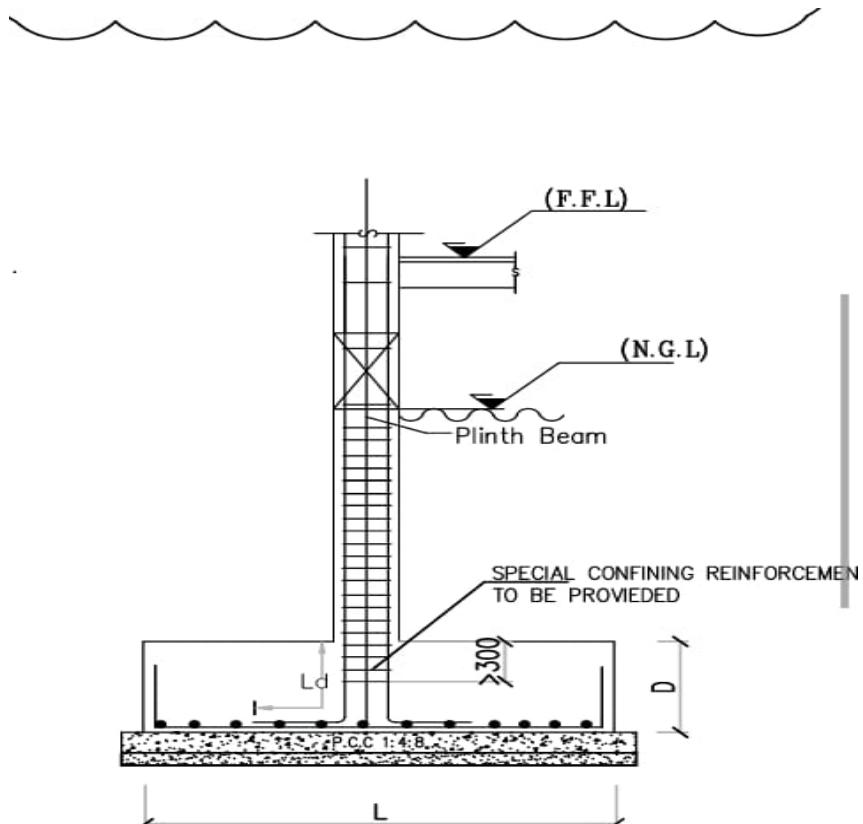
- 1) Check the center-to-center distance single room span
- 2) Small *runner* spacing is not more than 25mm.
- 3) Check foam is used in every shutter joint to prevent water leakage.
- 4) Check oil is applied to the form.
- 5) Check the slab level in all directions.
- 6) Check beams are straight and placed in position as per the drawing.

## SUPERSTRUCTURE:

### ISOLATED IN SQUARE FOOTING

Isolated footing is defined as the footing, which is provided beneath the column to distribute the loads safely to the bed soil. This kind of footing is used to support single-columns and when the columns are arranged relatively at long distance.

Shallow foundations are constructed where soil layer at shallow depth (up to 1.5m) is able to support the structural loads. The depth of shallow foundations is generally less than their width.



CONFINING REINFORCEMENT IN FOOTINGS

## PLANE CONCRETE CEMENT:

**Plain cement concrete** is a mixture of **cement**, fine aggregate (sand), and coarse aggregate without steel. PCC is an important component of a building that is laid on the soil surface to avoid direct contact of reinforcement of **concrete** with soil and water with the grade of M20

## PROVIDING BAR BENDING SCHEDULE ON PCC:

The **bar bending schedule** (BBS) of a concrete **footing** provides the reinforcement details and the total steel quantity required for the **footing** construction. The BBS and quantity of steel reinforcement required for a simply isolated **footing** are calculated and explained by means of a workout example.

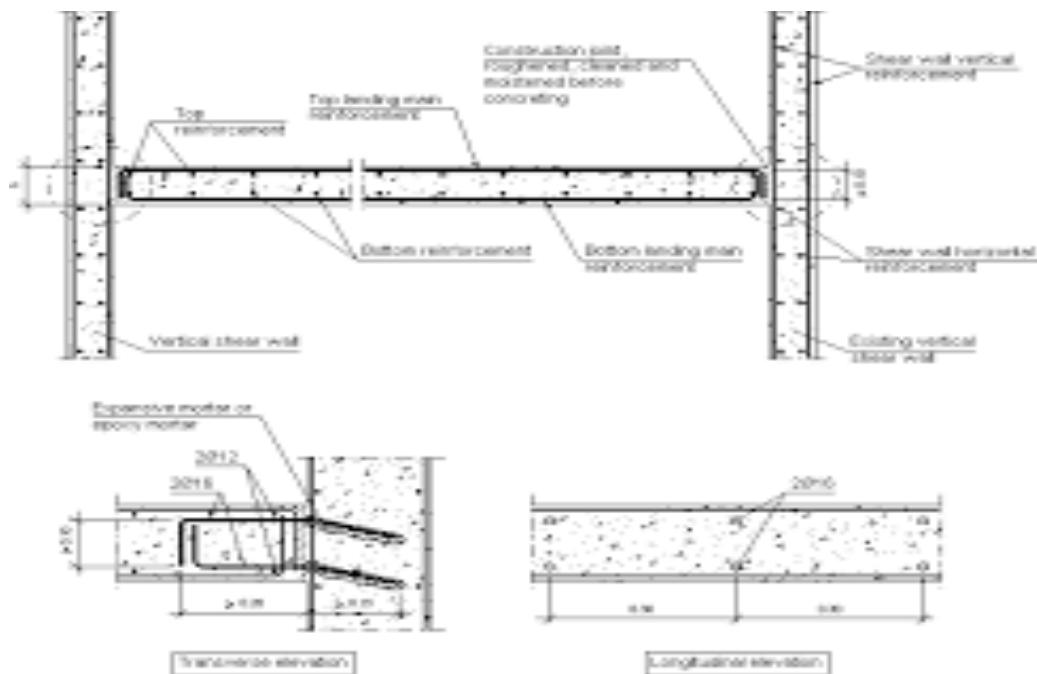
### PLINTH BEAM:

A plinth beam is a beam in a framed structure provided at or above (sometimes below) ground level that takes the load of the wall built on top of it. Most other beams are subjected to loads not only from walls but also the load from the slab, such as dead loads (self-weight of slab, floor finish est.) and live loads. Plinth beams also serve another indirect purpose - they reduce the length of the columns thereby reducing their effective length and slenderness.



## DOWEL:

Dowel bars are short steel bars that provide a mechanical connection between columns without restricting horizontal joint movement. They increase load transfer efficiency by allowing the leave slab to assume some of the load before the load is actually over it. This reduces joint deflection and stress in the approach and leaves slabs. It project columns' bottom area is known as a dowel.



## CONSULTATION FOR SOIL TEST:

**Soil tests** may refer to one or more of a wide variety of soil analyses conducted for one of several possible reasons. Possibly the most widely conducted soil tests are those done to estimate the plant-available concentrations of plant nutrients, in order to determine fertilizer recommendations in agriculture. Other soil tests may be done for engineering.

### STARTERS:

The name itself suggests that it's a starting point. The starter is usually a casting of concrete material having the same width and length as the column section and a relatively smaller height of around 10 cm. It is casted in such a way that an equal cover is left surrounding the reinforcement bars of the column and then the next activity is to put shuttering column hence this starter helps mainly to adjust the formwork of a column vertically and ultimately sufficiently gap is remained between column reinforcement and shuttering. To get the correct position of the columns located in the below slab, we mark starters, so that we are able to get the column lines in a number of floors easily.



### FORMWORK OF COLUMN:

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Column Formwork is to be designed to be able to accommodate relatively high fresh concrete pressures as comparatively small

cross-sections are concreted quickly. Therefore, the joints in particular are to be formed very carefully and tightly sealed.

Column formwork is comprised of panel formwork elements or based on individual formwork girders; steel formwork is also available.

The quick and easy adjustment of the cross-section and height with minimum effort and the least possible number of system components is an important criterion for the cost-effectiveness of a column formwork system. In addition, columns with the same cross-sections are frequently required to be constructed in large numbers so that the systems need to be quickly transported to the next place of use without any assembly effort. Furthermore, system solutions have been developed with which the high demands frequently placed on concrete surfaces, evenness or the sharp edges of corners can be fulfilled.



#### LAPPING ZONE IN COLUMN:

A lap is required when two pieces of reinforcing bar (rebar) are overlapped to produce a constant line of rebar. The length of the lap fluctuates according to the concrete strength, the rebar grade, size, and spacing.

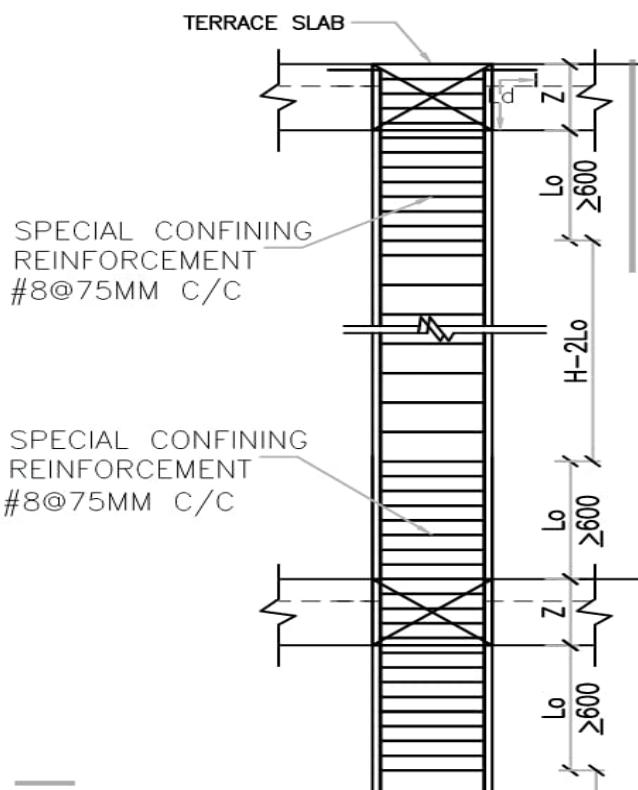
The objective of the lap is to transmit the load from one bar to another bar as well as retain continuity. The positioning of the lap is dependent on the bending moment of the column.

Lap length refers to the length of the overlap of the bar necessary to securely transmit stress from one bar to another. Lap length varies on the basis of tension and compression zones and mostly relies on the grade of concrete and steel. Development length refers to the length of the bar necessary to transmit stress from steel to concrete.

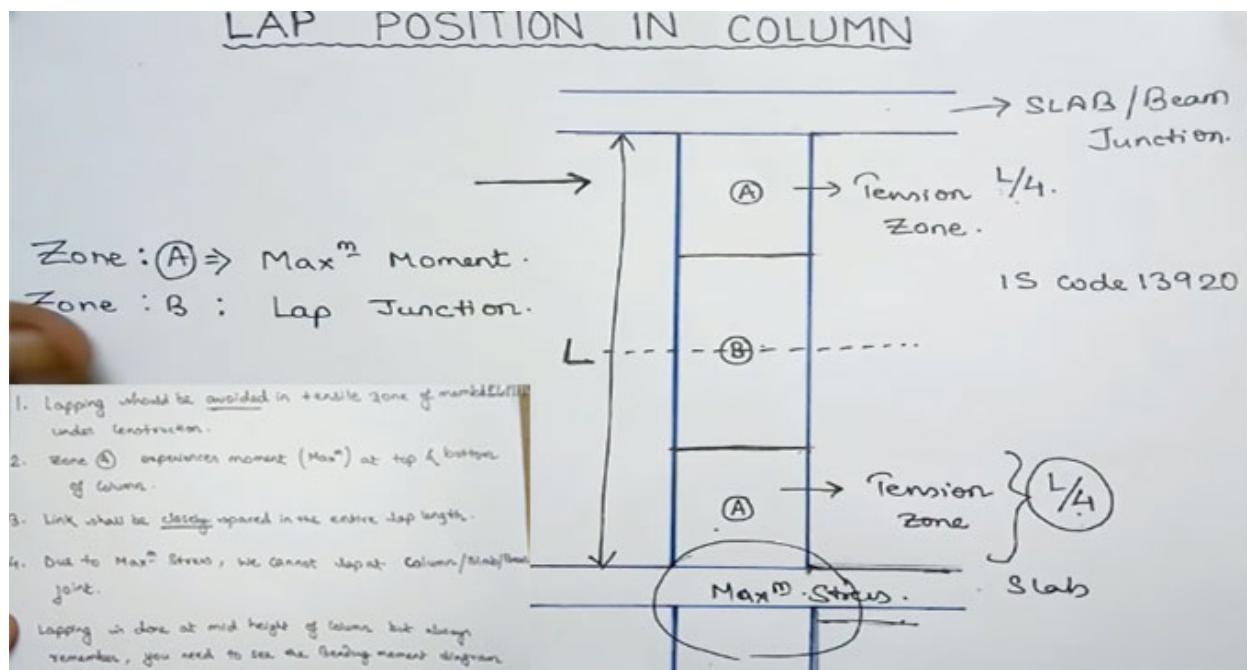
**Vertical bars of Columns should be lapped in the regular zone (Mid-height) only and it should be spread out i.e. not surpassing 50% of the bar is lapped at one section. Besides, the lowest clear vertical distance among lapped bars should be 0.25 times the lap length.**

| Diameter mm | M25 | M30 | M40 |
|-------------|-----|-----|-----|
| (1)         | (2) | (3) | (3) |

|    |      |      |      |
|----|------|------|------|
| 8  | 390  | 365  | 290  |
| 10 | 490  | 455  | 360  |
| 12 | 590  | 540  | 435  |
| 16 | 785  | 720  | 570  |
| 20 | 980  | 910  | 715  |
| 25 | 1225 | 1135 | 900  |
| 32 | 1570 | 1450 | 1145 |

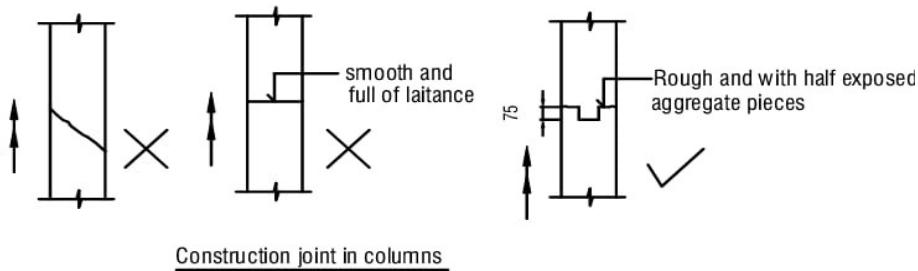


There are two basic forces at work in any structural element: **compression** and **tension**. **Compression** is the force applied when two objects are pushed together. ... The force crushing down on the bottom stone is **compression**. **Tension** is the force applied when an object is pulled or stretched.



### construction joint in columns:

Following figure shows correct method of providing construction joint in column. Construction joint in column shall not be provided with smooth surface or inclined surface. The top surface of the column should be rough with parts of coarse aggregates being seen.

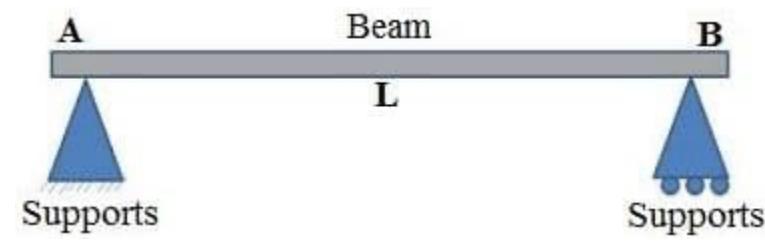


## Beam:

Different types of beams are used in construction of building and structures. These are horizontal structural element that withstands vertical loads, shear forces and bending moments. Beams transfer loads imposed along their length to their end points to walls, columns, foundations, etc.

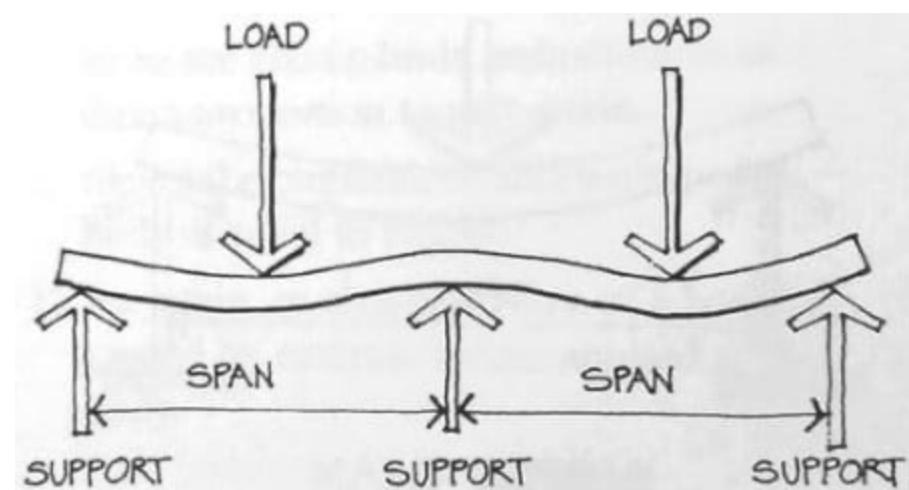
### 1. Simply Supported Beam

It is the one of the simplest structural elements that both ends are rest on supports but is free to rotate. It contains pinned support at one end and roller support at the other end. On the basis of assign load, it sustains shearing and bending.



### Continuous Beam

A continuous beam has more than two supports distributed along its entire length.



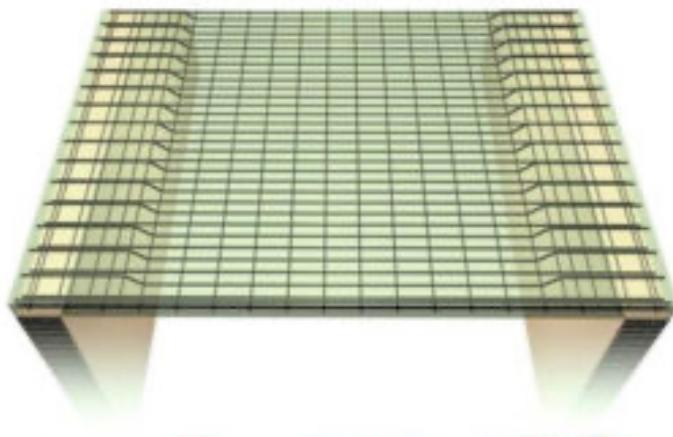
## Slab:

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

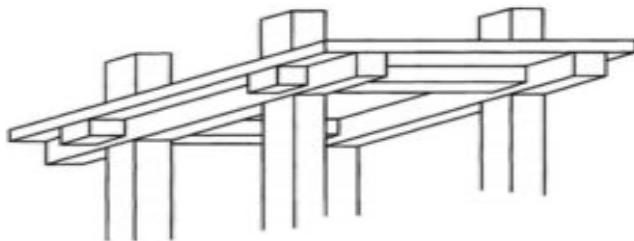
A thick concrete slab supported on foundations or directly on the subsoil, is used to construct the ground floor. These slabs are generally classified as *ground-bearing* or *suspended*. A slab is ground-bearing if it rests directly on the foundation, otherwise the slab is suspended. For multi-storey buildings, there are several common slab designs.

## Difference between one way and two way slab:

One way slab is a slab which is supported by beams on the two opposite sides to carry the load along one direction. In one way slab, the ratio of longer span (l) to shorter span (b) is equal or greater than 2, i.e. longer span (l)/Shorter span (b)  $\geq 2$



When a reinforced concrete slab is supported by beams on all the four sides and the loads are carried by the supports along both directions, it is known as two way slab. In two way slab, the ratio of longer span (l) to shorter span (b) is less than 2.

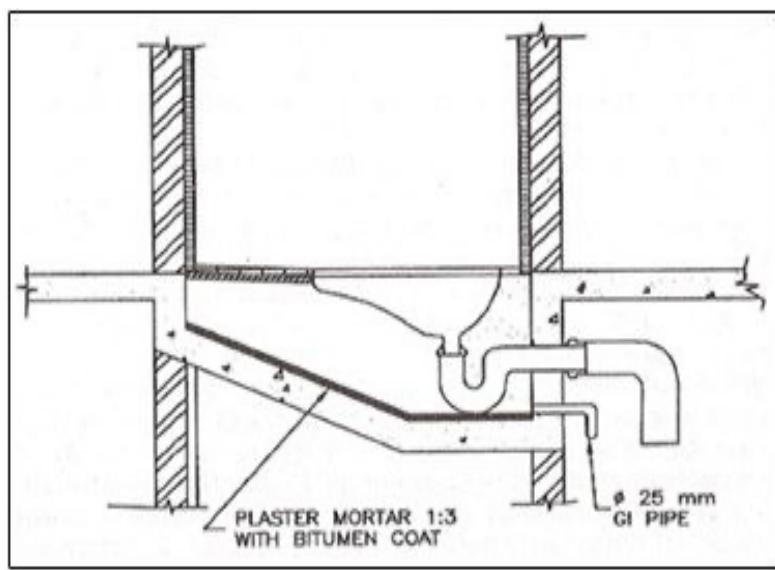


Two way slab

[www.dailycivil.com](http://www.dailycivil.com)

### Sunken:

Sunken slabs are slabs which are cast at a certain depth (200 or 300 mm or any other depending on design) below normal floor level. This extra depth is used for placing pipes and utility ducts. And then space is filled with sand or other light weight materials until the normal floor level.



## **USES OF SUNKEN SLAB:**

Sunken slabs can be used in the following locations:

1. Bath room/toilet/latrine /wash area floor: The floor trap and the drainage lines can be taken within the sunken portion.
2. Here the beams are inverted so that the beams do not protrude down side and a plain surface is available.
3. Mid Landing on a staircase: The end beam is designed as an inverted beam so that there is adequate head room available below the landing.

### Reinforcement of slab:

Reinforcement detailing of a slab is done on its support conditions. Slab may be supported on walls or beam or columns. Slab supported directly by columns are called flat slab.

Slab support on two sides and bending takes place predominantly in one direction only is called one way slab. On the other hand, when slab is supported on all four sides and bending takes place in two directions are said to be two way slabs.

The slabs having ratio of longer length to its shorter length ( $L_y/L_x$ ) greater than 2 is called one way slab otherwise as two way slab. In one way slab main reinforcement is parallel to shorter direction and the reinforcement parallel to longer direction is called distribution steel. In two way slab main reinforcement is provided along both directions.

Slabs could be simply supported, continuous or cantilever. In two way slab the corners may be held down by restraints or may be allowed to lift up. Additional torsion reinforcement is required at corners when it is restrained against uplifting.

Minimum clear cover to reinforcements in slab depends on the durability criteria and this is specified in IS 456-200. Generally 15mm to 20mm cover is provided for the main reinforcements. Alternate main bars can be cranked near support or could be bent at  $180^{\circ}$  at the edge and then extended at the top inside the slab as Curtailment and cranking of bars.

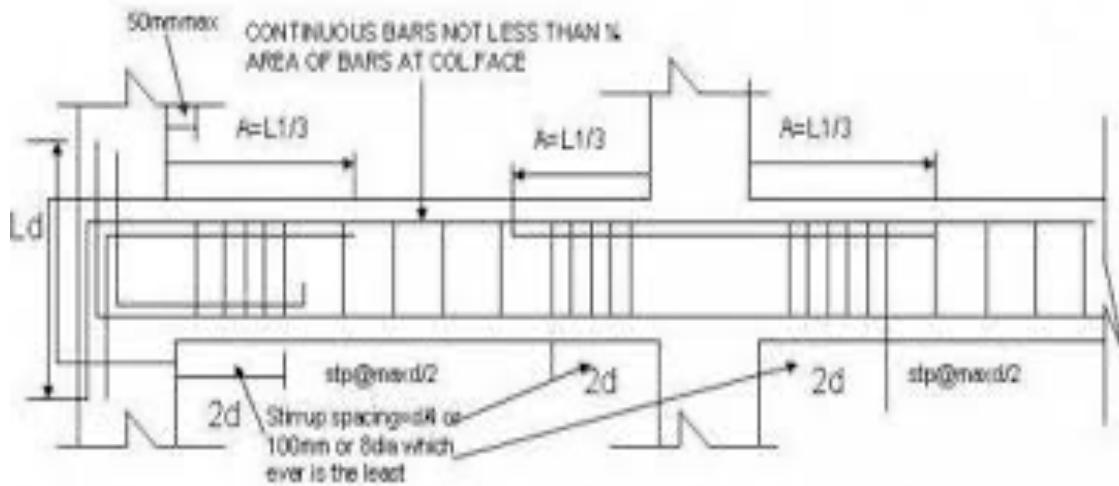
The maximum diameter of bar used in slab should not exceed 1/8 of the total thickness of slab. Maximum spacing of main bar is restricted to 3 times effective depth or 300 mm whichever is less. For distribution bars the maximum spacing is specified as 5 times the effective depth or 450 mm whichever is less.

Thickness of the slab is decided based on span to depth ratio specified in IS456-2000. Minimum reinforcement is 0.12% for HYSD bars and 0.15% for mild steel bars. The diameter of bar generally used in slabs are: 6 mm, 8 mm, 10 mm, 12mm and 16mm.

## Reinforcement detailing in beams

- Beam carries transverse external loads that cause bending moment, shear forces and in some cases torsion
- Concrete is strong in compression and very weak in tension.
- Steel reinforcement counter act tensile stresses in reinforced concrete beams.
- Mild steel bars or Deformed or High yield strength deformed bars (HYSD) used.
- HYSD bars have ribs on the surface and this increases the bond strength at least by 40%

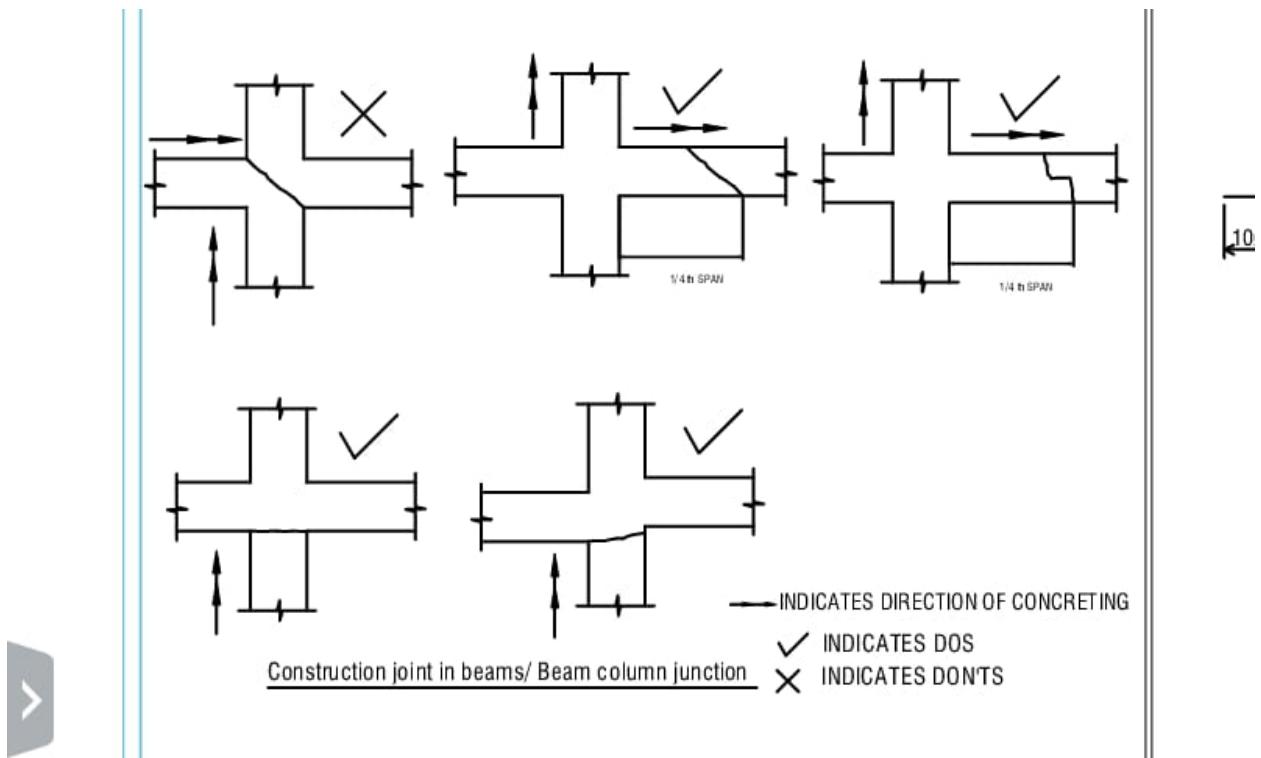
When a beam is designed with slab, called slab beam or Tee-beam, reinforcements are provided as shown in figure below. The beam is generally designed as simple beam but additional reinforcement provided on top with slab to make it behave like a Tee-beam.



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### **Construction Joints in Beams and Beam-Column Joint:**

Following figure shows the typical construction joint to be provided in beams and beam column joints.



It can be seen that construction joint in the beams should be provided at  $1/4$  the span of beam from the face of the column and should not be provided on the column.

For a beam column joint, the construction joint for the column should be provided after construction of some length of column above beam level, and for the beam, it should be provided at a span of  $1/4$ th from the face of the column.

### CURING:

Curing of concrete is defined as providing adequate moisture, temperature, and time to allow the concrete to achieve the desired properties for its intended use. This would mean maintaining a relative humidity in the concrete of greater than 80 percent, a temperature greater than 50 degrees Fahrenheit, and for a time

typically ranging from three to 14 days depending on the specific application. When these recommendations are properly specified and performed in the field, the final properties of the concrete mixture will be achieved.

### Methods used for curing of concrete:

Curing can be described as keeping the concrete moist and warm enough so that the hydration of cement can continue. More elaborately, it can be described as the process of maintaining satisfactory moisture content and a favorable temperature in concrete during the period immediately following placement, so that hydration of cement may continue until the desired properties are developed to a sufficient degree to meet the requirement of service. If curing is neglected in the early period of hydration, the quality of concrete will experience a sort of irreparable loss.

- 1) Pounding method
- 2) Spraying method
- 3) Water curing method

|    |  |         |
|----|--|---------|
| a. | Vertical formwork to columns,<br>walls, beams.   | 16-24 h |
| b. | Soffit formwork to slabs<br>( Props to be refixed immediately<br>after removal of formwork ) | 7 days  |
| c. | Soffit formwork to beams<br>( Props to be refixed immediately<br>after removal of formwork ) | 7 days  |
| d. | Props to slabs(excluding<br>flat slab with drops)  |         |
|    | 1) Spanning up to 4.5 m  | 7 days  |
|    | 2) Spanning over 4.5 m   | 14 days |
| d. | Props to beams and arches  |         |
|    | 1) Spanning up to 6 m  | 14day   |
|    | 2) Spanning over 6 m   | 21days  |
|    | 3) Cantilever beams /slab  | 28day   |

## Ramp in building construction:

Ramps are sloped pathways used both inside and outside buildings used to provide access between vertical levels. Ramps provide an alternative to stairs for wheelchair users, people with mobility issues and people with prams, bicycles and other wheeled items.

The gradient, slope or steepness of a ramp is the angular relationship between its rise (vertical height) and its horizontal projection or length (run), often expressed as a ratio. The rise may be set at a unit of one, so that, for example, a slope of 1:20 means that as each dimensional unit of height rises or falls, the dimensional unit of length runs out by 20 units. A ramp that has too steep a slope will prove difficult for people to use and could even be

unsafe, whilst a ramp with too shallow a slope can require excessive length.

There are a wide range of issues that must be considered in the design of ramps, including:

- The appropriate steepness, length and width.
- The distance between landings.
- Likely users and the mode of assistance they are likely to require.
- Surface materials.
- Placement of door handles and the swing direction of doors.
- Compliance with the building regulations.

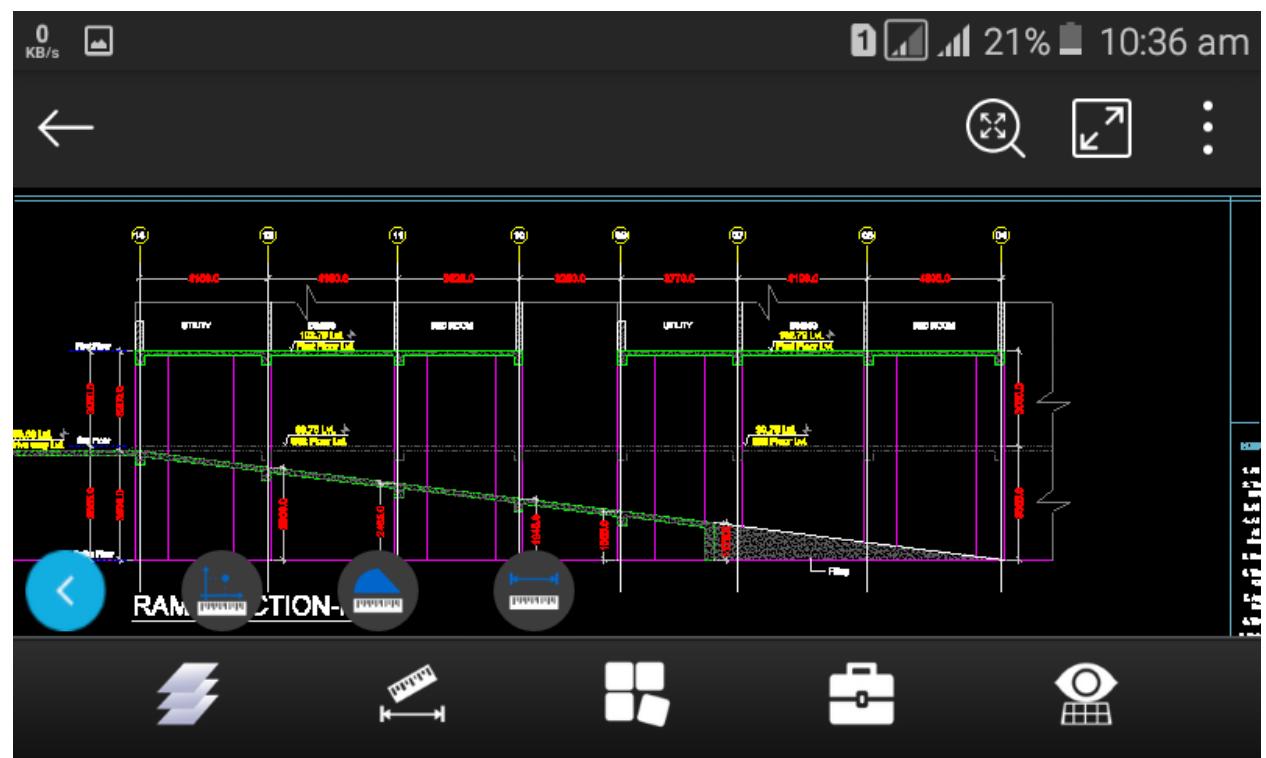
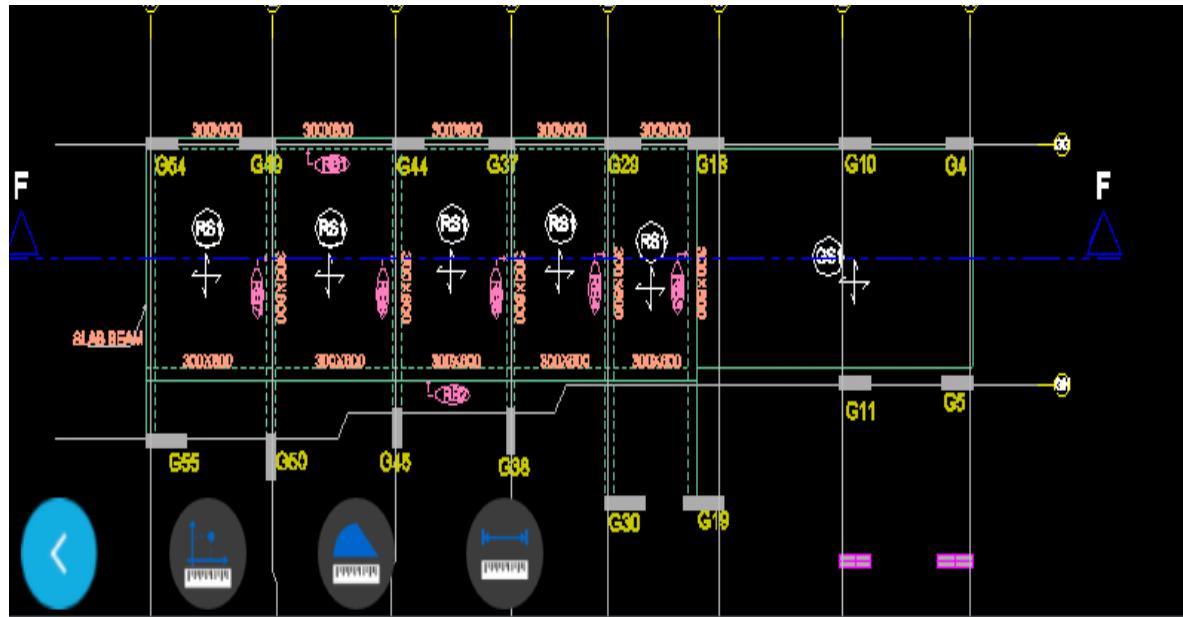
Any walkway or surface with a slope greater than 1 inch for every 20 inches of run is a ramp. When you are making a concrete ramp, you must use a slope less than 1 inch for every 12 inches in order to meet the safety standards as set by There may be additional regulations in your community, so check with your local building authority. Although all ramps are slightly different in size, there are some basic techniques to observe when making a concrete ramp. You should have some knowledge of concrete production before you begin.

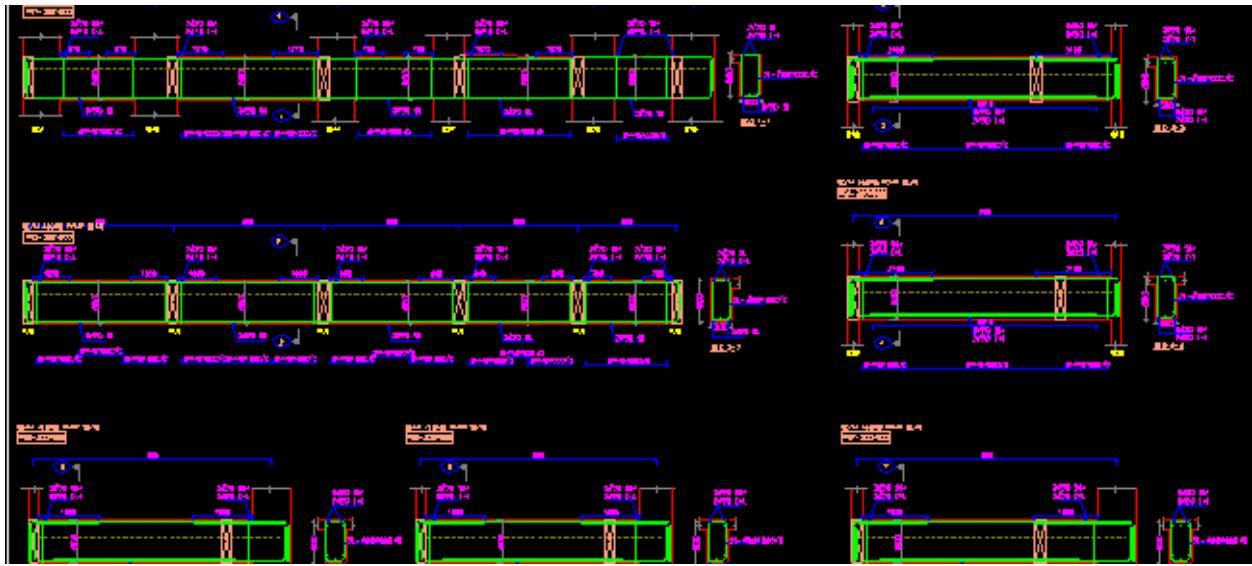


### Level for ramp:

First level - last level = high between two level

High between two level / length =  $0.a \times$  bottom level to the column distance.





### Ramp beam:

**Post-and-Beam:** A majority of **ramps** built at homes are of the "post-and-beam" **construction** type. ... Horizontal "beams" are then attached between posts to frame the perimeter for landings, and between ramp way posts to create the running surface support.