



Under the leadership of Claudio Ourives, Managing Director of Penetron Brasil Ltda, Penetron has been closely involved with the preparation of Brazilian infrastructure for the FIFA WORLD CUP 2014. This included refurbishment of existing sport facilities, building of new sport facilities as well as metro lines, airports and Maravilha Port in Rio de Janeiro.

Invariably, the engineers in charge of these projects were forward-thinking people, not just concerned with strength and waterproofing of concrete, but also the durability of these structures. They wanted this infrastructure to stand the test of time, and make sure the Brazilian people can enjoy these facilities for many decades to come.

Through extensive testing at different certified and independent laboratories, Penetron was able to demonstrate that Penetron-Admix-treated concrete shows vastly improved chloride diffusion performance, sulphate resistance, permeability, drying shrinkage, freeze-thaw cycles as well as self-healing capability. This results in Penetron-treated concrete producing on average 3 times the expected service life of a conventional concrete.

Football is the national sport of Brazil. Every child starts playing it at young age. This translates into a great love for the beautiful game, and being able contribute to the 2014 World Cup in Brazil has been a dream come through for the whole team... seeing the infrastructure and stadiums in place is a great reward for the team work done and the consolidation of Penetron technology in Brazil.

Asked who the new World Champions will be, Claudio is firm; " Brazil will win of course . . . but Germany and Spain have great teams too, and Belgium could be a surprise ".

May the best team win !

INSIDE THIS ISSUE

PENETRON WORLDWIDE

Plácido Aderaldo Castelo Stadium, Fortaleza, Ceará

Pernambuco Stadium, Recife, Pernambuco

Fonte Nova Stadium, Salvador, Bahia

Grêmio Stadium, Porto Alegre, Rio Grande do Sul

Mineirão Stadium, Belo Horizonte, Minas Gerais

Kleber Andrade Stadium, Cariacica, Espírito Santo

Arena Corinthians, Sao Paulo

Metro Line 2 (Green Line), Sao Paulo

Metro Line 4 (Yellow Line), Sao Paulo

Metro Line 4, Rio de Janeiro

Maravilha Port, Rio de Janeiro

Guarulhos Airport Terminal 3, Sao Paulo

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PENETRON WORLDWIDE

Plácido Aderaldo Castelo Stadium, Fortaleza, Ceará



The Plácido Aderaldo Castelo Stadium (Castelão).

The Plácido Aderaldo Castelo Stadium located in Fortaleza, Ceará, in the Northeast of Brazil is more commonly known as “Castelão” or “Gigante da Boa Vista”. Originally inaugurated in 1973, this stadium was expanded to maximum capacity of 67,037 seats to meet FIFA requirements. Castelão will host 6 matches during the World Cup 2014 including one quarterfinal.

Sustainability and green construction practices were a key concern of the designers as well as Galvão and Andrade Mendonça, which formed the construction consortium to refurbish Castelão. This involved the recycling of most parts of the old stadium including the metal roof, the demolished concrete, old seats and more.

The selection of environmentally friendly materials was a mandatory aspect as the project is seeking to apply for LEED certification to serve as an example of sustainable green stadiums.

To live up to this promise Penetron Admix, a green-certified product, was selected to protect the slab on steel deck terrace from chloride penetration and water ingress due to the close proximity of the stadium to the ocean. Penebar SW-55 was applied to seal new construction joints. In total 60'000 m² of concrete were effectively treated with this system.



Application of PENETRON ADMIX-treated concrete on Castelão. Construction joints have already been prepared with PENEBAR SW-55.

Pernambuco Stadium, Recife, Pernambuco

Pernambuco Stadium is a brand new stadium.. in Brazil's Northeast and will host 5 World Cup matches including one “Round of 16” match between June 12 and July 13. After the World Cup 2014 the stadium will become the home base of Clube Náutico Capibaribe, one of three professional football clubs in the Recife region.



Pernambuco Stadium.

The project, which is built by Odebrecht Infraestrutura features a seating capacity of 46'000 and is scheduled to be expanded with a neighboring university campus, indoor arena, hotel and convention center as well as commercial and residential units.

Penetron Admix was applied to waterproof retaining walls and increase the durability of concrete slabs on various floors of the stadium complex.



Aerial view of Pernambuco Stadium.

Fonte Nova Stadium, Salvador, Bahia

Fonte Nova Stadium is a completely new stadium that was erected for the 2014 FIFA World Cup in the same location as its predecessor Estádio Fonte Nova. The stadium officially opened on April 7, 2013 with a match of local rivals Bahia and Vitória (5:1) and will see 6 World Cup matches including one "Round of 16" and one quarter-final match.



Aerial View of Fonte Nova Stadium.

Designed by Schultz architects from Germany in collaboration with Tetra Arquitetura from Brazil and built by a consortium made up of Grupo OAS and Odebrecht this multifunctional stadium features over 50'000 covered seats and hosts different events including football matches and large concerts.

In an effort to increase durability and protect the concrete of this project, PENETRON ADMIX was applied to the concrete of the basement slab and lower reservoirs. New constructions joints were sealed using PENEBAR SW-55.



Fonte Nova Stadium under construction.

Grêmio Stadium, Porto Alegre, Rio Grande do Sul

Grêmio Stadium (Arena do Grêmio) is the home base of Grêmio Foot-Ball Porto Alegrense and one of the most modern venues in South America.



Aerial view of Grêmio Stadium.

The stadium, which was inaugurated on December 2012 with a friendly match between Grêmio and Hamburger SV (2:1), has a capacity of over 60'000 seats. It is mainly used for football events and will be host to 5 World Cup matches including one "Round of 16" match.

The stadium was designed by architectural firm PLARQ and built by main contractor OAS.

From the beginning, the plan was to construct a self-sustaining stadium unlike Estadio Olímpico Monumental, which Arena Grêmio was supposed to replace, and which was already falling apart.

In order to ensure concrete durability and enhance the lifetime of this important project, PENETRON ADMIX was chosen to treat the steel-reinforced concrete ramp that supports the stadium structure.



Side view of the PENETRON ADMIX-treated ramp.



Aerial view of the Grêmio Stadium inauguration.

Mineirão Stadium, Belo Horizonte, Minas Gerais

Mineirão Stadium is the largest football stadium in the state of Minas Gerais in Brazil's Southeast and one of the most famous stadiums in the country. It originally opened in 1965 and was refurbished to host matches of the 2013 FIFA Confederations Cup, 6 2014 World Cup matches including one "Round of 16" match and one semi-final match. In addition it will host some of the matches of the football tournament of the 2016 Summer Olympics.



Aerial photo of Mineirão Stadium.

The renovated stadium complex involved a redesign of the seating tiers bringing up capacity to 64'000 viewers, construction of a new roof and upgrade of all services and infrastructure including new shops and the Brazilian football museum.

The grandstand was also completely renewed. To ensure long-term structural integrity and waterproofing properties 15'000m² of the new grandstand were treated with PENETRON ADMIX.



Close-up of PENETRON ADMIX-treated concrete beams for Mineirão Stadium.



The grandstand under construction.

Kleber Andrade Stadium, Cariacica, Espirito Santo

Officially known as Estadio Estadual Kleber Andrade the stadium is located in Cariacica in the Southeast of Brazil. The stadium has recently been upgraded from its original design in 1983 to host up to 22'000 spectators, an official football pitch, an official eight-lane athletic track, a gym, first aid, medical treatment, physiotherapy and massage, meeting/briefing and multimedia rooms as well a private team management office, café and parking areas.

The Kleber Andrade Stadium is suitable for football, athletics and rugby training and is going to be used as a pre-games training camp for the Olympic Games in Rio de Janeiro in 2016.

In order to ensure the longevity of this project a combination of PENETRON products including PENETRON, PENETRON ADMIX, PENECONCRETE MORTAR and PENESEAL SW-55 were used to enhance concrete durability and waterproofing properties.



View of the roof structure.



View of the concrete wall treated with PENETRON and PENECEM MORTAR.



View from the PENETRON ADMIX-treated grandstands.

Arena Corinthians, Sao Paulo

The Arena Corinthians the new home of Sport Club Corinthians Paulista, one of Sao Paulo's first league football clubs. With a seating capacity of over 48'000 it is Brazil's largest private-owned stadium. During the World Cup an additional 19'800 seats will be added in order to comply with official requirements.

The stadium will host the opening match of the 2014 FIFA World Cup and see 5 more matches during the event, including one semi-final.

Main contractor Odebrecht worked closely with Penetron Brasil Ltda. in order to provide an effective and long-lasting solution, protecting the drainage concrete elements and basement of Arena Corinthians using PENETRON ADMIX.



Artist impression: Arena Corinthians.



Arena Corinthians under construction.



PENETRON ADMIX-treated concrete at Arena Corinthians.

Metro Line 2 (Green Line), Sao Paulo

Sao Paulo Metro Line 2 or the Paulista Line as it is also known runs from Vila Madalena station in the East to Vila Prudente station in the West of the city. The Green Line is the latest addition to Brazil's largest transport system. After construction a 1.16km-long tunnel section between km 29.284 and km 30.445 near Tamanduatei station, built by contractors Constran and Galvão Engenharia, required waterproofing treatments to joints and the cut and cover walls.

Penetron Brasil Ltda. was invited to provide an efficient solution that could be applied from the negative side. Subsequently all active leakage was stopped using WATERPLUG. All construction joints were treated with PENECONCRETE MORTAR, while the waterproofing properties were ensured by application of two coats of PENETRON to the affected area.



View of the cracks before the PENETRON treatment.



Internal view of the tunnel after the PENETRON treatment.

Metro Line 4 (Yellow Line), Sao Paulo

When fully completed in 2014 the Yellow Line of Sao Paulo Metro will stretch over 12.8km from Luz station in the North of Sao Paulo to Vila Sônia in the East and comprise of a total of 11 stations. The total project is budgeted at 2.1 billion Brazilian Real (950 million USD).

PENETRON ADMIX was approved for application on Metro Line 4 after extensive compatibility, durability and performance testing was undertaken by the quality department of the contracting consortium CCR. Subsequently, PENETRON ADMIX was used to increase water penetration resistance and improve durability of the concrete used in the construction of the underground stations.



View of the cracks before the PENETRON treatment.

Metro Line 4, Rio de Janeiro

Increasing demands in public transport and the upcoming 2014 FIFA World Cup and 2016 Olympic Games in Rio de Janeiro resulted in a surge in investments to upgrade and extend the city's public transport system.

Rio de Janeiro has already begun to expand its metro network to tackle traffic problems with several new lines being built, including the new Metro Line 4 (Blue Line). This line will connect the Barra da Tijuca neighborhood in the west of the city, with Ipanema in the south, transporting an average of 300,000 commuters per day. Construction on the 16-km long metro line with six new stations commenced in June 2010 and is scheduled to be completed in 2016, just in time for the start of the Olympic Games.

PENETRON was chosen to waterproof the concrete of all six stations. Due to efficiency and ease of application, PENEBAR SW-55 waterstops replaced the initially specified PVC waterstops in the construction joints.



View of the Nossa Senhora da Paz station at Leblon; PENEBAR SW-55 was used for the concrete joints and PENETRON for the bridge.

Maravilha Port, Rio de Janeiro

The port region in Rio de Janeiro once played a fundamental role in the economic and social rise of Rio de Janeiro into a modern metropolis. The past decades, however, saw a slow decay of Rio de Janeiro's oldest area as port activities dried up.

In an effort to restore the port to its former glory, Rio de Janeiro has started a massive, 8 billion reais (3.6 billion USD) urban redevelopment program to reshape the 5 million square meter space known as Maravilha Port (the marvelous port).

Over the next 15 years the area will see the construction of 4 km of tunnels, 70 km of streets, 700km of underground water, sanitation, drainage, electricity, gas and telecommunication networks, 650km² of sidewalks, 17km of bike paths, six-lane highways, a light railway system, three sanitation plants alongside historic preservation and cultural and education buildings including the Art Museum of Rio de Janeiro (MAR) and the Museum of Tomorrow at Praça Mauá and Mauá piers, as well as the planting of 15'000 trees.

Penetron has closely accompanied the redevelopment of Maravilha Port providing full technical support in the design and construction phases. Several components of the Penetron system have been utilized in the construction works on Maravilha Port. Those mainly consisted of PENETRON ADMIX, a third-generation, crystalline concrete permeability-reducing admixture and PENEBAR SW-55 for the treatment of construction joints.



View of the Maravilha Port and the Mauá Pier.



Tunnel excavation near the port; PENETRON ADMIX is used in the shotcrete.



Construction site of the Museum of Tomorrow; concrete slab was treated with PENETRON ADMIX and PENEBAR SW-55.

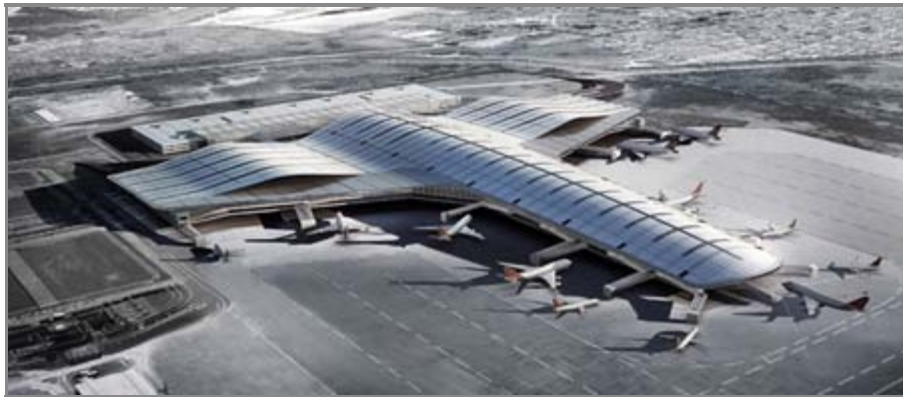


The Museum of Tomorrow.

Guarulhos Airport Terminal 3, Sao Paulo

For many years Guarulhos Airport in Sao Paulo has been the largest, but with 36 million passengers in 2013, also one of the most congested airports in Latin America.

With the 2014 FIFA World Cup and 2016 Olympic Games around the corner, much needed relief for the overcrowded terminals T1, T2 and T4 at Guarulhos Airport was announced in 2009. In order to upgrade and improve the existing airport infrastructure (terminals and runways) and incorporating a new, third terminal, the airports' management company unveiled a 1.3 billion USD investment plan.



Artist impression: Guarulhos Airport Terminal 3.

The new passenger terminal complex was designed by Consortium MAG including PJJ Malucelli Arquitetura, Biselli + Katchborian Arquitetos – GPA Arquitetura and Adrade Rezende Engenharia. It is comprised of two connected sectors: a 230'000m² passenger terminal and a 150'000m² parking garage and is designed for passenger traffic of up to 19 million travellers per year.

The new terminal will exclusively be utilized for international flights and feature a 50-room, 4-star hotel for connecting travelers.

PENETRON ADMIX provided waterproofing and durability for the 25'000m³ concrete basement slab on Terminal 3. All construction joints were sealed using PENEBAR SW-55 waterstops.



View of Guarulhos Airport Terminal 3 basement slab.

WITNESS PENETRON'S CRACK HEALING ABILITY

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