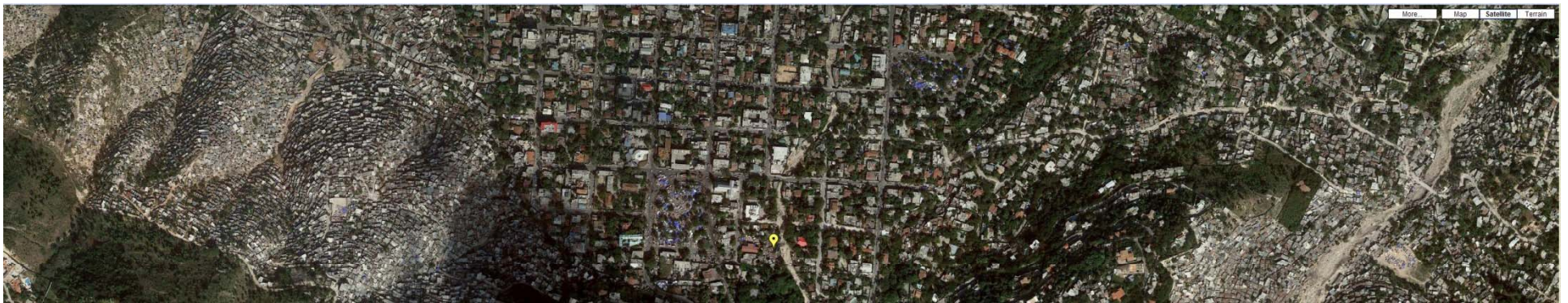


Transitional to What?

Purpose of Study:

Prepared as a technical document to assess a portion of the transitional shelters dispersed and discuss proposed methods for extending their expected lifespan if applicable to the shelter & site.



Presented By:

Architecture for Humanity / Habitat for Humanity

Adam Saltzman . Cara Speziale . Eric Cesal . Heidi Arnold . Schendy Kernizan



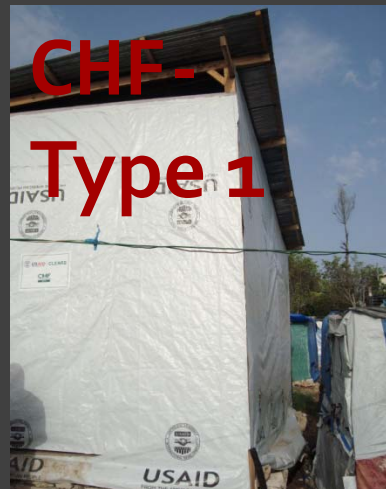
- ADRA
- CHS Type 1-WOOD
- CHS Type 2-STEEL
- CORAID
- IOM
- Habitat For Humanity
- Samaritan's Purse
- Spanish Red Cross
- World Concern Type 1-WOOD
- World Concern Type 2-STEEL

Shelter Case Studies

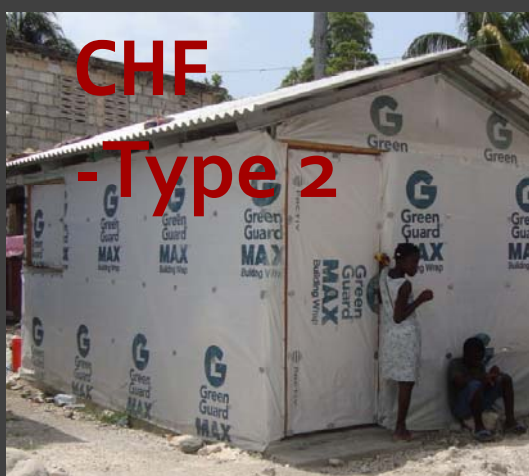
ADRA



**CHF-
Type 1**



**CHF
-Type 2**



**CORTAID
1850**



**Habitat for
Humanity**



IOM



**Samaritan's
Purse**



**Spanish
Red Cross**

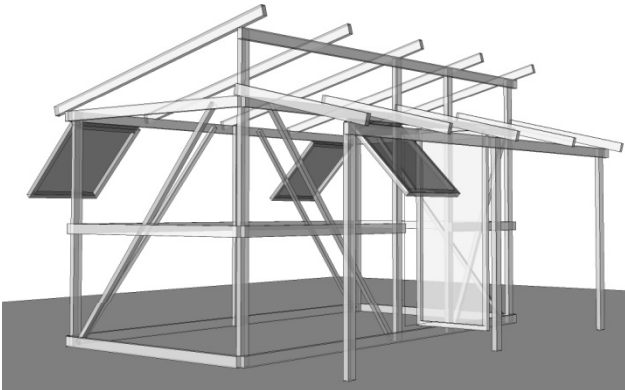


**World
Concern
-Type 1**



**World
Concern
-Type 2**





Facts:

- # Dispersed: 3060
- Base Unit Cost: \$? US
- Base Size: 12 square meters (128 sq.ft.)
- Type: PT Wood Frame
- Other: Covered Porch Included
- Foundation Type: Varies, Concrete Bucket Footings
- Floor Type: None
- Roof Type: Corrugated Steel
- Cladding Type: Tarpaulin
- Hurricane Strapping: Yes
- Openings: 1 door, 3 windows
Clearstory at Ends



Site Survey-Habitat for Humanity



Beneficiary Feedback / Modifications:

- Lack of Security with Tarp, Adding piece-meal siding
- Second Door Preferred
- Additional Covered Outdoor Area Needed
- Rain Blows in Gable End

Immediate Concerns:

- Safety/Siding
- Size
- Flooding Hazard; Water Infiltration @ Base
- Hurricane Hazard; Metal Roofing Nailed

Current Projected Lifespan:

- 1-3 years Extended Lifespan Potential



Site Survey-Habitat for Humanity

<u>Type</u>	<u>Shelter Divisions</u>		
	100-Foundation/FI.	200-Structure	300-Enclosure
A	Anchor or Bucket Fnd./No Fl.	Wood Frame	Tarp Siding
B	Concrete Footing / Slab	Wood Frame	Tarp Siding
C	Concrete Footing / Slab	Wood Frame	Plywood Siding
D	Concrete Footing / Slab	Wood Frame	Metal Lath or Masonry
E	Anchor or Bucket Fnd./No Fl.	Light Gage Steel	Tarp Siding
F	Point Conc.Fnd. Raised Floor	Light Gage Steel	Tarp Siding
G	Concrete Footing / Slab	Light Gage Steel	Tarp Siding

Shelter Construction Divisions:

100 - Foundation / Floor

200 - Structure / Frame

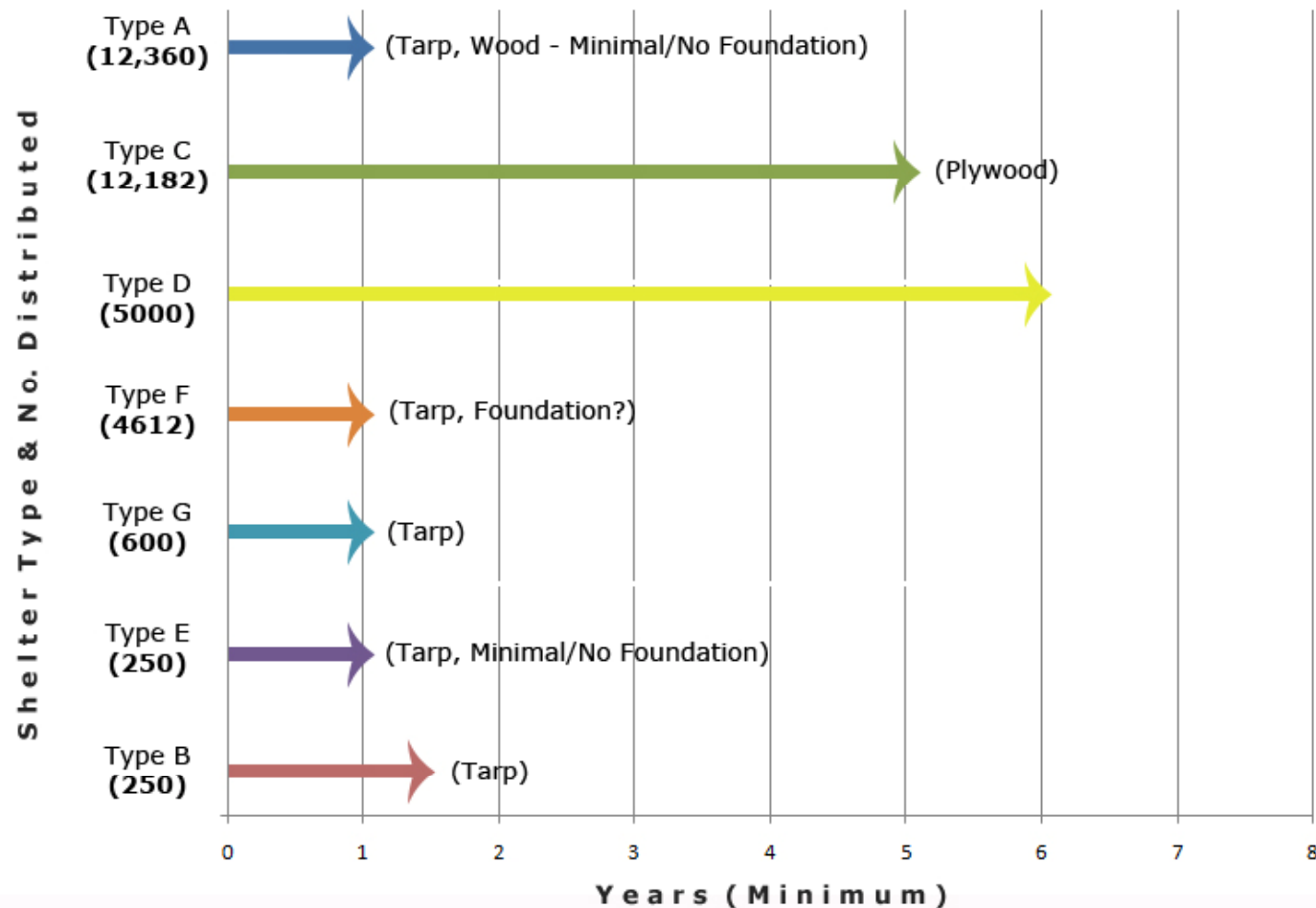
300 - Enclosure / Cladding

400 - Design ; Size & Space, Openings,
Additions

500 - Infrastructure

600 - Finishing

Case Study: Common Types / Divisions



(Shelter Types Key)

A (Anchor, Bucket Fnd./ Wood Frame / Tarp)
 B (Concrete Slab / Wood Frame / Tarp Siding)
 C (Concrete Slab / Wood Frame / Plywood)
 D (Concrete Slab / Wood Frame / Metal Lath
 or Masonry)

E (Anchor, Bucket Fnd. / Lt. G. Steel / Tarp)
 F (Raised Floor & Point Fnd. / Lt.G.Steel /
 Tarp Siding)
 G (Concrete Slab / Lt.G.Steel / Tarp Siding)

Case Studies Types Estimated Lifespan

Shelter Divisions:

100 – Foundation / Floor

200 – Structure / Frame

300 – Enclosure / Cladding

400 – Design ; Size & Space, Openings, Additions

500 – Infrastructure

600 – Finishing



Case Study Review; w/in Shelter Divisions

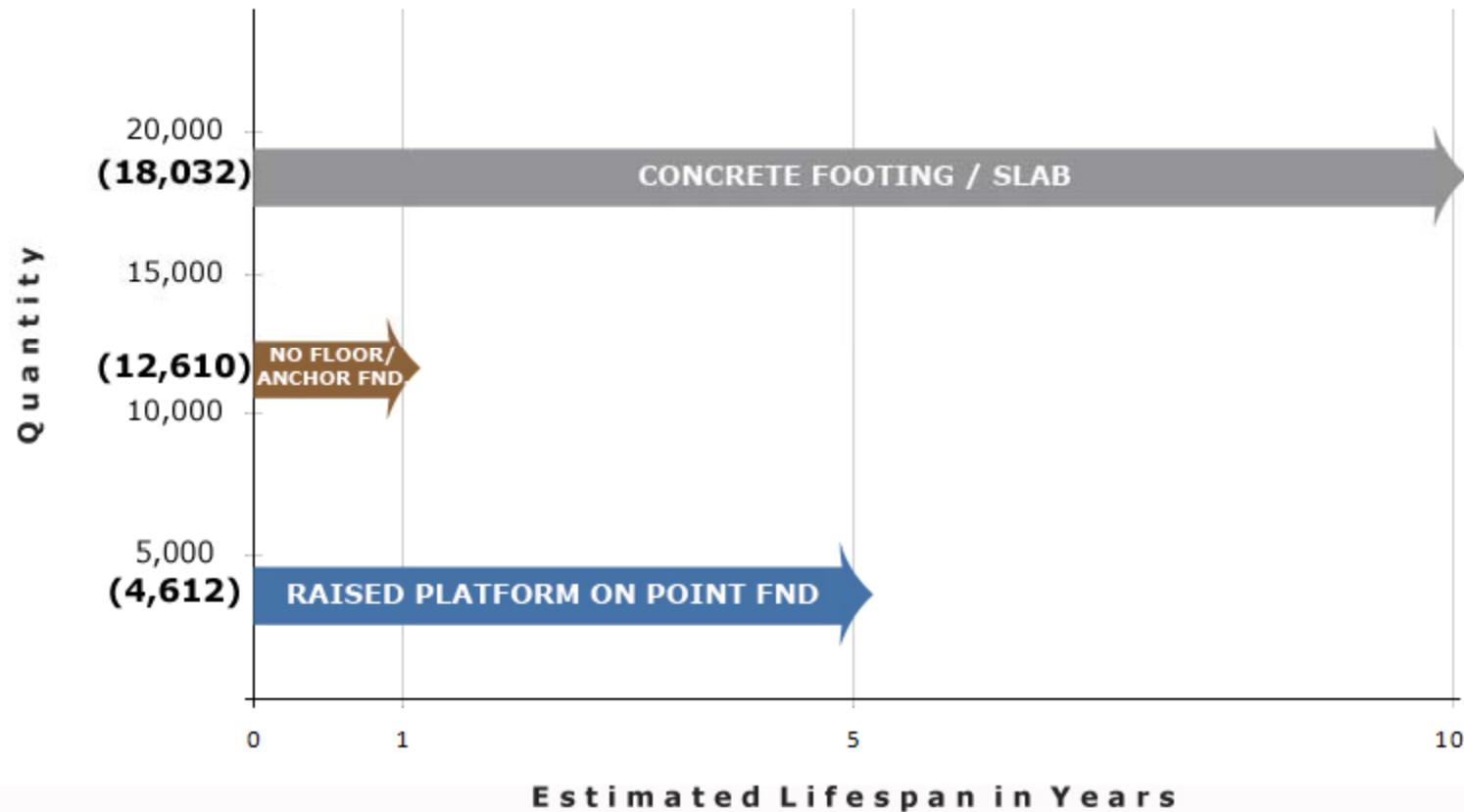


(Owner Modified)

100 - Foundation / Floor:

- Water Hazard
 - Ground Water Infiltration at Base
 - Wash out potential at shallow Footings
- Hurricane Hazard
 - Inconsistent methods w/ Hurricane Tie-Down / Strength of Footings

Case Study Review: 100-Concerns & Modifications



100 - Foundation / Floor:

- Water Hazard
 - Ground Water Infiltration at Base
 - Wash out potential at shallow Footings
- Hurricane Hazard
 - Inconsistent methods / ? Strength of Footings to Resist Heavy Winds

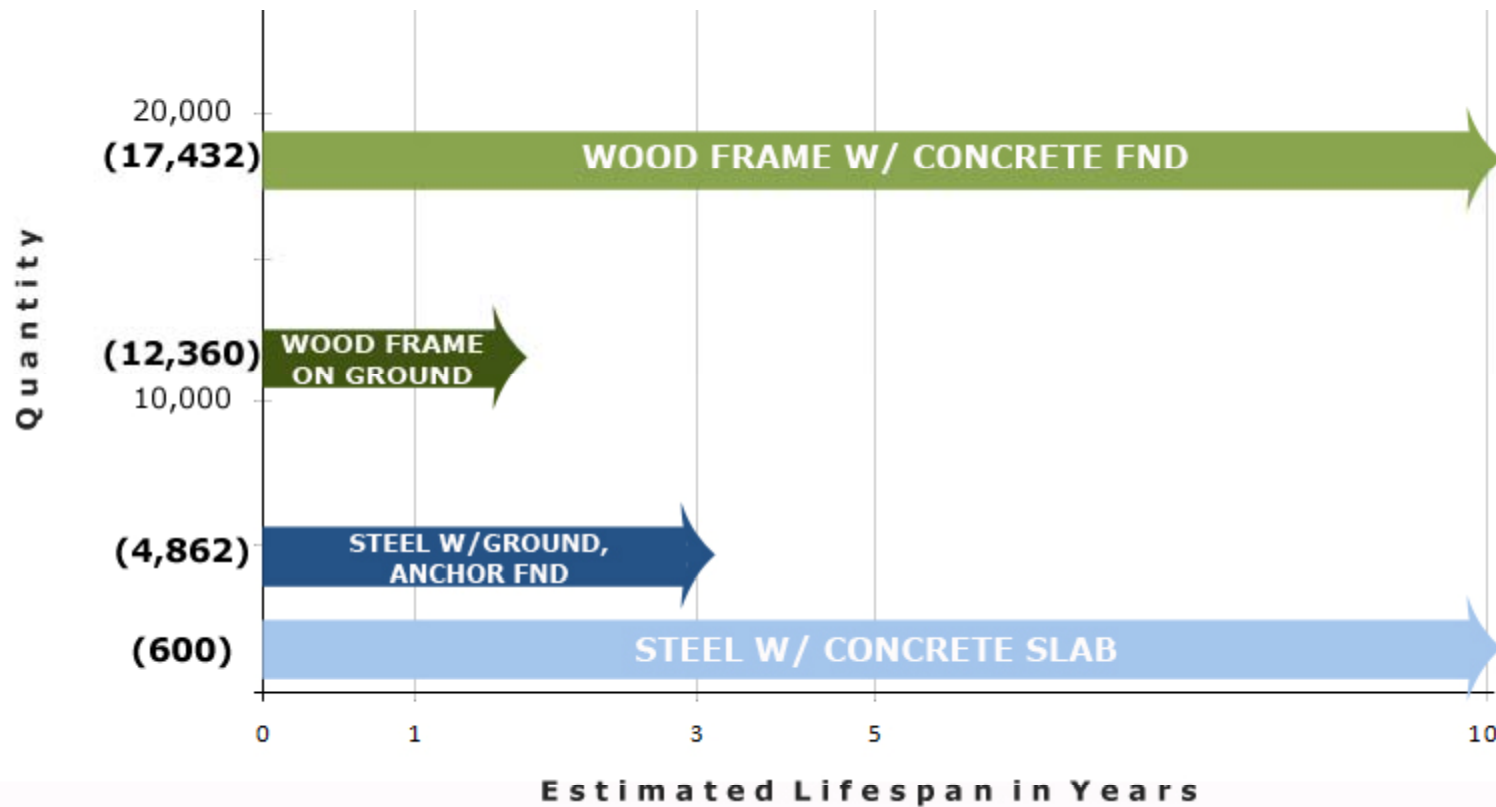
Case Study Summary: 100-Lifespan



200 - Structure/Frame:

- Water Hazard - Contact with Moisture/Ground
- Hurricane Hazard - Inconsistent installation of Hurricane Straps (with-in companies & types)

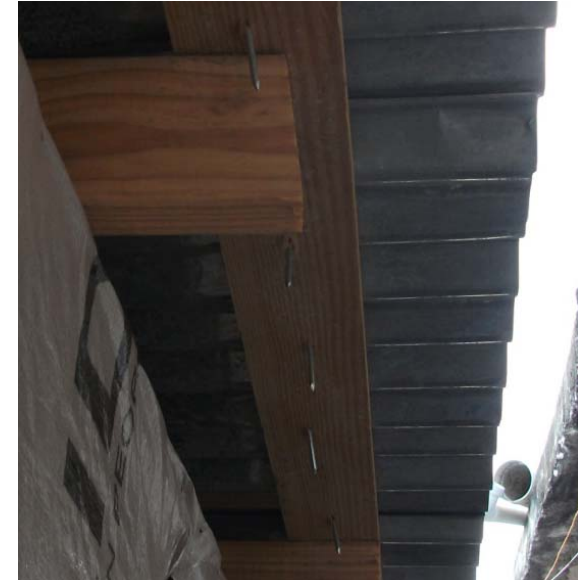
Case Study Review: 200-Concerns & Modifications



200 - Structure / Frame:

- Water Hazard - Contact with Moisture/Ground
- Hurricane Hazard - Inconsistent installation of Hurricane Straps (with-in companies & types), Diagonal Bracing omitted on some

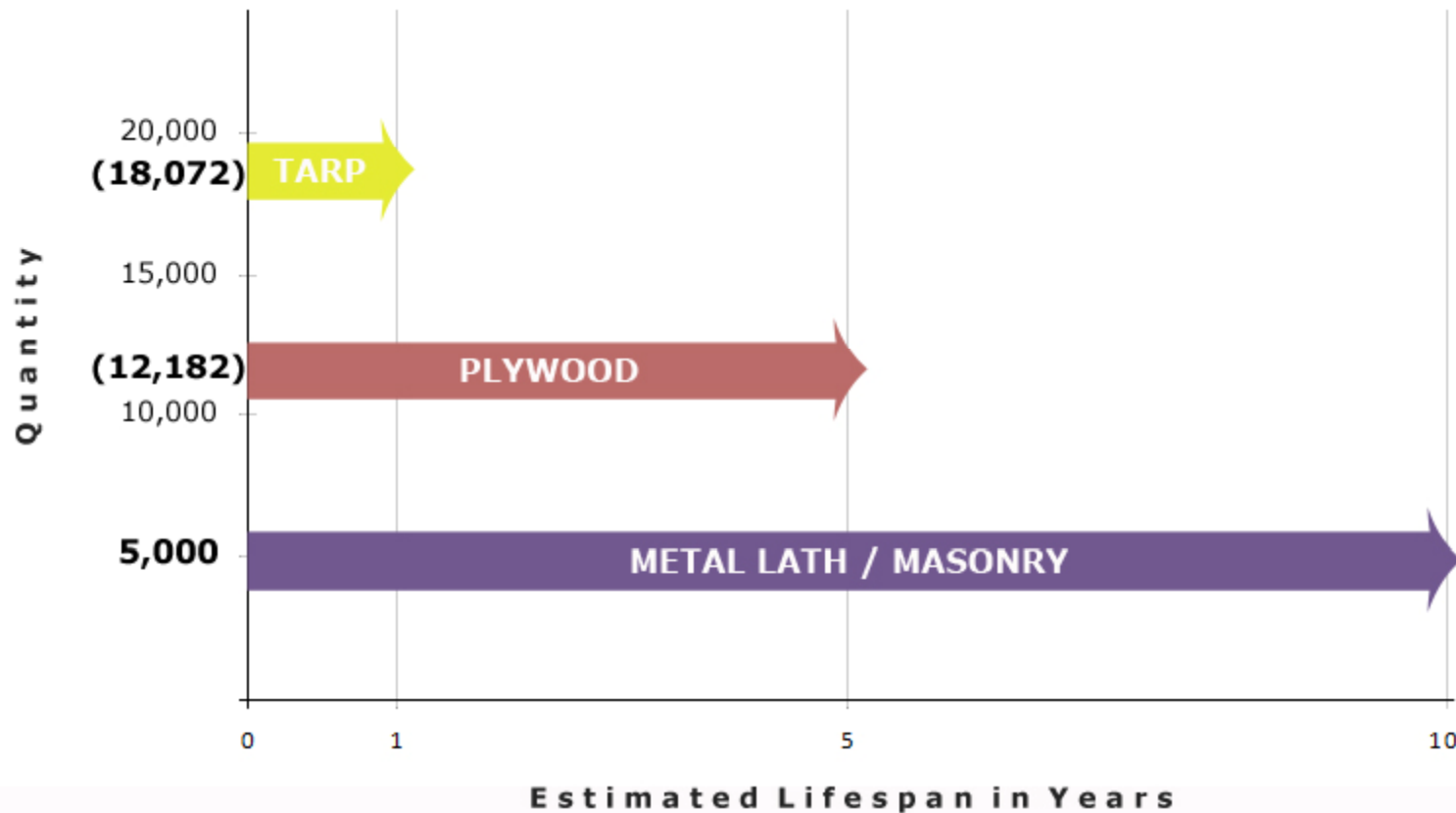
Case Study Summary: 200-Lifespan



300 - Enclosure/Cladding:

- Water Hazard
 - Roofing Leaks w/ Metal Frame
 - Durability of Tarp Siding, Tearing through at conn.
- Hurricane Hazard
 - Low Durability to High Winds w/ Tarps & Metal Roofing Installation Methods (nails not bent over, no screws)
- Other Concerns
 - Heat / Lack of Ventilation
 - Safety / Security of Tarps

Case Study Review: 300-Concerns & Modifications



300-Enclosure/Cladding:

- Water Hazard
 - Durability of Siding
 - Roofing Leaks w/ Metal Frame
- Hurricane Hazard
 - Low Durability to High Winds, Tarps & Metal Roofing Installation Methods
- Other Concerns
 - Heat /Ventilation
 - Safety/Security of Tarps

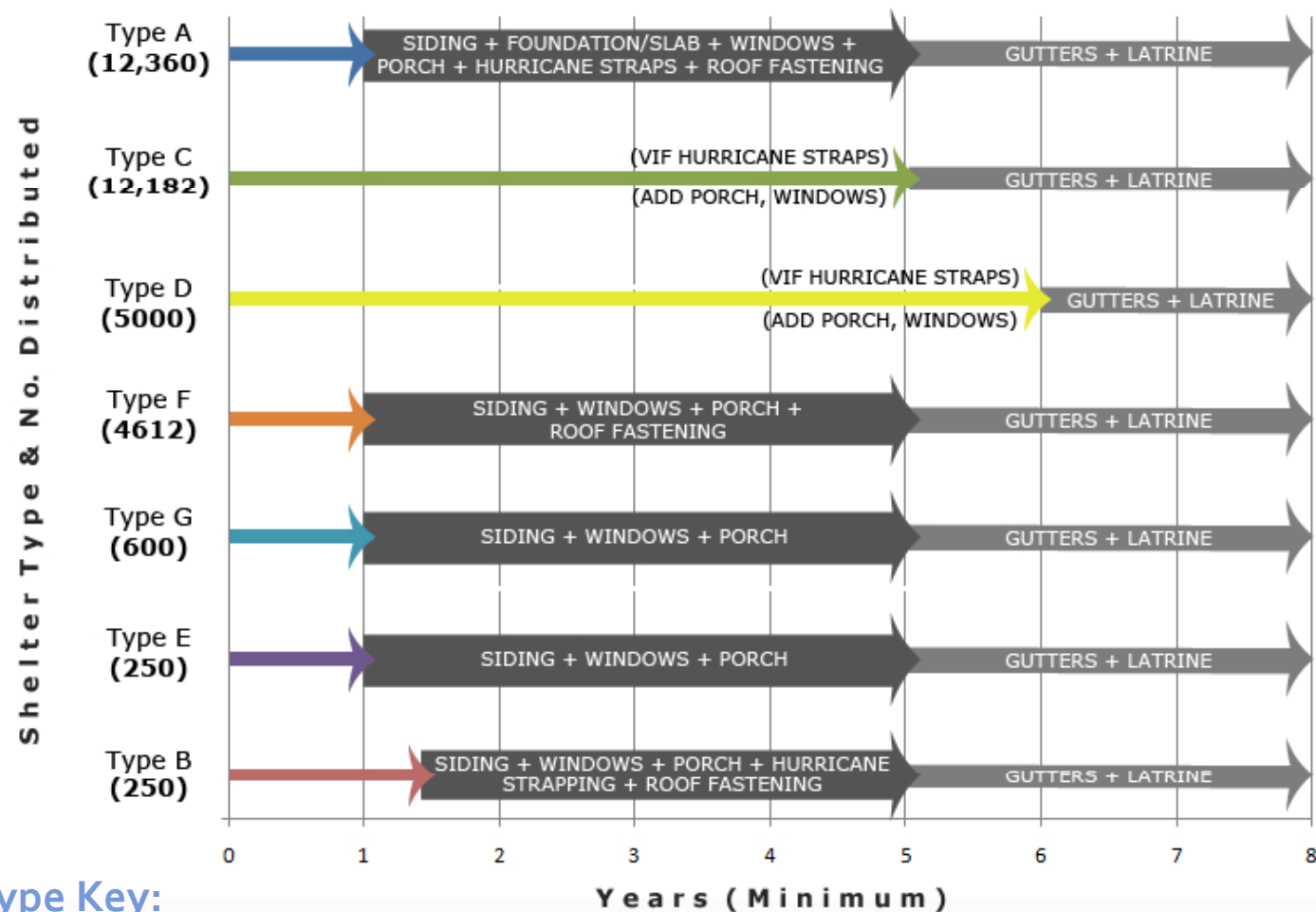
Case Study Summary: 300-Lifespan



400-Space Requirements / 500-Infrastructure / 600-Finishing :

- Insufficient Outdoor Covered Space
- Few windows for Light & Ventilation
- Additional Door Preferred
- Latrine Not always Provided
- Water Collection Systems Needed (Gutters & Barrel)

Case Study Review: Concerns & Modifications



Shelter Type Key:

A -No Floor, Bucket Fnd./Wood Frame /Tarp
 B -Concrete Slab / Wood Frame / Tarp Siding
 C -Concrete Slab / Wood Frame / Plywood
 D -Concrete Slab / Wood Frame / Metal Lath
 or Masonry

E -No Floor, Bucket Fnd. / Lt. G. Steel /Tarp
 F -Raised Floor & Point Fnd. / Lt.G.Steel /
 Tarp Siding
 G -Concrete Slab / Lt.G.Steel / Tarp Siding

Recommended Modifications to Extend Lifespan of Shelters

Proposed Modification Packages by Division:

100 – Foundation / Floor

200 – Structure / Framing

300 – Enclosure / Cladding

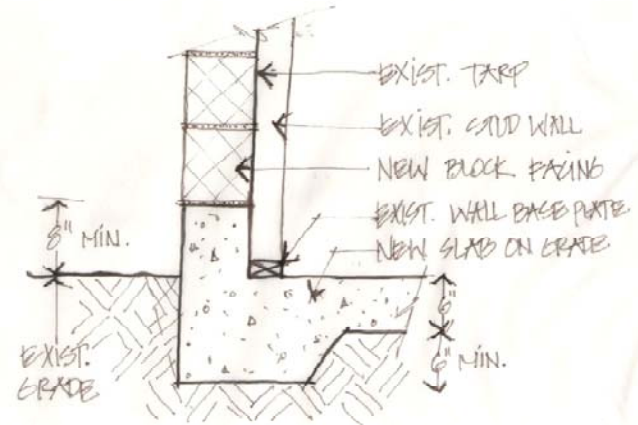
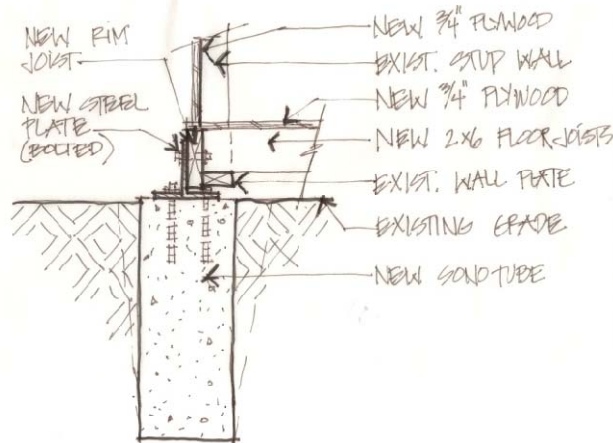
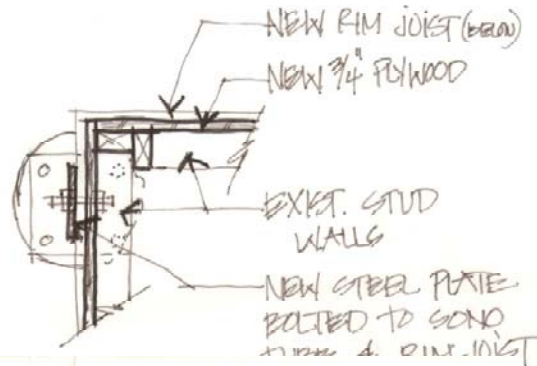
400 – Design ; Size & Space, Openings, Additions

500 – Infrastructure

600 – Finishing



Recommended Modifications to Extend Lifespan of Shelters



MOD100-01

- For Implementation at No Floor / Fnd.
- Potential for Relocation of Shelter/Materials
- Raised Wood Floor Frame & Plywood S.Fl.
- Point Foundation (Replacement if Nec.)
- \$\$ / sq.meter

MOD100-02

- For Implementation at "Permanent" Locations
- Continuous Concrete Footing & Slab on Grade
- \$\$\$ / sq.meter

Division 100 - Fnd./Floor Modification Packages



MOD200-01

- Hurricane Straps Installed @ Roof / Wall Plate / Foundation
- \$

Division 200 – Structure/Frame Mod. Packages



MOD300-01

- Plywood Siding Enclosure
- \$\$ /sq.meter



MOD300-02

- Metal Lath & Stucco
- \$\$\$ /sq.meter



MOD300-03

- Masonry Facing
- \$\$\$ / sq.meter)
- Permanent Locations



MOD300-04

- waddle & Daub & Plaster
- \$\$ / sq.meter

Division 300 – Enclosure Modification Packages



MOD300-05

- Metal Roof Fastening at Wood Shelters
- Screwed Down & Sealed
- Existing Nails Bent Over
- \$



MOD300-06

- Metal Roof Fastening at Steel Shelters
- Seal Leaks
- \$

Division 300 - Enclosure Modification Packages



MOD400-01

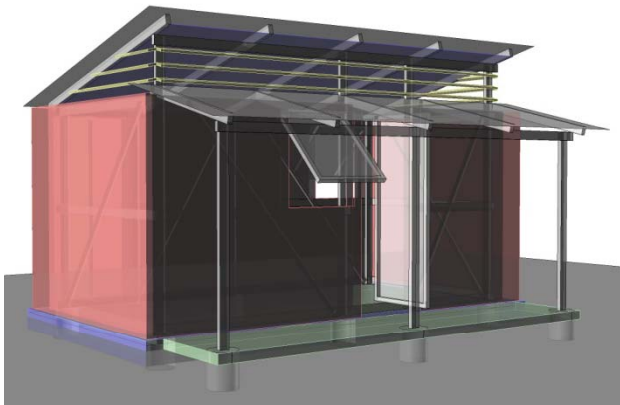
- Plywood Shutter & Wood Frame
- All Fasteners and Security Hardware Incl.
- (4) 2'x4' openings
- \$350 Estimated Cost



MOD400-02

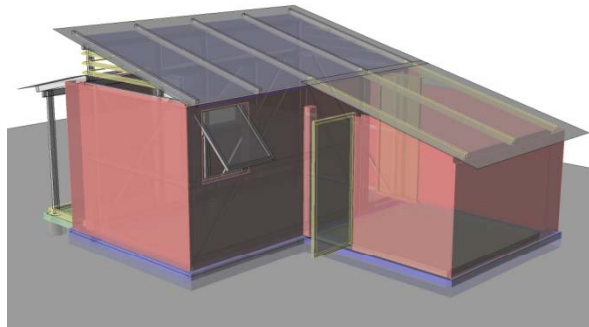
- Plywood Door & Frame
- All Fasteners & Security Hardware Incl.
- (1) 3'x6'8 door)
- \$65

Division 400 - Proposed Vent. / Openings



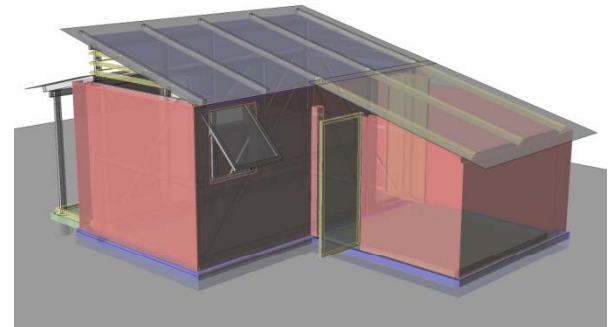
MOD400-03

- Wood Framed Porch Roof No deck
- Includes: lumber, Fasteners, point foundation
- Size 8'x 16'
- \$458(estimated)



MOD400-04

- Wood Framed Shed Roof Addition
- Includes: framing, plywood, point foundations, raised wood framed floor
- Size: 8'x 8'
- \$780 (estimated)



MOD400-05

- Wood/Masonry Framed Shed Roof Addition on Slab
- Includes: framing, plywood siding, conc. slab/footing
- Size 8'x8'
- \$\$\$\$

Division 400 - Addition Packages



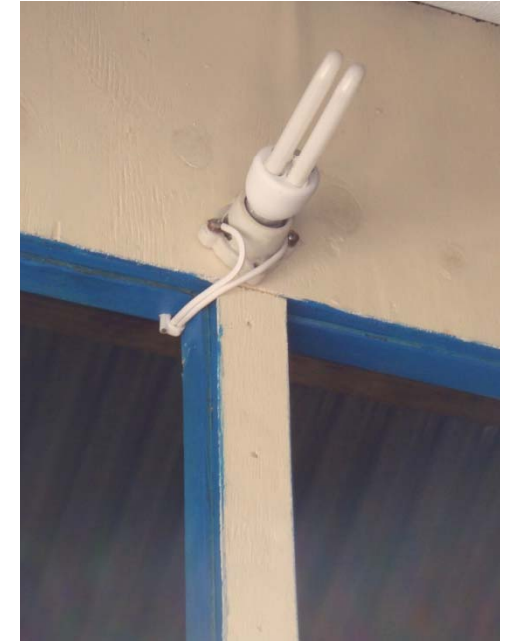
MOD500-01

- Sanitation Facility
- Detached Pit Latrine & Shower Stall w/Plywood Enclosure
- Size 4'x6'
- \$\$



MOD500-02

- Water Catchment Gutter
- 50 gal. Storage Barrel
- 12' Horizontal Run
- \$



MOD500-03

- Power Control Box
- 2 Surface Mount Light Fixtures
- 2 Duplex Outlets
- \$

Division 500 - Infrastructure Packages



MOD600-01

- Interior Wall Board
- Metal Stud Installation
(complaints about sharp edges)
- \$\$



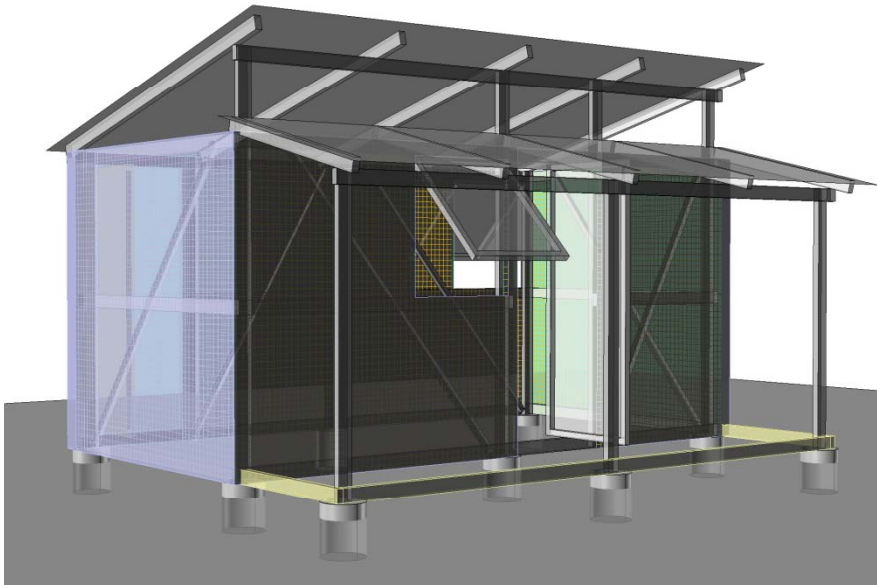
MOD600-02

- Screens @ Clearstory &
Between Rafters
- by Case/Shelter
- \$

Division 600 - Proposed Finishing Packages

MOD A1: Includes

- 100-01 New Point Foundation w/
Raised Wood Floor Joists &
Plywood SubFloor
 - 8'x16' (12sq.m.) Main
Structure Floor
 - 6'x16' Porch Deck
- 200-01 Plywood Siding
- 400-01 Window Shutters
- 400-02 Plywood Door
- 500-02 Gutter & Barrel
- 600-02 Gable End Screens



MOD A1

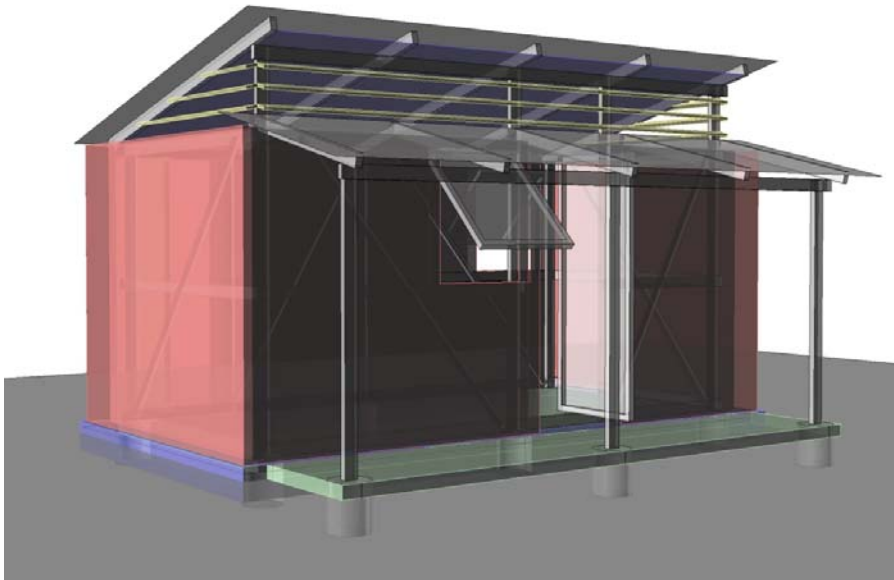
- Shelter Type **A** (Relocation or Material Re-use Possible)
 - 100 - Bucket Foundation
 - 200 - Wood Frame
 - 300 - Tarp Siding
- \$1,620 (Estimated material costs)



Sample Shelter Modification-A1

MOD A2: Includes

- 100-02 Continuous Concrete Foundation & Slab on Grade
 - 8'x16' (12sq.m.) Main Slab
 - 6'x16' Porch Slab
- 200-03 Block Siding
- 400-01 Window Shutters
- 400-02 Plywood Door
- 500-02 Gutter & Barrel
- 600-02 Gable End Screens



MOD A2

- Shelter Type A (“permanent locations”)
 - 100 - Bucket Foundation
 - 200 - Wood Frame
 - 300 - Tarp Siding
- 60 L.Ft. Foundation, 224 sq.ft. concrete slab
+ \$675 (materials, including Block)



Sample Shelter Modification-A2

Next Steps - Recommendations:

Perform Assessment of Shelter Type & Current Conditions

Phase 1 Priority Modification Packages to implement (if Necessary):

MOD100 or 200 – Floor/Foundation Upgrade

(from survey: **12,610** w/ No Floor)

MOD200 – Strapping /Hurricane Fasteners

MOD300 – Siding Upgrade

(from survey: **18,072** w/ Tarp Siding)

VIF Metal Roof Installation

Phase 2 Modification Packages to implement:

MOD400 – Additions/Covered Areas/Ventilation & Openings

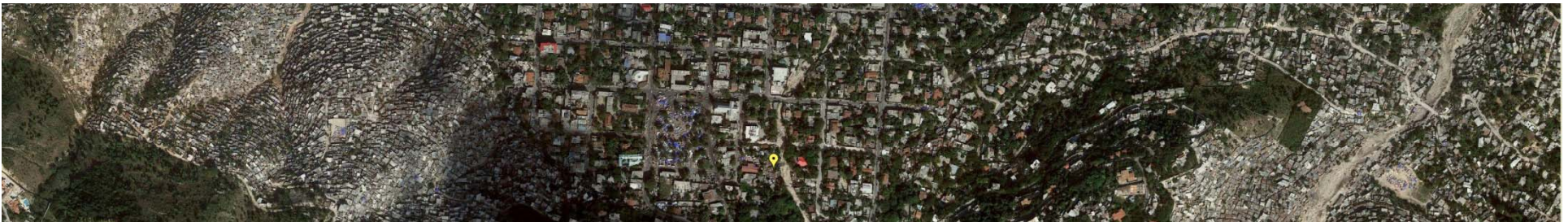
MOD500 – Infrastructure Packages

Latrine / Water Collection / Electricity

MOD600 – Finishing Packages

Interior of L.G.Steel Shelters

Screens



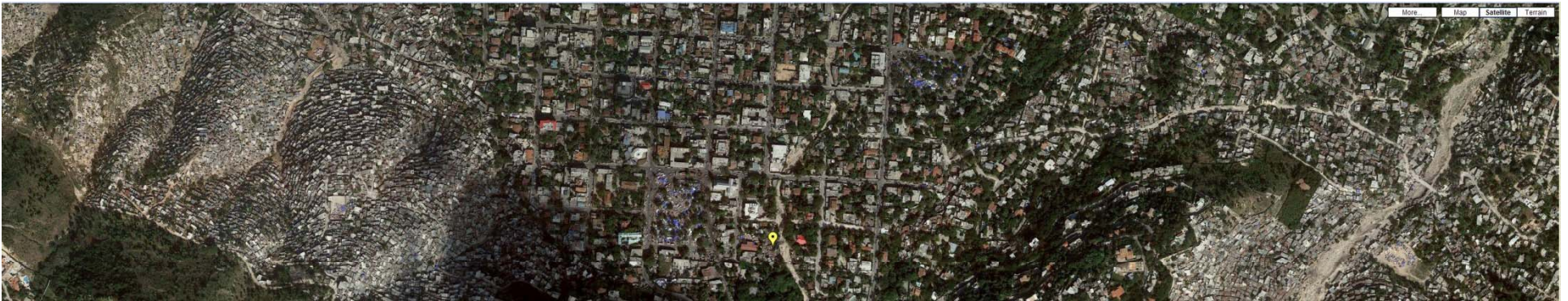
Conclusion

Transitional Shelters Case Studies

Site Study Performed By: **Architecture for Humanity**

All Data collected by September 2010, some
information is estimated.

Adam Saltzman . Eric Cesal . Heidi Arnold . Schendy Kernizan



Appendix 01- Master Case Study List

T-SHELTER ASSESSMENT												
SHELTER INFORMATION			ORGANIZATION NAME									
TARGET		DETAILS	ADRA	CHF		CORDAID 1850	IOM	Habitat for Humanity	SAMARITA N'S PURSE	SPANISH RED CROSS	WORLD CONCERN	
				CHF TYPE 1 Wood	CHF TYPE 2 L.G.Steel						W.C. TYPE 1 Wood	W.C. TYPE 2 L.G.Steel
Quantity of Deployed Shelters	Projected Quantity											
	Location	Port-au-Prince	1582	1800		0	1100	0	0	540	0	0
		Jacmel					500		145			
		other				6000	500		5000	112		
		Leogane			800	2000	1500	460	1130	1060	0	0
		Grand-Goave		0	0	2000	500	0	225	0	0	0
		Croix-des-Bouquets					1500	2600	880			
	Total Count	Total # by 2010.05.12										
Costs of Shelter		Total # by 2010.09.12	1582	1800	680	10000	5600	10600	7500	4612	250	250
	Manufacture/day		48-51									
	Estimated/Original Cost			\$700-850								
Size of Shelter	Current Costs 10.09.06 including Install		\$1,784	\$1,300	\$1,500	?	?	?	?	?	\$1,200	?
	Base Unit	Square Meter (sq.ft.)	14sq.m.	18sq.m.(180)	1.8544(199sq.ft)	20.0670(216)	1.8915(120sq.ft)	1.8815(120sq.ft)	3.3780sq.m.(364)	18sq.m.(180)	3.3780sq.m.(364)	3.3780sq.m.(364)
Shelter Construction Specifications (on- site inspection)	Add.space/porch	Square Meter (sq.ft.)	sq.m. Latrine					5.9536				
	Structure Material Type	Wood		*		*	*	*	*	*		*
		Steel			*					*		
		Other										
	Foundation Type	concrete footing			*	*		*		*	*	owner provided
		deadman	*	*								
		block					*					
	Floor Type	none							*			*
		wood frame/plywood							*	*		
		slab	*		*	*	*				*	
	Cladding Type	none / ground		*				*	*			*
		plastic/tarp		*	*			*	*		*	*
		plywood	*				*					
	Roofing Type	metal sheeting										
		other				*						
		Plastic/tarp										
	Openings/ fenestration	Corrugated Metal	*	*	*	*	*	*	*		*	*
		other										
		# of Doors	1	1	1	3	1	1	1	1	1	1
	Structural Components	# of Windows	2	2	2	4	2	3	1	2	2	2
		other openings/clearstory	0		0	0	0	3	0	4		
		hurricane strapping	*			*						
Infrastructure		diagonal/cross bracing	*	*		*	*		*			*
		Latrine	*									
		Water Catchment System							*			
		Power										

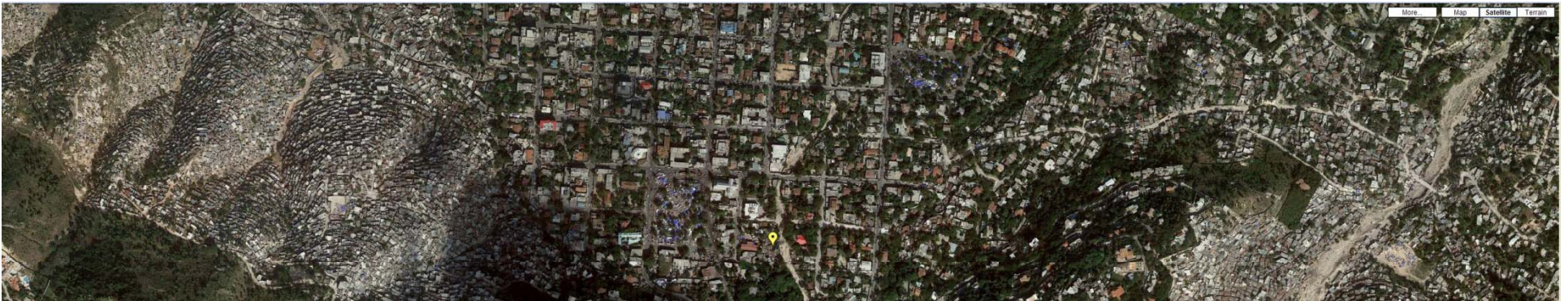
Appendix 01- Master Case Study List

Transitional Shelters Case Studies

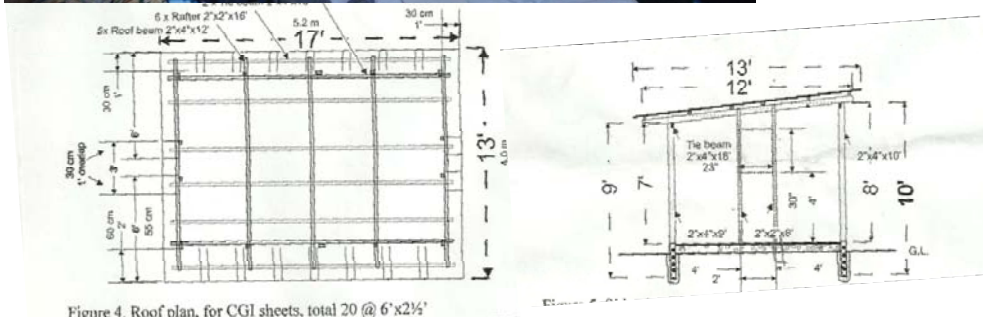
Site Study Performed By: **Architecture for Humanity**

All Data collected by September 2010, some
information is estimated.

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Appendix 01- Case Studies



Data:

- # Dispersed: 1582
- Base Unit Cost: \$1784 US
- Base Size: 14 square meters
- Type: PT Wood Frame
- Other: Pit Latrine Included per 2 units

- Foundation Type: Concrete (prepared by beneficiary)
- Floor Type: Concrete raised 6" Above Grade
- Roof Type: Corrugated Steel
- Cladding Type: 3/4" Plywood
- Hurricane Strapping: yes roof/wall/foundation
- Openings: 1 door, 2 windows

ADRA



Beneficiary Feedback / Modifications:

- Poor Ventilation / low ceiling
- Additional Windows /Secure Venting Needed
- Second Door Preferred
- Additional Covered Outdoor Area Needed
- No flooding or water penetration issues

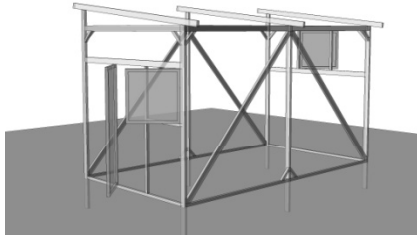
Immediate Concerns:

- Heat/Ventilation
- Hurricane Winds; Metal Roofing Nailed straight through, no Screws
- Size / Add. Covered Outdoor Area

Current Projected Lifespan:

- 2-8 years, Extended Lifespan Potential

ADRA



Data:

- # Dispersed: 1800
- Base Unit Cost: \$700-850 US
- Base Size: 18 square meters (180 sq.ft.)
- Type: Wood Frame
- Foundation Type: Concrete Bucket w/ motor oil on timber below grade
- Floor Type: None
- Roof Type: Corrugated Steel
- Cladding Type: Tarpaulin
- Hurricane Strapping: No
- Openings: 1 door, 2 windows

CHF-Type 1 Port-au-Prince



Beneficiary Feedback / Modifications:

- Lack of Security -Tarp
- Poor Ventilation
- Second Door Preferred
- Additional Covered Outdoor Area Needed
- Rain Blows in Gable End

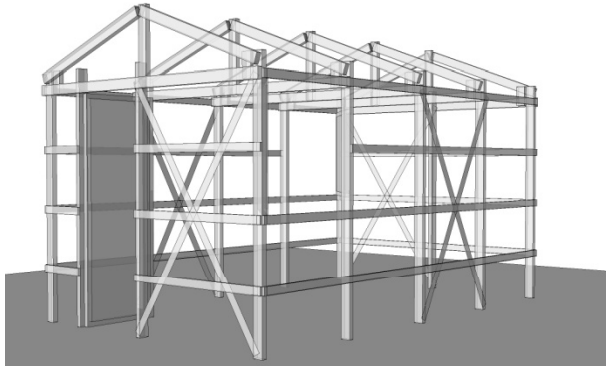
Immediate Concerns:

- Security
- Heat/Ventilation
- Flooding Hazard; Water Infiltration @ Base
- Hurricane Hazard; Metal Roofing Nailed, no straps at roof/wall or posts/foundation

Current Projected Lifespan:

- 1-3 years

CHF-Type 1 Port-au-Prince



Data:

- | | | | |
|-------------------|---------------------------------------|--------------------|-------------------|
| ▪ # Dispersed: | 600 | ▪ Foundation Type: | Concrete |
| ▪ Base Unit Cost: | \$1500 US | ▪ Floor Type: | Concrete Slab |
| ▪ Base Size: | 14.8644 square meters
(160 sq.ft.) | ▪ Roof Type: | Corrugated Steel |
| ▪ Type: | Light Gage Steel Frame | ▪ Cladding Type: | Tarpaulin |
| | | ▪ Openings: | 1 door, 2 windows |

CHF-Type 2 Leogane



Beneficiary Feedback / Modifications:

- Lack of Security -Tarp
- Poor Ventilation
- Second Door Preferred
- Additional Covered Outdoor Area Needed
- Durability of Tarps
- Sharp Edges at Interior

Immediate Concerns:

- Security
- Heat/Ventilation
- Size - Additional Space

Current Projected Lifespan:

- 1-8 years (extended lifespan potential)

CHF-Type 2 Leogane



Data:

- # Dispersed: 10,000
- Base Unit Cost: \$? US
- Base Size: 20 square meters (216 sq.ft.)
- Type: Wood Frame

- Foundation Type: Concrete
- Floor Type: Concrete Slab
- Roof Type: Corrugated Steel
- Cladding Type: Several Options w/ Voucher Program
- Hurricane Strapping: Yes
- Openings: 3 doors, 4 windows

CORTAID 1850



Beneficiary Feedback / Modifications:

- Additional Covered Outdoor Area Needed
- Water Collection System Needed
- Latrine & Wash Facility Needed

Immediate Concerns:

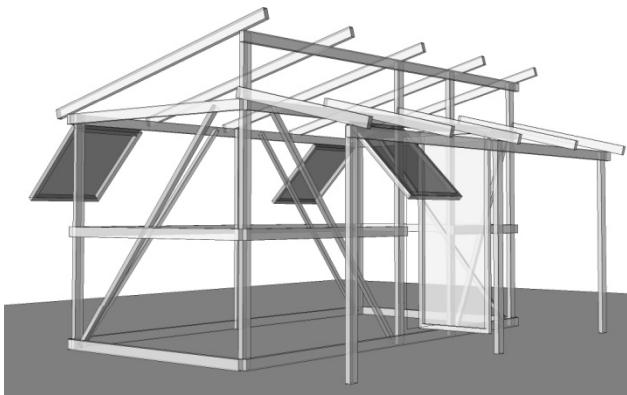
- Additional Covered Space
- Infrastructure Requirements

Current Projected Lifespan:

- 8 years min.

Extended Lifespan Potential

CORTAID 1850



Facts:

- # Dispersed: 3060
- Base Unit Cost: \$? US
- Base Size: 12 square meters (128 sq.ft.)
- Type: PT Wood Frame
- Other: Covered Porch Included
- Foundation Type: Varies, Concrete Bucket Footings
- Floor Type: None
- Roof Type: Corrugated Steel
- Cladding Type: Tarpaulin
- Hurricane Strapping: Yes
- Openings: 1 door, 3 windows
Clearstory at Ends



Habitat for Humanity



Beneficiary Feedback / Modifications:

- Lack of Security with Tarp, Adding piece-meal siding
- Second Door Preferred
- Additional Covered Outdoor Area Needed
- Rain Blows in Gable End

Immediate Concerns:

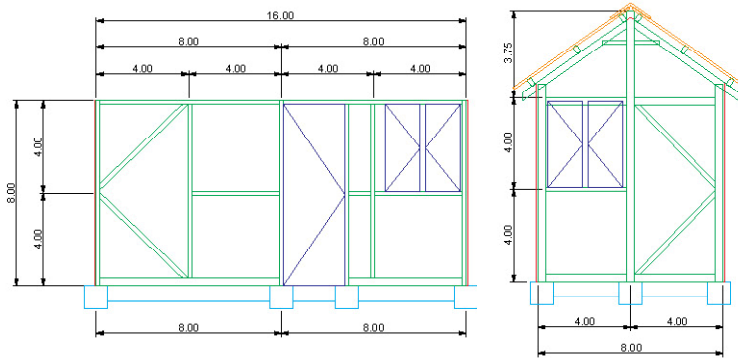
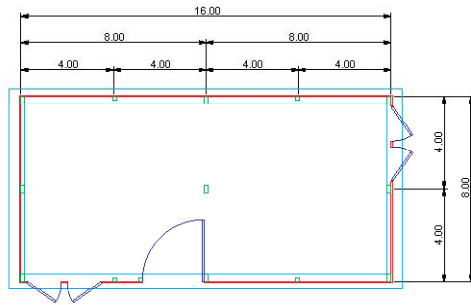
- Safety/Siding
- Size
- Flooding Hazard; Water Infiltration @ Base
- Hurricane Hazard; Metal Roofing Nailed

Current Projected Lifespan:

- 1-3 years Extended Lifespan Potential



Habitat for Humanity



Data:

- # Dispersed: 5600
- Base Unit Cost: \$? US
- Base Size: 12 square meters (128 sq.ft.)
- Type: PT Wood Frame
- Other:
- Foundation Type: Block
- Floor Type: Concrete Slab
- Roof Type: Corrugated Steel
- Cladding Type: ½" Plywood
- Hurricane Strapping: Yes
- Openings: 1 door, 2 windows



Beneficiary Feedback / Modifications:

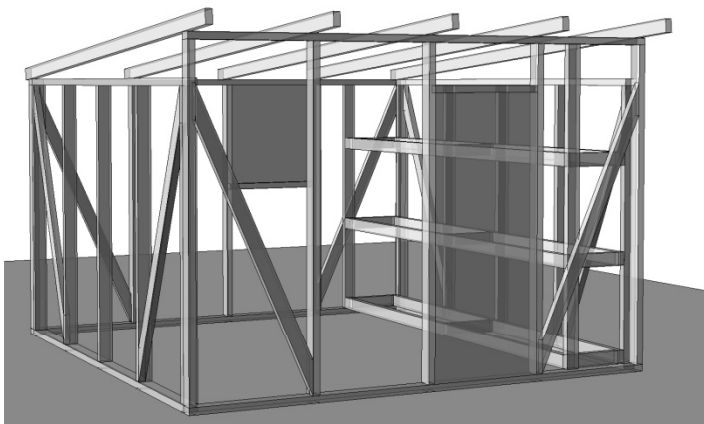
- Poor Ventilation, minimal Windows
- Second Door Preferred
- Additional Covered Outdoor Area Needed

Immediate Concerns:

- Heat/Ventilation
- Size -Additional Covered Area
- Hurricane Hazard; Metal Roofing Nailed, hurricane straps not consistently installed

Current Projected Lifespan:

- 3-8 years Extended Lifespan Potential



Data:

- # Dispersed: 7500
- Base Unit Cost: US \$?
- Base Size: 13.5 square meters (144 sq.ft.)
- Type: PT Wood Frame
- Other: Water Catchment System /Latrine Provided
- Foundation Type: Treated Anchor
- Floor Type: None
- Roof Type: Corrugated Steel
- Cladding Type: Tarpaulin
- Hurricane Strapping: yes
- Openings: 1 door, 1 window

Samaritan's Purse



Beneficiary Feedback / Modifications:

- Lack of Security -Tarp
- Poor Ventilation
- Second Door Preferred
- Additional Covered Outdoor Area Needed
- Ground Water Infiltration

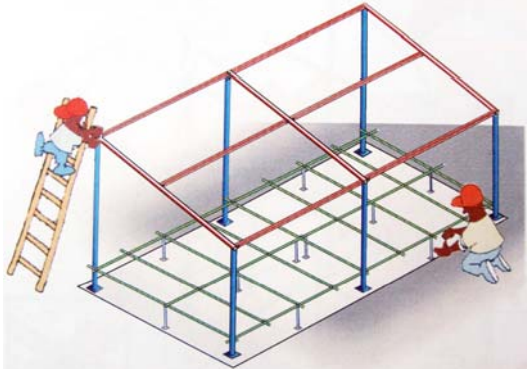
Immediate Concerns:

- Security
- Heat/Ventilation Size - Add. Covered Area
- Flooding Hazard; Water Infiltration @ Base
- Hurricane Hazard; better tie to foundation

Current Projected Lifespan:

- 1-3 years

Samaritan's Purse



Data:

- # Dispersed: 4612
- Base Unit Cost: \$? US
- Base Size: 18 sq.meters (180 sq.ft.)
- Type: Steel w/wood
- Other:

- Foundation Type: Concrete Footing
- Floor Type: Plywood on Raised Steel Frame
- Roof Type: Corrugated Steel
- Cladding Type: Tarpaulin
- Hurricane Strapping: yes
- Openings: 1 door, 2 window
Full clearstory

Spanish Red Cross



Beneficiary Feedback / Modifications:

- Lack of Security -Tarp
- Poor Ventilation
- Second Door Preferred
- Additional Covered Outdoor Area Needed
- Rain Blows in Clearstory

Immediate Concerns:

- Security
- Heat/Ventilation
- Size -Additional Covered Area
- Hurricane Hazard; siding

Projected Lifespan:

- 1-8 years, Extended Lifespan Potential

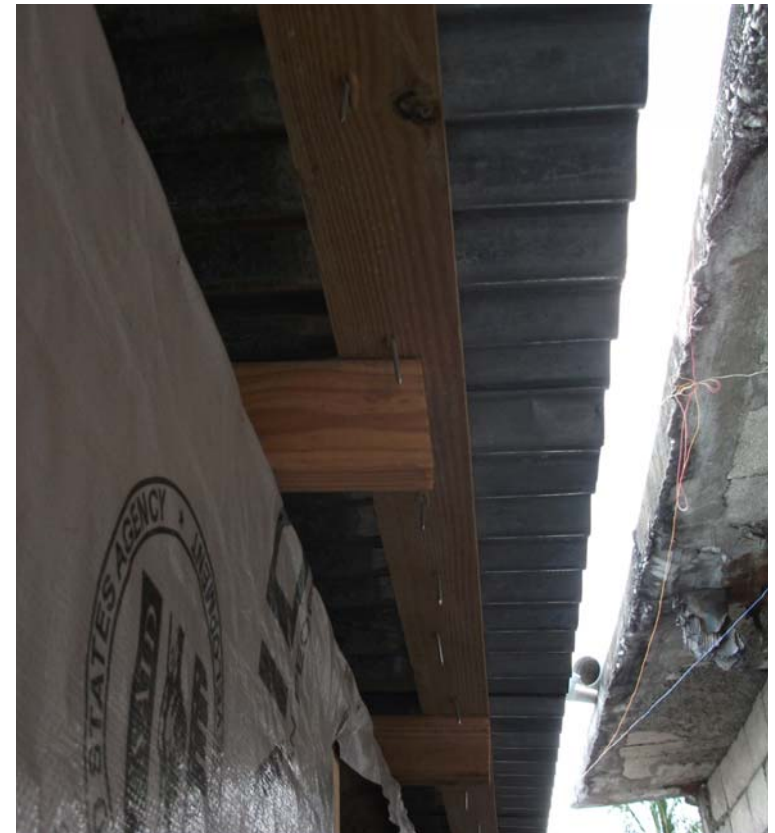
Spanish Red Cross



Data:

- # Dispersed: ?250
- Base Unit Cost: \$1200 US
- Base Size: 13.38 square meters
 (144 sq.ft.)
- Type: Wood Frame
- Foundation Type: Concrete, raised
 perimeter wall
- Floor Type: Concrete Slab
- Roof Type: Corrugated Steel
- Cladding Type: Tarpaulin
- Hurricane Strapping: No
- Openings: 1 door, 2 windows

World Concern –Type 1



Beneficiary Feedback / Modifications:

- Lack of Security -Tarp
- Poor Ventilation
- Second Door Preferred
- Additional Covered Outdoor Area Needed

Immediate Concerns:

- Security
- Size
- Heat/Ventilation
- Hurricane Hazard - Metal Roofing Nailed,
no straps @ roof/wall or foundation

Current Projected Lifespan:

- 1-5 years, Extended Lifespan Potential

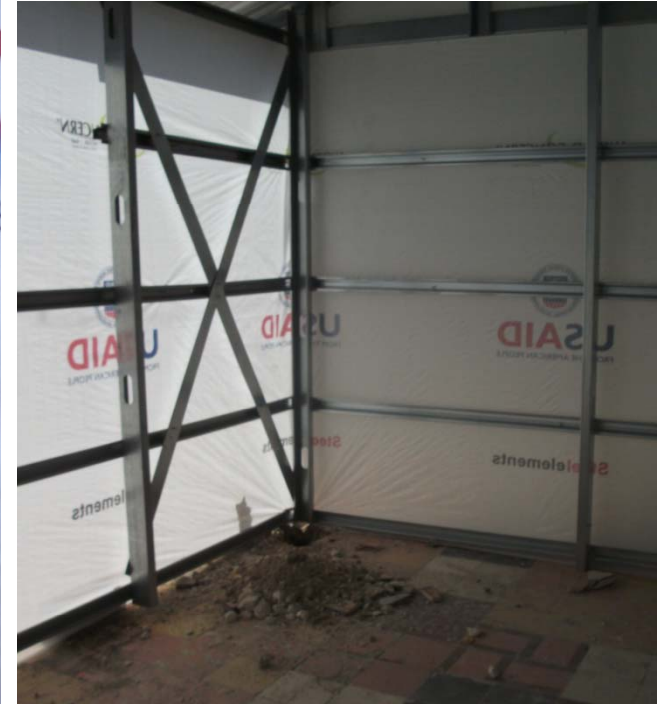
World Concern -Type 1



Data:

- | | | | |
|-------------------|-------------------------------------|--------------------|------------------------|
| ▪ # Dispersed: | ~250 | ▪ Foundation Type: | Concrete Point, Varies |
| ▪ Base Unit Cost: | US \$XX | ▪ Floor Type: | Beneficiary Provided |
| ▪ Base Size: | 13.38 square meters
(144 sq.ft.) | ▪ Roof Type: | Corrugated Steel |
| ▪ Type: | Steel Frame | ▪ Cladding Type: | Tarpaulin |
| | | ▪ Openings: | 1 door, 2 windows |

World Concern -Type 2



Beneficiary Feedback / Modifications:

- Lack of Security -Tarp
- Poor Ventilation
- Second Door Preferred
- Additional Covered Outdoor Area Needed
- Roof Leaks at fastening points
- Water Infiltration @ Base

Immediate Concerns:

- Security & Durability of Tarp -pull through
- Heat/Ventilation
- Size
- Flooding Hazard - Water Infiltration @ Base
- Hurricane Hazard- Varying Found. Anchor Sys.

Current Projected Lifespan:

- 1-8 years, Extended Lifespan Potential

World Concern -Type 2