

METHODOLOGY:

BUILDING DISASTER RESISTANT BUILDINGS

1 CHECK:
CONSTRUCTION
MATERIALS

2 KNOW:
STORING
MATERIALS

3 LEARN:
CONCRETE WORKS

4 LEARN:
MASONRY WORKS

5 LEARN:
ROOF AND
ROOF FRAMING

CHECK:
CONSTRUCTION MATERIALS

1

CONSTRUCTION MATERIALS

CHECK THE QUALITY OF NEWLY ARRIVED MATERIALS.

VISUAL INSPECTION OF PORTLAND CEMENT



Dry and intact.



Wet and open or broken bags.

NOTES:

CONSTRUCTION MATERIALS

CHECK THE QUALITY OF NEWLY ARRIVED MATERIALS.

VISUAL INSPECTION OF AGGREGATES

USE WASHED RIVER SAND, NOT BEACH SAND



Black sand without lots of dirt. Quarry sand is also acceptable, and may be lighter in color.



Beach sand with shells.

NOTES:

CONSTRUCTION MATERIALS

CHECK THE QUALITY OF NEWLY ARRIVED MATERIALS.

VISUAL INSPECTION OF AGGREGATES

CRUSHED GRAVEL 3/4" (19mm)



Angular and rough surface.



Do not use Limestone.

NOTES:

CONSTRUCTION MATERIALS

CHECK THE QUALITY OF NEWLY ARRIVED MATERIALS.

VISUAL INSPECTION OF MASONRY BLOCKS

CONCRETE HOLLOW BLOCKS



Good quality blocks.



Breaks even during handling and storing.

NOTES:

CONSTRUCTION MATERIALS

CHECK THE QUALITY OF NEWLY ARRIVED MATERIALS.

VISUAL INSPECTION OF MASONRY BLOCKS

RULE: IF BLOCK LOOKS SOFT AND IS FALLING APART, CONDUCT DROP TEST.



Drop block from chest height on hard surface to test block quality. If more than 1 out of 5 blocks breaks, the batch of blocks is probably not strong enough.

NOTES:

CONSTRUCTION MATERIALS

CHECK THE QUALITY OF NEWLY ARRIVED MATERIALS.

VISUAL INSPECTION OF STEELS

DEFORMED BARS



IF THE TIP OF THE BARS ARE NOT PAINTED OR PAINTED WHITE, DO NOT ACCEPT.

**USE YELLOW BARS (GRADE 40) FOR BARS UP TO 12MM
USE GREEN BARS (GRADE 60) FOR BARS GREATER THAN 12MM
BARS WITH ONE RED END ARE WELDABLE**

NOTES:

CONSTRUCTION MATERIALS

CHECK THE QUALITY OF NEWLY ARRIVED MATERIALS.

VISUAL INSPECTION OF STEELS

SQUARE BARS



Do not accept very rusty square bars.

NOTES:

CONSTRUCTION MATERIALS

CHECK THE QUALITY OF NEWLY ARRIVED MATERIALS.

VISUAL INSPECTION OF STEELS

FLAT BARS



Do not accept very rusty flat bars.

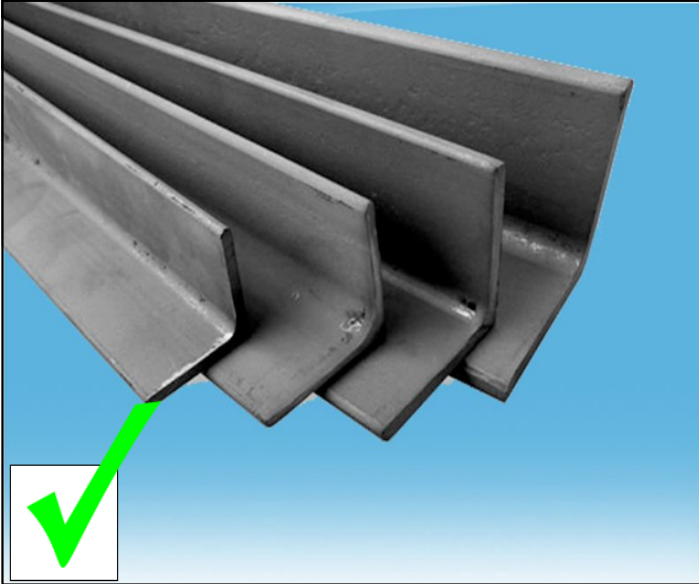
NOTES:

CONSTRUCTION MATERIALS

CHECK THE QUALITY OF NEWLY ARRIVED MATERIALS.

VISUAL INSPECTION OF STEELS

ANGLE BARS



Do not accept very rusty angle bars.

NOTES:

CONSTRUCTION MATERIALS

CHECK THE QUALITY OF NEWLY ARRIVED MATERIALS.

TIE WIRE



Do not accept very rusty tie wires.

NOTES:

CONSTRUCTION MATERIALS

CHECK THE QUALITY OF NEWLY ARRIVED MATERIALS.

PLYWOOD



NOTES:

CONSTRUCTION MATERIALS

CHECK THE QUALITY OF NEWLY ARRIVED MATERIALS.

STEEL C PURLINS

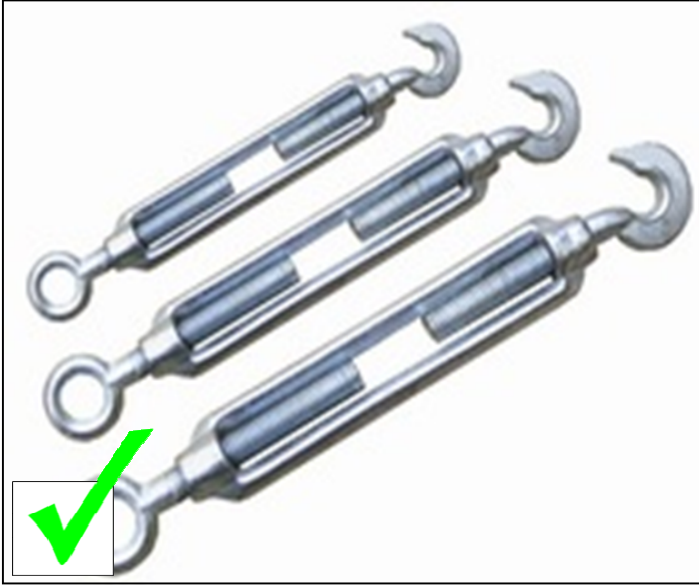


This is what a Steel C Purlin looks like.

NOTES:

CHECK THE QUALITY OF NEWLY ARRIVED MATERIALS.

TURN BUCKLES



This is what a Turn Buckle looks like.

NOTES:

CONSTRUCTION MATERIALS

CHECK THE QUALITY OF NEWLY ARRIVED MATERIALS.

PE FOAM DOUBLE SIDED WITH
ALUMINIUM FOIL



Roof insulation.

TEKSCREWS



Use to attach the roofing.

NOTES:

CONSTRUCTION MATERIALS

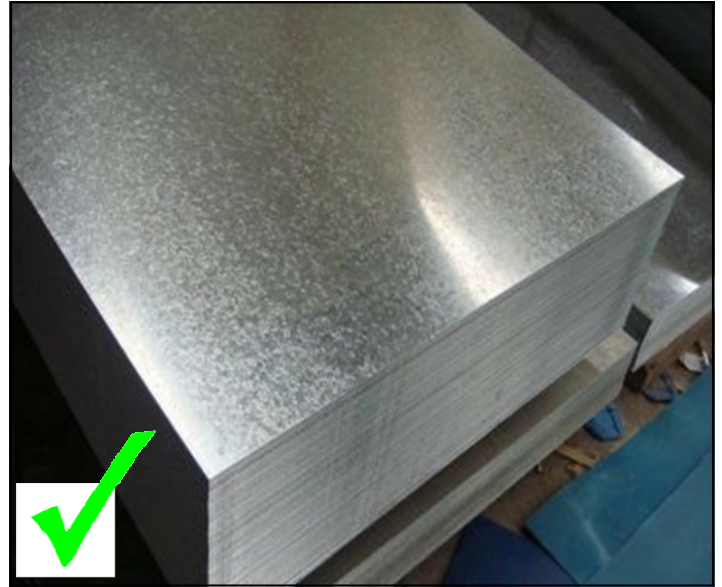
CHECK THE QUALITY OF NEWLY ARRIVED MATERIALS.

ROOF CORRUGATED SHEET



Called CGI Sheet.

ROOF PLAIN SHEET



NOTES:

KNOW:
STORING MATERIALS **2**

STORING MATERIALS

HOW TO PROTECT MATERIALS FROM DETERIORATION.

RULE: STACK AND COVER CEMENT BAGS.



Elevated from the floor. (15cm–20cm)



Piled directly on the ground.

NOTES:

STORING MATERIALS

HOW TO PROTECT MATERIALS FROM DETERIORATION.

RULE: STACK INSIDE OR ELEVATE AND COVER STEEL MATERIALS STORED OUTSIDE.



Protected from rain and unbent bars.



Exposed to rain and bent bars.

NOTES:

CHECK QUALITY OF MATERIALS FOR CONCRETE WORKS.

VISUAL INSPECTION OF PORTLAND CEMENT

RULE: CHECK FOR LUMPS IN THE CEMENT.



NOTES:

CONCRETE WORKS

CHECK QUALITY OF MATERIALS FOR CONCRETE WORKS.

VISUAL INSPECTION OF WATER

RULE : USE CLEAN FRESH WATER FOR CONCRETE MIXING, NEVER USE SEAWATER.



NOTES:

CHECK QUALITY OF MATERIALS FOR CONCRETE WORKS.

VISUAL INSPECTION OF AGGREGATES

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Beach sand with shells.

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CONCRETE WORKS

CHECK QUALITY OF MATERIALS FOR CONCRETE WORKS.

RULE: USE NEW GALVANIZED TIE WIRE



Do not accept very rusty tie wires.

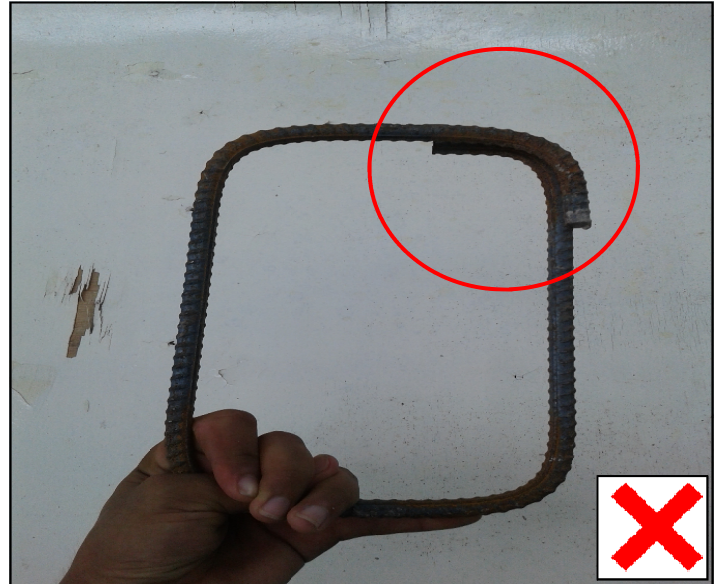
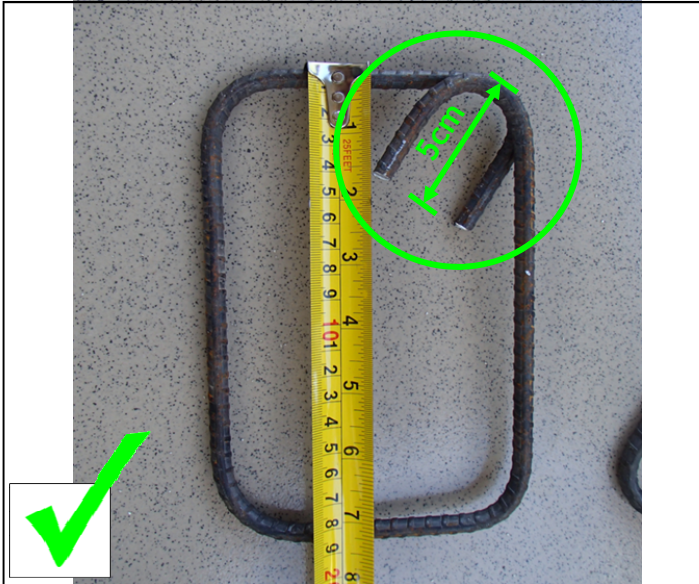
NOTES:

CONCRETE WORKS

BEST PRACTICES TO BUILD A DISASTER-RESISTANT BUILDING.

STEEL FABRICATION

RULE: FABRICATE STIRRUPS AND TIES WITH 135° HOOK AND 5 CM END.



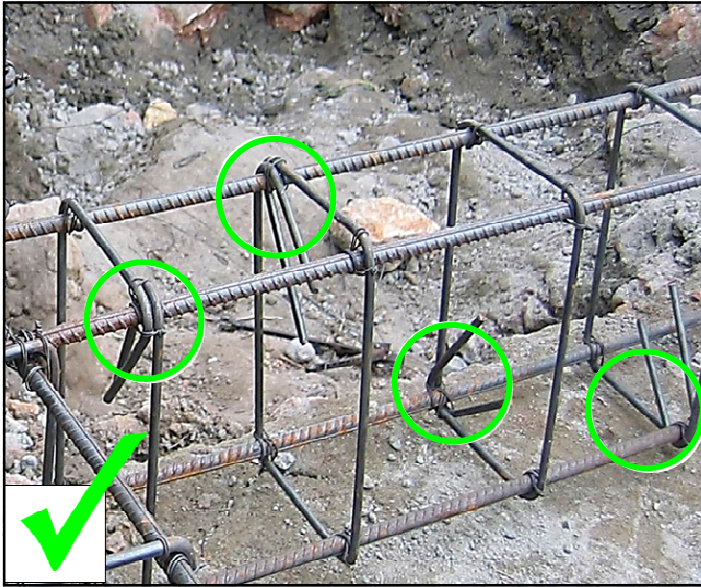
NOTES:

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BEST PRACTICES TO BUILD A DISASTER-RESISTANT BUILDING.

STEEL BARS INSTALLATION

RULE: INSTALL STIRRUPS AND TIES WITH HOOKS IN ALTERNATE LOCATION.



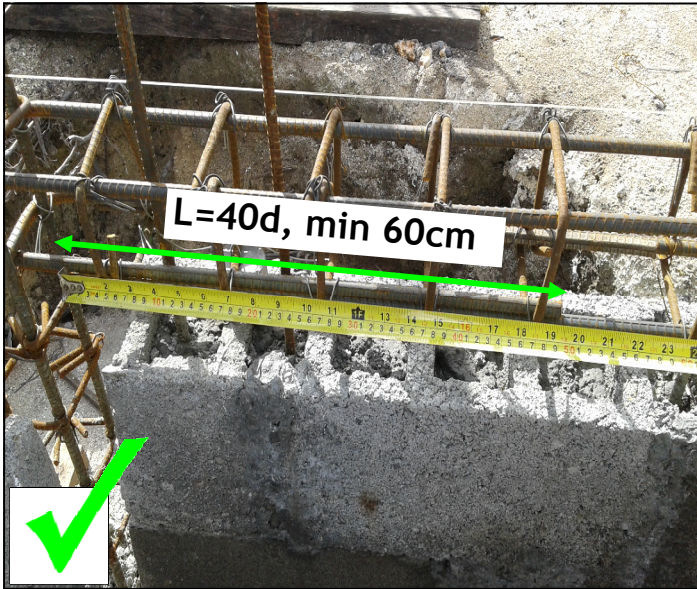
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CONCRETE WORKS

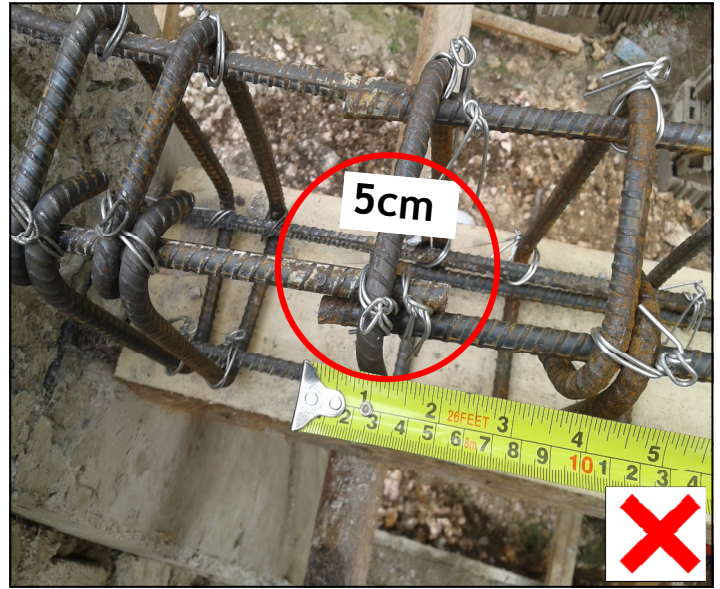
BEST PRACTICES TO BUILD A DISASTER-RESISTANT BUILDING.

STEEL BARS INSTALLATION

RULE: MUST HAVE MINIMUM LAP SPLICE LENGTH OF 40 BAR DIAMETERS OR 60CM



Opposite bars have enough overlap.



Overlap too short .

NOTES:

CONCRETE WORKS

BEST PRACTICES TO BUILD A DISASTER-RESISTANT BUILDING.

STEEL BARS INSTALLATION

RULE: INSTALL STEEL BARS WITH CONCRETE SPACERS ON SOIL.



CONCRETE SPACERS MAINTAIN THE THICKNESS OF CONCRETE COVERING DURING CONCRETE POURING.

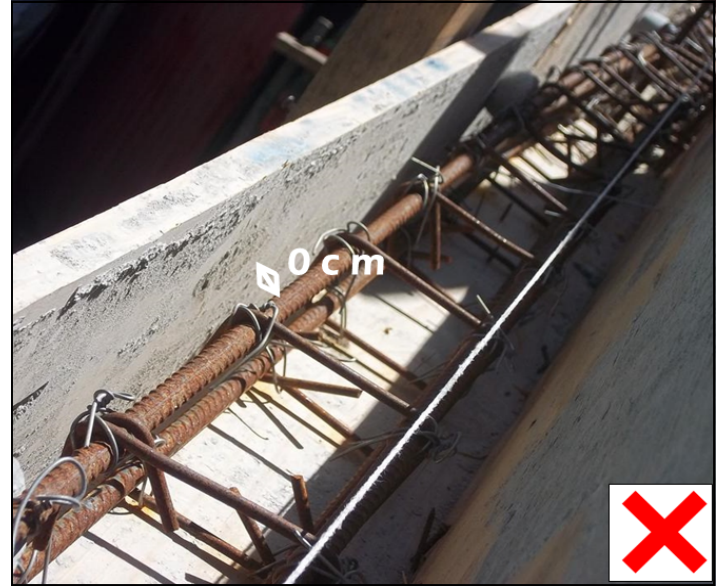
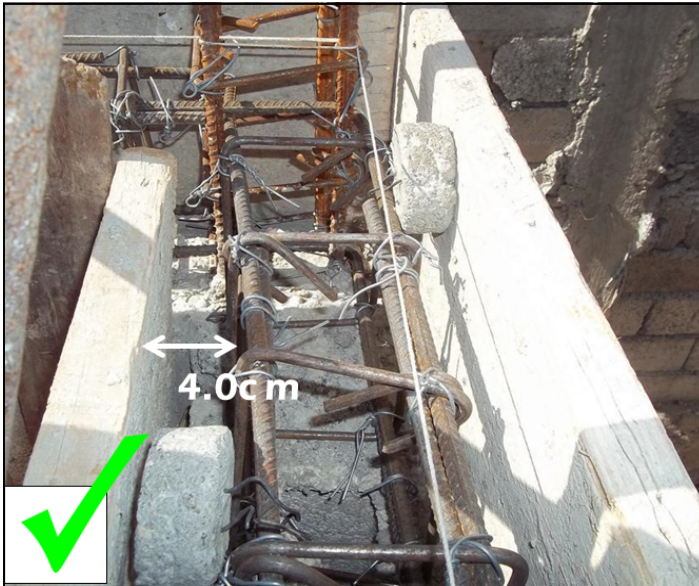
NOTES:

CONCRETE WORKS

BEST PRACTICES TO BUILD A DISASTER-RESISTANT BUILDING.

STEEL BARS INSTALLATION

RULE: INSTALL STEEL BARS WITH CONCRETE SPACERS ON FORMS.



CONCRETE SPACERS MAINTAIN THE THICKNESS OF CONCRETE COVERING DURING CONCRETE POURING.

NOTES:

CONCRETE WORKS

BEST PRACTICES TO BUILD A DISASTER-RESISTANT BUILDING.

CONCRETE MIXING

RULE: USE 1:2:3 (CEMENT/SAND/GRAVEL) RATIO FOR ALL STRUCTURES.



NOTES:

CONCRETE WORKS

BEST PRACTICES TO BUILD A DISASTER-RESISTANT BUILDING.

CONCRETE MIXING

RULE: MIX CONCRETE ON PAVEMENT OR MIXING BOARD.



NOTES:

CONCRETE WORKS

BEST PRACTICES TO BUILD A DISASTER-RESISTANT BUILDING.

CONCRETE MIXING

RULE: MIX SAND AND GRAVEL FIRST BEFORE ADDING CEMENT.



NOTES:

CONCRETE WORKS

BEST PRACTICES TO BUILD A DISASTER-RESISTANT BUILDING.

CONCRETE MIXING

RULE: DO NOT ADD TOO MUCH WATER TO THE CONCRETE MIX



Firm and moldable.



Too much water, soupy.

NOTES:

CONCRETE WORKS

BEST PRACTICES TO BUILD A DISASTER-RESISTANT BUILDING.

CONCRETE MIXING

RULE: USE CONCRETE MIX WITHIN 30 MINUTES.



NOTES:

CONCRETE WORKS

BEST PRACTICES TO BUILD A DISASTER-RESISTANT BUILDING.

CONCRETE MIXING

RULE: HAMMER AND ROD FORMS TO PROPERLY DISTRIBUTE CONCRETE.



NOTES:

CONCRETE WORKS

BEST PRACTICES TO BUILD A DISASTER-RESISTANT BUILDING.

FORMWORKS STRIPPING

RULE: OK TO STRIP FORMWORKS ON SIDES OF HORIZONTAL BEAMS AFTER 1 DAY,
BUT KEEP SCAFFOLDING AT BOTTOM UP TO 21 DAYS.



NOTES:

CONCRETE WORKS

BEST PRACTICES TO BUILD A DISASTER-RESISTANT BUILDING.

FORMWORKS STRIPPING

RULE: STRIP FORMWORKS AROUND VERTICAL COLUMNS AFTER 1 DAY.



NOTES:

CONCRETE WORKS

BEST PRACTICES TO BUILD A DISASTER-RESISTANT BUILDING.

CONCRETE POURING

RULE: COMPLETE CONCRETING IN ONE DAY.



NOTES:

CONCRETE WORKS

BEST PRACTICES TO BUILD A DISASTER-RESISTANT BUILDING.

CONCRETE CURING

RULE: CURE THE CONCRETE BY WETTING FOR 7 DAYS.



NOTES:

CONCRETE WORKS

BEST PRACTICES TO BUILD A DISASTER-RESISTANT BUILDING.

CONCRETE FINISHING

RULE: NEVER CHIP CONCRETE TO ROUGHEN SURFACE FOR PLASTERING.



Straight and smooth surface columns and beams don't need to be chipped off for plastering.



Chipping concrete for plastering will disturb the integrity of columns and beams.

NOTES:

RESULTS OF GOOD CONSTRUCTION PRACTICES.

RULE: NO UNCONSOLIDATED CONCRETE IN BEAMS.



Clean and smooth finish.



With small holes and exposed rebars.

RULE: NO UNCONSOLIDATED CONCRETE IN COLUMNS.



Clean and smooth finish.



With small holes and exposed rebars.

CHECK QUALITY OF MATERIALS FOR MASONRY WORKS.

VISUAL INSPECTION OF MASONRY BLOCKS

CONCRETE HOLLOW BLOCKS



Good quality blocks.



Breaks even during handling and storing.

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Do not accept very rusty tie wires.

NOTES:

MASONRY WORKS

BEST PRACTICES TO BUILD A DISASTER-RESISTANT BUILDING.

CONCRETE HOLLOW BLOCKS LAYING

RULE: SOAK BLOCKS BEFORE USING.



NOTES:

BEST PRACTICES TO BUILD A DISASTER-RESISTANT BUILDING.

CONCRETE HOLLOW BLOCKS LAYING

RULE: FOR PARTIAL BLOCKS, USE FULL CELL WITH MINIMUM HALF BLOCK.



NOTES:

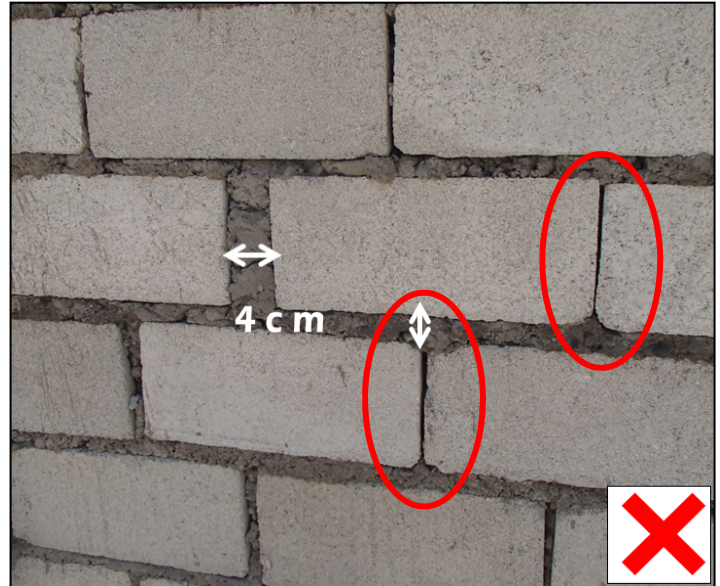
BEST PRACTICES TO BUILD A DISASTER-RESISTANT BUILDING.

CONCRETE HOLLOW BLOCKS LAYING

RULE: MAKE 2 CM MAXIMUM JOINTS ON BLOCKS.



Mortar in both horizontal and vertical joints. Make mortar joints 1-2cm wide.



No mortar in vertical joints. Mortar too thick.

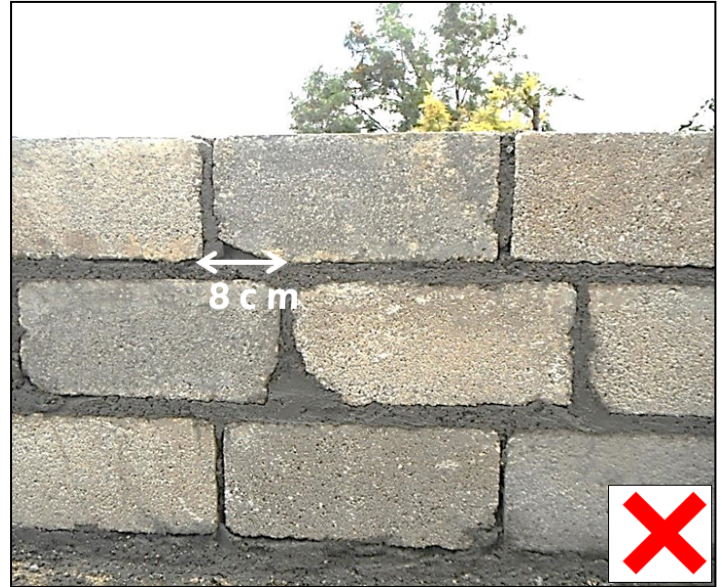
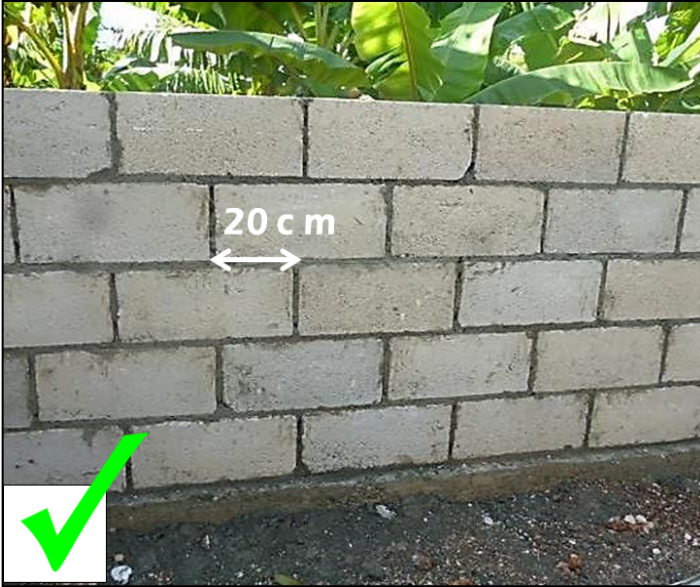
NOTES:

MASONRY WORKS

BEST PRACTICES TO BUILD A DISASTER-RESISTANT BUILDING.

CONCRETE HOLLOW BLOCKS LAYING

RULE: LAY BLOCKS IN STAGGERED MANNER.



NOTES:

MASONRY WORKS

BEST PRACTICES TO BUILD A DISASTER-RESISTANT BUILDING.

CONCRETE HOLLOW BLOCKS LAYING

RULE: FILL GROUT EVERY 3 LAYERS OF BLOCKS.



NOTES:

MASONRY WORKS

BEST PRACTICES TO BUILD A DISASTER-RESISTANT BUILDING.

CONCRETE HOLLOW BLOCKS LAYING

RULE: IF LESS THAN 1/2 BLOCK GAP, INCLUDE WHILE POURING COLUMN.

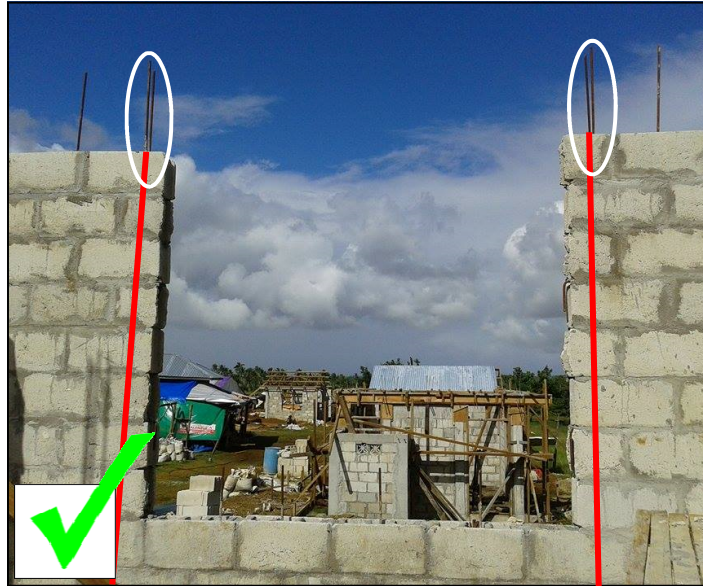


NOTES:

BEST PRACTICES TO BUILD A DISASTER-RESISTANT BUILDING.

STEEL BARS INSTALLATION

RULE: INSTALL REBAR AT ALL EDGES OF WALL OPENING.



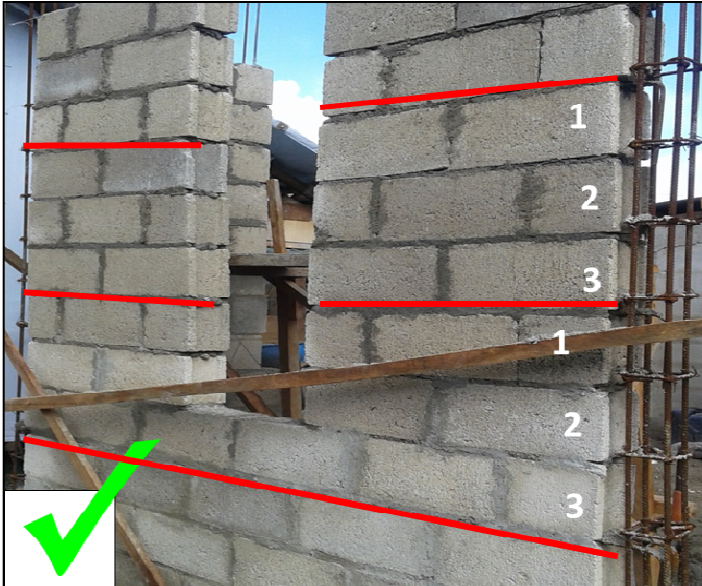
NOTES:

MASONRY WORKS

BEST PRACTICES TO BUILD A DISASTER-RESISTANT BUILDING.

STEEL BARS INSTALLATION

RULE: INSTALL HORIZONTAL REBAR EVERY 3 LAYERS OF BLOCKS.



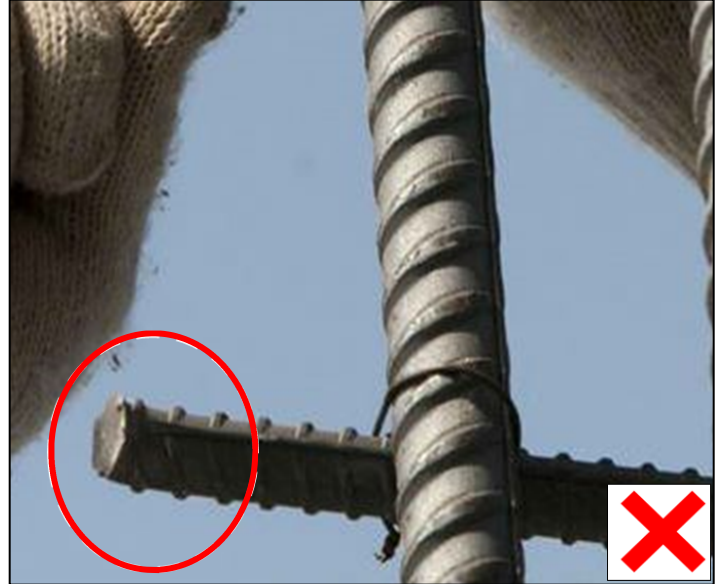
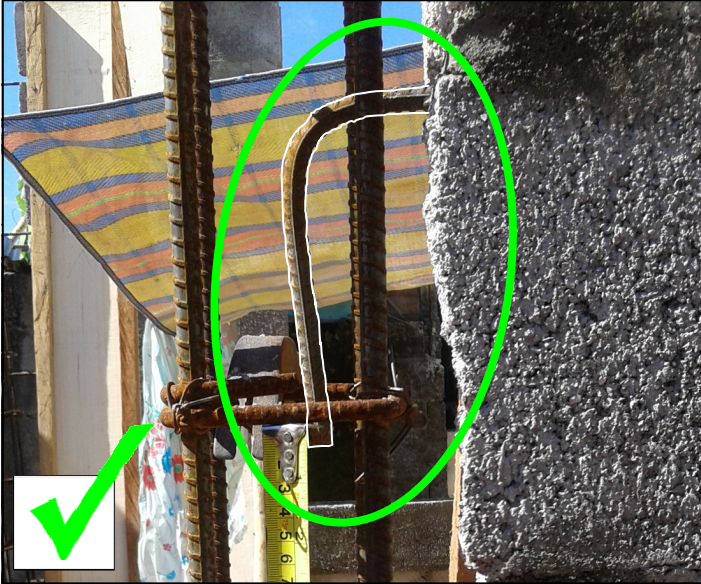
NOTES:

MASONRY WORKS

BEST PRACTICES TO BUILD A DISASTER-RESISTANT BUILDING.

STEEL BARS INSTALLATION

RULE: HOOK ALL WALL REINFORCEMENTS TO COLUMNS AND BEAMS.



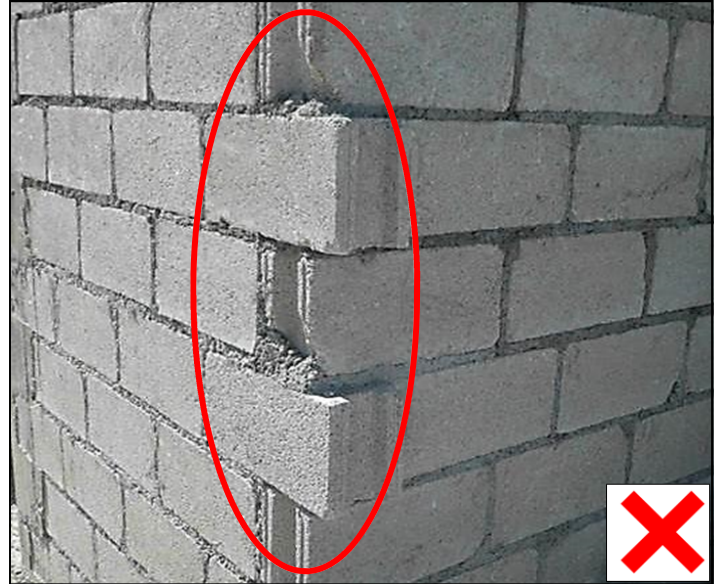
NOTES:

MASONRY WORKS

BEST PRACTICES TO BUILD A DISASTER-RESISTANT BUILDING.

MASONRY CONFIGURATION

RULE: HAVE A CLEAN INTERSECTION/CORNER OF MASONRY WALLS.



NOTES:

MASONRY WORKS

BEST PRACTICES TO BUILD A DISASTER-RESISTANT BUILDING.

MASONRY CONFIGURATION

RULE: PROVIDE LINTEL BEAMS ABOVE EVERY WALL OPENING.



NOTES:

ROOF AND ROOF FRAMING

CHECK QUALITY OF MATERIALS FOR ROOF & ROOF FRAMING.

VISUAL INSPECTION OF STEELS

FLAT BARS



Do not accept very rusty flat bars.

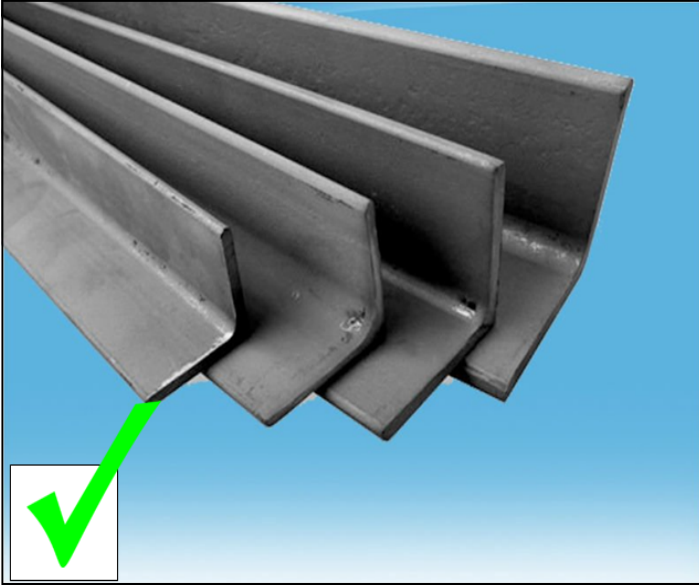
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VISUAL INSPECTION OF STEELS

ANGLE BARS



Do not accept very rusty angle bars.

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VISUAL INSPECTION OF STEELS

STEEL C PURLINS



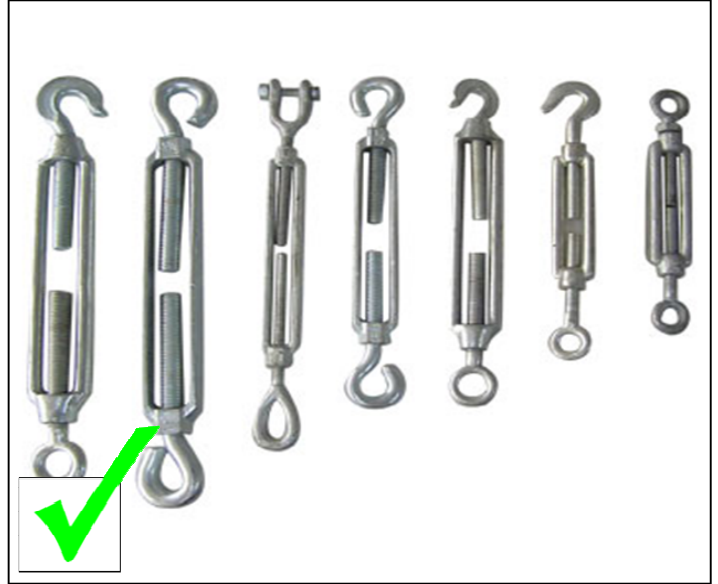
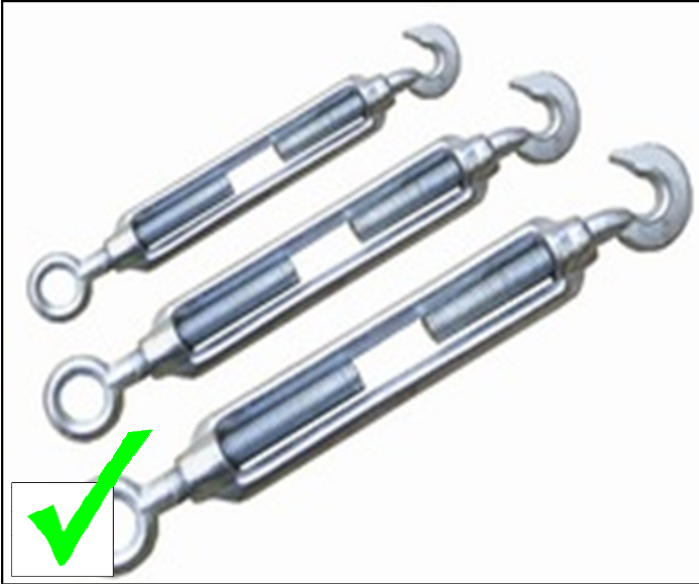
This is what a Steel C Purlin looks like.

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TURN BUCKLES



This is what a Turn Buckle looks like.

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CHECK QUALITY OF MATERIALS FOR ROOF & ROOF FRAMING.

PE FOAM DOUBLE SIDED WITH
ALUMINIUM FOIL



Roof insulation.

TEKSCREWS



Use to attach the roofing.

NOTES:

ROOF AND ROOF FRAMING

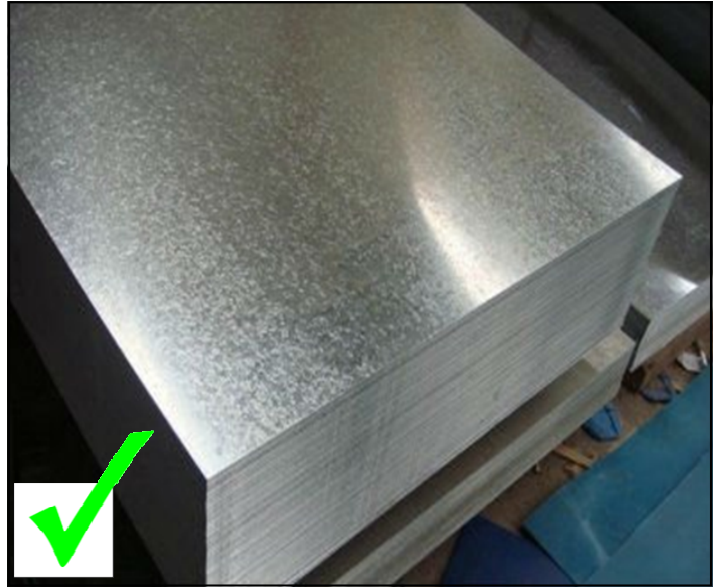
CHECK QUALITY OF MATERIALS FOR ROOF & ROOF FRAMING.

ROOF CORRUGATED SHEET



Called CGI Sheet.

ROOF PLAIN SHEET



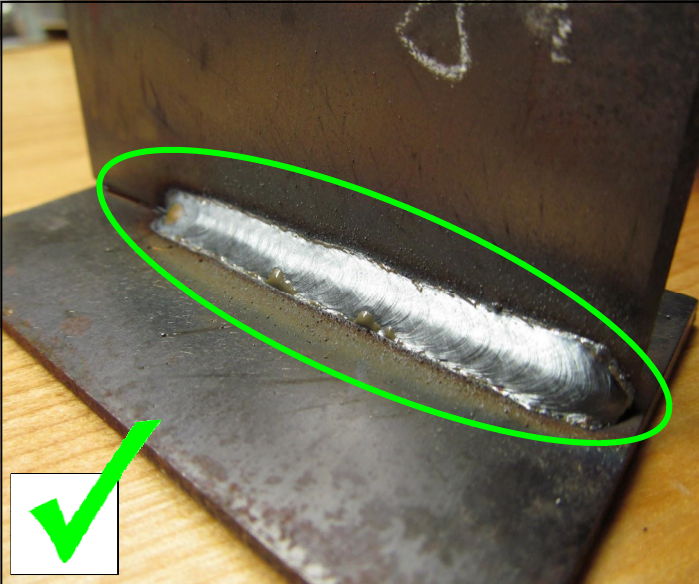
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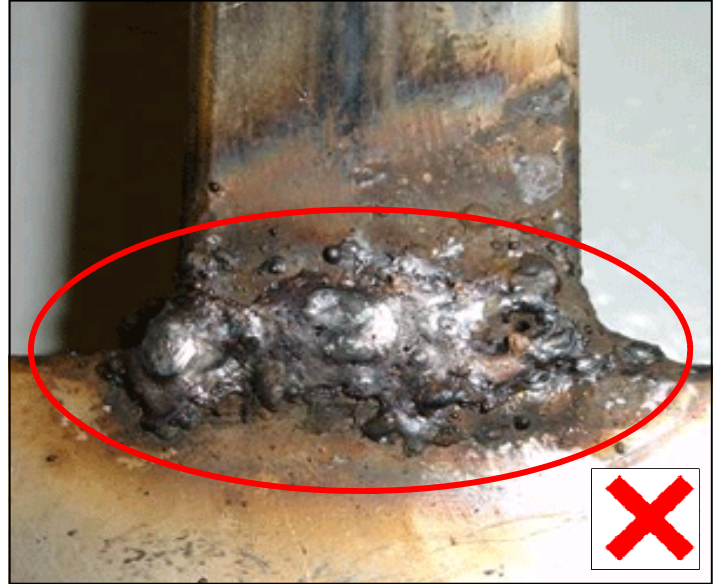
BEST PRACTICES TO BUILD A DISASTER-RESISTANT BUILDING.

WELDING

RULE: OBSERVE GOOD WELDING QUALITY.



Smooth and continuous weld.



Uneven weld and dirty metal.

NOTES:

ROOF AND ROOF FRAMING

BEST PRACTICES TO BUILD A DISASTER-RESISTANT BUILDING.

ROOF FRAMING ASSEMBLY

RULE: FABRICATE AND ASSEMBLE ROOF FRAMES ON GROUND.



NOTES:

ROOF AND ROOF FRAMING

BEST PRACTICES TO BUILD A DISASTER-RESISTANT BUILDING.

ROOFING

INSTALL ROOFING STRAIGHT.



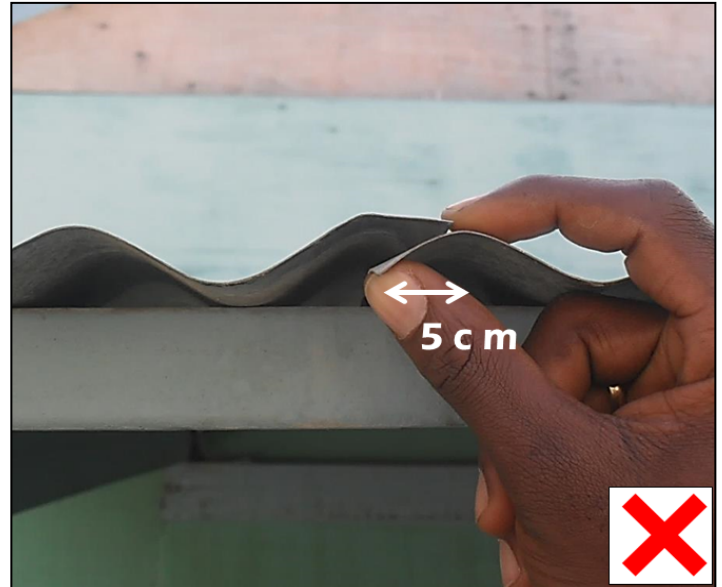
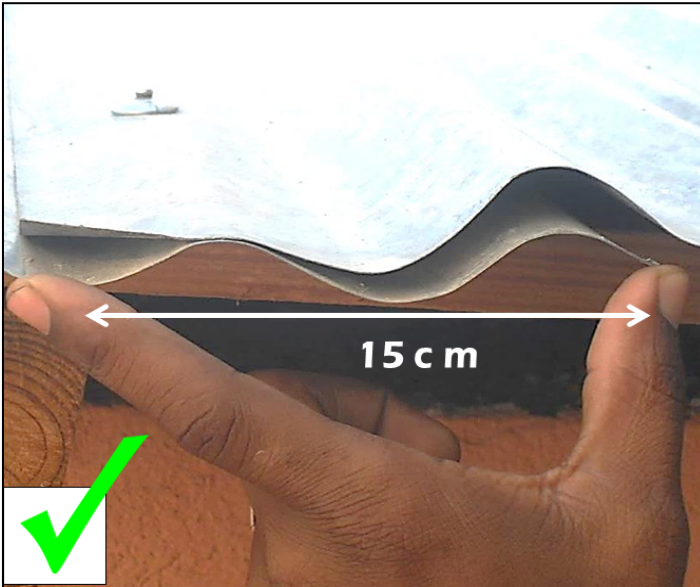
NOTES:

ROOF AND ROOF FRAMING

BEST PRACTICES TO BUILD A DISASTER-RESISTANT BUILDING.

CGI SHEET LAPPING

RULE: OVERLAP CGI SHEETS BY 2 WAVES ON SIDES.



NOTES:

ROOF AND ROOF FRAMING

BEST PRACTICES TO BUILD A DISASTER-RESISTANT BUILDING.

CGI SHEET LAPPING

RULE: OVERLAP CGI SHEETS BY 15 CM BOTH ENDS.



NOTES:

ROOF AND ROOF FRAMING

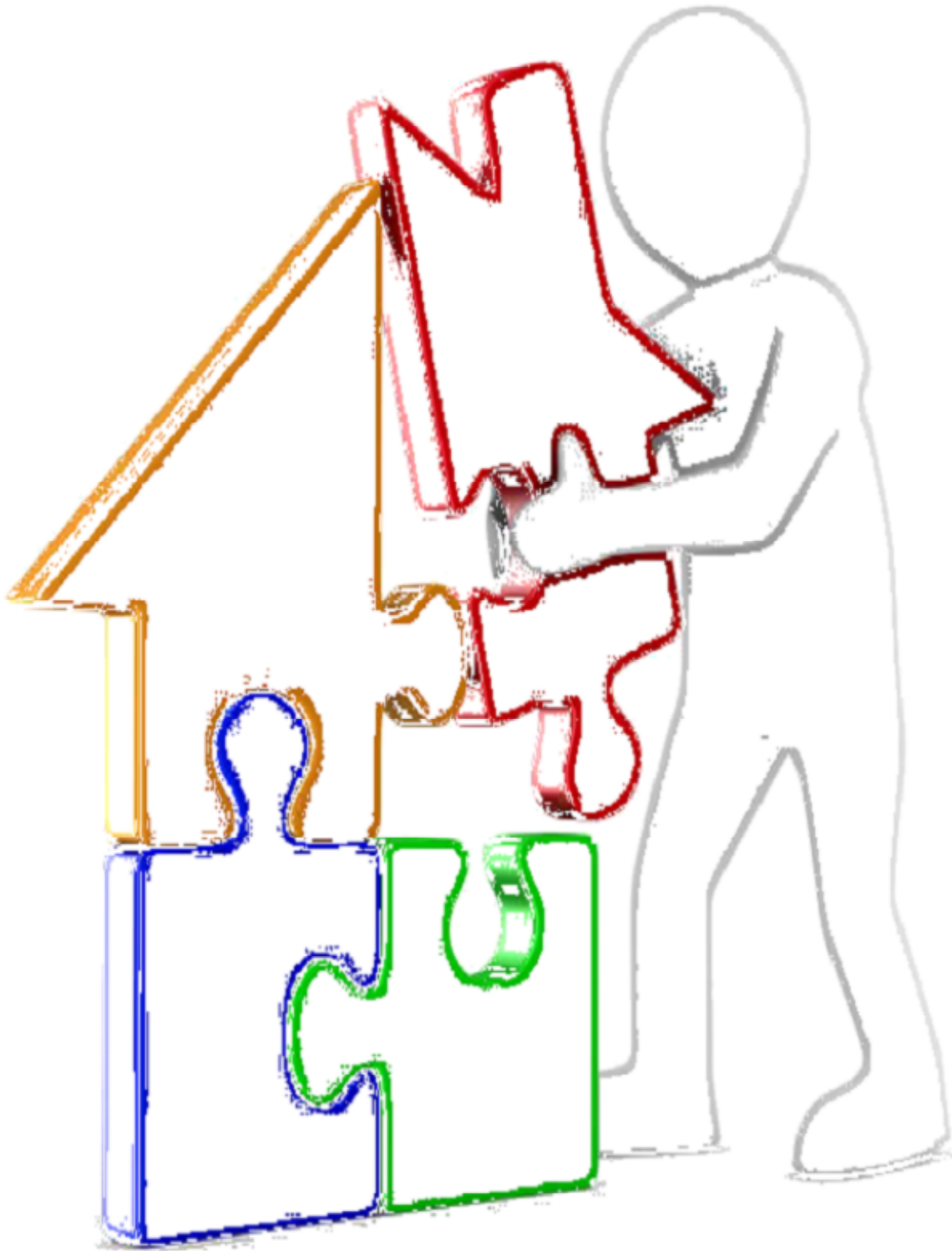
BEST PRACTICES TO BUILD A DISASTER-RESISTANT BUILDING.

CGI SHEET FASTENING

RULE: FASTEN EVERY TWO WAVES OR EVERY WAVE ON ROOF SUPPORTS.



NOTES:



BUILD A DISASTER-RESISTANT SCHOOL FOR YOUR COMMUNITY

BADLY BUILT BUILDINGS KILL PEOPLE DURING
TYPHOONS AND EARTHQUAKES!