Clay tiles Roofs

What is The Roof ???

- Roof is the covering on the uppermost part of a building. A roof protects the building and its contents from the effects of weather.

- Structures that require roofs range from a letter box to stadium,

- dwellings being the most numerous

- In most countries a roof protects primarily against rain. Depending upon the nature of the building, the roof may also protect against heat, against sunlight, against cold and against wind

Brief History of Roofing

The history of roofing has come an extremely long way. Man has utilized various natural resources throughout history to create the environmentally safe, effective roofing of today. From wood, mud and straw (قش), to tiling, shingles and beyond.

-**Roof tiles** are designed mainly to keep out rain

-are traditionally made from locally available materials such as terracotta or slate (من أنواع الطين)

- Modern materials such as concrete and plastic are also used and some clay tiles have a waterproof glaze

- House roofing has become outdated!!
- Planning to replace the old fashioned roofing tiles with other attractive roofing materials!!
- Might be you check in your neighborhood and find most of the homes are still has roofing tiles.
- So what's the reason behind most of the people still using tiles for their home roofing system?

- **Characteristics of clay tiles roofing:**

- good for moisture insulation
- high demand strength and enduring (متین)
- ensuring the tiles are long lasting and water proof
- roof tiles absorbed minimal amount of water
- Color Range: Roofing tiles comes with color for life warranty as they are fired, the colors of tiles will not fade (یتلاشی) or not change greatly in its appearance for the life of the home

-Run Off: Like any other roofing material, the water collected from a roofing tile is safe. However it is recommendable that the roof should be installed with a flushed first system or cleaned regularly to avoid the contamination of collected water.

-Long Lasting: Tile roofs have great durability and strength of long lasting, despite of weather conditions.

- Heat Resistance
- are non combustible materials that provide excellent protection against heat or bushfires (حرائق الغابات)
- Condensation: Other roofing materials can be affected with the corrosion but tiled roofs can breathe and minimize the need of insulation against the effect of condensation

- Cleaning: These tiles can become dirty just like any other roofing material but the procedure of cleaning it is very simple as you can yourself clean them with high pressure water

- Sound Insulation: Roof tiles make less noise so you can ensure peaceful environment in your home, the density of tiles acts as a barrier

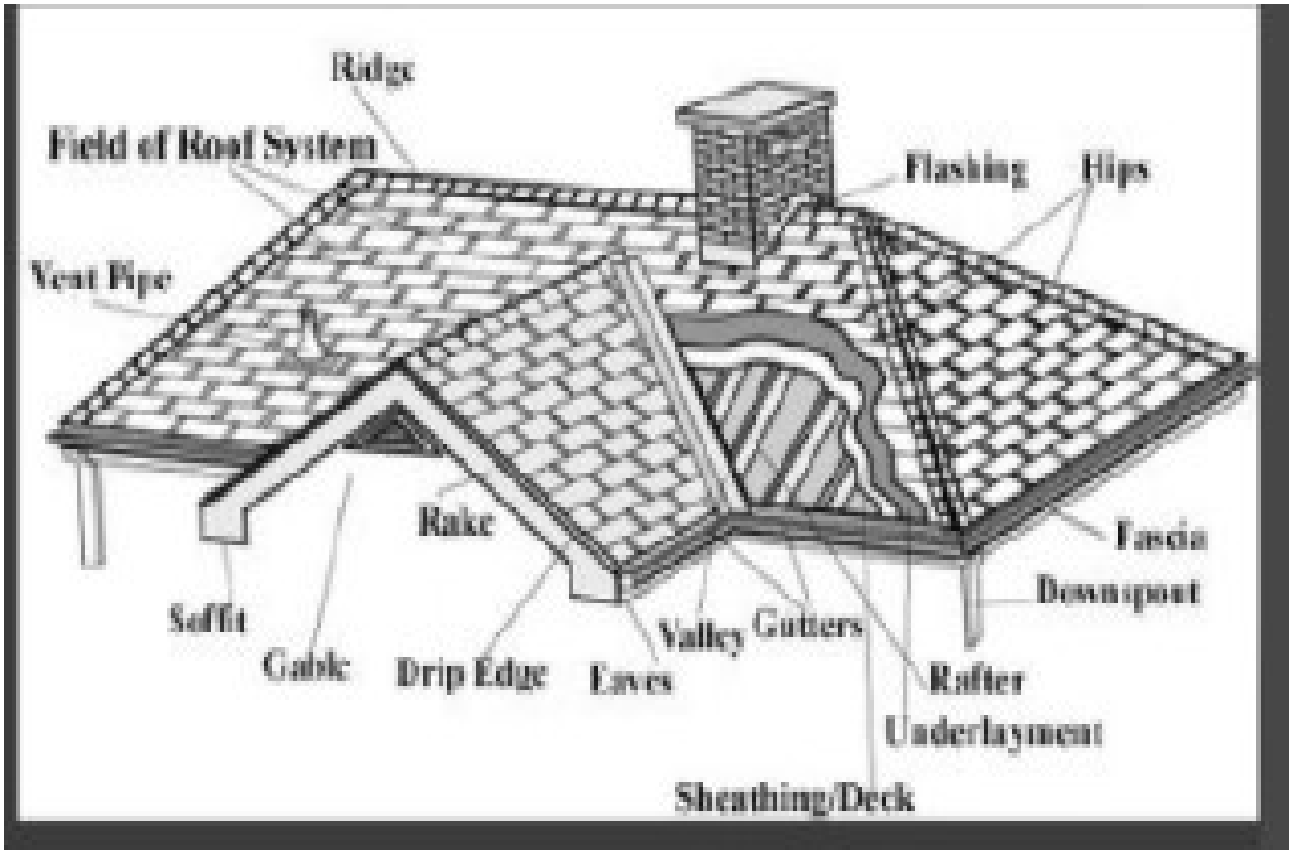
- very affordable home building products and just constitutes 5% of the total cost of new home

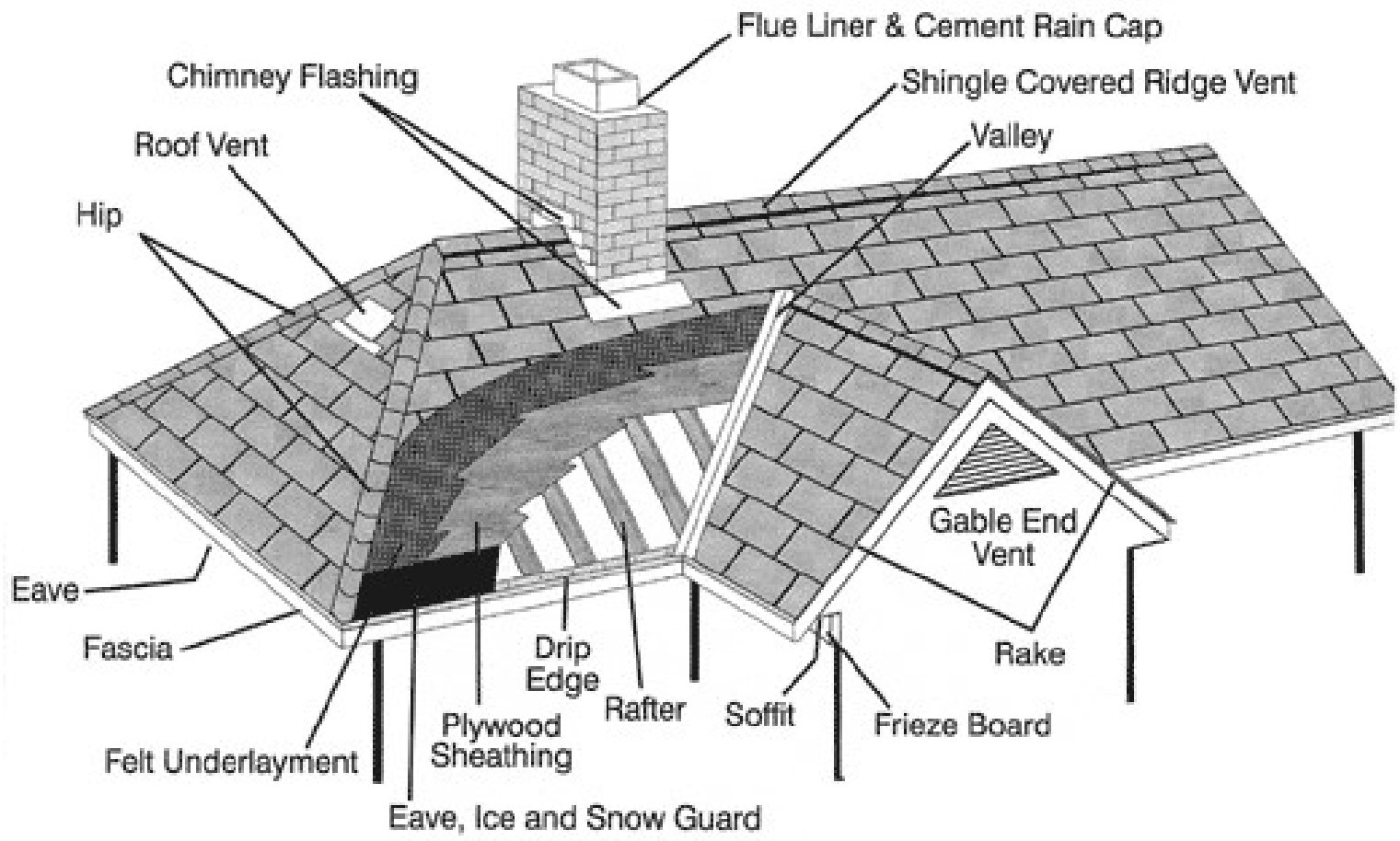
- Excellent in ejection (طرد) of water very quickly because they are fixed inclined

- Decorative with a variety of colors and shapes

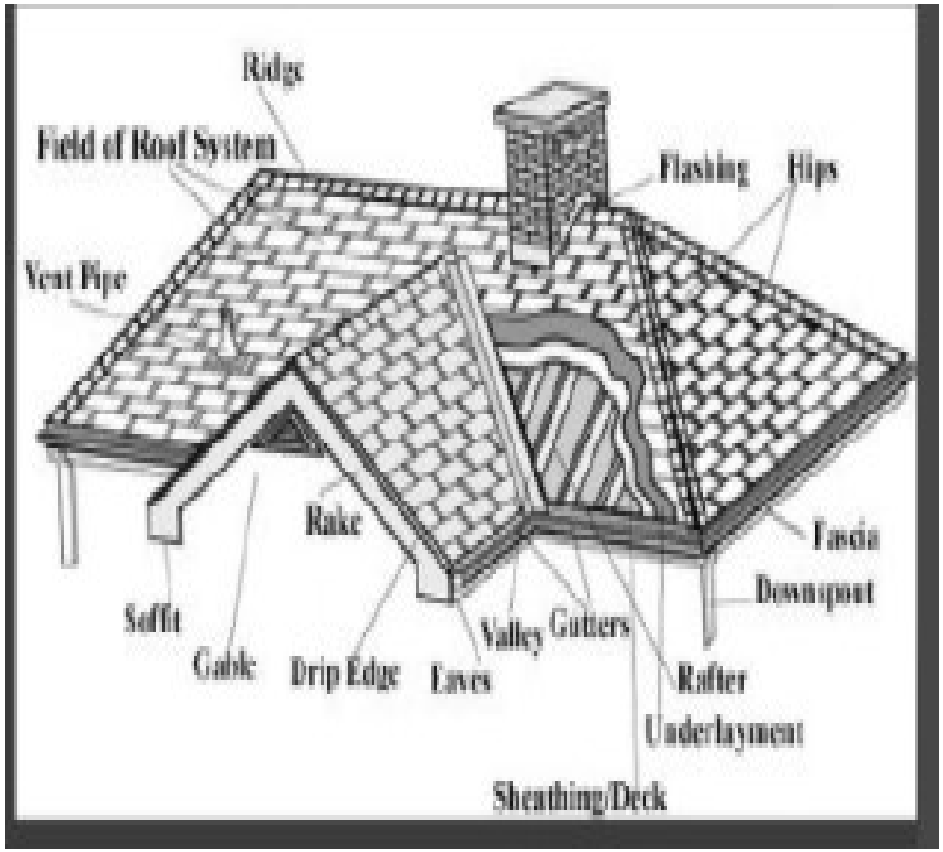
- It is possible to paint the clay roofing tiles

- Roofing terminology




Flue Liner & Cement Rain Cap
Chimney Flashing
Shingle Covered Ridge Vent
Roof Vent
Valley
Hip
Gable End Vent
Eave
Fascia
Drip Edge
Rafter
Soffit
Frieze Board
Rake
Plywood Sheathing
Felt Underlayment
Eave, Ice and Snow Guard

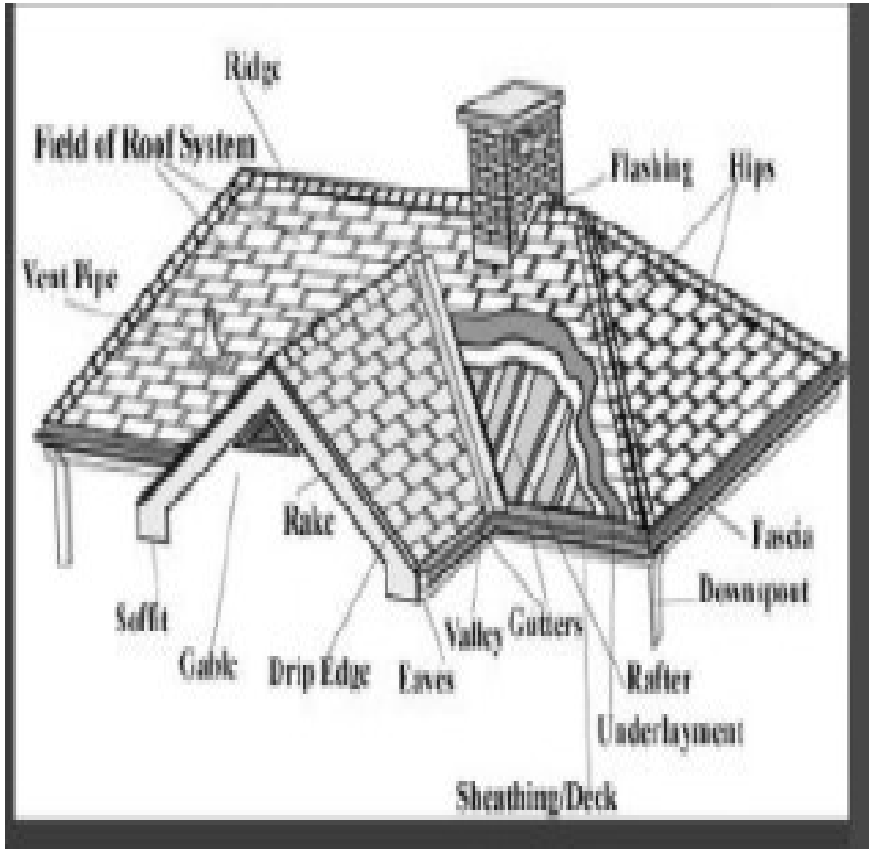
- **Hip:** The external angle at the junction of two sides of a roof whose supporting walls adjoin



- **Rafter:** A structural member (usually slanted: مائل) to which sheathing (الغطاء) is nailed

- **Flashing تغليف:** metal sheet or other material used at junctions of different planes on a roof to prevent leakage

- **Ridge:** The horizontal line at the top edge of two sloping roof planes



- **Valley:** The less-than 180-degree angle where two sloping roof sections come together

- **Drip**: The strip of metal extending out beyond the eaves or rakes to prevent rainwater from rolling around the shingles back onto the wooden portion of the house

Eaves The lower edge of a roof (often overhanging beyond the edge of the house)

Rake The slanting edge of a gable roof at the end wall of the house.

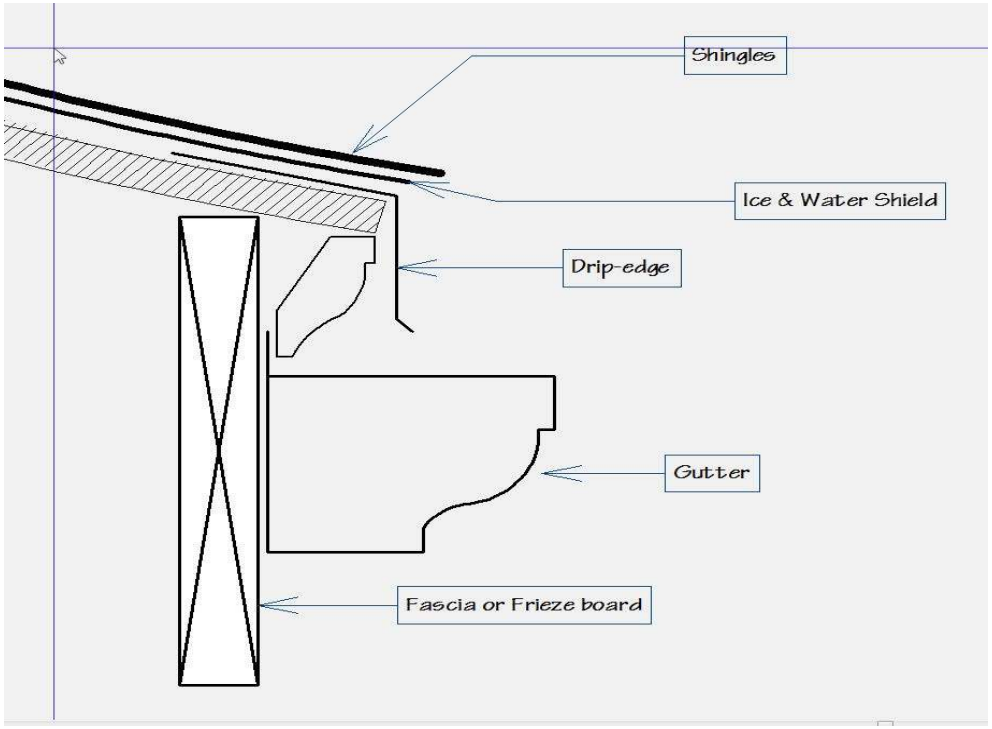
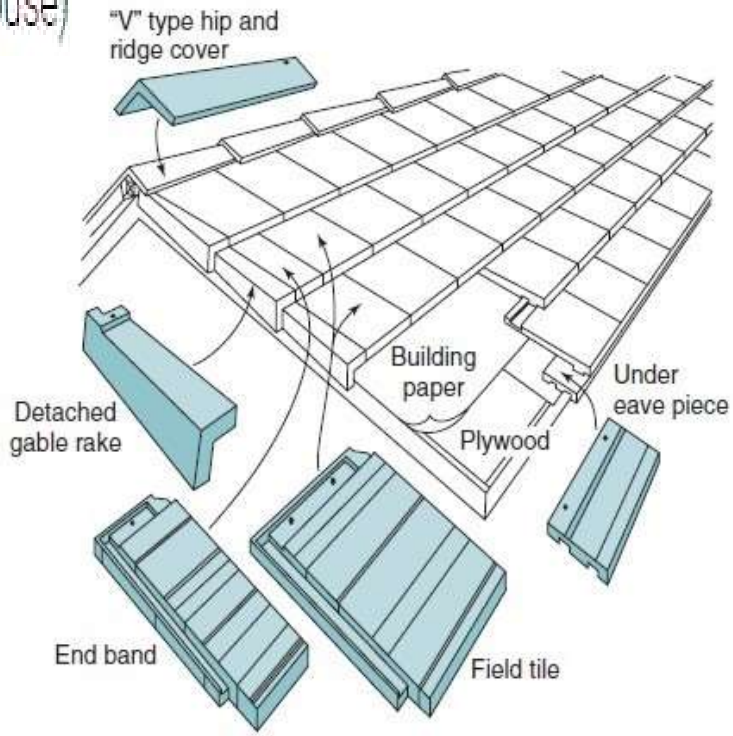


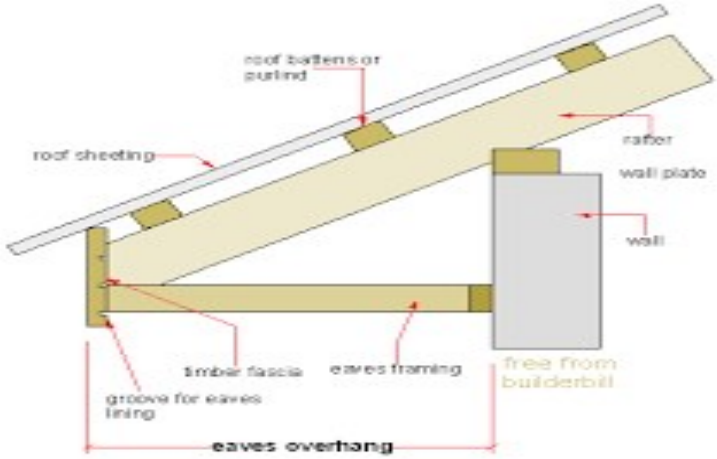
FIGURE 2-27 Flat Interlocking-Tile—Typical Installation.



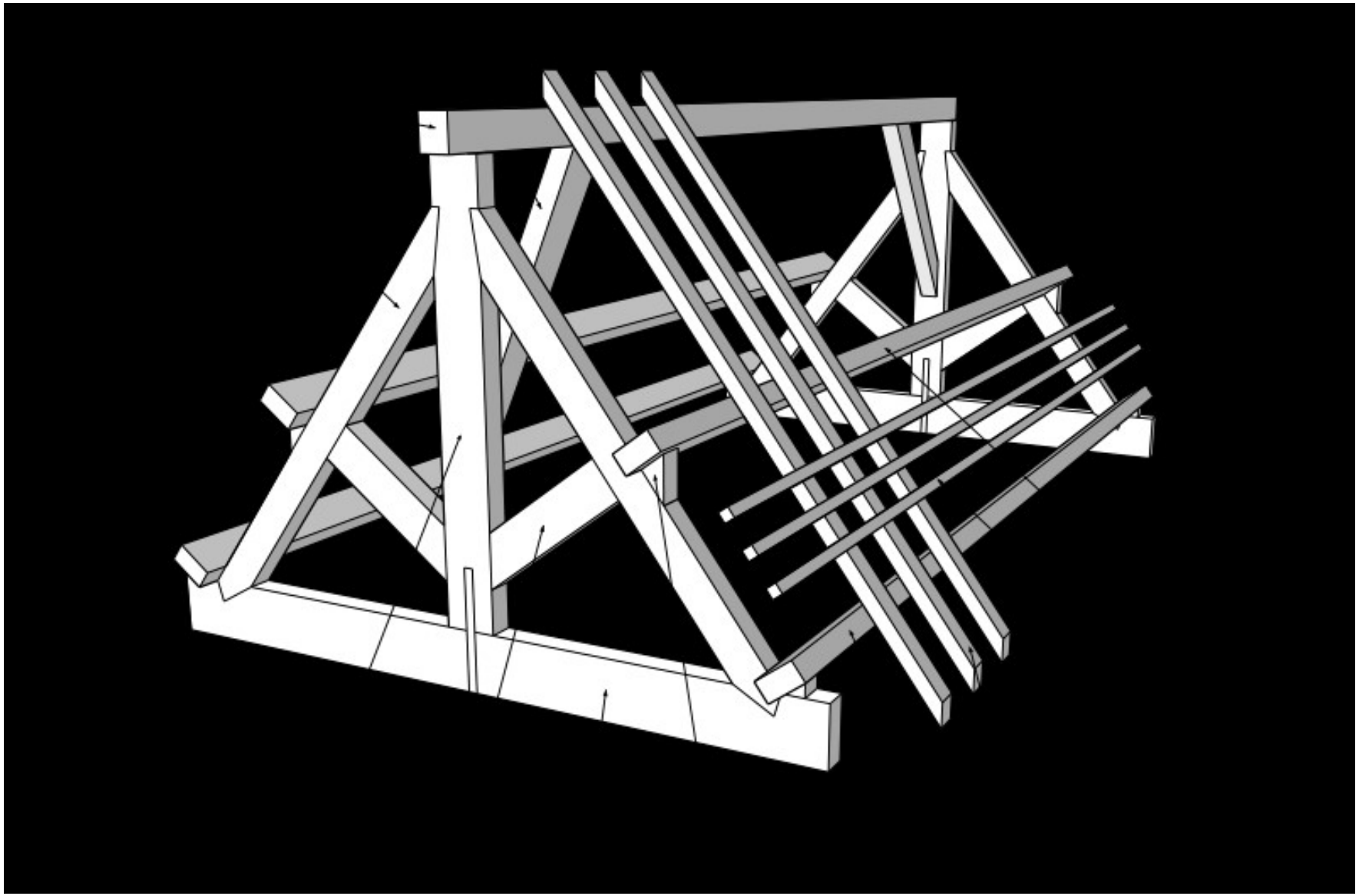
SOURCE: Adapted from *Architectural Graphic Standards, Residential*

- **Soffit:** The boards that enclose the underside of that portion of the roof which extends out beyond the sidewalls of the house

- **Fascia:** Trim board behind the gutter and eaves



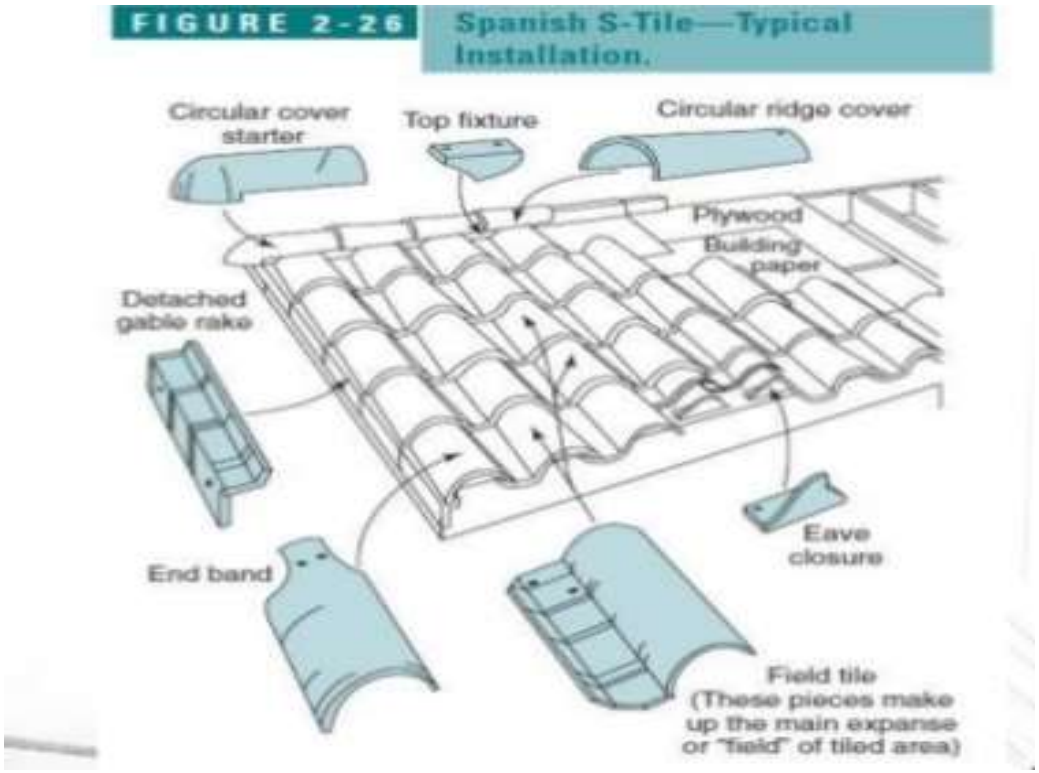
- **Rain water Gutter**



- **Clay tile covering**

-overlapping technique

-pitches from 15 to 45



Clay Roofing Tiles **Recipe**

Earth + Water + Fire = Clay Roofing That Lasts Centuries

Clay Roofing Tiles **MANUFACTURING** process

Clay Material Preparation

Extraction of Clay from the Quarry and transported to factory to storage as stockpiles in the plant

Clay Roofing Tiles **MANUFACTURING** process

Grinding & Screening the Clay

At the start of manufacturing process, clay is collected from the stockpile and loaded into the feed hoppers

Water, sand & additives are added to the clay and mixed in accordance with the recipe

Clay mixture is then fed into the clay preparation where it is ground and homogenized

Clay Roofing Tiles **MANUFACTURING** process

Extrude and Tile Forming

The prepared clay mix pass through an **extruder** to produce slabs of clay

Mechanical PRESS

It then loaded on a moulder press & form the precise format

Clay Roofing Tiles **MANUFACTURING** process

Drying Process

Pressed clay roof tiles will then send for drying. Depending on drying method used, it may take 1 – 3 days for the process.

Moisture removed in dryer

Colour Pigment

Then, using disk cabins for engobing the tiles before firing

Engobes are a mixture of minerals applied to a roof tile before glazing for decoration and to make the tile more durable to weathering

Clay Roofing Tiles **MANUFACTURING** process

FIRING clay tiles

It then transfer to firing kiln & may takes 48 – 72 hours depending on type of kiln

It usually fired by natural gas and achieve a maximum temperature of > **1000°C**

Tiles travel through the various heating stages and cooling on a kiln car which moving on a rails

During firing, clay roof tiles achieved **strength** and **durability** by the high temperature mineralogical process

Clay Roofing Tiles **MANUFACTURING** process

Packaging and Storage

After UNLOAD the products from kiln cars by **ROBOT**, roof tiles are **inspected for the quality**

ماكنة الربط

Strapping machines to PACK the tiles on pallets and placed in storage area and delivery

Clay Roofing Tiles **MANUFACTURING** process

Ready for Delivery

forklifts to LOAD the pallets on trucks or in containers and ready for delivery

Why Clay Roofing tiles?

Because it is ***Beautiful ...!***

تكشف

Clay Roof Tiles : Exclusive beauty. Clay Roofs unveil the beauty of the earth, and offers endless customization possibilities

Why Clay Roofing tiles?

Clay Roofing Tile is *Green*

Made of earth !

No harmful or endangered raw materials

100% NATURAL !

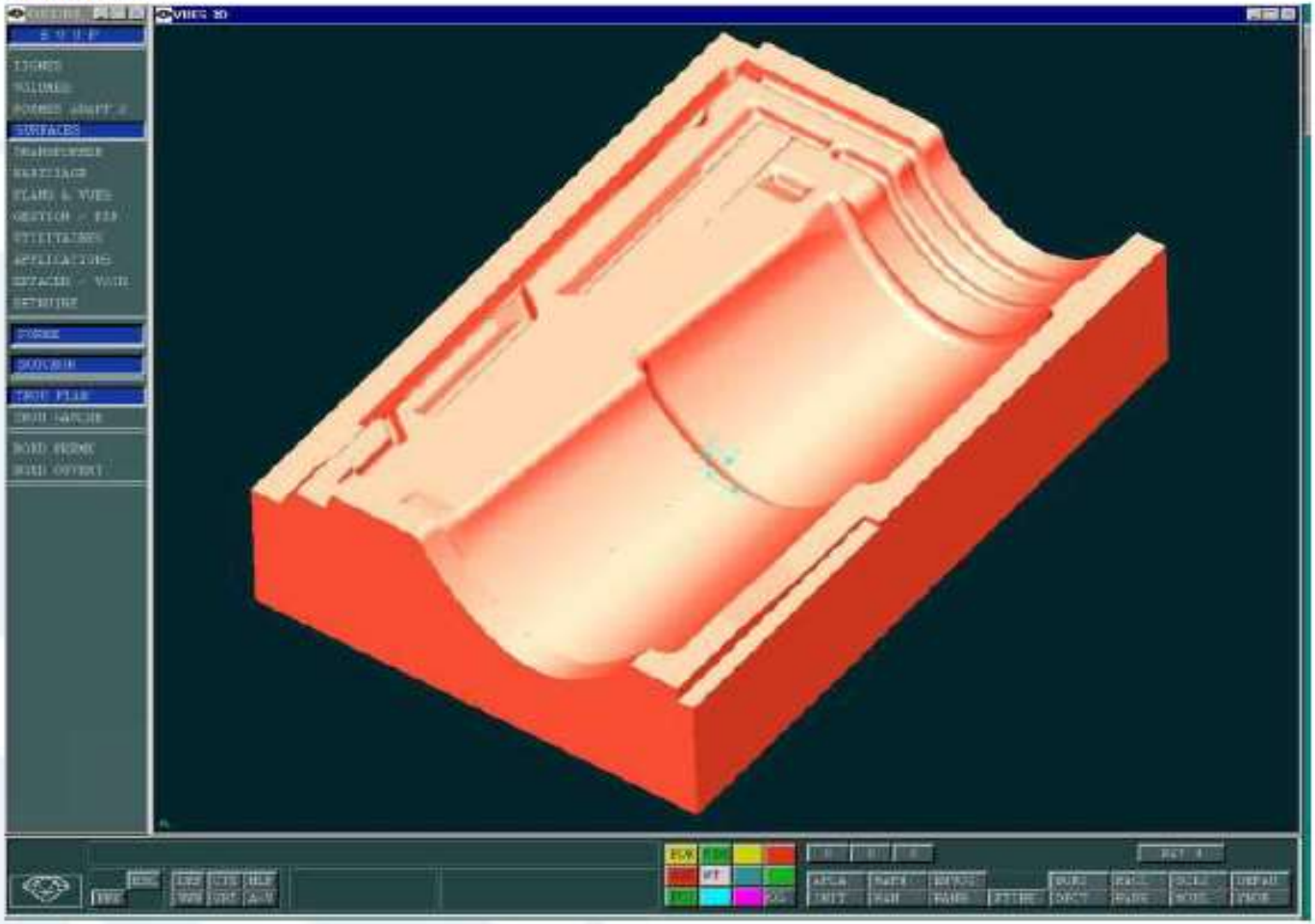
Why Clay Roofing tiles?

Long lasting aesthetic **to your roof !**

Color **will never fade and will be permanent !**

Clay Roof Tiles : Latest Technology for High Performance Roof

Computerized moulds & Pressing technology for best-in-class performance and consistence in **dimension accuracy**, **water-tightness, strength a**nd **security**, as well as perfect finishes



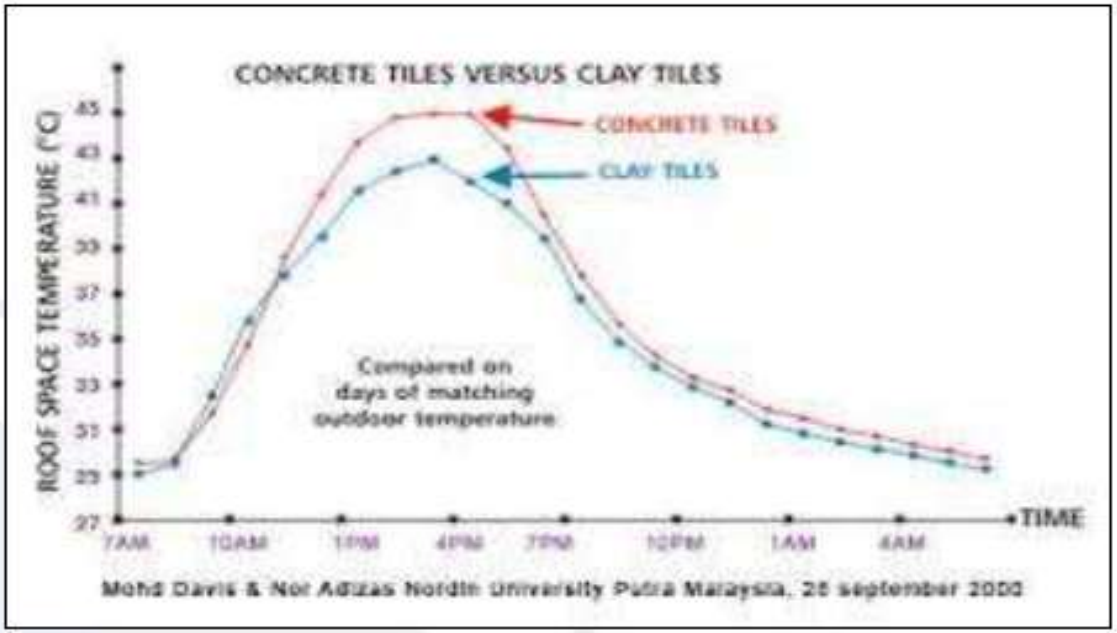
Clay Roof Tiles : Durable.

Engobed clay roof tiles basically can last for decades, with no hidden maintenance costs.
Other materials, often painted, will deteriorate much faster and incur heavy maintenance.

Clay Roof Tiles after 25 & 35 years

Others Roofing materials after 15 years

Why Clay Roofing tiles?



Clay roof provides good thermal insulation & better comfort.
3°C cooler compared to Concrete roof

Cooler home environment for better comfort

Reduce the need of air – conditioning

Save energy, save money for long term

Clay Roof Tiles : Energy efficiency. A modern and Environment-friendly product, with ever-lasting cooling properties enhancing your Comfort of Living

Clay Roof Tiles : Energy efficiency. A modern and Environment-friendly product, with ever-lasting cooling properties enhancing your Comfort of Living

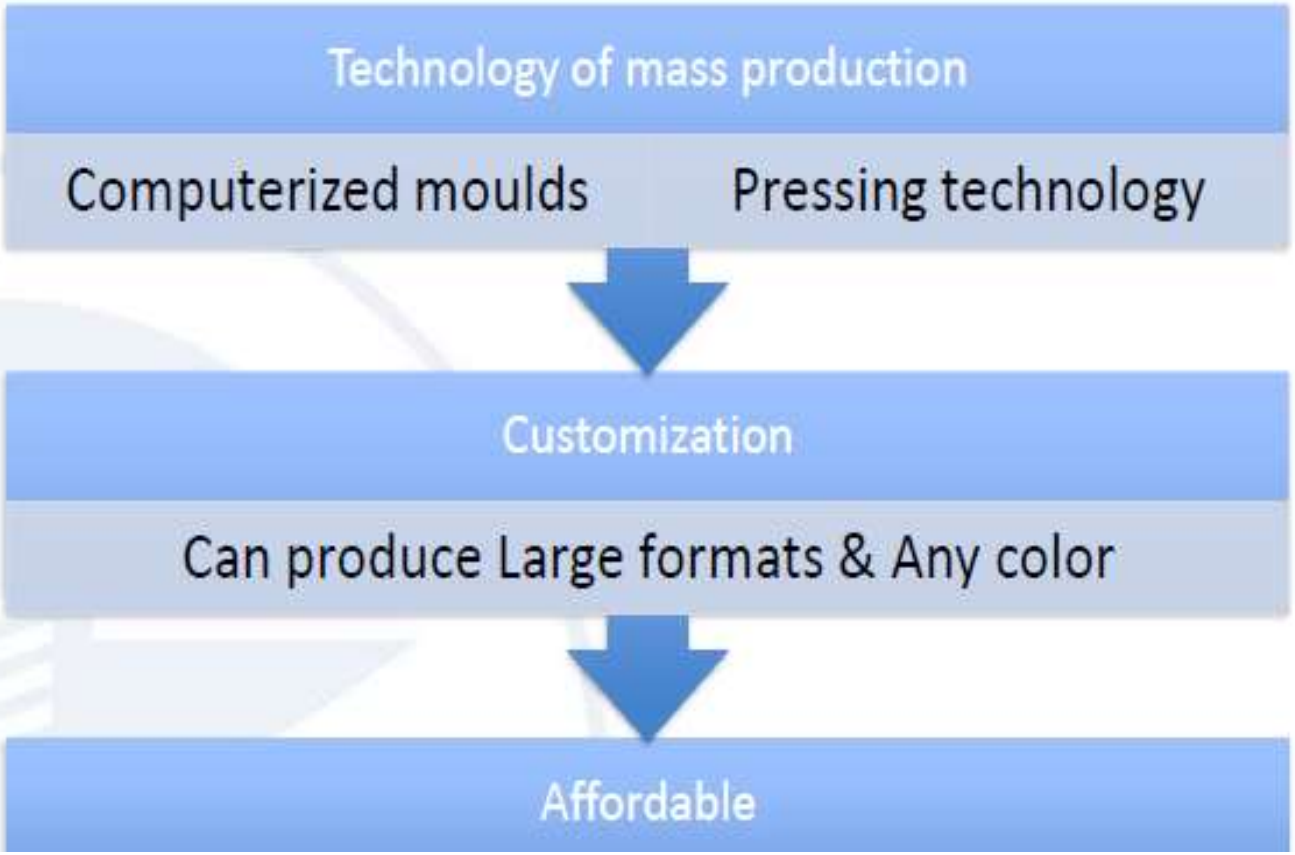
Concrete Roof Tiles
29.4°C

Clay Roof Tiles
25.6°C

Clay Tiles + Insulator
23.8°C

Clay Roof Tiles : Energy efficiency. Best-in-class **Solar Reflectance Index (SRI)** performance, in particular with White Glazed finished tiles

Clay Roof Tiles : Cost efficiency. Technology improvements enabled to produce **larger formats, fast and easy to install**, that will enable significant **savings on materials** and installation costs



Why Clay Roofing tiles?

Clay roof tile is ***exclusive & stylish***

It enhances the value of the property

It is *the Secret to beautiful* Homes !!!

Difference Between Clay Roof Tiles Vs. Concrete Roof Tiles 1

	Clay Roofing Tiles	Concrete Roofing Tiles
Materials	Made from Earth, 100% natural Product !	Made of Cement & sand !
Process	Pressed, Dried and Fired at > 1000°C	Extruded. Dry by natural air
Color Permanence	Color embedded, Permanent & long lasting	Paint Coated on surface, Color tone down over years
Heat Resistance (Energy Saving)	Excellent Heat Insulator	Average Heat Insulator.
Product Life Cycle	Durable & can last more than 50 years to century	Life Span 20 to 30 years. Reroofing Often required after this period

	Clay Roofing Tiles	Concrete Roofing Tiles
Fungus Growth	Glazed & Semi Glazed finished – almost no fungus Natural finished – common but washable	Common with moss / algae but not advisable to wash due to product characteristic (Porous)
Roof Profile Features	Double Interlocking & Double Overlapping System (DIDO) for Excellent water tightness	Overlapping system only
Home Value / Aesthetic	It looks exclusive and prestige	Common and not stylish, More for affordable home because of cheaper cost

Difference Between Clay Roof Tiles Vs. Metal Roof Tiles

	Clay Roofing Tiles	Metal Deck
Materials	Made from Earth, 100% natural Product !	Made of Metal
Process	Pressed, Dried and Fired at > 1000°C	Extruded / Casted
Color Permanence	Color embedded, Permanent & long lasting	Paint Coated on surface, Color tone down over years & depends on surface coating
Energy Saving	Excellent Heat Insulator	Poor Heat Insulator
Product Life Cycle	Durable & can last more than 50 years to century	It will be long if not rusted
Fungus Growth	Glazed & Semi Glazed finished – almost no fungus Natural finished – common but washable	No
Roof Profile Features	Double Interlocking & Double Overlapping System (DIDO) for Excellent water tightness	No overlapping. Join / clip-lock system.
Home Value	It looks exclusive and prestige	Looks common, commercial and not stylish

Difference Between Clay Roof Tiles Vs. Shingles Roof Tiles 1

	Clay Roofing Tiles	Shingles
Materials	Made from Earth, 100% natural Product !	Petroleum based product, not a environmental friendly roofing materials
Color Permanence	Color embedded, Permanent & long lasting	Extreme heat can cause shingles loose color
Resistance to heat	Excellent Heat Insulator	Poor Heat Insulator. Shingles absorb heat from sun and transfer it into house
Product Life Cycle	Durable & can last more than 50 years to century	Last 30 years. Surface will deteriorated after years of expose to hot weather

Difference Between Clay Roof Tiles Vs. Shingles Roof Tiles

	Clay Roofing Tiles	Shingles
Fungus Growth	Glazed & Semi Glazed finished – almost no fungus Natural finished – common but washable	yes . For rainy season with excess moisture, shingles start to rot
Roof Profile Features	Double Interlocking & Double Overlapping System (DIDO) for Excellent water tightness	Overlapping each tiles with 30-40% of surface
Home Value	Exclusive and prestige. Enhance the property value	It looks vintage. Widely use in Northern America because of inexpensive cost
Product Performance	DIDO system provide water tightness and difficult to lift up	Strong wind can uplift or tear shingles off easily.
Product Durability	Durable and long lasting against severe temperature	Not resistant to extreme hot weather. Expansions & contraction of the shingles can cause cracking

COLOUR / FINISHES : Glaze, Satin (Semi Glazed), Tropical Tones & Natural

GLAZED

SATIN / SEMI GLAZED

TROPICAL TONE

NATURAL TONE

- **Most common types of clay roof tiles**
- **Clay plain tiles**

- Water absorption

Less than 10.5 %

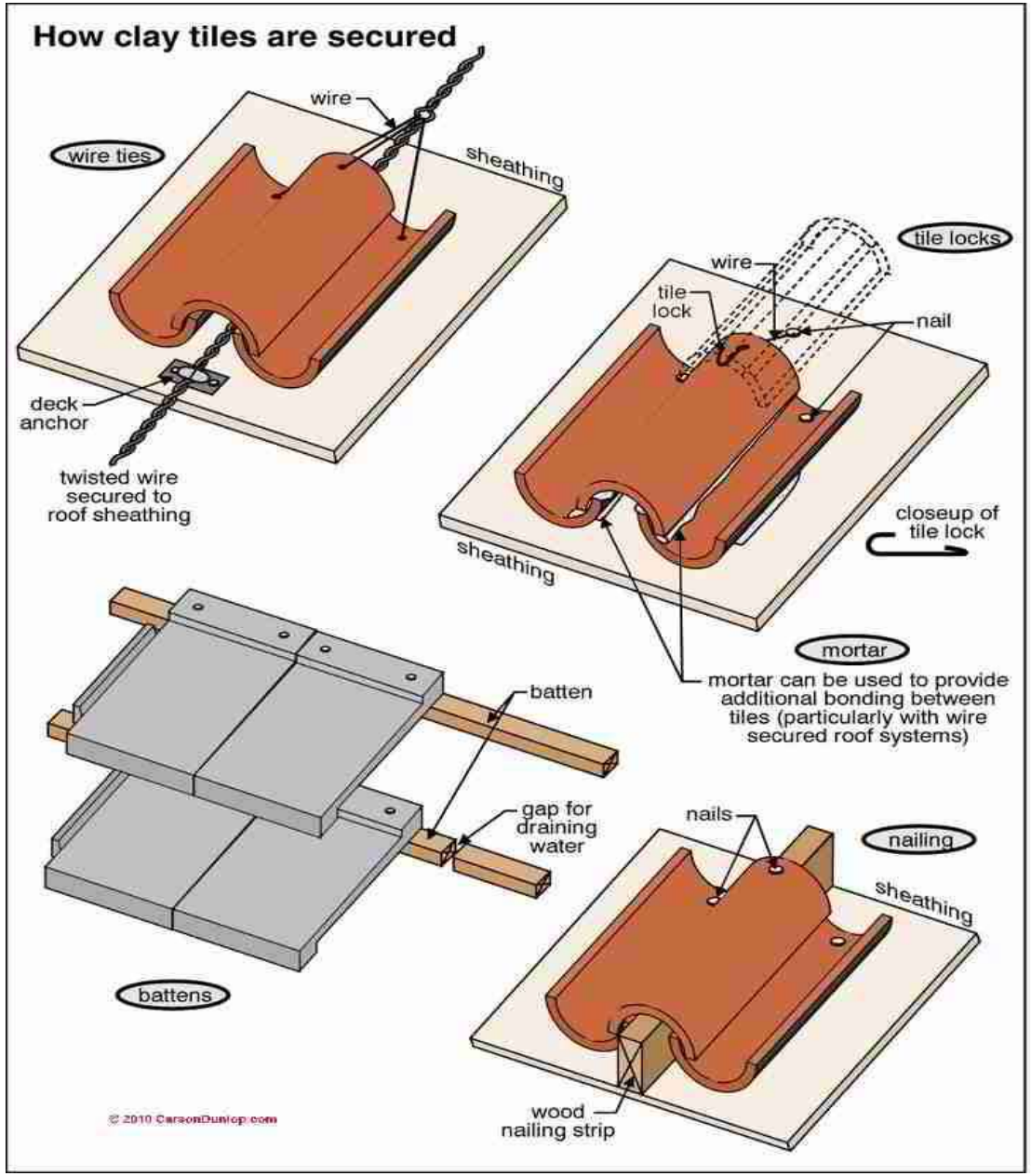
- **Mangalore clay roof tiles**

- Glazed 4%
- Full glazing 0.3%
- Normal 6% - 10%

- **Materials used to fix clay tiles**

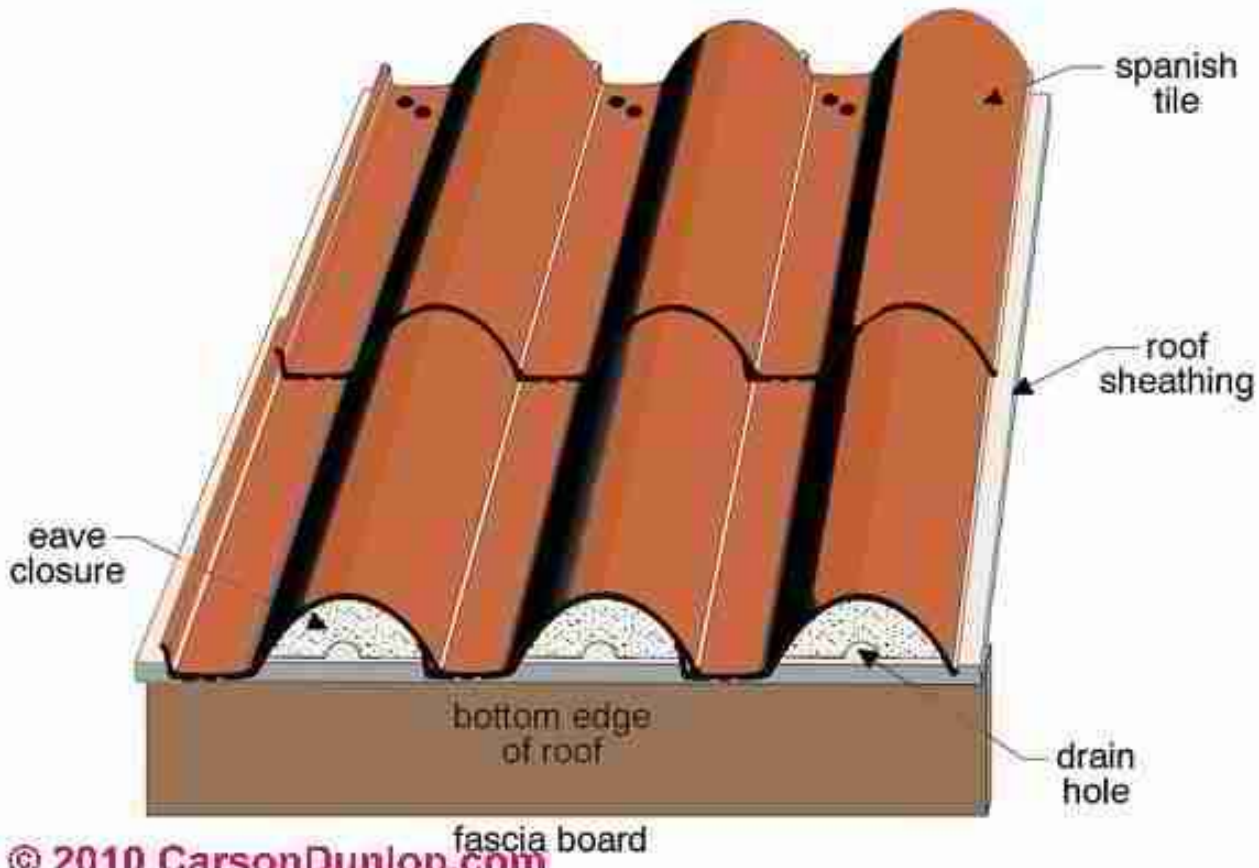
-Wooden framework or reinforced concrete framework with wood battens

- Nails: to secure clay tiles on some roofs are aluminum nails, hot dipped galvanized steel nails, or stainless steel nails


How clay tiles are secured
wire
wire ties
sheathing
deck anchor
twisted wire secured to roof sheathing
tile locks
wire
tile lock
nail
closeup of tile lock
sheathing
mortar
mortar can be used to provide additional bonding between tiles (particularly with wire secured roof systems)
batten
gap for draining water
battens
nails
nailing
sheathing
wood nailing strip
© 2010 CarsonDunlop.com

- You will need nails to secure the tiles to the roof and how many you will need depends upon the degree of your roof slope

Eave closures for spanish or mission tiles



- **Components of wooden framework**

-Bottom rafter from whitewood or pine صنوبر wood, 45 cm -60 cm. if used clay tiles are heavy type; the distance should be 45 cm.

- Covering the rafter with underlayment
- Most manufacturers recommend minimum slope requirements for their tiles as well as special underlayment and fastening techniques for low-slope installations
- Some manufacturers allow specific tile types to be installed on roofs as shallow as 2 1/2 :12 if a full waterproofing layer

- On slopes less than 3 1/2 :12, roofing tile is considered decorative only. The underlying roof provides all the necessary waterproofing.
- In general, there is no maximum slope for tile roofs. However, on extremely steep roofs above 19:12 or on vertical applications, wind currents may cause tiles to rattle (يهتز). To avoid this, use wind clips on each tile along with a construction grade silicone sealant or other approved sealant.

- Because of the long service life of tile, a long-lasting underlayment should be used as well. underlayment plays a key role in tile roofing, since most tile roofs are not completely waterproof
- At tricky areas, such as around roof vents, chimneys, and skylights, self-adhesive bituminous membrane can help achieve a watertight seal

- The rafters should be covered with roles of polyethylene (0.1 mm thickness) or it is possible to use asphalt sheets

- There should be an overlapping between the used sheets (not less than 10 cm)

- Battens from softwood with a length of at least 1.2 m to be fixed over three rafters at least.

- The dimensions of the batten (20 mm * 40 mm) or according to the dimensions of the used clay tiles

- Distance between battens should be enough to create the appropriate overlapping between the clay tiles

- There is a need to use a mortar in intersections of planes or in cases of using special pieces of clay tiles such as covers.

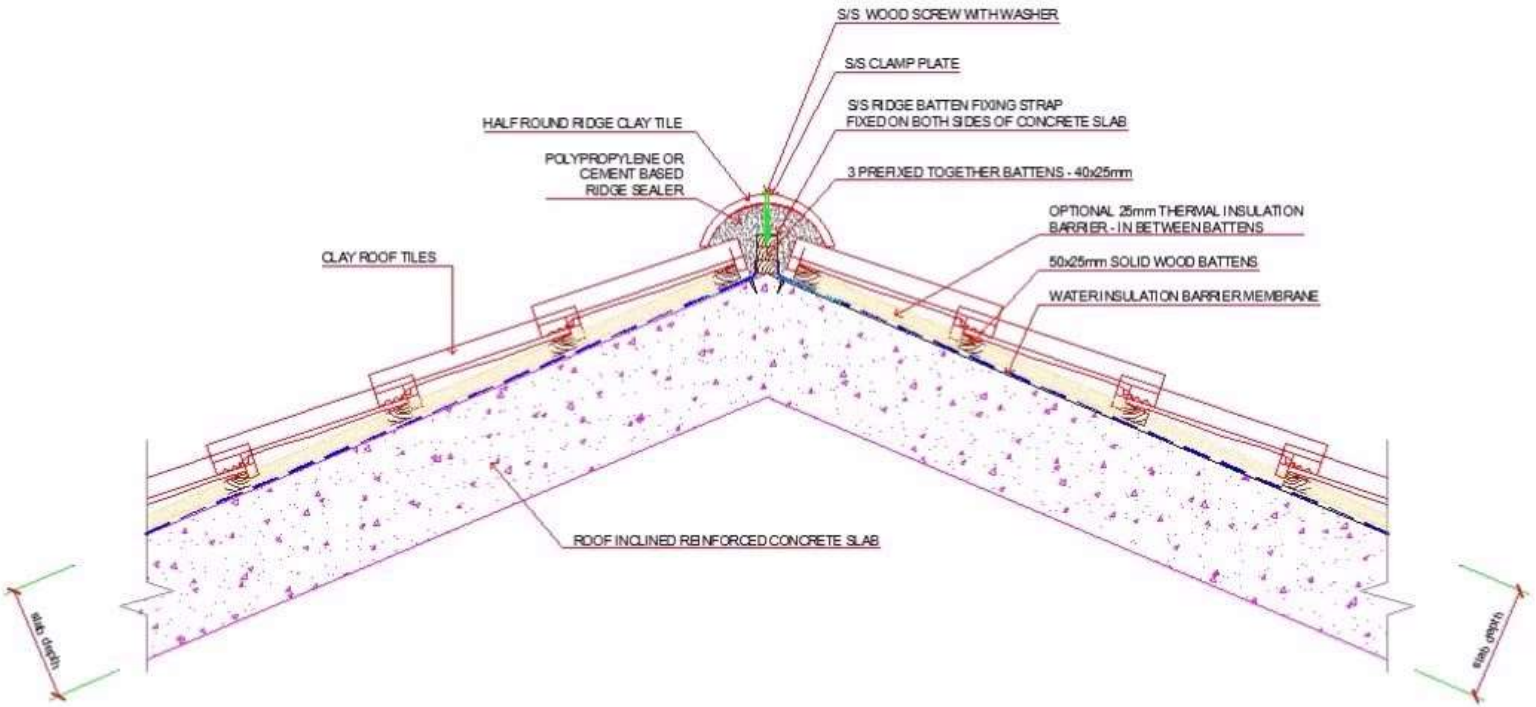
- The used mortar consists of white cement, fine aggregate (1: 1) and colors pigments.

- The color pigments should be in agreement with the color of the clay tiles

- The fixing of clay tiles (from bottom to top)

- **Fixing of clay tiles of RC roofs**

- By using wood battens, or
- By using mortar to fix the clay tiles on the RC roofs



ROOF RIDGE CLAY TILES ON INCLINED REINFORCED CONCRETE SLAB

SCALE 1:10

Lightweight roofing systems

Types of Roofs

- **Pitched or sloping roof:**

  Suitable for areas of heavy rain and snowfall

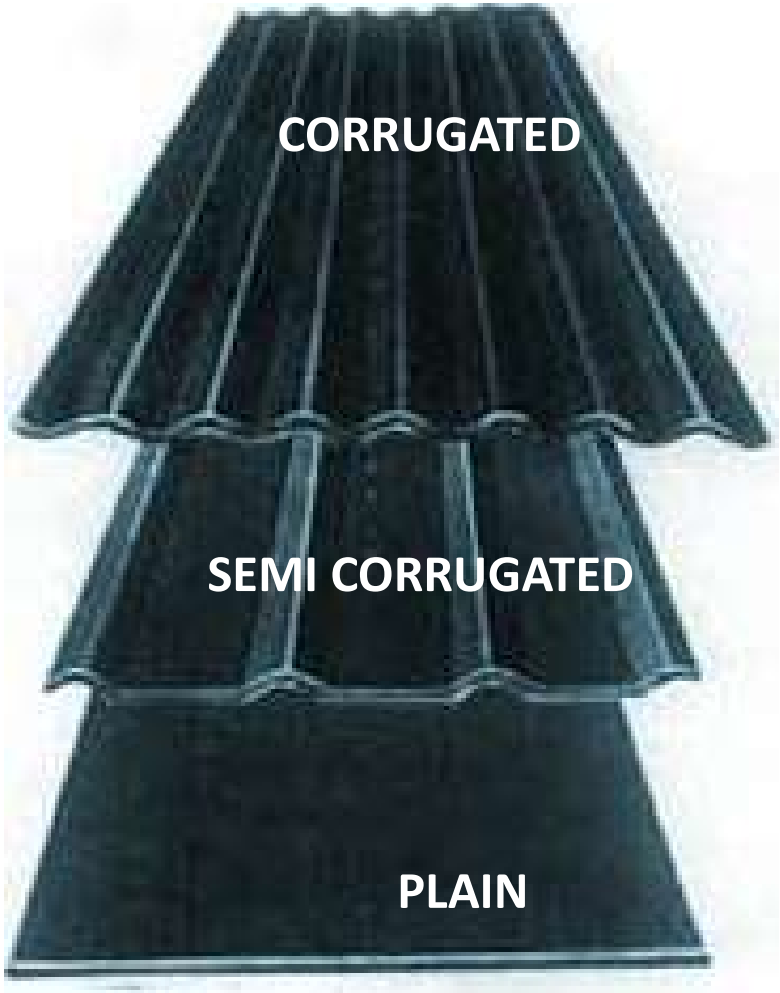
- **Flat Roofs or Terraced Roofs**

  Rainfall is moderate- slight slope (not more than 10°) is given

- **Curved Roofs**

  For Halls, theatres, Shells and Domes preferred when large column free area is required

ROOF COVERINGS



COMMONLY USED:

I. ASBESTOS- CEMENT SHEETS
II. ALUMINIUM SHEETS
III.GALVANIZED IRON SHEETS
IV.FIBRE SHEETS
V. TILES

- **Properties of lightweight roofing systems (in general)**

- Lightweight (with potential to carry their own weights, snow and wind loads)
- Sufficient and complete protection from snow and rains (overlapping)
- Thermal insulation
- Fire resistance
- Moderate maintenance costs

I. ASBESTOS- CEMENT SHEETS

Cement & asbestos

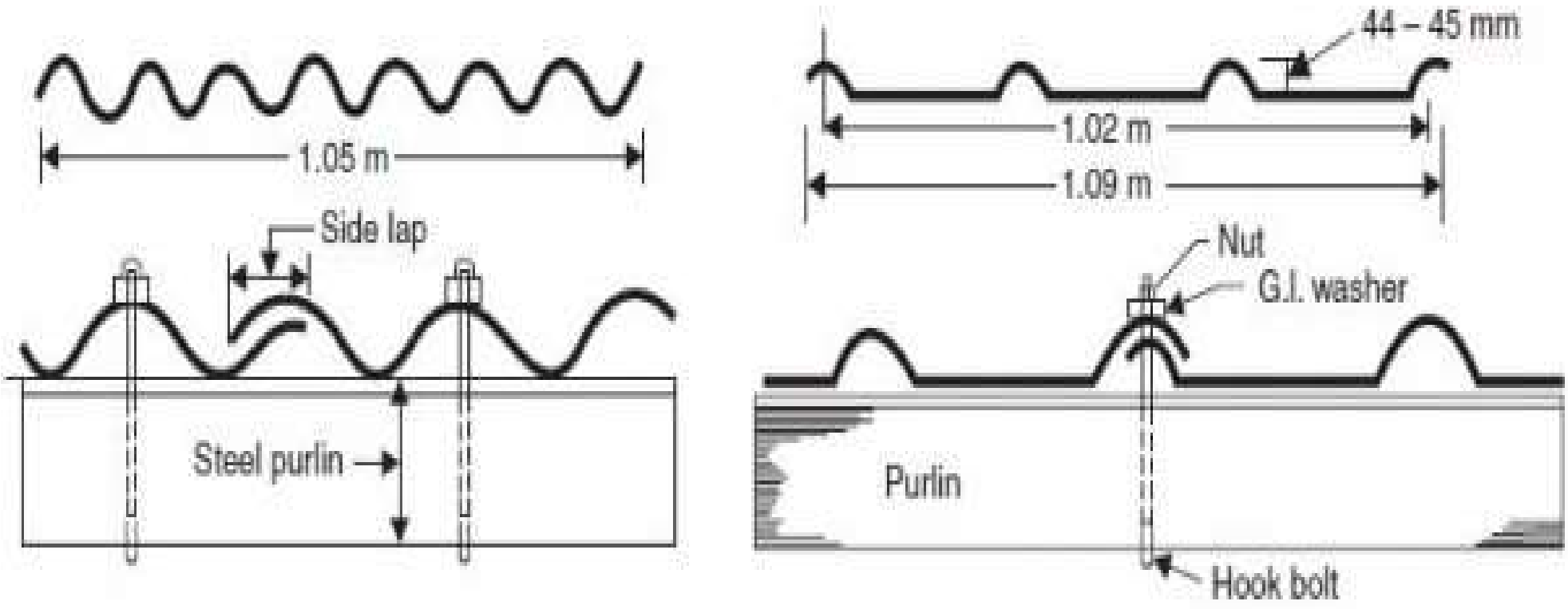
Purlin روافد spacing: 1 to 1.5 m

Advantages:

Cheap, tough, durable, water tight, fire resistant, light weight, do not rust

Disadvantages :

Low thermal conductivity, not attractive



(a) Corrugated sheet covers

(b) Trafford sheet covers

Fig. 8.20. A.C. sheet roofing

II. ALUMINIUM SHEETS

Aluminium + Mg (strength)

Lightest roof covering

Advantage: Reflects heat, corrosion free

Application: Warehouses

Industrial buildings

Automobile sheds

III. GALVANIZED IRON SHEETS

Iron sheets- galvanized with zinc

Advantages: durable, light, fire proof

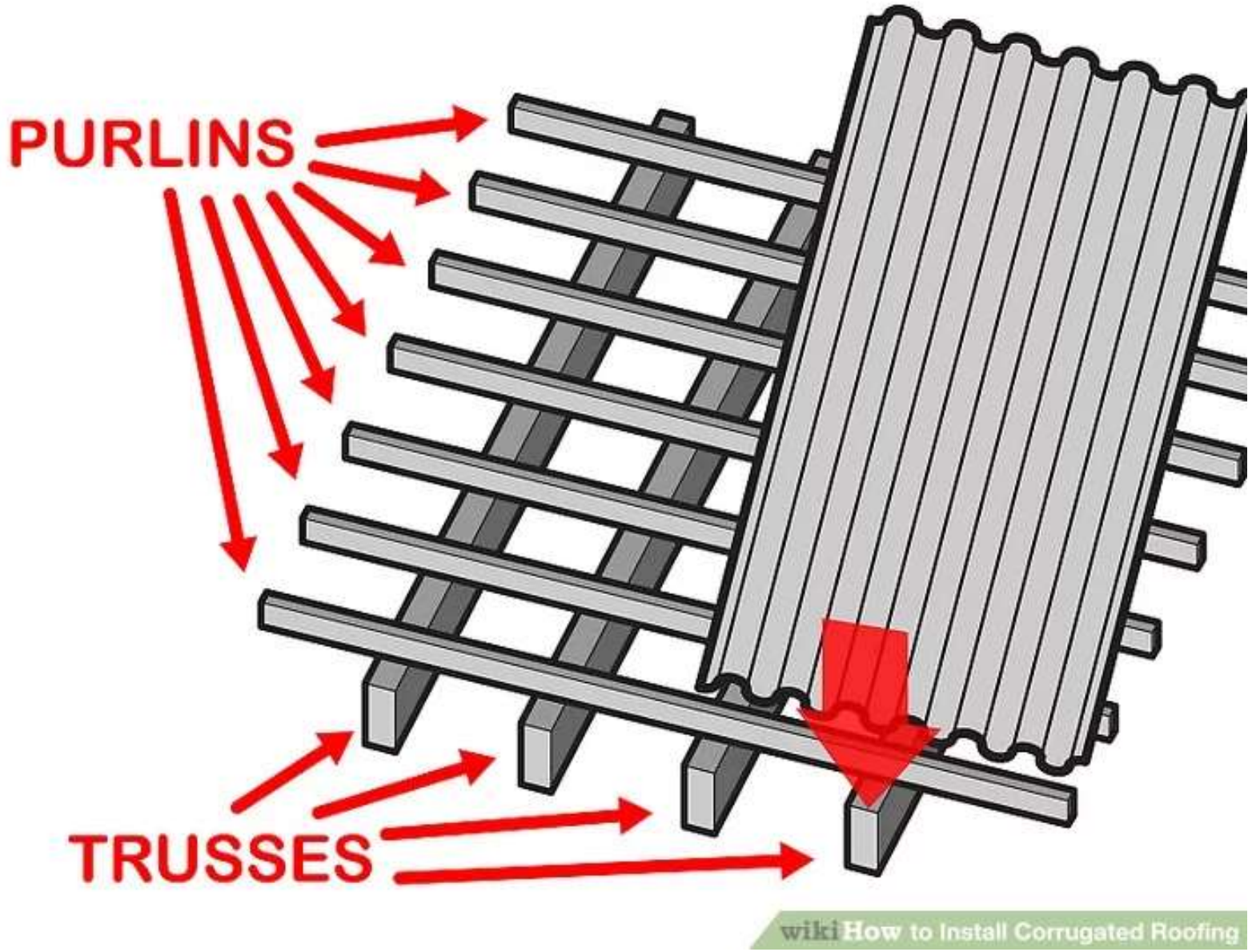
Disadvantages: Condensation problem in the inner side, transmit heat and cold easily

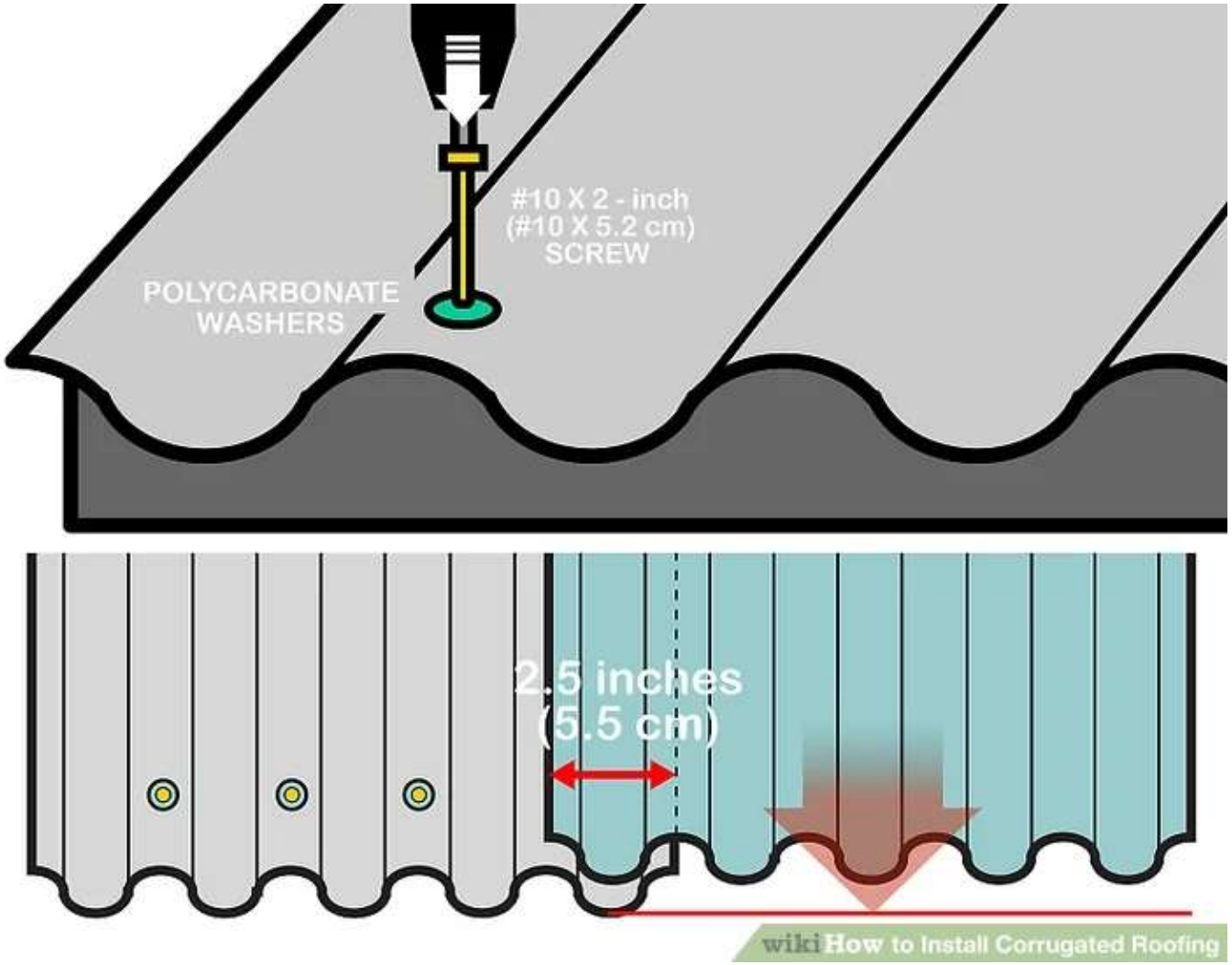
Application: Factories, workshop sheds, cost effective bldg

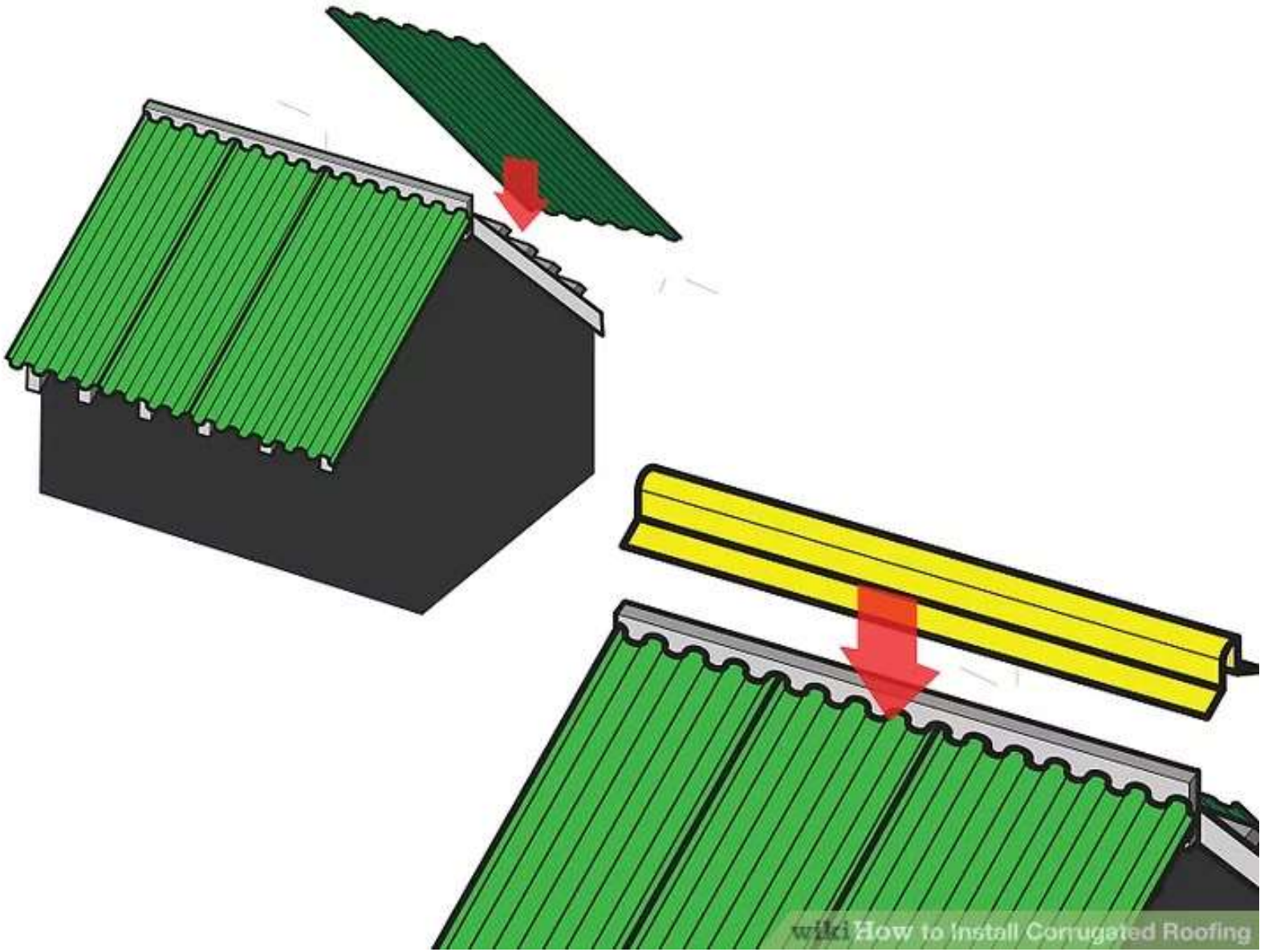
- **Galvanized Iron Sheets**

- Zinc added to Iron by spraying or dipping (تغطيس)
- This layer is well adhesively to iron
- After Oxidations, transform into Zinc carbonate
- This gives durable protection to iron (for many years)

- **Galvanized Iron Sheets**
- Installed over steel profiles
- The steel profiles should be painted before installing of Galvanized Iron Sheets
- If there is a need to fix steel trusses, followed by;
- Fixing steel profiles or steel angles
- Fixing the sheets with side overlapping (2 waves at least) to prevent the seepage of water


PURLINS
TRUSSES
wikiHow to Install Corrugated Roofing


#10 X 2 - inch
(#10 X 5.2 cm)
SCREW
POLYCARBONATE
WASHERS
2.5 inches
(5.5 cm)
wikiHow to Install Corrugated Roofing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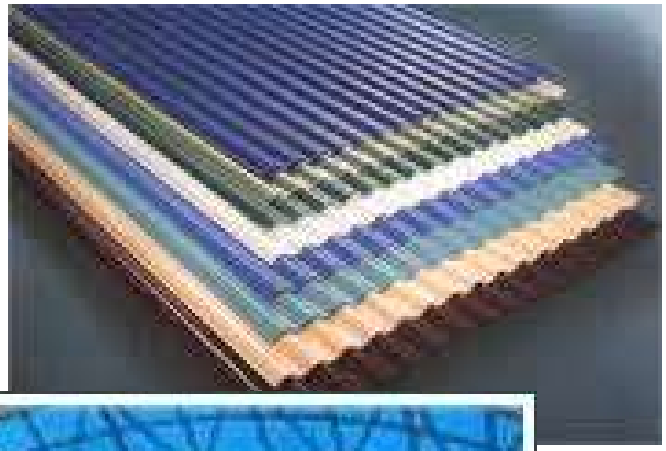
IV. FIBRE SHEETS



- Advantages: light weight, rust proof, can be cut easily

- E.g.: PVC sheets

  Poly carbonic sheets

- The advantage of the PVC/polycarbonate roofing is the translucency (شفافية) of the panels. They allow daylight to enter through them. If cost is a factor, PVC is a cheaper alternative to sheet metal.
- PVC will block out the heat from the sun much more effectively than sheet metal
- Some PVC is translucent, but filters ultraviolet rays, and comes in a variety of colors.

- **The disadvantages of PVC are**

- that it's not as durable as sheet metal,
- is noisy in the rain,
- and can easily break off during high winds

Waterproofing works

- The conventional system of waterproofing involves (membranes) .
- This relies on the application of one or more layers of membrane (available in various materials: e.g., bitumen, silicate, PVC, etc.) that act as:

- a barrier between the water and the building structure,
- preventing the passage of water.

- Virtually all building envelopes, particularly below-grade areas and plaza decks, encounter hydrostatic pressure from water during their lifetime. Therefore, the use of a quality waterproofing system is essential to preserve the water-tightness of the building envelope

- **What is quality Waterproofing?**

- A waterproofing system which prevents the passage of liquid water in the presence of hydrostatic pressure.
- Protection as necessary.
- A drainage system that reduces hydrostatic pressure.
- Accessory products which complement, attach and detail the waterproofing and drainage

Waterproofing VS Damp proofing

- **Waterproofing:** is the treatment of a surface to prevent the passage of liquid water in the presence of hydrostatic pressure

- **Damp-proofing:** is the treatment of a surface to retard the absorption of moisture in the absence of hydrostatic pressure

- There is a distinct difference between damp proofing and waterproofing.

e.g. for foundations

- Damp proofing is intended to keep out soil moisture while waterproofing keeps out both moisture and liquid water

- Any concrete or masonry foundation walls that retain earth and enclose interior spaces and floors below grade shall be damp proofed from the top of the footing to the finished grade." Using bituminous coating and acrylic-modified cement.

- Waterproofing is only required in areas where a high water table or other severe soil-water conditions are known to exist.

- Damp proofing is a coating, usually asphalt-based, that is either sprayed on or hand applied to the outside of the wall

- The drawbacks include an inability to seal larger cracks or holes left by form ties and the potential for damage by coarse or careless backfill.

- with proper surface drainage, and the absence of hydrostatic pressure to drive water infiltration, damp proofing can supply adequate and long-lasting protection for basements

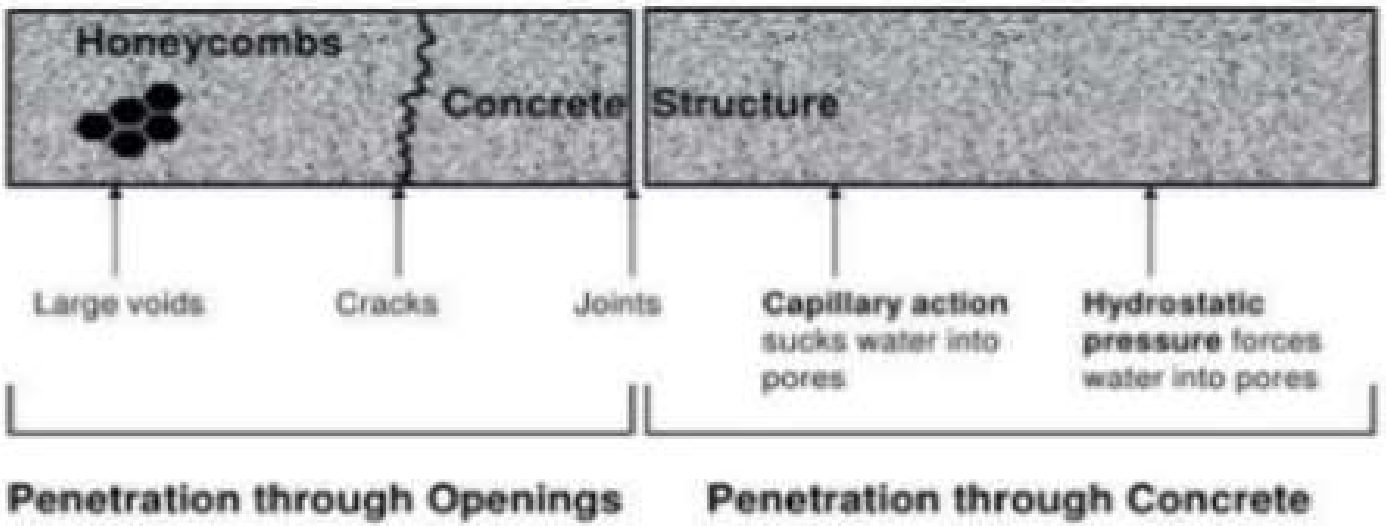
- Waterproofing a foundation requires the same care as damp proofing in regard to surface treatment and drain pipe, but is much more exacting in the treatment of the wall itself. Obviously, if there is any doubt about whether or not damp proofing will do the job, it's best to spend the extra time and money to waterproof, particularly for habitable space

Permeability of Concrete

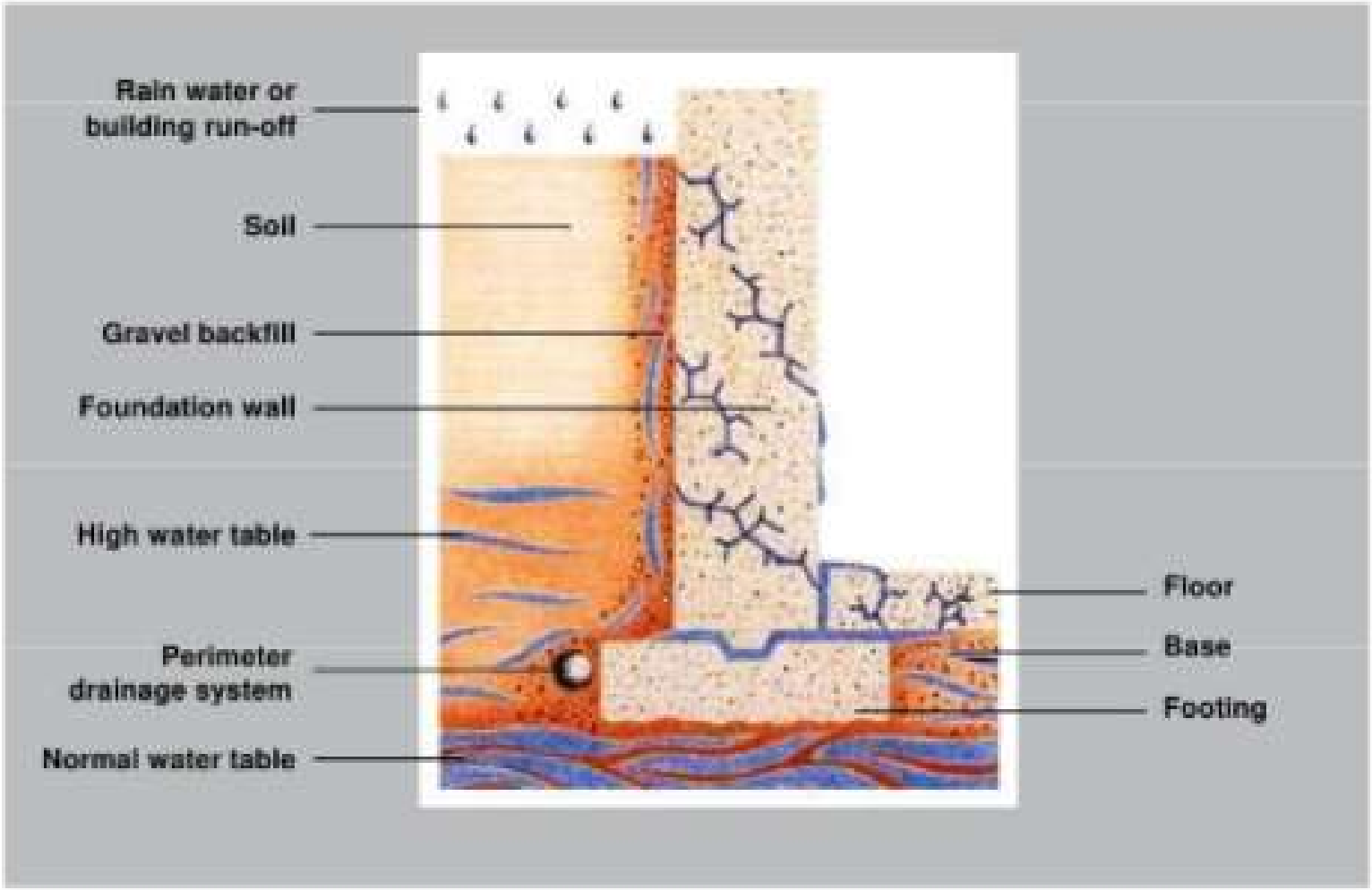
- Portland cement mortar and concrete can be made practically waterproof or impermeable without the use of any integral waterproofing materials; but in order to obtain it considerable care should be exercised in selecting good materials

- Well-graded sands containing considerable graded fine material are preferable for making impermeable concrete.
- The consistency of the concrete mixture should be wet enough to avoid the formation of pockets on the surface.
- The use of excessive water, causes shrinkage cracks
- Defective workmanship can result in improper proportioning, lack of thorough mixing etc

How Water can penetrate Concrete Structures?



Why Waterproof a Structure?



Why Waterproof Your Structure?

- Liability issues
- Structural integrity
- Consequential damage
- Provide additional usage space
- Unexpected water sources (grade, sewer lines)

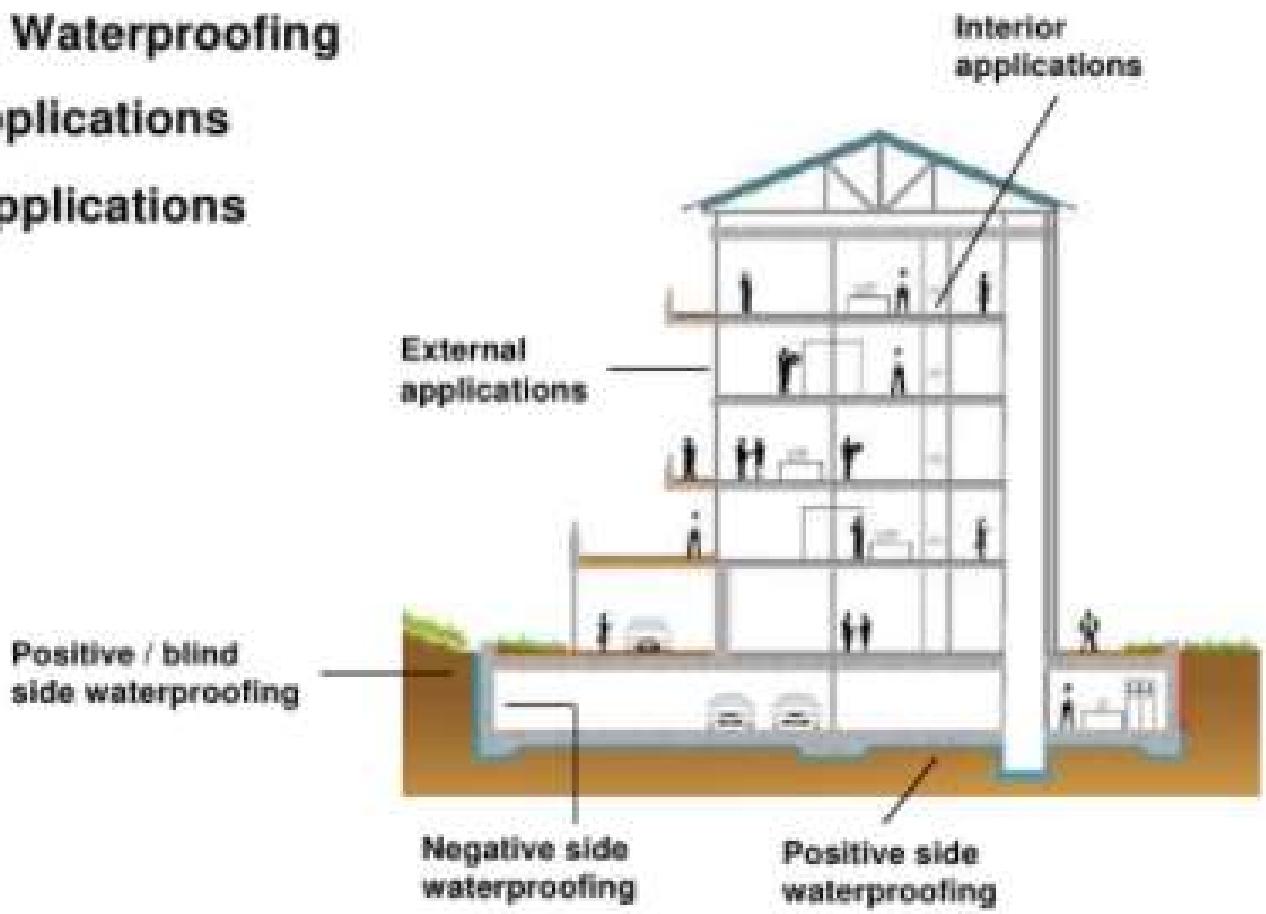
Where to Apply Waterproofing?

- Interior applications
- Exterior Applications
- Blind side waterproofing
- Negative side waterproofing
- Positive side waterproofing

Waterproofing

pplications

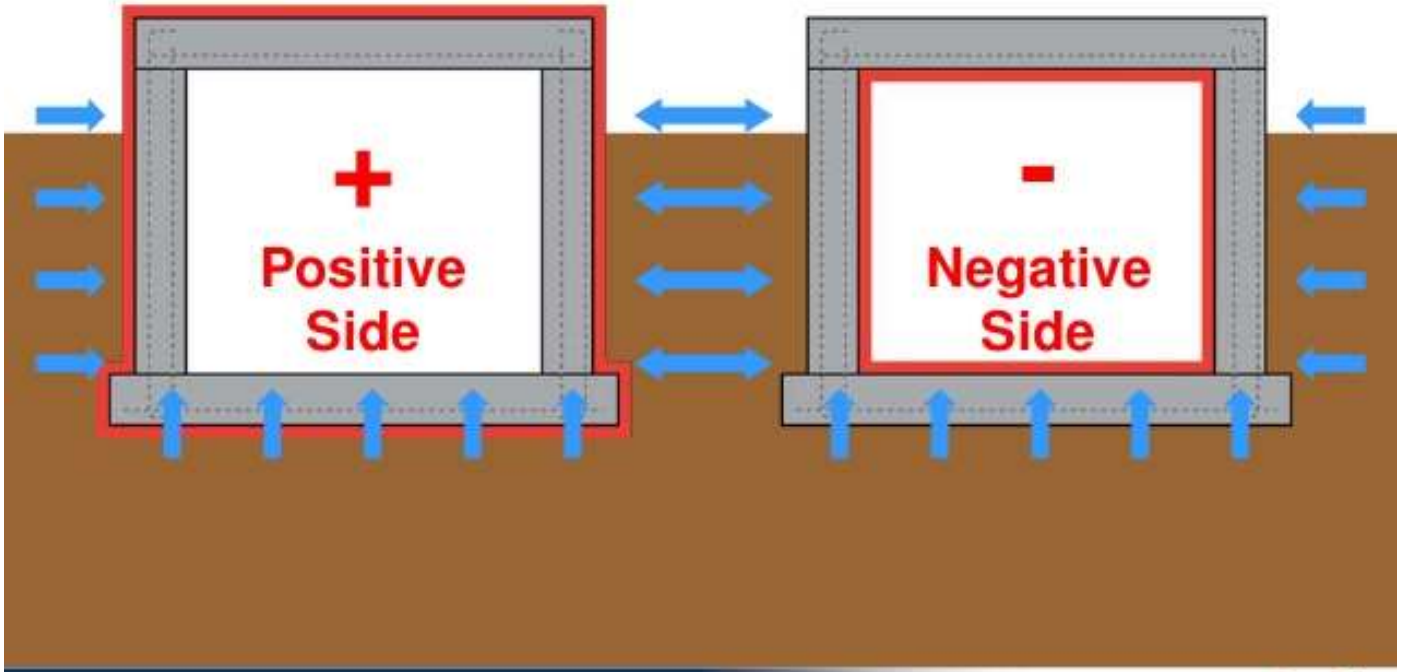
pplications



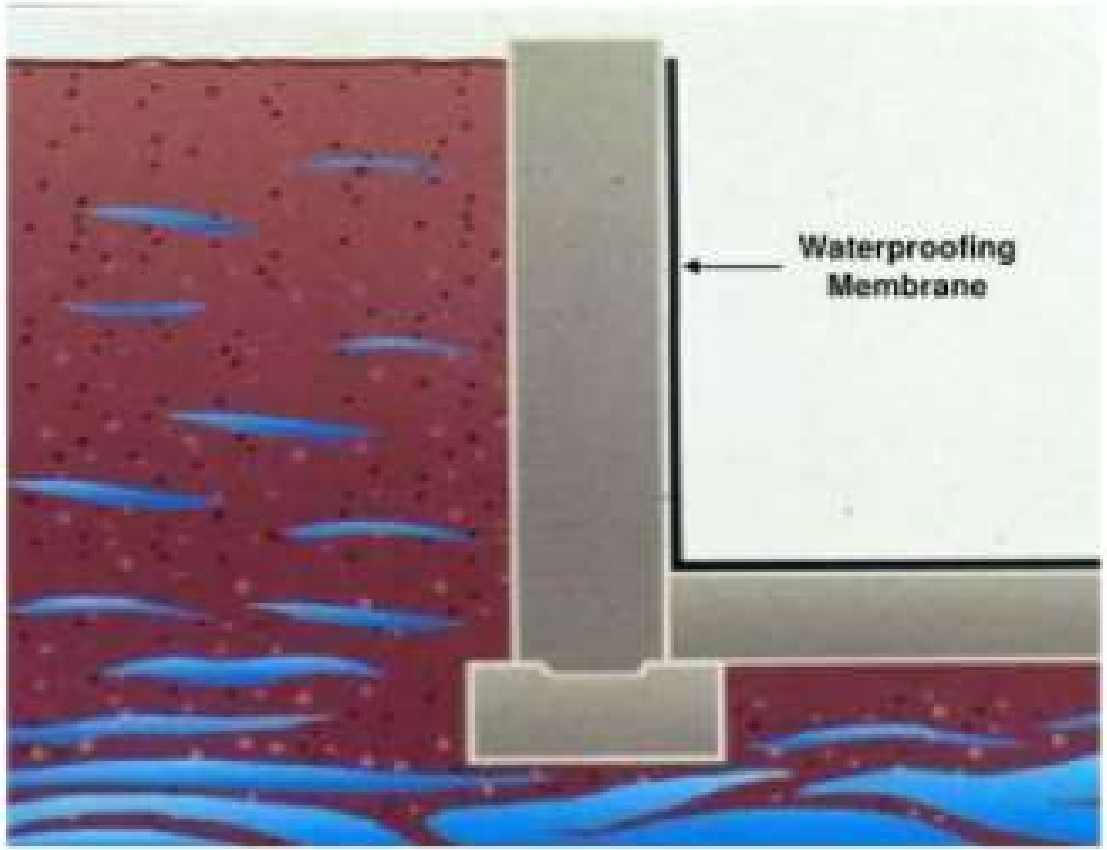
- Positive-side waterproofing applies to sides with direct exposure to water or a hydrostatic head of water.

- Designed to stop water before it has a chance to enter the structure and cause structural damage.
- Typically the most effective solution

Positive / Negative Side



- Negative-side waterproofing applies to the opposite or interior side from which water occurs
- Most commonly used in:
  - Remedial work
  - Elevator pits
- Tank liners Waterproofing Membrane

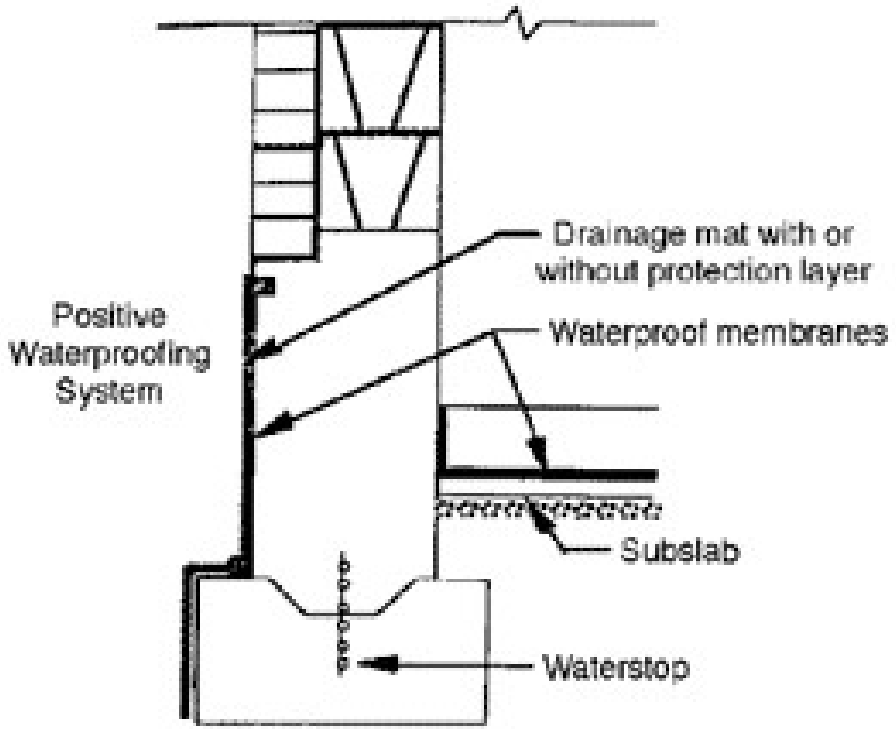

Waterproofing
Membrane

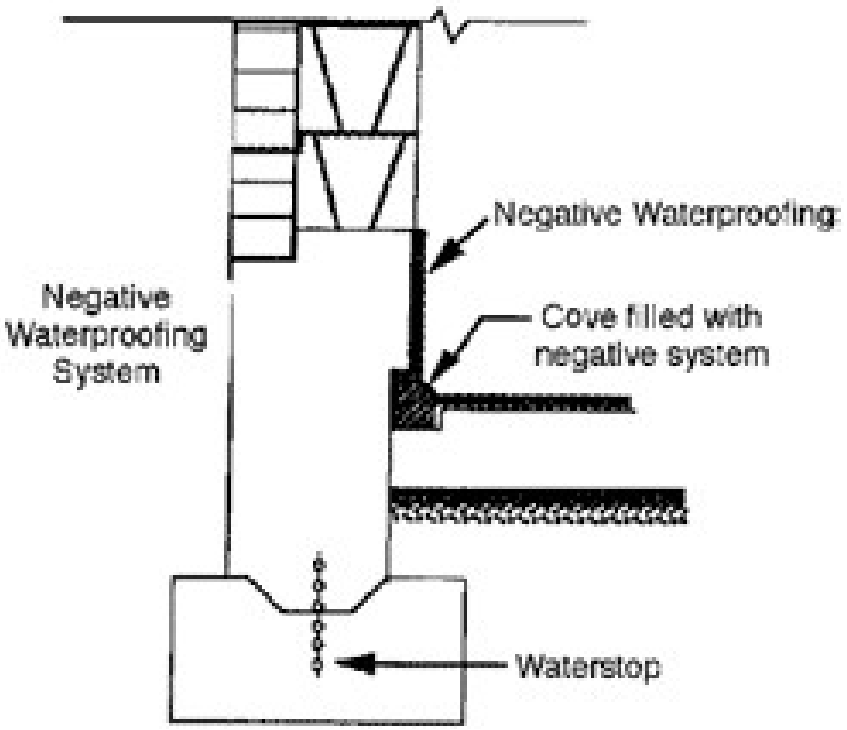
- Blind Side Waterproofing Positive side:

-Typically inaccessible once the structure is complete.

- In many cases this is the only positive side waterproofing option

- Blind-side waterproofing incorporates the waterproof membrane on the face of the shoring before the foundation is cast. Concrete is then poured, and the waterproofing fuses to the foundation wall as it cures


Positive
Waterproofing
System
Drainage mat with or
without protection layer
Waterproof membranes
Subslab
Waterstop


Negative
Waterproofing
System
Negative Waterproofing
Cove filled with
negative system
Waterstop

- The principal advantage of a negative system is also its principal disadvantage. It allows water to enter a concrete substrate, promoting both active curing and the corrosion and deterioration of reinforcing steel if chlorides are present.
- Positive-side waterproofing produces an opposite result—no curing of concrete, but protection of reinforcing steel and of the substrate itself

- **Types of waterproofing:**
- **Sheet Membrane Waterproofing**
- PVC, HDPE, etc. •
- Bonded – self-adhesive, hot applied ,
- **Liquid Waterproofing**
- One or two component
- Applied by spray or by hand
- Hot applied, cold applied
- **Bentonite Waterproofing**
- **Metal Oxide Waterproofing**
- **Cementitious Waterproofing**

- **Bentonite** is a type of clay having the unusual characteristics of cohesion, binding, sealing, and thickening. It is usually gray in color and when processed has the consistency of fine powder, similar to cement or flour. When bentonite is installed below grade as a waterproofing membrane, it becomes hydrated with the moisture that is naturally present in the soil and forms an impermeable barrier that absorbs and expels water
- **Rely on water to activate and to remain active**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	Advantages	Disadvantages
Sheet Membrane	Controlled, guaranteed thickness	Laps
	Robust, self-reinforced	Complex detailing
	No mixing or specialist equipment	
	Trafficked immediately	
Liquid	Seamless	Variable thickness
	Good for complex geometries	Cure time
	Quick coverage with spray application	Mixing and spray equipment
	Minimal substrate preparation	

Seamless: no joints or laps

- **Metal Oxide and Cementitious**

- Primarily Portland cement- based materials

-Positive and negative side applications

-Inflexible, subject to cracking

- Low cost

Roof Waterproofing Using Bituminous Waterproofing Membrane Sheet

-A bituminous waterproofing membrane is used for reinforced concrete roof waterproofing.

-This waterproofing membrane comes on site in the form of rolls manufactures and packed in the factory properly sealed.

- The specifications and safety manuals of this membranes provided by manufacturer should be read before installation process. Fire safety and prevention is the most important while using this membrane.

- All inflammable materials from roofs to be removed and good roofing practices should be followed.

- The bituminous waterproofing membranes are unfolded on the site and laid firmly on surface with tar based adhesives using blowtorch (موقد اللحام)

- A layer of bituminous water proof membrane is laid over the structural roof which acts as a shield against the seepage of water onto the roof.

- A proper slope is necessary to allow the water to flow steadily to drains

- These membranes have 2 to 4 mm thick water proof materials.
- Membrane should be flexible with elongation 150 %,
- strong,
- chemical & UV resistant,
- flexible enough to take any shape over which it is laid

Procedure for Roof Waterproofing Using Bituminous Waterproofing Membrane

- **Roof Surface Preparation**

-The surface to be membrane should be clear from dirt, dry and clean.

-Must not be installed during adverse weather and below 45^0 F.

- should be laid parallel to slope. This ensures that water is never be running at joint lap edge

- **Roll Alignment**

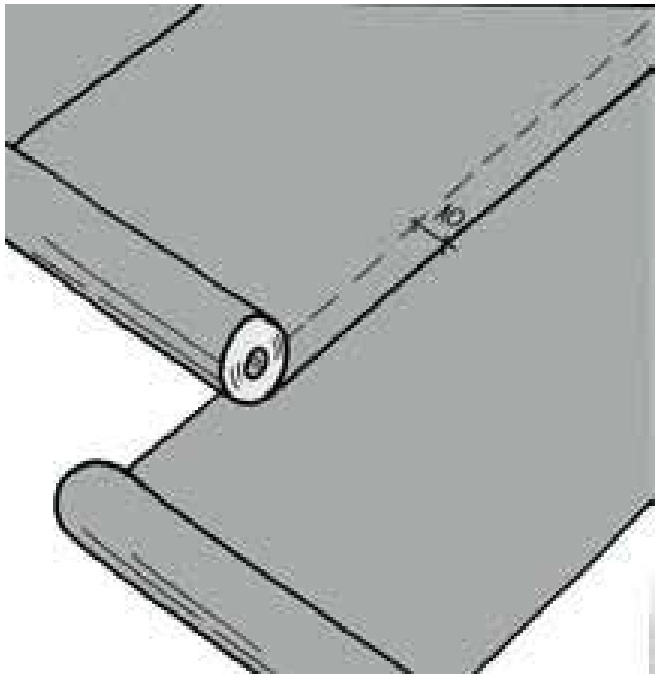
- No wrinkles (تجاعيد) should be allowed while laying membrane and proper alignment is necessary

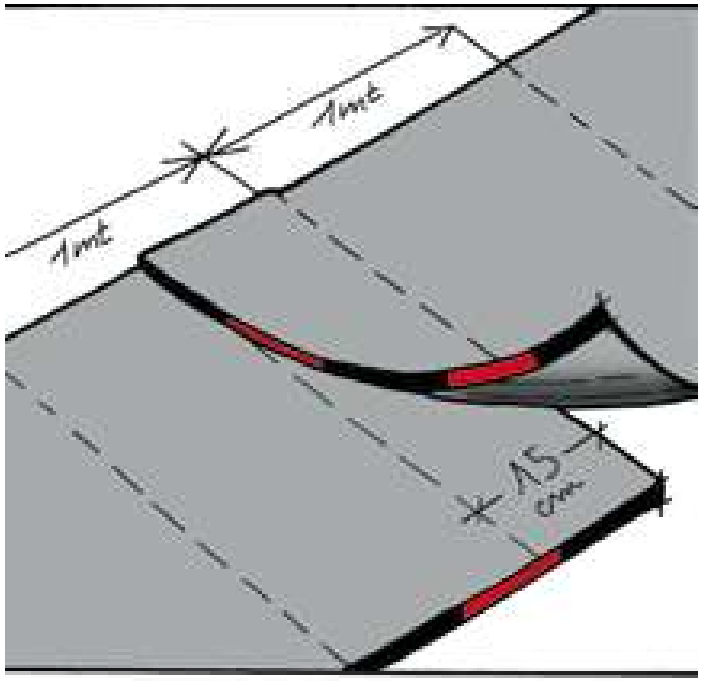
- The torch fire should be applied uniformly and slow over the roll while laying.
- While torching membrane on joints, approximately 1-inch chemical from the waterproofing membrane should be flowing out to ensure proper filling of gaps. More than 1-inch flow out signals to overheating of membrane.
- Roller should be laid over joints along with torching so that compound sets properly and no gap is created in joints

- Ensure perfect joint between two sheets is the most critical part. Check all the edges of joints properly to ensure proper adhesion of end laps of membrane,

- air gaps is not acceptable. At gaps the sheets should be lifted and heated with the torch and resealed again

- The bituminous waterproofing membrane sheets are overlapped 4 inches at the sides and 6 inches at the ends

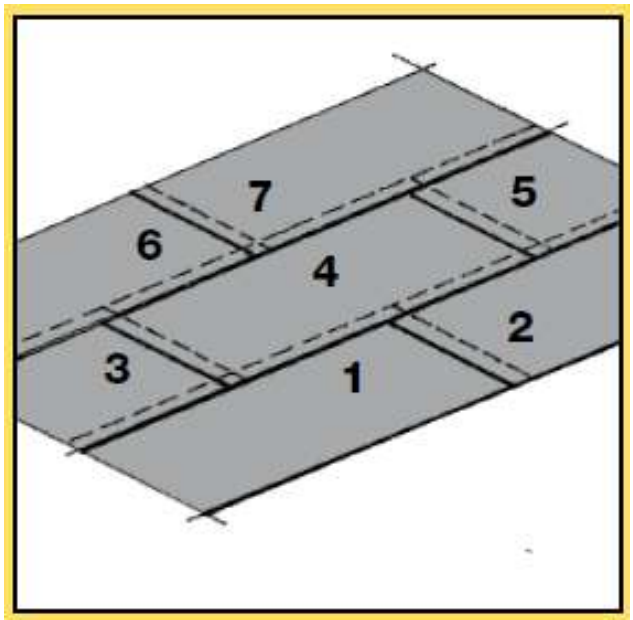




Before laying, the rolls must be unrolled and aligned to lay out the overlaps between the sheets.

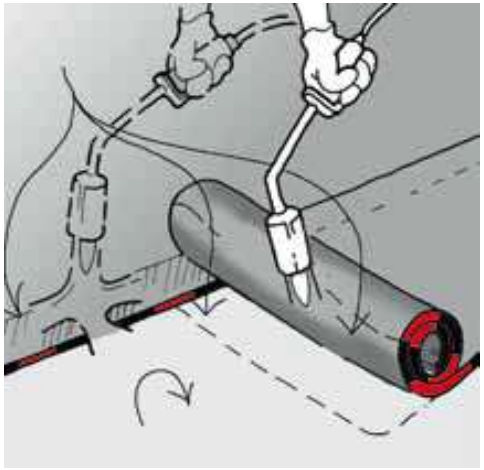
The sheets must then be rolled up again to proceed with the flame welding.

The end-to-end overlaps of the waterproof sheets must not be arranged along a single line but must always alternate



Connecting the membrane to the substrate must be carried out as follows:

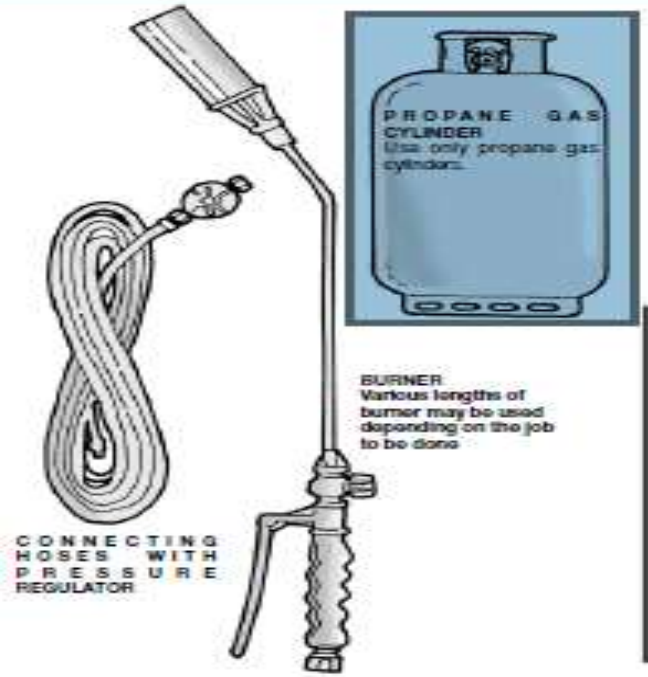
- in complete adhesion: The torching of the mixture of the rolls must heat the membrane and the substrate at the same time, concentrating on the roll



-in independence:

The membrane is unrolled "dry" onto the substrate, flame bonding only the overlaps. In this case, the waterproof membrane must always be ballasted (with flooring, gravel, soil etc,)

EQUIPMENT

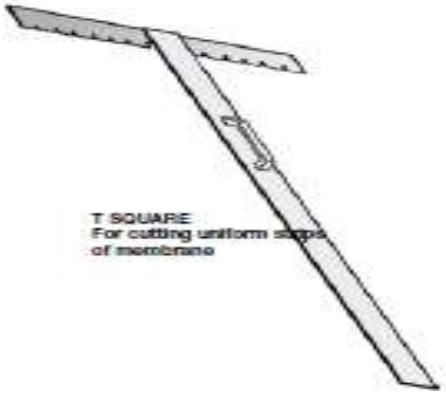


CONNECTING HOSES WITH PRESSURE REGULATOR

PROPANE GAS CYLINDER
Use only propane gas cylinders.

BURNER
Various lengths of burner may be used depending on the job to be done

RIGID HDPE CORE
To avoid ovalisation of the rolls during laying



T SQUARE
For cutting uniform strips of membrane

COMPASS
for cutting the membranes into circular shapes

"DELFINO" KNIFE
Aluminium knife

spread the bituminous adhesion primer INDEVER in the areas where the membrane is to be anchored

The primer has the very important function of preparing the receiving surface and increasing adhesion.

The bitumen polymer membranes must not be applied until the primer is completely dry: about 8 hours