

PROPOSAL FOR THE CONSTRUCTION OF LOW COST HOUSE AT IBRAHIM HYDERY, KARACHI

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1.0 A BRIEF ABOUT COUNCIL FOR WORKS AND HOUSING RESEARCH

The Council for Works and Housing Research (CWHR) was established in 1964 as an autonomous organization under the aegis of the Ministry of Rehabilitation and Works. Government of Pakistan. In 1972 CWHR was transferred to the Ministry of Science and Technology.

In order to materialize the objectives of the Council in the field of research in buildings, the National Building Research Institute (NBRI) was established at Karachi in the year 1985 by upgrading the former Building Research Station (BRS) which existed since 1954. As per the decision taken by the Government during its Cabinet meeting held on 27-01-1997, NBRI was merged with CWHR.

The main function of the Council are to initiate, promote and guide the scientific research having bearing on problems connected with all types of civil engineering structure such as building, road, bridge, dams harbours, treatment plants etc and economical utilization of construction materials or with any other allied matters referred to the Council by the Federal Government, Public Sector and Private Sector.

Some of the major achievements of this Council are as follows:

- i) Establishment of National Building Research Institute
- ii) Evaluation of Appropriate Construction Materials, Technologies and Construction System for Low Cost Housing.
- iii) Study and development of simplified Methods of Building Design and Construction through Indigenous Materials and Techniques.
- iv) A display Center has been set up in the premises of CWHR for displaying R & D products, processes and construction techniques developed at CWHR for wide adoption and dissemination for use in low cost housing programmes and to promote their marketing capabilities.
- v) Extension Service Laboratory for carrying out commercial testing consultancy service established at CWHR.
- vi) Construction of 10 Nos. Demonstration Model Units with indigenous material & innovative techniques developed by CWHR.

- vii) Feasibility survey for Development and Demonstration of Energy Efficient, Environment Friendly & Thermally Insulated Low Cost Houses in Different Regions of Pakistan.
- viii) Establishment of Non Destructive Testing facilities at CWHR.
- ix) A R&D park has been constructed in the premises of CWHR for display of full scale R&D products developed by CWHR.
- x) Mechanized production of Pre-Cast Reinforced/Plain Cement Concrete Lining Unit for Irrigation Channel.
- xi) Construction of Pilot Plant for the Manufacture of Organic Fibre-Chicken Mesh Reinforced Concrete Corrugated Roofing Sheet for Low Cost Housing

2.0 A BRIEF RESUME OF THE R & D WORK DONE BY CWHR IN THE FIELD OF LOW COST HOUSING

CWHR has developed a number of indigenous materials and innovative techniques for the construction of low cost and structurally sound structures.

In order to disseminate R & D result, low cost construction materials and techniques a number of demonstrative model structures have been constructed.

- i. Low cost school at Hub, Balochistan, constructed at an over all economy of about 37%.
- ii. Ferrocement room at NBRI premises; about 30% economy was achieved.
- iii. Construction of 3 class rooms at Gharo, Sindh; in this about 43% economy was made possible.
- iv. Construction of 1st floor of Administration Block at NBRI premises; economy was effected by adopting waffle slab construction.
- v. Construction of one room at NBRI, using granulated blast furnace slag cement as an economical construction material.
- vi. Lowe cost house using Rice Husk Ash and lime as cement at NBRI premises; about 37% economy was made possible.
- vii. Construction of demonstration low cost housing unit at Old Thano village, Malir, Karachi. The house is a two roomed structure with Kitchen & bath covering about 466 Sq. ft. constructed at a cost of Rs.250 per Sq.ft.
- viii. Construction of 2 Nos. Community Centres, one at NBRI premises and the other at Sheikh Somar, District Thatta.
- ix) Low Cost Rooms built using soil stabilized block technique at CWHR, Karachi
- x) A Low Cost Community Room built by CWHR At Muhammadabad, District Thatta, Sindh

3.0 DESIGN AND SPECIFICATION FOR A TYPICAL LOW COST HOUSE PROPOSED BY CWHR FOR THE PROJECT.

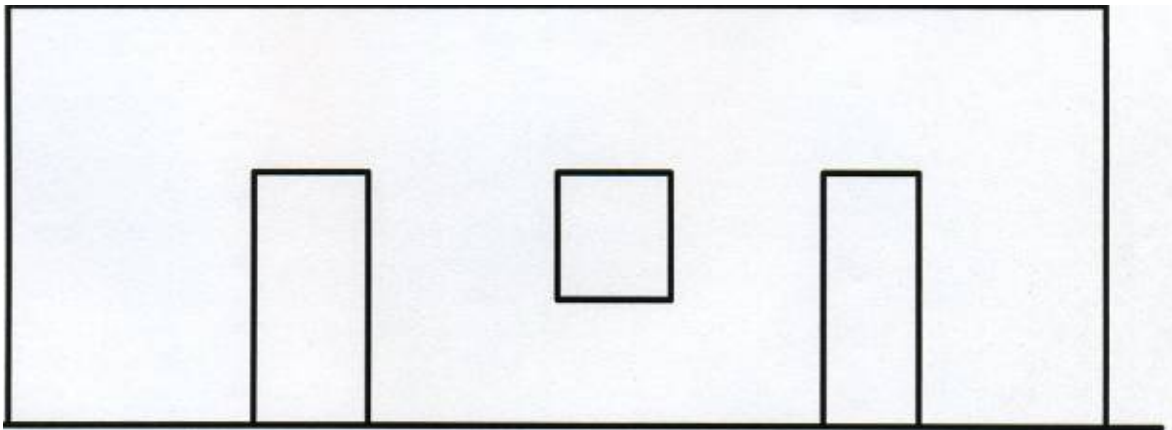
On the advise of Mr. Zia-ul-Islam, Special Assistant to Chief Minister, for CMIE & I Team and Chairman, People Housing Cell, Government of Sindh, a technical team of CWHR headed by Mr. Nadir Mansoor, PRO, CWHR along with the team of PHC visited the burnt hut of Fisherman Mr. Abdul Sattar on 23-12-2008. The hut got fired on Monday night i.e. 22-12-2008 in which three children of Mr. Abdul Sattar were burnt to death.

The hut is situated in a compound of 43'-0"x 68'-0" size in Rajani Mohallahat Ibrahim, Hydery, Karachi. The compound is inhabited by three brothers and one widow sister of Mr. Abdul Sattar in two other huts and one room made up of block masonry with pre fabricated roof .

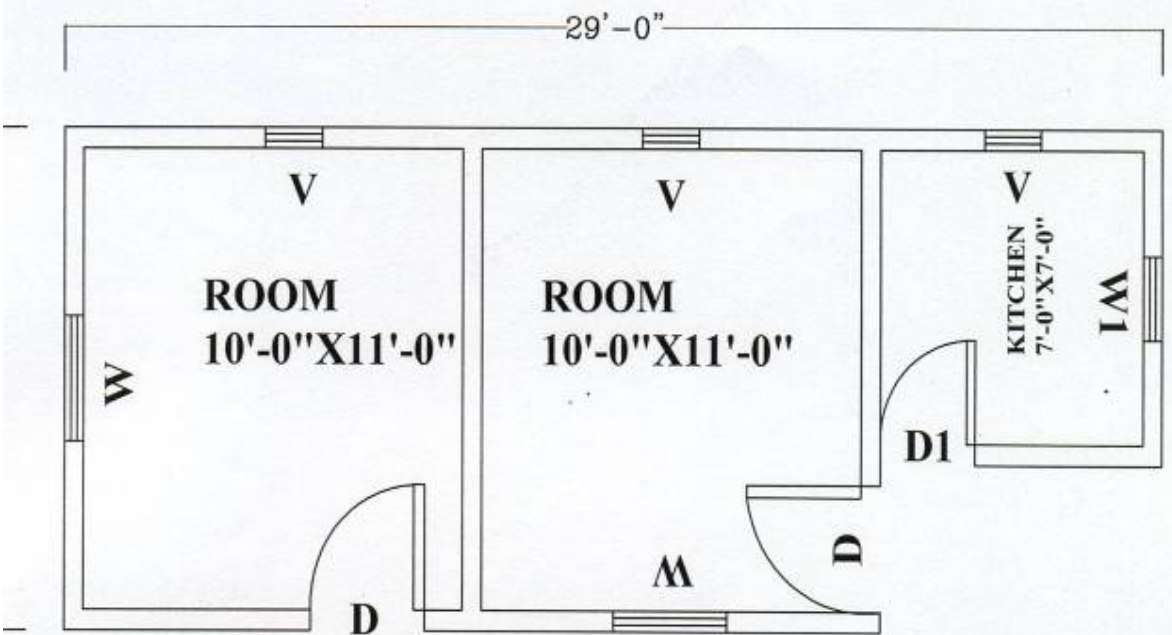
Keeping in view the type of construction and living style of people in the area the CWHR proposed low cost house to be built in place of Burnt hut with the following specifications:

FOUNDATION	:	The foundation shall be soil-cement stabilized having designed proportion of cement-soil mixture for a strength of 600 PSI. (Technology developed by CWHR)
PLINTH	:	SRC Block masonry with SR cement
D.P.C.	:	1:2:3 concrete with polythene. (Technology Developed by CWHR)
SUPER STRUCTURE	:	SR cement block masonry with SR cement sand mortar.
ROOF	:	Precast burnt clay tiles panel supported on pre-cast R.C.C beams. (Technology developed by CWHR)
DOOR	:	Ferrocement door & window shutters. (Technology developed by CWHR).
FLOORING	:	Compacted earth 3" thick soil-cement stabilized base and 1 ½" thick topping with 1:3:3 concrete smoothly finished. (Technology developed by CWHR)

(Details of the technologies developed by CWHR and to be adopted for the construction of the above low cost houses are placed as Annexure 1 to 5).



ELEVATION



PLAN

SCHEDULE OF OPENINGS

DOOR

D : 3'-0"X6'-6"

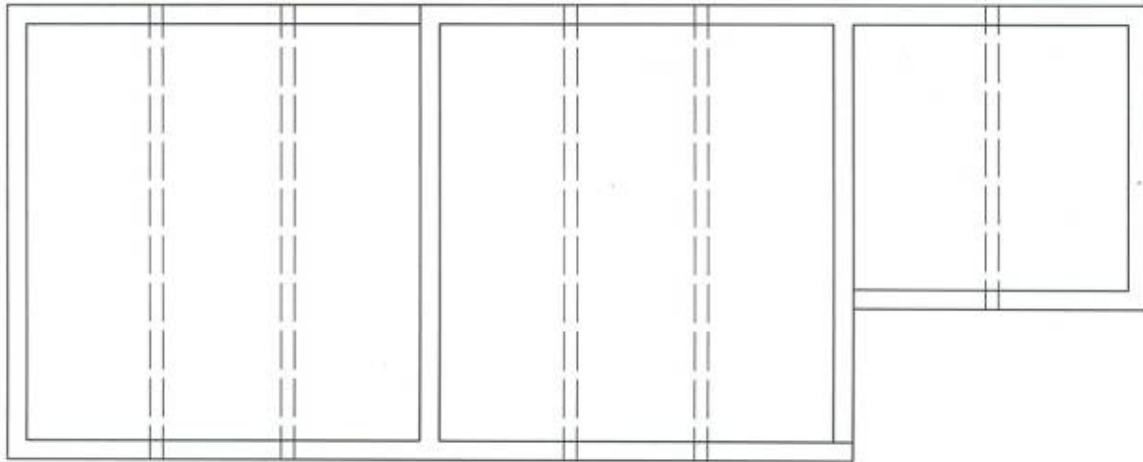
D1:2'-6"X6'-6"

WINDOWS

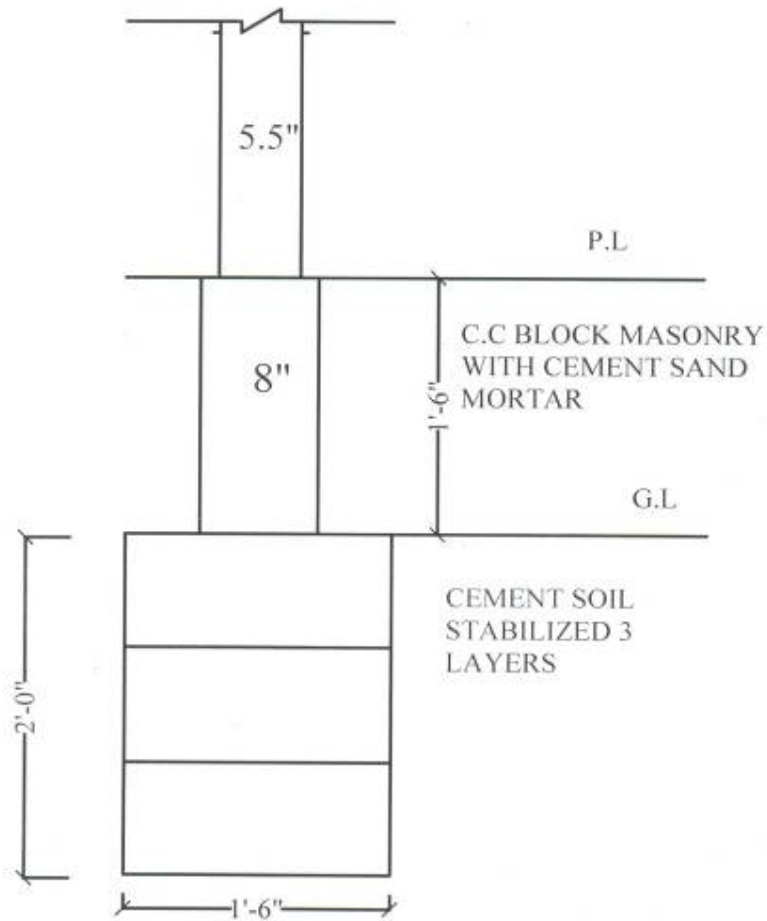
W :3'-0"X3'-0"

W1:2'-0"X3'-6"

V :1'-0"X1'-6"



KEY PLAN



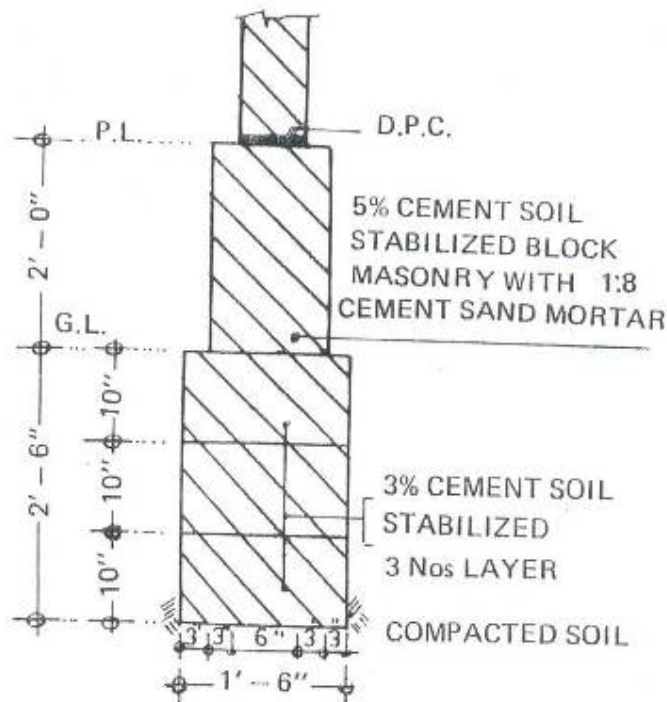
FOUNDATION DETAIL

SOIL STABILIZED FOUNDATION

The stability of building primarily depends on the foundation it is built on and the foundation in turn depends on the type of building and above all, on the load bearing capacity of the ground.

With regard to Low Cost Construction, the soil stabilized foundation was developed by the institute and two experimental and demonstration rooms constructed in 1980 in the premises of institute using soil stabilized foundation.

The foundation will be laid at a depth of 2'6" from the ground level. The base of foundation will be compacted with a mechanical compactor to give a density of 90% of maximum dry density. The foundation will be filled upto the ground level in three equal layers with 3% cement-soil mixture and will be compacted upto 95% of maximum dry density.



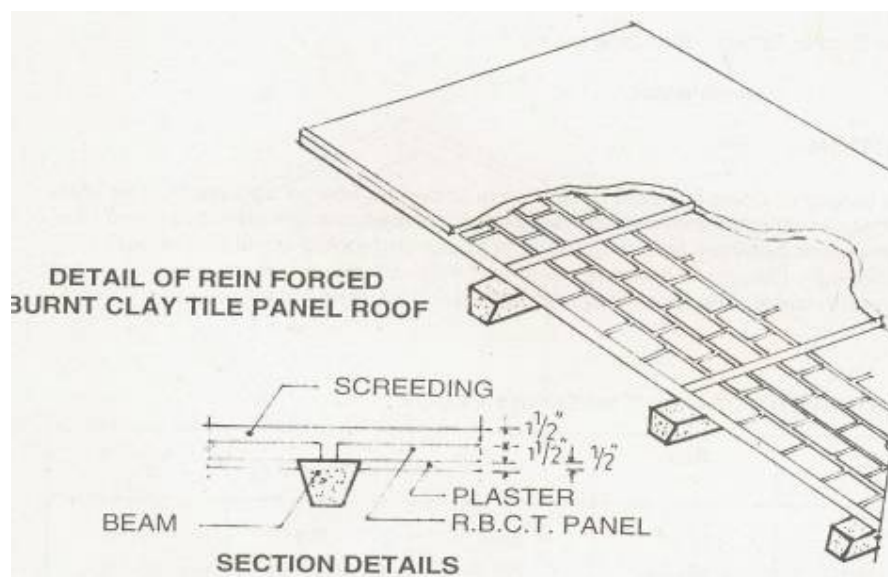
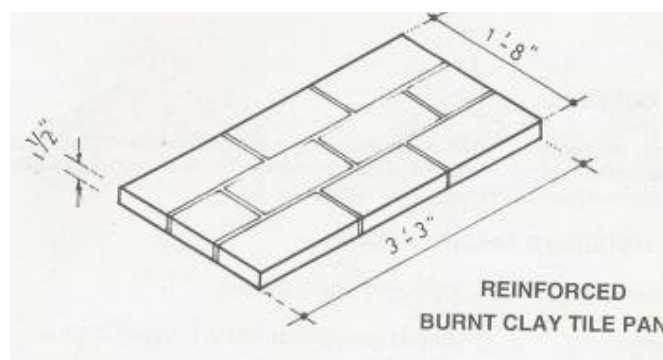
DETAIL OF FOUNDATION

REINFORCED BURNT CLAY TILES PANELS

FOR ROOFING

The roofing panels are developed in NBRI, to replace R.C.C roofing tiles. The panels are made of burnt clay tiles which are reinforced with steel bars and bounded by cement-sand mortar. The panels are about 24% lighter than R.C.C tiles.

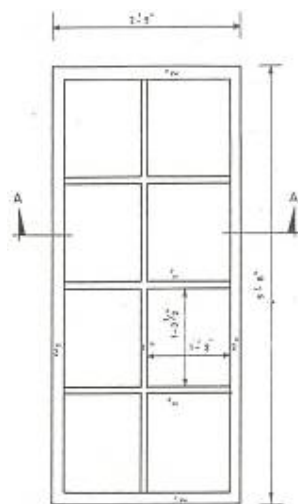
The tiles are soaked in water and arranged in parallel rows within wooden or steel frame, which is placed on an oiled smooth surface. After half-filling the joint with 1:3 cement sand mortar, two ¼" dia mild steel bars are placed in longitudinal joints. Then the joints are filled up with mortar. The panel is cured for 7 to 14 days before they are used in construction.



FERROCEMENT DOOR SHUTTERS AND WINDOWS

Ferrocement is a composite material of Portland cement mortar matrix, reinforcement, admixtures and coating. It possesses a degree of toughness , ductility , durability, strength to weight ratio .The materials required for making it namely cement, sand, wire mesh and mild steel reinforcing bars are easily available every where . It combines the lightness of steel and mould ability of concrete and can be casted to any shape. CWHR has conducted extensive R&D work, over the past decade, on technology of ferrocement and have developed ferrocement door and window shutter as a cheaper alternative to timber or steel shutters. The ferrocement door and window shutter bear the following salient features

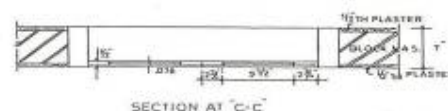
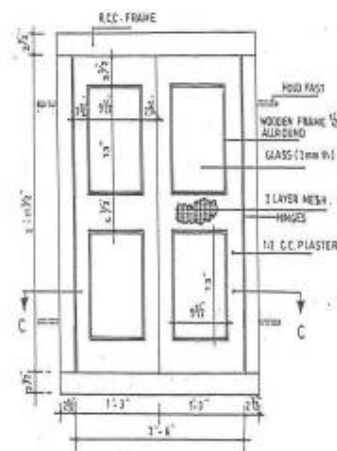
- Termite resistant and fungus proof
- No warping ,rotting and swelling.
- Strong and durable
- Less prone to fire and weathering
- Over all economical than wood.



PLAN



SEC. AT "A-A"



SECTION AT "C-C"

COST ESTIMATE FOR LOW COST HOUSE

S.N	Description	Unit	Quantity	Rate(Rs)	COST (Rs)
1	Excavation for foundation in soft soil	cft	263	5	1314
2	Providing and laying Soil cement(3%) Stabilized foundation	cft	263	12	3154
3	Providing and laying C.C. blocks in plinth	No	260	22	5720
4	Providing and laying 2" thick D.P.C(1:2:3 concrete with polythene sheet in plinth)	cft	10	150	1500
5	Providing and laying 6" thick C.C. blocks masonry with 1:6 in superstructure	No	1090	22	23980
6	Providing ,erecting and fixing precast R.C.C Beams(6" x 7")	rft	56	90	5040
7	Providing ,erecting and laying precast Burnt Clay panel Tile (20" x 40")	No	52	200	10400
8	Providing and laying 1 1/2" thick C.C. Screeding with 1:6 C.C at roof	cft	39	150	5814
9	Providing and laying Flooring	sft	264	30	7913
10	Providing & applying 3/4" 1:6 Cement / Sand Plaster	sft	1180	25	29500
11	Providing & fixing of Ferrocement Door Shutters	No	3	1200	3600
12	Providing & fixing of Ferrocement Window Shutters	No	3	800	2400
13	Providing and fixing Ventilator (C.C. Jali)	No	3	30	90
14	Providing and laying Electrification item		L.S	3000	3000
15	Providing & applying 2 / 3 coats of color over walls and ceiling	sft	1180	5.5	6490
17	Miscellaneous		L.S		10000
Total					119914

COVERED AREA =310.00 SFT

RATE / SFT = Rs. 387/-

Note:-The estimate is based on basic market rates. It does not include contractor's profit, departmental and other overheads, taxes etc.Wastage of only 5% has been included in the estimate.

PROPOSAL
FOR THE
CONSTRUCTION OF LOW COST HOUSE AT
IBRAHIM HYDERY, KARACHI

PREPARED BY: Nadir Mansoor
Principal Research Officer

Syed Amir Ali
Research Engineer

Muhammad Tausif Arshad
Research Engineer

CHECKED BY: Dr. Ataullah Maher
Chairman ,CWHR

December, 2008

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GOVERNMENT OF PAKISTAN

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