



# Built for Speed: A Case Study for Accelerated Heavy Duty Intersections

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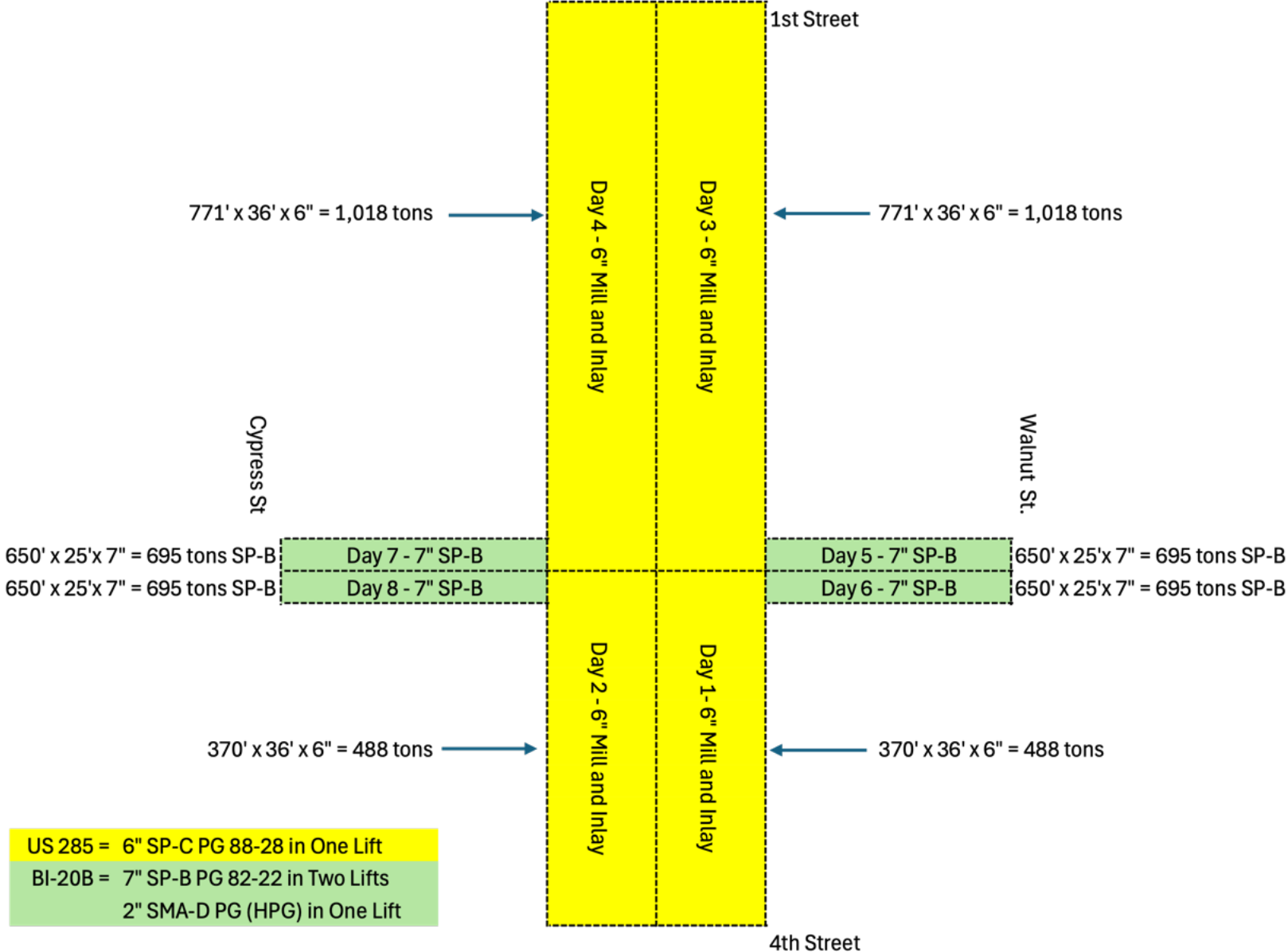
***PARTNERSHIP \* PLANNING \* PARTICIPATION \* PERFORMANCE***

**51st Annual Meeting of the Texas Asphalt Pavement Association**





Pecos BI-20B/US 285 Intersection Sequence



# Pavement distress at intersections

- No cracking but deep rutting
- Rutting is not observed 500 ft beyond the intersection.
- Rutting depth varies at intersection



# Causes for the deep rutting problem

- Hot weather
- Slow moving, heavy traffic



| AccuWeather Pecos, TX 78°  |                                                                                                   |                                                                                                   |                                                                                                   |                                                                                                   |                                                                                                   |                                                                                                   | Search   |
|---------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|----------|
| August 2026                                                                                                   |                                                                                                   |                                                                                                   |                                                                                                   |                                                                                                   |                                                                                                   |                                                                                                   | 10-DAY → |
| S                                                                                                             | M                                                                                                 | T                                                                                                 | W                                                                                                 | T                                                                                                 | F                                                                                                 | S                                                                                                 |          |
| 26                                                                                                            | 27                                                                                                | 28                                                                                                | 29                                                                                                | 30                                                                                                | 31                                                                                                | 1                                                                                                 |          |
| 103°<br>75°                                                                                                   | 106°<br>74°                                                                                       | 104°<br>74°                                                                                       | 102°<br>75°                                                                                       | 104°<br>73°                                                                                       | 105°<br>73°                                                                                       | 98°<br>77°                                                                                        |          |
| 2                                                                                                             | 3                                                                                                 | 4                                                                                                 | 5                                                                                                 | 6                                                                                                 | 7                                                                                                 | 8                                                                                                 |          |
| 100°<br>72°                                                                                                   | 103°<br>71°                                                                                       | 105°<br>72°                                                                                       | 103°<br>75°                                                                                       | 102°<br>77°                                                                                       | 103°<br>76°                                                                                       | 100°<br>73°                                                                                       |          |
| 9                                                                                                             | 10                                                                                                | 11                                                                                                | 12                                                                                                | 13                                                                                                | 14                                                                                                | 15                                                                                                |          |
| 99°<br>72°                                                                                                    | 102°<br>74°                                                                                       | 105°<br>75°                                                                                       | 103°<br>76°                                                                                       | 103°<br>73°                                                                                       | 103°<br>74°                                                                                       | 102°<br>68°                                                                                       |          |
| 16                                                                                                            | 17                                                                                                | 18                                                                                                | 19                                                                                                | 20                                                                                                | 21                                                                                                | 22                                                                                                |          |
| 98°<br>72°                                                                                                    | 99°<br>72°                                                                                        | 102°<br>67°                                                                                       | 105°<br>69°                                                                                       |  105°<br>74° |  103°<br>73° |  104°<br>74° |          |
| 23                                                                                                            | 24                                                                                                | 25                                                                                                | 26                                                                                                | 27                                                                                                | 28                                                                                                | 29                                                                                                |          |
|  105°<br>73°             |  107°<br>74° |  106°<br>73° |  104°<br>72° |  105°<br>73° |  105°<br>74° |  104°<br>73° |          |

# Causes for the deep rutting problem

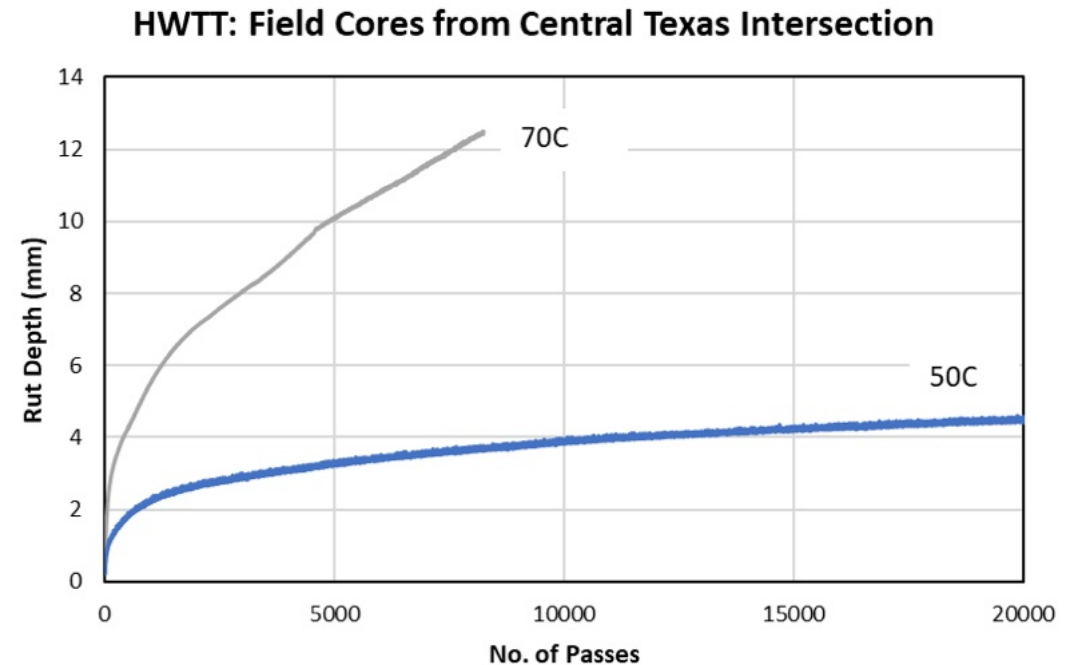
- Illustrate **speed** on material behavior: cornstarch



[What Kind of Liquid Lets You Run Across Its Surface? | Street Science](#)

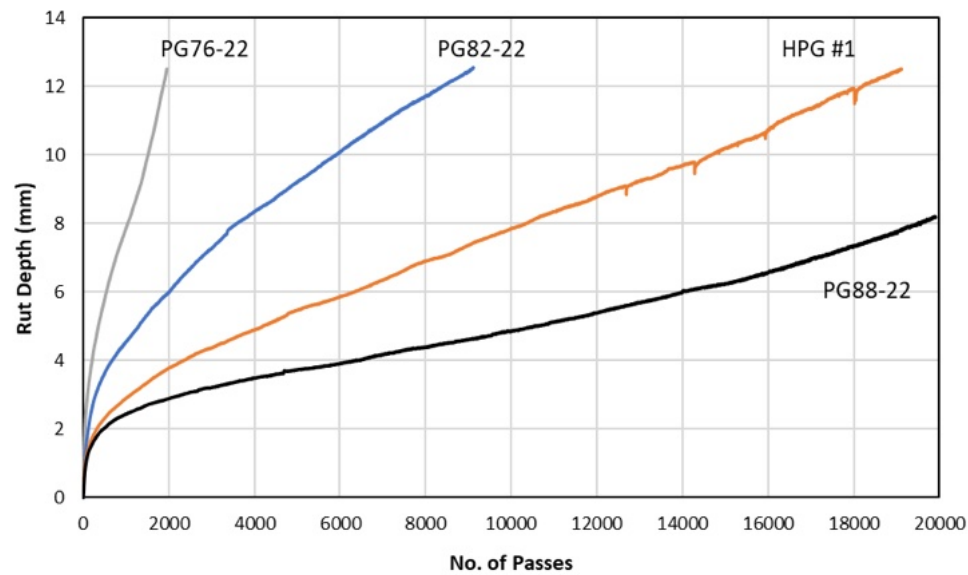
# Modified Hamburg wheel tracking test

- Slow moving and raising temperature have the same effect:
  - **Soften** asphalt mixtures
- Modified HWTT
  - Everything is same,
  - Except test temp= 70C

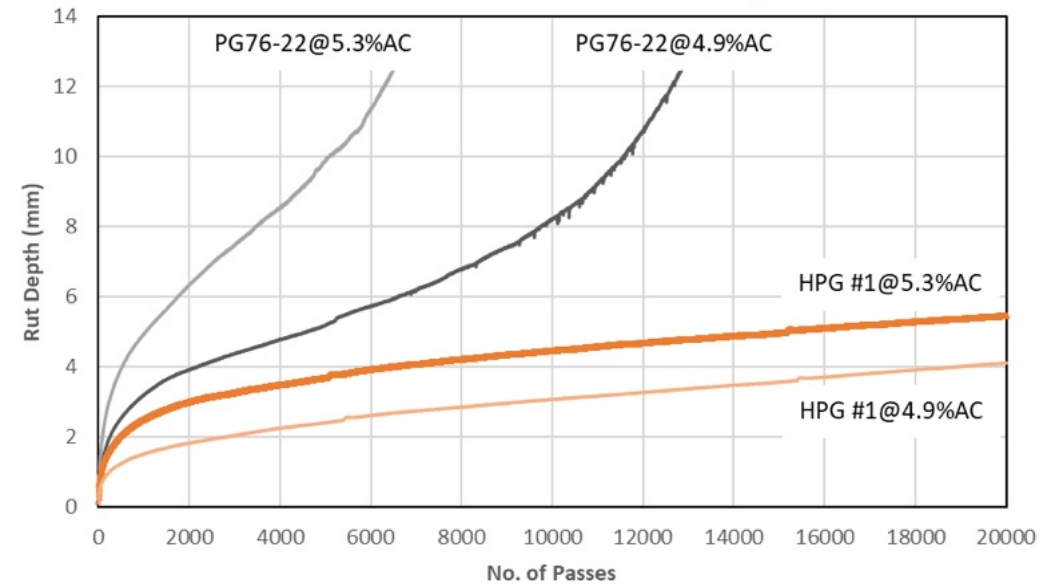


# Modified Hamburg wheel tracking test

Modified HWTT at 70C: 12.5 mm SMA-C



Modified HWTT at 70C: 12.5 SP-C with Igneous



**Use stiff binders to address the rutting problem!**



# BI20/US285 Mix Design

| Section Name | Recycled Materials | Binder Type | Optimum Binder Content (%) | HWTT@ 70C, 20000 Passes | Design Thickness |
|--------------|--------------------|-------------|----------------------------|-------------------------|------------------|
| US 285       | None               | HPG         | 5.1                        | 4.2 mm                  | 6" SP-C          |
| BI 20 Top    | None               | PG 88-22    | 6.3                        | 3.2 mm                  | 2" SMA-D         |
| BI 20 Bottom | 10 % RAP           | PG 88-22    | 5.3                        | <7.4 mm                 | 7" SP-B          |

# Construction



6 inch thick lift paving

# Field Condition on September 2, 2026



# HPG Binder Tips and Tricks

The screenshot shows a web browser window with the URL 'checklist.texasasphalt.org'. The page features the TXAPA logo at the top left and a hamburger menu icon at the top right. The main content area is titled 'HPG Binder Tips and Tricks' and 'Paving Checklist'. Below the title, it indicates '0 of 89 completed — 0%' with a progress bar. A thank you message follows: 'Thanks to Anderson-Columbia, Hunter Industries, Lone Star Asphalt, Madden Contracting, and Texas Materials for their project feedback.' The 'PLANNING:' section is highlighted in yellow and contains several checklist items, each with a radio button:

- ☐ HPG should only be used on interstates, limited access roads, or straight runs. It doesn't rake or compact well in areas that must be hand worked.
- ☐ Ordering Binder:
  - ☐ Check with supplier on lead time for ordering and during production.
  - ☐ Is there a minimum load order for HPG binder?
- ☐ Trial Batch: Find another section or mix to put remainder of trial batch binder in. Don't let sit in the tank for extended period.

## HPG BINDER Tips and Tricks



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### PLANNING:

- HPG should only be used on interstates, limited access roads, or straight runs. It doesn't rake or compact well in areas that must be hand worked.
- Ordering Binder
  - » Check with supplier on lead time for ordering and during production.
  - » Is there a minimum load order for HPG binder?
- Trial Batch: Find another section or mix to put remainder of trial batch binder in. Don't let sit in the tank for extended period.
- Production: Daily communication and feed from field to plant to supplier. Report any changes in consistency immediately to all. Keep binder supplier in the loop at all times, Group chat.
- Plan your work to run this mix daily until complete. Don't piecemeal HPG mix.
- Repairs: have critical spares available for plant and field equipment.
- Debrief daily and after project ends

### TEMPERATURES:

- Binder delivery – min of 350°F
- Binder Storage – 350-375°F
- Mix Discharge/Loadout: 340-350°F
- Windrow/Hopper – 335-345°F
- Behind Screed – 300-310°F
- Ambient: Consider 80°F a minimum for thin layers or seasonal limitations.

### ASPHALT PLANT:

- Equipment: Pumps, Piping, Meters, Motors, and Maintenance. Make sure the piping, pumps, and meters can handle very high viscosity liquids: 3 inch pump worked.
- HPG can be 4 times as stiff as a PG 76-22. Make sure your plant is well maintained as HPG binders are stiff, cool rapidly, and create extra stress on plant components.



# Acknowledgement

- TxDOT Odessa District, Area office, and Local Maintenance office
- TxDOT MTD
- TxDOT RTI
- Binder suppliers
- TxAPA
- Everyone who helped make the test section successful

# Questions





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