COMITE FRATELLI D'ITALIA
20 Calle 6-51, zone 10
Director: Guiseppe Ceschia
Telephone: 64446

Houses individually designed so each is different
$36m^2$ max.

No floor provided, soil-cement block wall with steel reinforced concrete columns, corrugated zinc roofing
material costs: not to exceed Q.850=Q.23/m^2
total costs: unavailable
construction time: depends
number: 7-10 a week for unknown time
site: San Juan Comalapa

PROGRAM OBJECTIVES/DESCRIPTION

The committee, comprised of a group of private citizens, seeks to build as many houses as possible within the resources they are able to raise. The stated objective is to approximate the housing environment of the town as it was before the earthquake but using safer construction techniques.

HOUSE DESCRIPTION/CONSTRUCTION

The committee is not presenting a single pre-designed solution that each participant is required to accept. The family is able to describe how they want their house designed within certain limits. These include the maximum of $36m^2$ covered living space, the use of stabilized adobe block with concrete structural frame and the corrugated roofing material.

A model house under construction used the CINVA-RAM made blocks with a reinforced concrete foundation, columns and head tie beam. The roof to the back extended beyond the house to cover a back corridor. The house is being built by a team of paid brick masons.

DISTRIBUTION/COSTS/FINANCING

The distribution will be determined by the Reconstruction Committee of Comalapa, comprised of local officials and representatives. The cost of a house is not to exceed Q.850, the repayment of which is paid to the Municipality. The Reconstruction Committee will establish the terms for repayment of the cost to the Municipality.

SITING/INFRASTRUCTURE

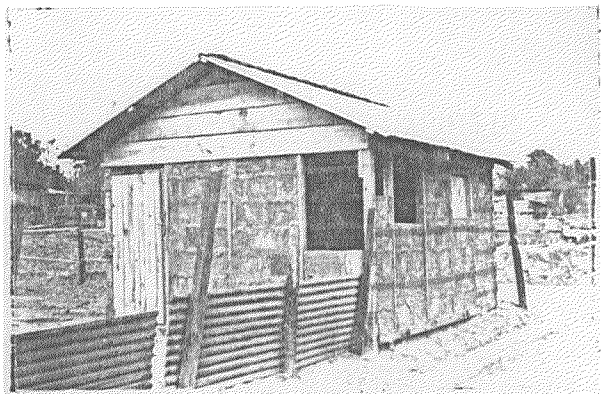
The program is not involved with infrastructure improvements or development. However, it may be determined to use the repayments for such projects. The houses are to be sited on the lot of the recipient as desired.

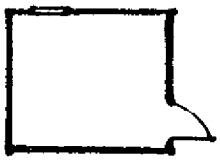
FUTURE IMPLICATION/CULTURAL SUITABILITY

With this approach each of the individual house designs needs a separate review in terms of earthquake resitent standards. The basic structure idea is sound but the plan and locations of openings may be a problem.

Because the family is given the opportunity to reconstruct approximately what they had before the earthquake, there is a built in probability of the acceptance of the result.

CUERPO MUNDIAL DE SOCORRO/GROUP
of private FRENCH RESIDENTS





3.70m x 4.25m
15.7m^2

dirt floor, wood frame, adobe on edge tied in by perforated metal strips, corrugated zinc roof
material costs: Q.160
total costs: Q.200=Q.13/m^2
construction time: 7 man days
number: 29
site: Patzicía

PROGRAM OBJECTIVES/ DESCRIPTION

A group of French residents in Guatemala are receiving private French donations for the reconstruction efforts. These funds are focused on projects in Patizicia. A number of European volunteers belonging to the Cuerpo Mundial de Socorro arrived shortly after the earthquake and are coordinating their work with the French group. These two groups met with local leaders to determine where their limited funds should be spent.

The program will depend on the funds collected but presently they are committed to building the 29 houses for the most needy, to assist in the construction of a secondary school and in the repair of the elementary school.

HOUSE DESCRIPTION/ CONSTRUCTION

The untreated wood frame is purchased from the CEMEC group which has a production set-up at km. 18 1/2 on the carretera San Juan. The frame is infilled with adobe block placed on edge and tied to the structure with perforated metal strips. It is likely that the structure will be plastered over.

The houses will be constructed by the volunteers. Community groups will help in the school construction. Ten CINVA-RAM type machines may be obtained for the production of blocks for the schools and future housing.

DISTRIBUTION/ COSTS/ FINANCING

A survey done by University of San Carlos social workers determined who were those most in need Of the 30 families (29 plus the model house) many are elderly or widows. They will receive the houses free of charge.

SITING/ INFRASTRUCTURE

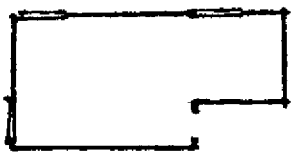
The houses are located on the lot according to the preference of the recipients.

Latrines will be part of the school projects only. There is a possibility of assisting with a water project.

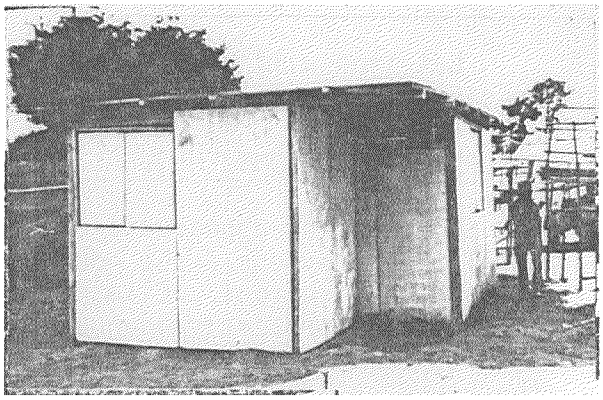
FUTURE IMPLICATIONS/CULTURAL SUITABILITY

Because the appearance of the house when plastered over will be similar to previous adobe houses the change will be only in the corrugated zinc roof. Climatically and for earthquake safety the structure is presently adequate. The difficulty will be moisture and termite damage to the structurally necessary wood frame. In five years the house could be unsafe depending on the deterioration or replacement of critical members.

FEDERACION DE COOPERATIVAS AGRICOLAS DE GUATEMALA (FEDECOAG)
2a. Calle 1-50, zone 3
Director: Urbano Perez
Telephone: 21721



3.60m x 7.20m
25.9m^2



floor and foundation provided by recipient, cement asbestos panels on wood frame, corrugated cement asbestos roof
material costs: Q.370 plus foundation
total costs: Q.500 = Q.19/m^2
construction time: 4 man days plus foundation construction
number: 10,000
sites: municipios de San Andrés Sajcabajá, Canillá, Zacualpa, Joyabaj, Chuaquenún, Pachalun, Santa Cruz del Quiché, Chinique, Chichicastenango, Sacapulas, San Pedro Jocopilas y San Bartolomé Jocotenango.

PROGRAM OBJECTIVES/DESCRIPTION

The construction of up to 10,000 houses over a period of one year in the Department of Quiché is only one aspect of a 10 year integrated social-economic development program. The project is a collaboration of several agencies working in the region of Quiché and in development programs.

Fedecoag cites the severity of the earthquake in several pueblos, the continuing low income of families, and high rates of malnutrition, infant mortality, illiteracy as the factors that directed the program objectives. They were determined after analysis and consulting with the communities. The reconstruction is said to be of new people, not just housing.

HOUSE DESCRIPTION/CONSTRUCTION

The provision of the foundation and floor of the house is the responsibility of the home owner. The house is made up of 1.20m x 2.40m panels consisting of 5mm thick flat cement asbestos sheets on a frame of 2" x 3" wood and a steel tension diagonal rod. The roof consists of corrugated cement asbestos panels on wood structure with diagonals in each corner.

The reasons stated by Fedecoag for the selection of the house include 1. it is more economical than their previous house, 2. earthquake resistant construction, 3. more hygienic materials than traditional materials, 4. fabrication from 98% national materials, 5. fire resistant, 6. easy to transport, 7. easy to remodel, and 8. enjoys the acceptance of the region's people.

However, a model house of this design constructed for Caritas in the municipality of Chichicastenango, showed poor workmanship and potential problems of construction. The cement asbestos panels, though providing great rigidity and earthquake resistant construction, does not have a long life in this kind of use, they are brittle and can break easily.

The houses are to be built by self-help housing methods. 240 men will be taught the construction techniques in a series of one week courses.

DISTRIBUTION/COSTS/FINANCING

The stated criteria to be a recipient of a house are that the recipients do not have a house and that their income permits a monthly payment of Q.2.50 for the house. This repayment period is to be 10 years.

This program is one of the few that has made a specific effort to use national materials to a nearly total extent, thereby reinforcing the national economy.

SITING/INFRASTRUCTURE

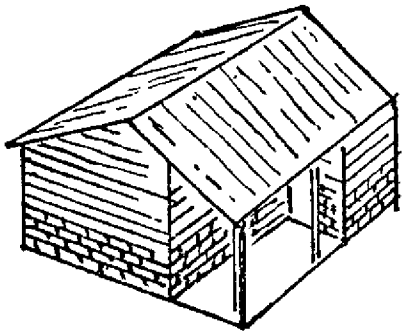
The houses are to be constructed only in rural areas resulting in no plans being made for infrastructure development.

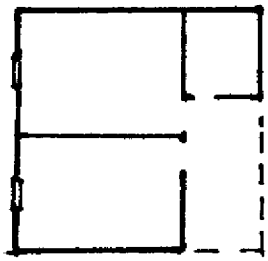
FUTURE IMPLICATIONS/CULTURAL ACCEPTABILITY

Because the house is constructed of panels it is felt that it will easily be amplified or modified. That will depend in great part on the availability of the cement asbestos panels and on their long term desirability for continued use.

Some other assumptions perhaps should be questioned. At Q.500 the house must be more expensive than the traditional use of adobe and straw or tile roof. Most houses will no doubt continue to have dirt floors, and therefore improvement of the hygienic quality is only marginal. The long term acceptance of the design must still be in doubt as it is of an appearance, construction, and climatic characteristics quite unlike previous houses. The thinness of the walls and the almost flat roof are particular items that may prove unsatisfactory.

FUNDACION DEL CENTAVO
6a. Ave. 7-29, zone 9
Director: Hernan Quan Berducido





6.34m x 6.40m
28m^2 enclosed
13m^2 covered

continuous reinforced footing, dirt floor, steel frame, 1m of concrete block, wood above, zinc, corrugated roofing
material costs: Q.500
total costs: Q.19m^2
construction time: not determined
number: 1,000 to 3,500

PROGRAM OBJECTIVES/DESCRIPTION

The Foundation has a focus on agricultural and rural development projects with the very poor. The earthquake added housing as a critical need for these same people. The present program intends to respond to their requests and to fortify the organizational base in rural areas by building permanent and safer houses.

The foundation is providing financing for recipients to purchase the houses and organizing the material distribution. Consequently with some technical advice the recipients are enabled to construct their houses.

By meeting with various representatives of the potential recipient and presenting alternative project ideas the present house design was achieved as a combination of ideas. The present design may not be the ultimate.

HOUSE DESCRIPTION/CONSTRUCTION

The metal posts and roof structure are being fabricated in Guatemala City. The metal frame was choosen for structural security, prevention of deforestation and durability at what was considered little additional cost over a wood frame. The frame and roofing will be assembled on site rapidly with the help of instructors from the factory and the Foundations. If the recipients have emergency zinc sheets they may incorporate them into the permanent structure.

The continuous footing has two horizontal steel bars. Each 1 1/2 meters a vertical reinforcing bar will be tied into the foundation but the voids in the concrete blocks will not be cemented in. This is being done so that while there will be a five block high wall now, future steel could be tied on and cemented in so the block could be continued up. Above the concrete block will be w od panels prefabricated in Guatemala City. Except for the metal frame the work will be done by and at the pace of the recipient.

DISTRIBUTION/COSTS/FINANCING

Distribution will be through local groups in the yet to be designated villages. As most of the recipients are campesinos without a steady income they will repay the costs of the materials in annual payments over the next ten years. The loan is interest free comprising a substancial subsidy. The loans will be repaid to the Foundation for reinvestment in other projects.

The materials are purchased in the cash marketplace rather than being locally available such as adobe, logs or paja for which a campesino doesn't normally pay. The cost of transporting two different fabricated components is an additional expense. The Fundacion anticipates setting up small scale productions of concrete block which should lower the cost and create another local economic base.

SITING/INFRASTRUCTURE

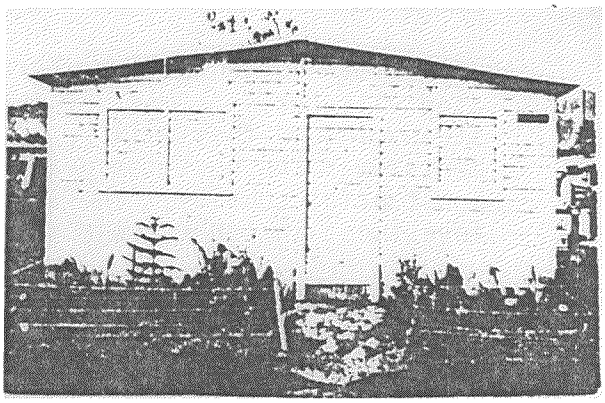
The design provides for a covered porch to be so oriented as to view the fields or to store the crops. A prefabricated concrete floor plate will be provided for a latrine. It is up to the recipient to dig the hole and build the enclosure.

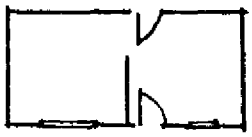
FUTURE IMPLICATIONS/CULTURAL SUITABILITY

Because representatives of the future residents were involved in the evolution of the house design, its acceptance is quite probable. The consideration of the porch and kitchen demonstrate key elements of the rural lifestyle.

A long life and the ability for future modifications to the house have been criteria for the house design. Depending how the house is sited, access might be improved if a passage from the kitchen to the opposite side of the house is included. The L shape of the plan violates a principle of earthquake resistant construction which states that the plan should be rectangular or have a one meter space between sections that form an L. The kitchen passageway would correct this and provide connection to future additions in this direction if desired.

HOGAR Y DESARROLLO
10a. Calle 8-21, zone 7
Director: Hildebrando Cumes Samayoa
Telephone: 42-4-41





6.10m x 3.05m
18.6m^2

no floor, wood frame and siding, corrugated cement asbestos roofing .
material costs: Q.272 (includes factory labor but no foundation)
total costs: Q340 = Q.18/m^2 (not including transport out of Guatemala City)
construction time: 6 man days plus construction of base wall
number: 3,000
sites: not yet designated

PROGRAM OBJECTIVES/DESCRIPTION

Hogar y Desarrollo is an ongoing and expanding non-profit producer of minimal houses. Their objective is to provide houses for low income families to advance the process of their development.

The economic model plus several double sized houses were designed on a modular system, for immediate installation, to be low cost and a presentable house. The same design will be used for the reconstruction programs as well as a less expensive version with rough cut ship lap siding.

The institution works two ways. On the one hand they produce and sell the houses to other groups or cooperatives, on the other hand they sell directly to individuals who qualify for a loan at 4% interest rate from BANVI (Banco Nacional de la Vivienda).

HOUSE DESCRIPTION/CONSTRUCTION

The recipient constructs the footings and a wall about 20 cms. high on which the house is placed. The type of floor is optional and provided by the recipient. The panels are frames with wood siding on one side. Generally the prefabricated panels are delievered to the site and the recipient assembles them. With their new equipment Hogar y Desarrollo claims a daily capacity of up to 100 units.

DISTRIBUTION/COSTS/FINANCING

To whom and what financial arrangements are made with the recipient depends on the organization who purchases the houses from Hogar y Desarrollo. Because the buyers are generally Cooperatives or local groups

with similar general objectives, the financing arrangement for the recipients is arranged according to their social-economic conditions.

When the houses are sold directly to individuals financing is through BANVI with a maximum payment of Q.10 monthly for three years. Each situation is determined by analysis of the family's social economic situation.

SITING/INFRASTRUCTURE

The recipient must have a lot where to place the house- this land can be of his own, rented or borrowed. The siting of the foundation is up to the recipient. The purchase price does not include anything other than the panels, doors, windows, and roof.

FUTURE IMPLICATIONS/CULTURAL SUITABILITY

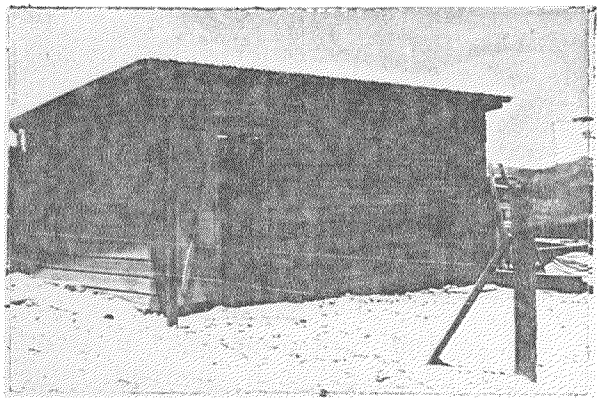
The base wall is a good idea to prevent rotting of the lower part of the panel but its construction quality and the attachments to the panels is important to the effectiveness of the structure's earthquake resistance.

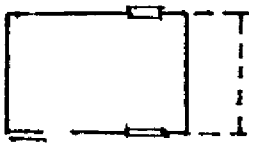
Since it is a modular system the recipient could come back to the factory and purchase more panels for additions. However, additions could be made with onsite construction as desired.

The obvious and important difference between this program and others presented here is that it is an ongoing production that is expanding to address reconstruction demands but will continue to serve the future housing needs.

This house design has become a Latin American standard of formal minimal construction using studs and wood siding. That fact doesn't insure its desirability but it has received wide acceptance as a relatively efficient use of basic materials.

MENNONITE CENTRAL COMMITTEE
18 Calle 9-21, zone 1
Director: John Koffenhaver
Telephone: 81416





3.10m x 4.70 or 6m
14.6m^2 or 18m^2

prefab concrete footings, no floor, wood frame and siding, corrugated zinc roofing
material costs: Q.180 and Q.220
total costs: Q.200 & Q.240 = Q.13m^2
construction time: 8 man days
number: 1,000
sites: Santa Maria Cauque, San Jacinto, Colonia Brigada and several more to be determined.

PROGRAM OBJECTIVES/DESCRIPTION

With a $300,000 budget the objective is to provide an improved housing condition at minimal cost so as many houses as possible can be built. The first houses were completed in mid-March using rapid construction methods which was a major consideration. The design of the house and some administrative details have been coordinated with CEMEC and CEPA.

HOUSE DESCRIPTION/CONSTRUCTION

Prefab concrete post like footings are sited, then the wall frames which have been preassembled are raised into place. The siding is nailed in place, two wire diagonals are located at the ceiling level and corrugated sheets of zinc are placed on the shed roof structure.

The jigs used for the wall frames are straightforward. The whole process is action oriented. The teams made up of a North American volunteer, a paid carpinter and the recipients are able to produce rapidly.

DISTRIBUTION/COSTS/FINANCING

In the first two locations newly formed cooperatives handle the distribution and work schedules and will handle the repayment into a fund for future community projects. In the third location the Alpha and Omega organization will be in charge of the future administration.

The houses are being sold at below material costs. The amounts to be paid to the community fund are Q.108 and Q.144 depending on the size. The minimum monthly payment will be Q.3 over a period of 3 years.

SITING/INFRASTRUCTURE

The recipients are allowed to locate the unit on their lots as desired. While it is important to permit such decisions the environmental consequences may result in quite irregular patterns in the community. The location of the house is important because while the units are considered provisional for legal reasons they will probably become permanent; therefore, the future viability for the social patterns is critical. Some variety of siting has resulted because of the recipient's different conclusions about the placement of the only door. The houses have two windows; the recipient is given the choice among three locations for the windows.

No provisions are now made for water or sewage but future projects of the cooperatives are intended to address these services.

FUTURE IMPLICATIONS/CULTURAL SUITABILITY

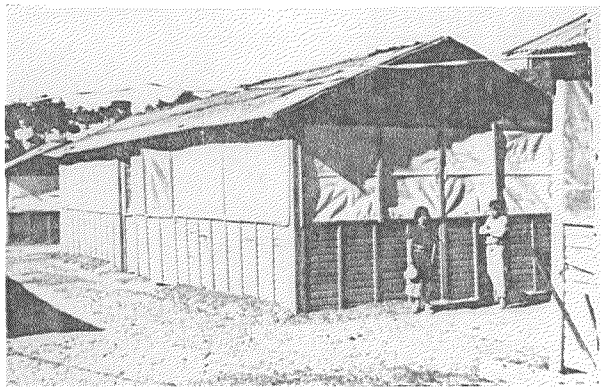
The recipients view wood as a preferred and safer material than the previously used adobe. The single diagonal brace in each wall and the ease of removing or loosing the ceiling wires are weak antisismic measures.

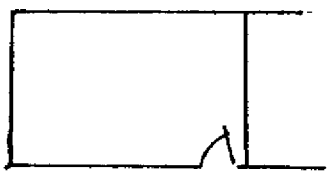
While the structure is typical for low cost housing in Latin America it may be rather minimal for the cold evenings in these particular sites. Cooking fires within the house could be a potential hazard.

The reality of most recipients' previous housing condition was a dirt floor so the change is understood. Where the tile floors remained from the previous houses the new houses were often sited on top of them. However, the lack of continuous footings make the wood more vulnerable to deterioration and the possibility of a non-earth floor more difficult to install for those who will add a finished floor.

The future possibility of an addition will depend in part on the siting. If another door is needed to connect the rooms it may mean the cutting of a diagonal brace.

MEXICAN GOVERNMENT
4a. Calle 6-55, zone 9
Director: Ing. García Telga





4.1m x 6.1m
25m^2 in duplexes

dirt floor, wood frame panels, bottom wood siding, top half plastic corrugated pressed fiber material for roofing
material costs: unobtainable
total costs:
construction time: 1 1/2 man days per unit on site
number: 900
sites: Tecpán, Patzún, Patzicía and others scattered

PROGRAM OBJECTIVES/DESCRIPTION

The government of Mexico has provided prefabricated panels, trusses and other materials and staff to construct 900 units of emergency housing. The house was chosen because it was a design with which the Mexican government had had experience in Chapas, Mexico. The house is light weight and easily transported by truck.

The units were considered emergency housing not intended for permanent reconstruction. However, some are still being built in April and a Embassy official reports the request by the Guatemalan government for 10,000 more units. Some of the original units are now being transferred as individual houses on the recipients lot and being modified for long term use.

HOUSE DESCRIPTION/CONSTRUCTION

Trucks have made several trips bringing the prefabricated components to Guatemala. In addition, crews of young men from INDECO (Instituto Nacional de Construcción) and several technicians came to construct the houses in duplex units.

The panels are simply raised up on the location and bolted together. The trusses are placed and the roofing sheets nailed on. The roofing is not easily reusable.

Colorful plastics are tacked on the top half of the wall panels all around the peremeter. This replaced the mosquito netting that was used in the hot Mexican climate from which the design came.

DISTRIBUTION/COSTS/FINANCING

The original 700 were given to the National Emergency Committee who was then in charge of distribution and financial arrangements with the recipients. A camp of about 400 units was established near Tecpán.

The exact cost of the unit was not available. However, by making calculations of material amounts at Guatemalan prices a rough figure could be estimated at Q.200 per each individual house. This does not include transportation, labor and overhead expenses which would increase that price.

SITING/INFRASTRUCTURE

Mexican engineers provided the site planning for the three sites. Groups of approximately 100 to 400 houses are layed out on a grid leaving 4 meters between the sides of duplexes and 6 meters between the ends. The doors are placed on either side or the end.

In Tecpán 4 public water faucets are provided. Several latrines at some distance from the houses or between some of the units were in poor condition. A clinic had been provided by another organization.

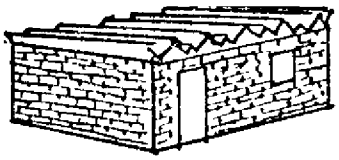
FUTURE IMPLICATIONS/CULTURAL SUITABILITY

The apparent intention of the design of the structure is to be light weight, portable and easily assembled. It is successful in these regards, but at a sacrifice of earthquake resistent standards. Because there is no diagonal bracing in either the walls or roof structure, several units are already falling out of alignment.

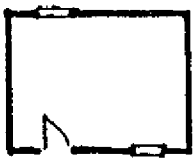
As the houses become permanent, the plastic which is inadequate for the cold evenings, is being replaced generally by savaged wood pieces which makes the structure heavier. Without improvement of the basic structure the result could be dangerous in another earthquake.

The placement of candles on the wood ledge by the plastic creates a potential fire hazard. With the units so close and regimented the consequences are not desirable for long term living conditions, especially with so many people and the lack of sanitary facilities.

CHURCH OF JESUS CHRIST OF THE LATTER DAY SAINTS (MORMONS)
3a. Ave. 11-52, zone 9
Director: David Judd
Telephone: 66735



4.79m x 3.79m 18.15m^2



concrete block walls, cement asbestos, chanel roofing
material costs: est. Q.500
total costs: Q.525 = Q.29/m^2
Construction time: 14 men days
number: 400

PROGRAM OBJECTIVES/DESCRIPTION

After a survey of church members concerning the loses suffered due to the earthquake, the church leaders determined that initially approximately 400 houses should be built for those in need.

HOUSE DESCRIPTION/CONSTRUCTION

Technical personnel in Utah provided the design based on experience with the block making process and storage buildings used for regular church construction in Central America. Two compounds have been set up for the living quarters of volunteers (mostly Guatemalan young men members of the church) and production of the blocks, windows and doors.

The molds for the block are very simple, (made in Guatemala) with dimensions of 4x8x16 inches and produce a more domestic scale block. The mixture ration is four parts pumice sand to 1 part cement which is then pressed into the molds by a person using a mallet. With two persons operating the cement mixer, each block maker can produce 100 to 150 blocks a day.

There are 1/2 inch dimeter reinforcing bars used in the walls, footings and head tie beam. With the cement asbestos channels used for roofing no additional supporting structure is needed.

DISTRIBUTION/COSTS/FINANCING

All construction costs are paid by the church which includes assistance from the headquarters in the United States. The houses are given to the family without any payment required. Other church members are feeding the volunteers building the houses.