



# **ASPHALT BINDER**

## **Section 8 – Production and Construction**

# Production

- **Prepave Conference**
  - ▶ **Prior to paving**
  - ▶ **JMF**
  - ▶ **Materials Source**
  - ▶ **Plant Equipment and Operation**
  - ▶ **Burner Fuels**
  - ▶ **Lime Addition**
  - ▶ **Roller Types and Patterns**
  - ▶ **Lay down Equipment**
  - ▶ **Density Requirements**
  - ▶ **Tack or Seal Coats**

# Asphalt Mixing Plants

(WYDOT 401.3.3)

- **Types**
  - ▶ **Batch Plant**
  - ▶ **Drum Plant**
  
- **Capacity > 100t/hour**
- **Plant Mix Quantity > 5000 tons**

# A Drum Mixing Plant



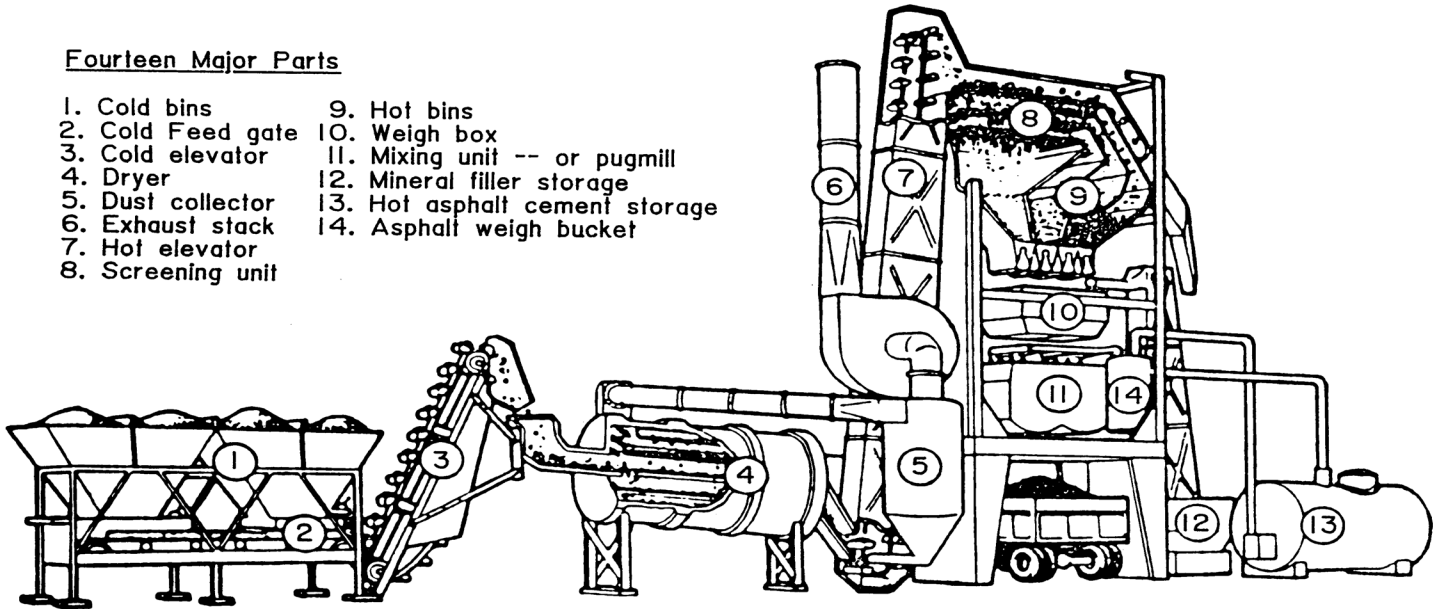
# Storage Silo



# A Batch Mixing Plant

## Fourteen Major Parts

- |                   |                                |
|-------------------|--------------------------------|
| 1. Cold bins      | 9. Hot bins                    |
| 2. Cold Feed gate | 10. Weigh box                  |
| 3. Cold elevator  | 11. Mixing unit -- or pugmill  |
| 4. Dryer          | 12. Mineral filler storage     |
| 5. Dust collector | 13. Hot asphalt cement storage |
| 6. Exhaust stack  | 14. Asphalt weigh bucket       |
| 7. Hot elevator   |                                |
| 8. Screening unit |                                |



# Aggregate Bins



# Mixing & Compaction Temperatures

**Table 401.4.9-1**

|                 | <b>Lab Mixing Temp F</b> | <b>Lab Compaction Temp F</b> |
|-----------------|--------------------------|------------------------------|
| <b>PG 58-XX</b> | <b>310</b>               | <b>285</b>                   |
| <b>PG 64-XX</b> | <b>320</b>               | <b>295</b>                   |
| <b>PG 70-XX</b> | <b>330</b>               | <b>305</b>                   |
| <b>PG 76-XX</b> | <b>330</b>               | <b>305</b>                   |



# Asphalt Mix Temperature



# Weather Limits

- **Cutoff Dates – May 1 to October 15**
- **In writing, the engineer may extend paving start or finish dates**
- **No placement when conditions prevent proper handling, compacting or finishing**

# Plant Mix without Warm Mix Additives

## Atmospheric Temperature Limits

Table 401.4.3-1

| <b>Air Temperature Limitations</b>                        |                        |
|---|------------------------|
| <b>Compacted Thickness of Surface Course Being Placed</b> | <b>Air Temperature</b> |
| Compacted thickness < 1 in [25 mm]                        | 60 °F [15 °C]          |
| 1 in [25 mm] ≤ compacted thickness < 2 in [50 mm]         | 50 °F [10 °C]          |
| Compacted thickness ≥ 2 in [50 mm]                        | 40 °F [4 °C]           |
| Leveling  | 50 °F [10 °C]          |

# Plant Mix with Warm Mix Additives

## Atmospheric Temperature Limits

Table 401.4.3-2

| <b>Air Temperature Limitations Using Warm Mix</b>         |                        |
|---|------------------------|
| <b>Compacted Thickness of Surface Course Being Placed</b> | <b>Air Temperature</b> |
| Compacted thickness < 1 in [25 mm]                        | 55 - 60 °F [15 °C]     |
| 1 in [25 mm] ≤ compacted thickness < 2 in [50 mm]         | 45 - 50 °F [10 °C]     |
| Compacted thickness ≥ 2 in [50 mm]                        | 35 - 40 °F [4 °C]      |
| Leveling  | 45 - 50 °F [10 °C]     |

# Hauling

- **Release Agents – Paraffin or non petroleum**
- **No contamination**
- **Cover as needed**

# Incorrect Truck-loading Sequence



# Correct Truck-loading Sequence



# Rollers

- **WYDOT 401.3.6**
- **Meet requirements of subsection 210.3.6**
- **Capable of reversing direction without backlash**
- **Shall not adversely affect pavement surface**



# Asphalt Paver



# Compaction



# Burner Fuels

## WYDOT 401.2.4

- **Natural gas**
- **Used Oil**
- **Butane**
- **Propane**
- **Number 1 and Number 2 fuel oil**

## Mixing

- **Asphalt within 25°F of aggregate**

# Spreading and Finishing

## ➤ Maximum/Minimum lift

Table 401.4.11-1  
Single Lift Thickness

| Nominal Maximum Aggregate Size (in [mm]) | Lift Thickness (in [mm]) |         |
|--|--------------------------|---------|
|  | Minimum                  | Maximum |
| ¾ [9]                                    | 1 [25]                   | 2 [50]  |
| ½ [13]                                   | 1½ [38]                  | 3 [75]  |
| ¾ [19]                                   | 2 [50]                   | 3 [75]  |

## ➤ Longitudinal Joints

- ▶ Top lift coincides with center line and lane line or edge line
- ▶ Offset 6”
- ▶ Not in wheelpaths
- ▶ 1:3

# Spreading the Finishing (continued)

- **Transverse Joints**
  - ▶ **Taper 1V:6H**
  - ▶ **Taper removed**
  
- **Opening to Traffic**

# Test Strips

- **Purpose**
  - ▶ **Verify density can be achieved**
  - ▶ **Verify equipment**
  - ▶ **Verify procedures**
  
- **General**
  - ▶ **First 500 t of pavement**
  - ▶ **Produced at normal rate**
  - ▶ **Remain in place**
  - ▶ **No additional Hot Plant Mix until accepted (only leveling can be placed)**
  
- **Compaction**
  - ▶ **Immediately after placement**
  - ▶ **Continuous and uniform**

# Test Strips (continued)

- **Sampling and Testing**
  - ▶ **7 samples from last 300 t**
  - ▶ **If correlation is being done 2 samples per location**
  - ▶ **Random locations – WYDOT selected, contractor core**
  - ▶ **No sample <1 ft for edge**
  - ▶ **Densities by T 230 (Wyoming modified)**
  
- **Acceptance**
  - ▶ **If P.F.  $\geq$  1.00 – Accept Test Strip**
  - ▶ **If P.F. < 0.50 – Reject Test Strip**
  - ▶ **If P.F.  $\geq$  0.50 but <1.00 – May be left in place**

# Test Strips (continued)

## ➤ Other Considerations

- ▶ Additional Strips – Contractor Pay
- ▶ JMF Changes – New Test Strip
- ▶ Contractor Request – Contractor Pay
- ▶ Materials Program Request – State Pay
- ▶ Results - < 24 hours
- ▶ Payment – Lump Sum
- ▶ Payment for materials – based on P.F. evaluation



# Compaction

## ➤ Rolling

- ▶ Immediately after placement
- ▶ Continuous till density achieved
- ▶ Sufficient rollers

# Compaction (continued)

## ➤ Sampling

- ▶ Seven test/lot on QC/QA projects
- ▶ Lot 1500 t, maximum
- ▶ Sublot – one-seventh of lot
- ▶ Random locations
- ▶ No test < 1 ft for edge
- ▶ AASHTO T 230 (Wyoming Modified) for acceptance
- ▶ Nuclear density gauge – if calibrated, use for quality control only

# PMWC

## ➤ JMF

- ▶ **Passing 1/2"** **100%**
- ▶ **Passing 3/8"** **97-100%**
- ▶ **Passing #4** **± 5%**
- ▶ **Passing #8** **± 5%**
- ▶ **Passing #200** **± 2.0%**
- ▶ **Mix Temperature JMF Temp. ± 20°F**

## ➤ Placing and Compaction

- ▶ **3 passes steel wheel in static mode**
- ▶ **No density requirements**
- ▶ **Cutoff dates – June 1 to September 15**