



Solutions for Marine Construction





Products, Service and Support across Asia Pacific and around the world

Master Builders Solutions is a leading supplier to marine facilities for all construction, rehabilitation and upgrading projects – container ports, harbors, jetties and wharfs as well as the associated onshore buildings and all types of infrastructure

Whether the need is for repair to critical structures or the control and prevention of concrete deterioration due to reinforcement corrosion, Master Builders Solutions has the solutions to maintain and extend the life of your assets. Providing large scale protection of concrete in new construction, precision grouting for the installation and alignment of port side crane rails, Master Builders Solutions experts and products support the industry's requirements cost effectively, reliably and sustainably.

Master Builders Solutions offers a full range of products that enable fast return to service in refurbishment projects, or reduced construction programmes in new construction without sacrificing performance. Master Builders Solutions are represented globally, and we work to ensure that you will have local support, regardless of project location. An organized, dedicated, networked team of professionals make it easy to find solutions on every continent.





Master Builders Solutions more than a Century of Experience

For more than a century Master Builders Solutions has served the needs of owners, operators, designers and contractors involved with construction and maintenance of marine facilities and structures

- **Concrete repairs to Marine Structures reducing maintenance downtime**
- **Corrosion control to extend the service life of reinforced concrete**
- **Durable grouts under extreme loads supporting valuable equipment**
- **Chemical and abrasion resistant finishes for maintenance-free flooring**
- **Protective coating systems for secondary containment areas**
- **Strengthening and crack injection solutions to reinstate structural integrity**
- **Waterproofing to maintain water quality and reduce water loss**
- **Admixture solutions to improve workability and enhance durability of reinforced concrete**





Corrosion control to extend the service life of reinforced concrete

Over time, aggressive environmental influences result in deterioration and corrosion of reinforcing steel. This compromises the durability and negatively affects the service life of structures and buildings in a marine environment. Technologies from Master Builders Solutions are available to protect concrete, and prevent corrosion of the reinforcing steel in these harsh environments. Understanding the corrosion process and addressing the fundamental cause of the deterioration is key to providing a long-term solution.

Solutions for

Pile encapsulation

MasterBrace

A system consisting of a marine grade FRP jacket combined with a highly flowable epoxy grout provides a long lasting protective encapsulation of concrete, steel and wooden piles. The **MasterBrace** Advanced Pile Encapsulation System prevents ingress of waterborne chlorides and other contaminants and reduces the available oxygen at the surface which effectively provides a reduction in the corrosion potential in the reinforcing steel and protects steel and wooden elements.

Protective treatments

MasterProtect

The **MasterProtect** system offers a complete range of concrete protection products, including liquid, surface applied migrating corrosion-inhibitors, embedded galvanic anodes, latex and epoxy-modified anti-corrosion coatings for rebar, as well water repellents, protective coatings. The Master Builders Solutions experts connect with customers to identify the best products to use for extending concrete life, and restoring original aesthetics and design function.





Mina Zayed, Abu Dhabi UAE

Project details

Repair and corrosion protection of existing jetty wall

Owner:

Abu Dhabi Port Authority

Project approval Consultant:

Abu Dhabi Port Engineering Department

Contractor:

Dicotect, Abu Dhabi

Project Year:

2006

Products used:

MasterEmaco S466

MasterProtect 8000 CI



Product selector

	Applications			
	Protective coating	Hydrophobic impregnation	Corrosion control	Pile encapsulation
MasterProtect 8065/8105/8150			✓	
MasterProtect 8000 CI			✓	
MasterProtect H 1100		✓		
MasterProtect 300	✓			
MasterProtect 1818	✓			
MasterProtect 1812	✓			
MasterBrace 6000 UW				✓
MasterBrace 6061 UW				✓
MasterBrace 6063 UW				✓



Concrete repair and protection to reduce maintenance downtime

Master Builders Solutions experts work collaboratively with owners, designers and contractors to complete durable, high quality concrete repairs of marine structures, onshore infrastructure and buildings.

Diagnosing the underlying cause of deterioration and developing a clear repair strategy ensures the right products are used to gain long term structural integrity. Our comprehensive product systems include solutions for structural and surface repairs, strengthening, crack repair and sealing, bonding, and coating.

Solutions for

Structural and surface repair

MasterEmaco

A full complement of cementitious and epoxy modified products are available to meet the unique demands of marine structures. Formulated to be wet or dry spray applied, formed or hand troweled, the **MasterEmaco** line of products ensures long term durability in vertical, horizontal and overhead installations and provides additional features such as fast return to service, temperature tolerance (both high and low), fiber reinforcement and corrosion inhibition.

Concrete protection

MasterProtect

The **MasterProtect** system offers a complete range of concrete protection products, including liquid, surface applied migrating corrosion-inhibitors, embedded galvanic anodes, latex and epoxy-modified anti-corrosion coatings for rebar, as well water repellents, anti-carbonation and chemical resistant coatings. The Master Builders Solutions experts connect with customers to identify the best products to use for extending concrete life, and restoring original aesthetics and design function.





Mumbai Port Trust: Jetty Repair

Project details

Restoration of jetties at Jawahar Dweep and Pirpau

Owner:

Mumbai Port Trust

Project approval Consultant:

Indian Institute of Technology, Bombay

Contractor:

M/s SCC – S&P (JV)

Project Year:

2013

Products used:

MasterEmaco S 810

MasterBrace FIB 230/200



Product selector

	Applications										
	Steel reinforcement primer / bonding agent			Repair					Protection		
	Active protection	Zinc-rich sacrificial	Bonding agent	Structural	Non-structural	Large surface area	Crack repair	Pile encapsulation	Coating	Impregnation	Corrosion control
MasterEmaco P 130		✓									
MasterEmaco P 5000	✓		✓								
MasterEmaco P 157			✓								
MasterEmaco S 5400					✓						
MasterEmaco N 5100					✓	✓					
MasterEmaco N 5200					✓	✓					
MasterEmaco S 466				✓	✓	✓					
MasterEmaco S 902 UW				✓							
MasterFlow 788				✓		✓					
MasterInject 1315							✓				
MasterBrace ADH 2200							✓				
MasterProtect 8065/8105/8150											✓
MasterProtect 8000 CI										✓	✓
MasterProtect H 1100										✓	
MasterProtect 300									✓		
MasterProtect 135									✓		
MasterProtect 1818									✓		
MasterProtect 1812									✓		
MasterBrace 6000 UW								✓			
MasterBrace 6061 UW								✓			
MasterBrace 6063 UW								✓			



Structural strengthening and crack repair to extend structures' service life

With the corrosion of reinforcement and the subsequent reduction in cross section, the service load capacity of a structure is severely affected. In new construction projects, the demands to build complex marine structures quickly can lead to inadequacies in curing or concrete mix design causing cracking or poor placement of the reinforcement. Technologies from Master Builders Solutions are available to repair and strengthen concrete in both new construction and refurbishment projects.

Solutions for

Crack repair

MasterInject

Where the structural integrity of concrete has been compromised, epoxy adhesives, injection resins and bonding agents fill and seal cracks and voids that have occurred from corrosion or damage during seismic activity and physical impact. The epoxy- and polyurethane-based **MasterInject** products are easily injected into the crack to penetrate the structure, filling the cracks to re-establish the load bearing capacity and structural integrity. Various formulations meet specific performance criteria.

Structural strengthening

MasterBrace

The **MasterBrace** composite strengthening system is a proven method to restore capacity of concrete structure loss due to deterioration, upgrade load bearing capacities, correct design deficits, and for seismic retrofit. This innovative fiber-reinforced polymer composite system is supported by Master Builders Solutions experts who provide specification and design assistance, contractor training and on-site testing.





Stonecutters Bridge, Hong Kong

Project details

Construction of new bridge across Rambler Channel
Hong Kong

Owner:
Hong Kong Highways Department

Project approval Consultant:
ARUP

Contractor:
M/s Maeda-Hitachi-Yokogawa-Hsin Chong (JV)

Project Year:
2009

Products used:
MasterInject 1315
MasterBrace 2200



Product selector

	Applications			
	Structural strengthening	Wet crack repair / sealing	Construction joint sealing	Crack injection
MasterSeal 901		✓	✓	
MasterInject 1315				✓
MasterBrace 2200		✓		✓
MasterBrace 4000 (Adhesive)	✓			
MasterBrace Laminate	✓ (Flexural)			
MasterBrace 4500 (Saturant)	✓			
MasterBrace Fiber	✓ (Confinement)			



Precision grouting to support valuable equipment under extreme loads

Master Builders Solutions full range of precision cementitious and epoxy grouts, including high early strength formulations, are used as the vital link between crane rails, critical equipment, bridge bearings and the foundation, providing total bearing and dynamic load transfer and resistance to maintain alignment even under severe impact, torque and vibrational loads.

Formulated to meet the most demanding requirements, Master Builders Solutions grout products provide stable volume, ease of placement, high strength, controlled set times, as well as chemical, sulfate and corrosion resistance. Master Builders Solutions for grouting are used in many different applications in marine construction, including:

- Crane rails
- Tank bases
- Post tensioning ducts
- Offshore oil & gas structures
- Pumps and motors
- Conveyer supports
- Precast elements and bearings

MasterFlow

The **MasterFlow** product line includes precision cementitious and epoxy grouts that are engineered to provide a stable foundation for critical equipment. The Master Builders Solutions brand draws on more than a century of experience, and **MasterFlow** grouts have a proven track record. Respected for consistent, reliable performance, backed by the support of a global network of Master Builders Solutions experts, **MasterFlow** grouts are specified on marine structures and near shore building projects throughout the world.

Cementitious grouts

Master Builders Solutions supports equipment and plant all over the world with **MasterFlow** cementitious mineral and metallic aggregate grouts. Different products within the range allow for reliable, non-shrink performance at consistencies of fluid, flowable, plastic or dry pack.

Master Builders Solutions cementitious grouts provide:

- Extended working time
- Wide temperature range
- High strength
- Fluid consistency for easy placement
- Harden free of bleeding, segregation, or settlement shrinkage

Epoxy grouts

MasterFlow epoxy grouts are three component grouts consisting of a two-part resin and high performance blended aggregate. Different products within the range provide solutions for traditional, high flow, anchor bolt, chock grouting and repair applications.

Master Builders Solutions Epoxy Grouts provide:

- High early and ultimate strength
- Good chemical resistance
- Bond to steel and concrete
- Excellent bearing area for even distribution of loads





Gorgon Project, Australia

Project details

Grouting of liquefaction train modules

The Gorgon Project is operated by an Australian subsidiary of Chevron and is a joint venture of the Australian subsidiaries of Chevron (47.3 percent), ExxonMobil (25 percent), Shell (25 percent), Osaka Gas (1.25 percent), Tokyo Gas (1 percent) and Chubu Electric Power (0.417 percent).

Products used / Quantity:

- MasterFlow 870 (cementitious)
- MasterFlow 815 (cementitious)
- MasterFlow 648
- MasterFlow 622
- MasterFlow 628



Product selector

	Applications				
	Precision grouting	Wind turbine grout	Post tensioning duct grouting	General purpose grouting	Anchor grout
CEMENTITIOUS					
MasterFlow 870	✓				
MasterFlow 871	✓ (Deep pours)				
MasterFlow 810				✓	
MasterFlow 880	✓ (metallic aggregate)				
MasterFlow 816			✓		
MasterFlow 700				✓	
MasterFlow 9500		✓ (Offshore)			
MasterFlow 9300		✓ (Onshore)			
EPOXY					
MasterFlow 648	✓				
MasterFlow 410				✓	
MasterFlow 935					✓
MasterFlow 915					✓



Waterproofing to maintain water quality and reduce water loss

Master Builders Solutions offers waterproofing solutions for many types of complex structures in a marine environment. From the foundations to the roof of a warehouse building, in storage silos, water retaining tanks, or the superstructure of a jetty or wharf, Master Builders Solutions products have proven reliability on projects around the world.

Solutions for

Water storage and structures

The waterproofing of silos and tanks, which store water for critical operations is necessary to maintain water quality, ensure water availability and avoid water loss by leakages or other construction damages. Master Builders Solutions offer includes a range of resin-based and cementitious waterproofing membranes, as well as complementary joint sealants, to improve durability and extend the service life of the structure.

Secondary containment

Environmentally hazardous chemicals and liquids are frequently stored in a port facility. Master Builders Solutions understands the critical nature of secondary containment and offers high performance solutions for waterproofing of concrete used in these applications. Highly efficient and effective elastomeric membranes provide the desired protection properties, while also ensuring chemical resistance and superior durability.

MasterSeal

The **MasterSeal** product family for waterproofing includes polymer-modified, polyurea, polyurethane, epoxy and cementitious membrane solutions. With benefits such as spray or hand application, quick cure for reduced downtime, crack-bridging properties, high elasticity and resistance to abrasion, these products improve the durability and service life of structures and water retaining tanks. **MasterSeal** sealants are used to ensure complete protection on surface and internally sealed joints; even in areas with high chemical resistance requirements.





Dry docks waterproofing, Dubai

Project details

Waterproofing of Dry Dock walls

Owner:
Dubai Dry Docks

Applicator:
Dicotech Dubai

Project Year:
2000

Products used:
MasterSeal 550



Product selector

	Applications				
	Tanks / water retaining structures	Wet areas / unexposed roofing	Below grade	Traffic decks / roofs exposed and unexposed	Cracks / joint detail
CEMENTITIOUS					
MasterSeal 540	✓	✓			
MasterSeal 551	✓	✓			
MasterSeal 555	✓	✓			
MasterSeal 561		✓			
MasterSeal 501/502			✓		
POLYMER BASED					
MasterSeal HLM 5100			✓		
MasterSeal M 800			✓	✓	
MasterSeal M 881				✓	
MasterSeal M 820				✓	
MasterSeal Tapes					✓
MasterSeal 910/921					✓
MasterSeal 930					✓
MasterSeal 901					✓
MasterSeal 909					✓



Industrial flooring to provide durable, cost-effective and safe solutions

Materials used in marine environments and associated industrial facilities create a number of challenges for flooring. Applications such as wet process areas, tanker loading bays, and secondary containment have requirements for broad spectrum resistance to acids, alkalis, oils, and solvents. Anti-static properties are necessary in areas of organic powders or gases where there is risk of explosions. And the ability to withstand high impact, abrasion and elevated temperatures is common.

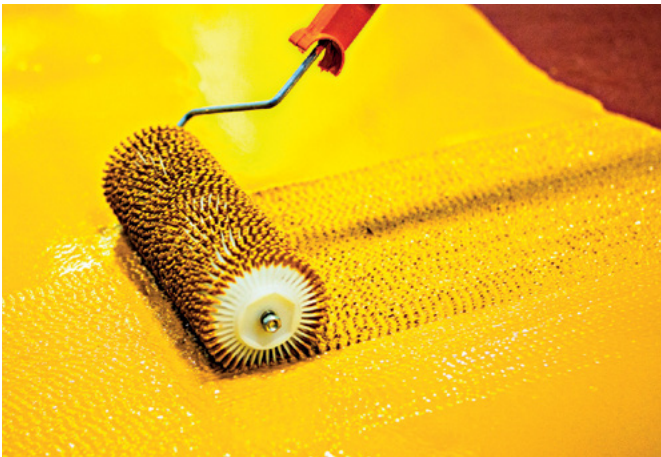
Flooring solutions for industrial facilities

Ucrete

Ucrete uses unique polyurethane resin technology that gives floors exceptional resistance to aggressive chemicals, extreme mechanical and thermal shock, providing a long-term, durable flooring solution.

MasterTop

The **MasterTop** product family is a group of versatile dry shake, cementitious, epoxy and polyurethane-based flooring systems that are suitable for industrial uses in a diverse range of applications.





Chia Tai Food processing facilities in Qinhuangdao and Qingdao Plant, China

Project details

High performance flooring system for new food processing facilities

Owner:

Chia Tai Food

Location:

Qinhuangdao and Qingdao plant

Project Year:

2014

Products used:

Ucrete MF

Ucrete UD 200



Product selector

	Applications						
	Dust-proofer	General purpose floor topping	Abrasion resistant floor hardeners	Abrasion resistant toppings	High performance floor topping	Heavy duty floor toppings	Impact resistant floor toppings
MasterTop 300			✓				
MasterTop 330				✓			
MasterTop 1110	✓						
MasterTop 1230		✓					
MasterTop 1324					✓		
Ucrete MF					✓		
Ucrete IF						✓	✓



Admixtures solutions to improve workability and enhance durability of reinforced concrete

The extreme demands of a marine environment call for concrete that can withstand attack from aggressive conditions, sea water as well as damage from wave action and vessel impact. The Master Builders Solutions brand offers the widest range of admixtures available from a single source to improve concrete durability and contribute to a longer service life for structures and infrastructure. Increased concrete productivity, workability and performance are achieved by utilizing the latest Master Builders Solutions technologies.

Solutions for

Enhanced placement

MasterEase

High-range water-reducing admixture for superior rheology and rheology retention

MasterGlenium

High-range water-reducing admixture for applications where slump retention, high early strengths and durability are required and for use in hot and cold climates.

MasterPolyheed

Non-chloride mid-range water-reducing admixtures formulated for superior workability and finishing.

MasterSure

Workability-retaining admixtures featuring a new generation of polymers that provide slump retention in concrete without affecting setting times or early strength development.



Improved performance and durability

MasterSet

Accelerating admixtures modify the setting time of concrete according to specific project needs, and hydration control products offer stabilization where concrete will be hauled long distances.

MasterLife

Durability-enhancing admixtures provide resistance to deterioration caused by abrasion, corrosion of steel, alkali silica reaction, sulfate attack, and drying shrinkage cracking.

MasterFiber

Fiber products introduce crack control and extend the service life of concrete.

Green Sense Concrete

A concrete designed by Master Builders Solutions that has been quantified by third parties to show a reduction in environmental impact, while still meeting the engineering requirements of the project.

Smart Dynamic Concrete

Concrete which has been designed to have self-compacting properties based upon MasterMatrix admixtures.

Master X-Seed

A unique crystal seed hardening system that improves the concrete strength development even at temperatures as low as -20°C / 5° F.



Penang Second Bridge, Malaysia

Project details

Construction of the longest bridge in South East Asia

Owner:

Government of Malaysia,
Malaysian Highway Authority

Concrete Producer:

Unipati Concrete Sdn Bhd

Contractor:

United Engineers Malaysia
China Harbour Engineering Company

Project Year:

2013

Products used:

MasterBrace 1441
MasterGlenium SKY 8705
MasterGlenium ACE 8589
MasterPozzoloth RT 100
MasterKure 128
MasterFinish 222
MasterRheobuild 1000M
MasterEmaco S 5400
MasterEmaco S322
MasterInject 1333
MasterEmaco P 5040





Master Builders Solutions for the Construction Industry

MasterAir®

Complete solutions for air entrained concrete

MasterBrace®

Solutions for concrete strengthening

MasterCast®

Solutions for the manufactured concrete product industry

MasterCem®

Solutions for cement manufacture

MasterEase®

Low viscosity for high performance concrete

MasterEmaco®

Solutions for concrete repair

MasterFinish®

Solutions for formwork treatment

MasterFlow®

Solutions for precision grouting

MasterFiber®

Comprehensive solutions for fiber reinforced concrete

MasterGlenium®

Solutions for hyperplasticized concrete

MasterInject®

Solutions for concrete injection

MasterKure®

Solutions for concrete curing

MasterLife®

Solutions for enhanced durability

MasterMatrix®

Advanced rheology control solutions for self-consolidating concrete

MasterPel®

Solutions for water tight concrete

MasterPolyheed®

Solutions for high performance concrete

MasterPozzolith®

Solutions for water-reduced concrete

MasterProtect®

Solutions for concrete protection

MasterRheobuild®

Solutions for superplasticizes concrete

MasterSeal®

Solutions for waterproofing and sealing

MasterRoc®

Solutions for underground construction

MasterSet®

Solutions for retardation control

MasterSure®

Solutions for workability control

MasterTop®

Solutions for industrial and commercial floors

Master X-Seed®

Advanced accelerator solutions for pre-cast concrete

Ucrete®

Flooring solutions for harsh environments

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