

Aam Aadmi Series - 1

HOUSE BUILDING DIGEST

(Things to know)



bmtpc

"Creating Enabling Environment for Affordable Housing for All"

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1. House Construction

Construction of a house is an activity which can be carried out by Central or State Government agencies like housing boards, development authorities, private builders, co-operative housing societies etc. Besides construction of houses by such agencies, a large number of houses are also being constructed by the individuals themselves.

Whereas agencies involved in house construction deploy professionals like planners, engineers, architects etc to carry out their work programmes, such facilities are not available to the individual house builder. During the construction of the house, the individual house owner is himself the planner, architect, engineer and the builder. All these require professional knowledge & skills.

**Construct
a house the
easier way !!**

Building Materials and Technology Promotion Council (BMTPC), therefore, felt it appropriate to bring out "House Building Digest Series" to elaborate on basic issues related to the planning and construction of a house, for the benefit of the individual builder. This publication accordingly deals with some of the important aspects which a common man must know before planning to construct a house.

2. Activities Involved

Having owned the plot, with legal rights to construct a house on the same, some of the major activities / issues which are involved in the construction of a house must be known to the 'Owner'. These broadly include preparation of a house plan, finalization of the types and nature of building materials and practices (better known as specifications of construction), detailed estimates, approval of





the plans etc by the competent authority (like local development authority, municipal corporation etc), the actual construction and its supervision, obtaining of completion certificate etc.

3. Acquaint Yourself

In order to plan and construct the house in a smooth manner, the prospective owner must carry out the basic groundwork and get acquainted with the fundamentals.

Construction Elements

To start with, one must know about the main elements of house construction. These broadly include foundations, walls, roofs, doors and windows, flooring and finishing. In addition, the services which are to be provided in the house relate to sanitary, water supply and electrical. Similarly, major materials involved in construction include cement, iron and steel, bricks, timber, sand and aggregates. Wide varieties of these materials as also the sanitary, water supply and electrical appliances and fittings are currently available in the market having a varied range of costs.

Main building elements of house construction are foundations, walls, roofs, doors and windows, flooring and finishing

Market Survey

It would, therefore, be advisable to carry out a market survey with regard to cost, quality and local availability of building materials, appliances and fittings etc. This information would come in handy to keep a proper check on cost, quality and time during the construction.

Such information could also be obtained from those who have recently constructed their houses. Presently some books bringing out such details are also available in the market which should be studied carefully.





Architectural Design

The next important issue which carries weightage is the architectural design/plan of the house. The architectural design/plan includes the details of the number, size and placement of rooms in the house (living room, bed room, kitchen, toilets etc). This is a key issue and deserves attention for having a comfortable living. It is advisable to go through some of these plans for having a first hand feel of the house. Books on typical house plans for different plot sizes are also available in the market.

Local Building Bye-laws

As a step further, it is recommended to obtain a copy of the local building by-laws which would give an idea of the extent of area which can be covered in the plot, the number of storeys that can be constructed, relevance of plinth area, floor area etc. It would also give the copy of the forms to be furnished to the local approval authority before, during and post construction. The most important thing to be ensured is the offset from the road side and open area. Other technical details given in the by-laws can best be ignored at the information gathering stage.

Having been equipped with the basic information, one can proceed further for the construction of the house.

4. Have an Architect

For the planning, construction of the house, an Architect would be of immense help. He/She will be able to give a physical form to the owners' requirements and ideas. An Architect has a key role to play and his / her selection should be done in a judicious manner.

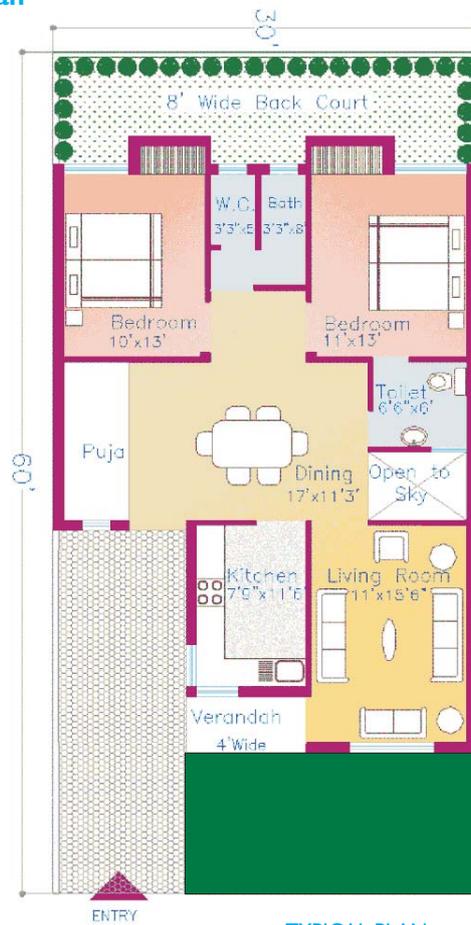




Housing Plan and Specifications

The requirement with regard to the number and size of rooms, number of storeys (including basement, if any), choice of building materials, the available budget for construction, time required for construction etc can be discussed and finalized with the Architect. These discussions would form the basis of house design/plan, detailed specifications of construction, estimate etc.

Typical Plan





Estimate

It would be of interest to note that the fund requirements are generally more than the estimated amount due to variations in cost of materials / labour which may occur during the construction process. Further you may like to use a different material than originally envisaged, which may be costlier. The estimates prepared by the Architect will also become the basis of obtaining loans from various housing finance companies/banks etc.



Approval of Plans

The issue regarding the approval of plans, estimates etc from the concerned authorities can also be discussed with the Architect.

Although the owner can himself carry out various jobs involved in construction, it is advisable to involve the Architect through the entire construction process, right upto obtaining the completion certificate. The Architect will also be helpful at many other stages as indicated in other sections in the booklet.

Most of the local Authorities have made it mandatory that the documents for submission to them should also be signed by the Architect, besides the owner himself.

5. Structural Design

Structural design of a house and its authentication has also been made mandatory by a number of local authorities. It brings out the placement and sizes of columns and beams etc, thickness of slabs, the amount of reinforcement to be provided. It also includes the measures to strengthen the house from earthquakes. This is different





task from Architectural design and should be entrusted to civil engineer. A proper structural design gives strength and stability to the house besides making it economical in construction. The thumb rule designs should be avoided.

6. Construction Cost

The cost of construction of a house depends on a number of factors which include the type of foundation, number of storeys, specifications of construction, etc. As a rough guide, the costs involved for labour and material as a percentage of cost of 'civil works' is as follows :-

Foundation	10%
Walls	30%
Roofs	25%
Doors and windows	15%
Flooring	10%
Finishing	10%

A further 25 to 30% of the total cost of 'civil works' is involved in providing the services pertaining to sanitary, water supply and electricity.

7. Planning and Construction Time

The process of planning/construction of a house involves a considerable time, depending upon the time taken at each stage. In order to have a good quality construction, which is also safe and economical, a proper planning should be carried out which may take about 10 to 12 weeks including finalization of architect/plans/structural design/contractor as well as submission of application to the concerned authority. Having completed the planning process,





construction should be taken up subsequently. A house having about 100 sqm of construction area may take about 50 to 60 weeks for completion. As a rough guide the break-up of construction time can be as under:-

ELEMENT	TIME
Foundation	12 to 14 weeks
Superstructure	13 to 16 weeks
Roof Slab	4 to 5 weeks
Doors/Windows	4 to 5 weeks
Finishing	10 to 11 weeks
Electrical Works	4 to 5 weeks
Water Supply/Sanitary/Plumbing	3 to 4 weeks
Total	50 to 60 weeks

It is also to be kept in mind that the progress of work during the rainy season is much below the average levels. Further, some of the activities can be carried out concurrently eg. bricks for foundation/superstructure can be ordered when excavation for foundation commences, doors and windows can be made when foundation work is in progress etc. Accordingly, some allowance has to be kept for such of the factors while estimating the time for construction. A proper sequencing of construction activities is essential in order to save on time.

Delays in construction time leads to escalation in construction Costs.





8. House Construction

Having been equipped with the approved Architectural and Structural designs and other issues, the owner can proceed with the actual construction of the house.

Mode of Construction

The house can be got constructed either by the owner himself or by engaging a contractor, although the latter is advisable from the viewpoint of convenience. In case where the owner chooses to select, purchase and supply the required building materials at site, work can be got done by engaging a labour contractor only.



Since most of the owners have limited experience in the field of construction, it is advisable to engage a contractor for constructing the house with a full contract for labour and material. The only precaution that has to be taken is that the supervision should be proper such that the construction is undertaken as per architectural plan and the materials used are of the desired specifications quality and also the workmanship is proper.

Selection of Contractor

The contractor has to be selected with great care, thereby ensuring that the construction proceeds smoothly and the work is completed within the stipulated time and costs and is of the desired quality.

A good contractor can be selected on identification of those who are already working in that area or through the advice of the Architect or such other professionals. Having selected the contractor, the owner should finally enter into an agreement with the contractor.





Major Contractual Issues

All issues which are likely to emerge during the construction process should be considered before going into an agreement. These include the quality of materials to be used, construction quality, construction time, making of payments, extra items etc.

Deduction in payments in case of delays in construction by the contractor, the defect liability period (say 6 months or so, during which the contractor is liable to rectify the defects in the house at his own cost) etc are also amongst the other issues to be discussed and finalised.

Daily Diary

Whereas it is the contractor's liability to carry out the work as per the written down agreement, the owner, in his own interest, should maintain a daily diary with dates for execution of works. This will help in keeping a vigil on curing, duration of centering and shuttering for concrete works, receipts and consumption of materials, expenditure and financial requirements etc.

Payments



The payments to the contractor may be made in installments. These installments are based on a number of factors like soil conditions, specifications of construction, number of storeys, type of materials used etc. However as a rough guide the schedule of payments (as a percentage of civil works) can be based on the schedule given below.





Execution of Work Upto	Payment
1. Excavation, Foundation Concrete, Brickwork in Foundation and Plinth and Damp Proof Course	15%
2. Brickwork and concrete upto roof level	15%
3. Laying of Roof	20%
4. Door & Windows	12%
5. Plastering and Finishing	10%
6. Floors including their finishing	8%
7. Water Supply, Sanitary and Electrification	15%
8. Final	5%

In any case the schedule of payments must be finalized after discussions with the professionals and people who have constructed their house during the immediate past as also the contractor.

9. Supervision of Works

It is advisable that the Architect or such other professionals be involved for supervision during the construction process in order to ensure that the house is being constructed as per approved plan, the materials of construction are as per the specifications, the workmanship is



proper as also to keep a track of the schedule of construction and the extent of making payments at different stages of work. The Architect should be asked to pay visits to the construction site on a regular basis and also at times when casting of slab, columns is taking place. Also ensure correct placement & quantity of steel reinforcement.





10. Check Yourself

Besides the issues already mentioned, it is further recommended that the house owner should check certain points so that he enjoys the comforts of good living. Some of these include :-

1. The house should have a proper orientation so as to take maximum advantage of sunlight during winters.
2. The openings, like doors and windows should be properly placed so as to have a proper ventilation.
3. Have adequate number of balconies which are good breathing spaces.
4. Anti-termite treatment should be carried out in the foundations to take precautions against termite and other insects.
5. Damp Proof Course (DPC) should be laid properly to prevent ingress of dampness in the walls.
6. Ordinary Portland Cement (OPC) or Portland Pozzolana Cement (PPC) suited for house construction should be used, which should not be more than six months old.
7. Bricks should be bright red in colour and should give a ringing sound when struck against each other. They should also be fully soaked in water before use.
8. Steel for reinforcement should be clean, free from rust and oil or grease
9. Sand and stone aggregates etc should be clean before use.
10. Materials for construction should be of ISI mark
11. The leftover mortar or concrete mixture of the previous day should not be used in construction.





12. Curing of brick and concrete works should be done properly in order to achieve the desired strength.
13. Vertical centering and shuttering for concrete works should be in place for 8 to 10 days. Steel shuttering is advisable to get a good undersurface.
14. Concrete in slabs, beams etc should be properly vibrated to avoid honeycombing
15. Water proofing of the roof should be carefully done including joints of slabs and parapet (provide 'gola' at the interface)
16. Jointing of water and drainage pipes should be properly done

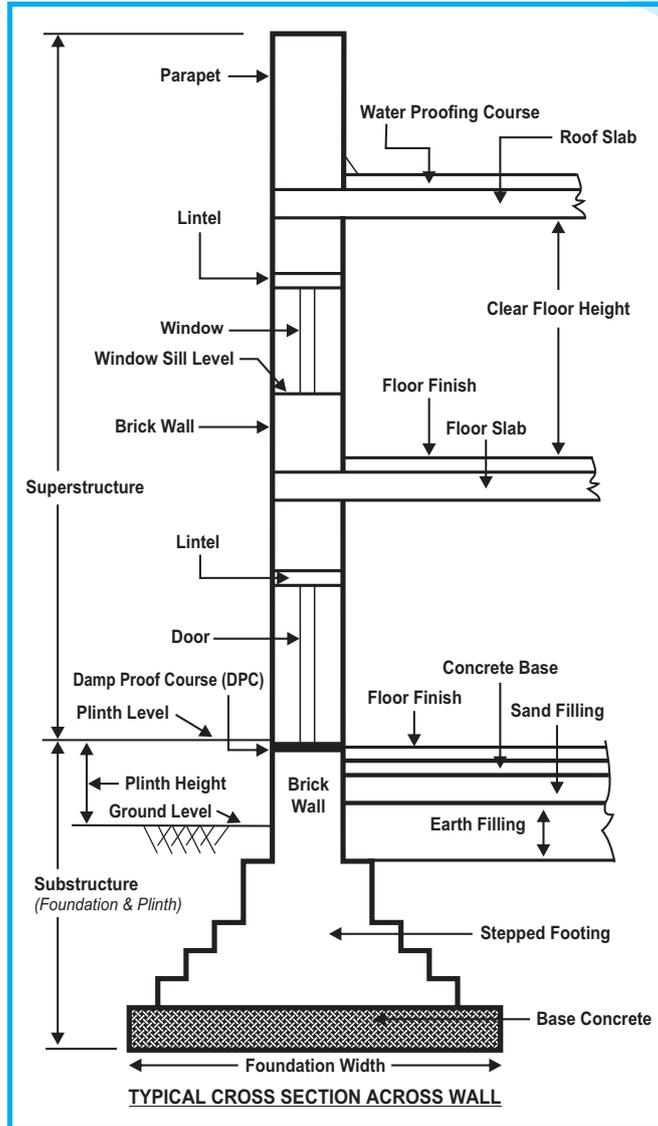
If the above precautions are taken, the maintenance costs of the house will be reduced considerably.

11. In Conclusion

It would be evident from the above that construction of a house involves a large number of individuals and agencies which inter-alia include the owner, the local authority, architect, structural engineer, contractors for civil, sanitary and electrical works, material supplier, supervisors, skilled and unskilled labour etc.

A proper coordination needs to be maintained between them in order to achieve the maximum benefit of the money being spent by the prospective house builder.





This is first of BMTPC 'House Building Digest Series' for creating awareness about construction of a house.



BMTPC

The Building Materials & Technology Promotion Council (BMTPC) was setup in 1990 as an inter ministerial organisation under the Ministry of Housing and Urban Poverty Alleviation to bridge the gap between the laboratory research and field level application.

VISION

BMTPC to be world class knowledge and demonstration hub for providing solutions to all with special focus on common man in the area of sustainable building materials, appropriate construction technologies & systems including disaster resistant construction.

MISSION

To work towards a comprehensive and integrated approach for promotion and transfer of potential, cost effective, environment-friendly, disaster resistant building materials and technologies including locally available building materials from lab to land for sustainable development of housing.

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