

Puma Bitumen Case Study

OLEXOBIT® HSS Sprayed Seal

Millmerran Inglewood Road, QLD

Contractor: RoadTek, Toowoomba, QLD

Asset Owner: Department of Transport
and Main Roads (QDTMR)

Date: January 2009



Background

The OLEXOBIT® HSS Millmerran project involved the placement of the final seal on a two lane section of the Millmerran Inglewood Road, 15km south of Millmerran in Queensland. The pavement was reconstructed and widened in 2006 and the planned seal was the final seal for the construction project. This is required to provide a durable and waterproof seal and to retain good texture in the long term.

Challenge

The Millmerran Inglewood Road takes 300 vehicles per day – however, it also takes a very high proportion of heavy vehicles. The heavy vehicle count of 28% is not uniform throughout the year and may exceed this level from time to time.

The purpose of the pavement upgrade was to establish the road as a through link for road trains. A normal seal in this situation would be designed for the low traffic count, but might be compromised by the damaging effects of the heavy vehicles, potentially suffering from loss of texture due to flushing, or from loss of cover aggregate.



Solution

The traffic count for this road is too low to justify the placement of a double/double seal, which may be better able to cope with the heavy vehicle traffic. A conventional single/single seal using normal Class 170 bitumen would not be expected to cope.

The only viable alternatives were to consider the use of a modified binder, such as multigrade M500/170 or a polymer modified binder (PMB). However, cost considerations prevented the use of highly modified binders.

Due to the particularly challenging circumstances, it was decided to use OLEXOBIT® HSS, which is designed to achieve excellent aggregate retention in high stress seal situations. The choice of this PMB over Class 170 would ensure the seal can withstand the stresses caused by the high proportion of heavy vehicles using the pavement, especially on the curves in this section of the road.

Construction

Seal construction took place during a period of fine weather with ambient temperatures around 34°C.

RoadTek applied the binder using their dual bar transverse variable sprayer. A higher binder application rate of 2.0 L/m² was applied between and outside the wheelpaths – and a lower rate of 1.7 L/m² was applied in the wheel paths.

Application Details

Existing Pavement	14mm seal over an unbound granular pavement
Weather	34°C and fine with very little wind and no rain imminent
Pavement Temperature	48°C to 57°C
Traffic	300 vpd (28% HV)
Aggregate Size	10mm
Aggregate Type	Crushed basalt
Aggregate Spread Rate	130m ² /m ³
Aggregate Precoat	Precoated with Shell Mexkote A at 6 L/m ³
Binder Application Rate	1.7 L/m ² in the wheel paths 2.0 L/m ² between & outside the wheel paths
Binder Spray Temperature	170°C
Binder Cutter Content	1% cutter
Adhesion Agent in Binder	0.6% DIAMIN TOL (N-oley propylene diamine – ex Quimikao)



Results

A very good bond was achieved between the existing surface and the new seal. A substantial benefit provided by the unique polymer technology within OLEXOBIT® HSS is the superior early life adhesion, which led to the rapid development of adhesion to the cover aggregate, even before rolling took place. A very good tight stone matrix was formed with very few loose stones after rolling was completed.

Inspection of the seal at 3 months showed it to be performing very well with excellent binding of the cover aggregate. A stone was removed to show that the binder was lively and elastic, as demonstrated by stringing of the binder. Inspection of an adjacent section of the seal constructed using M500/170 multigrade bitumen showed less binder strength and no stringing.



About OLEXOBIT® HSS

OLEXOBIT® HSS is a polymer modified binder (PMB) designed for use in sprayed sealing applications to achieve improved aggregate retention and reduced risk of flushing over conventional bitumen. It is especially suited where the seal is under medium to high traffic-induced stress – for example, roads with tight curves, and where there is a moderate degree of braking, accelerating and turning motions, which can quickly result in stripping of the aggregate.



Information for this case study was compiled by Puma Bitumen with the assistance of the Queensland Department of Transport and Main Roads, and RoadTek.

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