

Project library of the specialized group of construction

SHELTER

Project

Project name Reconstruction of 600 houses in Palmiste-à-Vin, Haiti

Country	Haiti	
Region/town	Palmiste à Vin / Léogâne District / Ouest Department	
GIS data (WGS 84)		
Project type	Post-disaster Reconstruction	
Typology	Individual Housing	
Approach	contracted construction team from the local area and beneficiary participation	
Beneficiaries	Local population affected by the earthquake in 2010	
Climate	Tropical	
Special constraint	Storm / earthquake / termites	
start / end of project	01.07.2010 – 30.09.2012	
Country GNP	USD/ cap U\$ 1'200 (2011, est.)	

Partners

Organization (donor)	Swiss Red Cross (Swiss Solidarity, American Red Cross, Belgium Red Cross, Portuguese Red Cross, Belgium Development cooperation)
IO/NGO partners	Petits Frères de Sainte Therese de l'Enfant Jésus de Palmiste à Vin, Haitian Red Cross
GO partners	

Context to project

Initial Situation	The magnitude 7.0 earthquake that struck Haiti on January 12, 2010 significantly deepened existing challenges and created massive pressure on the country that was already the poorest in the Western Hemisphere. The earthquake killed over 230,000 people and left well over a million displaced making it one of the deadliest natural disasters on record. The quake ravaged cities including Port au Prince, the capital, destroying entire neighbourhoods, wiping away roads, collapsing public buildings, and damaging businesses. According to the World Bank, the earthquake caused USD 7.9 billion in damage or 120 percent of the nation's gross domestic product.
Goals, Beneficiaries	Support the most vulnerable, earthquake affected households in the rural community of Palmiste-à-Vin (PàV) in Léogâne district with the construction of 600 houses. This project was complemented by a Water, Sanitation and Hygiene intervention targeting the same community and providing latrines, individual 400-gallon water tanks, common water reservoirs and hygiene promotion for 1200 households.
Implementations / Results	599 houses were constructed in the mountain village of PàV. The initial basic shelter type was adapted and upgraded in the course of the project. The material for one house was stolen.

Reference data (comparative)

Land plot (per house unit)	N/A	Garden	N/A
Ground floor (incl. walls)	29 m ²	Floor (incl. walls)	29 m ²
Occupants max.	7	Occupants min.	1
Total house area	29 m ²	Surface / occupant	5.8m ² (ave. 5p / house)
House volume (outside dimension)	71,5m ³	Volume / occupant	14.3m ³ (ave. 5p / house)
Number of rooms	1 room	Occupant / room	5p/room (ave. 5p / house)
Heated area	N/A	Heated area/occupant	N/A
cost /unit	6,924 USD	cost/occupant	1,384.8 USD/cap
cost/m2	239 USD/m ²	cost/m3	96,8 USD/m ³
Total housing cost	6,924 USD		

Approach to results

Initial Situation

The epicenter of the earthquake was in Léogâne, the capital of the Ouest Department. The village of Palmiste-à-Vin (PàV) is situated around 15 kilometers away from the city of Léogâne. An 600 houses were completely destroyed.

Strategies and shelter options required flexibility in the shelter approach in order to cope with the contextual challenges such as land mapping and tenure, logistic supplies, weak local authorities, lack of building standards and codes, construction chain quality control, the complexity of the environment, endemic poverty, poor security and the impact of additional crisis, such as cyclones and a cholera outbreak.

Due to these extraordinary circumstances and the overwhelming shelter needs, the Inter-Agency Standing Committee (ISAC) Haiti Shelter Cluster agreed to focus the efforts on emergency and transitional shelter. Minimal standards for a fast, semi-permanent housing solution were then designed and shared with all shelter agencies.

Approach

SRC worked in close partnership with the local congregation of the "Petits Frères de Sainte Thérèse de l'Enfant Jésus" (PFST), which is running a health center, a school and some community based workshops in the community of PàV. This congregation was directly involved in the beneficiary selection and in mobilizing and facilitating the participation of the community. The beneficiaries were involved into the project by preparing the construction site, transporting the materials to their plot of land, excavating the foundations, helping the workers at the construction site and painting their shelter.

All workers who participated in the project were selected from the community. The workers were grouped into five-person construction teams, who built the shelter on the site of the previously destroyed home. At the beginning, 6 days were needed for the houses to be erected. With increased routine this time frame was brought down to 3 days.

The structure was imported from Vietnam and supplied in prefabricated steel components, including the roof, doors and windows. Timber and plywood used for making the walls and the flooring were bought locally and cut to size and assembled on-site. Each shelter is anchored to the ground by 6 concrete block foundations.

Once containers from Vietnam cleared Haitian customs, they were transported to the Logistics Base (LogBase) in Léogâne and their contents were unloaded, inventoried, secured and organized. Subsequently, shelter kits were pre-assembled at the base with the required fasteners and accessories. From the LogBase, material to erect shelters was transported to PàV. The plywood and the lumber used for the siding and flooring were delivered directly to PàV from Port-au-Prince according to a pre-defined time frame.

The beneficiaries carried out the last leg of transport of each shelter (i.e. 900 kg of the steel structure kit + 28 sheets of plywood + 18 pieces of lumber) to

their respective plots. A packing list with details of all the components given was approved and signed by each party.

The construction of the shelters followed a construction time frame that organized all activities both in the field and at the LogBase in Léogâne. This time frame, based on a weekly rhythm, indicated the transport of material from the LogBase in Léogâne to PàV, the wood delivery, the reception of housing components, the supervision of deliveries and distributions. Thanks to these measures and the good cooperation of all involved actors, the erection of the houses progressed as planned.

After the construction of the first shelters, an external evaluation took place. The evaluation made a number of recommendations in order to extend the life of the shelters and adapt them to the Haitian context. Some of those recommendations were implemented during the first phase of the project such as increasing the ventilation and lowering the level of the flooring. For implementing the other more complex recommendations, a second phase of construction was necessary. This phase included the reinforcement of the floor, the protection of the plywood walls by adding an extra layer of siding material made with fiber cement boards, the protection of the door and windows, the addition of a second door and the construction of an external veranda to better match with the Haitian culture and increase the potential for extending the shelter.

Knowledge about anti-seismic construction is very limited in Haiti. Therefore, at the end of the project, an on-site training on confined masonry construction was organized for masons and workers involved in the project. Together with the German Red Cross (GRC) and the Swiss Development Cooperation's competence center for reconstruction (CCR), a 7-weeks theoretical and practical training course was developed. This comprehensive training strengthened the professional competences of the workers and give them better chances to find new jobs at the projects end.

Problems/Constraints

Duplication: SRC and GRC had interventions in the same zone. Close coordination between the two National Red Cross societies was required to determine the exact location of each shelter/housing program in this area. Thanks to the GPS data collected, the issue was resolved to avoid duplication.

Stolen material: All wood and steel components of one house disappeared and were allegedly stolen. The materials were handed over to the beneficiaries, but when the construction workers came to the site, no materials were available. Allegedly, one family member of the beneficiary household received the material and left.

Houses rented and unoccupied: A complete survey of all households was done to evaluate the state of the project's houses in the community and validate the identity of the beneficiaries. All houses were inspected for quality and occupancy. A second round of visits took place which required further scrutiny and analysis. This second survey indicated that 45 houses were unoccupied and 16 were rented. The vacant houses could be explained because they were just being built and people were unable to move in at that point in time. Regarding the cases of the rented house, it was in fact the plots of land that were rented following a rent-to-buy agreement (see comments in Type of ownership section). Further site visits and individual meetings took place to determine why families hadn't moved into their new house or were renting them out. At the end, three houses were still identified as requiring specific follow-up. The communities were solicited for their participation in order to solve such issues and were integrated into the final decisions. Several discussions took place with the beneficiaries and the head of our partnerorganisation. Today, all houses are occupied by needy families.

Lessons learned

Mapping: Mapping activities need to start at an early stage of the program in order to help setup logistics, avoiding duplication and improve communication with stakeholders.

Contextual understanding: Constructing shelters requires the understanding of the environmental, socio-political, cultural and economic context. It is a process that requires an integrated approach. Project planning also needs to include the study of the local building culture and its global environment in order to provide adapted shelter solutions.

Listening and beneficiary participation: It is important to communicate to/with the beneficiaries on planned activities, assessments and mid-term reviews in order to allow the community to have a voice on shelter customizations, materials, etc. Active participation of the beneficiaries throughout the life of the project is the key to ensuring ownership, adapted solutions and overall satisfaction.

Flexibility: Since the socio-cultural context cannot always be understood with depth in advance, it is important to build flexibility into the project to be able to adapt to an evolving context. This flexibility requires the openness of donors that alternative solutions may arise during the course of the project.

Evaluation

External evaluation: Swiss Solidarity (SWS), one of the main donors of the project, has asked the URD group - a research, evaluation and training institute - to carry out external monitoring and evaluation of the SWS funded projects. Four visits took place. After each visit a report was suggesting recommendations for further improvements. Meetings and workshops were also organized with other SWS's partners to create synergies and encourage learning.

Satisfaction survey: At the end of the project, a satisfaction survey was conducted anonymously among 33 % of the households. 31 simple questions were asked related to: the beneficiary selection, the use of the house, their participation into the project, the quality of the house provided, etc.

Legal framework

Politically attached to

Département : West ; Commune : Léogâne ; Communal Section :
4ème Fond de Boudin, 5ème Palmiste à Vin, 12ème Cormier.

Type of ownership

Rent-to-buy agreement: Most of the plots belong to the beneficiaries. Only few pieces of land were rented following rent-to-buy agreement. This common agreement in Haiti is a lease combined with an option to purchase the land property within a specified period, usually 5 years at an agreed-upon price. With this type of agreement the owner can only sell the land to the actual tenant. If the tenant is not interested to buy the land he can keep renting the house. Some lands visited have been rented for 50 years following the same type of agreement.

Securing ownership: Since most beneficiaries do not possess any legal document to prove land entitlement, a process to secure the issue of ownership was elaborated with the community and the local authority.

Construction information

Construction Structure	Foundations	Six 80cm deep reinforced concrete foundation point
	Walls or columns	Galvanized steel frame including bracing
	Facade	2 layers of siding materials screwed into the structure and painted
	Roof	CGI sheets
	Earthquake and hurricane protection	Braced structured, light roof, hurricane straps, small eaves
materials	Floor surface	2 layers of 3/4" pressure treated plywood
	Walls	1 layer of 3/4" pressure treated plywood sheets + 1 layer of fiber cement trims and boards
	Doors	1 aluminum and glass door covered with a layer of fiber cement board
	Windows	2 aluminum and glass windows protected by a steel awning and grill
	Ceiling	N/A
watsan	Thermo insulation	N/A
	Roofing	CGI sheets + aluminum gutters
	Water	N/A
	Toilets	Ventilated Pit latrine
	Waste water	N/A
equipment	Rain water	installation of a complete water harvesting system that connects gutters to a 400gal water tank
	Heating system	N/A
	Electricity connection	N/A
	Telephone connection	N/A
	Cooking facilities	N/A
Total		100%

Urban planning

Distance to	Health center	Between 0,1 km to 5 km
	Education facilities	Between 0,1 km to 5 km
	Income activities	Mainly farming
	Public transport	TapTap (local taxi), moto-taxi

For further information

Involved SHA construction group consultants	
Other involved SHA consultants	
Author / Contact:	Olivier.legall@redcross.ch
Recommended Institutions:	Belgium Red Cross
Recommended partners:	Les Petits Frères de Sainte Thérèse de l'Enfant Jésus de Palmiste à Vin, Léogâne.
Recommended books/reports:	
Relevant other projects (links):	
Annex	

Relevant illustration



Google earth overview of the project area



Distribution of the steel components to a household. Usually households group together for renting a tap-tap.



Labor installing the layer of plywood on the structure.



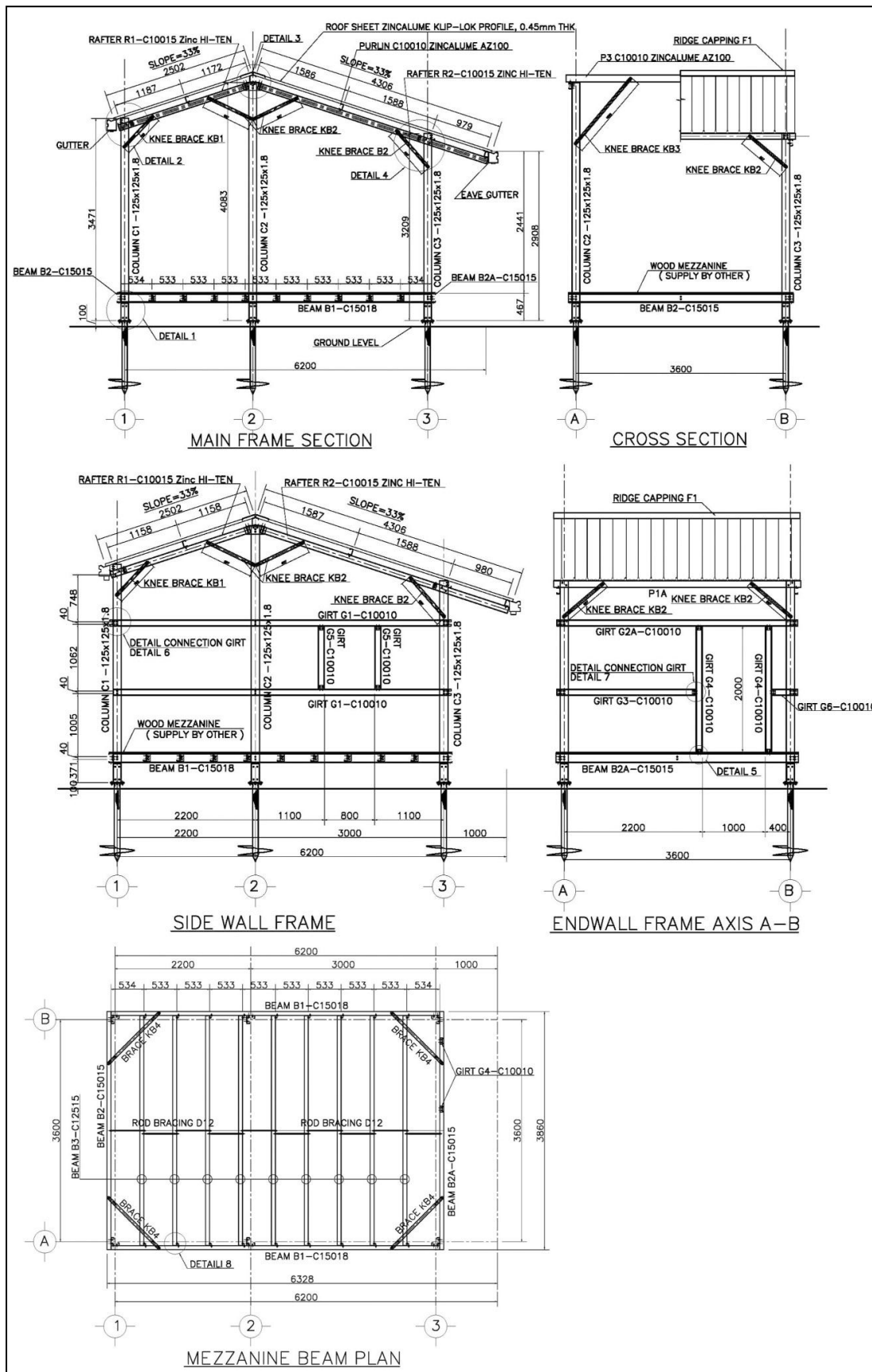
Labor working on the installation of the second layer of the wooden floor



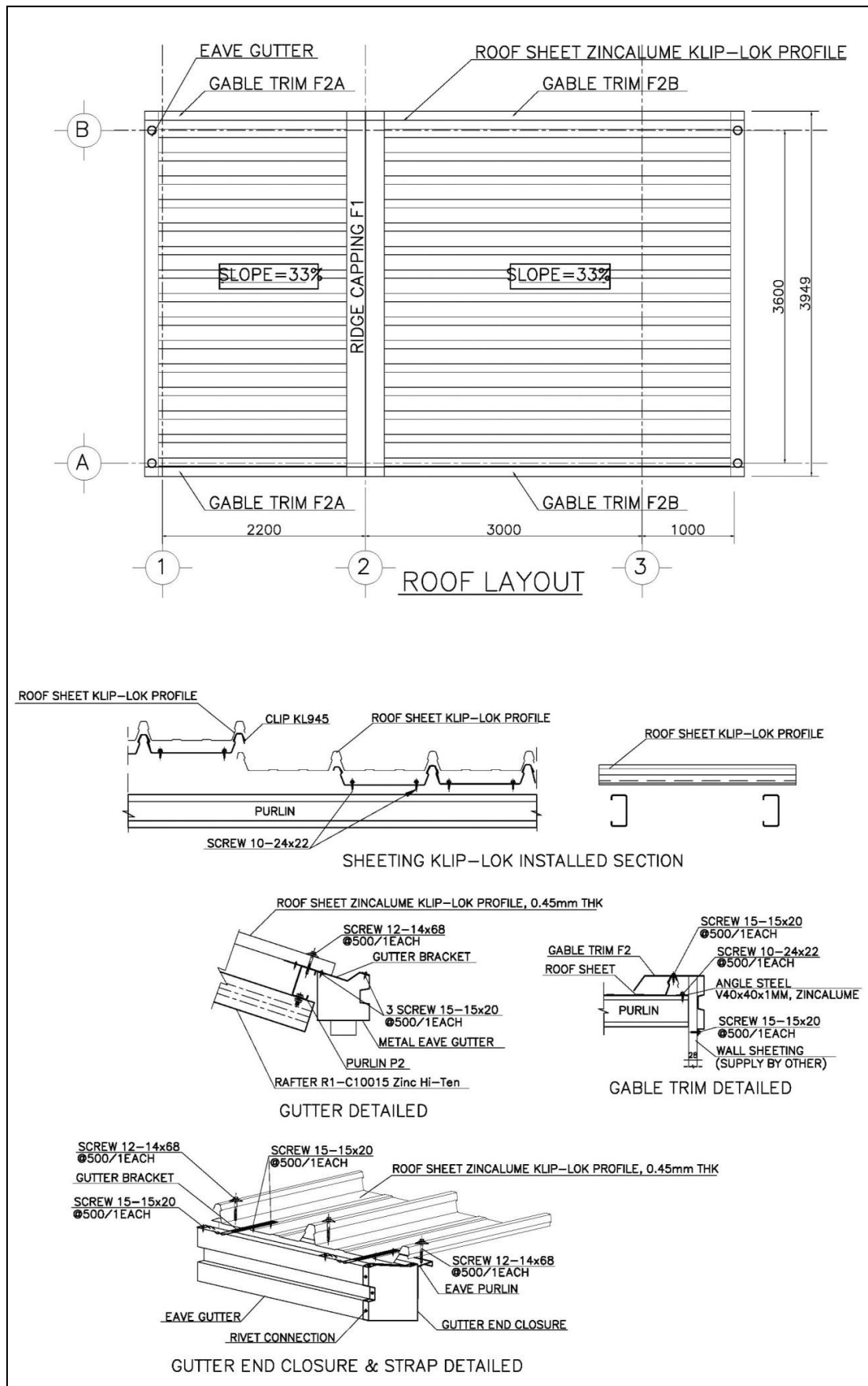
A house adapted with a wooden front porch, the new siding layer, the protection for the door and the painting



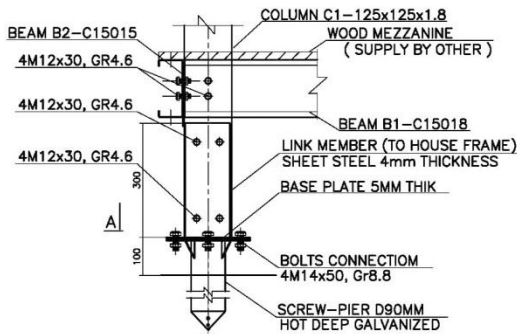
A complete house that includes the extra door, the protection for the windows and the rainwater harvesting system.



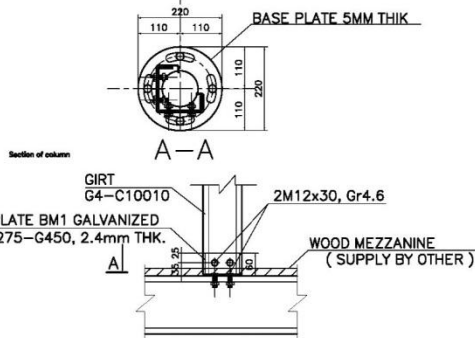
Structural system of the prefabricated house



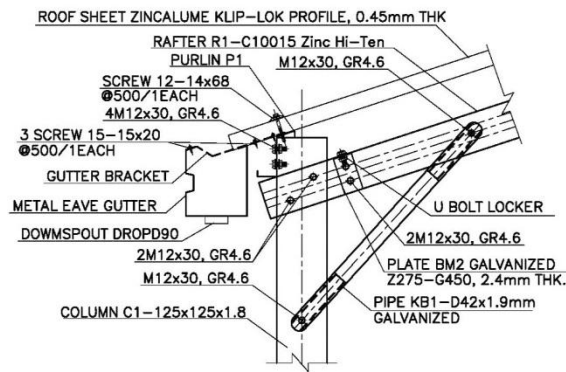
Roofing system



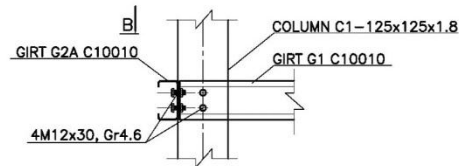
DETAIL 1



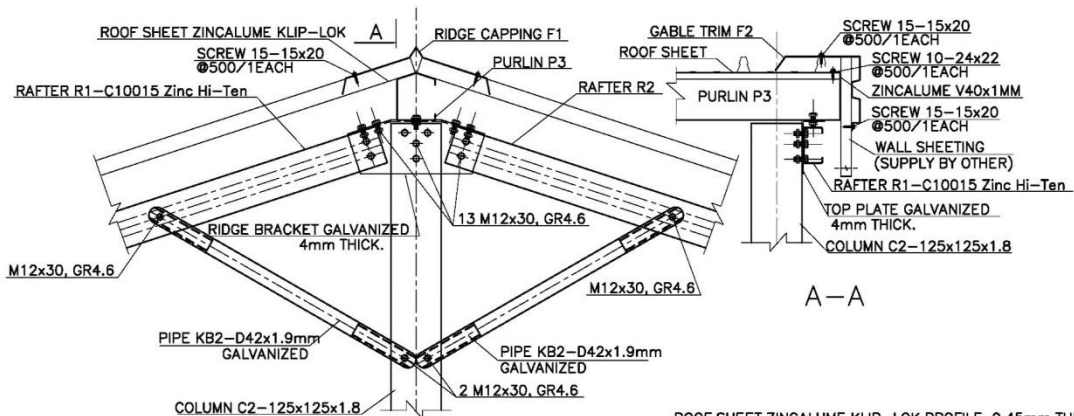
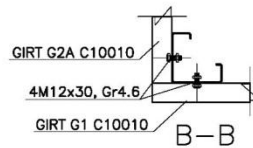
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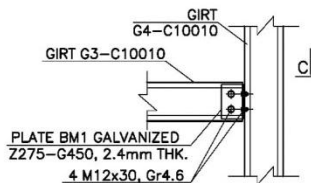
DETAIL 2



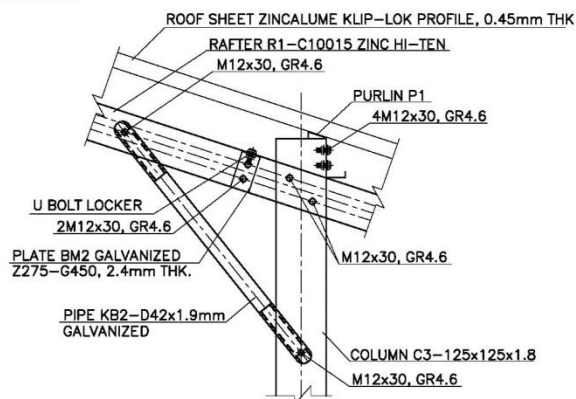
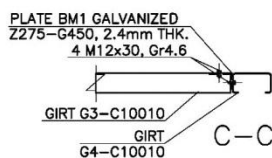
DETAIL 6



DETAIL 3

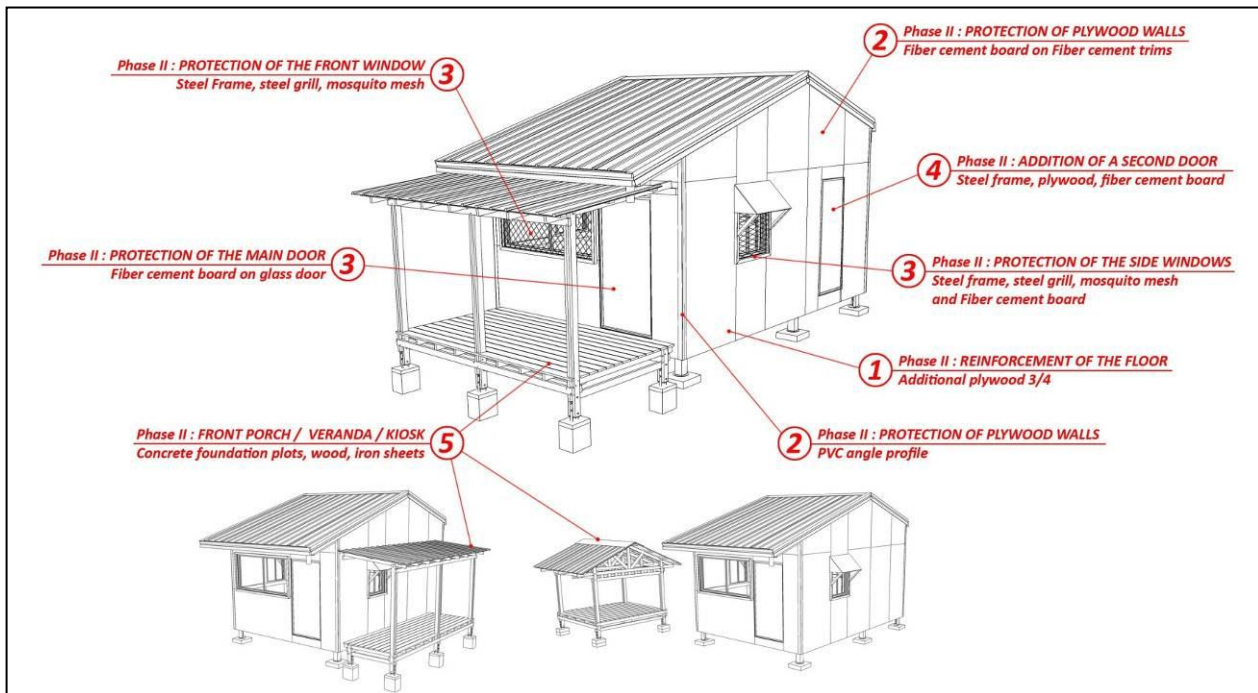


DETAIL 7

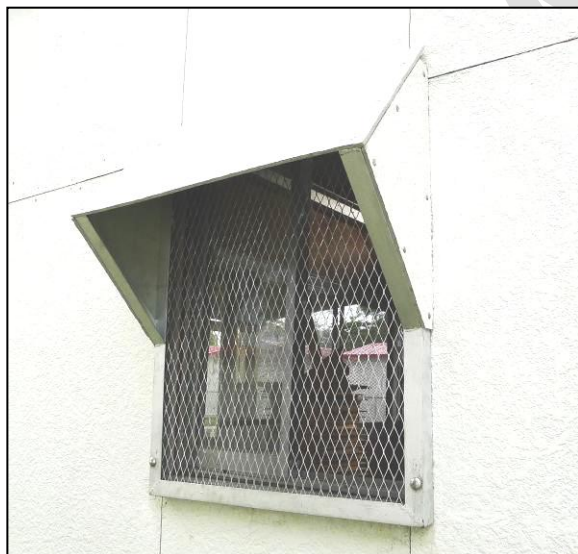


DETAIL 4

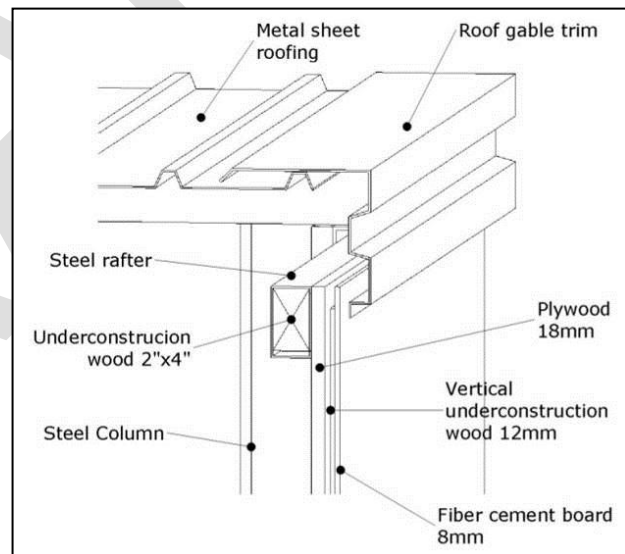
Details of construction



Improvements implemented during Phase II



window protected by a steel awning and grill



Installation principle of the ventilated fiber cement layer