



# MODERN PORTABLE TINY HOUSE TECHNIQUE

Tushar Bharat Patil<sup>1</sup>, Akash Vitthal Bhoje<sup>2</sup>

<sup>1,2</sup>Department of Civil Engineering, Sandip Institute of Engineering & Management, Nashik

## ABSTRACT

*Tiny portable house, no more than parking spot, is a new concept for homeless people, slum development or those who are unable to participate in traditional house. Nowadays there is massive use of concrete in construction industry to overcome this, new construction techniques and material is adopted for good living standard. This technique considered all the factors like sufficient space for living, economy, environmental issues, portability of house and living standard. Nowadays Government is contributing for rural development so it will be helpful for it.*

**Keywords:** *Easily available material, Economy, Foldable & Portability, Living standard, Low Wastage*

## I. INTRODUCTION

There is a huge problem associated with poor people's related with their living. Tiny house is a concept to afford homes for poor peoples in their budget. The peoples who are migrating for their business or peoples having temporary rehabilitation for those new concepts are introduced in it. This house has been designed with considerations of nominal sizes of various units of house like hall, bedroom, kitchen etc. This tiny house includes 1 room with intermediate floor, kitchen, bathroom & wc. This concept is totally based on economy, living for homeless and portability, foldability.

## II. HEADINGS

### 1. Problems of housing

Access to appropriate, affordable, housing is a fundamental human right, which "is essential for individual, family and community wellbeing". While many Indians have done well out of the housing market there is a growing pool of people who cannot access affordable housing, appropriate or otherwise.

The housing affordability crisis has been developing for some years and has been increasingly documented in recent media reports. One of the biggest problems lower-income Indians households face today is finding affordable, secure and appropriate housing. While this has been an issue for some time, concerns that the problem has been worsening and affecting moderate as well as low-income, households have made this a priority issue at all levels of government.

### 2. Innovative approach of housing

In this concept the floor area is minimized by proper arrangement of the bedroom inside the house by replacing the brick and concrete. The dead load of different members of house like wall, slab, beam, and column is



reduced by replacing it with advanced material. Generally tiny houses not having the arrangement of folding but in this concept the house can be fold and transferable to required location. Folding mechanism is made in such a way that whole structure can be easily lifted by 7-8 peoples.

### **3. Cost effectiveness**

By reducing the massive use of steel and concrete we can reduce the total cost of the project by replacing it with the new materials like aluminium, fibre cement concrete & roofing material. The estimated cost of this tiny house is around 68000/- including fabrication cost. If we are thinking to make this project in large scale then total cost can be minimized by proper planning and discounts given by material seller.

3.1 It does not required that much skill labours for completion, so the labour cost is reduced.

3.2 To complete this project requirement of labours is less.

### **4. Area management**

Total area of this house is 200 sq.ft. All units are arranged in such a manner that area should be minimized considering nominal sizes of each unit. Intermediate slab is introduced which can be used as a bedroom.

### **5. Material properties**

#### **5.1 Fibre cement board (Heavy duty)**

| Properties            |                                 |
|-----------------------|---------------------------------|
| Density               | 1300 ± 50 Kg/m <sup>3</sup>     |
| Modulus of Rupture    | >7 Mpa(Wet)                     |
| Thickness Tolerance   | 5500 ± 50 Mpa(Wet)              |
| Water Absorption      | ≤ 35 %                          |
| Moisture Content      | ≤ 12 %                          |
| Acoustic Insulation   | STC = 30 dB (6 mm single board) |
| Ignitibility          | Pass                            |
| Freeze resistance     | Pass                            |
| Warm water resistance | Pass                            |
| Heat/Rain resistance  | Pass                            |

#### **5.2 Aluminium**

##### **5.2.1 Weight**

One of the best known properties of aluminium is that it is light, with a density one third that of steel, 2,700 kg/m<sup>3</sup>. The low density of aluminium accounts for it being lightweight but this does not affect its strength.

##### **5.2.2 Strength**

Aluminium alloys commonly have tensile strengths of between 70 and 700 MPa. The range for alloys used in extrusion is 150 – 300 MPa. Unlike most steel grades, aluminium does not become brittle at low temperatures. Instead, its strength increases. At high temperatures, aluminium's strength decreases. At temperatures continuously above 100°C, strength is affected to the extent that the weakening must be taken into account.

##### **5.2.3 Corrosion resistance**

Aluminium reacts with the oxygen in the air to form an extremely thin layer of oxide. Though it is only some

hundredths of a (my)m thick (1 (my)m is one thousandth of a millimetre), this layer is dense and provides excellent corrosion protection. The layer is self-repairing if damaged.

#### 5.2.4 Non-magnetic material

Aluminium is a non-magnetic (actually paramagnetic) material.

### 6. OBJECTIVES

6.1 Shelter for homeless peoples in low budget

6.2 To reduce the use of materials which is harmful for environment.

6.3 To reduce the wastage of construction material.

6.4 Portability & foldable technique.

6.5 Temporary houses for disaster management.

6.6 To increase the use of waste material for production of fibre cement board.

6.7 Better option for tent.

6.8 Very low maintenance.

### 7. Limitations

7.1 While handling the material care should be taken.

7.2 Limited design options.

#### 8.1Future scope

8.1.1 This houses can be afforded by government for poor peoples so

8.1.2 Completely freestanding-This modular homes require no foundations so they can be put practically anywhere and are easily move to new location.

8.1.3 Fast Implementation-Off site manufacture eliminates cost uncertainty and dealy,delivering homes ready for immediate occupation

### III. FIGURES

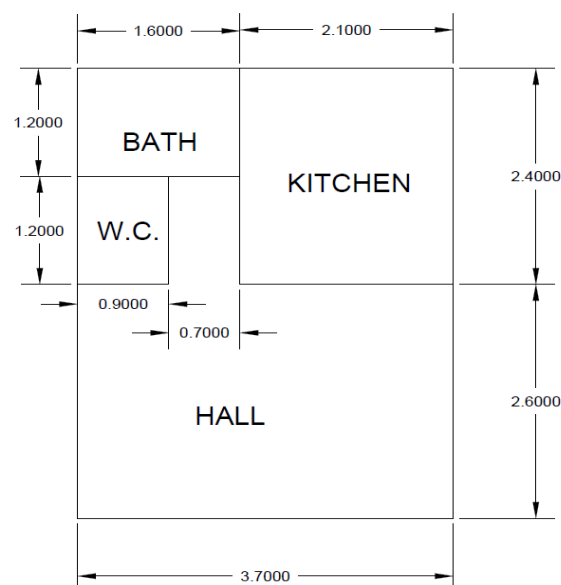


Fig. Floor plan

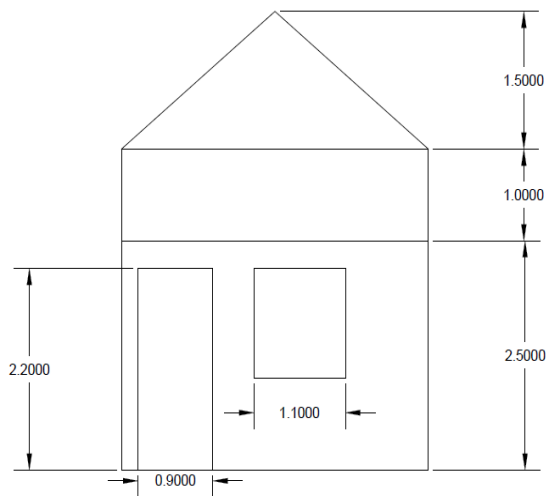


Fig. Front elevation plan

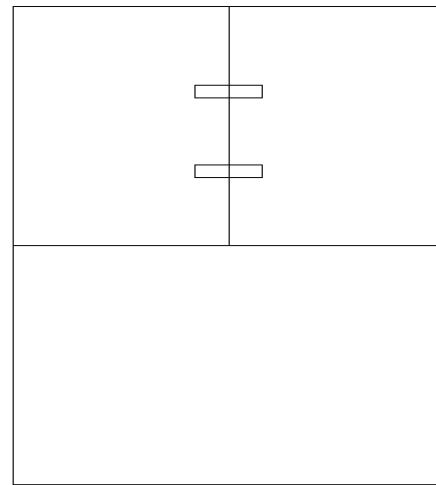


Fig. Intermediate floor plan

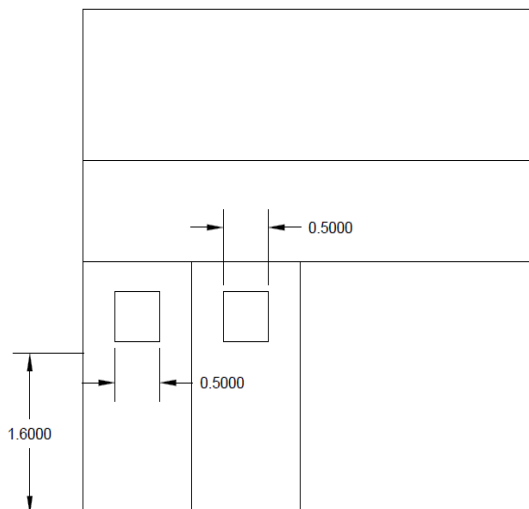


Fig. Left hand side view

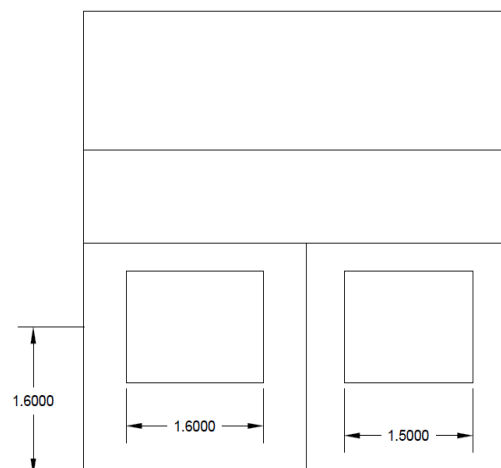


Fig. Right hand side view

#### IV. .CONCLUSION

It will fulfill the need of shelter for poor peoples in low budget. By considering all the problems and necessities like environmental, economical, technical this is good concept for use in actual practice and also for future research. The material which is used in this concept has very low wastage and can be reused. Foldable arrangement helps to portability of structure but having limitation in structural design.

#### REFERENCES

##### Journal Papers

- [1] Catherine Mingoya, the Department of Urban Studies and Planning, Building Together, Tiny House Villages for the Homeless A Comparative Case Study.



- [2] G. Adaire Chown, Senior Director Technical Affairs, Canadian Manufactured Housing Institute under the direction and guidance of the Provincial-Territorial-Municipal Working Group on Tiny Houses. Tiny Houses in Canada's Regulatory Context: Issues and Recommendations.
- [3] Austin Griffin, The tiny house movement.

**Books**

- [1] *building technology and material.*

**Proceeding Papers**

- [1] Community Frameworks, *Tiny houses, Case Study*