Solve the Housing Demand in 3 Steps

1. **Light gauge steel**
2. **Cellular Concrete or Lightweight Foam Concrete**
3. **Formwork: non-dismantling fiber cement board**

1.

Light gauge steel construction is very similar to wood framed construction in principle - the wooden framing members are replaced with thin steel sections. The steel sections used are called cold formed sections, meaning that the sections are formed, or given shape at room temperature. This is in contrast to thicker hot rolled sections, that are shaped while the steel is molten hot. Cold formed steel is shaped by guiding thin sheets of steel through a series of rollers, each roller changing the shape very slightly, with the net result of converting a flat sheet of steel into a C or S-shaped section.

The steel used here is coated with zinc (called galvanized) or a mixture of zinc and aluminum (called zincalume or galvalume by some) to protect it from corrosion. The thickness of this coating can be varied to suit a range of environments. Typically, marine environments require the most protection, and dry, arid regions the least.

The thicknesses of steel used here range from about 1 to 3mm for structural sections, and 1 to 2mm for non-structural sections. The members are sized to roughly correspond to wood members: 2x4" and 2x6" are common sizes.

Like in wooden framed construction, a frame of steel members is first constructed, and then clad with dry sheeting on both sides to form a load bearing wall. Construction with steel follows the platform frame system of house building. Connections between members are made with self-tapping self-drilling screws.

This form of construction can also be used for non-structural framing, such as interior partitions or external cladding. In fact, this form of construction was originally developed for interior partitions in offices.

ADVANTAGES OF LIGHT GAUGE STEEL CONSTRUCTION

Light gauge steel structures have many of the advantages of light wood framed structures:

They are light, and allow quick building without heavy tools or equipment. Every component can easily be carried by hand - a house is like a carpentry job on a larger scale. The main tool is a light, handheld screw gun. Since steel is strong, LGS structures are lighter than wood framed structures of equivalent strength.

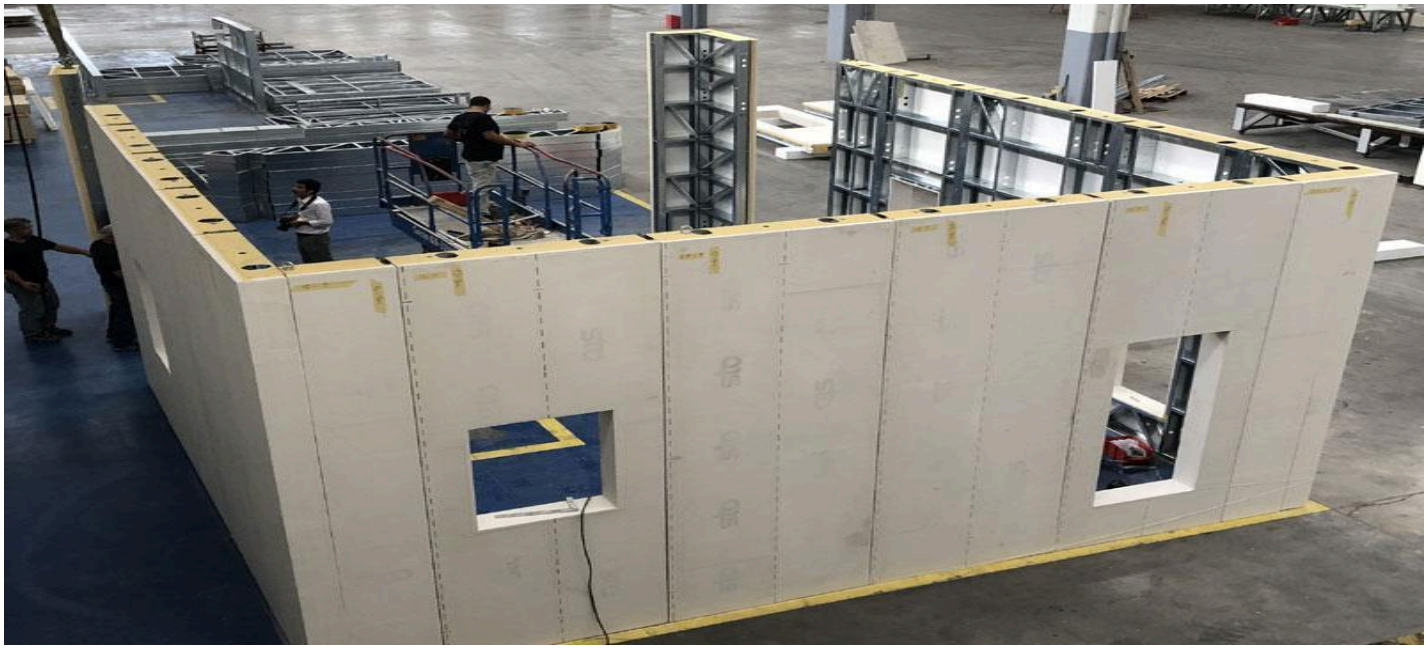
Their higher strength allows greater spacing between members when compared to wood frame construction: about 24" (600mm) for LGS vs. about 16" or 20" (400 or 500mm) for wood. Fewer members translates to quicker construction times.

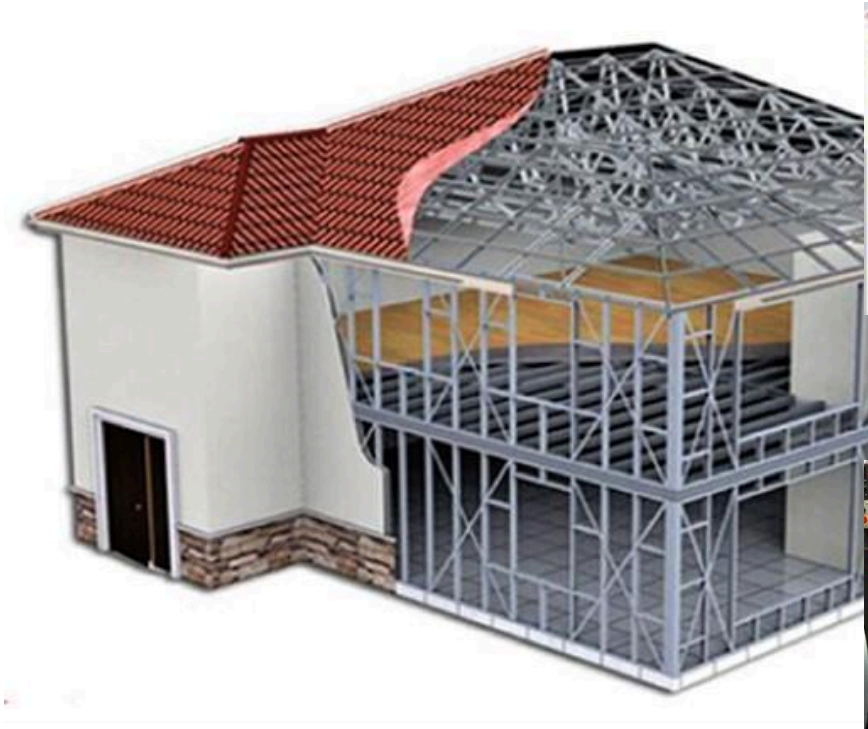
- It is able to shape itself to any form, and can be clad and insulated with a wide range of materials.
- It is easy to change or modify this construction at any point in its lifespan.
- There are a great range of systems and products catering to this type of construction.

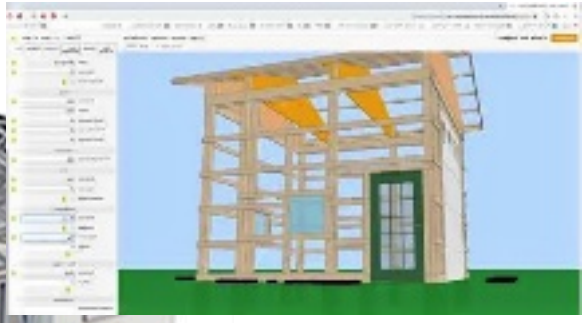
In addition,

Light gauge steel structures are non-combustible, which is a code requirement for some types of structures. Since steel loses its strength in fire quite easily, it must be protected from fire with fire rated sheathing or cellular concrete at the outside perimeter walls.

Light gauge steel structures do not rot, shrink, warp, or decompose like wood structures, and can be used in areas where there is a probability of termite attack.







2.

Cellular Lightweight Concrete (CLC) also known as Foamed concrete is one of the most significant types of concrete used for construction purposes due to its various advantages and usages over traditionally produced concrete.

Foamed concrete is manufactured by mixing Portland cement, sand or/and optional fly ash, water and preformed foam in varied proportions. Cellular lightweight concrete can be produced at building sites using machines and molds devised for normal concrete at ambivalent conditions.

Cellular concrete in construction or Lightweight cellular (foamed) concrete is made by mixing pre-formed stable foam and cement-based slurry. Cellular concrete is replacing traditional materials in the construction industry due to its lightweight, high quality and availability.

Cellular concrete can have a range of dry densities, typically from 400 kg/m3 to 1600 kg/m3 and a range of compressive strengths, 1 N/mm2 to 15 N/mm2. It is very versatile, since it can be tailored for optimum performance and minimum cost by choice of a suitable mix design

Accelerated urbanization, growth in infrastructural activities, and increasing industrialization have driven the growth of the cellular concrete market. The increasing income and spending capacity of people in developing economies and increasing demand by end-use sectors such as commercial buildings, residential buildings, and infrastructure are the major factors driving the market.

This growth will be stimulated by expanding applications in construction components, blocks, void filling, and roof insulation.

Due to its lightweight nature cellular concrete can indirectly reduce costs on a project by, for example, reducing the overall loading on a building so that fewer piles are needed to support it.

Cellular concrete is a very flow-able material and so can be easily installed by using gravity and can be self-levelling. It is typically used to construct floor slabs, window panels and roofs.

Cellular concrete provides structure, insulation, and fire and mold-resistance. Cellular concrete products include blocks, wall panels, floor and roof panels, and lintels. It also provides a low-density fill material used in geotechnical applications.

Advantages of Cellular Lightweight concrete

Cellular lightweight concrete has several advantages associated with their applications:

1. **Lightweight**
2. **Fire resistant**
3. **Thermal insulation**
4. **Sound absorption and Acoustical Insulation**
5. **Environmental Friendly**
6. **Cost-efficient**
7. **Termite proof and resistant towards freezing issues.**

1. **Lightweight**: Cellular lightweight concrete is low on weight and thus it has a positive impact on weight management of building material and craning work. Normal concrete on the other hand is very dense and it's difficult to work on it especially once it sets into a form.
2. **Fire resistance**: In CLC, the air pockets in its structure are responsible for high resistance to fire breakout. Irrespective of density range CLC walls are non-combustible and can endure fire breakout for hours.
3. **Thermal insulation**: At reduced density foamed concrete acts as a perfect thermal insulator. Although at this density it has absolutely no structural reliability in terms of strength.
4. **Sound absorption and Acoustical Insulation**: The low density increases acoustical insulation.
5. **Environmental Friendly**: Fly ash based cellular lightweight concrete is suitable for surrounding because fly-ash is one of the by-products of industrial waste.
6. **Cost-efficient**: Apart from fruitful application of industrial waste, addition of fly ash also saves considerable investment on cement products. Hence it substantially diminishes the cost of construction.
7. Cellular light weight concrete is also **termite proof** and **resistant towards freezing issues**.

3.

For formwork applications, fiber cement boards typically come in thicknesses ranging from 6mm to 20mm, with options like 6mm, 8mm, 10mm, 12mm, 14mm, 16mm, 18mm, and 20mm being common.

Here's a more detailed breakdown:

- **Common Thicknesses:** 6mm, 8mm, 10mm, 12mm, 14mm, 16mm, 18mm, and 20mm are frequently used.
- **Application:** These boards are suitable for various applications, including cladding, partitions, ceilings, stone/tile/brick backer boards, rigid air barriers, and in-situ formwork for concrete.
- **Dimensions:** Typical dimensions include lengths of 2,400mm, 2,700mm, or 3,000mm.
- Materials: The asbestos-free boards are autoclaved to form a dimensionally stable board.
- **Reinforcement:** Additional load capacity can be obtained by providing extra reinforcing bars and/or by increasing the grade of concrete.