

LIFETIME WATERPROOFING AND PROTECTION FOR STRUCTURAL CONCRETE

RADCON[®]
FORMULA#7



CAR PARKS
SITE REFERENCES

RECENT SITES OF INTEREST 2006

Radcrete Pacific presents: Trafficable Areas



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FIGURE 1.

Top level of the Ferrara Plaza car park waterproofed with RADCON #7

RADCON Formula # 7 protecting the ground breaking shopping complex in Portugal – FERRARA PLAZA.

The latest RADCON #7 application in Portugal was a car park area of the new "Commercial Theme Centre" – the Ferrara Plaza Shopping complex.

The project began in November 2006 and is the most significant construction in the Pacos de Ferreira region, from a communal perspective.

This entertainment and leisure centre will feature 130 stores, Carrefour hypermarket, 5 cinemas and a 1,400 space car park already waterproofed with RADCON Formula #7.

Thanks to the expertise of Exigencia e Estrategia, this mega complex is another entry on the high profile site reference list in Portugal.

SITE DETAILS:

COUNTRY	- Portugal
PROJECT NAME	- Ferrara Plaza
DEVELOPER	- Martifer Group
APPLICATOR	- Coala
SIZE	- 6,000 sq mtr

This 60 million Euro investment will feature a unique and ever changing display of furniture, design and decoration, representing the region's biggest industry. Its doors are due to open in August 2007.



SHOPPING CURITIBA, BRAZIL

Location: Curitiba, Brazil
Builder: Irmaud Construtora SA
Size: 3,000 square metres
Applicator: Lienge Netherland

As emerging markets like Brazil develop and stabilise, companies like Radcrete can make inroads in providing specifiers, builders and owners with new and reliable ways to waterproof concrete. A recent project was the Shopping Curitiba Centre in the city of Curitiba in the State of Parana

approximately 400 kilometres South West of Sao Paulo.

Curitiba is rapidly becoming a significant industrial centre in Brazil with several new greenfield car manufacturing plants and growing wealth.



FIGURE 8 - ROOFTOP

Radcon #7 was applied to 3,000 square metres of flat concrete rooftop of which most was critical areas directly above the Food Hall. The roof has no fall lines and has

clusters of starter bars to allow for upward extensions in the future. These can be seen in Figure 8 encapsulated in the black pyramids. These starter bars created a detailing challenge to the applicator ~ Lienge Netherland. Being up to the task, Mr Luiz Hollanda successfully pond tested the site after application to the satisfaction of the client and builder.



FIGURE 9 - SHOPPING CURITIBA, BRAZIL

NORWAY GAOL, NORWAY

Location: Ringerike Kretfengsel, Norway
Owner: Statsbygg
Architect: Torstein Ramberg AS
Engineer: Berdal Stromme
Building Admin: Kare Hagen AS
Main Contractor: Veidekke ASA
Applicator: Minihaller AS

This is a new prison outside the Norwegian city of Oslo. Radcon #7 was utilised to protect the top of the wall from the freeze/thaw damage. The Norwegian climate is very severe on concrete with freeze-thaw damage causing early deterioration. The prison wall is 1.1 kilometre long.

This is a very high security prison and is expected to house mainly international criminals, potentially people who commit crimes against humanity such as War Criminals.



FIGURE 10 - NORWAY GAOL



FIGURE 11 - RADCON #7 APPLICATION

RADMYX LIFETIME WATERPROOFING FOR THAI BASEMENT

Owner: First National Family Co Ltd
Main Contractor: K Tech Construction & Engineering Co Ltd
Architect: Palmer & Turner (Thailand) Ltd
Engineer: Meinhardt (Thailand) Co Ltd
Applicator: Radcon (Thailand) Co Ltd
Product: Radmyx Slurry – 3,000 Sqm

The use of crystal growth slurry and sprinkle systems is proving popular in the Thailand construction market.

Radmyx – Radcrete's specially formulated crystal growth for waterproofing below-grade structures – is enjoying wide acceptance and being specified in an ever-increasing number of projects.

Here Radmyx is being applied as sprinkle coat to the basement floor slab at the time of the concrete pour for this new commercial complex.

The detailing work required all construction joints contain Volclay RX, bentonite waterstops.

In addition, all joints were coated with Radmyx slurry prior to casting the adjoining concrete.

The end result is an efficient waterproofing system that is an integral part of the structural concrete. It will not de-bond and will be effective for the life of the structure.

The slurry coat was applied to the walls at 0.8kg/sqm; single coat. The Radmyx sprinkle coat was also applied at 0.8kg/sqm; single coat.



THAILAND

PRE-CAST TRAFFICABLE PANELS — RADCON #7 FOR LIFE

Owner: CenCar Co Ltd
Main Contractor: K Tech Construction & Engineering Co Ltd
Architect: Siam Coussine Consultants Co Ltd
Engineers: Dunning Thornton (Thailand) Co Ltd
Applicator: Radcon (Thailand) Co Ltd
Area Treated: 14,000 Sqm (car park deck, roof and balcony over shopping area)

All too often, Radcrete personnel have seen waterproofing failures on pre-cast panel construction where topping slabs are emplaced and the structure becomes volatile under vehicular loading.

This is certainly NOT the situation in Thailand — where proper design is giving pre-cast construction structural stability and integrity to car park decks — and is achieved by making the

topping slab basically a RC (reinforced concrete) slab by specifying a 120mm topping. Each slab is no more than 25 metres by 20 metres.

Minimum reinforcing is 12mm bars at 30cm spacing in both directions with twice this amount of reinforcing over all support lines. This approach produces the structural stability required for any suitable waterproofing material to work



RAMA 4 HYPERMARKET, THAILAND

effectively.

Specifiers should note that Thailand, being in the tropics, produces very little thermal stressing for structures. In higher latitudes, where thermal stress increases, 50mm to 70mm reinforced topping slabs may not achieve structural stability which is a primary requirement of satisfactory design.

MAIA SHOPPING CENTRE, PORTUGAL

Owner: Sonae SA
Project Manager: Cinclus SA
Builder: Contacto SA
Architects: Nuclarq SA
 Hellmuth Obata & Kassa Baum Inc, USA
Pre-cast Engineer: Forjadus Castello (Spain)
Application: Coala SA
Size: 12,500 square metres

Portugal is going through a building boom centred around 'Expo 98' in Lisbon. Infrastructure works such as freeways, the large Vasco de Gama bridge, water treatment and supply projects (which are mainly EU financed) and private Shopping Centre developments are under construction.

The Sonae SA group, which is one of Portugal's largest enterprises, has built and owns a substantial portfolio of centres in Oporto, Lisbon and other major cities. Portugal seems to be one of the few countries in Europe that has really embraced the large US and Australian style of shopping centre.

The Maia shopping car-park is approximately 320m long and 40m wide. It is a pre-cast structure using Spanish pre-cast technology.

The 12,500 square metres is broken into 8 areas by approximately 500m of movement joints where **Texsa®** joint sealants were used.

The panels are pre-stressed approximately 250mm in thickness, overlaid by a 60-80mm thick topping, with crack control reinforcement. There was a significant amount of cold joints, some of which were of sufficient quality to seal with Radcon #7 alone, the remainder were hacked out and grouted.

The construction of this project was fast-tracked. This meant some of the site conditions were tough for the applicators,



FIGURE 12 - RADCON #7 APPLICATION

however that didn't inhibit the quality of the work. With a busy shopping centre development like this, the fact that other trades could use the car-park shortly after application was a point greatly appreciated by the Main Building Contractor, Contacto.



FIGURE 13 - MAIA SHOPPING CENTRE, PORTUGAL

LAKE GARDA CAR PARK, ITALY

Location: Malcesine on Lake Garda,
 Trento District of Northern Italy
Applicator: Tecnocoat Trento
Area treated: 3 levels of car park
Size: 6,000 square metres

The multi-storey car-park is located in the town on Malcesine on the shores of the famous Lake Garda in Northern Italy. It is a popular holiday area and is a great area for lake sailing and other boating activities. The car park is 3 levels, all of which was treated with Radcon Formula #7.

The reason the lower levels are treated is that in the northern part of Italy during winter there is snow and heavy use of de-icing salts. The cars carry this into the car-park and it melts leaving pools of salty water.

The ability of Radcon #7 to waterproof and resist chloride penetration helps to protect the decks from pre-mature deterioration from reinforcement corrosion.



FIGURE 14 - TOP DECK OF CAR PARK

SUPA CENTRE, SYDNEY

Engineer: Hyder Consulting
Architect: Mark Newton Architects
Main contractor: Southern Cross Construction
Area treated: podium deck
Size: 4,500 square metres

Hyder Consulting Engineers recently specified Radcon #7 for the waterproofing of this podium deck at the Supa Centre in Homebush, Sydney.

After the Radcon #7 waterproofing treatment to the concrete was complete, the deck received a coloured trafficable coating. The area is now being utilised to display outdoor furniture.



FIGURE 37 - RADCON #7 APPLICATION

The product was applied with a team of applicators using back-pack spray units. Each spray unit can achieve an application rate of up to 150 square metres per hour enabling the waterproofing to be completed very quickly compared with



FIGURE 38 - SUPA CENTRE, HOMEBUSH

traditional membrane waterproofing systems. By specifying Radcon #7 for this project, no protective screeds or toppings were required to protect the treated concrete. The coloured trafficable finish was simply applied over the Radcon #7 for a durable surface.

MELBOURNE CITY LINK - 'WESTERN LINK'

D&C Contractors: Transfield-Obayashi Joint Venture
D&C Sub-Contractor: Boulderstone Hornibrook
D&C of all Foundations for Elevated Sections
- Sub-contractor: Wagstaff Piling

The 'Western Link' is part of the Melbourne City Link project. It forms a road connection between the 2 major arterial roads of Tullamarine Freeway and West Gate Freeway.

Part of the Western Link section involves the construction of 4.2 kilometres of elevated dual carriageway, which follows the Moonee Ponds Creek. To support the elevated road section of the project, Wagstaff Piling were responsible for some 4,500 concrete piles, a majority of which were pre-cast driven piles.

Radcon Formula #7 was chosen to increase the durability of the concrete piles. This was undertaken in order to fulfil the specific project design specifications in accordance with Austroads.

The product was applied to 268 pre-cast concrete piles which were driven into 16 locations in Area No. 5 - Moonee Ponds Creek, shown here in Figure 39.

Each pile was 400mm by 400mm with the upper 6 metres being treated with Radcon #7 at the manufacturing plant as shown here in Figure 40. The application was undertaken by Wagstaff Piling.

The Moonee Ponds Creek is a tidal stream with approximately one third the salinity of sea water. The piles in this area will be constantly exposed to 1-2 metres of flowing water. At the lowest tide this will be reduced to 200mm of water.

Radcon #7 was selected as an impregnation waterproofing product, being cost effective compared to a paint coating system, or a grouted sleeve application.



FIGURE 39 - PILES DRIVEN INTO MOONEE PONDS CREEK



FIGURE 40 - RADCON #7 APPLICATION

This additional assurance by treating the piles with Radcon #7 was undertaken to reduce corrosion as micro-cracking often occurs due to the impact of the pile driver.

1 UTAMA SHOPPING CENTRE, MALAYSIA ~ 46,000 SQM

Owner: See Hoy Chan Holdings Group
Retail Planner: Semba Corp. Tokyo
Architect: C.T. Architects
Engineers: Perunding Talico
Main Contractor: FNE OC Consortium
Area treated: Rooftop car park
Size: 46,000 sqm



As Malaysia's economy continues to record high growth figures under the leadership of Datuk Seri Dr. Mahatir with his 'Vision 2020', another massive shopping centre is completed. 1 Utama Shopping Centre seen here is Figure 12 is located in Bandar Utama Town Centre and poised to become the major commercial centre for Petaling Jaya.

Radcon Formula #7 was specified by project architect, CT Architect and the main contractor was made up of a joint venture between First Nationwide Engineering (FNE) and the Japanese contractor, Obayashi. The product was applied to 46,000 square metres of car park rooftop which made up part of the 2,600 car spaces distributed over three levels.

The original construction of this shopping centre involved massive amounts of poured in-situ concrete. To fast track the project, the design was altered to incorporate the use of precast panels.

With precast panels in place, a full structural topping was cast providing a stable concrete base. There were concerns during design and construction that vehicular traffic over precast panels had a high tendency to develop working cracks exceeding the abilities of Radcon #7. As the contractor was fully aware of this problem, tight design and control procedures were implemented during precast construction and installation.

Due to the size and importance of this project Radcrete provided full technical support and supervision of the major product applications to the rooftop car park. Figure 11 shows Radcon #7 being applied to the first stages of the shopping



FIGURE 10 - ONE OF THE CAR PARK SECTIONS



FIGURE 11 - RADCON #7 APPLICATION

centre. With the correct site preparation and large unobstructed areas of rooftop, application rates up to 4,000 square metres per day were achieved with one motorised spray unit.

The benefits of using Radcon #7 in this application are that the product waterproofs the structural topping leaving it completely trafficable, and increases the surface hardness meaning no requirement for a floor hardener.



FIGURE 12 - 1 UTAMA SHOPPING CENTRE, BANDAR UTAMA TOWN CENTRE, KUALA LUMPUR

N3 SUPERBLOCK CAR PARK, INDONESIA

Owner: PT LippoLand Development
 Architect: Crone & Associates
 Engineer: PT Bitu Enercon Engineering, Bandung
 Main Contractor: Inti Surya - Wijaya Kusuma Contractors (JV)
 Applicator: PT Argacipta Cemerlang
 Area treated: Car park
 Size: 5,000 sqm

After the successful waterproofing of Lippo Karawaci Shopping Centre which included 65,000 square metres of Radcon Formula #7, the product was recently specified and applied to the nearby N3 Superblock Car Park.



N3 Superblock is a development comprising of 4 Towers of mixed commercial and residential components with a cross shaped car park/podium best shown in Figures 2. The towers to be located in the empty corners of the site will range from 28 to 33 levels. As these Towers are built, the car park will be raised by an additional 3 Levels to accommodate a total of 1,500 car spaces. Sydney based Crone & Associates are the architects for this project.

Radcon #7 was treated to the entire top deck of the car park which had developed a number of typical shrinkage cracks as seen in the insert of Figure 3. The cracks pass directly through the concrete slab and during application this caused Radcon #7 to leak through to the underside. To pond Radcon #7 inside the cracks, PT Argacipta Cemerlang wiped Ordinary Portland Cement along the soffit where the product was dripping through. Radcon #7 flash sets with the abundant Calcium ions in cement which creates a plug at the bottom of the crack.

Interestingly on this site the contractor had located the site sheds on the Ground Floor of the car park. When wind driven rain was blown into Level 1 which was untreated, leaks developed into the site sheds. Level 1 had only been treated with a floor hardener which has no crack bridging or waterproofing capabilities. PT Argacipta Cemerlang, were then called back to treat these areas with Radcon #7 to keep



FIGURE 2 - N3 SUPERBLOCK CAR PARK, STAGE 1 COMPLETED



FIGURE 3 - CAR PARK DECK WITH CRACK INSERT

the contractor dry. As this was the first time Inti Surya - Wijaya Kusuma (J.V.) Contractors had used Radcon #7, this problem gave them a good understanding of the products performance.

Due to limited use of the car park at this early stage of the project, the nearby University has now turned this car park into fully enclosed temporary class rooms. Whilst Radcon #7 was applied to the top deck of the car park, in what would be classified as fairly low risk, it is now demonstrating real waterproofing performance directly over critical habitable areas.

UNIVERSITY OF BOLOGNA, ITALY - CRACK RE-SEALING TEST

Radcrete Pacific has always had ample proof of crack bridging performance on-site for Radcon #7, coupled with the University of NSW "Condition Survey of Applications using Radcon #7" where all sites surveyed had cracks going right through the slabs.

To substantiate our claims in Europe and more specifically Italy - we had to prove the products performance again in their home country. The University of Bologna was chosen to develop and perform laboratory testing to demonstrate the products crack re-sealing and permeability reduction capability. In order to simulate on-site cracking and push the performance of the product to the limits, a special rig was built to create, control and measure cracks in concrete elements as seen in Figure 4.

The slabs were cast 60mm thick with an indent for inducing of a crack, which meant the actual depth of the cracked slab was only 30mm. Once cured, the slabs were treated with Radcon #7 then put under tensile stress to induce a crack. The cracks were closed to 0 microns as a starting point. The

slab was then ponded with water and the crack was progressively opened to simulate conditions similar to a new crack. Radcon #7 maintained a watertight seal from 0 microns to 300 microns (0.3mm) which is a typical hairline crack width.

The testing was continued with a ponded Calcium solution to simulate a richer calcium supply normally experienced in the depth of a structural slab. Without re-applying the product, the cracks were able to re-seal up to 1.3mm.



FIGURE 4 - TEST RIG TO SIMULATE CRACKING

Copies of this test and other testing is available on request by faxing your name and address details on your company letterhead.

THE GLEN SHOPPING CENTRE, MELBOURNE

Architect: Hames Sharley Architects
Engineer: Connell Wagner Engineers
Construction Managers: Bovis McLachlan
Main Contractor: Baulderstone Hornibrook
Approved Applicator: Higgins Coating
Area treated: Suspended car park deck
Size: 7,000 sqm
Completed: May 1996

The Glen Shopping Centre is located in the Melbourne suburb of Glen Waverly. The construction work seen here is part of a major upgrade and extension to the existing shopping centre.



FIGURE 5 - THE GLEN

Radcon Formula #7 was applied to two main areas: the exposed car-park area on the upper level seen in Figures 6 & 7, and the exposed loading dock and car park on the lower levels. While both slabs were stressed there was some degree of cracking which showed leakage.

Radcon #7 was chosen as the material to waterproof this structure due to

the products simplicity, speed of application and the proven reliability when exposed to high traffic and thermal stress.

The application of Radcon #7 can be seen here in Figure 7 being applied to the top deck of the car park. Radcon #7 absorbs into the concrete over a 3 day watering procedure. The product reacts with the free Calcium ions that are liberated during the primary hydration of the concrete, forming a non-water soluble calcium silicate hydrate gel complex. This dense gel material reduces the permeability of the concrete matrix, and seals the shrinkage cracks, even when exposed to high thermal stresses.



FIGURE 6 - SECTION OF CAR PARK

The motorised spray unit will enable application speeds up to 800 square metres per hour. The fast application rate of Radcon #7 proved to be beneficial to Baulderstone Hornibrook who were nearing completion of the project at the time of waterproofing.



FIGURE 7 - RADCON #7 APPLICATION

YOSENJI TEMPLE, JAPAN

This interesting Temple located in Tokyo was designed to have an exposed concrete finish as seen in Figure 8. For the waterproofing of this site, Radcon #7 was ideal due to its ability to waterproof both, the matrix of the concrete, and seal existing cracks up to 2.00mm.



FIGURE 8 - YOSENJI TEMPLE, TOKYO

Regarding the aesthetics, Radcon #7 is a clear colourless treatment leaving the concrete colour unchanged so that the architect could maintain the dramatic effect of exposed concrete and still being able to achieve a waterproof result. This photo (Figure 8) was taken after the product had been applied.

Radcon Japan our exclusive representatives for Japan, applied Radcon #7 to a total of 2,000 square metres made up of rooftop, balconies and the concrete facades. Figure 9 shows the top of the cylindrical tower in the Temple where

glass blocks are to be set into the cast concrete to enable a natural light source.



FIGURE 9 - GLASS BLOCKS TO BE USED FOR LIGHTING

The Temple is located next to the American Embassy and the project was completed in June 1996.

SITES OF INTEREST 2010

Radcrete Pacific presents: **Trafficable Areas**

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SITE DETAILS:

COUNTRY	- Brazil
SITE	- Iguatemi Shopping Salvador
CLIENT	- Iguatemi Shopping Centres
CONSULTANT	- Netherland Engenharia Ltda
APPLICATOR	- Aterel Ltd
TREATED AREA	- Rooftop car park
SIZE	- 3,850 sq metres

FIGURE 1-2.

Radcon #7 spray-application on the rooftop car park.

RADCON #7's faultless performance on a rooftop car park in Brazil.

Radcon Formula #7 treatment for the rooftop and exposed car park of the Iguatemi Shopping Centre in Salvador was concluded in January 2007.

The area was required for the centre's grand opening and therefore left the authorised applicator – Aterel Ltd, with *only 3 days to waterproof an area of 3,850 sq metres!*

As there are department stores and other parking spaces located below the treated area, it was crucial to guarantee a 100% watertight result.

Radcon Formula #7 has been *performing without any leakage* since the completion of the works and *under severe traffic and weather conditions* (heat and torrential rains).



EXCLUSIVE GLOBAL DISTRIBUTOR FOR **RADCON FORMULA #7** WATERPROOFING CONCRETE FOR LIFE

SEACON SQUARE, BANGKOK

Developer: Seacon Development Co. Ltd.

Architects: CASA/Design & Develop

Construction Management Consultant: PMI


Project Managers: PRO 8 (Australia)

M&E Engineering Services: Lincolne Scott (Australia)

Main Contractor: Italian Thai Dev. Corp. Ltd.

Gross Area: 500,000 square metres

Rooftop: 50,000 square metres

 With Seacon Square Shopping Centre opened in the last quarter of 1994, Thailand now has a shopping centre ranked in the top 5 around the world. Constructed over 3 years, Seacon Square is certainly the largest retail development in Thailand located on a 34 acre plot of land with a total investment of B10,000 million.

Not far from the new Bangkok international airport, and Phases 2 & 4 of the city's main expressway, the site is located on Srinakarin Road, Bangkok's prestige residential and corporate zone. The developer, Seacon Group was established 30 years ago by the Sosothikul family. In the mid-60s, the family developed Siam Square, which was Thailand's first large scale retail centre.

Seacon Square has immediately become a resounding success. The credit for this must surely go to the owner Mr Kobchai Sosothikul (educated at Sydney University) and his son Mr Tatiya Sosothikul, both of whom are well aware of the value of international expertise.

By acquiring the best of foreign skills and combining it with Thai designers and architects they came up with what is a landmark in Thai design. It is not simply the size of Seacon which sets it apart, but the layout and pleasant surroundings which entice consumers.

The Australian Project Managers, PRO 8, under the direction of Mr John Lake, played a major role in

the co-ordination and set out of the project. Their input has given Seacon a clear advantage over any previous shopping centre complex yet completed in Thailand. PRO 8 was able to work in well with the Thai Designers, Consultants and Contractors.

With the high level of rainfall in Bangkok's wet season choosing the most effective waterproofing system was paramount. The determining factors to consider were: proven system, trafficability, and price competitiveness.

Radcon #7 was able to meet all these criteria as the treatment penetrates into the concrete, coating the solids, filling pores and sealing cracks up to 2mm. As Radcon #7 waterproofs within the matrix it leaves the concrete completely trafficable. Additionally, Radcon #7 is now entering its 20th year since the first commercial application proving excellent long term performance.

A reinforced liquid membrane was also considered but its vulnerability to traffic and environmental factors saw it dismissed in favour for Radcon #7.

Classic Technologies Co. Ltd., waterproofed approximately 32,500 square metres of the concrete rooftop carpark over all critical areas utilising Radcon #7. After the architects and project managers were satisfied with the principal functions of Radcon #7, they requested an on-site performance test to confirm the product's waterproofing capabilities.



Large shrinkage cracks and cold joints were marked for the trial areas as seen in this photo. Firstly,



SEACON SQUARE, BANGKOK

these areas were ponded to verify that the cracks were leaking. Once this was confirmed and the areas were allowed to dry, Radcon #7 was applied. After the final watering, the areas were ponded for a period up to 2 months as seen in the photo here.



At the end of this on-site testing, Radcon #7 had shown 100% success rate in sealing the slab and was given final approval for the project.

Seacon Square is a low rise structure with 6 floor levels above ground. The building is approximately 500m long by 100 metres wide with 3 expansion joints acting as building breaks. The expansion joints are 50mm to accommodate the minimal thermal movement experienced in these tropical latitudes.

The concrete strength ranged from 20 to 25 MPa

(3000-3500psi) ordinary portland cement (OPC) with only a retarder used to cope with the heat and sometimes, extended travel time. For speed of construction in such a wide expanse low rise building, all floor levels, with the exception of the basement and rooftop, were constructed utilising precast units.

The structural design was conservative and generally based on American Standards, similar to the ELASTIC THEORY, which was formerly practiced in Australia. The roof deck which forms a car park area is a 250mm thick reinforced concrete slab.

In the Main Atrium at the entrance to the shopping centre large areas of free space were required. To accommodate this large space, steel roof trusses close to 50 metres in span were used to support a large glass roof. This internal area, is open from the roof to the ground floor.

Other Australian's involved in the site were: Lincolne Scott - Engineering Building Services, Chesterton Property Consultants, Art Busters - Interior artwork and Fantech.

JAPANESE WASTE TREATMENT PLANT

Nishimatsu Contractors, the builders of the Urayasu-City Industrial Water Disposal - Chiba Prefecture, utilised Radcon #7 on 7,000 square metres of this structure for concrete waterproofing and protection.

Radcon Japan, were initially called on site by Nishimatsu after a number of natural shrinkage cracks in some suspended slabs and walls showed signs of leaking. The total areas treated primarily for waterproofing, were the external facade, prior to painting, ramps and unloading areas as seen in the photos. Importantly, Radcon #7 treated concrete will not affect the adhesion of paint to the concrete surface. The painter may find that the coverage rate of the paint increases as the concrete's absorption rate is decreased.

More specifically for concrete protection, the entire inside of the huge concrete waste bin was Radcon #7 treated to increase the resistance of chemical attack from the industrial waste.



RADCON #7 - LE PIRAMIDI - ITALY

Job: Concrete Refurbishment
Client: Building Owners
Project: Le Piramidi
Advisor: Architect Botti Romano
Area: 2,500 sq. metres
Applicator: Radcon Italia.

The "Le Piramidi" comprises three separate buildings constructed some 20 years ago.

Located in Modena, Italy these structures were suffering the ravages of time, with severe carbonation present.

Various "material" approaches underwent testing over a 12-month period.

With testing concluded, Radcon #7 was the chosen material to undertake this refurbishment application.

The light terraced area of the background building had been waterblasted and Radcon #7 treated when this photograph was captured.



LE PIRAMIDI, MODENA, ITALY

RADCON #7 - FOR MASERATI

Client: Maserati S.p.A.
Contractor: Neri S.p.A. Building
Project
Engineers: Ing Marcolongo & Ing
 Perricone
Area Treated: 2,500 sq. metres
Applicator: Radcon Italia.

When you are next visiting Modena, Italy the home of Ferrari and Radcon Italia you will also be in a "City of Innovation" incorporating the headquarters for Maserati, now part of the Fiat Group of companies.

For Maserati Radcon #7 waterproofing was utilised for the rooftop car park ramps and podium of the attached office building.

The top deck of the carpark is of pre-cast panel construction with a reinforced topping between 20cm to 30 cm in thickness.



MASERATI'S NEW CAR PARK BUILDING

Our non-executive director of Radcon Italia, Aldo Ferrari has an excellent Radcon network in Italy headed by Giovanni Bonatti.

We wish the Radcon Italia team every success in winning further high profile Radcon #7 applications in the Italian marketplace.



THE ROOFTOP AT MASERATI

JAPANESE CAR PARK DECK — NO PROBLEM WITH RADCON #7

Contractor: Haseko Corporation
Applicator: Rad Japan Co Ltd
Area Treated: Car Park Deck
Size: 4,000 Sqm

With a myriad of sites now treated and exhibiting proven lifelong performance, trafficable areas have fast become one of the most popular applications globally for Radcon #7 — and it is easy to see why due to:

- fast track application,
 - no wearing slab required,
 - safe material handling/nil toxicity,
- and,
- significant cost savings.

In Japan it is no different. This large expanse top decking is the Ooba car park in Yokohama City that will service a private condominium complex just completed adjacent to the car parking structure.



Ooba Car Park – Yokohama, Japan

RADCON #7 SOLVES ANOTHER FAILED MEMBRANE

Client: Project Design & Development Co Ltd
Applicator: IDC Centepro Vietnam
Builders: B/W/ Nageco and Norfolk Group Joint Venture
Area Treated: 150 Sqm (Rooftop)

The PDD Building in Ho Chi Min City was completed in 1995. Within 3 years the roof membrane system had failed - despite carrying a 10-year guarantee. Obviously a more reliable and lifelong solution was required and, by late 1998, repairs were completed using Radcon #7 waterproofing.

In the 2 years since the Radcon #7 application no leaks are apparent — and another lifetime result has been delivered.

Failed rooftop membranes usually require costly remedial work. Before addressing any waterproofing issue, firstly the topping screed needs to be removed and then the several layers of the bituminous membrane.

Site preparation costs, including the labour of removing the failed system and debris, along with cost of the Radcon #7 application were greater than the original waterproofing contract. If Radcon #7 had been originally specified the building owner would have enjoyed both a lower initial cost (and lifelong waterproofing result) and certainly no expensive repairs.



PDD Building, Ho Chi Min City, Vietnam

PORTUGUESE CAR PARK WATERPROOFED WITH RADCON #7



SUIL PARK, S JAO DE VER, PORTUGAL

Client: Finaldia
Empreendimentos Imobiliarios Lda
Location: Areal
S Jao de Ver Santa Maria da Feira
Engineer: Emprofeira
Empresa de Projectos da Feira
Applicator: Coala S.A.
Area: 2,161 Sqm

The Suil Park is a new building complex in S Jao de Ver.

The building has both residential and commercial areas with car parking. To realise a complete waterproof result Radcon #7 was applied to 2,161 square metres of the top-level car park deck.

The Radcrete system approach to this site required the use of Dilaflex joint treatment to all expansion joints that, in tandem with the Radcon #7 treatment, achieved a waterproof result.

PORTUGAL: PRE-CAST DECK WITH TOPPING & RADCON #7

Client: Vougainvest-Imobliari, Lda
Location: Aveiro
Builder: Somague Engharia, S.A.
Engineer: Duplano
Applicator: Coala S.A.
Size: 20,533 Sqm

The Glicinias Shopping Centre is a large, significant development in Aveiro. A gross letable area of some 100,000 square metres is housed under the large expanse car park deck waterproofed with Radcon #7.

The construction method incorporates pre-cast panels with an overlaid topping between 60-80mm in thickness. This topping was heavily reinforced to assist with crack control and currently no structural volatility is present.

The specification for the site required Sika joints (Combiflex system) to all expansion joints in order to deliver a total waterproofing solution.



GLICINIAS SHOPPING CENTRE, AVERIO, PORTUGAL

RADCON #7 HITS THE MARK IN THE 'BIG BLUE'



BLUE MOUNTAINS CAR PARK, AUSTRALIA

Main Contractor: Adco Constructions
Project Manager: Sinclair Knight Merz
Architect: PMDC Architecture & Design
Applicator: Hunter Valley Waterproofing
Area: 4,800 Sqm (1,800 Sqm Radcon #7 / 3,000 Sqm Radfloor)

The Blue Mountains, some 100 kilometres west of Sydney, is one of Australia's greatest visual assets and highly popular with visitors from the world over.

This new car park is for one of the Blue Mountains' great tourist attractions, the Scenic Railway at Katoomba.

In an area which experiences winter freeze/thaw conditions, Radcon #7 waterproofing was applied to some 1,800 square metres of exposed areas including the top deck of the car park.

With Radcon #7 protecting the structure's extremities, the lower car park floors only required concrete hardening - where Radfloor was applied over some 3,000 square metres to achieve the required result.

RADCON #7 PROTECTION FOR NEW HI-TECH SYDNEY OFFICE

Builder: Thiess Contractors
Architect: Scott Carver
Structural Engineers: MPN Group
Applicator: Kratrim Pty Ltd
Area: 380 Sqm

This major new office complex in Sydney, Australia had Radcon #7 waterproofing applied to the roof terrace and plant room areas.

Originally a two-layer membrane was specified - this spec would also require a wearing slab around the roof perimeter where a Building Maintenance Unit (BMU) operates. Fundamentally, the use of Radcon #7 alleviated the need for a protective wearing slab (and associated costs) plus provided a substantially lower cost waterproofing solution than originally specified.

Radcon #7 has formed a continuous surface seal in the actual concrete and cracks - no mechanical damage can be caused by the BMU operation, or other abrasive activities, that could occur during future maintenance activities.



80 PACIFIC HIGHWAY, NORTH SYDNEY, AUSTRALIA

RADCON #7 WATERPROOFS STEEL PAN CAR PARK DECK

Client: Chofu City Municipal Government
 Architect: Urban Dynamics Institute, Takaha
 Main Contractor: Hazama Corp.
 Approved Applicator: Rad Japan
 Area Treated: 6,000 Sqm

This 6,000 Sqm car park deck serves an office, residential and shopping centre complex in Chofu City, Tokyo. The deck is constructed using steel pan. The steel pan not only acts as permanent formwork

but also functions as a component of the reinforcement. The deck can be seen below prior to the pour. The classic problem with leakage in these types of structures, especially in coastal or cold climates, is that if leaks occur, the pan slopes slightly to the steel beams. Water borne chlorides then attack the beams facilitating corrosion and compromising the structural integrity. Radcon #7 is a perfect solution to preventing this problem.



CONSTRUCTION USING STEEL PAN



CAR PARK DECK, CHOFU CITY, TOKYO, JAPAN

RADCON #7 TREATMENT TO HIGH LOAD AREAS

Client: Jurong Town Corporation
 Architect: Indeco Consultants
 Main Contractor: Evan Lim & Co Pte Ltd
 Applicator: Reverton Engineering (S) Pte Ltd
 Area: 30,000 Sqm

Reverton Engineering has once again beaten traditional membrane systems for waterproofing a difficult project with heavy traffic and loading.

The new Jalan Buroh Flatted Factory is designed and built to withstand heavy vehicle loadings. The reinforced concrete roof and car park deck is constructed with 450mm thick pre-stressed concrete treated with Radcon #7. A 50mm wearing slab was applied on top and this received a Radfloor treatment to improve surface strength, hardness and abrasion resistance.



JTC FACTORY, SINGAPORE



JTC FACTORY ROOF CAR PARK, RADCON#7 AND RADFLOOR TREATMENT, SINGAPORE

RADCON #7 ENJOYS SOUTHERN HOSPITALITY

Client: Northside Hospital, Atlanta GA
 Architect: Howard-Ruck-Dobson Architects
 Engineer: Sedki & Russ
 Applicator: Lee Inc.
 Area Treated: 5,000Sqm

"The conventional waterproofing for car park decks is a sprayed polyurethane 'trafficable' membrane. We believe that 'membrane' and 'traffic' are not compatible. The system is complex, time consuming, expensive and not particularly reliable. Radcon #7 is reliable, fast and cost efficient."

**"I've been waiting
 for this product
 for 20 years!"**

Joe Russ, Engineer

Radcon #7 is making inroads into the US Market. This project was specified and undertaken by the distributor for the South Eastern Region, Richard Lee of Lee Inc.

Specification was by Joe Russ, a highly respected Structural Engineer and principal of Sedki & Russ, who, on hearing of Radcon #7, said "I've been waiting for this product for 20 years, I can't tell you the problems we have with car park waterproofing here!"



NORTHSIDE HOSPITAL ATLANTA, GA, USA

RADCON #7 REVITALISES 60 YEAR OLD CONCRETE

KOLEHAVEN (COAL HARBOUR) - BERINGEN

Client: Monument & Landschappen
 Vlaamse Gemeenschap
 Stad Beringen - Prov.Limburg
 Design: Creo Engineering NV
 Contractor: Herbosch-Kiere
 Distributor: Orbi Chemicals

Leon Lambermon, the technical advisor for Orbi Chemicals, stated the 60-year-old coal harbour in Beringen, Belgium has not stopped working since opening in the 1930's. The owners, Mijnen N.V. along with Monumenten & Landschappen & Creo Engineering N.V., decided that the quay wall needed stabilisation and rebuilding due to the severe spalling and degradation of the structural elements. The decision was taken to protect both the newly repaired concrete and existing concrete, with Radcon #7. Radcon #7 will consolidate, re-alkalize and waterproof the old concrete plus protect the new materials.



COAL HARBOUR - BERINGEN, BELGIUM



COAL HARBOUR - BERINGEN, BELGIUM

RELIABILITY - AEGIS APPLICATION REVISITED

OCEAN INTERNATIONAL - MACKAY

Builder: Goldseal Constructions
Architect: Sanders & Ellick
Applicator: Rawstone Enterprises Pty Ltd.
Area Treated: 350Sqm (Basement - Non-hydrostatic side)
Completed: 1991

During construction the basement walls were waterproofed using a membrane. This waterproofing method failed during the heavy monsoon rains. The water table was very high and water was, in fact, jetting up through fissures in the floor and hitting the ceiling 3m above.

The site is tidal and the basement floor 1m below the normal low water mark. Aegis MSP was applied to the internal basement (non-hydrostatic side). Within 72 hours of completion Mackay received 125cm (50") of rain in 24 hours. No leakage then, and no leakage since.



OCEAN INTERNATIONAL - MACKAY, QUEENSLAND



OCEAN INTERNATIONAL - MACKAY, QUEENSLAND

RADCON #7 GETS FAST TRACK IN SAN DIEGO

Builder/Developer: Garden City Communities Inc.
Agent: Surface Technologies Inc
Application: In-house
Area Treated: 10,000Sqm (Podium Decks)

Mark Schneider, of Surface Technologies Inc, says, *"Construction technique is a little different in US than what your used to, cost and speed is everything!!"* The traditional technique for waterproofing the podium decks in condominium blocks is by sprayed polyurethane trafficable membrane. This is a costly and time-consuming process that is unreliable due to susceptibility to damage by construction workers. When the waterproofing is compromised, who do you blame - product, applicator or builder?

Radcon #7 delivers a solution that is an excellent alternative. After the post tensioned podium deck is cured, it is Radcon #7 treated and pond tested. From there, the construction workers from adjacent blocks finish work and start construction of the wooden frame. There is no need for fiddly detailing work nor is there any restriction on site access for the workers since Radcon #7 cannot be damaged. The decrease in cost and increase in speed makes Radcon #7 very attractive to US clients. To confirm the quality and success of Radcon #7, the project manager made a flying visit to Sydney to look at a sample of projects. Satisfied with results achieved, he then gave the go ahead for Radcon #7 to be applied.



GARDEN CITY COMMUNITIES - SAN DIEGO, USA



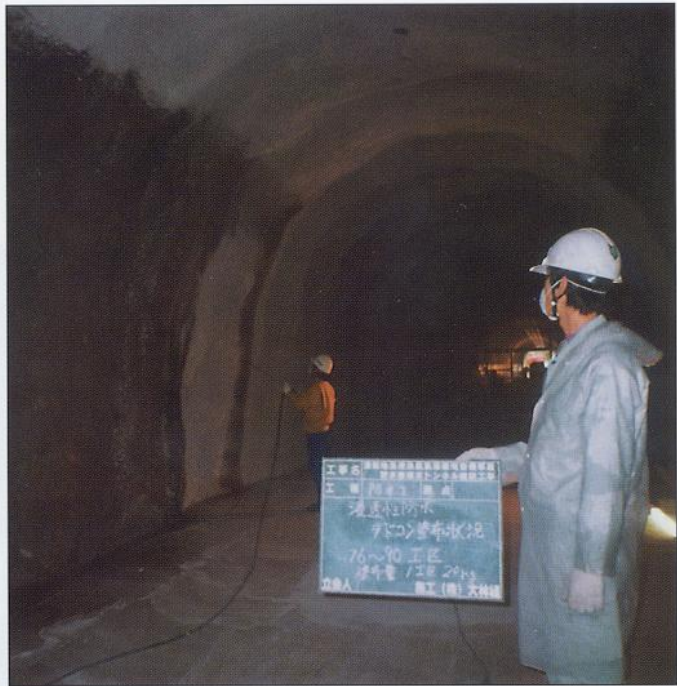
GARDEN CITY COMMUNITIES - SAN DIEGO, USA

RADCON #7 - MORE INTERESTING PROJECTS IN JAPAN

WATER RESERVOIR TUNNEL

Client: Nakajima City Municipal Office
 Specifier: Kokusai Kogyo Co Ltd
 Contractor: Obayashi Corporation
 Area: 6,000Sqm
 Distributor: Rad Japan

Rad Japan is at the forefront in innovative Radcon #7 applications. This tunnel application is interesting because it is a sprayed concrete surface that was applied to the inner face of the tunnel. Radcon #7 is not recommended for negative hydrostatic pressure applications. However, in this case, the applied face is the positive hydrostatic side as the tunnel is used for transporting water. The objective was to stop water from inside the tunnel escaping out rather than stopping any ground water getting in. In addition, Radcon #7 was chosen as it also consolidates and hardens the surface (which improves resistance to abrasion by water) and is certified suitable for use with potable water.



WATER RESERVOIR TUNNEL

CAR PARK DECKS

Project: 3 Storey Car Park
 Client: Shimizu Corporation
 Specifier: Kokusai Kogyo Co Ltd
 Contractor: Kawasaki Kizai Co Ltd
 Area: 2,000Sqm
 Distributor: Rad Japan

Radcon #7 was chosen to waterproof the suspended car park decks. Construction was steel pan with reinforced concrete of 80mm thickness. The steel pan acts as a reinforcing component. This 'composite' construction is very fast and economical to erect. Controlling leakage is very important in these structures.



CAR PARK DECK, SHIMIZU

While the steel pan is often galvanised, the beams holding them up normally are not. If the deck is not waterproofed correctly, water will run through the crack, down the pan and exit onto the beam that will lead to longer term corrosion problems.



CAR PARK DECKS, SHIMIZU

RADCON #7 FOR PRIME BANGKOK CBD OFFICE

BANGKOK CITY TOWER.

Owner:	City Realty Co., Ltd.
Main Contractor:	Thai Kajima Co., Ltd.
Architect:	Inter Architect Co., Ltd.
Structural Engineer:	2-R Engineering Co., Ltd.
Area Treated:	5,000Sqm (Roof decks , podiums, driveways, watertanks, helipad)
Applicator:	Radcon (Thailand) Co., Ltd.

Bangkok City Tower is located in the central business district of Bangkok on Sathorn Road.

A 32-storey office tower, it serves as the Thai head office for Bank of Asia, the Bank of China, and ABN-Amro Bank.

The original design specification allowed for the use of either a bituminous sheet membrane system with concrete topping protection or Radcon #7 waterproofing system.



ROOF AREA - BANGKOK CITY TOWER

Although Thai Kajima had not used Radcon #7 before, they based their decision on the reliability that Radcon #7 has shown on other Thai projects. It also allowed the contractor to take full advantage of their own quality control in the placement and finishing of large areas of concrete.

Since Radcon #7 does not require any form of protection all concrete roof and podium areas were finished to a slight fall to assist water drainage then Radcon #7 was applied directly to the exposed structural concrete. This resulted in very significant cost and time savings.

Large tiled areas at ground level also benefited from Radcon #7, allowing direct adhesion of tiles to the treated concrete surface thereby greatly improving the structural integrity of high traffic tiled areas.

Another benefit of using Radcon #7, safe for use in potable water applications, was its use on the large upper level potable water storage tanks.



BANGKOK CITY TOWER

MORE RADCON #7 WATERPROOFING FOR AMP

MACQUARIE CENTRE STAGE 1 - NORTH RYDE

Owner:	AMP Asset Management
Project Design Manager:	Winton Assets Pty Ltd
Architect:	Buchan Group
Structural Engineer:	Hyder Consulting Pty Ltd.
Builder:	Fletcher Constructions Pty Ltd.
Area Treated:	2,200Sqm

Radcrete Pacific has a long association with AMP who, as owners of shopping centres, demand the most reliable building solutions.

The brief was to waterproof a new car park deck that was an extension over the existing car park structure. The project used the 'Radcon Waterproofing System' approach that included pouring the slab to falls and using Volclay RX waterstop in all pour joints. The classic problem in

cold or pour joints is that honeycombing occurs along the joint or, if not "keyed in" correctly, shrinkage opens the joint and it will not be watertight. Volclay RX waterstop is a bentonite clay that swells on contact with water and is very easy to apply between pours.



MACQUARIE CENTRE STAGE 1, NORTH RYDE, SYDNEY