



Compaction 101: Doing the Right Things, The Right Way

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❖ Lecture Details

- *Roller compaction is the last opportunity during the paving process to produce a long-lasting and high-quality pavement. This session will cover the compaction basics that will help prepare attendees for challenges faced during construction operations. The common objectives include uniform target density and a pavement surface smoothness that earns rideability awards and bonuses. Using compaction best practices will consistently produce highest quality pavements with lowest production cost.*
- *Understand the four elements of compaction.*
- *How to balance production, laydown, and compaction operations in order to match paving speed with rolling speed.*
- *Understanding which factors can affect compaction, and practices to mitigate negative impacts.*

❖ Most important parameters of asphalt for basic compaction are:

- Mix type
- Particle size distribution curve
- Binder type and proportion
- Environmental conditions when paving
 - Temp, wind, overcast/sunny
- Course thickness

❖ Why do we worry about compaction?

- Improve material stability
- Minimize permanent deformation/ rutting
 - Ruts are caused by
 - Over-compaction – Results in a plastic deformation and no visco-elastic deformation.
 - Under-compaction – insufficient interlock that is compressed over time by traffic.
 - Defective mix
- Improve fatigue resistance /cracking

❖ Errors during paving

- Too much dynamic compaction
- Roller too heavy
- Roller starts too early

❖ Vibratory Screeds are great if can get them on pavers! – High temp at lay down. Optimum point for even temperature. Helps flow of material under screed.

❖ If your density starts going down after rolling in oscillating mode, you are probably rolling too fast. 3.5mph is the max you should run.

❖ Split drum rollers are great for tight turn areas, so you don't rip the mat turning.

❖ Key roller design specs affecting comp

- Amplitude
- Frequency
- Static weight
- Centrifugal force
- Rolling speed
 - Goal is 12-16 impacts per linear foot of pavement
 - Speed too high? You'll see it on IRI.
- Drum diameter
- Drum activation controls
- Drum water and scrapers

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- Drum offset
- ❖ High freq. rollers are good for thin lifts
- ❖ External factors affecting compaction
 - Mix design
 - Mix temperature
 - Paver issues
 - Operator issues
 - Ambient Temperature
 - Base Conditions
- ❖ De-active vibratory mode when reversing.
- ❖ Android apps like PaveCool 3.1 or MultiCool v2.0 can show you roller details based on your asphalt mixture and weather.
- ❖ 10 Commandments for Roller Operators
 1. Roll as closely as possible behind the paver
 2. When compacting, always begin at the lower edge
 3. Compact the seams first (if next to a hot mat)
 4. Deactivate vibration before reversing
 5. Always change the rolling speed gently
 6. Move forwards and backwards in the same track
 7. Change the roller track on the cold side
 8. Roll in parallel tracks
 9. Water the drums sufficiently
 10. Never leave the roller on hot asphalt