



Unexpected popping in thin asphalt surfaces resolved

Environmental Fact Sheet No. 3

Introduction

There is an increasing use of recycled materials in road construction. The use of recycled crushed concrete as an aggregate on lightly loaded pavements is a common application adopted on a variety of projects such as car parks, sporting facilities, bikeways, school yards etc.; however, there are some perceived contamination problems.

Small defects in the surface of asphalt pavements were discovered in several locations, through examination and testing it was determined that the cause of the defects was the use of a foundry material which included a material susceptible to corrosion. The removal of the material eliminated the chance of further defects.

This also provided the impetus for the creation of a remediation strategy to manage these issues, should they arise in the future.

Problem

When an asphalt pavement started to have small areas where the surface was being pushed up, like the surface was “popping” (refer Figure 1). An investigation into the cause of the problem was undertaken.

Initially the spots where the deformities were occurring were examined, and a white powder was discovered (refer Figure 2).

This looked like something had corroded, and subsequently an independent consultant was engaged to further investigate the cause of the “popping”.

Diagnosis

It was determined that the “popping” was indeed caused by corrosion, in this case it was aluminium alloy. This was further traced back to the inclusion of foundry material, which contained the aluminium alloy. The alloy reacted with water and then corroded, increasing in size and pushing the pavement surface up.

Trial Pavement

To determine the ongoing effects of this type of problem, a small trial pavement was created, which was seeded with pieces of aluminium, steel and rubber. A layout of the trial is shown below:

Quarry Material
Aluminium Casting
Recycled material type 1
Aluminium Casting
Recycled material type 2
Steel bolts, washers and rubber
Recycled material type 2
Aluminium casting

Table 1 – layout of trial pavement

This was constructed in October 2009, and is reviewed regularly to determine the effects of these materials. It was noted that some initial “popping” occurred, directly where the aluminium was included, however no change has since been observed.

Resolution

To prevent this from happening again, the recommendation was not to use the foundry material in the material used for the construction of pavements when recycled materials were included.

This was supported with the development of a pavement repair and monitoring strategy to overcome issues of “popping” when they occurred. This strategy is outlined in Environmental Fact Sheet No. 7 – Pavement Repair and Monitoring Strategy.



Figure 1 – popping in pavement surface



Figure 2 – white powder

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