

THURROCK COUNCIL

PROCEDURE AND SPECIFICATION FOR POTHOLE/PATCHING REPAIR

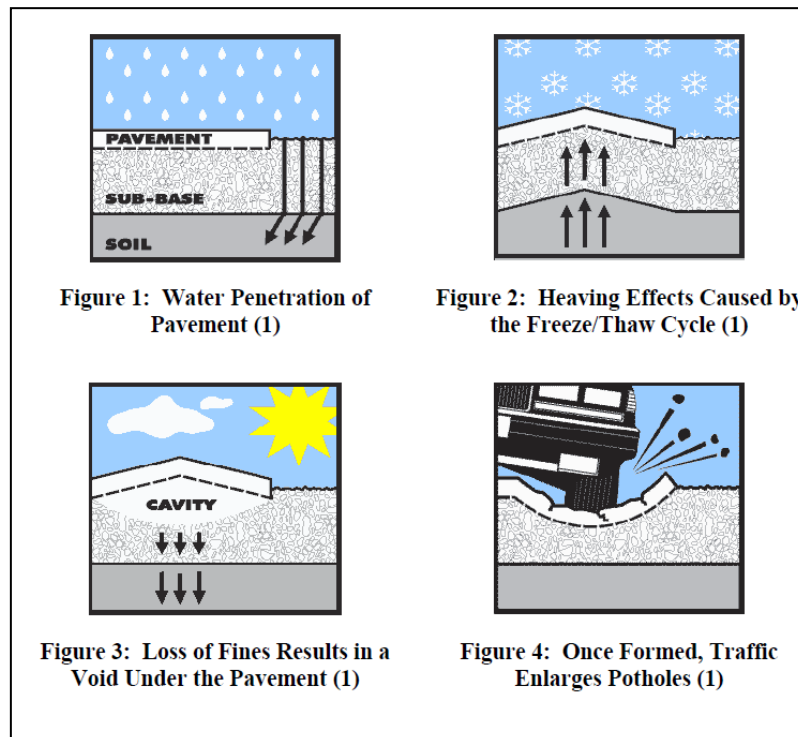
1.0 Introduction

- 1.1 Patching, one of the most expensive of the maintenance procedures for hot-mix asphalt (HMA) pavements, (per unit of measure, i.e. cost/ton, cost/cm², cost/m²) and is often done in preparation for other forms of corrective maintenance, pavement preservation, or pre-treatment prior to an overlay. Patching restores the pavement surface to a state where other preservation treatments can be used with a good chance of success.
- 1.2 The primary methods of patching include the replacement of materials that have been lost due to localized pavement distress or disintegration, the complete removal (dig out) and replacement of continuous segments of failed pavement, or the application of a thin layer of HMA material over segments of pavement that exhibit more surface-related distress/distortion. Once patched, the distressed area is repaired or strengthened so that it can carry a significant traffic level with improved performance and lower rates of deterioration.
- 1.3 Patching may be temporary, semi-permanent, or permanent treatments. The appropriate method to be used depends on the traffic level, the time of the year during which the repair is carried out, the time until scheduled rehabilitation, and the availability of equipment and personnel.
- 1.4 Patching is best carried out during clear moderate weather. However, emergency repairs may require patching be performed during poor winter weather conditions. In these instances, the durability of the patch is likely to be poor and the patch should be considered to be temporary. Accordingly, it is a good strategy to plan for a more semi-permanent repair of these areas when moderate weather conditions prevail.

2.0 Potholes

- 2.1 Potholes are a form of disintegration of the pavement that may be associated with poorly compacted material, raveling, cracking, base failure or aging of the pavement. Potholes often appear after rain or during thaw periods when pavements are weaker. The generally accepted mechanisms for pothole formation are as follows:
 - Ravelling, stripping, or cracking in the pavement surface.
 - Water penetrates the surface layers of the pavement, softening the underlying pavement layers, which increases deflections. Figure 1 illustrates how water can penetrate a pavement.
 - Ice formation and heaving in the pavement occurs in some climatic areas. Figure 2 illustrates heaving due to a freeze-thaw cycle in a cold climate.
 - Fines from the underlying pavement layers are lost, reducing overall structural strength and support for the pavement surface. Figure 3 illustrates the resulting cavity when the fines are lost due to migration or pumping.

- Once a hole is formed, it will continue to grow until it is repaired. Figure 4 illustrates the role traffic plays in enlarging a pothole.



3.0 Construction procedure/specification for potholes

3.1 Semi-permanent patching is considered to be an effective patching method (second only to complete removal and replacement of the failed area). This will be the first choice of repair in Thurrock when dealing with potholes (as opposed to temporary repair). The following steps describe how this form of patching will be carried out:

- Mark the boundaries of the distressed area, taking care to encompass a slightly larger area than that reflected by the distress. The repair boundaries should be as rectangular as possible and take into consideration the dimensions of the equipment that will be used for removal of the old material and compaction of the new material.
- Cut the boundaries of the patch square using either a diamond saw or pneumatic hammer with a spade bit. In the case of the latter, care should be taken not to damage the HMA surface layer in the sound pavement.
- Remove water and debris from the hole. Figure 7 illustrates a hole that has been dewatered and cleaned of debris. Depending on the size of the pothole, this may be accomplished manually with a pick and shovel or with various combinations of power equipment, i.e., a pneumatic hammer and shovel, backhoe, or front-end loader. Cold milling equipment can also be very effective for this operation.

- Square up the sides of the hole until the edges of the hole are sound pavement. This step is usually very simple if the boundaries of the repair area were cut with a diamond saw or established with cold milling equipment. It is usually only required when manual techniques of material removal are employed. Figure 8 illustrates a hole that has been extended to sound pavement and firm supporting material. It is suggested that the depth of the patch be 50% thicker than the thickness of the failed layer.
- Apply a tack coat of asphalt emulsion to the sides and bottom of the hole at a rate of approximately 1 litre/m² (0.2 gal/yd²) of slow or rapid setting emulsion. The tack coat should either be sprayed or brushed on the edges of the repair, never poured. Figure 9 illustrates the tack coat application.
- Place the patch material in the hole. If the patch is placed manually, use a shovel (not a rake) to place the HMA material taking care to avoid segregation. The hole should be overfilled by 20 to 25 percent of its depth to provide adequate material for compaction. An asphalt rake should be used to feather or blend the patch edges.
- Compact the patch material with a hand device or a small vibratory roller. It is preferable to use compaction equipment whose surface is smaller than the size of the patch. It is very difficult to achieve satisfactory compaction with equipment that bridges the repair area. Figure 10 illustrates the compaction of the patch material.
- The finished patch should have a 3 to 6 mm (0.1 to 0.2 in) crown. This allows for further compaction by traffic and helps prevent standing water in the patch area. Figure 11 illustrates the finished patch.
- The patched area should be seamed with crack sealant and fog sealed.

