

Reinforced Concrete Bridges

New Construction, Restoration and Protection

PROBLEM (TASK)

SOLUTION

Bridge Deck Deterioration & Protection

Corrosion of reinforcing steel alone, or combined with freeze-thaw, results in delaminations within a concrete deck.
The existing or new deck requires an overlay or asphalt pavement.

Protect the exposed reinforcing steel with *Fibre-Prime* rust proofing. Repair delaminations using a good quality air entrained concrete or *Fibre-Patch*. *Gem-Crete HDO*, thin overlay is applied when the additional weight must be minimized. *Adi-Con CSF (R)* modified concrete is used as a thick concrete overlay. When penetrating sealer is required, use *Gem-Gard*.

Superstructure Deterioration

Insufficient cover, poor concrete consolidation, high water-cement ratio in combination with carbonation and chloride results in corrosion of the reinforcing steel. The expansive rust causes cracking and deterioration of concrete, often aggravated by freeze-thaw action.

Protect the exposed steel with *Fibre-Prime* rust proofing.
Use *Gem-Plast TC* mortar for thin patches and *Fibre-Patch* mortars for thick sections.
Use machine applied *Spray-Con* for larger volume repairs.

Superstructure Protection – Restoration & New Construction

Waterproofing and protection of bridge superstructure is very important in restoration projects. Carbonation and chloride may cause continuing corrosion of the reinforcing steel. The waterproofing and reduction of concrete moisture content reduces corrosion.
In new construction, the waterproofing sealers and coatings extend the life of the structure.
The repair results in uneven surface color and the aesthetics and color become an important consideration.

Sealers are used when minimum cracking is expected. *Rain-Shield Clear* has a limited life; for long-term protection, use *Rain-Shield Stain* alone, or in combination with *Rain-Shield Clear*.
When cracks are expected, the highly flexible *Tuff-Flex* should be used. Its color range enhances aesthetic appearance.
Cement based *Cem-Kote ST* is highly economical and can also be used in submerged conditions. *Cem-Kote Flex Plus* offers a long-term protection of concrete piers (columns) exposed to heavy abrasion by ice.
Gem-Gard MCI sealer system is used to provide long-term corrosion reduction by the use of the migrating corrosion inhibitors.

Product	Use	Deck	Superstructure	New Construction	Restoration
<i>Fibre-Prime</i>	Anti-corrosive coating for reinforcing steel	•	•		•
<i>Gem-Crete HDO</i>	Thin overlay	•			•
<i>Adi-Con CSF(R)</i>	Concrete overlay admixture	•		•	•
<i>Gem-Gard SX, SL & MCI</i>	Penetrating sealers	•	•	•	•
<i>Gem-Plast TC</i>	Thin section restoration (machine or hand applied)		•		•
<i>Fibre-Patch ST & OV</i>	Thick section restoration (hand applied)		•		•
<i>Spray-Con WS & DS</i>	Thick section restoration (machine or hand applied)		•		•
<i>Rain-Shield Clear & Stain</i>	Protective sealer & coating (<i>Stain</i>)		•	•	•
<i>Tuff-Flex</i>	Protective coating		•	•	•
<i>Cem-Kote ST & Flex Plus</i>	Protective coatings		•	•	•

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Associated Companies World-wide

Product Name	Description and Use	Features and Benefits
Fibre-Prime	Brush applied, cement based, corrosion protective coating, containing migrating corrosion inhibitor. It is used to protect exposed reinforcing steel.	<ul style="list-style-type: none"> • Excellent corrosion protection • Excellent adhesion • Simple application
Gem-Plast TC 0-12 mm (0 – ½ in)	Repair mortar used in the thin section repair of reinforced concrete. Hand or machine applied.	<ul style="list-style-type: none"> • Excellent adhesion • Superior workability • Low drying shrinkage
Fibre-Patch 12 mm (1/2 in) and thicker	Hand applied, fast setting fibre reinforced, micro-silica enhanced structural waterproofing mortar for application on horizontal, vertical and overhead surfaces. Also used in grouting types of concrete repairs.	<ul style="list-style-type: none"> • Fast strength • Excellent workability • Superior bonding • Low drying shrinkage
Spray-Con WS 12 mm (1/2 in) and thicker	Spray-applied (shotcrete), fibre reinforced, micro-silica enhanced wet shotcrete for large volume structural rehabilitation and re-profiling.	<ul style="list-style-type: none"> • Structural waterproofing • Low drying shrinkage • Easily pumpable and sprayable
Gem-Gard Sealers	Solvent borne, clear penetrating deck sealer provides protection against chloride and water intrusion. <i>Gem-Gard MCI</i> provides deep corrosion protection using migrating corrosion inhibitors.	<ul style="list-style-type: none"> • Deep penetration • Highly breathable • Stops chloride intrusion
Rain-Shield Sealers and Coating	Solvent and water borne, silane/siloxane penetrating clear sealers used to protect concrete against penetration of water and chlorides. <i>Rain-Shield Stain</i> coating provides long-term protection and color.	<ul style="list-style-type: none"> • Stops chloride intrusion • Long term durability • Carbonation protection • Breathable
Tuff-Flex Flexible coating	Highly flexible, crack bridging, colored coating. Used mainly in restoration projects but also in new construction to provide low temperature crack bridging protection against water, chloride, carbon dioxide and oxygen intrusion.	<ul style="list-style-type: none"> • Highly flexible • Long term durability • Bridges cracks • Breathable
Cem-Kote ST Polymer cement coating	One component, polymer modified cement coating for protection of reinforced concrete structures. Available in cement grey and white.	<ul style="list-style-type: none"> • Excellent protection • Excellent adhesion • Highly economical
Cem-Kote Flex Plus Flexible polymer cement coating	Highly flexible and abrasion resistant Portland cement based coating combines flexibility and durability, even when continuously submerged in water and when exposed to ice abrasion.	<ul style="list-style-type: none"> • Highly abrasion resistant • Protection against flowing ice • Ice abrasion protection
Gem-Crete HDO 12 mm (1/2 in) and over	Fibre reinforced , silica fume enhanced mortar is used as highly abrasion resistant waterproofing overlay (finished surface) in protection of existing concrete bridge decks.	<ul style="list-style-type: none"> • High abrasion resistance • Thin • Chloride intrusion protection
Adi-Con CSF (R) Concrete admixture	Silica fume (micro-silica) based admixture for concrete, provides low permeability, chloride penetration and water resistant concrete overlay.	<ul style="list-style-type: none"> • High durability • Resistance to chloride penetration • Low drying shrinkage

Contact Gemite's Technical Service for diagnostics and specification assistance

Gemite Group has extensive experience in the repair, maintenance and protection of concrete structures. Gemite Group offers effective and economical solutions, including technical support, material selection and site support worldwide through its network of associated companies.