Improper Installation Leads To:

- Pre-mature Loss of Load Transfer Ability
- Socketing of drilled holes
- Structural failure in the drilled hole area
- Settling/Tipping of the entire full depth repair
- Loss of good riding characteristics
- Durability of overall full depth patch performance
- Long term durability of the project
Problems

- Drilled holes too tight to receive dowel bars and anchoring material
- Anchoring material not filling void in drilled hole
- Air voids in drilled hole
- Bars not placed full depth into holes
- Bars not worked during installation into drilled holes
Drilling Issues

- Not drilling holes to proper depth
- Reinforcing steel in existing pavement
- Drilling holes 1/8” larger than dowel bars not adequate
- As drill bits wear hole diameter decreases
Drilling Solutions

- Best practice drill holes ¼” larger than dowel bar
- When steel is encountered move drilled hole the least amount as possible
- Consider skipping one bar if can’t find good location to drill
- Check drill bits for wear
- Check drill rig for drill depth and alignment
Anchoring Issues

- Consistent anchoring materials
- Air pockets or trapped air
- Bar to tight in drilled hole
- Voids or uncoated areas in the drilled hole after bar placement
- Holes not cleaned prior to bar installation
Anchoring Solutions

- Ensure holes are drilled to proper dimensions 1/4” over
- Clean hole properly with compressed air
- Choose good anchoring material
- Fill hole from back forward with proper amount of grout
- Bar must be worked as installed to fill all voids and remove trapped air
Anchoring Materials

- Epoxy Grout
- Hand mixed non shrink grout
- Grout capsules

All three work when properly installed
Epoxy Grout

- Cold weather sensitive
- Expensive equipment required for installation
- Requires additional working of the bar to fill all voids
- Mixing is critical and must be monitored
Non Shrink Grout

- Requires hand proportioning and mixing
- Consistency issues
- Hand installation into drilled hole
- Cold weather
Grout Capsules

- Simple to use
- Consistent every time
- No equipment required
- Results have shown great results
- Cowboy proof
Cost of the 3 Types

- Best cost of the 3 types when you consider all things would be the grout capsules.
Conclusion

- We have learned through a closer look at dowel bar installation that we are not necessarily achieving the results we thought we were.
- We can continue to operate as we have in the past that it always worked before why change
- Take what we have learned and improve on the performance of CPR projects for the benefit of all of us.
Questions ?

Thank You