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# HMA Asphalt Patching



# HMA Asphalt Patching Checklist

This checklist is one in a series created to guide State and local highway preservation/maintenance and inspection staff on the use of innovative pavement preservation techniques.

FHWA uses its partnerships with different pavement preservation organizations including American Association of State Highway and Transportation Officials, and State and local transportation agencies to promote pavement preservation.

To obtain other checklists or to find out more about pavement preservation, contact your local FHWA division office or check the following FHWA Web page:

[www.fhwa.dot.gov/pavement/preservation/resources.cfm](http://www.fhwa.dot.gov/pavement/preservation/resources.cfm)

Other valuable resources on pavement preservation:

- [www.roadresource.org](http://www.roadresource.org)
- [www.fp2.org](http://www.fp2.org)
- [www.tsp2pavement.pavementpreservation.org](http://www.tsp2pavement.pavementpreservation.org)

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# Preliminary Responsibilities

## Document Review

- Project specifications
- Construction manual
- Traffic control plan
- Agency requirements
- Manufacturer's sealant installation instructions
- Safety data sheets
- Applicable Occupational Safety and Health Administration (OSHA) safety requirements
- Contractor quality control (QC) plan

## Materials Checks

- Verify that materials including asphalt binder, aggregate(s), tack coat, and sealant are from approved sources.
- Asphalt binder is performance graded consistent with environmental and traffic factors.
- Aggregate(s) meet required skid resistance value.
- The mix is produced by an approved hot-mix plant.
- The mix design meets specifications.
- The mixture has been tested for moisture susceptibility.
- Asphalt content, air voids, and gradation are within the job mix formula (JMF) tolerances.

# Pre-Application Inspection Responsibilities

## Equipment Inspections

### Paver (If Applicable)

- Ensure that the paving machine is well maintained and in good working order, including the following:
  - Auger
  - Screed
  - Flow gates
  - Slat conveyor
  - Hopper wings
- Tires are properly inflated or tracks properly adjusted.

### Rollers

- Water spray bars, wetting pads, and scraping bars are working on all rollers to avoid material buildup.
- Approved asphalt release agents are available. Note: Do NOT use diesel fuel to clean roller drums or tires.
- Steel drums are free of grooves and dents and not warped.
- Vibratory plates or hand tampers are available for areas inaccessible to rollers.

## **Hot Applied Sealant Melter**

- An indirectly heated double boiler type melter with effective agitation should be used.
- The melter is in good working order with all heating, agitation, pumping systems, valves, thermostats, and other parts functioning.
- The melter's heating system is thermostatically controlled.
- Temperature gauges are calibrated and checked for accuracy.
- Proper wand tips for desired application are used.

## **Weather Requirements**

- Air and surface temperature meet agency requirements.
- Paving does not begin if rain is imminent.
- Air and pavement surface temperatures, humidity, wind, and lift thickness will affect how quickly a mix cools and the time available for compaction.
- Application of the sealant does not begin if there is any moisture on the surface.

## Traffic Control

- Verify that traffic control conforms to plans and specifications and complies with the *Manual on Uniform Traffic Control Devices* (MUTCD).
- Verify that traffic control personnel are trained and qualified in accordance with contract documents and agency requirements.
- Ensure that flaggers do not hold traffic for too long.
- Any unsafe conditions are reported to a supervisor.
- Signs are removed or covered when they are no longer needed.

## Project Inspection Responsibilities

### Removing Pavement

- Using a pavement saw, milling machine, or pneumatic hammer, an outline of the patch should be created.
- The patch outline should extend at least 1 ft beyond the limit of the distressed area.
- Ensure that the patch is square or rectangular in shape with the edges aligned parallel, or at right angles, to the centerline of the pavement.



- Ensure that the existing pavement is excavated to a depth required to reach firm support. In areas where the subgrade is poor, the subgrade will also need to be excavated.
- Remove the existing asphalt material within the outline of the patch and properly dispose of the debris.

## **Subgrade Excavation**

- Verify that the subgrade beneath the removed pavement provides adequate structural support. If not, the subgrade should be excavated and backfilled with suitable granular material.
- Ensure any excavations greater than 4 ft in depth utilize protective safety measures such as ladders, steps, or ramps. Personnel working around excavations should be familiar with Trenching and Excavation Safety standards of OSHA.
- Deeper excavations require sloped, shored, or shielded trench walls that will increase the size of the asphalt patch.
- Ensure that the lift thickness of the backfill material does not exceed specifications. Commonly, lifts are applied and compacted at 6 in. increments.
- Verify that density requirements are met after compacting each lift of backfill material.

## Constructing the Patch

### Manual Application

- Ensure tack coat is applied to the vertical faces of the asphalt along the perimeter of the patch.
- Asphalt can be shoveled directly from the truck into the patch.
- The asphalt should be placed against the edges of the patch first.
- A rake should be used to spread the material evenly across the patch.
- Avoid pulling material from the center of the patch to the edge.
- If additional material is needed at the edge, it should be deposited there and the excess raked away.
- The asphalt should be compacted in lifts no more than 3 in. thick.

## **Paver Applied**

- ❑ Ensure the paving screed is preheated before starting placement.
- ❑ Verify the mix arriving at the paving site is within the specified temperature range.
- ❑ Ensure the mix is being placed at the proper grade and cross-slope and at the specified thickness.
- ❑ Surface texture is uniform, free of segregation, tearing, or scuffing.
- ❑ Verify the placement is providing a smooth riding surface.

## **Compaction**

- ❑ Small patches can be compacted with a vibrating plate compactor, while large patches should use a steel drum roller.
- ❑ The asphalt should be compacted in lifts no greater than 3 in.
- ❑ Each compacted asphalt lift should meet density requirements.
- ❑ For the surface lift, the patch edges should be compacted first.
- ❑ The finished asphalt surface should be flush with the surrounding surface or up to 0.1 to 0.2 in. above the surrounding pavement. Leaving the finished asphalt surface slightly above the surrounding pavement will account for further compaction by traffic.

## Sealing the Edges of the Patch

- After the patch has cooled, the edges of the patch should be sealed to prevent water from entering the pavement structure.
- Ensure that manufacturer's temperature installation requirements are being followed.
- Melter is heated to the correct temperature range.
- Sealant is heated to a minimum of the manufacturer's recommended pouring or application temperature, but temperature does not exceed the material's safe heating temperature.
- Sealant is continuously agitated to assure uniformity, except when adding additional material.
- If melter is equipped with a heated hose system, the hose is heated to operating temperature prior to beginning sealant application.
- If melter does not have a heated hose, the hose is verified to be unplugged and clear prior to beginning application.
- Sealant is recirculated through the hose to warm the hose prior to application. During idle periods, or if it is noted that sealant is cooling through the hose, sealant is recirculated through the hose back into the material vat to maintain hose temperature.
- Sealant temperature is checked periodically to assure proper temperatures.

- ❑ Melter is kept at least one-third full to help maintain temperature uniformity.
- ❑ Sealant material is formed/squeegeed/finished (if required) to the specified configuration.
- ❑ Sufficient material is applied to form the specified configuration, but not so much as to oversupply squeegee.
- ❑ Detackifier or other blotter is applied to reduce tack prior to opening to traffic, if needed.

## Opening to Traffic

- ❑ Sweeping should be performed as necessary to remove any remaining debris from around the patch.
- ❑ The pavement can be opened to traffic after the mix has been compacted and the mat has cooled to 140°F or the agency's required temperature.
- ❑ No traffic is allowed on unrolled asphalt or until the edge sealant has adequately cooled or cured to not pick up on vehicle tires.
- ❑ If the patch extended into the pavement lane lines, place temporary pavement markers on lane lines for delineation before opening the pavement to normal traffic.
- ❑ All construction-related signs are removed when opening pavement to normal traffic.

## Cleanup Responsibilities

- Verify that all debris has been removed from the roadway.

## Common Problems and Solutions

### **(Problem: Solution)**

#### **Asphalt Mix Does Not Bond to the Patch Hole:**

- Ensure the patch is cleaned properly and not too wet.
- Ensure sufficient tack coat is applied.
- Ensure the patch is solid before trafficking.
- Dust patch surface with sand or fine aggregate before heavy trafficking.
- Wait for better weather.

#### **Traffic Has Created a Rut in the Patch Mixture:**

- Ensure finished hole is overfilled 0.1 to 0.2 in.
- Ensure adequate compaction is achieved.
- Ensure mix is workable at application temperatures.
- Allow longer time before trafficking.

## Sources

Information in this checklist is based on or refers to the following sources:

*Manual on Uniform Traffic Control Devices*. 2009, Revised May 2012. Washington, DC: Federal Highway Administration.

*Materials and Procedures for Sealing and Filling Cracks in Asphalt-Surfaced Pavements - Manual of Practice*. Pub. No. FHWA-RD-99-147. 1999. Washington, DC: Federal Highway Administration.

*An Overview of Surface Rehabilitation Techniques for Asphalt Pavements*. Pub. No. FHWA-PD-92-008. 1992. Washington, DC: Federal Highway Administration.

*Pavement Patching Practices, NCHRP Synthesis 463*. 2014. Washington, DC: Transportation Research Board, National Cooperative Highway Research Program.

*Tack Coat Best Practices*. FHWA Tech Brief (Pub. No. FHWA-HIF-16-017). 2016. Washington, DC: Federal Highway Administration.

*Thin-Surfaced Pavements, Synthesis of User Practices, NCHRP Synthesis 260*. 1998. Washington, DC: Transportation Research Board, National Cooperative Highway Research Program.

*Trenching and Excavation Safety*. Pub. No. OSHA 2226-10R. 2015. Washington, DC: Occupational Safety and Health Administration.

**For more information on the Pavement Preservation Checklist Series, contact:**

Construction Management Team, HICP-30  
Office of Preconstruction, Construction,  
and Pavements  
Federal Highway Administration  
U.S. Department of Transportation  
[www.fhwa.dot.gov/pavement/preservation](http://www.fhwa.dot.gov/pavement/preservation)



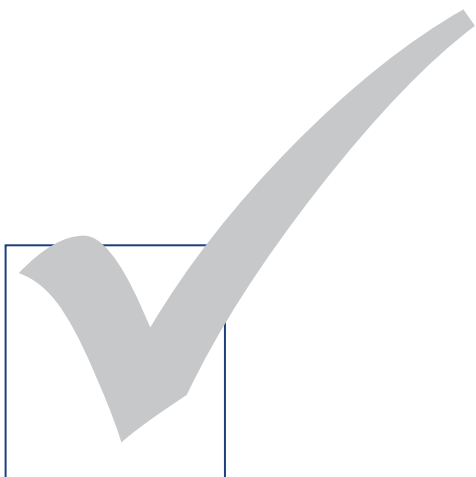
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July 2019

Publication No. FHWA-HIF-19-041

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**Federal Highway Administration**