

Clever Reinforcement Brasil



Distribuidor Autorizado

ASPHALT PAVEMENT REPAIR WITH S&P PRE- BETUMINISED GRIDS BRAZIL ECOPISTAS KM 17+500 EAST TRACK

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1. INTRODUCTION:

The S&P pré-bituminised grids Glasphalt G and Carbophalt G as objective of increasing the pavement service life when the problems are on asphalt bitumen layers and when the base course degradations that we can face with this kind of products, avoiding deep repairs. The S&P grids under a new asphaltwearing course delay the crack reflecting leading to a significant life service.

2. HISTORIC

In April 2011 S&P Brazil applied the asphalt grids bitumen coated (Pre-bituminise) Glasphalt G and Carbophalt G in to the track 4, on the way to North interior, between KM 17,400 and 18,000 highway Ayrton de Senna. This particular part of highway pavement as and indication of Deep repair due to the BGTC (Cement gravel soil) base degradation, but in this case there was no time for deep repair , opening window for this repair it was just between 22:00 to 6:00.

The job site was done on the 18 and 19 of April of 2011, and pavement , spite of some crack already reflected , its still in good condition of use and its possible that it would last another year, until end of 2016. In Sequence we present and describe the section pavement condition before and after repair and cracks evolution in 3 year comparing with tracks repair at the same time without S&P per-bituminised grids.

3. PAVEMENT SITUATION BEFORE REPAIR

In 24 of March 2011 the first inspection was made to document the situation and the pavement crack pattern. The following images reports the pavement status.



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4. APPLICATION AND JOB SITE EXECUTION

The job site application as made in 18 and 19 of April 2011 from 13:00 to 6:00. The pavement section was first CUT milled , bonding polymer emulsion applied at 300gr/m² and applied de mesh Glasphalt and Carbophalt , following on top the wearing course with the following thickness:

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

4.1 Cut milling



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Track 3 and 4 heavy damaged.
Repair executed in May 2011

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Grid applied on top of emulsion tack coat polymer modified

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5. FOLLOW UP

5.1 SITUATION AT 31 OF MAY 2011



Track 3 and 4 already repaired.

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5.2 PAVEMENT SITUATION AT 09 DE FEBRUARY 2012



Track 3 (without grid) that was repaired after track 4 already presents degradation and was subjected to punctual repair , image below.



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5.3 TRACK SITUATION IN 17 SEPTEMBER OF 2012



After 17 months the pavement with S&P Grid on track 4 its still in good conditions of use. The Track were executed without grid , and after the track 4, and was already submitted to full repair again.

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5.4 Track situation at 23 of May 2013

Comparing the tracks 3 and 4 after two years application. Track 3 its already cracked suffered a second full layer application and its needing a new wearing course layer already.



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5.5 TRACK SITUATION AT 05 OF JUNE 2014

In June 2014 ,3 year after the job site, the track 3 was repaired three times and the track four , in spite of having some cracks its still in conditions of use and passed on the external inspection from ARTESP.



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The existent cracks pavement on the track 4 didn't increase and are influenced by the really high loads and traffic frequencies along with low quality drainage and bad base soil. The fact of the good bonding between the grid, the new wearing course and the base its retarding a lot the crack reflecting and controlling at the same time the opening crack width, that allows the grid to make is function, assuming some of the pavement tension into the grid.

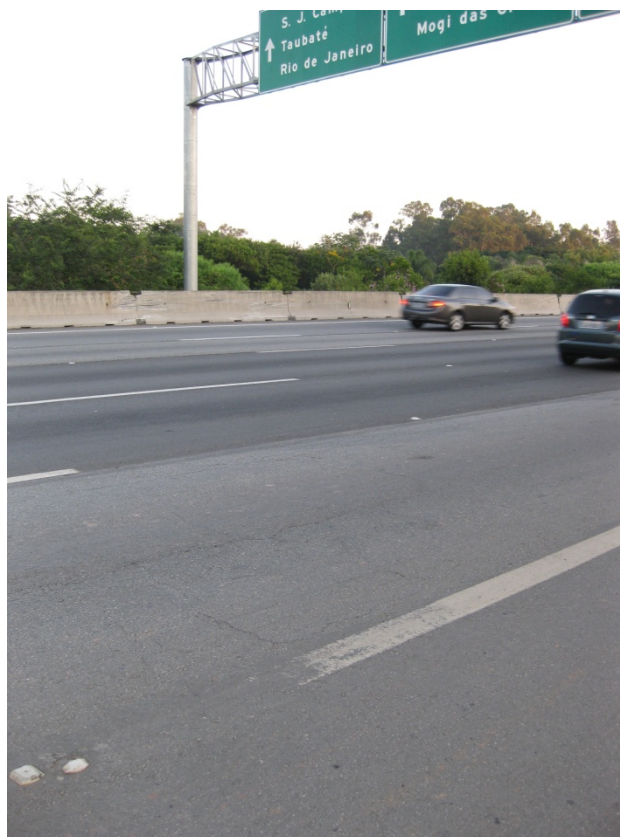
5.6 TRACK SITUATION AT 11 DE JANUARY OF 2015



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Analysing the pavement situation in July 2014 and January 2015 we can see that there wasn't significant degradation evolution, that makes us believe that this pavement Will last a list another year without repairing.

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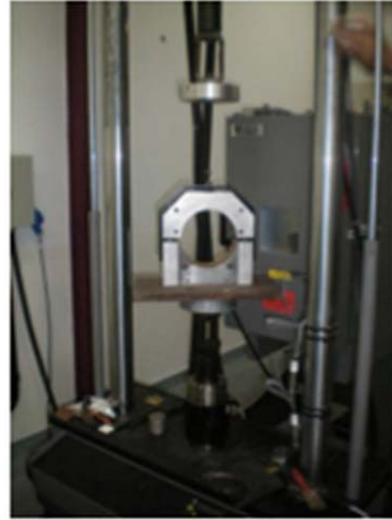
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6. LEUTNER TEST CONTROLLING AT LTP-USP



(a)



(b)



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Tabela 1. Resultados do ensaio de cisalhamento direto

Tipo de Geossintético	km	Amostra	P _{max} (kN)	Tensão _{max} (kN/m ²)
Geotêxtil Bidin com capa de 5cm	17+410	CP01		
		CP02	4,47	569,14
		CP03	4,37	556,41
		Média	4,42	562,77
		DP	0,07	9,00
		CV	1,6%	1,6%
Georelha de Vidro com capa de 5cm	17+511	CP04	6,68	850,52
		CP05	8,02	1021,14
		CP06	7,29	928,19
		Média	7,33	933,28
		DP	0,67	85,42
		CV	9,2%	9,2%
Geogrelha de Carbono com capa de 5cm	17+620	CP07	8,97	1142,10
		CP08	12,63	1608,10
		CP09	8,35	1063,16
		Média	9,98	1271,12
		DP	2,31	294,49
		CV	23,2%	23,2%
Geogrelha de Carbono com capa de 8cm	17+720	CP10	9,63	1226,13
		CP11	9,05	1152,28
		CP12	8,49	1080,98
		Média	9,05	1152,28
	17+830	CP13	6,35	808,51
		CP14		
		CP15	10,71	1363,64
		Média	8,85	1126,31
		DP	1,62	206,17
		CV	18,3%	18,3%

All test demonstrate that the bonding with our grid Carbophalt and Glasphalt were way better then polypropylene grids , double the value.

6. CONCLUSIONS

Analyzing this date we can conclude that the use o our grids S&P Pré-betuminise combined with the emulsion polymer modified , doesn't influence the bonding between layers and produce very good results. This pavement had a life usage predicted to one year , normal procedure on this pavement section, and comparing with the layers without grid confirm this fact , and now its expected to last another year in a total of 5 year without any repair intervention. New testing its on going FWD and another set of Leutner tests Will confirm the need of repair.

ANEXO I



Betunel
INDÚSTRIA E COMÉRCIO LTDA

BETUNEL
INDÚSTRIA E COMÉRCIO LTDA

CERTIFICADO DE QUALIDADE DE PRODUTO ACABADO

(cópia)

Nº 1025/2010

PRODUTO: RR-2C FLEX S

QUANTIDADE: 10 Kg

DATA DO CARREGAMENTO: 15/10/10

C. PROVA FAB/CLI: /

CLIENTE:

N. FISCAL Nº:

DESTINO:

VEÍCULO PLACA:

MUNICÍPIO:

ESTADO:

HORA:

TRANSPORTADOR:

TQ.: 20

TEMPERATURA: °C

OBS:

CARACTERÍSTICAS DE ACORDO COM A ESPECIFICAÇÃO PARTICULAR	LIMITES	MÉTODO	REPRODU- TIBILID.(*)	ENCONTRADAS	
				Carrega- mento	Na Obra
VISCOSIDADE SAYBOLT À 50°C,SSF	100 a 400	NBR-14491	± 21%	290	
RESÍDUO POR EVAPORAÇÃO, % peso - mín.	67,0	NBR-14376	ND	67,9	
PENEIRAMENTO, 0,84mm, % em peso - máx.	0,10	NBR-14393	± 0,08%	0,01	
SEDIMENTAÇÃO, 5 DIAS, % peso - máx.	5,0	NBR-6570	± 10%	2,4	
CARGA DA PARTÍCULA	positiva	NBR-6567	ND	positiva	
DESEMULSIBILIDADE, % peso - mín.	50	NBR-6569	± 30%	67	
ENSAIO SOBRE O RESÍDUO RECUPERADO POR EVAPORAÇÃO - NBR-14896					
PENETRAÇÃO,100g, 5s, 25°C, 0,1mm	45 a 150	NBR-6576	± 4 dmm	50	
PONTO DE AMOLECIMENTO (°C), mín.	55	NBR-6560	± 3°C	56	
REC. ELÁSTICA DUTIL, 20cm, 25°C, % mín.	70	NBR-15086	ND	76	

(*) A diferença entre dois resultados de ensaios, individuais e independentes, obtidos por operadores diferentes trabalhando em laboratórios distintos e em amostras de mesmo material, com a execução correta e normal deste método, pode exceder os valores somente em um caso em vinte.

ND - Não Determinado, NA - Não Aplicável

O prazo de validade das emulsões asfálticas catiônicas modificados por polímeros elastoméricos será de 30 (trinta) dias a contar da data da comercialização ao consumidor final.

Não recomendamos aquecimento de produto para descarga ou na armazenagem, pois poderá alterar suas características. Aquecimento somente no equipamento de aplicação (espargidor) respeitando os cuidados e limite máximo de 70°C

PREZADO CLIENTE: FAVOR ASSINAR E DEVOLVER A 2ª VIA DESTA COM OS RESULTADOS DA ANÁLISE ENCONTRADOS QUANDO DA CHEGADA DO PRODUTO NA OBRA. CASO ENCONTRE ALGUMA DIVERGÊNCIA, ACIMA DA REPRODUTIBILIDADE DO MÉTODO, OBSÉQUIO CONTACTAR NOSSO DEPARTAMENTO TÉCNICO.

Declarações:

- Os resultados contidos neste documento se referem a amostra ensaiada.
- Este certificado só pode ser reproduzido integralmente.
- Os dados permanecem arquivados e disponíveis em nosso arquivo eletrônico.

Original assinado por:

Rômulo Santos Constantino

Resp. Técnico - CRQ-4ª REGIÃO -03312827

O MATERIAL ATENDE AS ESPECIFICAÇÕES.

LOCAL: _____ DATA: _____ ASSINATURA: _____ REVISÃO 2.19 de 13/08/2010