CHAPTER:- 1

ABOUT COMPANY

Omaxe is one of the leading real estate companies . Having spread its footprints in 12 States across 39 cities in India has already delivered more than 140 projects and is currently executing 52 projects - 15 Integrated Townships, 2 Hi-Tech Townships, 16 Group Housing projects, 7 Shopping Malls & Commercial Complexes, 2 Hotel projects and 10 EPC contracts, roads & bridges construction.

The genesis of the company goes back to 1989 when first generation entrepreneur and civil engineer Mr. Rohtas Goel founded Omaxe Builders Private Limited to undertake construction & contracting business. In 2001, the Company made inroads into the evolving real estate sector and in 2006, rechristened itself as Omaxe Ltd. In 2007 the company got listed on Indian bourses (BSE and NSE). Within a short span, the company emerged as one of the largest real estate companies marked by some of the renowned and hugely appreciated projects, awards and accolades and more importantly the trust of the people.

In order to leverage its expertise in construction, the Company diversified into infrastructure sector in 2007 through its wholly owned subsidiary Omaxe Infrastructure and Construction Ltd (OICL) and in 2010 forayed into Highway and Bridge construction.

Over the years, Omaxe has made a mark with some landmark projects and engineering marvels in metros. Seeing an opportunity in tier II and III cities, the company made a conscious decision to venture into States like Uttar Pradesh, Madhya Pradesh, Punjab, Haryana, Uttarakhand, Rajasthan to name a few. True to its motto, "Turning Dreams into Reality", Omaxe has completed and delivered more than 74.60 mn sq ft since inception – 31.80 mn sq ft of construction projects and 42.80 mn sq ft in real estate across India.

Today, Omaxe stands tall on the foundation of its values — values of delivering quality and excellent real estate spaces, ensuring customer satisfaction, and redefining lifestyle of people.

For Omaxe, environment protection and innovative architecture are the standards it maintains in real estate development. The company keeps pace with the progress in construction technology and is working with finest architects.

The workforce of the Company counts to over 2160 with varied skill sets, whose expertise is widely recognized in the industry. Not only is Omaxe a profit-making company but has also been, over the years, doing Corporate Social Responsibility (CSR), through Omaxe Foundation. The Company's success, over the years, bears testimony to its customer-centricity.

Omaxe now brings forth its second tower INTERNATIONAL TRADE TOWER of Office spaces. This Business Park is set to revolutionize the place of work by providing spacious air conditioned offices with ample parking spaces and round the clock internet connectivity. This office complex known as the International Trade Tower shall be a pioneer in its own sense, being the tallest structure of the region and shall change the perception of offices in and around Chandigarh.

CHAPTER.2

INTRODUCTION TO THE PROJECT

It takes a million dreams to build a Home and it takes a lot more to have a home at The Resort. Yes, its only at Omaxe where life is a never ending holiday and a resplendent carnival where every day brings in something new and exciting.

New Chandigarh Mullanpur is regarded to a new pre planned city being developed next to The city beautiful CHANDIGRH. Mullanpur new Chandigarh is India's first pre planned city.

Speciality of project :-

- Commercial
- Residential

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View of project after completion

Fig(1)

PROJECT:- Holiday Inn.

Its a G+25 storey building with hotel and office accomodation in a same building .It is a 5 star Hotel with In-door swimming pool.

Holiday Inn is one of the most established and recognizable brands globally. It's the only hotel brand that has been named the Best Mid- Market Hotel Brand in "Asia Pacific" and "Worldwide" by Business Traveller magazine for 8 years in a row.

In India - Holiday Inn is not just thought of as a business hotel, but is also used for leisure stays. There will be two towers with G +14, to be retained by the 5 Star Hotel with indoor swimming pool and another tower of G+22 for Service Apartments and Office Suites. Project is to be developed over 7 acres of land. All across the country the service apartments have been a success where there has been a medical facility in the vicinity.

AREA

- 3BHK(option 1) area 1530 to 1580 sq. ft
- 3BHK(option 2) area 1820 to 1885 sq. ft
- 3BHK(option 3) area 2300 sq. ft
- 4BHK area 2760 sq. ft and 4850 sq. ft

SAILENT FEATURES OF HOLIDAY INN

- Fully secure group housing with 3-Tier Security system.
- Each Lift operates by bio matrix system.
- WiFi facility will be available in entire society.
- Every tower has his individual gym in each basement.
- Lotus Shape Club House will be great attraction with all Indoor & outdoor Games.
- 80% Area will open & maintains with beautiful Land Scalping & Water Body.
- Electronic Security.
- Intercom Facility.

- Fire Alarm.
- Feng Shui / Vaastu Compliant.
- Recreation.
- Park.
- Near to Proposed Amusment Park / Film City by U.T Government.
- Going to be North India ’s first ECO Township .

PROXIMITY

- Near to Botanical Garden
- Pollution free environment
- Near to Proposed Bus Stand Mullanpur
- Tree-lined 100 metre road on both sides
- Beautiful view of mountains Shivalik Hills
- Surrounded by 30 Kms of reserved greens
- Only 3.5Kms from sector 38 west ,Chandigarh
- Omaxe Chandigarh Extension has a very good connectivity with Baddi ,Nalagarh and Mohali

SITE PLAN

Fig(2)

Fig(3)

VIEW OF THE PROJECT AT THE BEGINNING OF INDUSTRIAL TRAINING

Fig(4),(5)

STEPS OF CONSTRUCTION WORK

1) **Types of building**:-First select the type of building whatever we want to construct, depending on the need like villas, flats, apartments, penthouses, malls, industrial buildings or group housing.

2) **Site Selection**: - Site for construction of building can be selected according to the space required and whatever the area and the people demands, in accordance with the population and bearing in mind the geographical and industrial point of view for further development.

3) **Survey**: - By survey we measure all the dimensions and plot the real position or place wherever we want to construct our structure. This includes many aspects like financial survey, economical survey, topographical survey etc. etc.

4) **Site Investigation**: -By this we investigate about the type of the soil, bearing capacity of the soil, nature of the bed, the topographical feature of the area, which in turn helps the structural designer to design the footing for our project.

5) **Architectural Drawings**: - Architectural drawings are the heart to the project, which is the master document or the copy with which we have to stick completely and do accordingly; these drawings have all the plans and construction details about the particular project.

6) **Structure Design**: - Structural Designer is that person who gives life to an Architectural Drawing; it infuses the correct data and interpret the correct meaning which an Engineer knows. He suggests the type of foundation, columns, beams and slabs etc. which are needed for the construction and also provides the amount of steel and its size.

7) **Construction**: - After all these steps, Construction of the proposed project starts.

CHAPTER.3

MULTI STOREY BUILDINGS

A Multi Storey Building that has multiple floors above the ground in the building.Multi storey building aim to increase the floor area of the building without increasing the area of the land the building is build on it. Hence saving land and in most cases, money (depending on material used and land prices in the area).

Types of Multi Storey Buildings

a) Commercial Buildings

b) Educational buildings

c) Residential buildings

d) Industrial buildings

Parts of Building

A building can be divided into two parts:-

a) Sub Structure

b) Super Structure

a**) Sub Structure** :- The part of the building constructed beneath the ground level is known as Sub Structure. For example: Foundation etc.

b) **Super Structure:-** The part of the building constructed above ground level is known as super structure. It is second part of building. All the activities of building construction take place after the making of sub structure. Flooring, walls, columns, roofing are the example of super structure of the building.

COMPONENTS OF BUILDING

(a) **Foundation:-** It is the lowest part of a structure below the ground level which is direct contact with ground and transmitted all the dead, live and other loads to the soil on which the structure rests.

(b) **Plinth:-** The part of the building above the ground level and the floor immediately above the ground is called plinth.The purpose of the plinth is to stop the entry of rain water from the ground level.

(c) **Walls:-** Walls are provided to enclose or divide the floor space and desired pattern in addition wall provided privacy security and give protection against sun, rain, cold and other undesired affect to the weather.

(d) **Column:-** A column may be defined as an isolated load bearing member, the width of which is neither less than its thickness. It carries the axially compressive load.

(e) **Floors:-** Floors are flat supporting element of a building. They divided a building into different levels.Therby creating more accommodation on a given plot of land. The basic purpose of a floor is to provide a firm and other items like stores, furniture, equipment etc.

(f) **Roof:-** It is uppermost component of the building which mainly cover the space below it and acts a protection from rain, snow, and sun is called roof.

(g) **Stair:-** A structure consisting of the number of steps provided for movement from one floor to another or connecting one floor to another floor is called stair.

CHAPTER.4.

MATERIALS USED IN CONSTRUCTION

1.STEEL USED IN COLUMNS

- 32 diameter (in mm)
- 25 diameter (in mm)
- 20 diameter (in mm)

Fig(6,7)

2.STEEL USED IN SLABS

10 mm diameter @150c/c

8mm diameter @100c/c

3.CONCRETE

Transportation of concrete

It is the process of carrying the concrete mix from the place of mixing to final position of deposition. In this time factor is involved, therefore, it is of utmost importance for maintaining quality of concrete. The concrete should be transported as quickly as possible so that it may not become stiff and thereby reducing the loss of water by evaporating. The concrete mix was transported at site by concrete mixer truck.

Fig(8)

Placing of concrete

It is the process of depositing the concrete in its required position. It is very essential place concrete carefully for maintaining good quality surface. If concrete is not placed properly then segregation will occur. Before the placing of concrete it is very important to check the framework and shuttering.

Compaction of concrete

It is the process to consolidation the concrete after the placing it in position. It is preformed to eradicate air holes for obtaining maximum density. It is also confirms an intimate contact between concrete and the steel reinforcement and other embedded part. The mix should be workable otherwise it will be cause segregation, lower density, excessive laitance at the top and weakness on account of the presence of excess water. The strength of concrete will reduce due to presence of more air voids. While compacting it should be ensured that there is no disturbance to the reinforcement and frame work is not displaced and damaged. Compaction should ne uniform otherwise concrete becomes porous and non uniform. The strength of concrete will also reduce. Compaction of concrete is done by Vibrator and the time is within 15sec to 60sec at one place.

- **M40 concrete** is used for beams and columns. In columns lower levels have more load and upper levels have lesser loads. M40 at lower level which allow some reduction in size which will help to economise upper level column and M20 at upper levels.

- **M25 concrete** for slabs. M25 grade of *concrete* nominal mixing ratio of 1:1:2 (cement: sand: course aggregate) is *used*. This is generally the case for small RCC bridges span upto 25 meters.

CHAPTER.5

CASTING AND FRAMEWORK

Framework (steel) is done as per according to details provided in drawing of respective floor. After the completion of frame work, level check is performed for slabs and casting is done using M25 conc.Vibrator is used to ensure proper consolidation.

After drying up of slabs, curing of slabs is done to help conc. gain its strength. 20 mm cover is provided for slabs. Cover blocks and chains are used.

CASTING OF COLUMNS

Fig(9)

The frame work of columns designed specifically as they are major component of whole structure. Frame work of columns is divided in zones i.e. zone A and zone B. Zone A is area close to beams and mid column area is zone B. Stirrup design i.e. ringshave smaller c/c distance in zone A then zone B as they have to resist moments built up close to beams and to bear shear force. Main steel resists the bending moment

Before casting of columns layout of floor is done to make sure proper alignment is proper.Plump bob is used as a vertical line of reference to make sure proper vertical axis of column is Ok.

Apparatus used for casting of columns :-

- Ply boards

- Shuttering clamps
- Tie rods
- Round cover blocks

Fig(10)

Column casting is removed after 24 hrs.

Couples is used to join two threaded steel rods.

Lap is provided to join unthreaded steel rods , formula used :50D (D=dia)

It takes atleast 15 days (min) to complete one floor of building and the whole process of shuttering ,Steel frame work for columns, beams and slabs, then level check of slabs, than casting of slabs, beams and columns(than layout of columns). Curing is repeated for every floor.

CHAPTER.6

BEAMS

Definition: - A beam is a structural element that is capable of withstanding load primarily by resisting bending. The bending force induced into the material of the beam as a result of the external loads, own weight, span and external reactions to these loads is called a bending moment.

Types of Beams:-

a) **Simply Supported Beam** - A beam supported on the ends which are free to rotate and have no moment resistance.

b) **Fixed Beam** - A beam supported on both ends and restrained from rotation.

c) **Over Hanging Beam** - A simple beam extending beyond its support on one end.

d) **Double Overhanging Beam** - A simple beam with both ends extending beyond its supports on both ends.

e) **Continuous Beam** - A beam extending over more than two supports.

f) **Cantilever Beam** - A projecting beam fixed only at one end.

At site mainly continous beams were used.

Steps of Construction of Beam:-

a) First of all casting the column at the height of the bottom of the beams that lay on the columns.

b) Then check the drawing of the slab beam layout plan. Check the location of the beams. Check the size of beams and the size is check from the drawing of slab beam detail plan. Because of shuttering of beams and shattering of the slab is done in same period. So, it is very important to check properly all about the beams.

c) After the checking, Shuttering work is started.

d) After the completion of the shuttering work reinforcement of the beams are started. All the reinforcement detail is also given in the slab beam detail drawing. Reinforcement are done according on the given specification from the drawing.

e) After the completion of the reinforcement of beams and slab the casting work will be started.

CHAPTER.7

SLAB

Definition: - A large, thick, flat piece of stone or concrete, typically square or rectangular in shape.

Fig(11)

Types of Slabs:-

One Way Slab:- One way slab is supported on two opposite side only thus structural action is only at one direction. Total load is carried in the direction perpendicular to the supporting beam. If a slab is supported on all the four sides but the ratio of longer span (l) to shorten span (b) is greater than 2, then the slab will be considered as one way slab. Because due to the huge difference in lengths, load is not transferred to the shorter beams. Main reinforcement is provided in only one direction for one way slabs.

Two Way Slab: - Two way slabs are the slabs that are supported on four sides and the ratio of longer span (l) to shorter span (b) is less than 2. In two way slabs, load will be carried in both the directions. So, main reinforcement is provided in both directions for two way slabs.

Construction steps for slab:-

a) After the casting of column at desire height, frame works of the beams as well as slab are start by using the shuttering plate.

b) After the shuttering work of the slab and before the starting of the reinforcement firstly oiling the shuttering plates with shuttering oil.

c) After the oiling of shuttering plates, starting the reinforcement of the slab and the reinforcement of the slab done properly according to the specification of the drawing.

d) After the levelling of the plates slab will be casted by use M25 concrete mix. During the casting of slab thickness of the slab will be check place by place with the help of the steel bar having marking at 6" and using the vibrator for proper settlement and finishing the surface of slab.

Technical Data

- Grade of concrete for footing : M25
- Type of Slab : RCC.
- Design slump of concrete : 80-120mm
- Type of Concrete : RMC from Batching plant
- Grade of steel :Fe 500D
- Dia. of steel in footing :10mm &12mm
- Dia. of steel of Columns and beams :16mm, 20mm & 25mm
- Dia. of steel of Strirrup Rings :8mm

Construction Machinery

1. Transit Mixer

2. Welding Machine
3. Concrete Vibrator
4. Concrete Pump

1. Scaffolding:-

Scaffolding, is a temporary structure used to support people and material in the construction or repair of buildings and other structures. Scaffolding has been used since ancient times. There are many kinds of prefabricated, modular system of metalpipes or tubes, although it can be custom made from other materials such as wood and bamboo.

2.Reinforcement :- First of all reinforcement of primary beams is laid and then secondary beams on a certain height above the shuttering according to structural drawing (beam detail). After all beams are tied and are placed on their respective position slab reinforcement is laid according to structural drawing (slab reinforcement detail) and bar bending schedule. Cover blocks are placed in between shuttering and slabs reinforcement. Note: All the section should read carefully and dowel required for any section or staircase should be placed before casting.

3. Levelling of slab :- To check exact level of slab (both bottom and top) a certain level is marked above the finished floor level on columns bars as convenient. A thread is tied throughout that mark on the column bars at the marked level and level of slab (bottom and top) is measured by measuring the perpendicular length from thread level to the top level of slab by the help of measuring tape or a graduated bar.

4.Concrete :- Concrete is a composite consisting of the dispersed phase of aggregates (ranging from its maximum size coarse aggregates down to the fine sand particles) embedded in the matrix of cement paste. But here we are using concrete of M25 grade. They buy concrete from Readymix concrete. They place concrete with the help of concrete pump. Needle Vibrator are used to compact properly.

5.Curing :- Curing of concrete is the term we use for stopping freshly poured concrete from drying out too quickly. The reason that we do this is because if we let concrete dry out of its own accord:-

- The hydration reaction will not complete due to absence of water.

- It will not develop the full bond between all of its ingredients.
- It will be weaker and tend to crack more.
- The surface won't be as hard as it could be.

The drying process is quickest right after the concrete is poured so the first few days are critical. Hot or windy weather makes the drying out process quicker. We MUST in some way control the drying process. Curing for 7 days is required to be done. Compressive strength of properly cured concrete is 80 to 100 per cent more than the strength of concrete which has not been cured at all.

Wet coverings should be placed as soon as the concrete has hardened sufficiently to prevent evaporation and surface damage. They should not be allowed to dry out as they can act as a wick and effectively draw water out of the concrete.

CHAPTER.8

STAIR CASE

Stairs consist of steps arranged in a series for the purpose of giving access to different floors of a building. Stairs are needed for ascending and descending from floor to floor. Thus the space housing stairs is called stair case.

Since a stair is often the only means of communication between the various floors of a building, the location of the stair requires good and careful consideration.

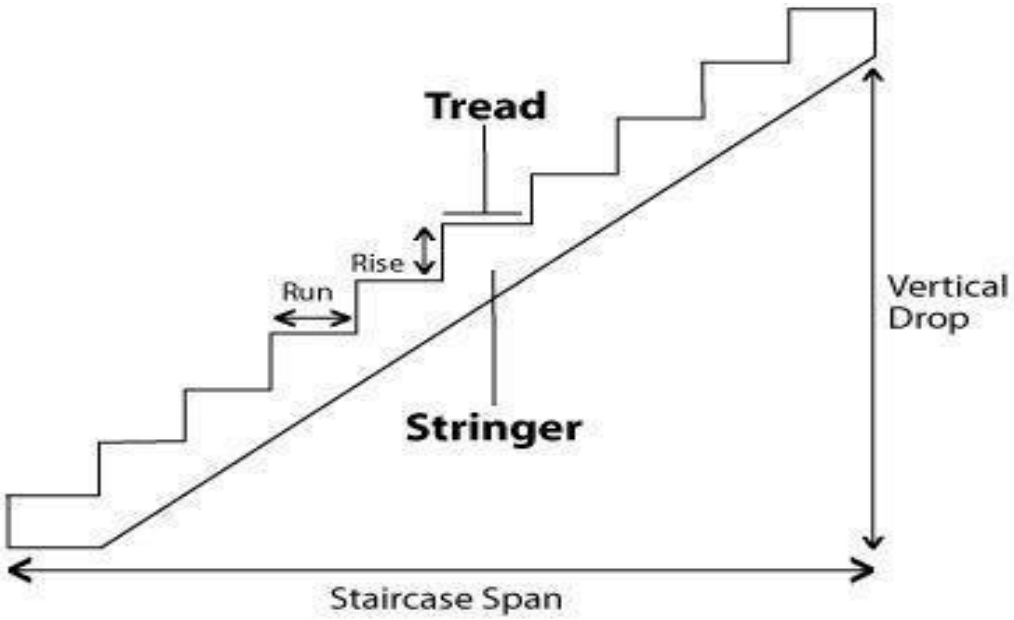
Components of Stair Case:-

a) Tread: - Tread means the horizontal upper portion of a step.

b) Riser: - Riser is the vertical portion of a step.

c) Landing: - Landing is a horizontal platform provided at the head of a series of steps to give some relaxation to public using stairs.

d) Flight: - Flight consists of a series of steps provided between landings.



Components of Stair fig(12)

Construction Steps for Stair Case:-

a) First shuttering of the stair case will be done according of the height of landing of stair case, landing beam and slop of waist given in the drawing. Shuttering of stair case is done very carefully if they are not proper then the step of the stair case are not be proper.

So, proper levelling and proper slop of the waist is very important in the stair case.

Specification of stair case :-

Riser - 150mm

Tread - 300mm

Landing slab thickness - 300mm

Waist slab thickness - 225mm

b) After the completion of the shuttering work, reinforcement are done according to the specification of reinforcement drawing,

c) After the completion of the reinforcement of stair case, casting of waist slab will be done by M25 concrete.

Fig(13)

d) Then brick work of stair case is done.

Frame work and Shuttering Work

Temporary Supporting Structure is those structures, which are temporarily required in building construction either for supporting the laying of concrete till it gets matured, such as formwork or or shuttering work. As fresh concrete is in a plastic state, when it is placed for construction purposes, so it becomes necessary to provide some temporary structure to confine and support the concrete, till it gains sufficient strength for self supporting. The temporary structure is known as Formwork or shuttering work. At our site they are using scaffolding.

Components of Scaffolding.

a) U frame jack.

b) Base jack.

c) Bracings

d) Key Locks.

e) Cup.

components of scaffolding fig(14)

Requirement of the formwork:

Good forms for concrete structure should satisfy the following requirements:

a) It should be strong enough to resist the pressure or the weight of the fresh concrete and the superimposed loads due to equipment, m en etc. This requires careful design of formwork, because the consideration of overloads will affects the economy where as of under loads may ca use failure of the forms work.

Fig(15)

b) It should be rigid enough to retain the shape without undue deformation.

c) It must be made or constructed so light that it does not allow the cement paste to leak through the joints.

d) The inside surface of the formwork should be smooth so as to give good appearance to the resulting concrete surface. To achieve this, the inside surface of formwork is usually applied with crude oil or soft soap solution. This also facilitates the removal of the formwork.

e) The entire formwork should be so made that it can be removed easily without causing the least injury to the surface or edges of the concrete.

f) It should be made economical by reducing the cost through proper design, construction and use of formwork.

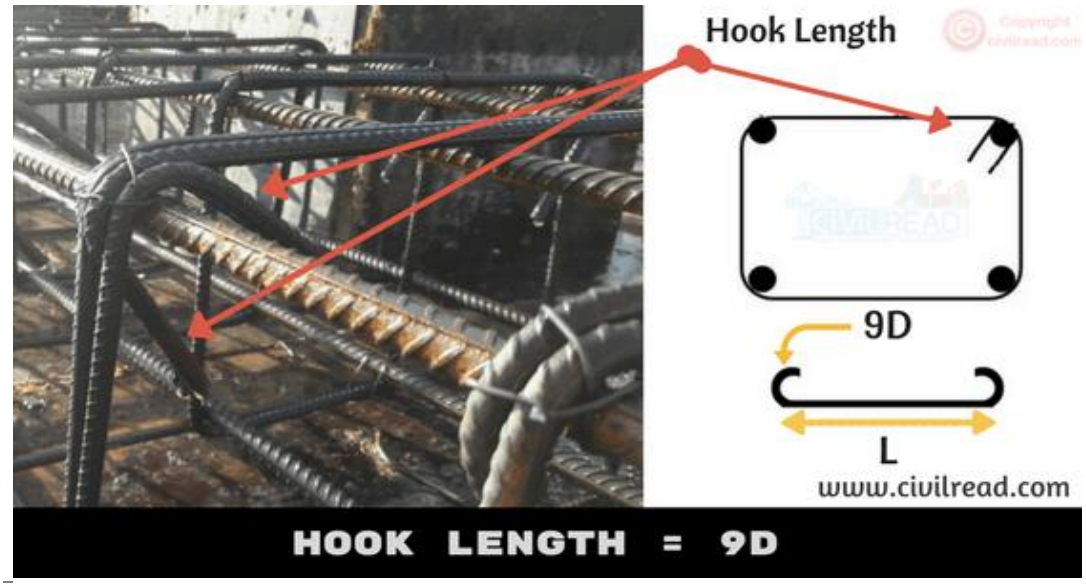
CHAPTER.9

BAR BENDING SCHEDULE (B B S)

BBS" The word BBS plays a significant role in any construction of High rise buildings. BBS refers to Bar Bending Schedule. BBS is termed as Calculation of Steel required for the construction of a building

Hook Length: The hook length is commonly provided for stirrups.

HOOK LENGTH=9D [D is Diameter of the Bar]



Fig(16)

Total length of stirrup= Total length of Bar+2x Hook Length (Two hooks)

Total length =L+2(9D)

Therefore total length=L+18D (D is diameter of bar)

Bend Length:-

Bend length is usually provided in columns at ends to tie the columns to the footings.

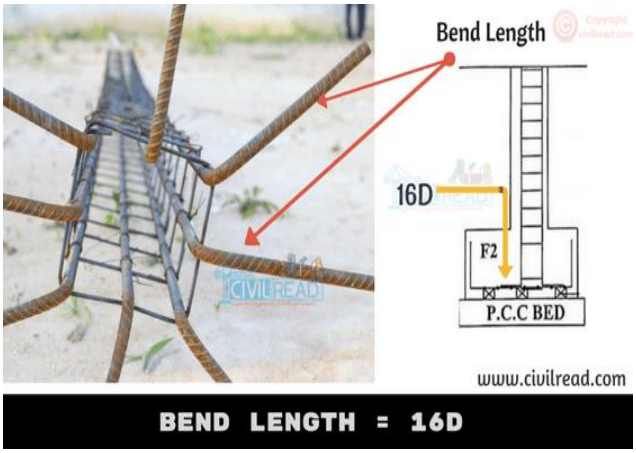


Fig9

Overlap Length /Lap Length in Reinforcement (Bar Bending Schedule):-

Suppose the length of building is 20 m. The standard length of rebar is 12m.We have to join two Re-bars for the total length of building. In order to join the two bars (overlap). Overlap length is adopted.

Overlap Length for compression members = 40D

Overlap Length for tension members = 50D

[D is the Diameter of the bar]

Crank Length :-

Crank length is provided in Slab Shear stress is maximum at supports in Slab. So, to resist this stress we usually crank the bars at the ends of supports in slab.

Crank bar is bent up at an angle of 45degree with the length of 0.42D

THICKNESS COVER

- Footings ……..50 mm
- Footing in water logged areas……75 mm
- Columns and Pedestals……40mm
- Beams ……25 m
- Slabs……....20 mm
- Shear wall…….25 mm
- Stair case……..15 mm
- Retaining wall……..20/25 mm
- Water retaining structure……20/30 mm
- Sunshade ……25 mm