

CHAPTER 8. SPECIAL SITUATIONS

There are certain situations that can occur that will present special challenges on seal coat projects. Among these are:

- Cul-de-sacs
- Intersections & Turn Lanes
- Parking Lots
- High Volume Roadways

Each of these will be discussed below.

Sealing Cul-de-sacs

Chip sealing cul-de-sacs presents unique challenges for the seal coat crew. The most common problems associated with sealing cul-de sacs is excessive loss of the cover aggregate. Primarily this is caused from either insufficient aggregate embedment (i.e. not enough binder) or placing the aggregate after the asphalt binder has already broken resulting in a poor bond between the binder and the aggregate. The following items contribute to the difficulty sealing a cul-de-sac.

- 1) Its large area and round shape requires extra care by the distributor operator in order to prevent overlapping of successive passes which can lead to bleeding.
- 2) Since the traffic flow is not as channelized as other roadways, the chips never end up on their flattest side. As discussed previously in this manual, this will require more binder to achieve proper embedment.
- 3) If the application of the binder is not planned carefully, the binder will “break” before the chips are placed and rolled. Once the binder breaks, it will be nearly impossible to achieve a good bond between the binder and the aggregate.
- 4) The turning movements in the cul-de-sac cause the chips to want to roll over. Using an aggregate with a poor gradation or shape can lead to problems with exposed binder as the particles roll over.

The following figures show the proper way to seal a cul-de-sac to ensure that the chips are placed and rolled before the binder “breaks”. This process has been observed in the field and has proven to result in good embedment.

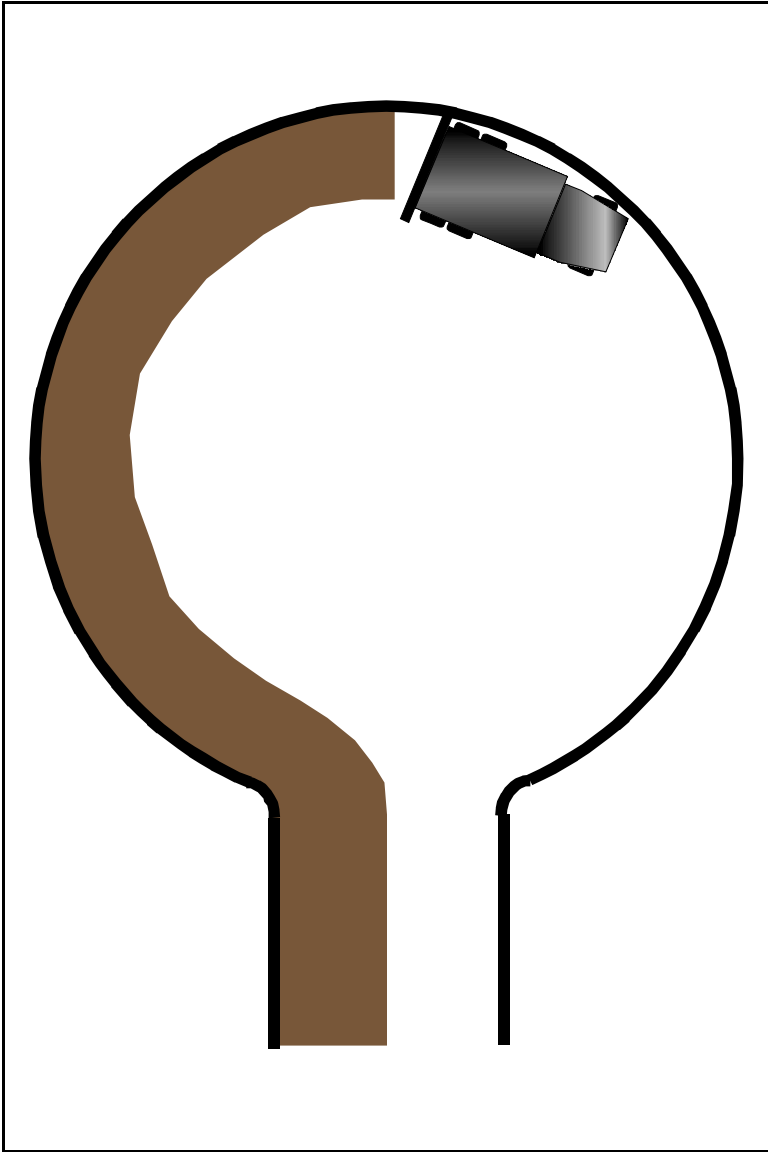


Figure 8.1. Distributor sprays halfway around the perimeter of the cul-de-sac.

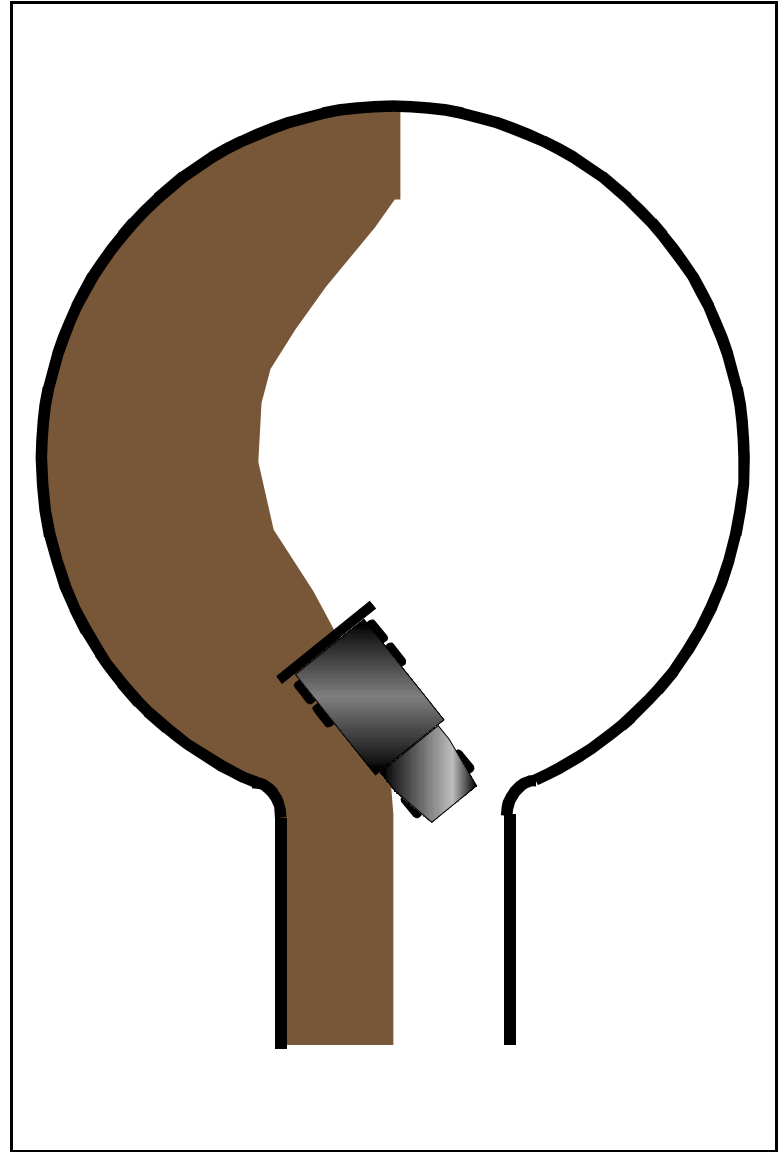


Figure 8.2. After backing into position, the distributor sprays adjacent to the previous pass.

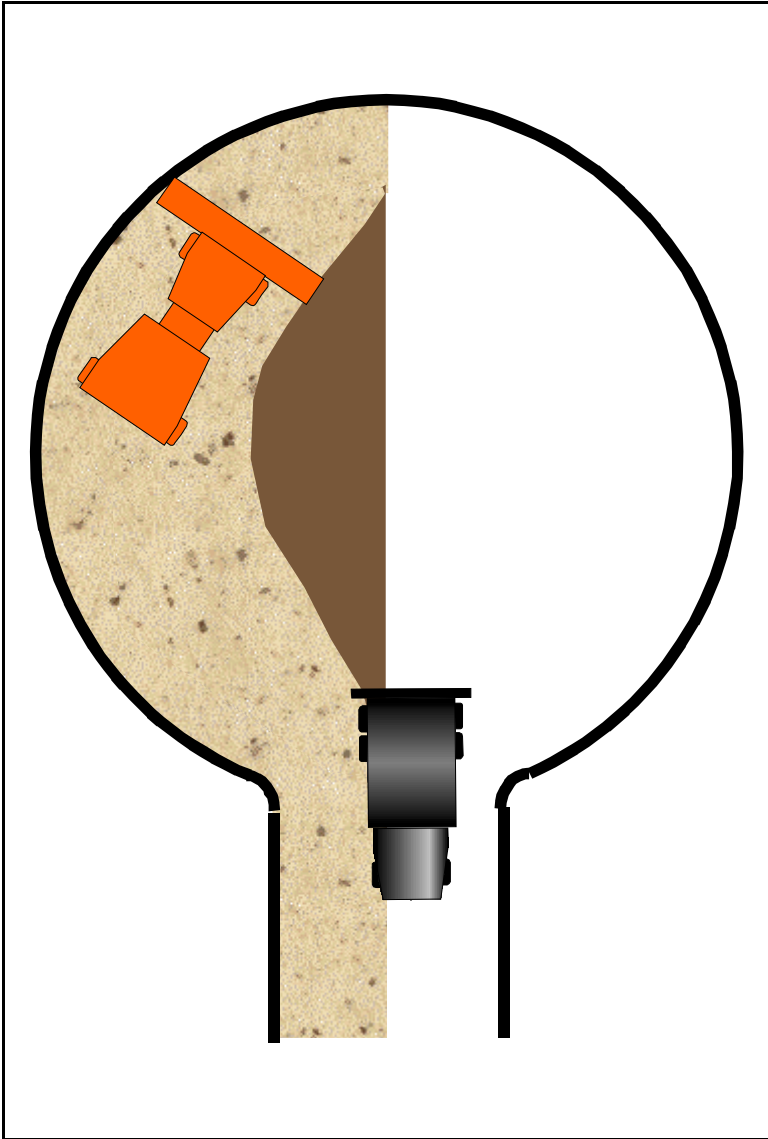


Figure 8.3. After backing into place, the distributor completes half of the cul-de-sac. The chip spreader and rollers begin working.

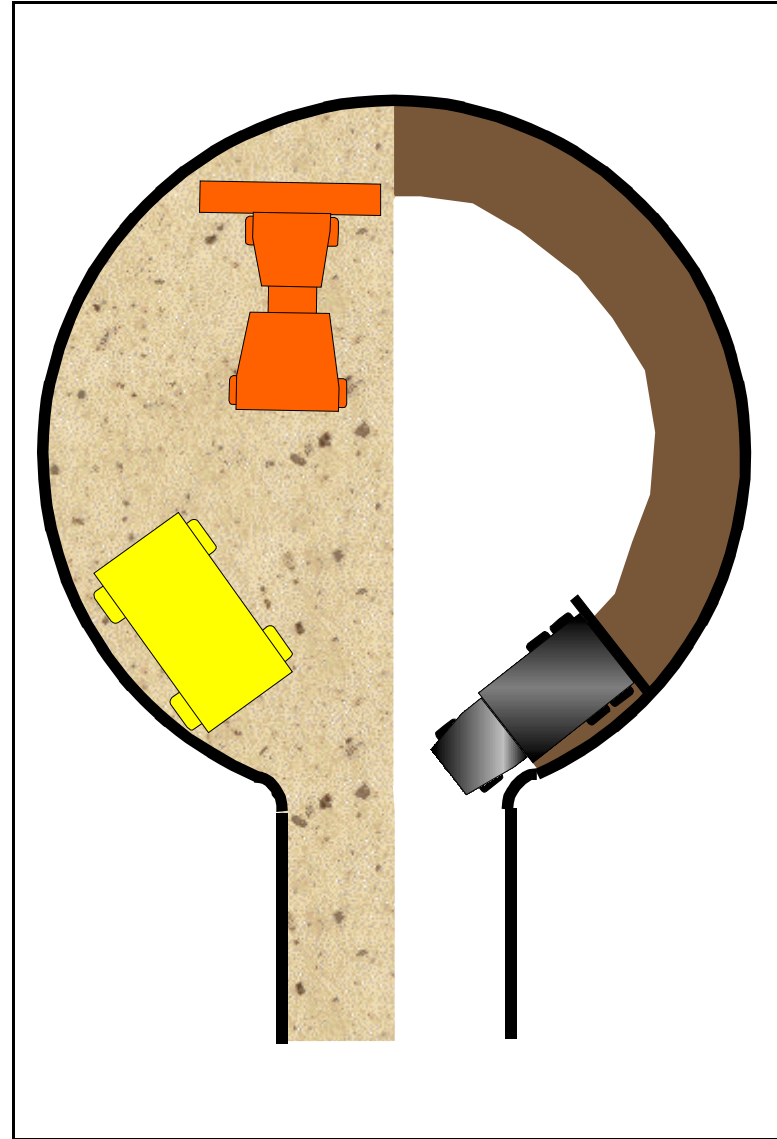


Figure 8.4. Distributor backs up to previous perimeter pass and completes spraying around the outside of the cul-de-sac. The spreader and rollers continue to work.

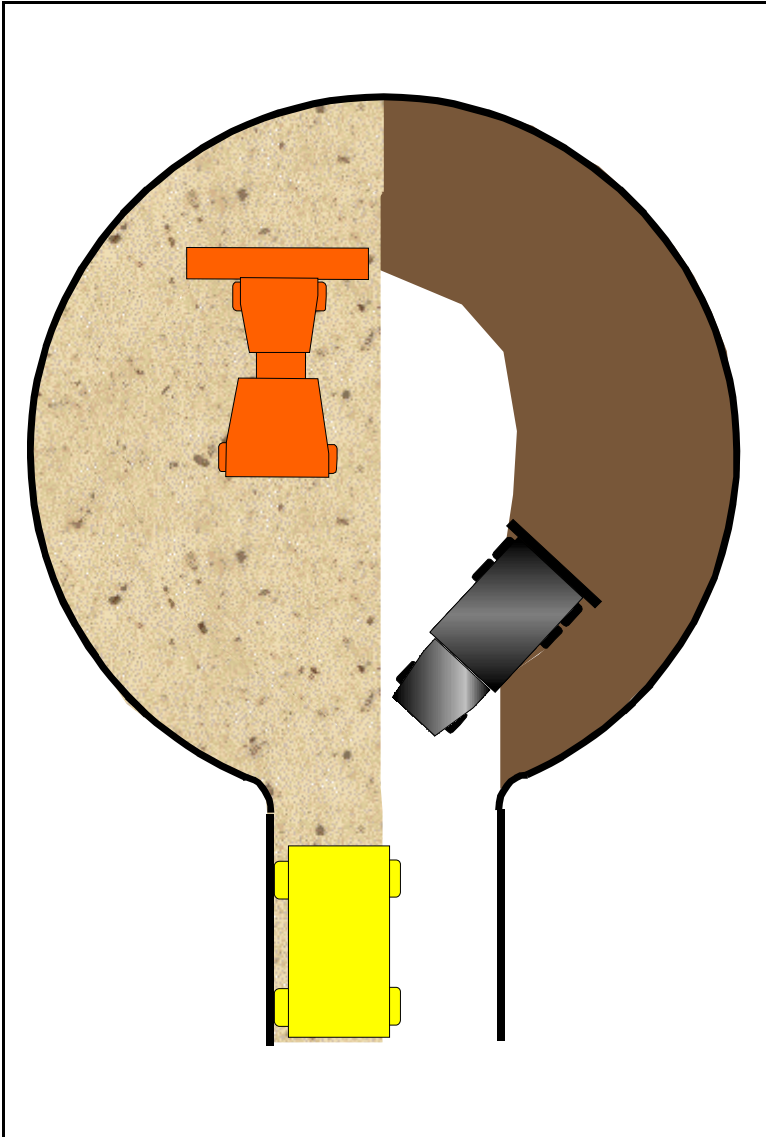


Figure 8.5. Distributor continues matching up with previous pass around the outer perimeter. Spreader and rollers finish the first half of the cul-de-sac.

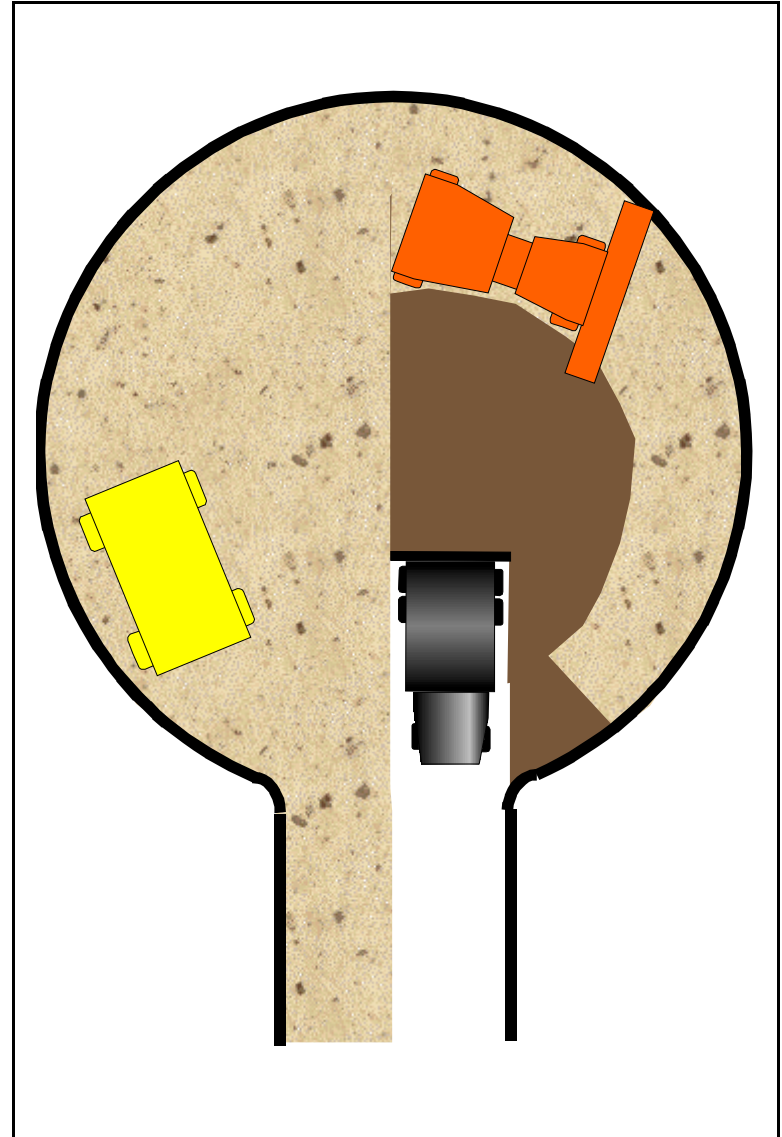


Figure 8.6. Distributor is ready to make its final pass out of the cul-de-sac. The spreader begins covering the other half of the cul-de-sac while the roller continues to work.

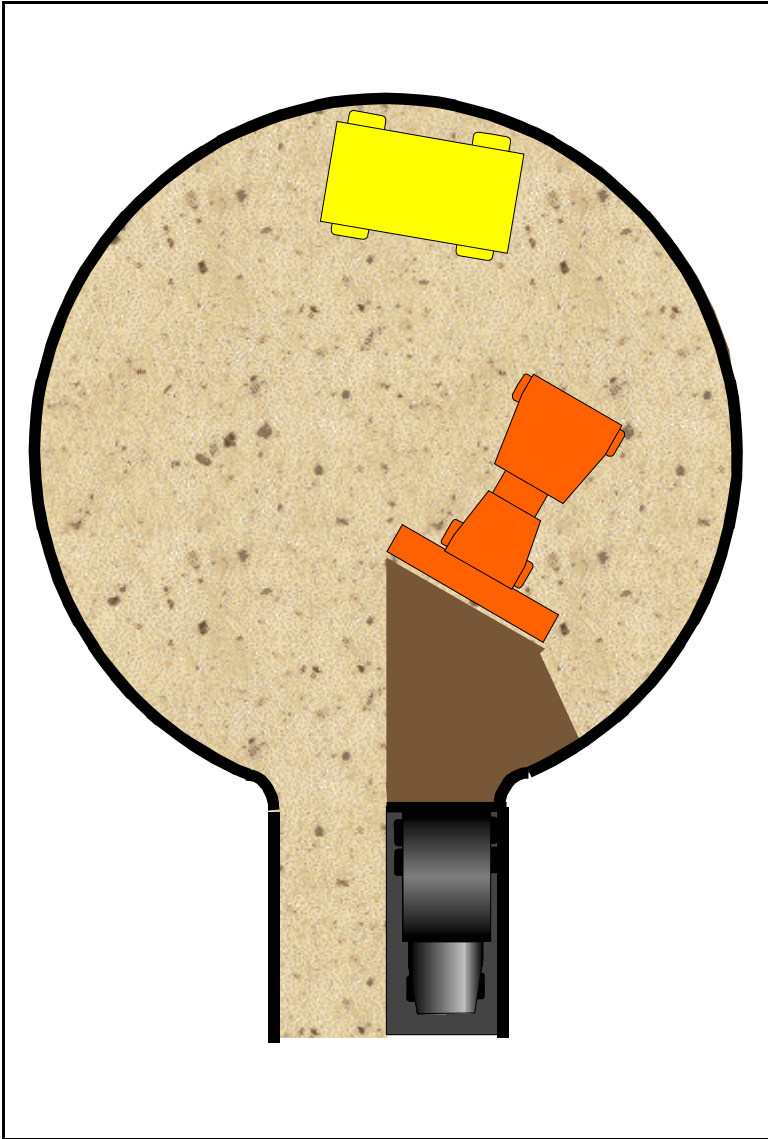


Figure 8.7. Distributor makes its final pass out of the cul-de-sac and completes the other entrance lane into the cul-de-sac. The spreader and rollers are nearly finished.

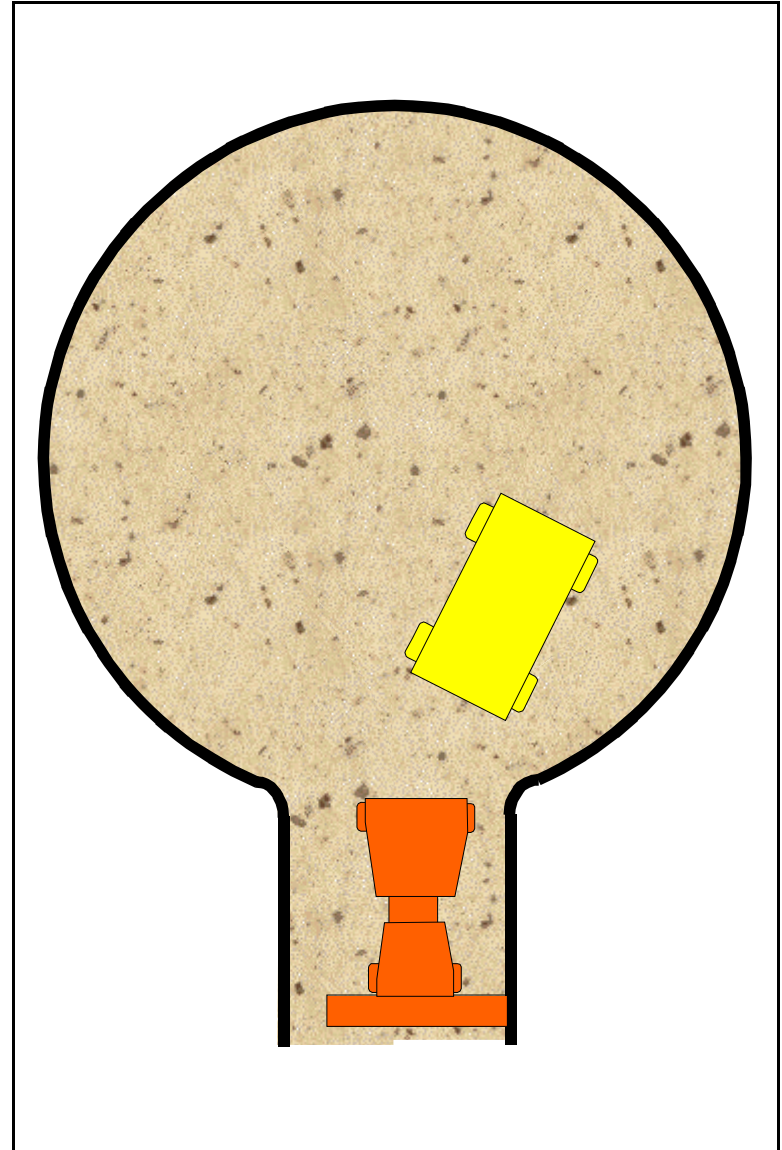


Figure 8.8. Chips spreader and rollers finish the cul-de-sac and head out to finish the rest of the street.

Intersections and Turn Lanes

Intersections and turn lanes also can present special challenges. Among the reasons are increased turning, which can cause scuffing, chip rollover and channelized traffic which causes the chips to lay very flat and can lead to bleeding if not accounted for. In addition, stopping action at intersections can suck the binder to the surface of the pavement, especially on hot summer days.

Parking Lots

Parking lots, like cul-de-sacs, involve large expanses of pavement which must be sealed in many passes of the distributor and chip spreader. Careful planning and proper operation of the distributor and spreader will help to ensure good results. The goal is to achieve proper embedment and roll the chips before the binder “breaks”.

High Volume Roadways

One of the main reasons seal coating is primarily used on low to moderate trafficked pavements is the fear of cracked or broken windshields caused by flying, loose aggregate during and shortly after construction. Long term, there is also the potential for bleeding problems if flat aggregate is used. Because traffic will cause aggregate to lay on its flattest side, high traffic roadways will have a more chips laying on their flat side than low volume roadways due to the increase in the number of vehicles. If the aggregate used has a high Flakiness Index, the difference in height between the traffic and non-traffic areas will be very pronounced. The result will either be bleeding in the wheel paths or loss of aggregate between them, both of which are undesirable. Some of the precautions that can be taken to minimize the potential for problems on higher volume roadways are:

- 1) **Use a Choke Seal.** This involves applying second layer of aggregate on top of a conventional seal coat. The aggregate in this top layer is smaller than the aggregate in the bottom layer. When they are rolled, they will become lodged into the voids in the bottom layer which locks the bottom aggregate together. With this type of surface the chance of any of the bottom stones becoming dislodged is greatly reduced.



Figure 8.9. Schematic of a Choke Seal (One layer of binder two layers of aggregate)

- 2) **Use a Double Seal.** This involves applying a second layer of *binder and aggregate*. The second layer of binder will totally encase the bottom layer in asphalt. The aggregate in the top layer is normally half the size of the aggregate beneath it. As a result, the surface locks together, similar to a choke seal, greatly reducing the possibility of loose rocks. If there are any loose rocks, they will be the small ones in the top layer which will also greatly reduce any chance of damage to vehicles.

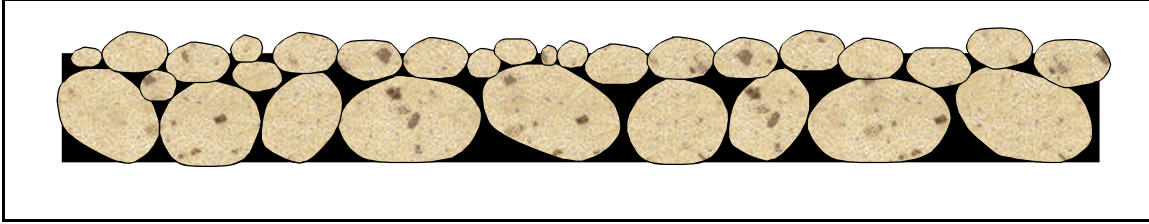


Figure 8.10. Schematic of a Double Seal (two layers of binder and aggregate)

- 3) **Use a smaller aggregate such as Mn/DOT FA-2.** One sure way to avoid cracking windshields is to use aggregate small enough that this won't happen. The downside to this is the protective layer of asphalt cannot be very thick when using small aggregate.
- 4) **Fit the spray bar with smaller nozzles in the wheel path than in the non-traffic areas.** Since the wheel path chips will be laying flatter, the amount of binder required will be less than in the other areas of the lane. By using smaller nozzles in the wheel paths, both the traffic and non-traffic areas will get the amount of binder necessary for proper embedment. This has been done in Texas with good results (4).

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