



Recycling 1 tonne of steel saves 1,200 kg of iron ore, 500 kg of coal, 20 kg of limestone, and the landscape degradation of the quarries to extract them

# Light Gauge Steel Framing

## Composite housing process





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# LGSF PROCESSING



**RAW STEEL AT PLANT**



**COIL ROLLS**



**GALVANISED/GALVALUME/BLUESCOPE STEEL COILS**



**COIL SLITTING**

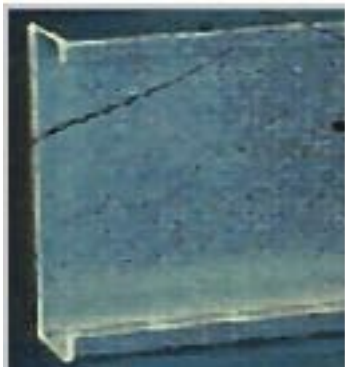




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# Profile with Roll Forming

- ✱ The coil is bent to profiles that is suited for Wall framing & Truss/Joists.
- ✱ A typical section consist of Channel with Lip commonly called Stud.
- ✱ Section without lips is called Tracks.
- ✱ Furring Channels are used as Purlins.
- ✱ Self Drilling Screws (Countersunk/Pan/hex Head) are used.



Hex head



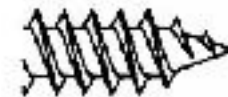
Pan head



Bugle head



Self-Drilling Screw Point



Self-Piercing Screw Point

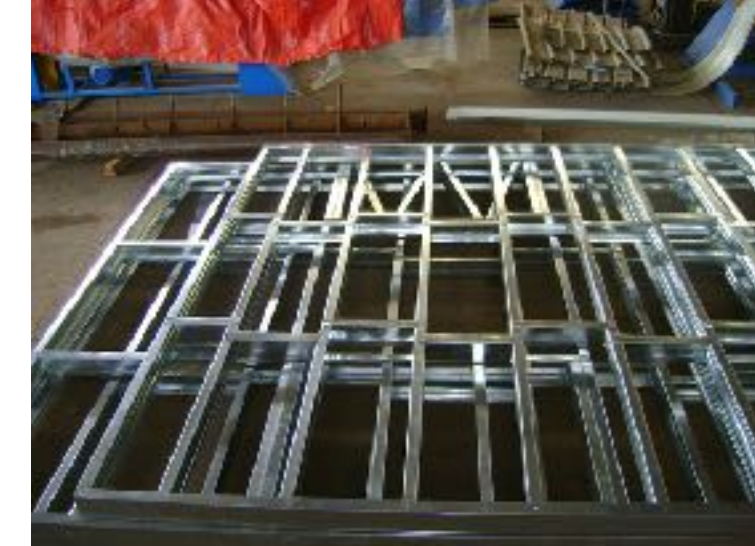






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# Framing Fabrication







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# Transport & Erection







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# Mesh-crete Wall Cladding







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# Slab or Roof

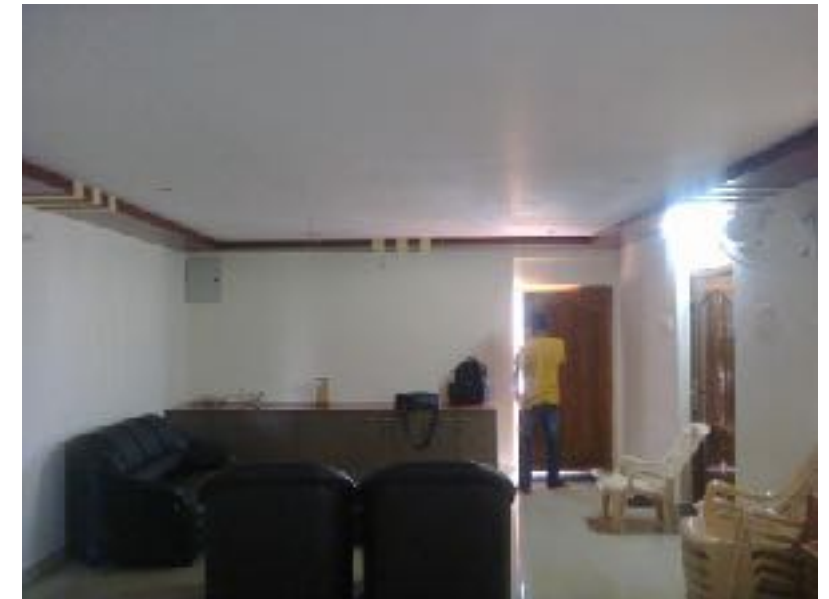






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# Residential







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# Farmhouse







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## Safilguda - Hyderabad (2014)

Penthouse - 1015 Sft.

House made with Load bearing walls

Actual Cost : 8.06 Lakh, Quoted - 10.15 Lakh







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## Safilguda - Hyderabad (2014)

CFS Tonnage = 2.23 Tons, 1mm thick, 100 Web, 50 Flange, 275Gsm, 345Mpa

Material Cost & Transport @ 75000 per Ton = Rs 1,67,250.

Erection Time = 3 Days







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## Safilguda - Hyderabad (2013)

EPS - 50mm thick - 15Kg/m<sup>3</sup> density @ 18 Rs/ Sft

Welded wire fabric - 1.4mm dia @ 60mm X 60mm @ 5 Rs/ Sft

Wall area - 2100 Sft. EPS Cost - Rs 37,820.

Mesh Cost - Rs 21,000. (both sided)

Activity - Day 3 to Day 6







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## Safilguda - Hyderabad (2014)

Deck Sheet - 0.6mm thick Bare Galvalume @ 40 Rs/ Sft.

Sheet area - 1288 Sft. Cost - Rs 51,520.

Electrical conduits and Flex pipes - Sudhakar make - Rs 8,000

Plumbing Pipes - Rs 12,000

Activity - Day 3 and Day 6

Slab Reinforcement with Bending and placement- 700 Kg @Rs 55/kg - Rs 38,500. Activity at Day 8.







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## Safilguda - Hyderabad (2014)

Shotcrete area - 4200 Sft, Thickness 35mm ~ 14 Cu.m

Chemical Adhesive - 4 Litres @ 800 Per litre - Rs 3200

Birla Cellulose fibre - 4 Bags @ 1200 per bag - Rs 4800

Shotcrete (cement, 5mm sieved aggregate & Sand) - Rs 3300/Cu.m

Shotcrete cost - Rs 46,200. Activity Day 12 to Day 18.







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## Safilguda - Hyderabad (2014)

Slab area - 1022 Sft. Concrete Volume - 8 Cu.m.

Slab concrete cost M20 grade - 3200 Per Cu.m - Rs 25,600

Activity - Day 18

Weathering Coarse - Lumpsum - Rs 18,000

Activity - Day 22







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## Safilguda - Hyderabad (2014)

Plastering 12mm thick - 4.5 Cu.m

Activity - Day 18 - 25

Cement / River sand - Cost - Rs 22,000 (~ Rs 5000 Per Cu.m)







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## Safilguda - Hyderabad (2014)

False ceiling - Gypsum @ 42 Rs/ Sft

False ceiling area - 1100 Sft + 220 Sft (Design) - 1320 Sft

Cost - Rs 55,440.

Electrical wiring and fittings - Finolex wires - Rs 21,000.

Parallel activity upto Day 38







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## Safilguda - Hyderabad (2014)

Door frame (Main Teak & internal neem)

Main Teak @ Rs 9500.4 Neem doors frames @ Rs 1500 each - Rs6000

Doors Flush with laminate - Rs 22,000

Windows - UPVC make NCL wintek brand @ 350 Rs/Sft

4 No's 5'X4' & 3 No's 2'X4' - Rs 37,000.

Window Grills - 105 Kgs - Rs 9500. Activity Upto Day 45.







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## Safilguda - Hyderabad (2014)

Painting - Exterior Birla putty, Internal Alteck, One coat primer and 2 coats Asian paint make emulsion @ 16 Rs/ Sft for exterior and Rs 14/Sft for interior. Texture scrub used in elevation.

Overall wall area 4200 Sft. Cost - Rs 64,000. Activity Upto Day 62.







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## Safilguda - Hyderabad (2014)

Floor Tiles - 2 X2 vitrified with matt finish @ 55 Rs for material and 12 Rs for laying. 4 Chemical grout bags @ 1200 Per bag - Rs 4,800.

Anti skid at Bathroom areas and wall ceramic tiles upto 7'.

Floor area including 4" skirting - 1120 Sft. Flooring price - Rs 78,400







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## Safilguda - Hyderabad (2014)

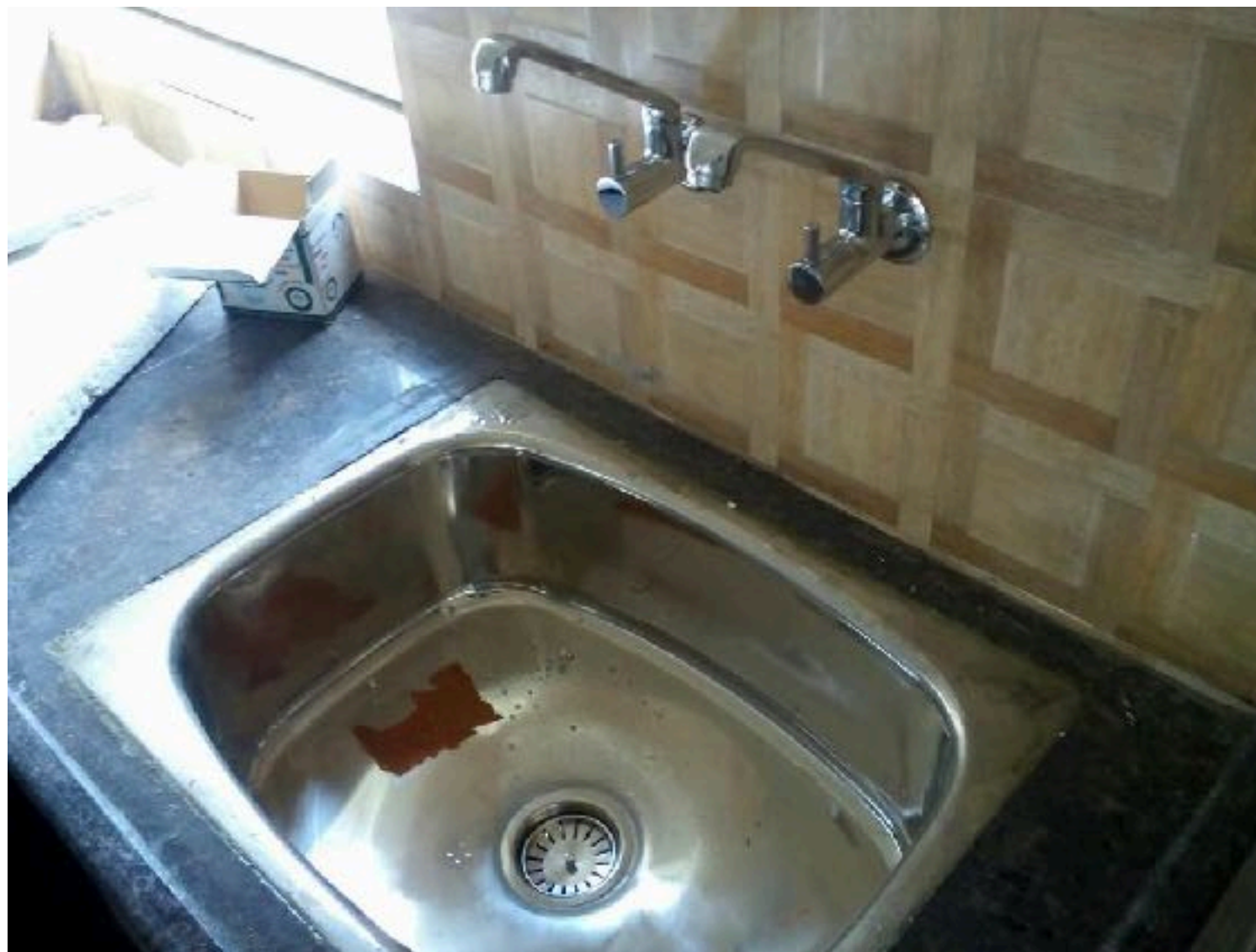
Terrace MS Railing - 2'6" height - 132 Rft ~ Rs 28,000

AAC blocks for open kitchen granite, Water tank brick padding and parapet ~ 110 Blocks - Rs 8800

Kitchen granite platform - 26 Sft, Black pearl make - Rs 4000.

Internal platform racks with Double polished kadapa stone - Rs 12000

Stainless steel sink with fittings - Rs 6500







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## Safilguda - Hyderabad (2014)

Electrical fittings - Anchor /Roma make - Rs 18000

Sanitary fittings. Two bathrooms , Cera commode with health faucet ,  
Flush - Rs 4500 each, and Sink @ Rs 2800 with shower and Tap fittings  
@ Rs 9000 Lumpsum. in each bathroom.

Syntex 1000 liters over head tank - Rs 6500.







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## Safilguda - Hyderabad (2014)

MS Staircase with railings- Lumpsum Rs 35,000.

Tiles on three sided slab projection - Rs 21,000. (Additional)

Structure Cost - Rs 400 / Sft (Approx)

Finishes - Rs 450 / Sft (Approx)







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## Penamaluru- 780 Sft @ 6.6Lakh

Old age home at vijayawada.  
Finishes as basic EWS.







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# Penamaluru- 780 Sft @ 6.6Lakh







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## Penamaluru- 780 Sft @ 6.6Lakh







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# Why Steel Framed Construction?

- \* Monolithic construction system (air-tight) – therefore no thermal bridges.
- \* Higher Flexibility due to material unification (same material for inside and outside walls, ceilings, floor).
- \* Non-Combustible Construction System.
- \* Very high CE ratings for fire, thermal and acoustic properties.
- \* High Earthquake Protection (structurally rigid when bound to internal steel frame).
- \* Light and easy to handle – no special equipment (heavy cranes, machinery) needed on-site.
- \* Generally far cheaper than alternative “eco” building systems \_ Minimises handing and installation time, manpower and related costs.
- \* Minimises downtime due to illness and accident (therefore also insurance costs).
- \* Minimises wastage and Less Life cycle Cost.
- \* Green & Sustainable





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# Limitations

## ✱ Long Spans.

1. Effective upto 20' (6m) with truss depth of 300mm.
2. Deflection control & First mode frequency..

## ✱ Number of Floors.

- Dry or Composite complete LGS could be feasible upto 5 Floors.
- Beyond that need a combination of Hot rolled/ Shear core, But joint articulation is the key with difference in stiffness





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# Cost trade off

Foundation ~ Rs 80/ Sft to Rs 150/Sft

Structure ~ Rs 250/Sft to Rs 500/ Sft

Finishes ~ Rs 350 / Sft to Rs 700 /Sft





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# Foundation

Black cotton

Hard Rock

Super structure weight





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# Structure

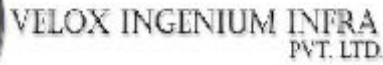
Planning - Wall to Floor area Ratios.

Material/ Resource selection -

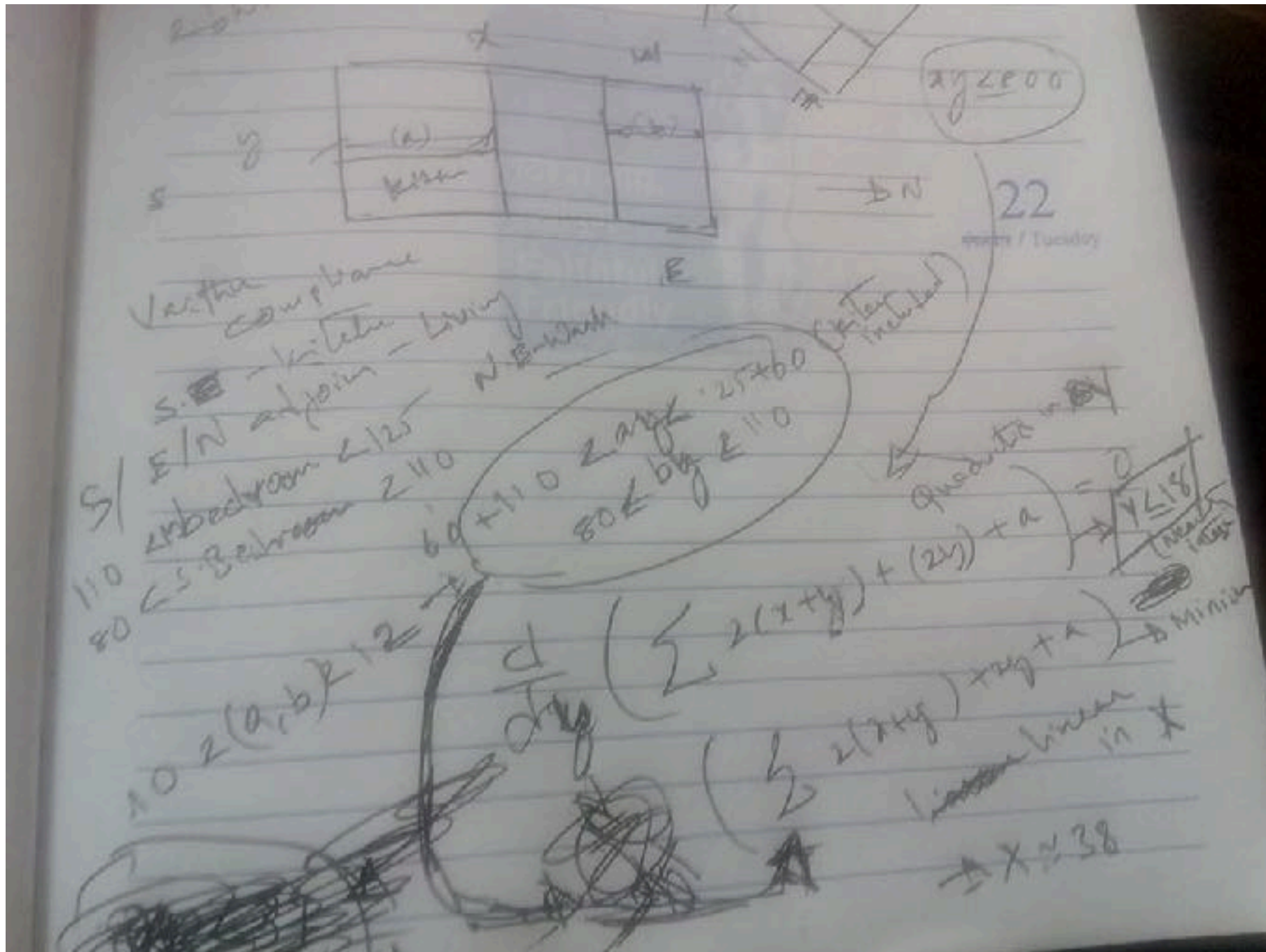
If labour intensive - Dry construction.

Always engineer cladding with locally available material.





Plan the space where wall area to floor area is minimum.



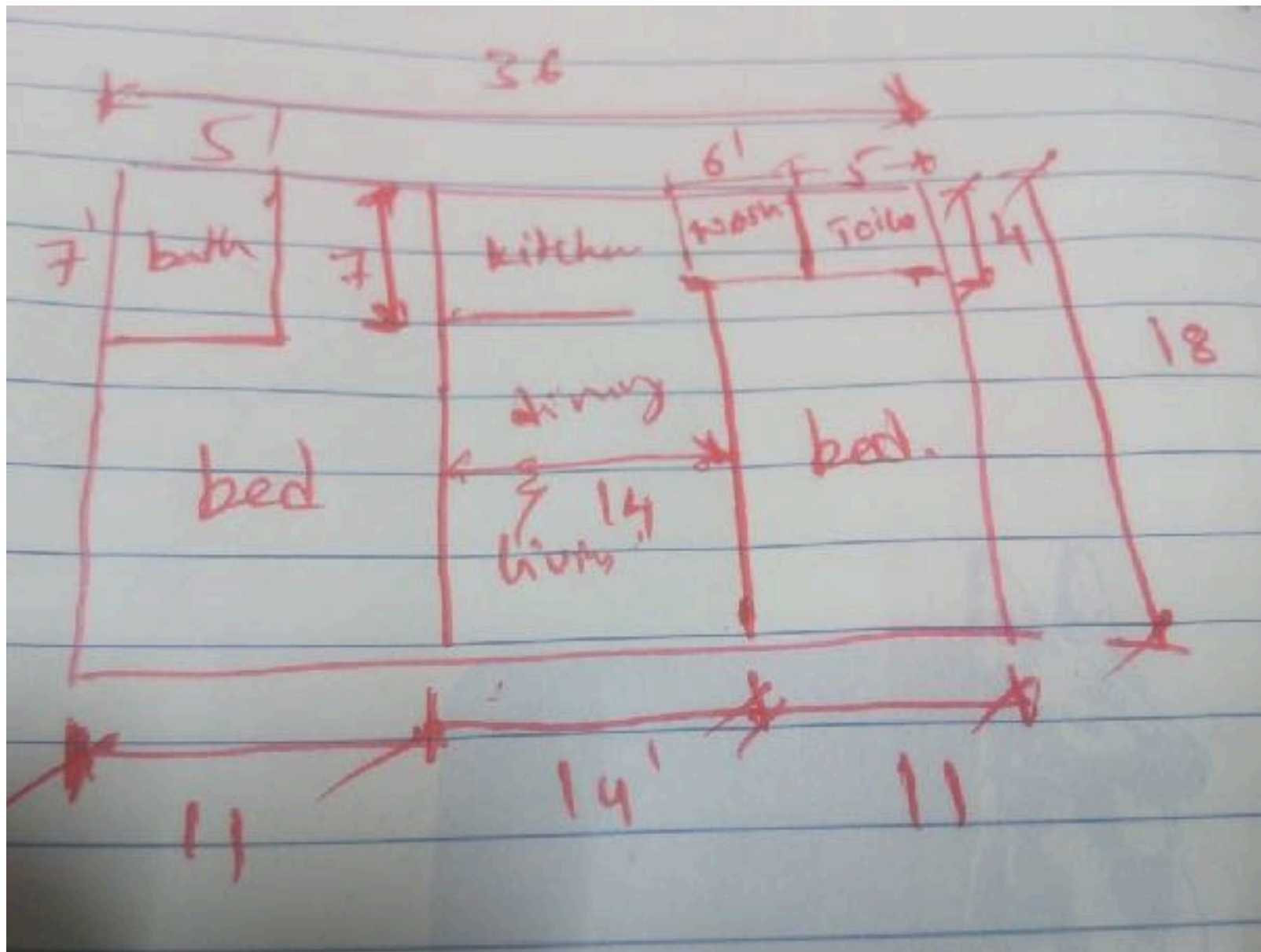


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# Structure (Planning)

648 Sft. Minimum width 10'6"

More common walls between blocks, more advantage

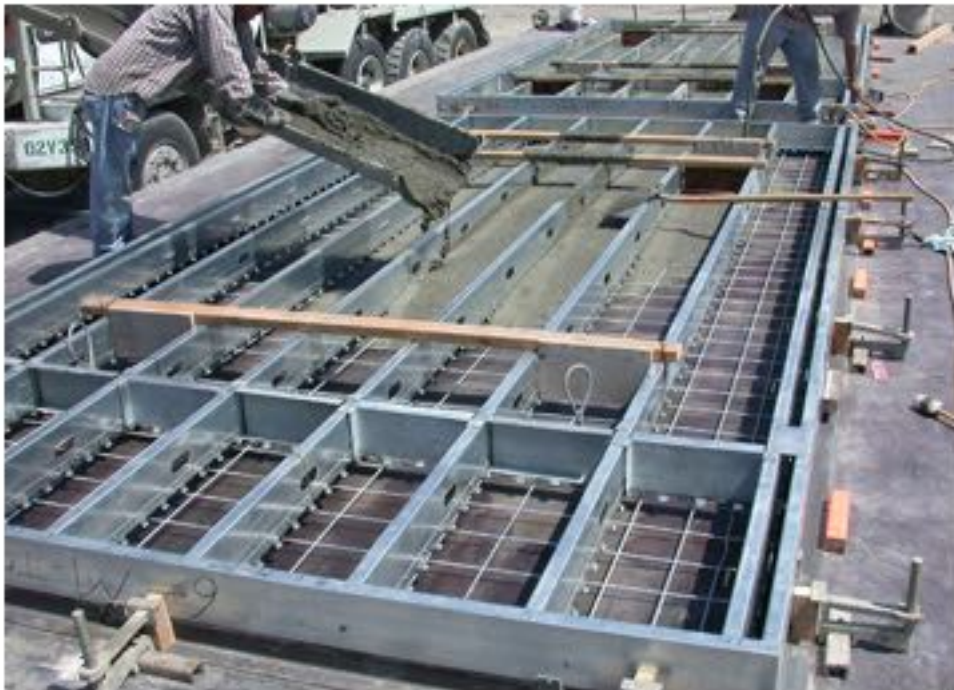
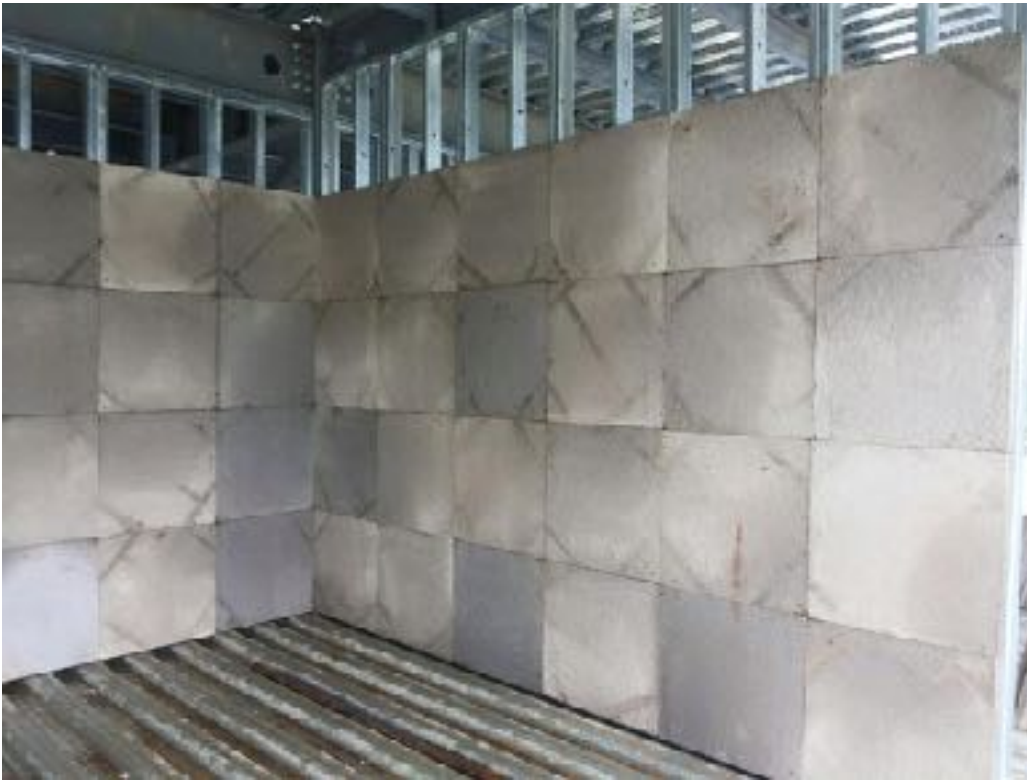






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# Structure (Material/ Resource selection)

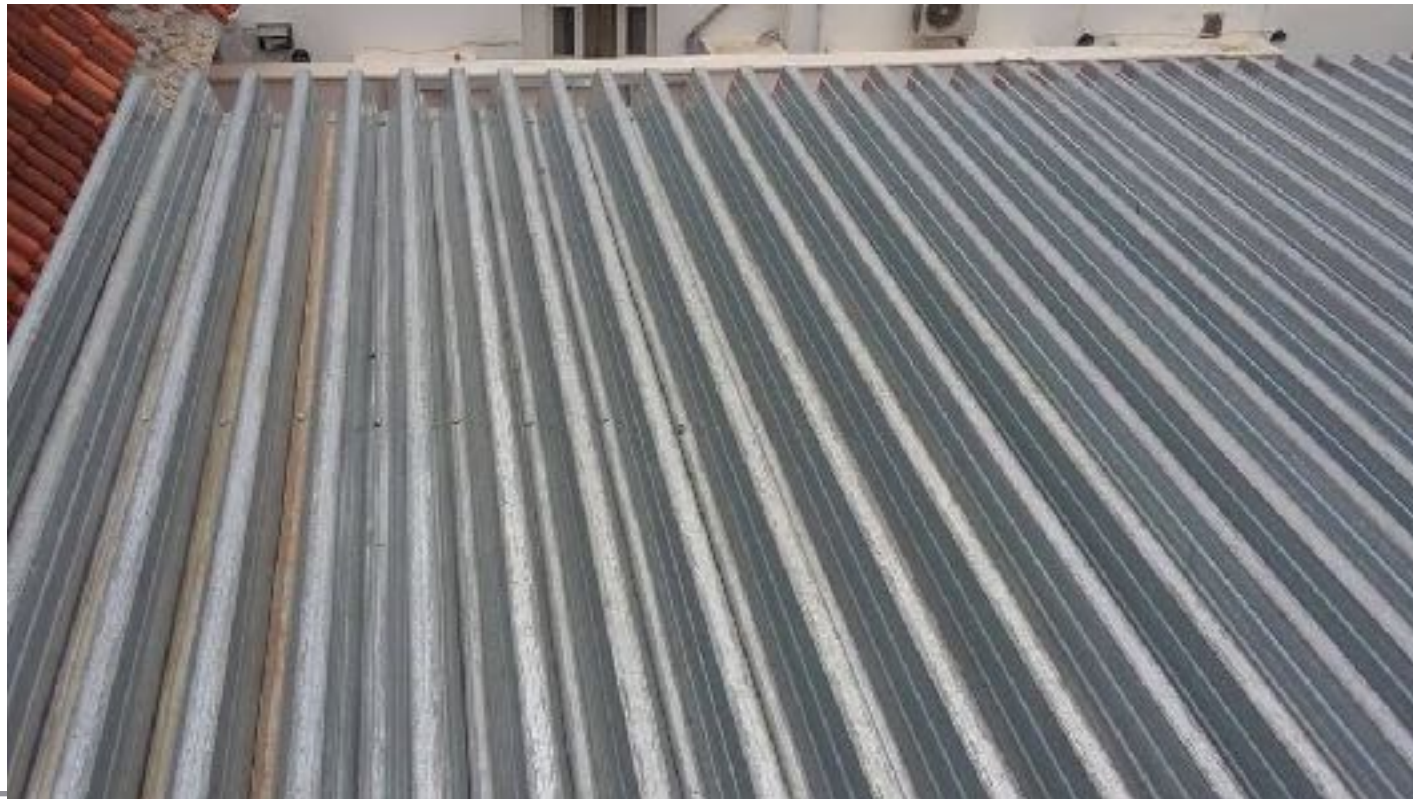






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# Can we avoid Joists?







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# Can we avoid joists?







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# Can we avoid joists?







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# Can we avoid false ceiling?







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# Social acceptance and fads

## Alternative to EPS







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# Social acceptance and fads

## AAC/ Foam block instead of EPS







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# Durability & Functional performance

Weathering - Periodic painting could avoid external weathering issues.

Fire Rating : Shotcrete scrid have the hereunder

1 1/2 hours

63mm EPS Core, 38mm concrete each side

- 2 hours

63mm EPS Core, 50mm concrete each side

- 4 hours

63mm EPS Core, 80mm concrete each side

However vermiculite mix in concrete design shall answer most of the fire rating issues.

## . INSULATION RATINGS:

- 63mm EPS Core = R Value 11.0

- 100mm EPS Core = R Value 18.0

- 125mm EPS Core = R Value 23.0





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# Applications

