

Unit House of 350 sq. ft. Floor Area



Steel Intensive Rural Structures - INSDAG Initiative

To achieve the goal of ensuing sustainable construction and for its mission of steel promotion INSDAG has developed few design models of rural buildings using structural steel.

4 building plans collected from municipalities of West Bengal have been used for building design.

1. One Unit house if Area 350 Sq Ft
2. One Anganwadi –cum- Health Centre of area 400 Sq ft
3. A meeting / Panchayat hall of area 1500sq.ft
4. A school building of area 2600sq.ft

A. Salient Features / Building Components of in Building Models with Steel Framing

i) Roofing

Roof sheeting is done with 0.5 mm thick Corrugated Galvanized/ Galvalume/ colour coated Steel Sheets spanning over purlins supported on steel portals or trusses made from Square Hollow Section/ Rectangular Hollow Section. Lighter weight Galvalume sheet and FC panel can also be used.

ii) Structural Framework

Structural steel Column and Trusses / Portal Frames using SHS/RHS

The entire framework for the building has been conceptualized using Square Hollow Section with idealized panels approximately 1.0mx1.0 m. The members are connected with the SHS or RHS sections by insert plates.

iii) Ferro-Cement Wall panels/Cladding

A typical panel size of 1m x 1m for the cladding materials has been chosen. Each panel is made of a 15 mm thick Cement-Sand mortar (1:1) skin with 1 layer of 0.265 mm diameter galvanized chicken mesh under a layer of 2.65 mm diameter reinforcement @ 25 mm c/c both ways as welded mesh placed centrally. The typical details of the connection of these panels are in the corresponding drawing sheets of each building . The gaps (approx. 2 mm) between the panels and SHS sections will be sealed with waterproof grouting using SIKA / Accoproof or equivalent, to make the connections leak proof.

iv) RCC Foundation System

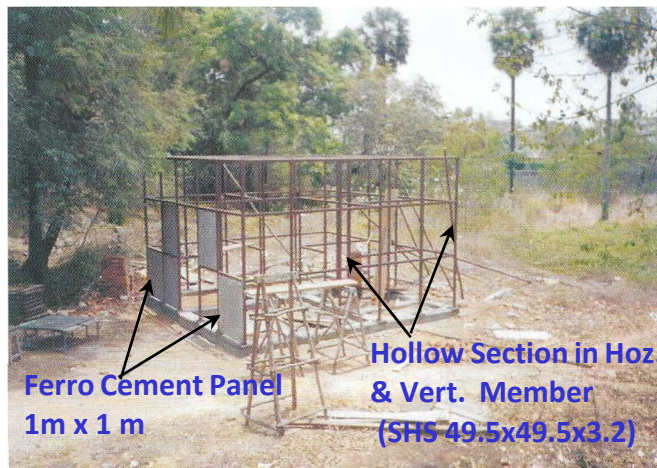
The foundation type and pattern for all of the housing modules has been conceived as a frame work of RCC peripheral beam at plinth level supported over RCC pedestals and RCC isolated footings. For partition walls, intermediate supports have been considered supported over tie beams.

v) **Flooring**

Brick on-edge flooring placed over rammed earth at locations of rooms. For water-tightness flooring is placed over 50 mm thick 1:2:4 Plain Cement Concrete.

vi) **Doors and Windows**

Steel framed doors and windows are assumed to be used. Depending on the local site condition other material can be used also to make it cost-effective.



Structural Frame & Ferro cement panels while Installation



Connection of SHS with Ferro cement panel

Prototype Buildings Installed by INSDAG



Picture 1



Picture 2

**Model Rural House Installed at Rural Technology Park
at the Campus of National Institute of Rural Development & Panchayat Raj, Hyderabad,
(Installed in 2017, still in good condition in 2023)**

Many more prototypes have been installed by INSDAG in many places like in Burdwan in West Bengal (2013), Tripura, Talegaon in Maharashtra (2017) with FC Panels.

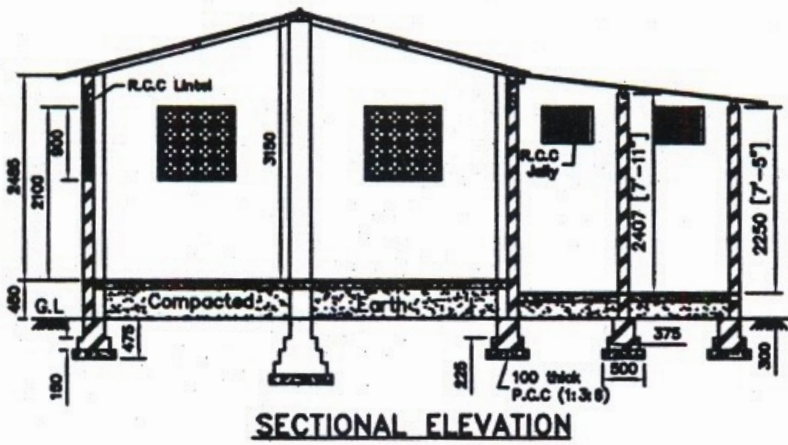
B. Cost Aspects

Steel framed building module by INSDAG would cost around Rs. 1100 to 1300/- per sq. ft of area (as estimated with DSR 2023) with steel usage of 4.0 to 5.3 kg steel per sq. ft. of construction area (structural steel & TMT bars) which is competitive and sometimes lower if constructed in mass scale.

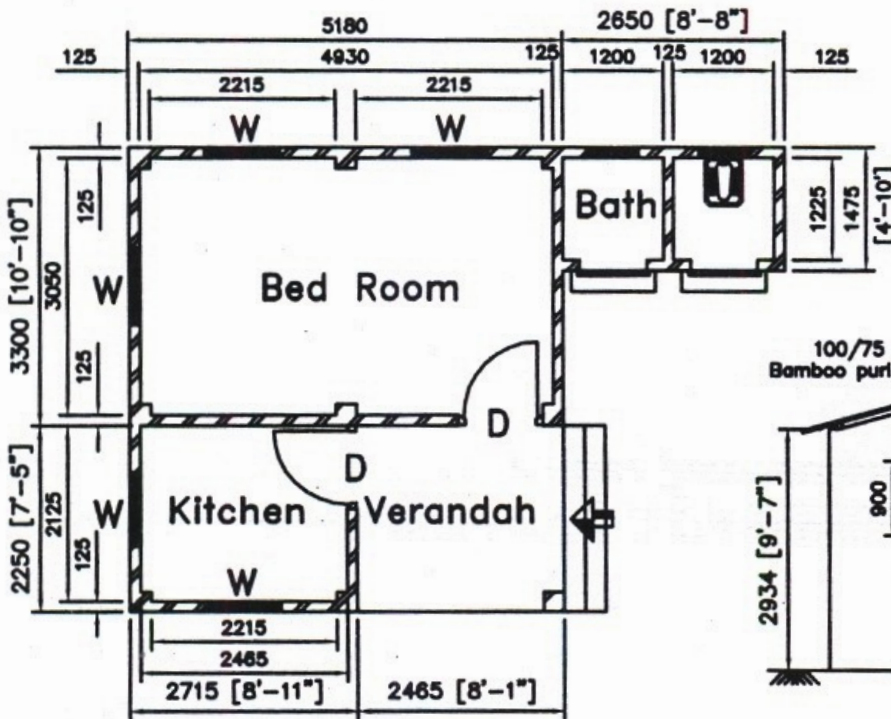
Cost & Steel Usage – 4 Building Modules

Building Type	Area Sq. Ft.	Cost per sq. ft.	Steel usage (Structural Steel & TMT)
Unit House	350	Rs. 1295 /-	5.3 kg / sq. ft. (only structural steel- 4.54)
Health / Aanganwadi Centre	400	Rs. 1125 /-	4.9 kg / sq. ft. (only structural steel- 4.00)
Meeting Hall	1500	Rs. 1276/-	4.7 kg / sq. ft. (only structural steel- 4.0)
School Building	2600	Rs. 1050 /-	4.0 kg / sq. ft. (only structural steel- 2.7)

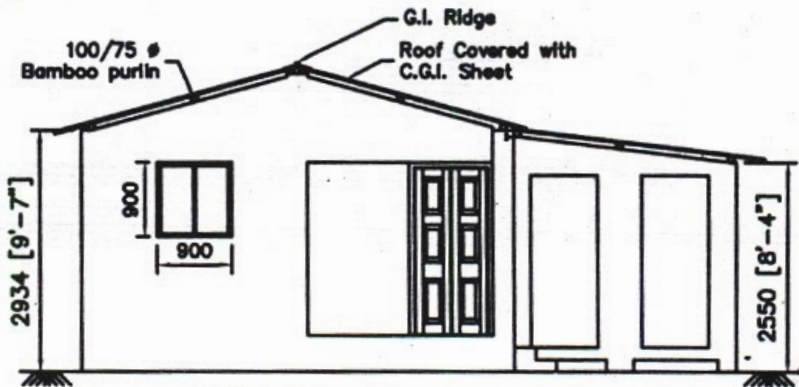
Architectural Plan of 350 sq. ft Floor Area of Unit Housing



SECTIONAL ELEVATION



PLAN



FRONT ELEVATION

PLAN AND ELEVATION SHOWING UNIT HOUSE

350 SQ. FT. FLOOR AREA

NOTES :

1. ALL DIMENSIONS ARE IN MM. & LEVELS ARE IN M.
2. DRAWING COLLECTED FROM S.A.E. OFFICE RANAGHAT BLOCK, WEST BENGAL



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TITLE : ARCHITECTURAL PLAN OF UNIT HOUSE UNDER IAY

DRG. NO.: INS/CON/12-13/01/IAY/ARC

DRAWN	SM	CHKD	ND/SC	SCALE	1:50, 1:20, 1:10	DATE	10/12/13	REV.
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