

CROCODILE Total Home Protection

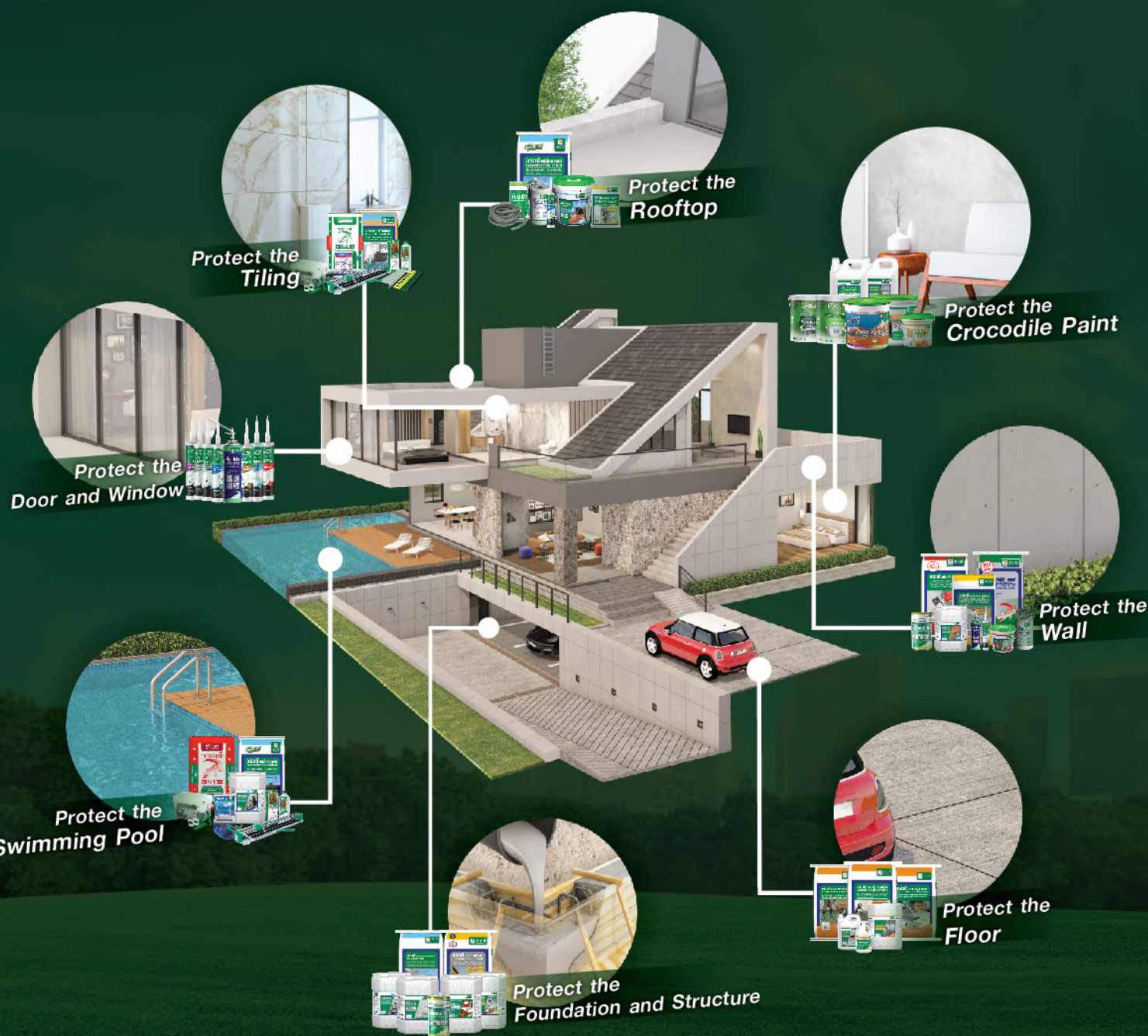


CROCODILE
Innovation for Your Family's Happiness



STRUCTURE

PROTECT FOUNDATION AND STRUCTURE



The basic information for the user.



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U.S.A. Standard from the Crocodile Family

Jorakay Corporation Co., Ltd.

Innovation for Your Family's Happiness



“

FOUNDATION And STRUCTURE

”

Key to Strong and Sustainable House

Construction of a building needs strong foundation and structure in order to bear weight of the structure and other weight, along with other underground risks, such as corrosion by groundwater, subsidence and others. Foundation and structure work thus is critical for construction, and only high-quality product should be used.

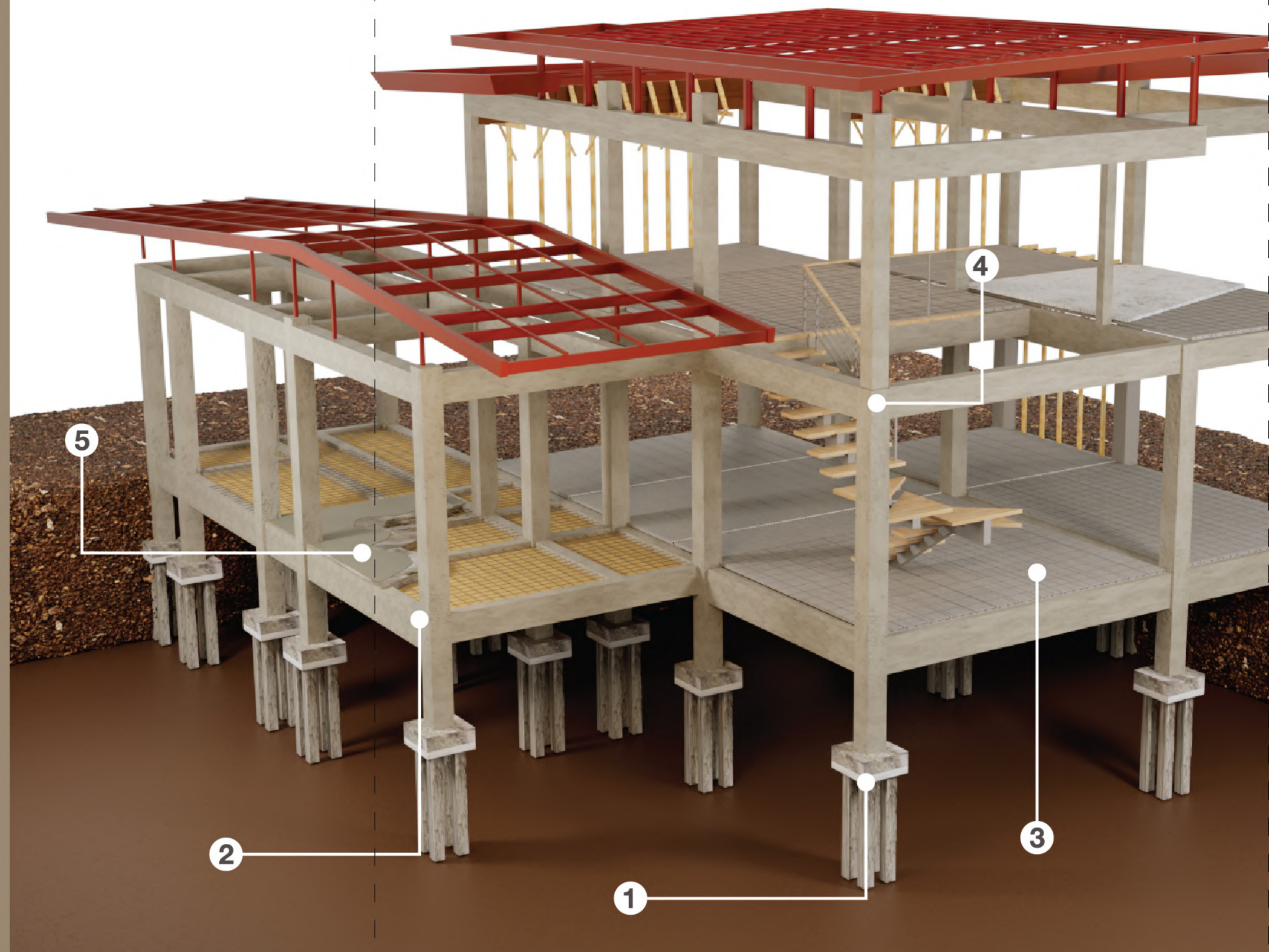
To improve durability and lengthen service life of structure, and for efficiency and appearance of the building.

Recommended to use Crocodile Together, Protech the House.

FOUNDATION

“ FOUNDATION STRUCTURE AND WATERPROOFING ”

- ❶ Foundation and Pillar
- ❷ Ground beam
- ❸ Floor
- ❹ Pillar and beam
- ❺ Waterproofing



Note: All construction work needs consulting with the supervising engineer for correctness and safety.

1 Foundation and Ground column



Foundation

The part bearing weight of the whole building and transmit to the pillar through the foundation and eventually to the ground. Foundation can be built in many ways, but generally two methods are used : Spread foundation and pile foundation.

- ✓ Non - stick concrete
- ✓ Smooth surface, lower porous
- ✓ More strength



Building the ground column

This part transfers the weight from above -ground pillar and building to the foundation, thus attention should be paid from mold preparation to concrete curing

Structural preparation process

1. Prepare the concrete mold, which could be made from various material such as wood, metal, plastic or aluminum. Before pouring concrete, coated the surface with mold release agent such as **Crocodile Admix Mold-O** or **Crocodile Admix Mold-W** to keep the concrete surface smooth, reduce damage from mold release and lengthen the life of the mold.
2. In concrete pouring for the ground column, to get the desired level the concrete should be left to cure for 2 days before removing the mold. If there are pores not bigger than 2 inches, the column should be repaired to prevent potential damage, but larger pores will require consulting with the supervising engineer to find a solution.
3. Concrete curing should be done 24 hours after pouring, for at least 7 consecutive days or as required by the design. It is recommended to use the concrete curing agent **Crocodile Admix Cure** to prevent excessive evaporation during hot or windy weather, maintaining optimal hydration in the concrete and reducing cracking problem.



Recommend to coat or spray the mold surface with **Crocodile Admix Mold-O** for outdoor, sunny conditions to prevent the agent from evaporating before pouring, or **Crocodile Admix Mold-W** for indoor use. The agent should be kept out of structural steel or rebar.



Crocodile Admix Mold-O
Oil base mold release agent
For outdoor work,
in windy or sunny conditions



Crocodile Admix Mold-W
Water base mold release agent,
for indoor use.



Crocodile Admix Cure
High -performance concrete Curing
Compound maintaining optimal reaction
in the concrete and reducing cracking problem.

2 Ground beam



Grade Beam/ Ground Beam

Bears the load from everything above it and transfer the load to the foundation structure. Most houses will have the lower floor around 50 centimeters above ground to reduce exposure to ground moisture. The ground beam can also be called the ground floor beam.



- ✓ Prevent leakage from the underground.
- ✓ Repair concrete
- ✓ High compressive strength

Construction of ground beam

The ground beam can be constructed in two ways :

Cast-in-place technique

1. The level must be measured, and the beam line is drawn. Then, the ground is leveled before pouring lean concrete to prevent liquid concrete from seeping into the ground, and soil mixing into the concrete.
2. Place ground beam rebar along with spacers to prevent the rebar from touching the mold. In this case the rebar should be placed on the lean concrete.
3. The mold is prepared for ground beam casting. Should apply **Crocodile Admix Mold-O**, release agent for outdoor and sunny work, to prevent evaporation prior to pouring. For indoor use, **Crocodile Admix Mold-W** is recommended.
4. Prevent damage from the underground moisture with **Crocodile Super Shield**, by sprinkling over the lean concrete. Surfaces must be carefully pre-watered prior to **Crocodile Super Shield** application allowing it penetrate deeply into and crystalize inside the concrete to protect the rebar.
5. The concrete must be poured evenly throughout the beam. Vibration spacing must be correct to optimize compression. Then, the concrete is left to dry before removing the mold and subsequent inspection for crack and level.
6. Concrete curing. It is recommended to use **Crocodile Admix Cure** to prevent excessive evaporation in hot or windy conditions, maintaining optimal concrete hydration and preventing cracks.



In case of honeycombs from incomplete pours, especially the load-bearing structure, **Crocodile Repair Mortar** should be used to repair and dress the structural concrete surface, cracks, and deep holes. Can be used to repair overhead or level work.

Precast ground beam

1. The factory-made precast ground beam is placed on the ground column.
2. Build a mold only around the joint between the ground beam and column, coat the inside of the mold with **Crocodile Admix Mold-O**, then pour either **Crocodile GP Grout** or **Crocodile Non-Ferrous, Non-Shrink Grout** that has high compressive strength.



In pouring, it is recommended to use either **Crocodile GP Grout** or **Crocodile Non-Ferrous, Non-Shrink Grout** which does not shrink and is able to maintain high compressive strength. Good for welding joints. On the other hand, welding with normal concrete or cement will result in lower compressive strength which might pose problems for the structure in the future. For normal houses, use **Crocodile GP Grout** which has compressive strength of 800 ksc and rising in one day. Larger structure such as factories should use **Crocodile Non-Ferrous, Non-Shrink Grout** which has compressive strength of over 850 ksc.



Crocodile Admix Mold-O
Oil base mold release agent
For outdoor work,
in windy or sunny conditions



Crocodile Admix Mold-W
Water base mold release agent,
for indoor use.



Crocodile Admix Cure
High-performance concrete Curing Compound
maintaining optimal reaction in the concrete
and reducing cracking problem.



Crocodile Repair Mortar
Structure repair mortar for general work



Crocodile GP Grout
Non-shrinking cement grout
for general work



Crocodile Non-Ferrous, Non-Shrink Grout
High performance non shrink grout with
high compressive strength, good for utility works.

3 Floor



Ground conditions in each area result in different methods for floor construction. After selecting the best method, attention should be paid to casting or bonding to ensure problem-free work upon delivery.

Concrete floor construction may be divided into two types :

- Cast-in-place
- Precast floor construction

Floor construction

Cast-in-place

Major steps are creating the mold for floor casting, tying, and welding the floor's rebar with the column rebar, placing spacers, and then pouring the concrete to join with the upper beam. Casting of the second floor and upward requires bracing under the mold and pouring until the mold is completely full.

1. The ground is prepared by leveling and topping with a layer of sand.
2. The rebar is placed with spacers to prevent it from touching the mold and ground. The rebar is placed around 5 centimeters lower than the concrete surface (after completion) or as required by design to prevent cracks in the concrete.
3. Concrete is prepared. It is recommended to add **Crocodile Admix Proof** to the concrete to reduce water content needed for mixing and surface pores, increase concrete density and improve concrete sealing properties.
4. The concrete is poured over the reinforced area in lines. After pouring the concrete is vibrated to reduce bubbles and honeycombs inside the concrete. Then, the surface is smoothed.
5. After the concrete dries and surface finishing, curing the concrete with **Crocodile Admix Cure** to prevent excessive evaporation, for at least 7 consecutive days.



Precast floor

The precast floor is placed on the reinforced beam and topped with concrete to reduce construction time, as the wooden mold and curing are not needed. Precast floor is suitable for interior areas, and other dry space such as bedroom or living room. This technique is not recommended for exterior or wet areas such as balcony, restroom, or rooftop. Most important, bonding and topping concrete, in which crack must not be allowed to form.

1. The precast floor is laid close together in the shorter part of the beam, as required in the design. The beams' rebar must be tied to increase bonding strength and prevent cracking.
2. Install the rebar, and wire mesh to hold the topping cement and shear load-bearing rebar as required by the construction design.
3. Bond the concrete by pouring **Crocodile Latex** or **Crocodile Acrylic Bondcrete** on the precast floor before topping with concrete while wet, to increase bonding strength, reduce cracking, and increase concrete durability.
4. Pour and vibrate the concrete evenly. After drying, the concrete must be immediately vibrated using the curing agent **Crocodile Admix Cure**.



Crocodile Admix Proof
Concrete mixture with thickening and waterproofing features



Crocodile Admix Cure
High-performance concrete Curing Compound maintaining optimal reaction in the concrete and reducing cracking problem.



Crocodile Latex
Concrete bonding agent



Crocodile Acrylic Bondcrete
Acrylic bonding agent & high strength admixture

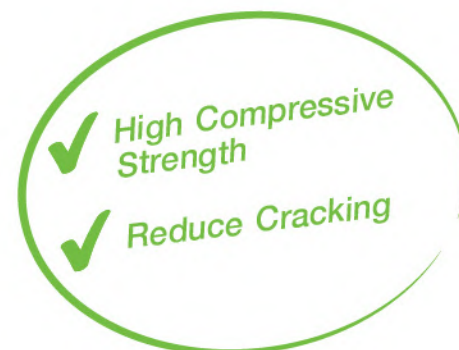
4 Column and Beam



The column is a vertical load-bearing structure that transfer the load from the structure to the foundation. Due to its significance in load bearing, placement of the column must include factors such as usage and load-bearing capabilities of the material.

Construction of the column and beam can be divided into two methods

- In-place reinforced concrete beam and column casting
- Precast concrete beam and column



Construction of the column and beam

In-place column and beam casting

1. Rebar tying and splicing must conform with standards. Appropriate concrete thickness around the rebar is required to prevent rusting. The beam and column must be level, vertically and horizontally.
2. The concrete mold is installed tightly, then coat the mold with **Crocodile Admix Mold-O** that prevent evaporation before outdoor pouring in sunny conditions, or **Crocodile Admix Mold-W** for indoor work that will not leave oil stain on the skin.
3. Pour concrete evenly into the mold to prevent layering. Vibrator can be used to ensure optimal compression. Then, the concrete is left to dry, or the engineer can be consulted prior to mold removal. The column and beam may be inspected for levelness and cracking. If cracks are found, they should be repaired with **Crocodile Repair Mortar**, cement for structural concrete repair that can handle over 500 ksc of compressive force.
4. The concrete is cured with the agent **Crocodile Admix Cure** to prevent excessive evaporation and maintain optimal concrete hydration to prevent cracking. For second floor pouring, after the first floor column is poured, the second floor beam is casted in the same manner as the ground floor beam.



In case of honeycombs due to incomplete pouring, especially in the load-bearing structure such as the beam and column, **Crocodile Repair Mortar** is recommended.

Precast concrete

Precast column and beam is another innovation commonly used in construction of houses, as precast parts can alleviate problems as before such as substandard construction method, unskilled builders, inconsistent ratio, and lack of clear calculation that might cause structural problems like subsidence later on.

1. Precast column and beam are placed on the foundation and ground column.
2. Build a mold only around the joint between the ground beam and column, coat the inside of the mold with **Crocodile Admix Mold-O** before applying Non-Shrink Grout.
3. Pour **Crocodile GP Grout** or **Crocodile Non-Ferrous, Non-Shrink Grout** that has high compressive strength to weld the joint. Non-Shrink Grout can strengthen the joint to avoid problems caused by the normal cement or concrete with lower compressive strength than the precast part. Thus, choosing the correct materials for the job is very important. For normal houses, **Crocodile GP Grout** which has compressive strength of 800 ksc and rising in one day may be used. Recommend **Crocodile Non-Ferrous, Non-Shrink Grout** which has compressive strength of over 850 ksc for larger structure such as factories.



Crocodile Admix Mold-O
Oil base mold release agent
For outdoor work,
in windy or sunny conditions



Crocodile GP Grout
Non-shrinking cement grout
for general work



Crocodile Non-Ferrous, Non-Shrink Grout
High performance non shrink grout with
high compressive strength, good for utility works.



Crocodile Admix Mold-W
Water base mold release agent,
for indoor use.



Crocodile Repair Mortar
Structure Repair Mortar
for General Work



Crocodile Admix Cure
High-performance concrete Curing Compound
maintaining optimal reaction in the concrete
and reducing cracking problem.

5 Waterproofing



Pay serious attention to waterproofing as it helps protect the house from water leak and moisture. It should be done during construction to prevent further problems in the future. Construction of most concrete houses usually include waterproofing work in every part, especially the cellar, ground floor, restroom floor, wall, and rooftop. The ground floor structure with reinforced concrete placed on the ground, separated from the ground and beam structure that support the wall, normally water can seep through the joint between the floor and wall/beam. Thus, the ground floor should be sealed to protect the house from groundwater and underground moisture, especially in high humid areas or near water sources.



Concrete floor pouring

After setting of concrete, coat it with **Crocodile Super Shield** or **Crocodile Perfect Shield** to protect the concrete from water either direct or indirect contact. The waterproofing cement can waterproof all pores in the concrete. Recommend **Crocodile Super Shield** for above-ground areas, but for underground areas such as cellar or retaining wall, **Crocodile Perfect Shield** is more suitable.



Wet areas : In areas with year-round exposure to large volume of water and moisture, waterproofing cement should be applied before tiling to prevent water from seeping to the bottom and causing damage. Use **Crocodile Ecoshield** to waterproof and increase adhesion for the floor and wall before tiling works. In uncovered areas, **Crocodile Flex Shield** is highly recommended.



Crocodile Perfect Shield
Crystalline Penetrate Waterproofing Cement with deep penetration. Waterproof on both sides and resistant against chemicals.



Crocodile Super Shield
Crystalline Waterproofing Coating that crystallizes on the surface. Waterproof on both sides.



Crocodile Flex Shield
Flexible Waterproofing Cement (1 component). One for all areas waterproofing.



Crocodile Ecoshield
Waterproofing Cement Coating (1 component) for tiling works.

TECHNICAL DATA



Crocodile Super Shield
Crystalline Waterproofing Cement Coating



- Blocks pores, capillaries and micro cracks to stop liquid water passage.
- Resists high hydrostatic heads, protects concrete from water borne aggressive chemicals and freeze-thaw damage.
- Sprinkle on the surface and leave to crystallize inside the concrete to prevent moisture from seeping.

Technical Data

Test method	Standard	Evaluation
Water absorption (ml / m ² / second)	BS 1881	0.37
Depth penetrated by microscope		20 cm



Crocodile Perfect Shield
Crystalline Penetrate Waterproofing Cement

- Waterproofing and chemical resistance properties remain intact even if the surface is damaged.
- Penetrates deeply and seals concrete's capillary tracts and shrinkage cracks
- Powerful pressure resistance up to 16 bar with both the positive and negative side
- Completely effective against high hydrostatic head pressure
- Allows concrete to breathe, eliminating water vapor build up and leaving the concrete completely dry.
- Seals cracks up to 0.4 mm
- Non toxic

Technical Data

Test method	Standard	Evaluation
Chemical resistance	ATSM C-627-77	Chemically resistant at pH 3-11
Water absorption (ml./sq.m./second)	BS 1881	0.24
Depth penetrated by microscope		30 cm



Crocodile Flex Shield
One for all areas Waterproofing Cement.



- Easy to use, only water is needed.
- Can be left exposed. Excellent UV.
- for the rooftop, balcony and rooftop garden.

Technical Data

Test method	Standard	Evaluation
Crack overbridging @ 28 days	EN 14891	0.37
Water impermeability positive/negative	EN 14891	1.5 bar/1.5 bar
Water impermeability under head pressure	EN 14891	>1.5 bar
Tensile strength @ 28 days	EN 1348	>2 N/mm ²



Crocodile Ecoshield
Waterproofing Cement Coating (1 Component)



- Easy to use, Just add water
- Non toxic
- High adhesion
- Very cost-effective per square meters.

Technical Data

Test method	Standard	Evaluation
Compressive Strength at 28 Days	EN 1015-11	0.37
Flexural Strength at 28 Days	EN 1015-11	>7 N/mm ²
Tensile Strength at 28 days	EN 1015-12	>1.5 N/mm ²
Water impermeability at 28 Days	DIN EN 1062-3	0.04 kg/m ² .h0.5.
Pull off at 28 days	ASTM D4541	>1.4 MPa



Crocodile Admix Mold-O
Mold Release Oil Base For outdoor, sunny or windy conditions

- Can be used with any concrete mold for easier removal without sticking.
- Good for metal mold as the agent protects it from rust.
- Leaves no stain on the concrete surface.

Technical Data

Test method	Evaluation
Based	Oil-based
Flash point	>80 °C
Specific gravity	0.87 - 0.88



Crocodile Admix Cure
Curing Compound

- Reduce surface shrinkage and cracking
- Enables cement to hydrate more efficiently
- Provides hard wearing surface and prevents dusting
- Time saving, can be applied immediately after placing concrete

Technical Data

Test method	Standard	Evaluation
pH		10 - 11
Non-volatile	ASTM D 2369	9.1%
Loss of water	ASTM C 156	< 1.5 kg / M ²
Drying time	ASTM C 309	17 - 18 min



Crocodile Latex
Concrete Bonding Agent

- Improve adhesive performance
- Lower chance of cracking defects
- Less Carbonation reaction on concrete surface

Technical Data

Test method	Standard	Evaluation
Compressive strength at 28 days	ASTM C348	>6 MPa
Tensile strength at 28 days	ASTM C190	>3 MPa



Crocodile Admix Mold-W
Mold Release Water Base releasing agent For indoor use.

- Can be used on any concrete mold for easier removal without sticking.
- Can be used with 4-8 times the water.
- smooth concrete surface, reduce surface pores.
- Does not rust the metal mold, leaves no stain on the concrete.

Technical Data

Test method	Evaluation
Based	Water Based
Flash point	> 200 °C
Specific gravity	0.898 - 0.908



Crocodile Acrylic Bondcrete
Acrylic Bonding Agent & High Strength Admixture

- Improved cement hydration and bonding properties
- Resistance to impact, moisture, and chemicals
- High flexural strength and bond strength

Technical Data

Test method	Standard	Evaluation
Compressive strength at 28 days	ASTM C109	>28 MPa
Flexural strength at 28 days	ASTM C348	>9 MPa
Bond strength by slant shear at 28 days	ASTM C882	>4 MPa
Tensile strength at 28 days	ASTM C190	>2.5 MPa



Crocodile Admix Proof
Waterproof Admixture

- Reduce permeability and relative water absorption.
- Increase durability and water tightness.
- Increase workability
- Excellent slump retention.
- Chloride free, no effect to steel reinforcement

Technical Data

Test method	Evaluation
pH	7.8-8.9
Non-volatile	1.01-1.02

TECHNICAL DATA



Crocodile Repair Mortar
Structure Repair Mortar for General Work

- High compressive load bearing
- Suitable for 3-40 mm in thickness of repair work (or in higher thickness when mix with dust stone or multiple layers plastering)
- Excellent adhesive performance, suitable for both level and overhead areas

Technical Data

Test method	Standard	Evaluation
Compressive strength at 28 days	ASTM C109	>600 ksc
Flexural strength at 28 days	ASTM C348	>70 ksc
Bond Strength by Slant Shear at 28 days	ASTM C882	>95 ksc



Crocodile Non-Ferrous, Non-Shrink Grout
High Performance Non Shrink Grout

- Extra compressive strength > 850 ksc
- High ultimate strength for grouting structural elements. Can be used under heavy duty machines and infrastructure
- No crack and shrinkage.
- Excellent flow ability with fine aggregate, without bleeding on concrete surface.

Technical Data

Test method	Standard	Evaluation
Compressive strength at 28 days	ASTM C109	> 870 ksc
Bleeding of concrete	ASTM C232	0%
Setting time Initial set Final set	ASTM C807	5 hr 2 min 6 hr 15 min



Crocodile GP Grout
General Purpose Non-Shrink Grout

- General Purpose Grouting to fill narrow or intricate voids of the base for structure including beams, columns, precast reinforced concrete walls, or use to grouting at door frames between walls or in various structural work
- High compressive strength >700 ksc
- Reduces segregation and bleeding
- Excellent flow ability

Technical Data

Test method	Standard	Evaluation
Compressive strength at 28 days	ASTM C109	> 800 ksc
Bleeding of concrete	ASTM C232	0%
Setting time Initial set Final set	ASTM C807	2 hr 33 min 3 hr 5 min

Q & A “House Problems”

Q : What to do if the concrete is damaged or stuck to the mold ?

A : Concrete sticking problems can be solved by coating inside of the mold with mold release agent before pouring. There are water-base and oil-base agents that can make mold release easier. This makes smooth concrete surface, and the mold can be easily cleaned, increasing mold life.

Recommended products : **Crocodile Admix Mold-W, Crocodile Admix Mold-O**

Q : What do we mean by curing concrete ?

A : Let's understand that concrete curing must be aware of to gain proper strength because if the concrete is dehydrated (losing moisture) during curing too quickly, the concrete's strength will decrease and shrink, after which cracks might be formed. Therefore, retaining adequate moisture is very important. Normally after removing the mold, the concrete will be covered in plastic or sack and hosed with water to retain moisture for several days. As this method is not convenient for larger areas, use of curing agent that can slow surface moisture loss. The agent will eventually evaporate by itself thus reducing the need to keep water the concrete.

Recommended products : **Crocodile Admix Cure**

Q : Should do we apply waterproofing before laying parquet on ground floor ?

A : One common problem occurred to the ground floor with surface covering like parquet, tile, or laminated tiles is peeling, due to underground moisture which causes damage to the concrete floor and cause the flooring material peel off. Thus, Flexible Waterproofing Cement is highly recommended to prevent any damages.

Recommended products : **Crocodile Perfect Shield**

Q : The ground column and beam have honeycombs that cannot be fixed with normal cement, not even with the Non-Shrink Grout, what to do ?

A : Repair of the column or beam is critical as they are load-bearing structure. The repairing material must be strong, and cement base is preferable as it can perfectly bond with the original column or beam. In this case, non-shrinking, high-compressive strength grout can be used to repair the structure as it provides good adhesion and can be used for overhead plastering and patching the honeycombs.

Recommended products : **Crocodile Repair Mortar**

House Problem
CHATKay

