Rhino Linings Industrial Presentation




Menu

Rhino Linings®
PREMIUM PROTECTION

Menu (continued)

Rhino Linings®
PREMIUM PROTECTION

Rhino Linings – The Company

- Rhino Linings Australasia Pty (RLA) is a part of a global company consisting of a network of over 2000 Independent Dealers and Approved Applicators operating in 80 countries around the world
- Since 1988 Rhino Linings (30 years of operations) has been providing superior spray applied solutions for impact, abrasion, corrosion and containment problems
- Rhino Linings has manufacturing and technical support centres around the world. Our ISO9001 testing laboratory in USA ensures we remain at the leading edge of product development. RLA is also ISO9001 certified
- Rhino Linings manufactures their chemical products and equipment requirements for Australia and Asia from its facilities in the Gold Coast, Queensland, Australia

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Rhino Linings – The Company (continued)

Rhino Linings has developed spray applied polymer products specifically for waterproofing, drinking water tank linings, industrial tank liners, thickener tanks, channel linings, ponds, dams and secondary containment applications.

- Impermeable to water and sea water
- Range of chemical resistance
- Potable water approved
- Wet area membrane approved
- Seamless
- Spray applied to any thickness in one application

The following list of Projects covers the generic family of protective coatings from Rhino Linings Australasia Pty Ltd. There is a range of Polyurethane and Pure Polyurea applications that demonstrate what can be done with either product.

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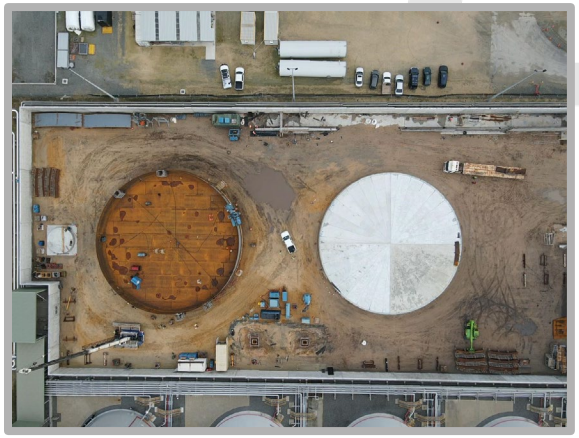
Protection of Fertiliser Holding Tanks

Extending the Lifespan of Industrial Assets

ARC's (www.australianresincoatings.com) biggest project to date! 45 tonnes of Rhino Linings chemical resistant HiChem 1170 utilised to coat and protect these two 19,301,945 litre steel tanks (24m high, 16m radius) against corrosion from liquid fertiliser.



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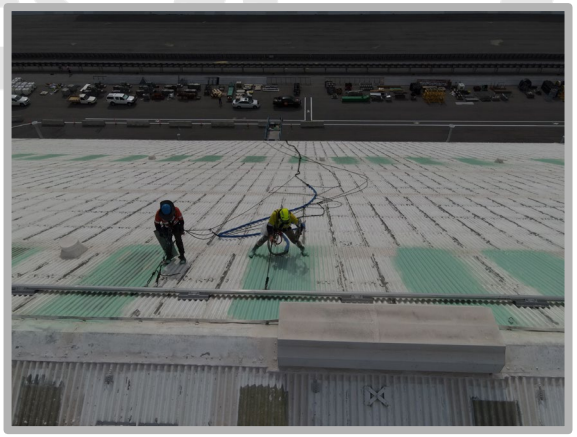
Refurbishing Deteriorating Sky Lights

Industrial Skylights Stronger than New

When you need industrial strength coatings, look no further. ARC (www.australianresincoatings.com) extended the life of 400 industrial fibreglass skylights in the 10000m2 CBH Grain Terminal roof in Rockingham, WA, utilising Rhino Linings products. An awesome product not only used for truck linings but anything else needing long life protection.



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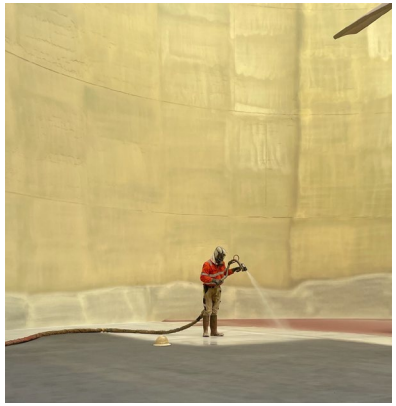
Protection of New Gold Leach Tanks

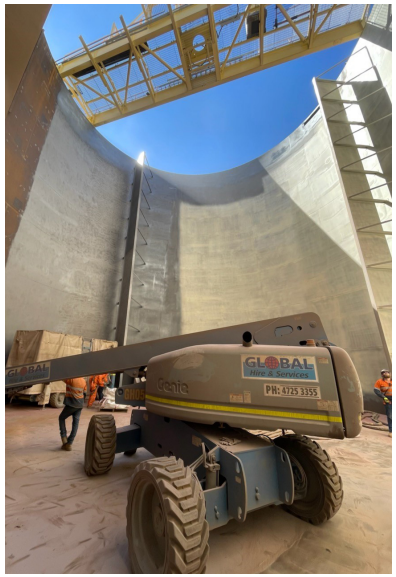
The coatings were applied to six new Gold Bearing slurry steel tanks 18.5mtr diameter by 20m high which amounted to over 10,000m2 of surface area.

The tanks were abrasive blasted to 2.5 class followed by RhinoPrime 251 & then had Rhino PP1195 applied to a thickness of 5mm.

The machinery used included 2 x Blast 1 Mega Blasters & 2 x Graco Reactor 2 EXP 2 Plural spray units.

The reason that Rhino PP1195 was the choice of product is that over the years Ravenswood Gold have had existing old tanks that were deteriorating repaired with Rhino PP1195 Pure Polyurea and has stood up to the abrasive harsh environment for many years.





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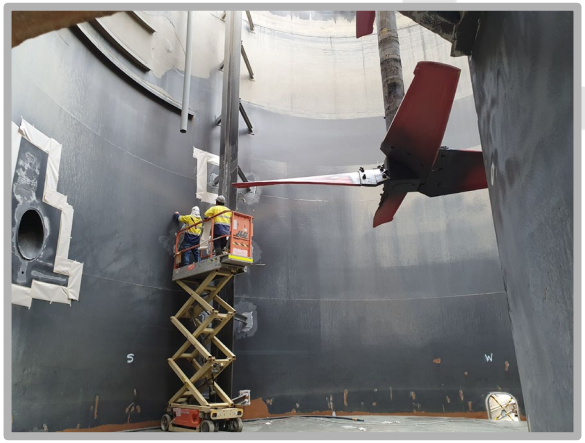
Refurbishment of Gold Leach Tanks

Prolonging the Life of Tanks

Here's how a professional refurbishment of Gold Leach Tanks gets done. The Applicators applied Rhino Linings PP1195 Pure Polyurea System to protect the tanks from further abrasion. Due to the fast cure time of the Rhino System the client was up and running with minimal downtime.



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5000+m2 RAAF Airbase Containment

Sealing Existing Concrete Bund

To meet Environmental Protection Agency guidelines the RAAF investigated options to seal the existing concrete bund of this AVTUR fuel farm. After careful consideration Rhino Linings PP1195 was chosen to provide a seamless, impermeable lining that was capable of bridging cracks & withstanding substrate movement. Being spray applied and seamless the Rhino Linings membrane easily seals around pipes and support structures.

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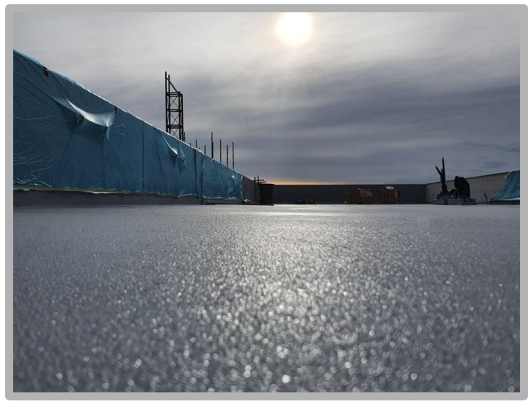
Waterproofing Quest Apartments - WA

Water Ingress Problems Solved

Quest Apartments needed a superior waterproofing membrane with a long warranty period for the flat roof top of the Quest serviced apartment complex. The Applicator was able to offer and then install a premium quality spray applied polyurethane water-proofing membrane that was backed by Rhino Linings Australasia. The client was so impressed by the result that they won another prestigious project QUEST Ascot).

The client will have peace of mind knowing they will not have to worry about having any water ingress from the roof for years to come.



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Sea Water Tank Lining - WA

Paspaley Pearls, Broome, Western Australia

The replacement of a failed drop-in liner with Rhino Linings protective coating systems, potable water approved, seamless membrane. Tank had concrete ring beam and earth floor. Geotextile sheet used to provide new floor for spray application. RhinoPrime 251 primer was used on the blasted steel walls for this application.

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Potable Drinking Water Tank

Imaluk Remote Community, Northern Territory

The replacement of a failed drop-in liner with Rhino Linings protective coating systems, potable water approved, seamless membrane. Tank had concrete floor with bolted panel tank attached directly to the floor. Mechanical surface profiling was carried out because remote location precluded blasting. The primers used on this application were: RhinoPrime 251 on the steel walls and RhinoPrime SP150 on the concrete floor.




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Potable Drinking Water Tank

Tiwi Islands Remote Community, Northern Territory

The replacement of a failed liner with Rhino Linings protective coating systems, potable water approved seamless membrane. Tank had a bolted steel floor. Mechanical surface profiling was carried out because remote location precluded blasting.

RhinoPrime 251 was the specified primer for this application.

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Remote Water Transfer

Coliban Water, Victoria

The repair and restitution of heritage listed open water channels (both concrete and dirt based) using Rhino Linings protective coating systems, potable water approved seamless membrane, with and without Geotextile. There was limited use of Rhino primers on this application due to Geotextile being the primary substrate application. RhinoPrime SP150 epoxy primer was used for all concrete surfaces.

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Remote Water Transfer

Barwon Water, Victoria

The repair and restitution of a 950m long water channel (both concrete and dirt based) in the Otway Ranges, Victoria, using Rhino Linings PP1195 Pure Polyurea, potable water approved seamless membrane, with and without Geotextile.

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Lihir Gold Mine

Lihir Gold Mine, Lihir Island Pacific Ocean - North of PNG

Rhino Linings completed the supply and fit of Rhino Linings PP1195 Pure Polyurea to various structures. The CCD required the coating of the rake arms and support arm of the deflector cone, along with the inside feed well, as shown in the photos. The CCD tank operates at approximately 700°C, with low pH, and is only available for repairs on a complete shutdown. The rake arms are coated to 3mm DFT, with 10mm DFT on the bottom of the rakes. The deflector cone is coated with 3mm DFT of Rhino Linings PP1195, while the support arms are coated with 10mm DFT of Rhino Linings PP1195. RhinoPrime 251 was the primary adhesion enhancing primer used during this coatings program.

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Thickener Tank Surface Protection

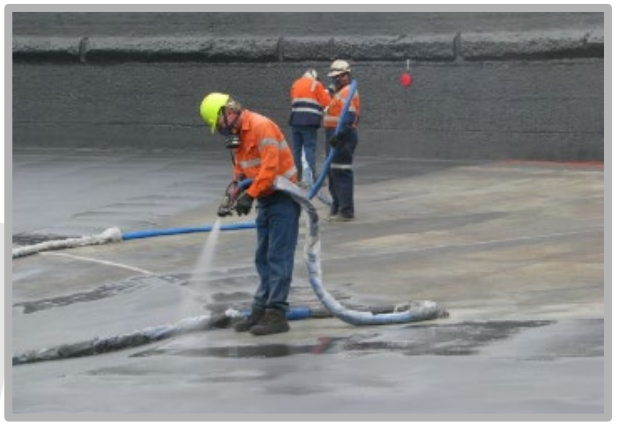
BHP Nickel Mine - BHP Billiton, Kalgoorlie, WA

This thickener tank is over 60 meters in diameter. The aggressive chemicals and abrasive materials in the nickel slurry were eroding the base structure. Rhino Linings PP1195 Pure Polyurea was applied at 5-6mm thick and significantly improved:

- Slurry flow
- Slurry mixing
- Tank floor surface wear

This coating can be easily repaired without removing the total membrane

- RhinoPrime SP150 epoxy primer was used in all concrete surfaces and RhinoPrime 251 was applied to small amount of steel components used in the construction of this structure.



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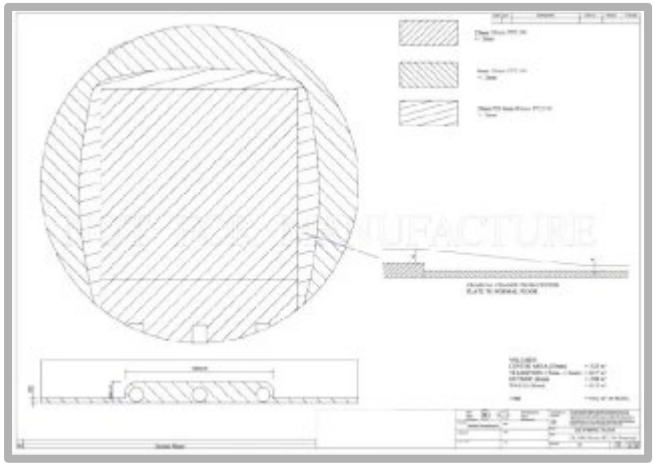
Slurry Tank Surface Protection

TK1000 Slurry Tank Olympic Dam, South Australia

This slurry steel tank has to cope with the aggressive slurry's associated with the recovery of radioactive material from this mine. Rhino Linings PP1195 Pure Polyurea, was selected as the preferred coating for this application and was applied at up to 25mm DFT. So far, the steel tank has remained protected at each shutdown inspection.



The Primer used in this application was RhinoPrime 251.

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Tank Repair & Relining

Moura Coal Mine, Queensland

Moura Coal Mine has 3 large bolted panel tanks for water storage. The internal liners on all the tanks have failed and corrosion had set in. The first of the 3 tanks was inspected to API653 and assessed as recoverable. Corrosion on sheet and bolts was removed, bolts replaced, then blasted and primed prior to the application of RhinoGuard 2185 Polyurethane.

This application late in 2012 saved the mine from having to replace the complete tank. The primer used was RhinoPrime RL315 for the primary substrate and RhinoPrime 251 for day joints.

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WWTP Inlet Works Rehab & Relining

Goulburn Valley Water, Mooroopna

This WWTP Inlet Works had deteriorated badly. H2S gas had attacked the concrete and after water pressure cleaning & neutralising, revealed severely exposed aggregate. Rhino Linings Bendigo used a cementuous grout specified by the WWTP Operator to rebuild the substrate, then primed the substrate with RhinoPrime SP150 Primer and sprayed 3mm of RhinoChem 2170 chemically resistant Polyurethane to the rebuilt surfaces including stainless steel “fences” at the base of the inlet.
This rehabilitation work was completed in 3 days and has now been back in operation for over 12 months.

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Chemical Storage Bund

Veolia Water, Bendigo, Victoria - Bund - Aqueous Ammonia and Sodium Hypochlorite

Veolia is a major player in the Australian Water and Wastewater treatment market. They installed a new Aqueous Ammonia storage tank and required a premium bund membrane. RhinoChem 2170 chemical resistant Polyurethane was selected and applied @ 3mm DFT for the tank facility.

Because of the success of the Aqueous Ammonia bund, Rhino Linings RhinoChem 2170 was also selected for the Sodium Hypochlorite tank and bund system that was installed latterly. Both systems function daily and are easy to maintain and show excellent resistance to chemical attack. RhinoPrime SP150 was used in this application.

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Mining – Heavy Machinery

Protecting Cab Floors

"We chose to install this (Rhino TUFF STUFF Polyurethane) as our preferred flooring due to the durability and hard-wearing nature of the product. The cab floors are easily cleaned and unlike cabs where rubber flooring is used there are no issues with smell and build-up of dirt under the rubber flooring where over time the rubber swells and becomes a trip hazard for operators."

Aaron Banes
Product / Technical Support Drill Rigs Australia

RhinoPrime 251 was used in this application

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Mining – Heavy Machinery

Bard Engineering, Queensland
Manufacturers of mine site refuelling tankers

Bard Engineering specified Rhino Linings TUFF STUFF be applied to the under guards of these large vehicles to protect against corrosion and chemical attack. RhinoPrime 251 was used in this application.

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Impact & Corrosion Protection

Protecting Mining Equipment

Many Cat and Komatsu heavy vehicles have had their fuel and hydraulic tanks, plus underguard areas protected by Rhino Linings TUFF STUFF Polyurethane. This coating of about 4-5mm DFT gives exceptional impact protection and total corrosion protection for these mine site vehicles. RhinoPrime 251 is used extensively as the base primer on these applications.

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Critical Chemical Containment

Orica Cyanide Factory Floor
Gladstone, Qld

This project was a result of an urgent requirement to eliminate any possibility of cyanide waste products leaching into the factory subsoil.

The project involved surface preparation of 6,500sqm of concrete, expansion joints and construction joints followed by the application of a 3mm coating of Rhino Linings PP1195 Pure Polyurea.

Several Rhino Primers were used in this application. They were RhinoPrime SP150 for concrete and RhinoPrime 251 for steel grates, grills and access hatches.

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Concrete Protection

Eastern Treatment Plant - Carrum Downs, Melbourne, Vic

This coating project involved the surface preparation and coating of transfer tunnels and open channels prior to the fitting of odour control sealing panels to the complete treatment works.

The project meant working on a live sewer and all the associated difficulties required to blast, surface prep, prime and coat the channel concrete above the low waterline with Rhino Linings PP1195 Pure Polyurea.

ArmaFloor AF300 ECO Epoxy was used as the primer for this application.

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Primary Containment

Water Storage Reservoir

Tweed Shire Council, NSW

This very large potable Water storage Reservoir required a full external / internal steel repair program, along with major floor leakage issues being dealt with in 2014.

External / Internal steel walls were blasted and painted by Rhino Linings Dalby, while the internal floor ring beam and segmented floor joints were treated with new joint filler and completely bridged/encapsulated with Rhino Linings PP1195 Pure Polyurea to ensure positive sealing of the tank floor.

RhinoPrime SP150 was used on the concrete and RhinoPrime 251 was used on all steel substrates for this application.

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Corrosion & Impact Protection

Hydrate Stockpile Facility Rio Tinto - Gladstone, Qld

This very large Hydrate Stockpile facility at Rio Tinto, Gladstone required a durable, abrasion/impact resistant and flexible protective coating for the inner steel wall piles and concrete ring beam.

External (paint)/Internal (Polyurea) steel pile walls and concrete were blasted and coated by Rhino Linings Dalby, using a prescribed paint system (external) and Rhino Linings PP1195 Pure Polyurea (internal).

RhinoPrime RL315 was used in this application.

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So, What is Polyurethane & Polyurea?

Uses & Applications

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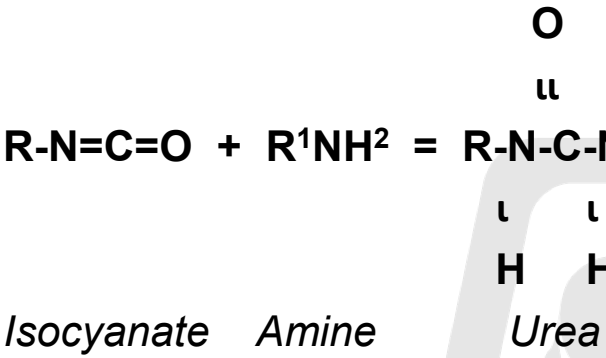
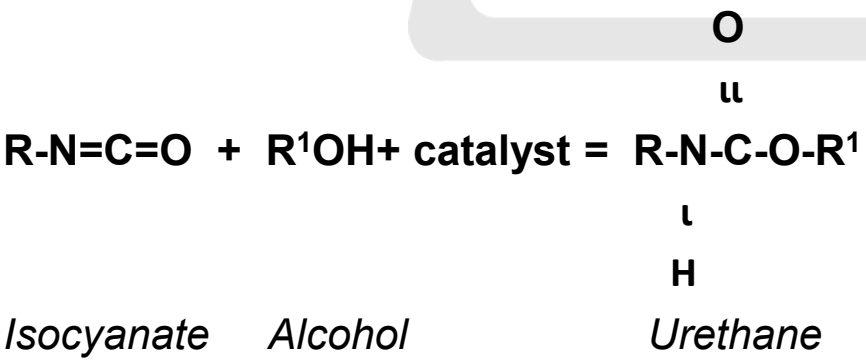
Polymer Potentials

Formulation of Pure Polyurea Linkage



Formulation of Polyurethane Linkage



These coatings are sometimes referred to as “snap cure” and usually are two component liquid coatings.

- **Pure Polyurea** *(least effected by weather conditions during application)*
- **Hybrid Polyurea** *(Polyurea and Polyurethane)*
- **Polyurethane***(most effected by weather conditions during application)*

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Polymer Potentials (continued)

Advantages of Pure Polyurea

- Very fast “snap” cure 3 –8 seconds (Rhino Polyurethane snap cure is 15 to 25 sec)
- Can be sprayed on a slope or vertical up to 6mm thick with no sags or runs
- Foot traffic can resume within 30 seconds on horizontal surfaces
- No included Polyurethane in formula unlike many non-Rhino Linings products

Weather Conditions can Affect Application

Relatively Insensitive

- Moisture
- Temperature

Weather Variations

- High Humidity
- High Temperatures
- Low Temperatures

Little Effect on Adhesion

- High Humidity
- High Temperatures
- Low Temperatures

Polymer Potentials (continued)

Spray polyurea was first used in the Alaska Pipeline due to its weather insensitivity during application (-29ºC)

Common Uses

- Concrete
- Earth and Dike to stop leaks
- Drinking Water Tanks (potable water certificate)
- Water Treatment Plants
  - ✓ Incoming dirty water – outgoing drinking water
  - ✓ Gas attack in sealed storage areas

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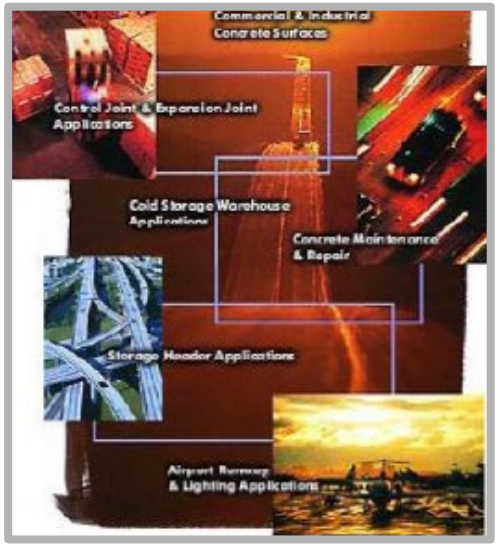
Polymer Potentials (continued)

Boston Big Dig

Used extensively throughout the airport, tunnel, approaching roads and more..

- Coating concrete surfaces
- Maintenance & repair
- Cold storage warehouse applications
- Airport runway
- Control joint and expansion joints



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Polymer Potentials (continued)

San Mateo Bridge - California, USA

The San Mateo–Hayward Bridge links the San Francisco Peninsula with the East Bay. It is over 9.6km in length and the 25th longest bridge in the world. Over 302,000m2 of polyurea coating was used for corrosion protection on the bridge.

Epoxy Primer applied to concrete girder

Polyurea being applied to concrete girder

Colour stable polyaspartic coating

Polyurea applied to concrete deck plate

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Polymer Potentials (continued)

Sydney Harbour Bridge Road Deck

The iconic Sydney Harbour Bridge underwent a major road maintenance project. Completed ahead of the structure's 80th anniversary on March19 2012, the works involved the application of a pure polyurea waterproofing system from a European supplier.

The project aimed to prevent rainwater damaging the structural elements of the bridge, including the concrete bridge deck and steel support structure. The pure polyurea supplier partnered with an experienced local contractor from Sydney to ensure the waterproofing application was delivered within a very tight schedule, minimising service downtime on this high traffic roadway.

The bitumen road was then laid over the waterproofing membrane.

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Polymer Potentials (continued)

Rhino Linings Proof of Safety

Flammability

ASTM D635 – Rhino Tuff Stuff Polyurethane, FAR 25-853, Rhino Extreme 1150FR (A) – Rexar MD95-15FR Polyurethane

Potable Water Certificate

AS/NZS 4020:2005 Testing of products for use in contact with drinking water. The following Rhino Linings products are approved:

Rhino TUFF STUFF Polyurethane

RhinoGuard 2185 Polyurethane

Rhino PP1195 Pure Polyurea

Rhino Hi-Chem 1170 – NSF/ANSI 372

Waterproof

Membrane Class II – AS4858-2004 Wet Area Membrane Test – Rhino PP1195 Pure Polyurea

Membrane Class III – AS4858-2004 Wet Area Membrane Test – Rhino Tuff Stuff Polyurethane

Surface Resistant (Anti-Static) – AS/NZS 60079.0.2019 – Rhino Extreme 1150 FR (A)

Polymer Potentials (continued)

Coating Thickness

- 100% Solids
- No solvents
- Therefore no volatiles (VOC) to evaporate
- Dry film thickness usually 2mm – unlimited

Thinner Films are not Available

- 0.15mm and above can be achieved
- Special guns (Gusmer GX-8, Glas-Craft LS)
- Flat tip instead of round tip
- Speed and distance

Polymer Potentials (continued)

Formulation Can Affect

- Flexibility – soft or hard elastomerson cure
- Different colours
- Aromatic or Aliphatic
- Surface texture: Smooth or non-skid
- Adhesion
- Chemical resistance
- Elongation
- Impact resistance and absorption

Polymer Potentials (continued)

Lessons Learned

- Polyurea must be applied onto a clean substrate
- Polyurea must have a good deep profile for adhesion (Steel Class 2½, 50-70 micron and Concrete ICRI 3 to 5 profile)
- If a profiled substrate is not obtainable, a thin coat, .0250 -.0500mm of primer, usually having an adhesion promoter in the formulation. Epoxy or Polyurethane Primers are preferred.
- For pre-treated substrates like galvanising, a whip blast followed by a solvent clean and .0250 -.0500mm of primer, usually having an adhesion promoter in the formulation is recommended.

Epoxy v's Polyurea

Epoxy

- Long cure time (overnight)
- Solvents present (VOC usually)
- Not always 100% solids
- Dry film thickness (DFT) is less (thin)
- Requires multiple coats to build DFT
- Heavy application traps solvents
- Shrinks on cure
- Surface tension sensitive
- Moisture sensitive
- Less algae resistance
- Not UV resistant
- High odour
- Sprayed by conventional airless gun

Polyurea

- Snap cure (3-10 seconds)
- Trafficable within minutes
- Short cure times to 90% strength (3-4hrs)
- No solvents present (No VOCs)
- 100% solids
- Dry film thickness heavier (2mm - unlimited)
- Single coating thick DFT possible
- No solvent entrapment
- Elastomeric properties reduce shrinkage on cure.
- Much less surface tension sensitivity
- Much less moisture sensitive (especially Pure Polyurea)
- Better algae resistance
- Aliphatic is UV resistant
- Low odour
- Sprayed by plural component gun

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Polyurea Potentials

Polyurea Coatings Combine Extreme Application Properties

- Rapid cure (even at low temperatures <0ºc)
- Insensitivity to humidity (especially Pure Polyurea)
- Exceptional physical properties –high hardness, flexibility, tear strength, tensile strength, chemical and water resistance
- Good weathering and abrasion resistance
- 100% solids (no VOC –meets strictest regulations)
- Effective in area such as corrosion protection, containment, membranes, linings and caulks.

Polyurea Potentials (continued)

Why have Polyurea Coatings not been Exploited in Typical Epoxy Coating, HDPE or Flexible Lining Applications?

- Spray polyurea technology has only been developing over the last 20 years (equipment development for two component snap cure materials). Rhino Linings was at the forefront of this development before Graco became the pre-eminent machine supplier.
- Previously polyurea materials were only used in reaction injection moulding (RIM) automotive applications.
- The Alaska pipeline that was applied many years ago and Rhino truck bed linings have enabled the markets for spray polyurea coatings and its application equipment to be developed and commercialised.
- Epoxy coatings have a long track record that has led to some complacency
- HDPE (and other flexible sheet linings) are presented as a cheap coating but can be very labour intensive (hidden cost) and extremely difficult to repair once failure has occurred.

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The Future

Rhino Linings offer superior solutions for the liquid containment industry using spray applied Polyurethane and Polyurea proprietary formulations, combined with innovative substrate preparations

- Spray applied
- Seamless, can be applied to any thickness in one applications
- Instant set – reduces downtime
- Superior flexibility to accommodate substrate movement
- Superior adhesion to a wide range of substrates
- Follows the shape of the substrate to be coated
- Excellent abrasion resistance
- Excellent chemical resistances
- Can be applied at remote locations
- Easy to maintain, clean and recoat if required

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