

# Case study

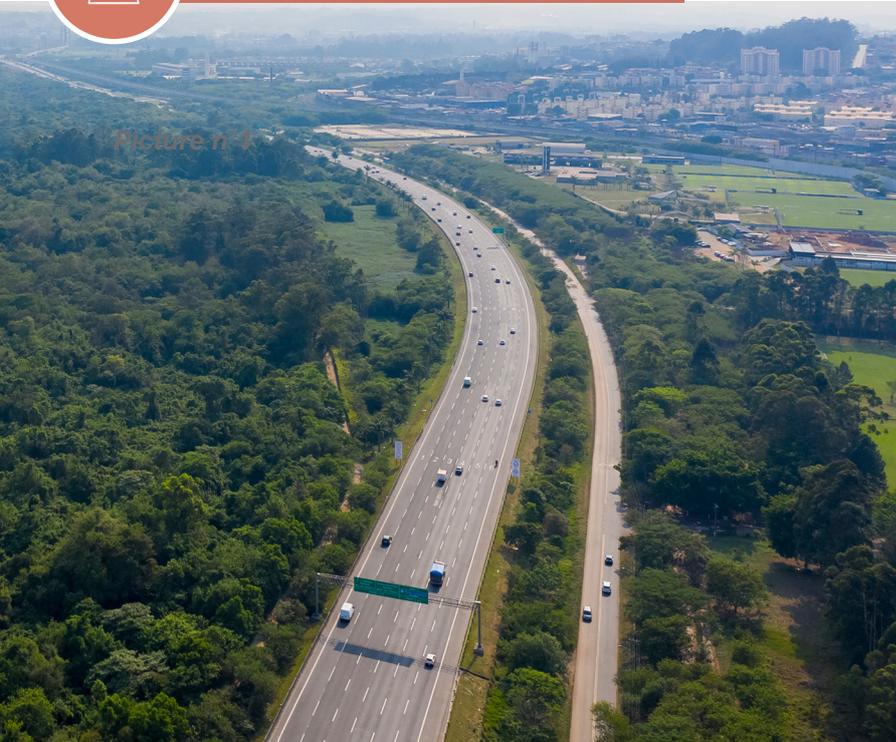


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## AYRTON SENNA HIGHWAY

Picture n° 1



**Project name**  
Ayrton Senna Highway, SP-070

**Location**  
São Paulo, Brazil

**Objective / Initial position**  
Double the durability of the road in challenging conditions to reduce costs, traffic obstruction and the use of resources

**Year**  
2011

**Duration**  
4 Years

### Project description



▲ S&P asphalt reinforcement grid laid onto bitumen tack coat

### Description

The SP-070 is an important transport link between São Paulo and Campos do Jordão, Vale do Paraíba and Rio de Janeiro, as well as being the main access route to Guarulhos International Airport.

### Situation

Due to excessive cracking of the asphalt wearing course, lanes of the highway had to be resurfaced approximately every 6 months at recurring high costs. This also meant repeated traffic disruptions as well as a waste of resources. The severe damage pattern was caused by reflection cracking from a 25 cm thick cement-bound base course, which was completely cracked due to the unstable subsoil and high daily traffic volumes (90,000 vehicles per direction, of which approx. 15 % are heavy goods vehicles).

This project had been used as a test section under extreme conditions (unstable base) and usually such projects are typically problematic when using asphalt reinforcement products. In fact interest in this particular project was so high that the University of São Paulo were involved in the tracking of the project and supported by carrying out jobsite tests, as well as analysis.

### Solution

On 18th/19th April 2011, S&P asphalt reinforcement grids were installed on various sections on lane 4 of the highway. Since the various sections had differing levels of stability and damage, the grid and wearing course combinations were recommended by S&P based on the severity of the damage pattern. These sections can be seen below:

- km 17+500 to 17+600 S&P Glasphalt® G + 5cm CBUQ (bitumen concrete wearing course)
- km 17+600 to 17+700 S&P Carbophalt® G + 5cm CBUQ
- km 17+700 to 17+850 S&P Carbophalt® G + 8cm CBUQ
- km 17+850 to 17+950 S&P Carbophalt® G + 5cm CBUQ
- km 17+950 to 18+050 S&P Glasphalt® G + 5cm CBUQ

The goal was to achieve a significant extension of the maintenance intervals by at least doubling the previous 6 month life span of the wearing course through the use of S&P asphalt reinforcements.

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### Project tracking

In order to get a direct comparison of the effect that the S&P asphalt reinforcement grids had on the road structure, a month later in May 2011 lane 3 was re-surfaced - but this time without any asphalt reinforcement grid in the structure. Subsequently there were further reviews of the highway during the following months and years with the following conclusions:

Date	Time elapsed	Condition of lane 4 (with grid)	Condition of lane 3 (without grid)
February 9th 2012	10 months	Very good condition	Already showing signs of degradation and punctual repairs were already carried out
September 17th 2012	17 months	Very good condition	Completely repaved for a second time, as the lane was deemed no longer safe
May 23rd 2013	25 months	Good condition	Completely cracked and already in need of repaving again
June 5th 2014	37 months	Light cracks appeared, but not enough for the lane to be deemed unsafe and it passed the external inspection from ARTESP	Completely repaved for a third time following the excessive cracking it had suffered
January 28th 2015	45 months	No further degradation was observed and at least another year of service life was expected	

### Summary

In summary the S&P reinforced lane 4 had shown a lifetime of more than 3 times longer than the lane 3 that was repaired at the same time. This despite the fact that lane 4 was the inside lane of the highway and therefore our assumption is that it would have received the higher and heavier traffic loads. Not only that but the lane with S&P asphalt reinforcement grids also far exceeded the project goal of having a lifespan of 12 months.

The S&P asphalt reinforcement grids are pre-impregnated with bitumen, and this together with the open grid structure leads to excellent bonding of the grid within the layers. This bonding is critical when considering how the grids work by absorbing and distributing crack inducing forces, which in turn protects the new wearing course by delaying the propagation of cracks to the surface.

In this case S&P worked together with the client to provide a sustainable solution despite the challenges with the very unstable subbase and high traffic loads. Further information can be found in the images below.

In August 2015, the road profile had to be completely changed to incorporate new exits for the airport. Therefore, it has not been possible to continue the project tracking further as the road structure was completely renovated - including replacing the unstable subbase.

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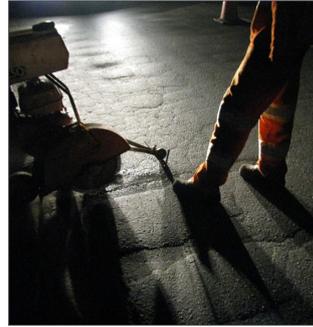


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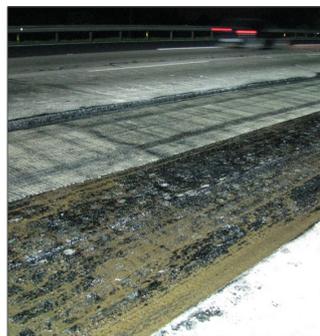
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### March 2011 - Highway inspection



The highway inspection revealed that there was severe cracking on the road surface.

### April 2011- S&P asphalt reinforcement grid installation



The road surface was milled and the S&P asphalt reinforcement grids were laid onto bitumen tack coat.

### May 2011- Lane 3 repaved without asphalt grid reinforcement for comparison



Lane 4 repaved with S&P asphalt reinforcement grids in April 2011, Lane 3 repaved without grids in May 2011.

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### February 2012 - 10 months elapsed



Lane 4 remained in very good condition. Lane 4 however was already showing signs of degradation and punctual repairs were carried out.

### September 2012 - 17 months elapsed



Again, lane 4 remained in very good condition, but lane 3 was already completely repaved for a second time.

### May 2013- 25 months elapsed



Whilst lane 4 remained in good condition, lane 3 was yet again showing signs of heavy damage and in need of repaving for a third time.

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### June 2014 - 37 months elapsed



Although light cracking appeared on lane 4, it passed the inspection from ARTESP and was deemed safe. Lane 3 was repaved for the third time.

### January 2015 - 45 months elapsed



No further degradation of lane 4 was observed and at least another year of service life was expected.

### August 2015 - 52 months elapsed

Road profile completely changed to incorporate new exits for the airport. Therefore, it has not been possible to continue the project tracking further as the road structure was completely renovated - including replacing the unstable subbase.

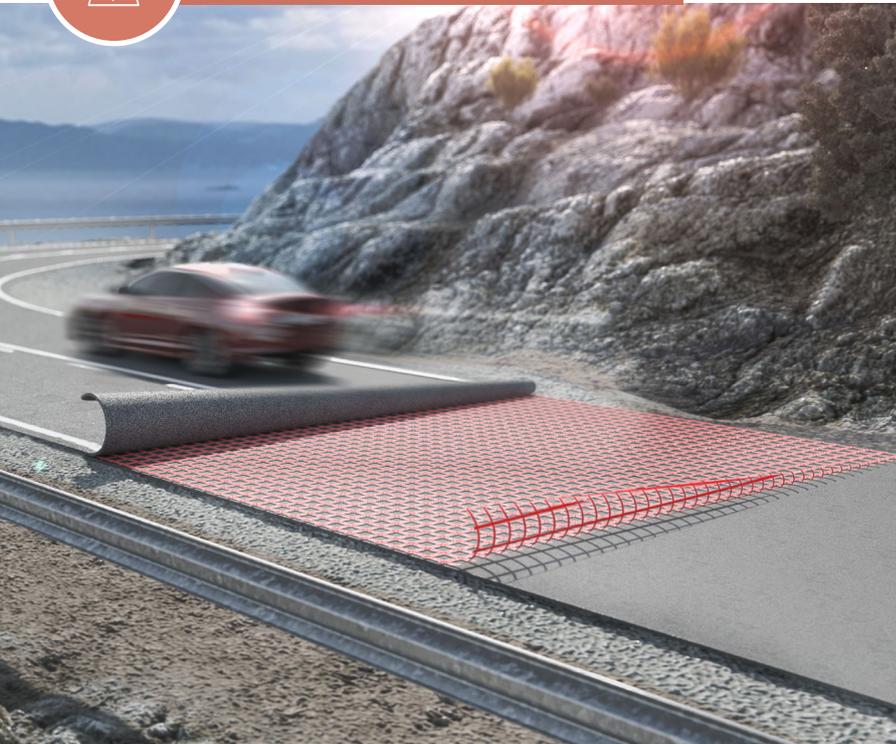
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## AYRTON SENNA HIGHWAY



### Client benefits

- Durable and long term solution
- Cost saving
- Resource saving
- Greatly reduced traffic obstructions

### Product used

- S&P Glasphalt® G
- S&P Carbophalt® G

### Contact

S&P Clever Reinforcement Ibérica, Lda  
Rua José Fontana, N°76  
Zona Industrial Stª Marta de Corroios  
PT-2845-408 Amora

+351 212 253 371  
info@sp-reinforcement.pt

