

CHAPTER 2

HMA DELIVERY

The purpose of the haul vehicle is to transport the asphalt mixture from the asphalt plant to the laydown machine. This must be done without delay or any change in the characteristics of the mix during the delivery process.

Haul Trucks

Three primary types of trucks are usually employed to transport the mix: end dump, bottom or belly dump, and live bottom (conveyor) trucks. All of these trucks are loaded in the same manner, either directly from the pugmill at a batch plant or from the surge silo at a batch or drum mix plant. The three types of vehicles differ in how each unloads the mix at the paver.

End Dump



An end dump truck delivers the mix directly into the hopper of the paver. When the bed is raised, it should not be in contact with the hopper and should not press down on or ride on the paver.

Semi-trailer



Contact between the truck bed and the paver can be a problem when large semi-tractor trailer units are used as haul vehicles, particularly when the truck bed is extended to its highest point. When the weight of the truck is being carried by the paver, care must be taken because the laydown machine may lose its ability to operate properly. Semi-trailer units typically haul more than single units and carry the maximum legal gross load. The payload depends on the number of axles, local regulations, and the empty

weight of the vehicle. Normally, these trailers carry between 20 to 25 tons of mix. The disadvantages include more skill required to maneuver these units around the jobsite, overhead obstructions (wires, bridges) when the bed is raised, and a potential for segregation when loading.

Horizontal Discharge



A live bottom truck employs a conveyor belt or slat conveyor in the bottom of the truck bed to discharge the mix. This eliminates the need to raise the bed, and deposits the mix directly into the hopper of the paver as does an end dump truck.

Horizontal discharge units also can carry the legal load limit. The payload is dependent on the same factors as semi-trailers. The advantage here is that the unit can discharge directly into the paver.

Tarps



In Virginia every haul truck must be equipped with a waterproof, tear-resistant tarpaulin to protect the mix in case of inclement weather. **Holes in the tarp are unacceptable.** For safety reasons, it is desirable to use tarps that can be extended by mechanical means over the bed of the truck without the driver having to climb up on the sides of the vehicle to unroll the tarp. If there is any water on the tarp when the truck is ready to discharge mix into the paver hopper, remove the water before removing the tarp by raising the bed of the truck and letting the water run off before the truck backs into the hopper.

Dealing with Extenuating Circumstances

Rain, equipment breakdown, and traffic delays all can ruin a well-intentioned paving plan. Have alternative plans in place; spare equipment available; night paving may need to be considered, depending on the nature of the project.

Operating Techniques

Pre-loading Inspection of Bed

The bed of the haul truck should be free of all deleterious materials before mix is placed in it. The bed should be reasonably smooth and free from any major indentations or depressions where the truck bed release agent and the HMA can accumulate.

Release agents



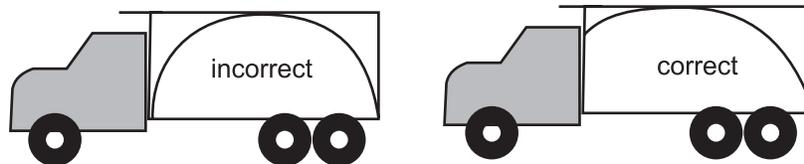
Once the bed is clean, coat it with a release agent. Uniformly spray a non-petroleum based release agent (from the approved list) over the sides and bottom of the truck bed. Use the minimum quantity necessary to cover the surface area of the bed without runoff. Drain out any excess liquid in the bed of the truck prior to loading the asphalt mix.



Never use diesel fuel as a release agent for the truck bed. Diesel fuel can cause changes in the properties of the asphalt mix material with which it comes in contact. Diesel fuel can also contribute to environmental problems as it evaporates or if it soaks into the ground.

Axle Weights vs. Load Distribution

Most haul trucks need to be loaded with the load slightly forward in the truck bed to comply with axle weights and load distribution regulations.



Loading Sequence

One objective of the truck-loading operation is to get the vehicle filled with mix and on its way to the paver as quickly as possible. This objective must be balanced, however, with the need to minimize segregation of the mix that occurs during the loading process.

Some mixes are more prone to segregation than others and special care must be taken to ensure the mix load is as uniform as possible. Some mixes are not prone to segregation and conventional load out procedures work fine. There is no one correct way to load a truck. The method will depend on the mix type, truck type, and a host of other factors. Use the method that will minimize the potential for segregation to occur during the loading. This loading plan should be discussed and agreed upon at the pre-construction conference. The following scenarios assume the mix being loaded has a tendency to segregate and multiple drops are needed.

From Pugmill

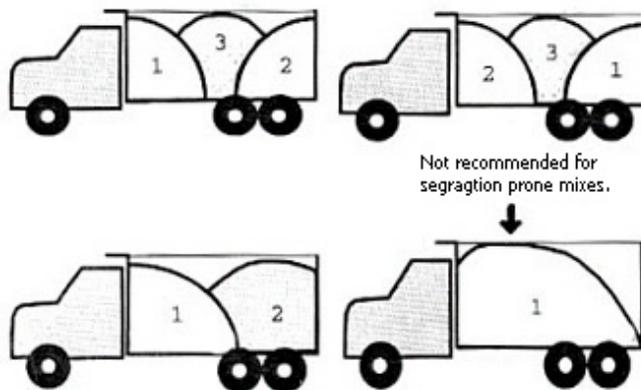
If it takes three batches of mix to reach the capacity of the haul truck, one pugmill batch should be loaded into the front of the truck bed. The truck should then be moved forward and the second batch of mix should be discharged into the rear of the truck, just in front of the tailgate. The third batch of material should be delivered into the center of the bed.

From Silo

Segregation of the mix can occur when mix discharged from the surge silo is deposited into the haul truck in a single drop. This segregation problem can be minimized by loading the truck in multiple drops of mix from the silo, similar to the procedure used for loading from the batch plant pugmill. However, some silos are specially designed for mass flow for a single drop. These silos will not cause segregation when operated properly.

The number of drops used depends on the length and capacity of the truck; the type of asphalt plant and the type of storage or surge silo used.

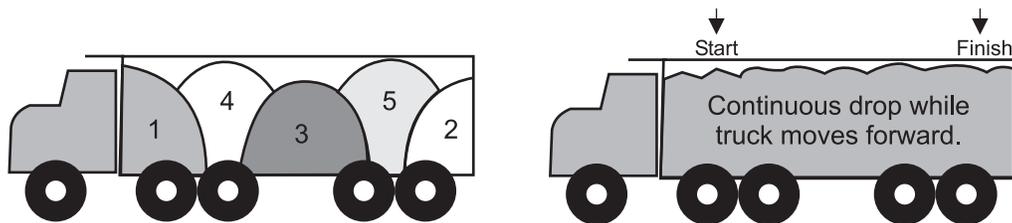
Example for End Dump Types



For other numbers of batches, multiple drops of mix should be used, with the first batch delivered to the front of the truck bed, the second batch deposited at the tailgate end of the bed, and the remaining drops of mix placed evenly in between the first two. Such a loading sequence will minimize the distance the coarse aggregate particles can roll and thus minimize the amount of segregation that is produced in the mix.

Some states have reversed this order. The first drop is placed at the tailgate, the second placed at the front, and the third placed in the middle.

Example for Semi-Trailer Type



When a semi-tractor trailer truck is to be loaded, at least five and probably seven different discharges of mix should be made before the truck capacity is reached. In every case, the mix should first be deposited at the front of the bed and then at the tailgate of the truck. The space in between the first two drops should be filled in with small, separate piles of mix placed between the initial “batches” of mix. The use of multiple drops of mix is slower than loading the truck in a single discharge of material from the silo.

Topping Off

There is a tendency for the plant operator to fill the truck to its legal capacity to reduce haul costs, particularly if the truck is sitting on a scale under the silo. Although this is good economic practice, it should not be accomplished by dribbling mix into the truck from the silo after the majority of the mix is already in the truck. The discharge of small amounts of mix from the silo greatly increases the chance for segregation of the mix.

Overloading

Overloading is illegal, dangerous, and can cause extreme stresses in pavements. Modern electronic weighout equipment and printed tickets have helped to eliminate this.

HMA Delivery Management



Once loaded, ticketed, and tarped, the haul truck should proceed immediately to the jobsite. Stagger the asphalt deliveries to the project to reduce the time trucks have to wait before dumping the asphalt into the paver but not be spaced so far apart that the paver has to stop and wait for deliveries.

Waiting on Site

Haul trucks should park in designated areas and attempt to minimize tracking of tack coats. Trucks should stay far enough ahead of the paving train as to not interfere with operations, but close enough to back to the paver to keep the operation moving. Communication is gain the key. Drivers should be informed about the paving plan.

Backing

When an end dump or a live bottom truck is used to deliver mix to the paver, the truck driver should back the truck up to the laydown machine **but stop just short of the push rollers on the front of the paver**. It is very important that the truck be centered before the paver contacts it. Off-center positioning can push the paver out of alignment, create problems as the mix floods the hopper, and cause the truck bed to contact and damage the hopper wings. In addition, project personnel tend to tune out back-up alarms and are vulnerable while walking in the driver's blind spot. This is the area between the tailgate and the paver hopper. Too many accidents occur in this area.

Truck Hitches/Contact/Configuration

Once the truck has come to a halt and the driver has released the brakes on the vehicle, the paver operator should pick up the stopped truck. The key to this process is that the paver picks up the truck instead of the truck backing into and bumping the paver. As much as possible, the paver should maintain a constant speed throughout the paving operation. Use of the proper procedure will reduce the incidence of screed marks and roughness in the mat.

Dumping

Dumping Into a Hopper - Raising Bed

If an end dump truck is used and the mix has a tendency to segregate, the bed of the truck should be raised a short distance in order to allow the mix in the bed to slide against the tailgate before the tailgate is opened.

Popping Gate and Flooding Hopper



Once the tailgate is opened, the mix is discharged from the truck in a mass and floods the hopper of the paver, reducing the possibility of segregation behind the paver screed. The same procedure should be employed, if possible, when a live bottom truck is used to transport the mix.

Dumping into a Material Transfer Vehicle (MTV)

This piece of equipment is basically a surge bin on wheels. Asphalt mix is deposited into the hopper on the front of the vehicle. The mix is transported from the hopper to a conveyor, which



delivers the mix to the extended hopper on the paver. The material transfer vehicle also allows the paver to be operated almost continuously if a continuous supply of mix is available from the asphalt plant. This provides for a smoother mat behind the paver screed by permitting the paver operator to keep the head of material in front of the screed constant. The equipment also eliminates the problem of the haul trucks bumping the paver and truck drivers holding the brakes on the truck when being pushed

by the paver. Because of the weight of this piece of equipment when it is full of mix, it must be determined ahead of time that the pavement over which this machinery will be running can support the weight of the device without being over stressed and damaged.

Dealing With Crusted Mix

There is no set limit as to how far a load of HMA can be transported. The key factors are the workability of the mix while it is passing through the paver and the ability to get the mix compacted. Both of these factors are highly dependent on the temperature of the mix.

The slight crust thickness that forms during transport should break up completely as the mix is discharged from the haul vehicle into the paver, is carried by the slat conveyors back to the augers, and is passed under the paver screed. As long as chunks of asphalt mix do not affect the quality of the mat behind the paver, the crust that forms on top of the mix during delivery will not be detrimental to the long-term performance of the mix.

Paving

Steering

While paving, the driver must focus not only on the dump person but in front of the truck also. The driver is responsible for steering within the “pull” of the paver, and keeping a slight pressure on the brakes to maintain contact with the paver and rollers.

Braking

Too much braking force from the haul truck may cause the paver to slip and affect the mat.

Pulling Away

Once the final hot mix has exited the truck bed, the bed should be lowered so the apron can clear the hopper guards. The truck should immediately depart from the area to a clean up station, and let the next truck back up.

On Site Clean Up



The contractor should designate a clean up area for the drivers to clean the remaining mix from their trucks, the tailgate, and the apron.

“Banging the Gate”



A common practice is to leave the truck gate up, speed up and stop quickly to bang the tailgate to expel any remaining mix should be discouraged.

Spillage on Pavement



“Banging the gate” and some other practices tend to drop some small piles of mix on the roadway which are subsequently rolled over by other trucks. If these piles are not removed, they affect the quality of the finished mat. If a spill occurs, the mix should be removed.

HMA DELIVERY
CHAPTER 2
Study Questions

1. When an “end dump” truck raises its bed to deliver mix into the hopper of the paver, the bed should not be in contact with the hopper and should not press down on or ride on the paver.
 - A. True
 - B. False

2. Contact between the hauling truck bed and the paver is never a problem.
 - A. True
 - B. False

3. In Virginia, haul trucks are required to be equipped with tarps _____
 - A. only during rain storms
 - B. only when the roadway temperature goes below 40°F
 - C. all the time
 - D. only when your supervisor tells you to put one on

4. The bed of the haul truck should be free of all deleterious materials before mix is placed in it.
 - A. True
 - B. False

5. When using diesel fuel as a release agent the residue must be dumped:
 - A. in a container listed on the Department's approved list.
 - B. onto the ground in a well drained area.
 - C. Diesel fuel should never be used as a release agent.
 - D. only at a VDOT Residency.

CHAPTER 2
HMA DELIVERY
Study Questions (continued)

6. Some mixes are more prone to segregation than others and special care must be taken to ensure the mix load is as uniform as possible.
- A. True
 - B. False
7. When a semi-tractor trailer is to be loaded, the mix should first be deposited at the:
- A. Back of the trailer.
 - B. Middle of the trailer.
 - C. Front of the trailer.
 - D. Middle and work toward back.
8. When using an end dump or live bottom truck to deliver mix to the paver, the truck driver should back the truck up to the laydown machine but stop just short of the push rollers on the front of the paver.
- A. True
 - B. False
9. The crust that forms on an asphalt mixture is acceptable if the temperature of the mix is greater than 225°F.
- A. True
 - B. False
10. Too much braking force from the haul truck may cause the paver to slip and affect the mat.
- A. True
 - B. False