

# The parallel construction industry – Wood Construction

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**Abstract** - In this paper, the study represents the simplified method of construction of houses by using wooden planks. In today's construction practices the use of various materials hugely impacts the environment from their manufacturing to the execution on sites. For reducing this impact & making the construction industry eco-friendly to some extent, the study of this research is essential. The research includes details of material required. It elaborates the different Components, Materials, Fastening Assemblies, Procedure of construction. The procedure of wood construction from modelling of building in software then the manufacturing of prebuilt wall panels in the factory to installing them on the site & Finishing.

**Key Words:** Lumber, building components, Insulation, Sheathing, Fastening assemblies, ATS rods, Anchor bolts.

## 1.INTRODUCTION

Lumber construction is a construction of houses using wood or lumber as a main material. All the structural elements such as column/posts, beams, floorings and roofs are made of wooden species. Sizes and types are dependent on location of the construction and availability as usual. Various fastening elements are used to join those lumbers to act as a single component. Insulations are used as an additional thermal resistor as per requirements. Sheathings are the structural sheets used for resisting the shear forces causing due to wind loadings acting on high rised buildings. Overall process of construction is may be on site/cast in situ or may be pre-built. Pre-built method is generally adopted to achieve consistency and good quality which results in economy as well.

## 2.MATERIALS

1. Lumber: 2x4, 2x6, 4x and 6x SPF lumber [1]
2. Sheathing: 4x10 OSB and Zip ½" sheathing
3. Anchor bolts: 5/8" dia. Anchor bolts
4. Nails: 0.120x2 ¼" nails of 16d, 10d and 12d
5. Insulation: Batt Insulation
6. ATS: ATSR 1-1/8x132

7. GWB: 5/8" Gypsum board

## 3.METHODOLOGY

Whole methodology includes inhouse modelling of walls panels, Manufacturing in a factory and Execution work on site.

### A. Inhouse detailing and modelling of wall panels

- 1) Step 1: Study the Architectural, structural and MEP plans.
- 2) Step 2: Create study sheet which includes all necessary data required for creating model:  
Type of lumber: 2x4, 2x6 SPF Lumber, Stud spacing: 24" oc & all fastening assemblies and their locations, sheathing types and size of individual sheets, etc.
- 3) Step 3: Make a model by drawing the layout of walls as per dimensions on architectural floor plans and assign stud 2x4 or 2x6 SPF studs as needed per wall thickness and 0.120x2 ¼" nails of 16d[3]. Then insert ½"x4x10 OSB sheathing or zip sheathing for interior and exterior wall respectively.

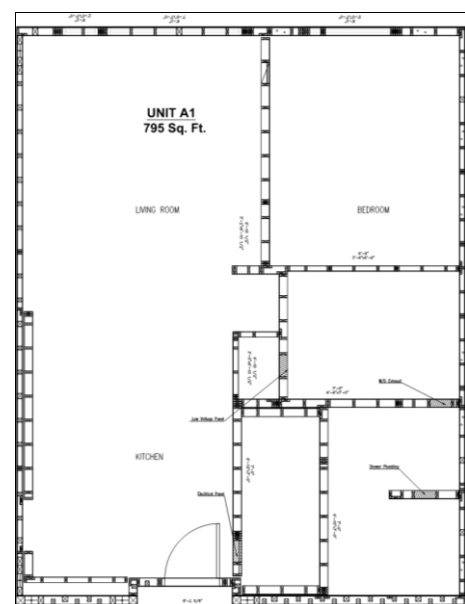


Fig-1: Model in software for 1bhk

4) Step 4: Add all opening assemblies such as doors and windows as per sizes on plans and add their kings and jacks.

5) Step 5: Add ATS rods ATSR 1-1/8x132 at given locations and 5/8" anchor bolts at 12" spacing to bottom plates of wall panels.



Fig-2: ATS rod



Fig-3: Anchor bolts

6) Step 6: Adjust junctions of wall connections, create cavities for MEP objects by shifting the studs without going beyond stud spacing of 24".

**B. Manufacturing of wall panels in factory**

1) Step 1: Saw the lumbers of required sizes as per cut lists.

2) Step 2: Assemble the panels one by one as shown in elevations and plans views of reports of respective panels.

3) Step 3: Drill holes for lifting purpose.

4) Step 4: Drive holes for plumbing or mechanical ducts.

5) Step 5: Connect hard-wares such as ATS rods wherever shown on reports.

6) Step 6: Attach the windows and door assemblies and lastly the sheathing excluding these openings.

7) Step 7: Mark the individual panels with unique numbers to get recognised at site while installation.

8) Step 8: Ship pre-built wall panels to site location.

**C. Execution on site**

1) Step 1: Prepare the site and level it to proceed for panels installation.

2) Step 2: Lay a foundation slab and mark layout to have a ease in installation.

3) Step 3: Place manufactured wall panels to their locations and fix with anchor bolts to the underneath concrete.

4) Step 4: Tighten the ATS rod assemblies.

5) Step 5: Provide Plumbing pipes, Electrical units like FEC/Electrical panel/washer dryer switches & HVAC.

6) Step 6: Once getting all these structural elements approved by respective experts the next is apply batt insulation.[4]

7) Step 7: Finish the wall with GWB sheets and later with primer and finishes as required by owner.

**4. ADVANTAGES**

1. The expansion causes decrease in the strength of materials. Wood does not practically expand against heat. Thermal coefficient of conductivity of the wood is very low.  
 2. Sound isolation is based on the mass of the surface. Wood is not better for sound isolation, but it is good sound absorption. Wood prevents echo and noise by absorbing sound.

3. Resistance to electrical current of a completely dry wood is equal to that of a bad conductor.

4. Wood is a decorative material when considered as an aesthetic material. Each tree has its own colour, design and smell. It is easy to avail various wooden materials according preferences.

5. Although wood has oxidation characteristics in some way, it is not the kind of oxidation seen in metals. Metals get rust,

wood doesn't. For such property, wood is preferred when necessary.

6. It is easy to repair and maintain wood. Old woods can be treated by special treatments. Other materials are difficult and costlier for maintenance and perform repair. so, they are disposed of.

## 5. CONCLUSION

We understood the various components of building, their functions & their requirements. Strength is increased by using the nails. Vertical stability provided by using Anchor bolts & ATS rods assemblies. We achieved the various milestone activities in minimum time durations by dividing the process into a parallel work breakdown structure. By managing the flow of the construction we achieved the economy by reducing multiple crane locations, labour management & various on-site activities.

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