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Superpave – Lessons Learned
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Excerpted:

Lesson #6 – No Jail Breaks!

Segregation is a major concern when placing Superpave mixes. To prevent segregation you must keep the mix flowing in a confined mass from the HMA plant to the pavement. If you fail to provide this confinement **at any point** in the paving operation, the larger aggregate particles will make a jail break and run to the edges of the unconfined material.

Segregation may begin as soon as the large and small aggregate particles are mixed together inside the HMA plant drum. Segregation may also occur in the drag conveyor and storage silos. During loading of the delivery trucks at the HMA plant, the larger aggregate particles will break jail and run to the sides and edges of the truck body if proper loading procedures are not followed.

Trucks must be loaded in three drops. The first drop is placed against the front of the truck bed, which provides confinement. The second drop is placed against the tailgate, which prevents segregation at the back of the truck. The third and final drop is placed in the middle of the truck, using the first two drops as confinement. This procedure will prevent jail breaks from the HMA plant into the delivery trucks.

The next opportunity for a jail break is during the truck unloading into the paver hopper. The dump bed must be raised enough to place material against the tailgate, so that the material flows into the hopper as a mass. Continue to raise the bed as necessary to maintain a mass flow during the unloading process. *Never dribble material from the truck into the paver hopper!*

The paver hopper operation is another chance for a jail break. Coarser aggregate particles flow to the outside edges of the hopper wings. The hopper wings should only be dumped when the paver hopper is at least half full. This will allow the coarser particles to be blended back into the mix. *Never dump the hopper wings when the hopper is empty!*

The hopper deck should be covered at all times during the paving operation. Allowing the hopper to run empty after a truck has dumped will cause the coarse aggregate from the edges of the truck bed and paver hopper to be concentrated in one location in the mat. This is known as end-of-load segregation. If this process is repeated after each truck, segregation will appear as a recurring pattern

in the roadway. This type of jail break can be prevented by keeping the hopper floor covered with mix at all times.

The paver feeder system provides several prospects for jail breaks. The auger drive box is located in the center of the two slat conveyors on most pavers. This provides an opportunity for coarse aggregate particles to dribble from the inside edges of the conveyors and run under the gear box, causing segregation in the center of the mat (centerline streak). This can be prevented by using diverter plates to force material from the inside edge of the conveyor back into the mass of mix, and then using reverser auger sections to force material under the gear box. These devices must be installed and well-maintained to prevent segregation in the center of the mat.

Feeder system operation must maintain a constant head of material in front of the screed to prevent segregation and to attain a smooth ride. Flow gates and feeder controls should be set to establish a constant, moderate speed for the conveyors and augers. If the speed is too slow, coarse particles can break jail as dribbling occurs. If the speed is too fast, the augers can sling the large aggregate particles out of the mix.

HMA mix needs to be moved from the conveyors to the end gates as a mass to prevent segregation, regardless of paving width. If coarse aggregate particles are allowed to break free and dribble to the end gate, segregation will occur at the longitudinal joint. Segregation at the end gate causes poor joint density and can lead to premature failure. Paving with the screed extended beyond the paver main frame requires the use of auger extensions and auger tunnel extensions to prevent a jail break at the edges of the mat.

Material Transfer Vehicles (MTVs) are increasing in use because they eliminate some of the jail break opportunities. These machines can remedy HMA plant, storage silo, and truck loading segregation by remixing the HMA. MTVs also reduce the opportunity for jail breaks from trucks unloading into the hopper and from hopper operation.

Many specifying agencies are convinced MTVs are a cure-all for all paving problems. They can make the placement of quality pavements easier, but laydown "best practices" must still be followed. An MTV cannot correct a segregation problem between the hopper and the screed.