

Suggested Field Considerations

The following field considerations are a guide to the important aspects of performing a chip seal project. There are various items that should be considered in order to promote a successful job outcome. The answers to these questions should be carefully evaluated before, during, and after construction. The appropriate staff to do this will vary by job type and size, and some topics may need attention from several staff. These items are not meant to form a report, but rather to call attention to important aspects and components of the chip seal project process.

Note that some specifications described in the following content may not be the same as the specifications followed by your agency. Always check with your State agency's standards and specifications when using these guidelines.

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Preliminary Considerations

Project Review

- Is the project a good candidate for a chip seal?
- How much rutting is present?
- How much and what type of cracking exists?
- Is crack sealing needed?
- How much bleeding or flushing exists?
- Review project for bid/plan quantities.

Document Review

- Bid specifications
- Special provisions
- Construction manual
- Traffic control plan (TCP)

Materials Checks

- Are the proposed binder and chips compatible?
- Is the binder from an approved source (if required)?
- Have the binder and aggregate been sampled and submitted for testing (if required)?
- Are all chips close to the same size?
- Are the chips clean and free of excess fines?
- When emulsions are to be used, are the chips in a surface-damp condition?
- Is the emulsion temperature within the application temperature specification limits?

Surface Preparation

- Is the surface clean and dry?
- Have all pavement distresses been repaired and sealed?
- Has the existing surface been inspected for drainage problems?
- Have pavement markers been removed and temporary markers placed?

Equipment Inspections

Broom

- Are the bristles the proper length?
- Can the broom be adjusted vertically to avoid excess pressure?
- Are water misters operable?

Distributor

- Is the spray bar at the proper height?
- Are all nozzles uniformly angled 15 to 30 degrees from the spray bar?
- Are all nozzles free of clogs?
- Is the spray pattern uniform and does it properly overlap (double or triple)?
- Is the application pressure correct?
- Is the distributor properly calibrated and are the correct size nozzle tips installed?

Chip Spreader

- Do the spreader gates function properly and are their settings correct?
- Is the scalping screen in good condition?
- Is the chip spreader's calibration uniform across the entire chipper head?
- Are the truck hook-up hitches in good condition?

Rollers

- What type of roller will be used on the project (pneumatic-tired roller recommended)? Do rollers meet weight requirements?
- Do the roller tire sizes, ratings, and pressures comply with the manufacturer's recommendations and specifications?
- Are the tire pressures the same on all tires?
- Do all tires have smooth surfaces?

Haul Trucks

- Is the truck box clean and free of debris and other materials?
- Is the truck hook-up hitch in working order?
- Is a truck box apron or extension required for loading the chip spreader?

Weather Requirements

- Do the specifications describe a range of dates when chip sealing can be done?

- Have air and surface temperatures been checked at the coolest location on the project?
- Do air and surface temperatures meet agency requirements?
- Are high winds expected? (High winds can create problems with the emulsion application.)
- Will the expected weather conditions delay the breaking of the emulsion? (High temperatures, humidity, and wind will effect how long the emulsion takes to break.)
- Is rain expected within 24 hours? (The application of emulsion should not begin if rain is likely within 24 hours.)

Determining Application Rates

- Have agency guidelines and requirements been followed?
- Has a chip seal design been done?
- Is the surface oxidized or porous? (More oil is applied to dried-out and porous surfaces.)
- Does the road have a low traffic volume? (More oil is applied on roads with low traffic volumes.)
- Is the surface smooth, non-porous, or bleeding? (Less oil is applied to smooth, non-porous, and asphalt-rich surfaces.)
- Does the road have a high traffic volume? (Less oil is applied on roads with high traffic volumes.)
- Is there a salt and pepper appearance after the chips have been applied?

Binder Calibration Considerations

Checking Application Rates

Binder – Method A (Recommended for Calibration)

- Record the weight of a 1 yd² carpet, pan, or non-woven geotextile material.
- Place the carpet, pan, or non-woven geotextile material on the road surface.
- Use the distributor to apply oil over the carpet, pan, or geotextile material.

- Record the weight of the carpet and oil, pan and oil, or geotextile material and oil.
- Subtract the weight of the carpet, pan, or geotextile material without oil from the weight of the carpet, pan, or geotextile material with emulsion.
- Convert the weights applied to the area of carpet (i.e., lb/yd²) to the units of the control mechanism, which is gal/yd², through knowledge of the specific gravity of the emulsion. If the distributor is not spraying the binder at the correct application rate, adjust the controls and repeat the process described above to achieve the correct application rate. (Although this is the responsibility of the contractor, the inspector should verify that the distributor is spraying the binder at the correct application rate.)

Checking Application Rates

Binder – Method B (Recommended for Random Checks)

- Park the distributor on level ground and measure its payload (the number of liters or gallons of emulsion.) Mark the locations of the front and back tires.
- Measure off a known distance for a test section.
- Have the distributor apply emulsion to the test section.
- Return the distributor to the original level ground and re-measure the remaining number of liters or gallons of emulsion.
- Subtract the number liters or gallons after application from the original number of liters or gallons to obtain the number of liters or gallons applied.
- Divide the number of liters or gallons applied by number of square meters or square yards covered by emulsion to give the application rate in gal/yd².
- If the distributor is not spraying the binder at the correct application rate, adjust the controls and repeat the process described above until the correct application rate is achieved. (Although this is the responsibility of the contractor, the inspector should verify that the distributor is spraying the binder at the correct application rate.)

Chip Calibration Considerations

Checking Application Rates

Chips – Method A (Recommended for Calibration)

- Weigh a 1 yd² tarp or geotextile material.
- Place the tarp or geotextile material on the roadway.
- Have the chip spreader apply the chips over the tarp or geotextile material.
- Weigh the tarp or the geotextile material with the chips.
- Subtract the original weight of the tarp or geotextile material from the weight of the tarp or geotextile with the chips. Divide the weight of the chips by the area of the tarp or geotextile to give the application rate in lb/yd².

Checking Application Rates

Chips – Method B (Recommended for Random Checks)

- Weigh an empty haul truck.
- Load the haul truck with chips and reweigh the truck.
- Subtract the weight of the empty truck from that of the loaded truck to obtain the weight of the chips.
- Empty all the chips into the chip spreader.
- Have the chip spreader apply all of the chips from the weighed truck.
- Measure the length and width of the area over which the chips were spread.
- Divide the weight of the chips by the area over which they were spread to determine actual rate in lb/yd².

Project Inspection Responsibilities

Binder Application

- Is roofing felt or building paper used to start and stop binder application?
- Is the binder temperature within the required application range?

- Does the application look uniform?
- Are any nozzles plugged?
- Is there streaking in the applied binder?
- Are application rates randomly checked?
- Is the speed of the distributor adjusted to match the chip spreader to prevent stop-and-start operations?
- Is the distributor stopped if any problems are observed?

Chip Application

- Are enough trucks on hand to maintain a steady supply of chips to the spreader?
- Does the application start and stop with neat, straight edges?
- Does the binder application start and stop on building paper or roofing felt?
- Does the chip spreader follow closely (33 yds) or less behind the distributor when an emulsion is used?
- Does the chip spreader travel slowly enough to prevent chips from rolling when they hit the surface?
- Are the chips in a surface damp condition?
- Are the tops of the chips free of binder?
- Is the application stopped as soon as any problems are detected?
- Does the application appear uniform?
- Do the chips have a salt and pepper appearance?
- Is the chip embedment in the binder checked and the binder or chip application rate adjusted if required?

Traffic Control

- Do the signs and devices used match the traffic control plan?
- Does the work zone comply with the Manual on Uniform Traffic Control Devices (MUTCD) Part 6 traffic control requirements?
- Are flaggers holding the traffic for reasonable periods of time?
- Does the pilot car lead traffic slowly—25 mph or less—over fresh chip seals?

- Are signs removed when they no longer apply?
- Are any unsafe conditions immediately reported to a supervisor?

Rolling

- Do the rollers follow closely behind the chip spreader?
- Is the entire surface rolled at least twice?
- Are roller speeds kept at 5 mph maximum?
- Is the roller's first pass on the meet line?
- Do rollers avoid exposed emulsion?
- Are all stops, starts, and turns made gradually?

Truck Operation

- Do trucks travel slowly on the fresh seal?
- Are stops and turns made gradually?
- Do truck operators avoid driving over exposed binder?
- Do trucks stagger their wheel paths when backing into the chip spreader? (This helps to eliminate chip roll over and aids in rolling.)

Longitudinal Joints

- Is the meet line only as wide as the spray from the end nozzle—about 8 in.?
- Does the distributor line up so that the end nozzle sprays the meet line?
- Are the meet lines clear of the wheel paths?
- Are the meet lines made at the center of the road, center of a lane, or edge of a lane?
- Are the meet lines covered overnight?

Transverse Joints

- Do all binder and chip applications begin and end on building paper or roofing felt?
- Is the building paper or roofing felt disposed of properly?

Brooming

- Does brooming dislodge the aggregate?

- Does brooming begin as soon as possible, but not until sufficient bond has formed between the chip and the binder? (Check with the binder manufacturer for their recommendation or refer to agency requirements.)
- Are the misting devices on mobile pickup brooms operating properly?

Opening the Chip Seal to Traffic

- Does traffic travel slowly—25 mph or less—over the fresh seal coat until the chip seal is broomed and opened for normal traffic?
- Are reduced speed limit signs used when pilot cars are not used?
- Are pavement markings placed before opening chip seal to normal traffic?
- Are all construction-related signs removed when opening chip seal to traffic and traffic control is removed?

Clean Up

- Is all loose aggregate from brooming removed from the roadway?
- Are binder spills cleaned up?