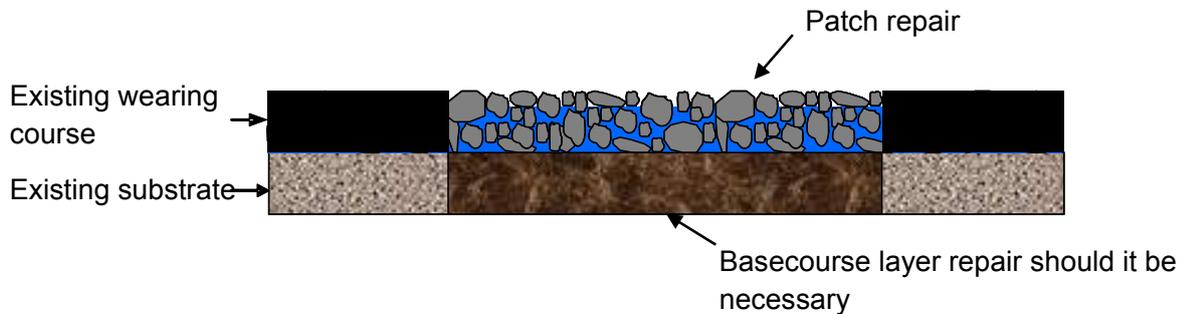


Method statement for labour based construction of:

Patch repairs – hot mix asphalt and cold mix



Definition

A patch is repair to the upper zone of a distressed pavement. It may extend to the base course layer. The size of the patch will depend on the extent and type of the distress in the pavement. In some cases the basecourse layer will also need to be replaced if the layer is defective. In such cases care should be taken to ensure the repair will effective in addressing the cause of distress.

Application

Patching can be undertaken as isolated repairs or as part of a rehabilitation project to repair distressed areas prior to the application of an overlay or reseal. Care needs to be taken to ensure that the soundness of intact surfacing around the area being repaired is not adversely affected by vibration of the compaction equipment or rollers used in the maintenance operation. Patches can be filled with either hot mix asphalt or cold mix asphalt. Both have advantages and disadvantages which will be discussed under the section on quality control. In the case where the basecourse also needs to be replaced asphalt base material should be used.

Material requirements

Asphalt: - hot mix asphalt or (bagged) cold mix can be used for reinstatement of the wearing course. A conventional continuously graded dense I wearing course with nominal maximum aggregate size of 13.2 mm is normally used for ease of handling and compaction.

Hot mix asphalt base material of maximum nominal size of 26.5 mm will normally be used in the deeper zones for base course replacement .

Prime or Bitumen emulsion: - Diluted anionic stablemix grade 60% bitumen emulsion is recommended as a tack coat for patching as it breaks more rapidly thereby allowing the repair to be carried out in a single operation.

Solvent/water: - used to clean the equipment after use. If an emulsion is used they can be washed off with water. Solvents will be required if a cutback bitumen prime is used.

Sealant: - to cover the patch once fixed to prevent moisture ingress at the edges and seal off the top surface.

Plant and equipment requirements

Item	Number of items
Tape measure	1
Crayons	1 box
Straight edge	1
Shovels	2
Broom	2
Block brush	1
Hand stamper	1
Rake	1
Roller (pedestrian or small sidewalk roller)	1

Labour requirements

Below is the typical composition of a small maintenance team required to undertake patching. It is not possible to give an exact production rate for this work given the variability in the nature of the work being undertaken. It will depend on the patch sizes, depths and spacing., the extent of the area to be patched and traffic volumes.

Activity	Number of workers
Supervisor	1
General labour	4

Additional labour will be required for traffic control. A minimum of 2 flag men should be deployed with appropriate signage to assist in this operation. Stop go signage and large cones or delineators will be required to demarcate the working area and make it safe for both workers and passing traffic.

Construction

Traffic control

The road will need to be barricaded off in the correct manner to allow for the work to be undertaken in a safe manner, especially where the work is undertaken under traffic. The signage may need to remain in place until the material has set and is hard enough to carry traffic loading. This operation needs to be coordinated by the supervisor to ensure the correct decision is made regarding the choice of asphalt wearing course to allow safe passage of traffic.

Should the patching be part of a rehabilitation contract, sections of road may well be closed off as part of the conditions of contract. In this case the traffic accommodation will already be taken care of.

Site Preparation

The damaged area that will be removed should be marked out using the straight edge and crayon. A tin of spray paint may also be used to demarcate the repair area. This marked out area should be in the shape of a square or rectangle with sides parallel to the road edge. Care should be taken to ensure that the area marked out covers the full extent of the distressed zone.

Excavation and preparation

Using a pick, the surfacing should be chipped out up to the edge of the crayon markings. This may require that some sound surfacing will have to be removed. All the loose material should be removed to a depth of at least 40 mm if only surface damage is being repaired. Should the base layer also need to be replaced this process of material removal should extend to the top of the subbase. The lower layer should not be disturbed by the picking action. The exposed areas should be broomed to remove all loose material and dust and to ensure that a good bond of the backfilling material to the existing pavement layers.

Using the block brush the entire exposed surface should be painted with the diluted emulsion (50/50 with water) to ensure a good bond between the asphalt and the existing material both on the sides and the bottom of the opened area. The prime must not be applied in such a thick layer as to leave pools at the bottom of the area. A thin, uniformly applied layer will suffice.

Backfilling the patch

Where the base course has been removed the hotmix asphalt base material will be placed first. For replacing the existing wearing course, either hot mix asphalt or cold mix asphalt can be used. Although the basic principles apply to both, some differences will be highlighted below.

Backfilling and compaction with hot mix asphalt base

The same principles apply as for the wearing courses detailed below with regards to temperature and quantities ordered. The temperature loss is less of an issue than for wearing courses given the larger stone aggregate size in the asphalt. Consequently the asphalt piles will tend to retain its temperature for longer periods. Nevertheless, it is still critically important to ensure that the temperature of the asphalt base material is higher than 120 °C before commencing with the patch work.

The top of the compacted asphalt layer should be as to allow for a wearing course layer thickness of 40 mm on top of the base. The wearing course will be placed once compaction and finishing of the base layer has been completed and, preferably having been allowed to cool overnight.

A roller should be used to compact the asphalt base if the area of repair permits, otherwise a plate compactor can be used. A hand stamper should be used to tuck the edges down flush with the top surface of the base layer. This will ensure a neat 90 degree edge joint for the wearing course.

Backfilling and compaction of hot mix asphalt wearing course

The temperature of the hot mix asphalt must be maintained for the edge break to be effectively repaired. It should be kept covered with a tarpaulin in heaps large enough to retain the heat for as long as is necessary. To avoid wastage only required quantities should be ordered. Once the temperature of the asphalt has fallen below 120 °C it becomes unworkable.

hot mix asphalt hot mix asphalt hot mix asphalt The hot mix asphalt should be dumped as close to the area where it is required to reduce double handling and also to ensure there is minimal temperature loss.

After placing the hot mix asphalt it should be raked level. A certain amount of compaction should be allowed for by leaving the hot mix asphalt about 10 mm proud of

the existing road surface. Use is made of the existing road edge as a guide for the required level. Compaction with the roller should commence, starting from the outer edge working towards the centre of the road. The surface of the compacted layer should be tightly knit together with no visible holes or large voids. Care should be taken not to damage the surrounding surfacing with compaction vibration as this may lead to further pavement distress. The surface should be checked for level with the straight edge. It is preferable to have the material slightly proud to creating a hollow. The proud surface will allow for some additional compaction under traffic especially in the wheel paths of the vehicles.

All loose material should be swept from the surface. To ensure that the patch is waterproof, a sealant should be painted onto the surface to seal off all surface cavities as well as the joint between the existing surfacing and the patch. This will ensure that the repaired patch is waterproof and will not allow water to seep into it.

The hot mix asphalt filled patch can be opened to traffic immediately after the sealant has set. A sprinkling of fine dust of sand can be placed over the sealant to assist in the drying process and preventing the sealant from being spread by the vehicles tyres. This action will ensure that the operation is left looking neat and tidy.

Backfilling and compaction with cold mix asphalt

Having measured the quantity of wearing course required, the corresponding number of bags are opened and the material exposed to sunlight for some time to warm up and become sufficiently workable for it to be laid and compacted.

The compaction of the repair is the same as that for hot mix asphalt.

It should be noted that where cold mix is used, it should not be opened to traffic immediately after completion because the volatiles in the cold mix still need to evaporate for the mix to stiffen. If at all possible traffic should be kept off the repaired edge break until the following day.

Cleaning up and moving on

All the tools should be cleaned after each patch repair to prevent any build up of emulsion and asphalt of the spades and rakes. The block brush should be kept in water during the repair operations and thoroughly rinsed at the end of each day.

Quality control

Regarding the selection of asphalt the following factors should be considered:

- Hot mix asphalt allows the road to be opened to traffic once it has cooled which is soon after the repair is complete, resulting in less traffic disruptions and earlier removal. As it is important to ensure that the HMA remains hot enough to be compacted, there is a risk of wastage.
- Cold mix (bagged) asphalt wearing course can only be opened to traffic once the volatiles in the mixture have evaporated to prevent the layer yielding under traffic. Consequently the repair area may cause an obstruction with signage having to be in place, typically overnight.

As with all repairs to roads under traffic, it is vitally important that road users are aware of the roadworks through proper signage and traffic accommodation