

# CL-19

CONSTRUCTION LEAFLET NO. 19  
 THE ASPHALT INSTITUTE  
 ASPHALT INSTITUTE BUILDING  
 COLLEGE PARK, MARYLAND 20740

## FULL-DEPTH<sup>®</sup> ASPHALT PATCHING

### INTRODUCTION

An important element in maintenance engineers' efforts to protect and preserve the sizeable investment in roads is the Full-Depth\* asphalt patch. It is used to repair all types of localized pavement distress that extend below the roadway surface. Examples of these are pot holes, alligator cracking, upheaval, and shoving.

Simply stated, the procedure is to remove the failed area and replace it with fresh asphalt mix. Although the operation is not difficult, frequently some of the necessary fine points are not attended to. Yet, these fine points often determine whether the completed patch will be a temporary expedient or an integral part of a functional pavement system.

This publication outlines the correct procedure for constructing a Full-Depth asphalt patch.

### PATCHING MIXES

**Asphalt Concrete** — This is a high quality, thoroughly controlled hot mixture of well-graded, high quality aggregate and asphalt cement. The materials are mixed at a high temperature and should be laid and compacted before the mix temperature drops much below 93°C (200°F). These mixtures, designed for strength and long life, should be used whenever this is practical and economical.

**Plant Mixes with Emulsified or Cutback Asphalts, Cold Laid** — These mixtures consist of a local aggregate and an emulsified or cutback asphalt mixed in a plant. They may be used immediately, if properly aerated, or stockpiled for future use.

\*Full-Depth<sup>®</sup> — The term Full-Depth (registered by The Asphalt Institute with the U.S. Patent Office) certifies that the pavement is one in which asphalt mixtures are employed for all courses above the subgrade or improved subgrade. A Full-Depth asphalt pavement is laid directly on the prepared subgrade.

## CONSTRUCTING THE PATCH

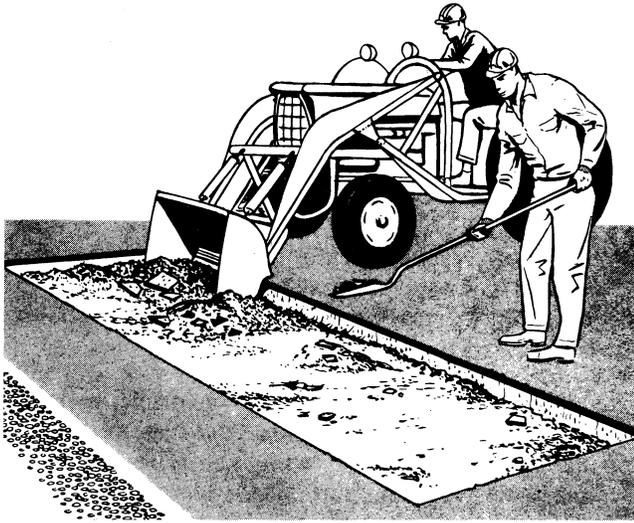


Figure I—Removing surface and base



Figure II—Applying tack coat to vertical surfaces



Figure III—Backfilling hole with plant-mix

- With a pavement saw or pneumatic hammer, cut the outline of the patch, extending at least 0.3 m (1 ft) outside of the distressed area. The outline should be square or rectangular with two of the sides at right angles to the direction of traffic.
- Excavate as much pavement as necessary to reach firm support (Fig. I). If a patch is to be an integral part of the pavement, its foundation must be as strong or stronger than that of the original roadway. This may mean that some of the subgrade will also have to be removed. The faces of the excavation should be straight and vertical.
- Trim and compact the subgrade.
- Apply a tack coat to the vertical faces of the excavation (Fig. II). SS-1, SS-1h, CSS-1, CSS-1h, RS-1, CRS-1 emulsified asphalts are all suitable.
- Backfill with the asphalt mixture (Fig. III). Shovel the mixture directly from the truck into the prepared excavation. Place the shovels-full against the edges of the hole first (rather than in the center and then raking to the edges). The maximum lift thickness largely depends upon the type of asphalt mixture and the available compaction equipment. Asphalt concrete can and should be placed in deep lifts, since the greater heat retention of the thicker layers facilitates compaction. From a compaction standpoint, patches using asphalt concrete can be backfilled in one lift. However, when placing a patch that is deeper than 125 mm (5 in.) it is often useful to leave the first lift 25 to 50 mm (1 to 2 in.) below the finished grade, making it easier to judge the total quantity of mixture required for the patch.

On the other hand, patches constructed with mixtures containing emulsified or cutback asphalt must be placed in layers thin enough to permit evaporation of the diluents that make the mixture workable.

- Spread carefully to avoid segregation of the mixture (Fig. IV). Avoid pulling the material from the center of the patch to the edges. If more material is needed at the edge, it should be deposited there, and the excess raked away. The amount of mixture used should be sufficient to ensure that after compaction, the patch surface will not be below that of the adjacent pavement. On the other hand, if too much material is used, a hump will result.



Figure IV—Spreading the mix

- Compact each lift of the patch thoroughly (Fig. V). Use equipment that is suited for the size of the job. A vibratory plate compactor is excellent for small jobs, while a vibratory roller is likely to be more effective for larger areas.

When compacting the final lift (which may be the only lift), overlap the first pass and return of the vibratory roller or plate compactor no more than 150 mm (6 in.) on to the patch on one side. Then move to the opposite side and repeat the process. Once this is accomplished, proceed at right angles to the compacted edges, with each pass and return overlapping a few millimetres (inches) on to the uncompacted mix. If there is a grade, compaction should proceed from the low side to the high side to minimize possible shoving of the mix.

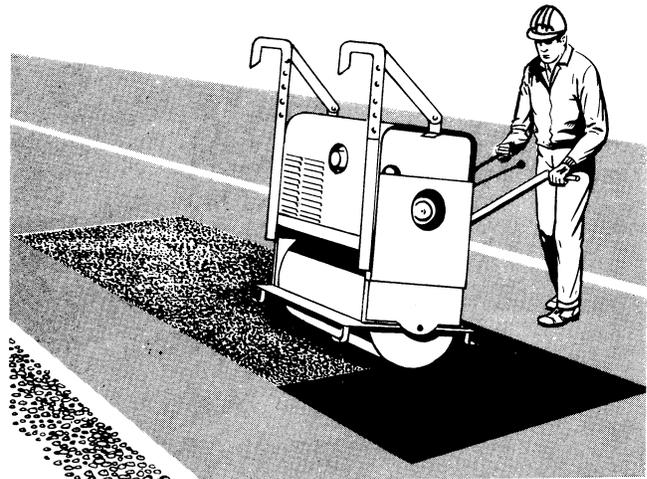


Figure V—Compacting the mix

When adequate compaction equipment is used, the surface of the patch should be at the same elevation as the surrounding pavement. However, if hand tamping or other light compaction methods are used, the surface of the completed patch should be slightly higher than the adjacent pavement, since the patch is likely to be further compressed by traffic.

- Check the vertical alignment and smoothness of the patch with a straightedge or stringline (Fig. VI).

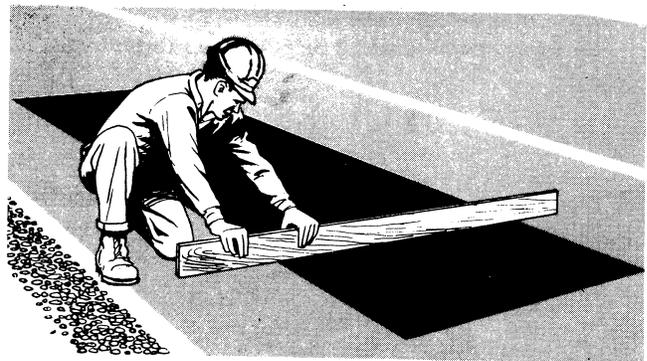


Figure VI—Straightedging the patch

## **ADDITIONAL INFORMATION**

Additional information on pavement maintenance is available from the Asphalt Institute offices listed below.

The following Construction Leaflets may also be of interest:

- CL-5 Pavement Rehabilitation — Preparation for Asphalt Overlays
- CL-6 Pavement Rehabilitation — Asphalt Widening
- CL-10 Open-Graded Asphalt Friction Courses
- CL-13 Specifications for Undersealing Portland Cement Concrete Pavements with Asphalt
- CL-14 Surface Treatment Tips
- CL-15 Maintenance and Repair of Asphalt Parking Lots