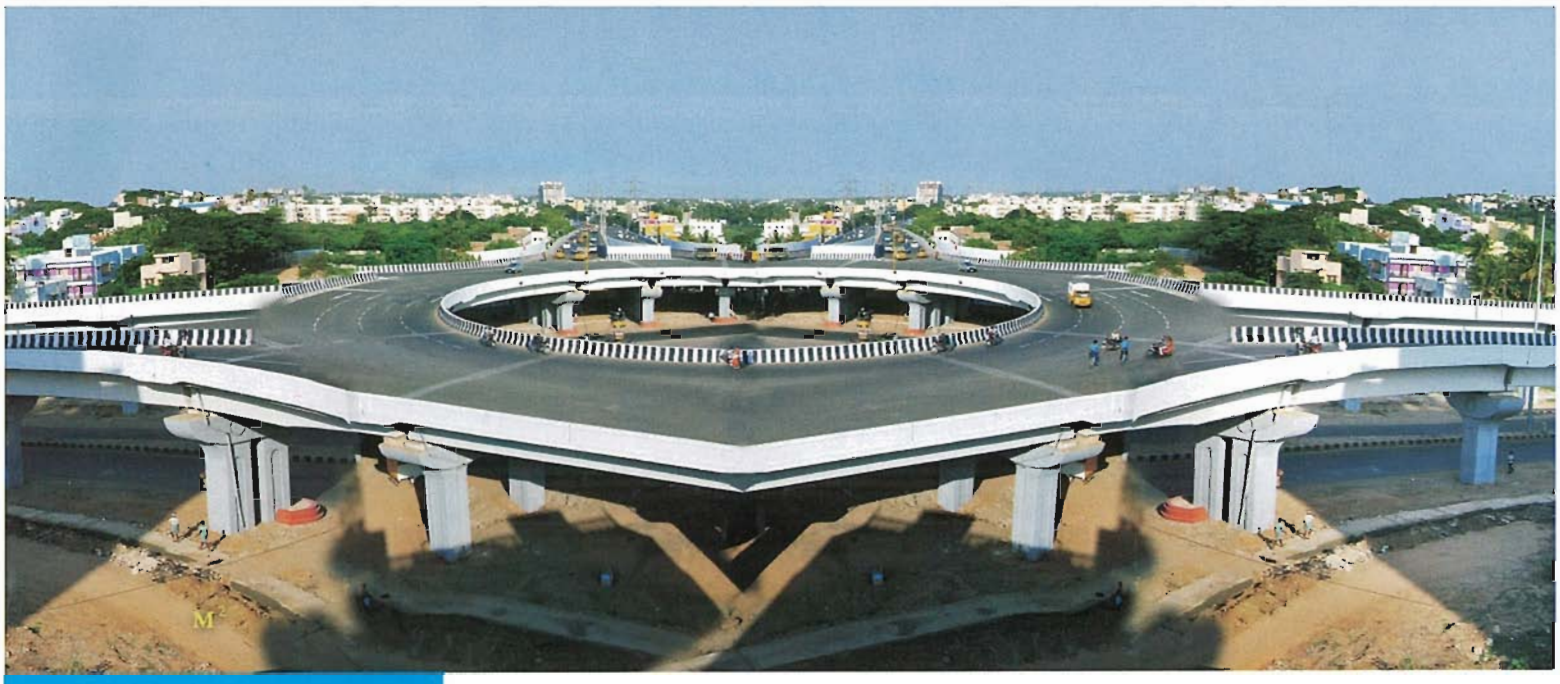


EmceColor - *flex* / BETON*flair*

Acrylic Polymer Modified Elastic Elastomeric, Breathable, Anti-Carbonation, Crack-Bridging, UV Resistant Protective Coating for Concrete

The need for Concrete Coating

Why we should?

Reinforced Concrete is one of the most versatile and widely used construction material on account of its constructability and durability.

It is used in a variety of exposure conditions and can be designed specifically for durability. However in harsher environmental conditions of today and due to extreme requirements of speed, economy and construction practices, it's durability is severely affected.

In almost all cases, lack of adequate cover to reinforcement is the key culprit in deterioration of concrete structures. From material science point of view, the durability of a concrete structure is a direct function of achieving specified cover in terms of dimensions as well as quality. Considering construction practicality, completion deadlines, speed and economy, it becomes virtually impossible to cast specified cover. The outermost layer of concrete therefore becomes the weakest one.

A combination of the porous nature of the concrete and a weak cover lead to diffusion of detrimental materials like water, carbon dioxide, chlorides and sulphur dioxide into concrete where they find easy access to the reinforcement.

These materials or a combination thereof, lead to loss of passivity and corrosion of the steel and ultimately deterioration of the concrete, which leads to weakening of the RCC structure as a whole.

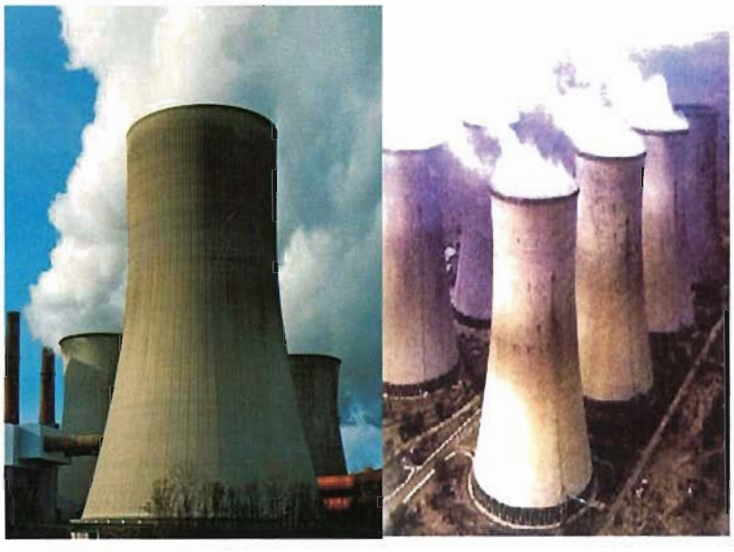
Therefore, the primary need to safeguard concrete is a protective coating that can form a physical barrier against moisture ingress and a chemical barrier against ingress of chlorides, CO_2 and SO_2. Paints and other decorative coatings are designed for aesthetic purposes and normally not for protection of concrete against carbonation, chloride attack, UV radiations and crack bridging properties.

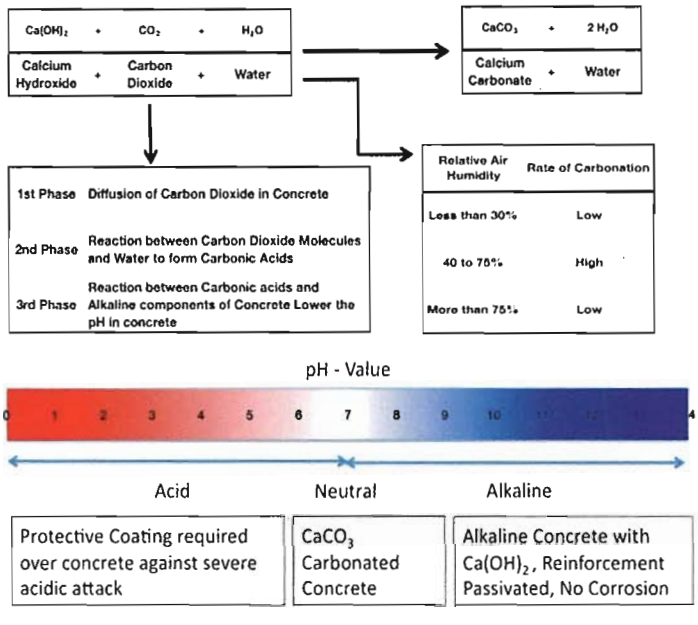
Main reasons for deterioration of Concrete

- Low density/Low thickness reinforcement cover
- Porous nature/wettability of concrete
- Water Ingress through cover
- Diffusion of CO_2, SO_2 and Chlorides into concrete

Solution

- Provide high cover thickness to Reinforcement
- Protect the concrete with a coating (not paint)!
- **EmceColor-Flex/Betonflair** systems will protect your Structure!!





From Unprotected Investment to
Asset Preservation for your Structures

Solutions for Protection of Concrete

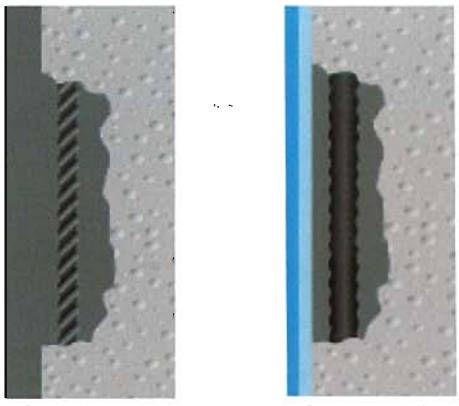
How EmceColor-Flex/Betonflair protect your structure

The main principles in protection of concrete:

A. Set up a cover that is sufficient in density and thickness

OR

B. Leave the cover as it is AND apply a surface protection system



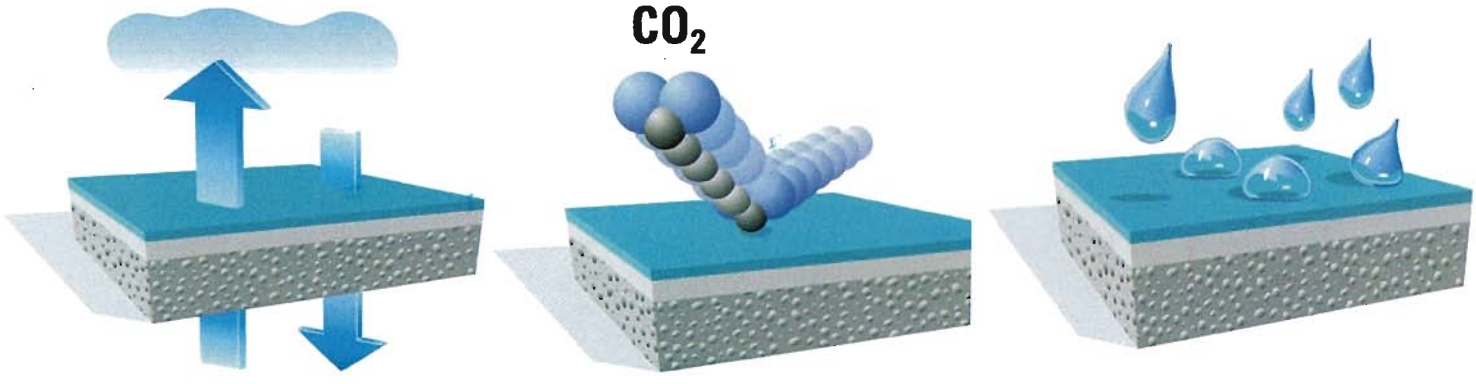
Strategy A Strategy B

Setting up a large concrete cover to reinforcement is time consuming and economically unsuitable. We thus recommend a surface protection system, due to ease of its use into today's hectic construction schedules and economy. It is established that in today's environment, it is detrimental to leave concrete unprotected or coated with 'simple paints' that do not have sufficient protective capacity against harsh environmental pollutants and water.

The need of the hour is to provide a breathable, water resistant, anti-carbonation, crack bridging and UV resistant protective coating that is established in practice. **MC** will fulfill this need for you.

Requirements of a Concrete Protective Coating

It is imperative that coatings to concrete be selected on the basis of protection criteria and not only aesthetics. In today's protection technology, it is possible to judicially combine a protective coating with aesthetics. **EmceColor-*flex*** or **Betonflair** systems from **MC** meet these needs for you. According to international literature the properties, listed and illustrated in the boxes below are most essential for an excellent concrete protection system.



1. Breathability

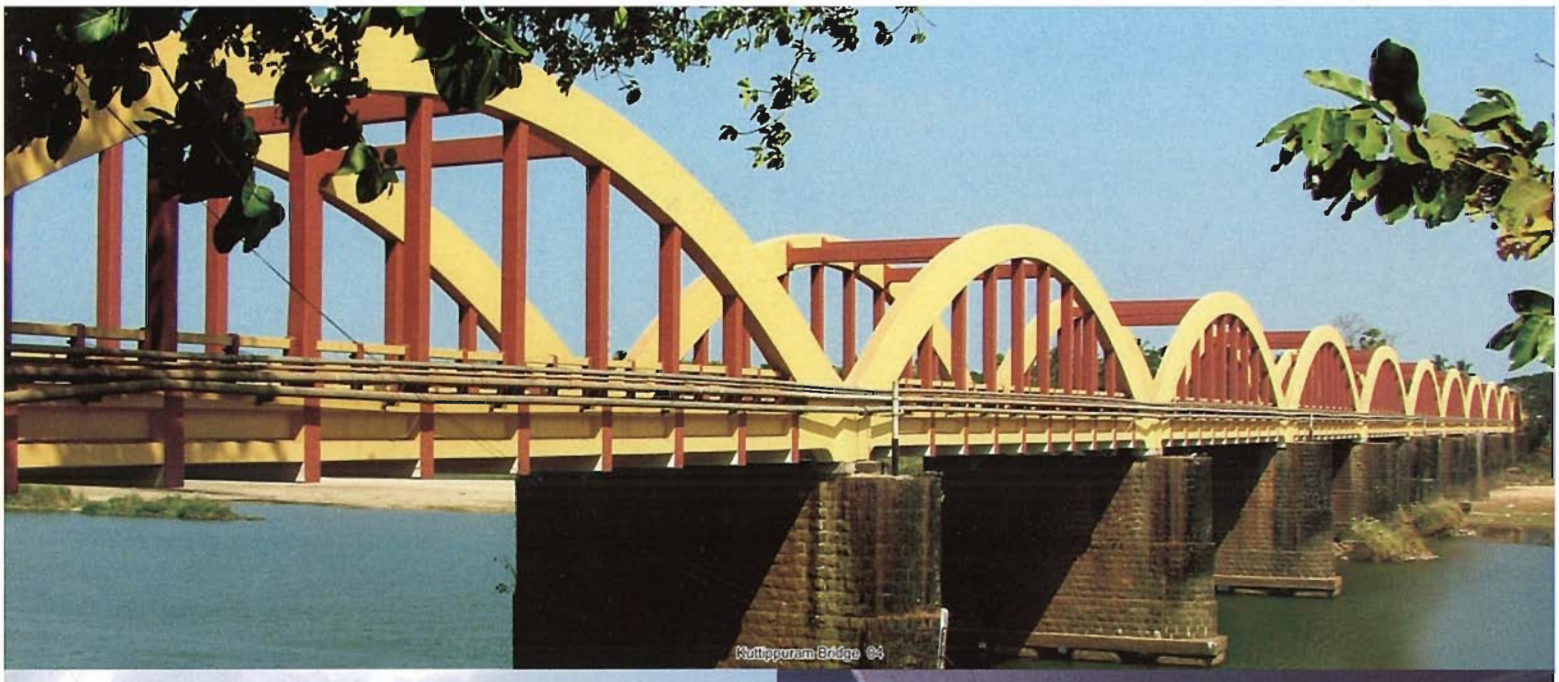
This property enables the water vapour to move in or out of the concrete with the fluctuation of temperature and humidity. This property is essential because, when concrete dries the water vapour tries to escape. This leads to osmotic pressure building up under non-breathable coatings and they eventually debond or peel. Breathability also enhances drying of the internal concrete, arresting corrosion. **Emcecolor-*flex* / Betonflair** provides much higher breathing capacity than most resin based coatings, and thus protects your structure longer.

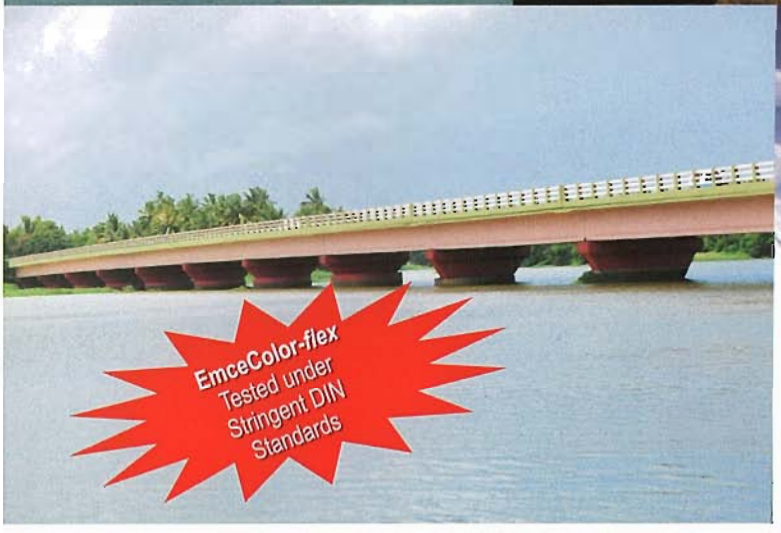
What this means for you is ability to coat concrete in early stages of drying, easy application in varying conditions and no deterioration of coating or structure in the long run.

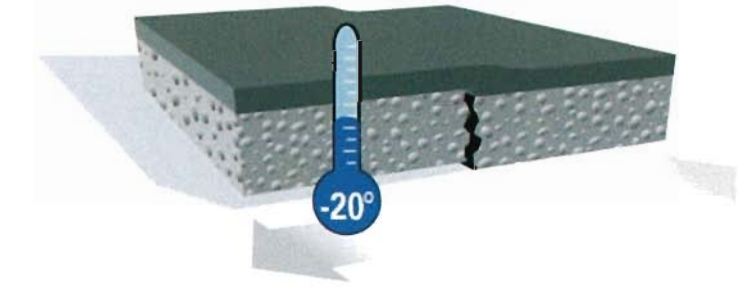
2. Impermeability to Water, CO_2 and gases

Protective coatings should be permeable to water vapour, but impermeable to water. Though these properties look contradictory they must exist complimentarily. Most coatings do posses water-proofing characteristics, but are not breathable. This is the balancing point separating **MC** from normal acrylic waterproofing paints. In addition to water, it prevents ingress of corrosion causing gases into the concrete. Advanced material design from **MC** helps achieve this property.

What this means for you is that **EmceColor-*flex*/Betonflair** provides a sound physical and chemical protection barrier to prevent corrosion in concrete, ensuring durability for your structure.







3. Crack Bridging

This is an important property as the coating should be able to negotiate expansions and contractions in the structure due to temperature or dynamic loads. It should also effectively seal and bridge over cracks, to ensure no water or gases enter concrete through them. Even after extensive weathering, **EmceColor-*flex*** and **Betonflair** show no debonding or cracking at widths upto 0.15mm.

What this means for you is ability to use **EmceColor-*flex*** or **Betonflair** in a variety of static or dynamic loading conditions, in varying exposure conditions and even on old concrete weathered (surface cracked) concrete surfaces.

4. Ultraviolet (UV) rays resistance

For exterior application it is mandatory that the coatings should be UV stable. The effect of sunlight can cause certain polymers to become brittle and lose their physical and chemical properties. Exposure to sun can also leads to fading of pigments and differential discolouring marring the beauty of the structures. **EmceColor-*flex*** and **Betonflair** remain flexible even after exposure to sunlight without degrading.

What this means for you is a stable beautiful protection for your structure in the long run.

Application of EmceColor-*flex*

Ready to use, crack bridging, anti-carbonation protective coating

EmceColor-*flex* Specified, approved, used and trusted for over 15 years

Application

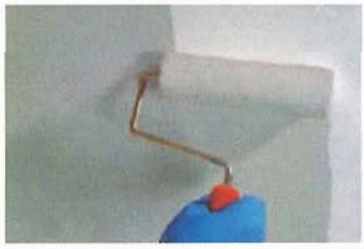
As shown alongside, the complete **EmceColor-*flex* / Betonflair** system consists of:

- Application of fine filler **Nafuquick** to fill surface imperfections
- Application of Primer **Primex 250**
- Application of **EmceColor-*flex*/Betonflair** as protective coating or last stage of repair.

EmceColor-*flex*/Betonflair products are ready-to-use and must be mixed thoroughly before use. Application by roller, airless spraying or by using worm pumps with variably adjustable discharge flows is possible. For spraying application please ask for our assistance.

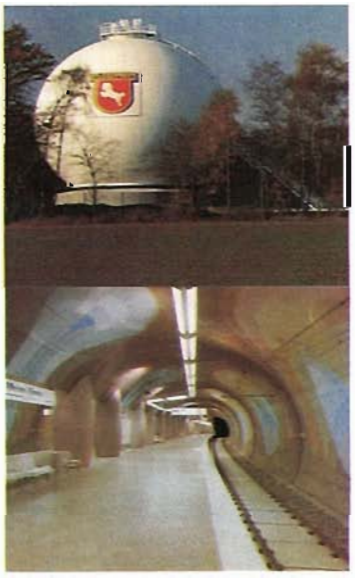
Application must not proceed during rain, high air humidity, frost or frost-threat. Freshly laid layers must be protected from dew, fog, rain and frost.

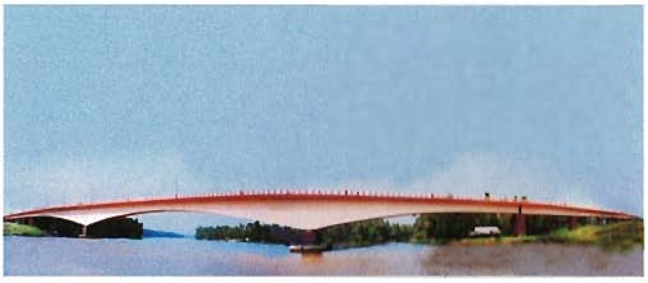
EmceColor-*flex*/Betonflair can be applied in two coats on fine filler Nafuquick. On all other substrates priming with Primex 250 is necessary before application. System build-up as shown in points 1 to 3 is recommended for best results.

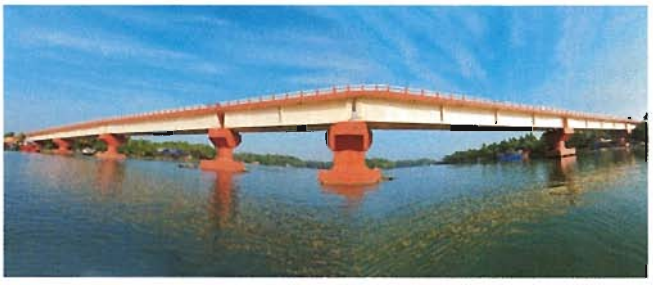


Areas of Application

- Bridge Decks
- Bridge Piers
- Water Tanks (External)
- Chimneys (External)
- Precast Elements
- Cooling Towers (External)
- Water Reservoirs (External)
- Residential Structures (External)
- Commercial Structures (External)
- Parking Structures
- Concrete transportation tunnels







More than 1,500,000 m^2 of Surface Protection – Partial Reference List

Name of Client / Project	Approxmate Area in m^2
Kerala Public Works Dept. National Highways Wing (3 Bridges)	98,200
JJ Bridge, Mumbai Gammon India	100,000
Roads and Bridges Development Corp. of Kerala (RBDCK) (15 Bridges)	127,000
P.V. Narasimha Rao Expressway (HMDA) Hyderabad (Approx. area till 2010) Simplex Infrastructure Ltd	100,000
National Highways Authority of India Chennai (3 Bridges) – STUP Consultants Som Datt Builders-Simplex Infrastructure JV	126,100
Flyovers Mumbai – MMRDA S.N. Bhobe and Assoc. J. Kumar- NCC JV	80,000
Cochin Port Trust Vypeen Bridge Afcons Infrastructure Ltd., Mumbai	55,000
Hebbal Flyover Bangalore Municipal Corporation Gammon India Ltd.	60,000
Pune University Flyover Pune Municipal Corporation Afcons Infrastructure Ltd., Mumbai	60,000
National Highways Authority of India Cochin (Vallarpadam and Aroor-Vytilla) – Soma Enterprises Ltd. And Cheriyan Varkey Const. Co. Pvt. Ltd.	320,000
Railway Bridges Cuttack Orissa	50,000

EmceColor-*flex*

Ready-to-use, crackbridging, pigmented surface protection system

- Water-based pure acrylate.
- Weather and UV-resistant.
- Open to vapour diffusion, Anti-carbonation.
- Applicable by roller or spraying.

Other Concrete Protection solutions from MC

- Zentrifix F 92
- Betonflair W / WS - WG
- Zentrifix Elastic
- Emcephob SX / AC

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