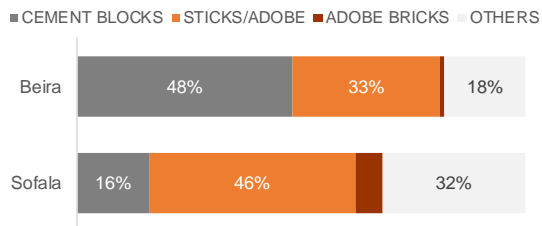




TECHNICAL ORIENTATIONS

FOR *BUILDING BACK SAFER* INTERVENTIONS

Draft 24th April 2019



TYPES OF WALLS

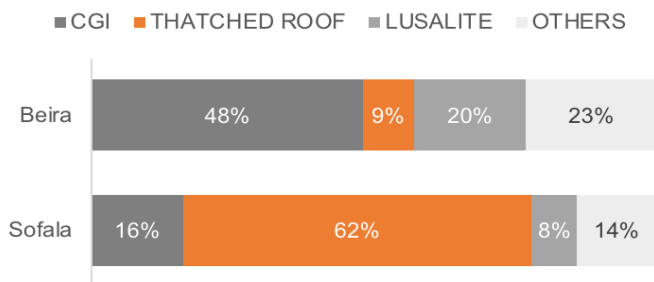
WALLS



		Sofala	Beira
Adobe bricks	sundried earth bricks <i>bloco de adobe</i>	6%	1%
Sticks/Adobe	sticks + adobe <i>paus maticados / pau a pique</i>	46%	33%
Reed/straw	canes / sticks / bamboo/ palm <i>canico/paus/bambu/palmeira</i>	27%	8%
Concrete Blocks	cement / rebars <i>bloco de cimento / ferro</i>	17%	49%



TYPES OF ROOF



ROOF



Thatched /Straw

straw / palm leaves
capim/colmo/palmeira

Sofala

62%

Beira

10%

CGI

iron sheet
chapa de zinco

26%

60%

Lusalite *

8%

20%

INE 2013 (data 2008)

* Lusalite (Asbestos) roof present specific environmental concerns.
A consultant seconded by MSB / Swedish Red Cross to the Shelter Cluster will be deployed by the first week of May (final date to confirm) for approx. 1 – 2 months.



ToR:
-Guidance on asbestos risks and possible interventions
- Capacity building training



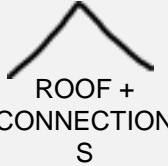



LEVELS OF DAMAGE PER TYPE

The objective of the matrix (at the moment an initial draft) it to define type of damages (expanding the GoM categories).

Standard interventions packages could be defined taking as a reference the damage categories.

PART	DETAILS	MINOR / NO DAMAGES	LIGHT DAMAGES	HEAVY DAMAGES	COMPLETELY DESTROYED
 ROOF + CONNECTI ONS	CGI	Roof Structure in good conditions	Roof Structure in good conditions	Roof Structure in bad conditions	Roof and structure are destroyed
	THATCHED ROOF	CGIs / lusalite / thatch still on the roof (need extra anchoring)	Some CGIs / lusalite / thatch flown away or broken Majority of the connections walls/roof in acceptable conditions. Some connections are weak or to replace	Roof cover (CGI, Thatched, lusalite) is partially/totally destroyed Walls/roof connections need improvement	
	LUSALITE	Connections walls/roof in acceptable conditions			
 WALLS + STRUCTUR E + FOUNDATI ONS	CEMENT BLOCKS	Structure standing Walls with no or minor damages	WALLS / FOUNDATIONS - Structure still standing and in acceptable conditions (need some reinforcement) - Walls with few damages, broken parts <20%	Structure partially destroyed, but possible to repair Walls with damages > 40%	Walls and structure are destroyed
	STICKS / ADOBE		Structure standing Walls with some damages	Structure partially destroyed, but possible to repair Walls with damages > 40%	
	ADOBE BRICKS		Structure standing Walls with some damages	Structure partially destroyed, but possible to repair Walls with damages > 40%	



PART	DETAILS	MINOR / NO DAMAGES	LIGHT DAMAGES	HEAVY DAMAGES	COMPLETELY DESTROYED
 ROOF + CONNECTIONS	CGI	Roof Structure in good conditions	Roof Structure in good conditions Some CGIs / lusalite / thatch flown away or broken	Roof Structure in bad conditions	 Walls and structure are destroyed
	THATCHED ROOF	CGIs / lusalite / thatch still on the roof (need extra anchoring)	Majority of the connections walls/roof in acceptable conditions. Some connections are weak or to replace	Roof cover (CGI, Thatched, lusalite) is partially/totally destroyed Walls/roof connections need improvement	
	LUSALITE	Connections walls/roof in acceptable conditions			
 WALLS + STRUCTURE + FOUNDATIONS	CEMENT BLOCKS	Structure standing Walls with no or minor damages	WALLS / FOUNDATIONS - Structure still standing and in acceptable conditions (need some reinforcement) - Walls with some damages, broken parts <30%	Structure partially destroyed, but possible to repair Walls with damages > 40%	Walls and structure are destroyed
	STICKS / ADOBE		Structure standing Walls with some damages	Structure partially destroyed, but possible to repair Walls with damages > 40%	
	ADOBE BRICKS		Structure standing Walls with some damages	Structure partially destroyed, but possible to repair Walls with damages > 40%	



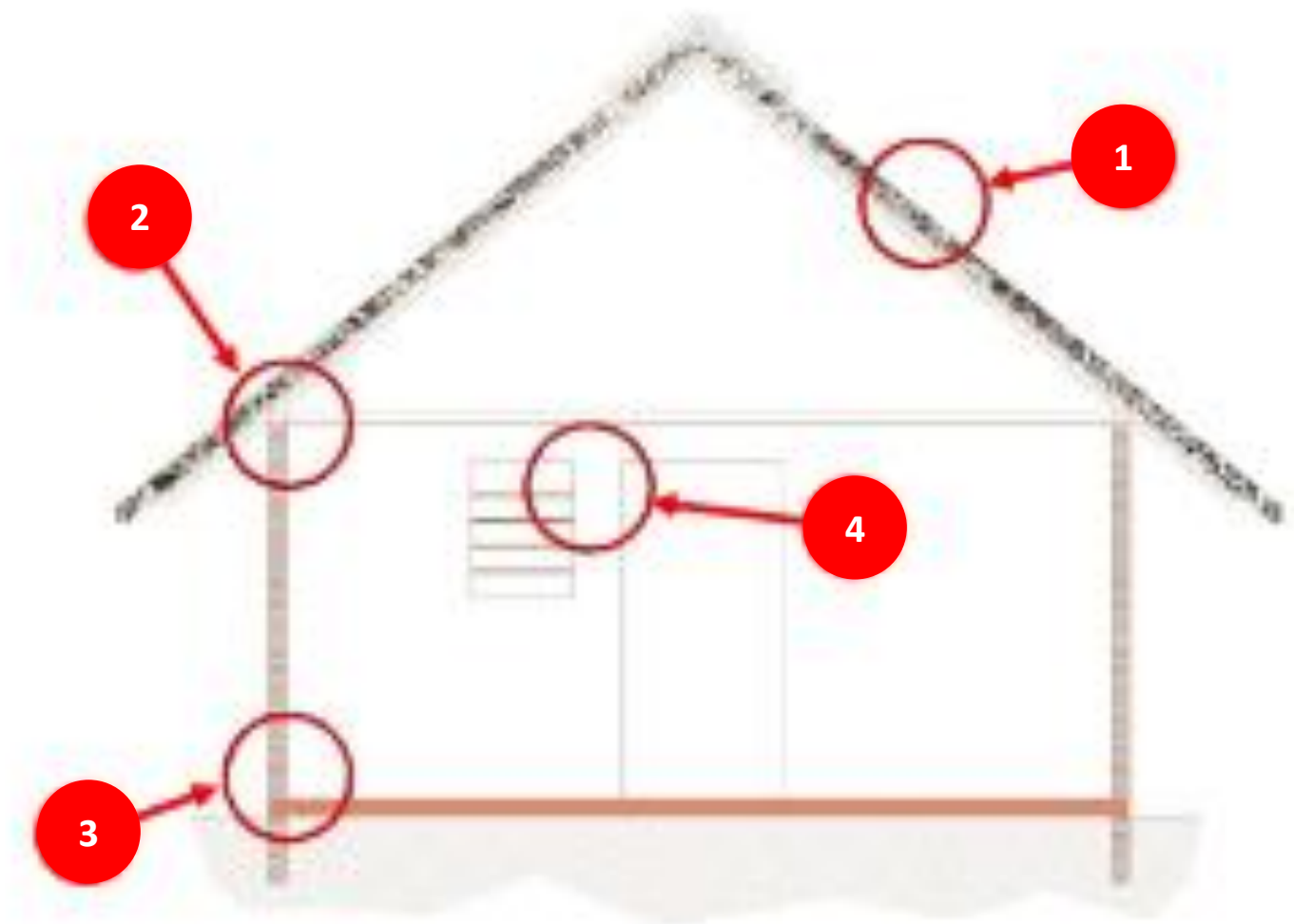
**Many families are already rebuilding with very limited resources.
To disseminate Build Back Safer messages, good construction practices and to provide technical support to improve the resistance of the houses is a priority.**











- 1- Roof**
- 2- Walls / Roof connections**
- 3- Walls / Corners / Foundations**
- 4- Doors / Windows**



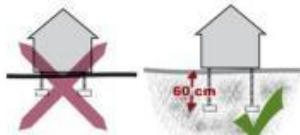
RECONSTRUINDO MELHOR
Província de Zambézia, Moçambique
CONSTRUÇÃO EM PAU-A-PIQUE



Como podemos reconstruir melhor?

A BASE DA CASA

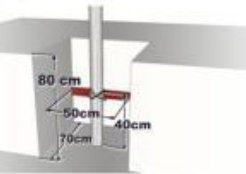
1
COMPACTAR A BASE DO CABOUÇO!!



2
PROFUNDIDADE MÍNIMO DO CABOUÇO = 60 cm
LARGURA DO CABOUÇO = 70 cm

3
AMARRAR UM PAU CRUZADO COM O POSTE VERTICAL PARA REFORÇAR A FUNDAÇÃO !!

comprimento: 50 cm
posição: 40 cm desde o fundo do cabouço



AS PAREDES DA CASA

1
COLOCAR DIAGONAIS NAS PAREDES PARA REFORÇAR OS POSTES VERTICAIS!!



2
COLOCAR DIAGONAIS PARA REFORÇAR OS CANTOS DAS PAREDES!!

3
UM REBOCO OU MATICADO DE QUALIDADE É NECESSÁRIO PARA PROTEGER AS PAREDES!



A COBERTURA DA CASA

1
COLOCAR DIAGONAIS NA COBERTURA COMO REFORÇO!!



2
PROLONGAR A COBERTURA NOS LATERAIS COM UMA ESTRUTURA DE BARROTES E CAPIMI!



3
ASSEGURAR O CAPIM COM FITAS VEGETAIS!!



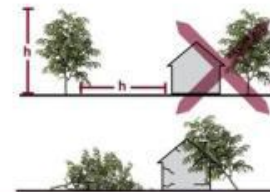
RECONSTRUINDO MELHOR
Província de Zambézia, Moçambique
CONSTRUÇÃO EM PAU-A-PIQUE
CONSTRUÇÃO EM ADOBE



Como podemos reconstruir melhor?

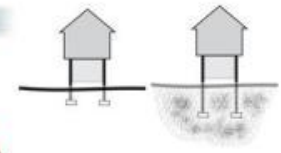
O LOCAL PARA CONSTRUIR

1
CONSTRUIR A CASA AFASTADA DAS ARVORES, JA QUE PODEM CAIR DURANTE O CICLONE!!



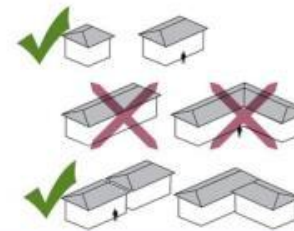
2
CONSTRUIR A CASA LONGE DAS AGUAS DO RIO OU DO MAR PARA EVITAR FICAR DANIFICADA PELA CHEIA E AS ONDAS !!

3
CONSTRUIR FUNDAÇÕES PROFUNDAS E ELEVAR A CASA PARA PROTEGER A CASA DA AGUA !!



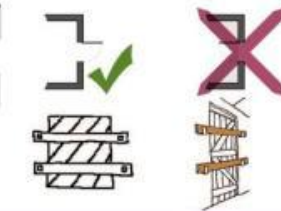
A FORMA DA CASA

1
UMA PLANTA COMPACTA E SIMÉTRICA É MAIS RESISTENTE



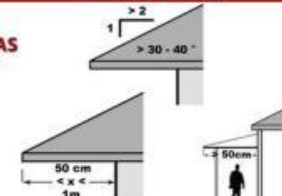
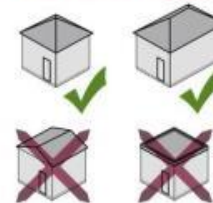
2
UTILIZAR REFORÇOS DIAGONAIS NAS PAREDES

3
AS JANLEAS PROTEGIDAS COM TAMPAS DE MADEIRA RESISTEM MELHOR A PRESSÃO DO VENTO!!

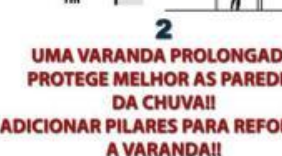


O TECTO DA CASA

1
COBERTURAS DE QUATRO ÁGUAS E INCLINAÇÃO MAIOR DE 30° RESISTEM MELHOR AOS VENTOS FORTES!!



2
UMA VARANDA PROLONGADA PROTEGE MELHOR AS PAREDES DA CHUVA!! ADICIONAR PILARES PARA REFORÇAR A VARANDA!!



3
UMA VARANDA SEPARADA DA COBERTURA RESISTE MELHOR AOS VENTOS FORTES!!



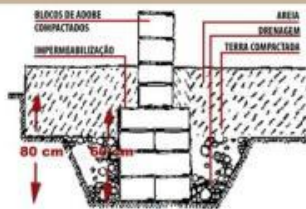


RECONSTRUINDO MELHOR
Provincia da Zambézia, Moçambique
CONSTRUÇÃO EM ADOBE



Como Podemos Reconstruir Melhor?

A BASE DA CASA



1
PROFUNDIDADE DO CABOUÇO
= 70 CM
COMPACTAR A BASE
DUPLICAR
OS BLOCOS DA FUNDAÇÃO

2
CONSTRUIR
UMA PLATAFORMA
DE 30 CM DE ALTURA!!



3
COMPACTAR BEM
AS CAMADAS
DA PLATAFORMA!!

AS PAREDES DA CASA

1
REFORÇAR OS CANTOS COM
CONTRAFORTES
DE BLOCOS!!



2
COLOCAR CONTRAFORTES
NA JUNÇÃO DAS PAREDES!!

3
FAZER UM BOM REBOCO
PARA PROTEGER AS PAREDES!



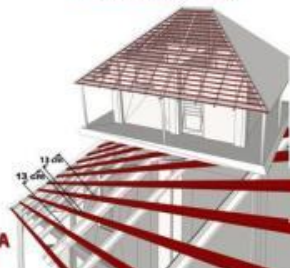
A COBERTURA DA CASA

1
ROLONGAR A VARANDA
PARA PROTEGER AS PAREDES
DA CHUVA!!



AGREGAR PILARES
PARA ASSEGURAR A COBERTURA
CONTRA OS VENTOS FORTES!!

2
MINIMIZAR O ESPAÇO ENTRE
AS LONGARINAS!!

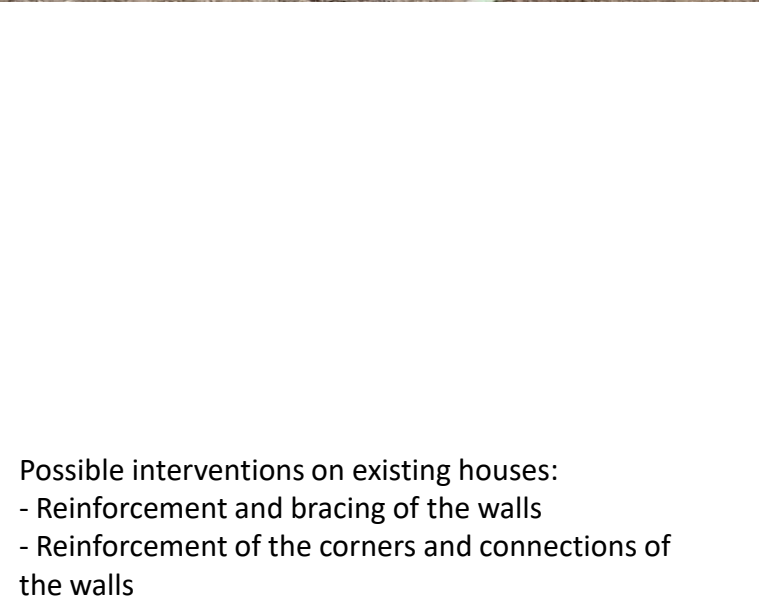
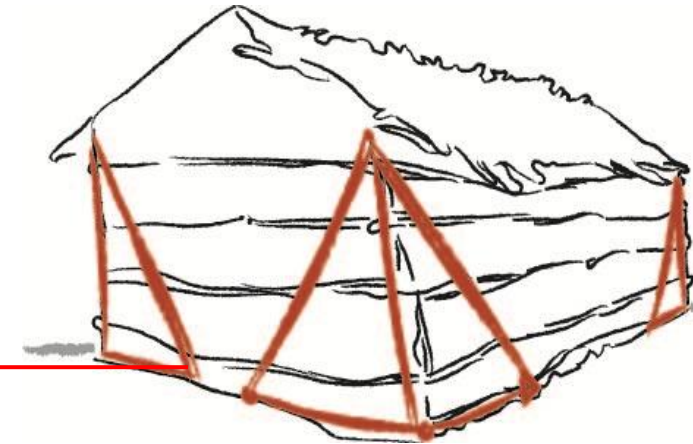


3
COBERTURA
BEM AMARRADA E REFORÇADA
COM CORDAS VEGETAIS

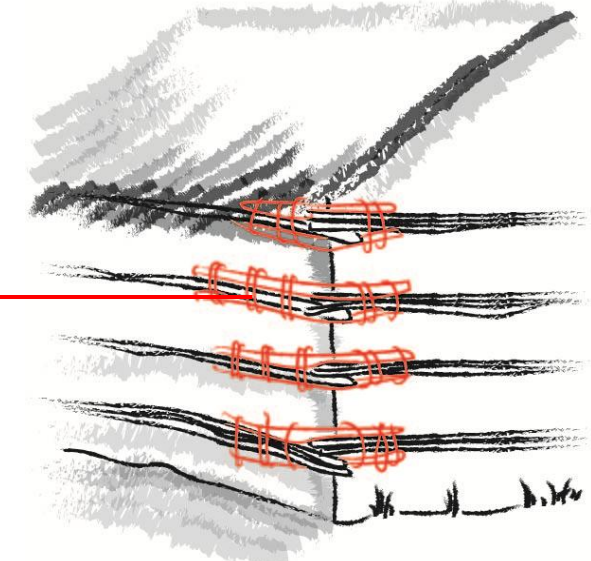




WALLS BRACING



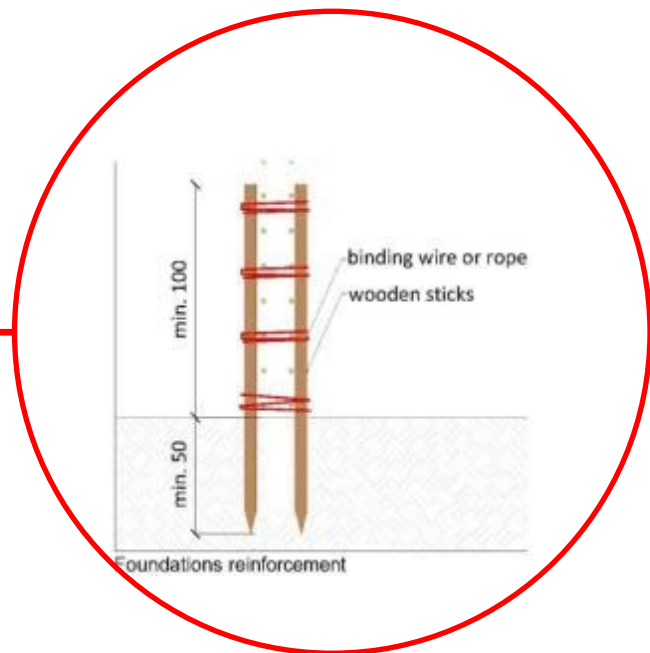
CORNERS REINFORCEMENT



- Possible interventions on existing houses:
- Reinforcement and bracing of the walls
 - Reinforcement of the corners and connections of the walls



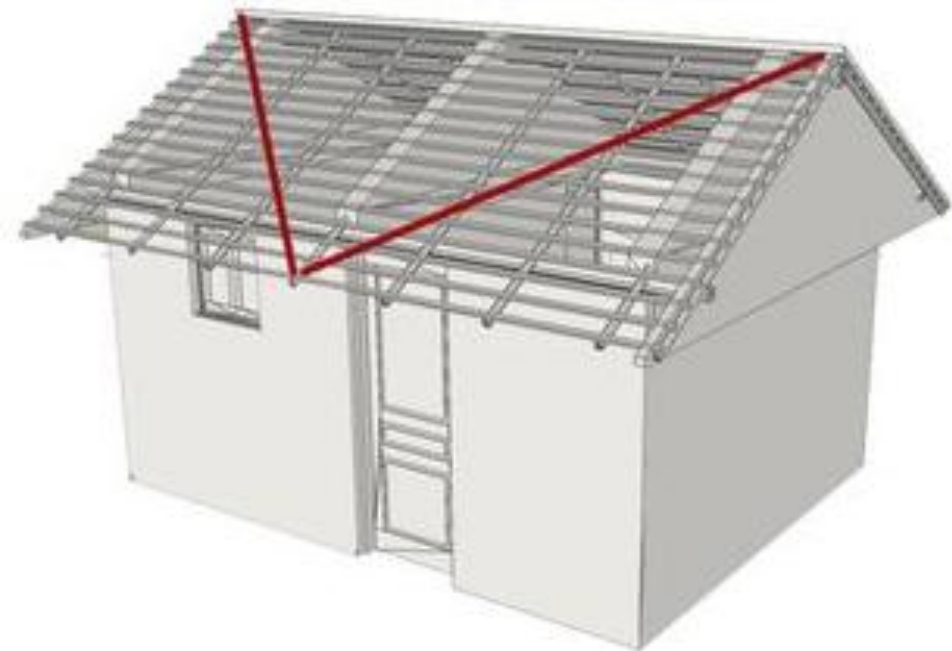
FOUNDATIONS REINFORCEMENT





REINFORCEMENT OF ROOF / STRUCTURE CONNECTIONS













ROOF BRACING AND CONNECTIONS OF THE COVER (CGI, THATCH) TO THE ROOF STRUCTURE





TOOLBOX:

Some basic tools and construction materials (total cost approx 100 USD), together with Build Back Safer trainings, will allow the HHs to improve the shelters they're already rebuilding

DESCRIPTION		UNIT	QTY	UNIT PRICE MT	UNIT PRICE (USD)	TOTAL PRICE Mt	TOTAL PRICE USD	Remarks
TOTAL						5890	98,17	Price may vary depending on location, distance from the market,...
Hammer (Martelho)		pcs	1	400	6,67	400	6,67	ROOF + STRUCTURE + WALLS
Machete (Catana)		pcs	1	150	2,50	150	2,50	STRUCTURE + WALLS
Hoe (Enxada)		pcs	1	360	6,00	360	6,00	STRUCTURE
Pliers (Camadas)		pcs	1	300	5,00	300	5,00	STRUCTURE + WALLS
Saw (Serrote) medium		pcs	1	250	4,17	250	4,17	STRUCTURE + WALLS
Shovel (Pala)		pcs	1	320	5,33	320	5,33	STRUCTURE
Nails (Pregos) 10 cm - 4" galvanized		kg	2	250	4,17	500	8,33	STRUCTURE + WALLS
Nails (Pregos) 5 cm - 2" galvanized		kg	2	250	4,17	500	8,33	STRUCTURE + WALLS
Umbrella Nails (Pregos de chapa)		kg	2	300	5,00	600	10,00	ROOF
Rope (Corda) 6 mm, nylon, roll 100 mts		roll	1	560	9,33	560	9,33	STRUCTURE + WALLS
Binding wire (Arame) roll 5 kgs (approx 200 mts)		roll	1	350	5,83	350	5,83	STRUCTURE + WALLS
Rebar (Varao) diam. 6 mm, length 6 mts		pcs	4	400	6,67	1600	26,67	STRUCTURE + WALLS