AustStab Construction Tips

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Stabilisation patch width

Introduction

Competing resource requirements to maintain the Australian network has led many asset managers to seek new approaches to establishing rehabilitation techniques to allow the network to meet minimum operation requirements. One such technique is to stabilise sections or patches of failed granular pavements. Whilst this a sound approach, the size of patch with regard to other road parameters can cause further damage to the granular road material near the patch. This guideline seeks to provide guidance for asset managers and design engineers to establish the best approach.

Site Investigation

Establishing the failure of a pavement material through a comprehensive site investigation is likely to lead to a suitable rehabilitation option for the given resources for the project. Various SRAs have technical manuals and guidelines listing the techniques for site investigation and AustStab developed an approach for the purpose of a rational approach to rehabilitation design [Ref.1]. These guides should be consulted to allow a suitable investigation to why the pavement failed and what type of material is available for stabilisation.

During site investigation it may become apparent the pavement may have failed due to a weak subgrade or lack of drainage. These two types of failure mechanism are important in determining the final pavement patch configuration as noted in the following sections.

Subgrade Failures

All pavement materials are prone to failure should they be directly supported on weak subgrades (refer to Figure 1).

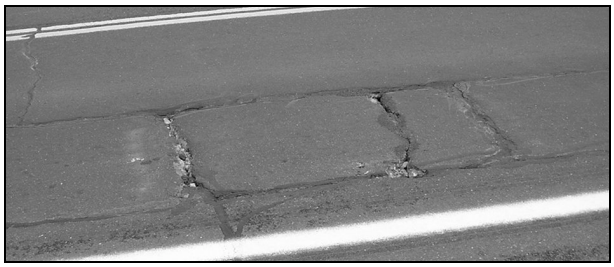

Figure 1 Stabilised pavement showing block cracking due to weak subgrade region.

Stabilising the existing failed material and compacting to a specified level is unlikely to provide a long-term rehabilitation solution. In these instances, it is prudent to stabilise or remove the weak subgrade layer and strengthen the layer to at least a CBR of 10%. Once the top (i.e. at least 150 mm) of the subgrade has been strengthened, the next stabilised layer can be constructed and compacted to suitable specified levels.

Drainage

Many experience engineers will openly admit that drainage, or the lack of it, is one of the most common causes of localised pavement failures. Similar to weak subgrades, the stabilisation of only the concerned area is unlikely to provide a long-term solution as adjacent areas may "tank" subsoil water to well after rainfall has ceased, leading to pavement failures adjacent to the patch (see Figures 2 and 3).

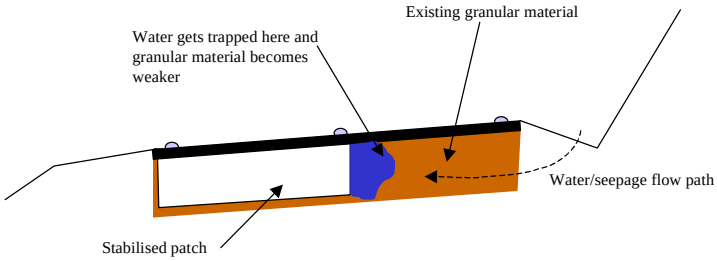

Figure 2 Potential drainage problems with half road width patching.

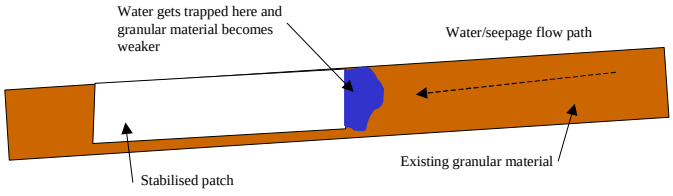

Figure 3 Potential drainage problems with longitudinal patching.

Equipment used for patching

At the moment there are three basic techniques for insitu patching, namely:

1. Skidsteer patrol patcher
2. Normal reclaimer/stabiliser with full or part-width rotor.
3. Mobile plant-mix machine using existing or quarried materials.

In the 1990s saw the development of a small-scale patrol-patching machine. The machine uses a 600mm-profiler style head, mounted on a skidsteer. A 200 litre water tank, water pump and spray system was incorporated onto the skidsteer.

The aim of this equipment was to stabilise the top 150 mm of base material for a patch area of less than 50 m^2 and to provide an immediate short-term solution. More detail may be obtained from AustStab Construction Tip 2 [Ref.2].

The more common approach is to use a reclaimer/stabiliser for patching. Bringing this equipment to the site is an important cost to the project, and therefore, careful consideration to the extent of patching for the road should be considered before tendering.

For the last five years, some AustStab contracting members have utilised part-width rotors, as shown in Figure 4. These special rotors were developed for the shoulder widening safety project identified by many SRAs as a rational approach to reducing rural death tolls due to poorly defined and sound shoulders [Ref.3]. These rotors mix to a width much less than the width of the reclaimer.

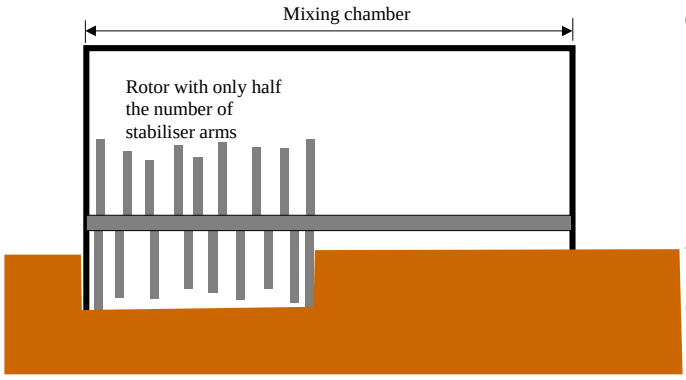

Figure 4 A half width rotor that can operate on several reclaimers including the RS500.

When full width deep-lift patches are carried out the transverse joint may be curved due to the size of the rotor, and in this instance the contractor is required to make two transverse mixes to "square" the transverse joints as shown in Figure 5.

Profilers are not recommended for stabilisation of patches, even when those have been adapted by the manufacturer with a water spray bar and water storage tank.

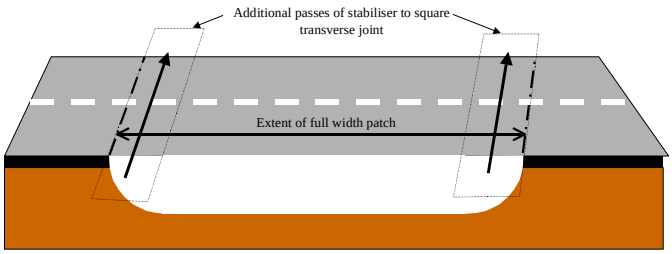

Figure 5 Transverse joints requires additional reclaiming for deep-lift stabilised patches.

Suitable patch widths

The best approach to take with patching is to stabilise the full carriageway width to overcome potential drainage problems and problems where wide wheel paths may occur on rural single and two lane roads.

If the failure of the patch is on the uphill side of the formation the half-road patches may be suitable. Otherwise if the failed pavement is on the downhill side of the formation, a full width patch is considered a prudent solution.

For patching of the outer wheel path due to rutting it is recommended that the pavement material be stabilised from the centre of the lane to the shoulder. However, these patches should be limited to about 50 m in length. Greater distances should involve full lane width patches.

References

1. *Site Investigations* National AustStab Guidelines, 14 October 1999.
2. *Skidsteer Stabilisers* AustStab Construction Tips No. 2, February, 2000.
3. *Roads in the Community - Part 2: Towards better practice* Austroads AP-50/97, Sydney 1997.

Web Sites

AustStab home page
http://www.auststab.com.au

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