

MAX
C E M E N T
MAXIMUM KI GUARANTEE

Living in Cloud 9

Build your dream home with MAX Cement



An Illustrative guide to build
your dream home with
maximum **strength** and **stability**

www.maxcement.co.in

Contents

- Planning Stage- Buying a plot
- Who's Who of Construction
- Estimating Construction Cost
- Material requirement guide
- Overview of a RCC Building
- Planning and Construction Schedule
- Selection of Building Materials
- Cover to Reinforcement
- Formwork
- Curing of Concrete
- Ensuring Maximum Strength, Setting and Stability to your home
- Protecting, maintaining and beautification of your dream home
- Energy Savings
- Rainwater Harvesting
- Sample Specification of a RCC Building
- My Dream Home- Expenditure accounts tables





Planning Stage - Buying a plot

MAX Cement: "Foundation to Roof" – Guide for your dream home building

Building your new home is very exciting, especially when you understand the process of building step by step. The following overview outlines the typical steps required to build your home and will also help to plan ahead at key stages.

Keep in mind that the home building process may vary from region to region and especially if you're Engineer and Architect about your requirements while planning for a new home.

Before you plan for a home, understand the needs

- ◀ Involve and discuss with all of family members before finalizing the plan
- ◀ Nos., Size and location of the rooms according to your family members- Joint family or nuclear family
- ◀ Please think about any future requirements and condition such as addition of new member in family, marriages etc.

Budget of The project

The very first step in planning the construction of a new home is the construction budget. Developing a preliminary budget spells out the allocation of funds for your project in broad terms.

Knowing your spending limits and developing a home building budget will go a long way towards keeping you out of financial trouble on your project, especially during the preparation of your plans and specifications.

Two major expenses includes

- ① Cost of the Land and
- ② Cost of the construction

Selecting a plot of land: One of the major obstacles that will probably come in your track is the non-availability of sufficient private land either in big cities or small towns. Several things need careful consideration while going for construction of a building. For any building, the site is the basic requirement and utmost care must be taken in its selection.

Selecting the right plot or the site

- Basic requirements: Check the municipal boundaries and facilities available near the plot such as availability of water, reliability of electricity supply, traffic and conveyance; proximity to the bus stand, railway station and airport, school, college, market place and hospital; free from noise and air pollution etc. The safety aspect also needs to be checked. Size of the plot will depend on requirement of your construction.
- Vaastu requirements: There are some important factors that you should always consider while purchasing a plot. Whenever possible one should always try to follow the Vaastu principles to lead a happy life.

Types of soil

Earth is classified according to its colour like brick red, dark brown, black, yellow or mixed, according to its smell, texture and taste.

- The soil white in colour, having lotus smell, sweet taste and which contains greenery is considered very good.
- The soil red in colour, smelling blood and astringent in taste is good but needs some attention.
- The soil yellow/pale green in colour, greenish smell and sour taste is average and needs a lot of rectification before commencement of work.
- The soil black in colour, having pungent smell and bitter taste should be avoided as it is not auspicious for construction of the houses.

While designing the foundation, the load bearing capacity of the soil should be checked by an Engineer through soil test. The real analysis of soil should be done which determines the land selection for the plot and for the foundation of the building.

Location and buying

The location of the plot is very important as the surroundings affects us directly and indirectly.

- One should not buy the land from people suffering from prolonged sickness or who have become insolvent, distressed or unfortunate people as the atmosphere of the particular space depends on the people living there.
- The soil of the land should not contain ant-hills, bones, skeletons.
- Old houses which are damaged due to fire, lightning, rain and storm etc. are not good.

Topography and surroundings

There are several factors which make a plot usable or non useable. The four directions, the shape, the existence of highways, cremation places, rivers, wells, places of worships, they all influence the VAASTU of the place.

- There should not be any cemetery graveyard, tomb adjacent to the plot or in front or the back. If this is the condition, the people residing in that house will live in fear and will never have the peace of mind.
- A temple, church, mosque also should not be in front of any house otherwise the inmates will always be sick and mentally upset.
- Falling of shadows of the temples and trees nearby on the main building brings undesirable problems.

Selection of the plot

Facing of the plots are considered important but there is a wrong notion that North and East facing plots are better than South and West facing plots. This is not true, all the directions are equally important; it is up to us how much we follow the rules

- The plot should be either square or rectangle in shape.
- Irregular shapes should be avoided or should be cured before construction.
- The site should be level or sloping towards North or east or North-East.

Legal Aspects

The land should be free from any disputes and obligations mentioned by municipal or development authorities. Please check the zoning regulations of local authorities and avoid plots in forest areas, wetlands and other protected zones. Measure the plot and verify all legal documents including mutation papers, tax paid receipts etc. at land revenue office. It is advised to consult with a good lawyer to verify all aspects and to proceed for permission to sale/purchase followed by registration with payment of stamp duty to have the registered deed of your legitimate purchase and ownership of the plot.



Who's who? of your construction

Building your dream house requires in-depth knowledge and specialization. Taking valuable advice and services from the experts in this field will ensure hassle free construction with stability and longevity. Following are the people who will lend a helping hand to you with their experience and expertise.

Architect / Engineer

An architect is a expert who plan, design and oversee the construction of the buildings and prepares the plan aesthetically acceptable. Engineers are experts who are responsible for applying mathematical and scientific knowledge in order to develop technical solutions for the construction including structural design.

An Architect / Engineer analyses your requirements, prepares the home plans according to your needs and then co-designs your home to the best of your expectation. He ensures that the plan prepared is as per construction guidelines / specifications as well as legal requirements. He prepares complete drawing for the construction including permission drawing and structural drawing in association with structural engineer. He generally supervise the construction process to ascertain that work has been carried out as per drawing and specification and is the most important people in the whole construction process. North East India is marked as very high seismic zone V and therefore please make sure that you are taking advice from experienced Architect / Engineer from your area and ideally he would charge you for the services either on percentage of the total project cost or on per square foot basis.

Petty Contractor

Petty Contractor or "Thikdaar" is the person who takes the responsibility to execute the construction work with the help of masons and labours, after receipt of building drawings from Architect / Engineer. He will arrange various skilled workmen for different activities required for the entire construction. Petty Contractors are generally paid either on per square foot basis of whole construction or in terms of wages against labour employed. The quality and durability of your construction depends on the experience and reliability of the petty contractor selected by you. The Engineer / Architect also can guide you to select a good Petty Contractor.

Mason

Mason or "Rajmistri" are the person who lays bricks and concrete with his team. They will do day to day works for building the foundation, brickwork, concreting, plastering, flooring, rod binding etc. They will handle cement, rod, tiles etc. building materials and it is important that they should be guided by Engineer & Petty Contractor to execute the work as per drawing & specification, scientific process for quality output. An experienced Mason is always preferred.

Carpenter

The carpenter or "Kaath Mistri" handles all the wood works for making doors, windows, frames or chowkaths and other furniture's. Please ensure that you select durable wood and quantity required in consultation with a good carpenter.

Electrician

An electrician does the design of electrical layout and wiring and execution. Please ensure that only licensed electricians are employed and check the power consumption projected with load of your existing / new meter. Electricians may be contacted at electrical equipment shop in your locality.

Painter

A painter carries out the priming and finishing jobs in painting exterior and interior walls, wood works, metal works.

Plumber

Water supply, sanitation and waste disposal are the important elements for any house to complete with. A plumber will help you to design and install with the best possible location and layout for the water supply and sanitary ware and pipes to minimize cost and hassle free services. Nearest sanitary ware and hardware store can guide you to get a good plumber.

Building material supplier

The whole construction project requires various building materials and the quality of every item is very important so as to ensure durable and long lasting home. It is advisable to check the specifications of the materials prior to purchase and these should be purchased from authorized dealer/retailer of reputed companies.

Friends, neighbours and acquaintances

Useful tips and suggestions can also be picked from your friends and neighbours who have recently completed their own home construction.



Estimating Construction Cost

Construction Cost

Construction Costs for any new home can vary greatly depending on home size, design (considering soil condition, structural & architectural factors), quality, finishing type, and other factors that affect construction cost.

The shape of the outside perimeter is an important consideration in estimating the total construction cost. Generally, the more complex the shape the more expensive the structure per square feet of floor area.

To calculate budgetary requirements you may use tentative plinth area estimates as follows but actual estimates will depend on the design proposed by Architect / Engineer for your home and cost of building materials prevailing in your local market.

Plinth area rates for R.C.C Buildings (residential)

Table 1: Approx Rate per sqft. of construction

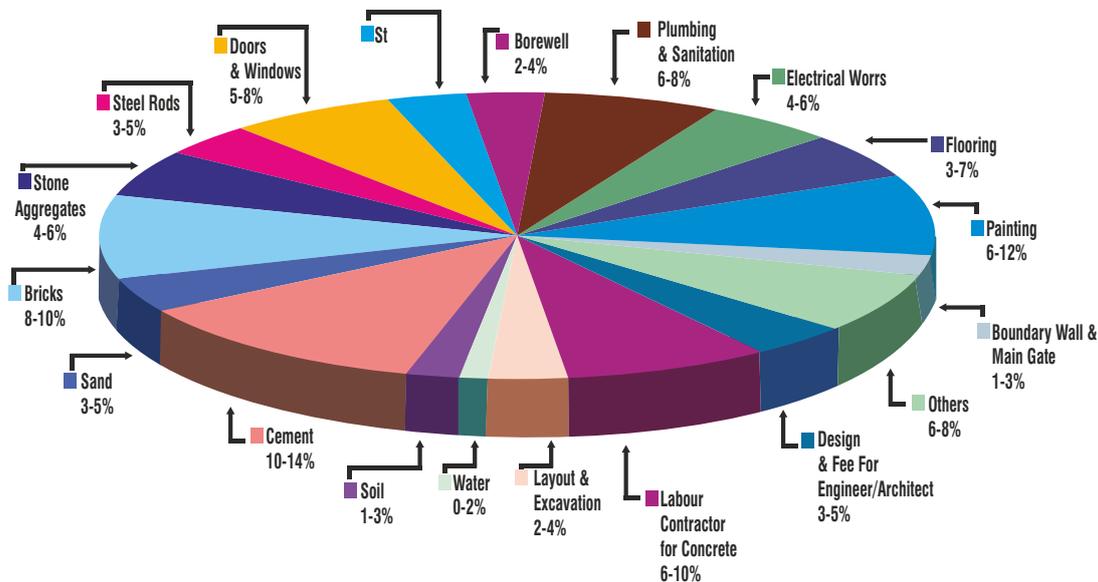
No. of Storeys	Ground Floor	1st Floor	2nd Floor	3rd Floor	4th Floor
	Rs./SQFT	Rs./SQFT	Rs./SQFT	Rs./SQFT	Rs./SQFT
Single	900				
Two	910	750			
Three	1050	800	815		
Four	1080	825	845	858	
Five	1100	860	875	885	900



Material requirement guide

Estimation of Item wise cost of Construction

The following pie chart will help you to estimate the approximate cost of various works and building materials so that you can plan for budget in advance for expenditure to be incurred in different heads.



- Build multi storied construction.
- While choosing Petty contractors speed and quality should be ensured with tools and availability of labours so that unexpected delay can be avoided. Some contractors have parallel works at a time and his devoted time, understanding and reading of architectural and structural drawings are crucial.
- Unnecessarily don't increase the floor height else the cost will increase and don't design for additional floors, if it is not required.
- Avoid non standard doors and windows, if not at all necessary and ensure maximum natural light in all rooms by providing adequate nos. of windows and ventilators.
- Using same flooring/floor materials or tiles in all the rooms and bathrooms will reduce the wastage.
- Discuss with Petty Contractors /Masons / friends & neighbours to purchase re- usable shuttering at lower cost than new shuttering materials.
- Ensure regular supply of building materials such as cement, steel reinforcement (rod), sand, crushed stone etc. and fix the schedule of delivery with building material supplier so as to avoid unwanted delay in construction.
- Maintain minimal stock of building material at site to avoid wastage but properly stock all the construction materials as per requirement only. Prefer materials available in nearby market. Material stock should be in safe custody.
- Fixtures and fittings should be selected for durability point of view rather than just appearance and low cost.
- Beforehand carefully plan for water outlet / tap points to minimize the length of pipes required connecting from water tank.
- Now a day using UPVC / Aluminium doors / windows rather than costly wooden doors / windows will also minimize cost.
- Try to visit your construction site on regular basis to understand the use of materials and proper communication to minimize wastage.

- Don't run after top brands but choose wisely to suit your needs, quality, serviceability and budget. Some materials are better than its perceived value.
- Don't compromise on quality; reduce your requirements to fit your budget.

Material Requirements: An overview of the cost of material against the mix specification is given below. As your construction progresses the material requirement may change slightly depend on quality of workmanship and handling.

In RCC framed structure / building footing, plinth and floor beam, column, slab, lintel are made of reinforced concrete. To calculate the quantity of material per cubic metre of concrete you have to calculate as follows:

Quantity in Metre Cube = length of member in metre X width of member in metre X thickness of member in metre

Tips for durable Home and Saving time & Money

First of all hire an Architect / Engineer who understands your present and future needs so that a suitable home can be planned. Choose between contemporary or traditional styles with detailed planning. The plan and drawings should be in your hand before the construction starts.



Table 2: Material required constructing 1 cubic metre of concrete work

Material Requirement for 1 cubic metre of concrete						
Concrete Grade	Concrete Mix (Ratio of cement: sand: crushed stone)	Water Cement Ratio (W/C)	Water requirement in litres per 50 Kg. bag of cement	Cement Quantity(nos. of 50 Kg. bags)	Sand (in cubic metre)	Crushed stone aggregates (in cubic metre)
M 25	1 : 1 : 2	0.3	15	11.2	0.40	0.80
M 20	1 : 1.5 : 3	0.42	21	8.0	0.42	0.83
M 15	1 : 2 : 4	0.55	27.5	6.2	0.43	0.87
M 10	1 : 3 : 6	0.75	37	4.4	0.45	0.90

M 25 and above grade is for high strength concrete ; M 20 and M 15 is for normal RCC works concrete; M 10 is for mass concrete in PCC / foundation and mix works. It is recommended that for all RCC building works minimum grade of concrete for use should be M 20.

Approximate quantity calculation for slab work (working example) : For a slab casting of size 1200 sq ft.(20 feet wide X 60 feet length or 6m wide X 18.28m length) with thickness of 5 inch. Or 0.127 m and using M 20 Concrete.

Total Volume in cubic metre = 6m X 18.28 m X 0.127 m = 13.93 cubic metre of concrete

Now, for 13.93 cubic metre of concrete material requirement is as follows w.r.to table-2,

Cement= 13.93 X 8.0 = Rounded 112 bags

Sand = 13.93 X 0.42 = 5.85 cubic metre

Crushed Stone = 13.93 X 0.83 = 11.56 cubic metre

Table 3: Material required constructing 1 cubic metre of brick wall

Brick Sizes differ from place to place. Although brick sizes as specified by Indian Standard as modular bricks are 190 mm X 90 mm X 90 mm but the size of traditional bricks available in Assam is 230 mm X 110 mm X 76 mm . With the size of traditional bricks approximately 520 bricks and 0.25 cubic metre of mortar are required for 1 metre cube of brickwork.

Cement : Sand mortar mix ratio	No. of cement bags required	volume of Sand in cubic metre
1 : 3	2.6	0.267
1 : 4	1.9	0.275
1 : 6	1.4	0.299
1 : 8	1.1	0.308

Table 4: Material required constructing 100 square metre of plaster over brick wall with 12mm thickness

Cement : Sand mortar mix ratio	No. of cement bags required	volume of Sand in cubic metre
1 : 2	21	1.4
1 : 3	15	1.5
1 : 4	12	1.6
1 : 6	9	1.8

Table 5: Material required to cement plaster a wall of size 12' X 10'

Considering a standard room of 12 feet X 12 feet with 10 feet ceiling height the material required for plastering of one wall of size 12 feet X 10 feet (wall area of 120 sq ft. or 11.15 sq m.) with 12mm thickness

Cement : Sand mortar mix ratio	No. of cement bags required	volume of Sand in cubic metre
1 : 2	2.34	0.156
1 : 3	1.67	0.167
1 : 4	1.338	0.178
1 : 6	1.00	0.200

Table 6: Useful Conversion Table

1 Feet= 0.3048 metre, 1 metre = 3.28 feet
1 square feet = 0.0929 square metre, 1 square metre = 10.76 square feet
1 cubic feet= 0.02831 cubic metre, 1 cubic metre = 35.31 cubic feet
1 foot= 12 inch = 30 cm. = 0.30 metre
1 metre= 100 centimetre = 1000 millimetres
1 cubic metre = 1000 litres

Overview of a RCC Building

Overview of the structural parts of Building

Now a day the most common construction is RCC (Reinforced Cement Concrete) construction and this type of construction consists of many structural components. Generally, structural components are divided into two categories-

- i) Sub structure and
- ii) Super structure

Sub structure

The structure below ground level is called sub structure. Sub structure can also be divided into two parts- a) Foundation and b) Plinth

Foundation

The most lower part of the building. The main function of the foundation is to transfer load to sub soil. It is the most important part of structure. Most of the failure of a structure may happen due to foundation failure. Foundation should be strong enough to meet the following requirements-

- It should be strong enough to distribute the load of building and people inside the building to sub soil.
- It is capable to support structure.
- Based on the type of soil and bearing capacity RCC foundation may be a pile foundation, isolated /combined footing or raft foundation.

Tips: Before designing the structure consult with a Structural / Geotechnical engineer to know the bearing capacity of your soil through soil analysis. Consult with Structural Engineer for earthquake resistant design of your home.

Plinth

The part between surrounding ground level and ground floor of the building is called plinth. The purposes of the plinth are-

- Transfer the incoming load from super structure to the foundation.
- Provide damp proof to the building
- Support the back filling as a retaining wall.
- Plinth also increases the esthetical look of the building.

Keep in mind that, sometimes, plinth isn't considered as sub structure and count it as an individual part of a structure.

Super structure

The part above plinth level is called super structure. Super structure contains many other structural components. Such as-

- Wall
- Floor/Slab
- Lintel and sunshade
- Step and stair
- Roof

Wall

Wall is used to separate the usable area of floor for different purpose. Such as bedroom, bathroom, kitchen, living etc. Other prime purpose of wall is to provide privacy and security.

Floor

The main purpose of floor is to provide better living space and support of occupants, furniture and other equipment of a building. The purpose of making different floor in different level of a building is to create more accommodation within limited space. Floor should be strong, durable, damp proof and heat protected.

Lintel and Sunshade

Lintel is provided for the purpose of supporting wall above door or window opening. Sunshade is generally combined with lintel above window opening to protect rain and sun. Step and Stair: Stair is made for easy communication among various floors of a building. Stair consists of steps. Steps height / rise and tread should be comfortable enough for vertical movement.

Roof

The top most part of a building is the roof. Roof is build for the purpose of enclosing and protects the living area / floor area from weather effect. Roof should be stable, durable and weather resistant.

There are also others structural parts of a building. Such as water tank, septic tank and parapet etc. Septic tank and underground water tank is completely separate structural part and not included in building structure. But, parapet and overhead water tank are parts of building structure.



Planning and Construction Schedule

Planning & Construction Schedule

Construction project scheduling for dream home project has two facets - developing the plan, and using the plan.

By developing a construction schedule - a plan you will know in advance when every facet of the job is to begin and when it should be completed. This is a planning function, and is carried out before the job is begun. This way, you will be able to schedule services from various experts such as Engineers, petty contractors and materials deliveries so that the necessary materials arrive when they are needed, which in turn will allow you to save time, money, and hassle.

Although the schedule may vary according to your project size, local conditions, material and manpower availability and other aspects related to construction. The ideal time frame required for a small residential project is shown below. You may prepare your own planning and construction schedule as per your dream home project requirement.

Attach the "Planning & Construction Schedule" bar chart. (Excel File enclosed)

Selection of Building materials for your dream house

Concrete = Cement + Sand + Coarse Aggregate + Water

Mortar = Cement + Sand + Water

Reinforced Cement Concrete (RCC) = Concrete + Steel bars

When building your own home, one of the most important decisions you will have to make is the choice of materials for use. The building materials you select will determine the overall strength and durability of the house. There is a wide choice of building materials available in the market and it can be difficult to determine the best option for your building project. The most important and basic materials are cement, sand, stone aggregates or coarse aggregates, bricks, water and reinforcement bars (steel rods). Careful selection of this building material will ensure the quality of construction as well as save money and time. Some criteria's for selection are explained to help you.



Selection of Cement

Cement is the binder that holds sand and stone together in addition with water to form concrete and mortar. Cement is never used alone but plays most important role in giving strength and durability to your home. It is also the only ingredient of concrete or mortar which is manufactured at factory and available in 50 Kg. bags. Always use fresh cement for healthy and durable construction. Strength of cement is measured in Mpa or N/mm². It is advisable to use good brand of cement from a reliable source such as authorized dealer or retailer. Cement constitutes almost 10%-14% of the total construction cost and therefore the handling, proper use and storage are very important.