

S L U T I O N S

PROJECT:

Rehabilitation of North and South Dams, South Africa

OWNER: NCP Chlorchem

YEAR: 2011-2012

The Details

PROJECT CONTRACTOR:

Hindle Mason Projects

PROJECT ENGINEER:

BKS (subsequently acquired by AECOM)

MARKET/ENVIRONMENT:

Chemical Processing Dam Walls

SUBSTRATE:

65 Year Old Concrete (Constructed in 1945)

PRODUCTS USED:

Five Star Structural Concrete[®], Five Star[®] Grout and Five Star[®] Waterproofing

SIZE OF PROJECT:

- Five Star Structural Concrete[®]: 3 cubic meters
- Five Star[®] Grout: 5 cubic meters
- Five Star[®] Waterproofing: 5,200 square meters

The Challenge – Repair severe corrosion of buttress design dam structures that were originally constructed in 1945.

The Solution – A full survey was conducted of the structures revealing severe aggregate exposure and corrosion of reinforcement resulting in the development of significant cracks and spalls. There were also areas of excessive leaks.

The repair methodology adopted was to stop any flowing water utilizing a foaming Polyurethane and then permanently sealing the cracks by epoxy crack injection. Spalled areas were then repaired using either the **Five Star Structural Concrete[®]** or the **Five Star[®] Grout** depending on the size and severity of the area to be repaired. The entire structure was then coated with a migratory corrosion inhibitor to reduce and slow down further corrosion of the reinforcement. Finally, **Five Star[®] Waterproofing** was applied to prevent further carbonation and penetration of contaminated water.

BEFORE REPAIRS



AFTER REPAIRS



FIVE STAR
Specified by the World's Best™

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FIVE STAR STRUCTURAL CONCRETE®

Fast, High Early Strength Permanent Repair

PRODUCT DESCRIPTION

Five Star Structural Concrete® is a high early strength, single component, permanent concrete repair material. Five Star Structural Concrete® produces a repair which is dimensionally stable, develops an integral bond to existing concrete, and restores structural integrity within hours of placement. Application thickness can range from 1/4 inch to 12 inches (6 mm to 300 mm) in a single pour. Five Star Structural Concrete® provides increased corrosion protection of steel reinforced structures with migrating corrosion inhibitor technology and very low chloride ion permeability. Moisture sensitive coatings can be applied in 8 to 24 hours.

ADVANTAGES

- Single component for reliability and ease of use
- High three-hour strengths
- Very low chloride ion permeability
- Fast turnaround times with high 3-hour strengths
- High bond strength
- Coarse aggregate extension
- Very low shrinkage
- Excellent freeze/thaw resistance
- One product for thin and thick placements
- Outstanding corrosion resistance for protection and rehabilitation

USES

- Repair of concrete structures
- Rapid machinery foundation rebuilds
- Fast repairs for coatings
- Concrete floor repairs and overlays
- Construction joint repair
- Marine and hydraulic structure repairs
- Repair of tanks, sumps and curbs
- Available for Nuclear Safety Zone Applications¹

FIVE STAR® GROUT

High Performance Precision Non-Shrink

PRODUCT DESCRIPTION

Five Star® Grout is the industry's leading cement-based, nonmetallic, non-shrink grout for supporting machinery and equipment. It is formulated with Air Release technology that combines high performance with the greatest reliability. When tested in accordance with ASTM C 827, Five Star® Grout exhibits positive expansion. Five Star® Grout meets the performance requirements of ASTM C 1107-02 Grades A, B and C, ASTM C 1107-07, and CRD-C 621-93 specifications for non-shrink grout over a wide temperature range, 40 °F - 90 °F (4 °C - 32 °C).

ADVANTAGES

- Air release technology per ACI 351.1 R
- 95% Effective Bearing Area (EBA) is typically achieved following proper grouting procedures
- Provides placement versatility: pour, pump or dry pack
- 45-minute working time
- Permanent support for machinery requiring precision alignment
- Does not contain gas generating additives, such as aluminum powder
- Non-shrink from the time of placement

USES

- Grouting of machinery and equipment to maintain precision alignment
- Non-shrink grouting of structural steel and precast concrete
- Grouting of anchors and dowels
- Support of tanks and vessels
- Available for Nuclear Safety Zone Applications¹

FIVE STAR® WATERPROOFING

High Performance Waterproof Coating

PRODUCT DESCRIPTION

Five Star® Waterproofing is a polymer-modified cementitious waterproofing material that creates a rigid barrier which resists very high water pressures in both positive and negative side applications. This high performance coating is self-curing for greater reliability and has excellent resistance to the penetration of chloride ions. Five Star® Waterproofing is applied in one coat by trowel, or in a multi-coat brush application.

ADVANTAGES

- Effective on negative and positive side
- Excellent resistance to chloride ion penetration
- Self-curing
- Trowel or brush applied

USES

- Concrete and masonry surfaces
- Vertical and horizontal applications
- Base for moisture-sensitive coatings
- Elevator/escalator pits
- Foundations
- Manholes
- Vaults
- Tanks

FIVE STAR® SERVICES

- Design-A-Spec™ engineering specification assistance
- Technical on-call center with field and project experienced staff
- Field support representatives for on-site consultation
- Corporate research laboratory available to customize products for unique applications

For worldwide availability, additional product information and technical support, contact your local Five Star® licensee, distributor, local sales representative, or you may call the Five Star Products' Engineering and Technical Service Center at 1-800-243-2206 (from the U.S.) or +1 203-336-7900 (outside the U.S.).

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¹Compliant with NRC 10CFR50 Appendix B and ASME NQA-1 Quality Programs



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