



OHIO DEPARTMENT OF
TRANSPORTATION

HIGH STRESS PAVEMENT LOCATIONS

Successful strategies For Treatment

Ohio Asphalt Paving Conference

February 5, 2014

OPE *Office of
Pavement
Engineering*

Design

Management

Research

A large, circular, metallic-looking button with a red diagonal slash across it. The text '446 Type 1H' is centered on the button. The background is a light gray grid pattern with a blue decorative element on the left side.

446 Type 1H

Pending HMA Specification Changes

Effective with SS 800 Update July 14

- Heavy truck traffic mixes will continue to be specified using ITEM 442.
- Medium traffic mixes will use ITEM 441
- Light Traffic (Locals, Counties, etc...) will be specified by Supplemental Specification ###

New Pay Items - Pending

- Items 446 and 448 will be specified using Item 441:
 - Item 441 Asphalt Concrete Surface Course, Type 1, (446) PG 64-22
 - Item 441 Asphalt Concrete Surface Course, Type 1, (448) PG 64-22
 - Item 441 Asphalt Concrete Intermediate Course, Type 1, (446)
 - Item 441 Asphalt Concrete Intermediate Course, Type 2, (448)
- Item 442 – No changes.

What is a High Stress Location?

- An area where rutting is likely to occur.
 - Slow moving trucks
 - Start and Stop truck traffic
 - High truck volume
 - Any location where standard asphalt mixes have rutted in the past
- Also defined by the High Stress Guidelines.

HIGH STRESS LOCATION

High stress locations are found at areas of high acceleration and braking, at intersections, sharp curves, ramps, and where heavy vehicles frequent at slow speeds. High stress locations occur at intersections with forced stop control and one or more of the following criteria:

- The approach grade to the stop control is greater than or equal to 3.5 percent.
- Current Design Designation of 500 trucks per day or greater in the design lane.
- Current Design Designation of 250 trucks per day or greater in a turn lane.

HIGH STRESS LOCATION

Any location where the pavement is structurally sound, and the proper surface and intermediate mix was placed, with quality construction practices, but none the less is rutted.

RUTTING - CAUSES

- **Lack of Structure:** The pavement must be capable of protecting the subgrade, otherwise rutting can be found in the subgrade.
- **Density:** Improper compaction provides space for further densification from traffic. As the mix densifies, rutting results.
- **Unstable Mixes:** Lack of stone-on-stone contact, non-fractured aggregate, and lack of stiffness in the binder permits the mix to deform under load. As traffic pushes aggregates around rutting results, especially in hot weather.

What mix is the right mix?

Pavement Design Manual

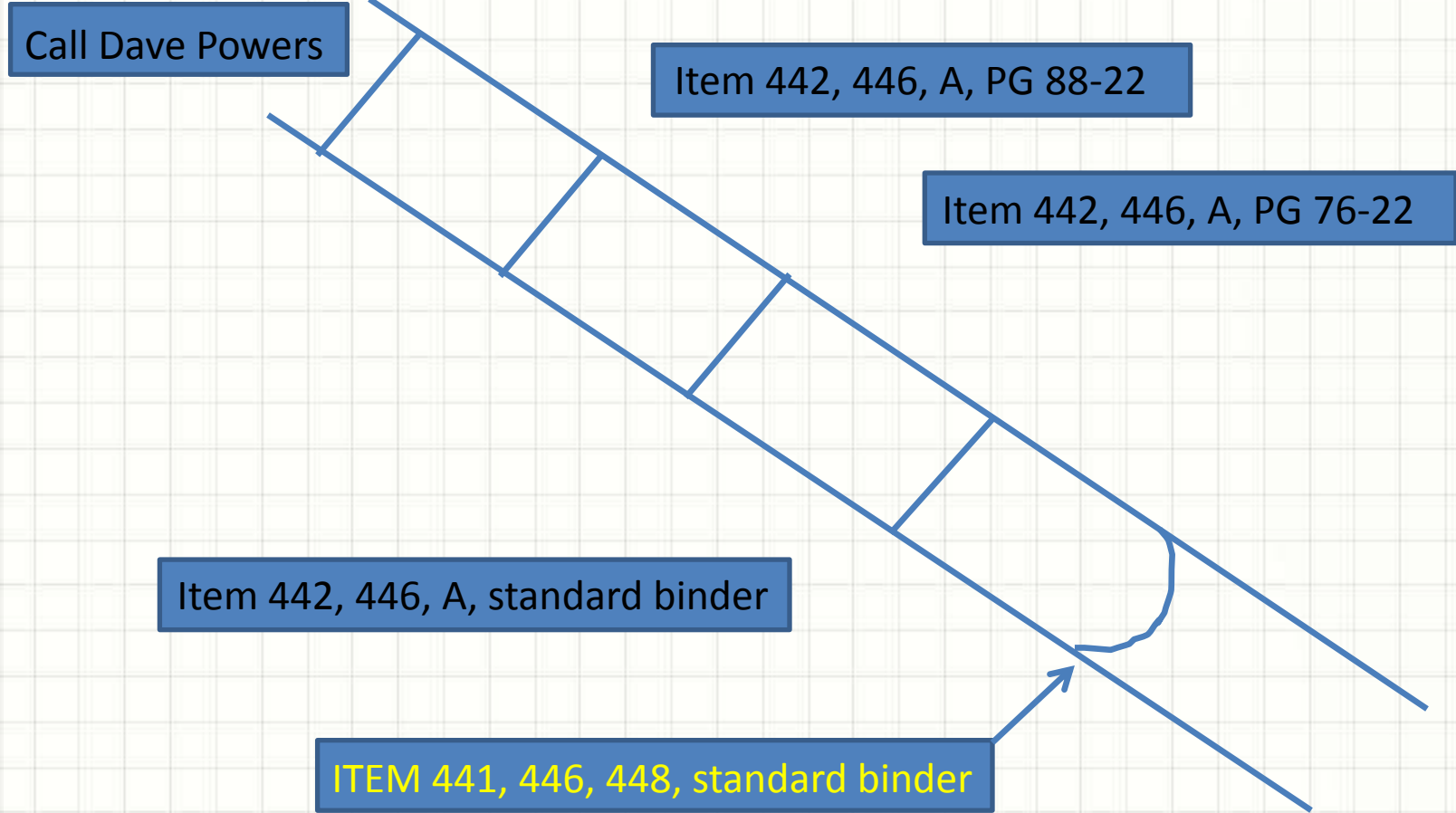


The Ohio Department of Transportation

Stability of Mixes

- Item 442 is a more stable mix than Item 441
 - Item 442 has higher angularity requirements (A)
 - PG 70-22M binder is modified with a polymer
 - Item 442 has the same density control as Item 441
 - 446 or 448 apply to both 441 and 442
- Item 441 is better choice for medium truck traffic.
 - Item 441 will have higher asphalt binder content.
 - Item 441 will generally be a less expensive product.
 - Item 441 should have greater longevity.

High Stress Location Next Step Approach



High Stress Location Next Step Approach

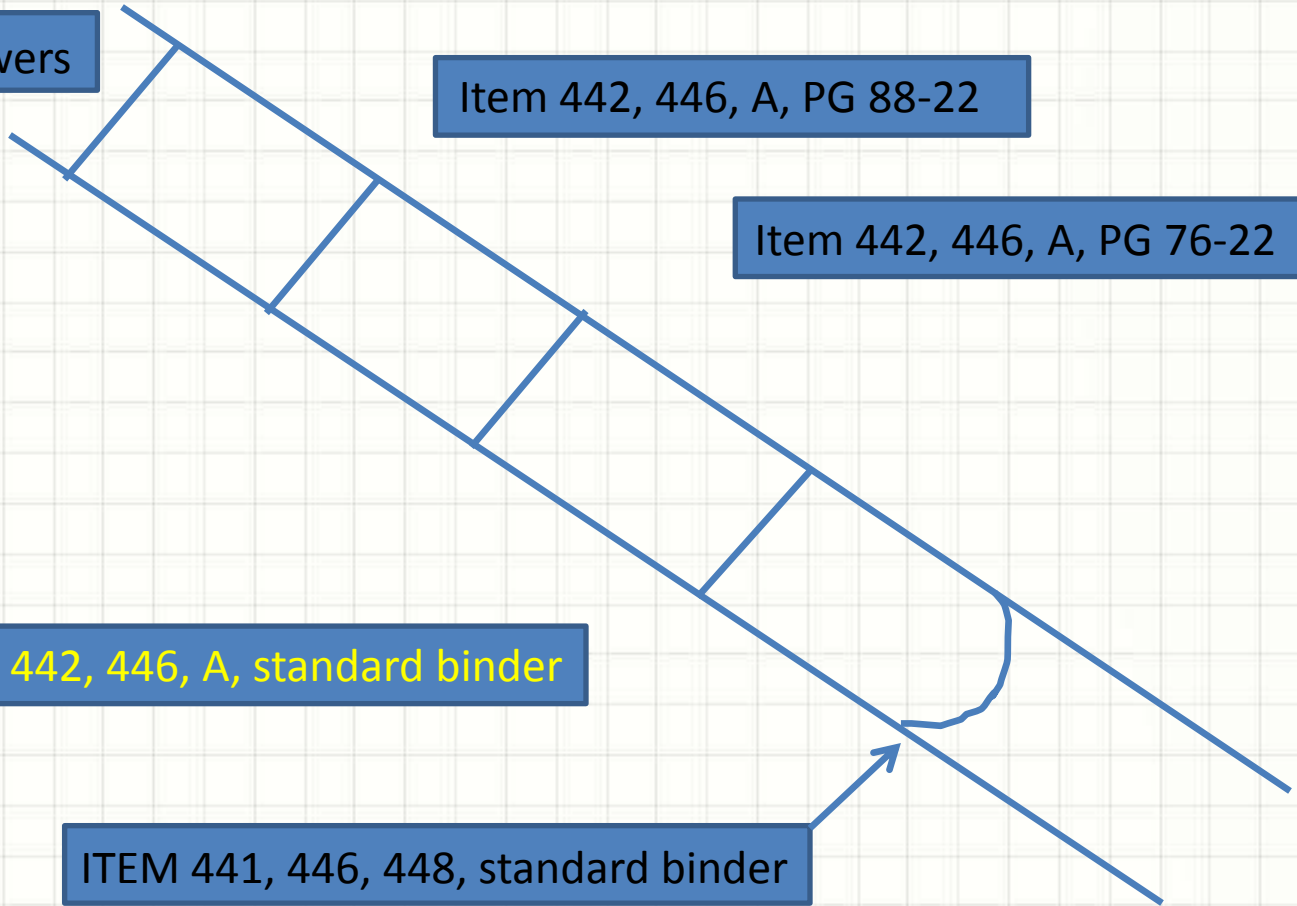
Call Dave Powers

Item 442, 446, A, PG 88-22

Item 442, 446, A, PG 76-22

Item 442, 446, A, standard binder

ITEM 441, 446, 448, standard binder



High Stress Location Next Step Approach

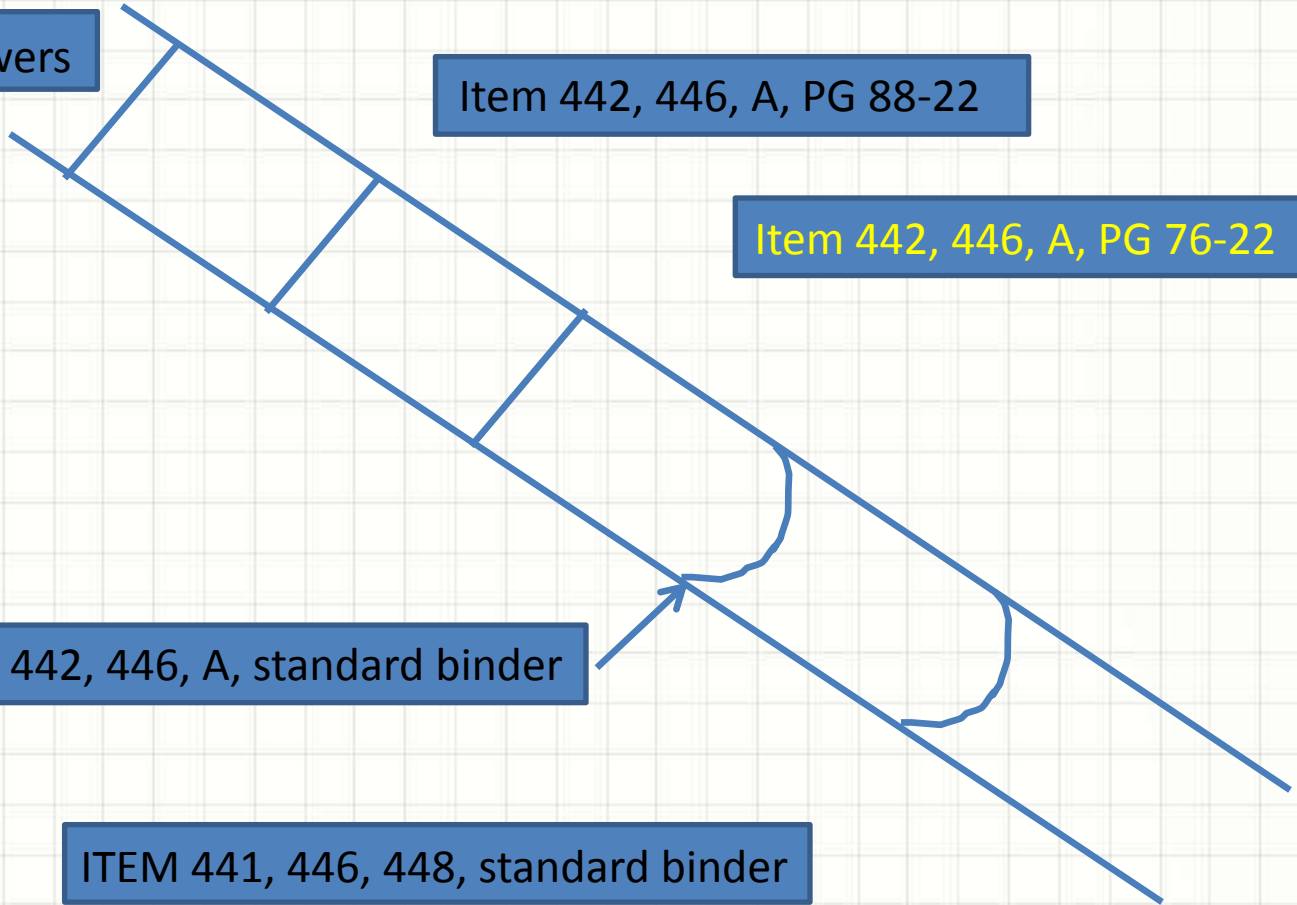
Call Dave Powers

Item 442, 446, A, PG 88-22

Item 442, 446, A, PG 76-22

Item 442, 446, A, standard binder

ITEM 441, 446, 448, standard binder



High Stress Location Next Step Approach

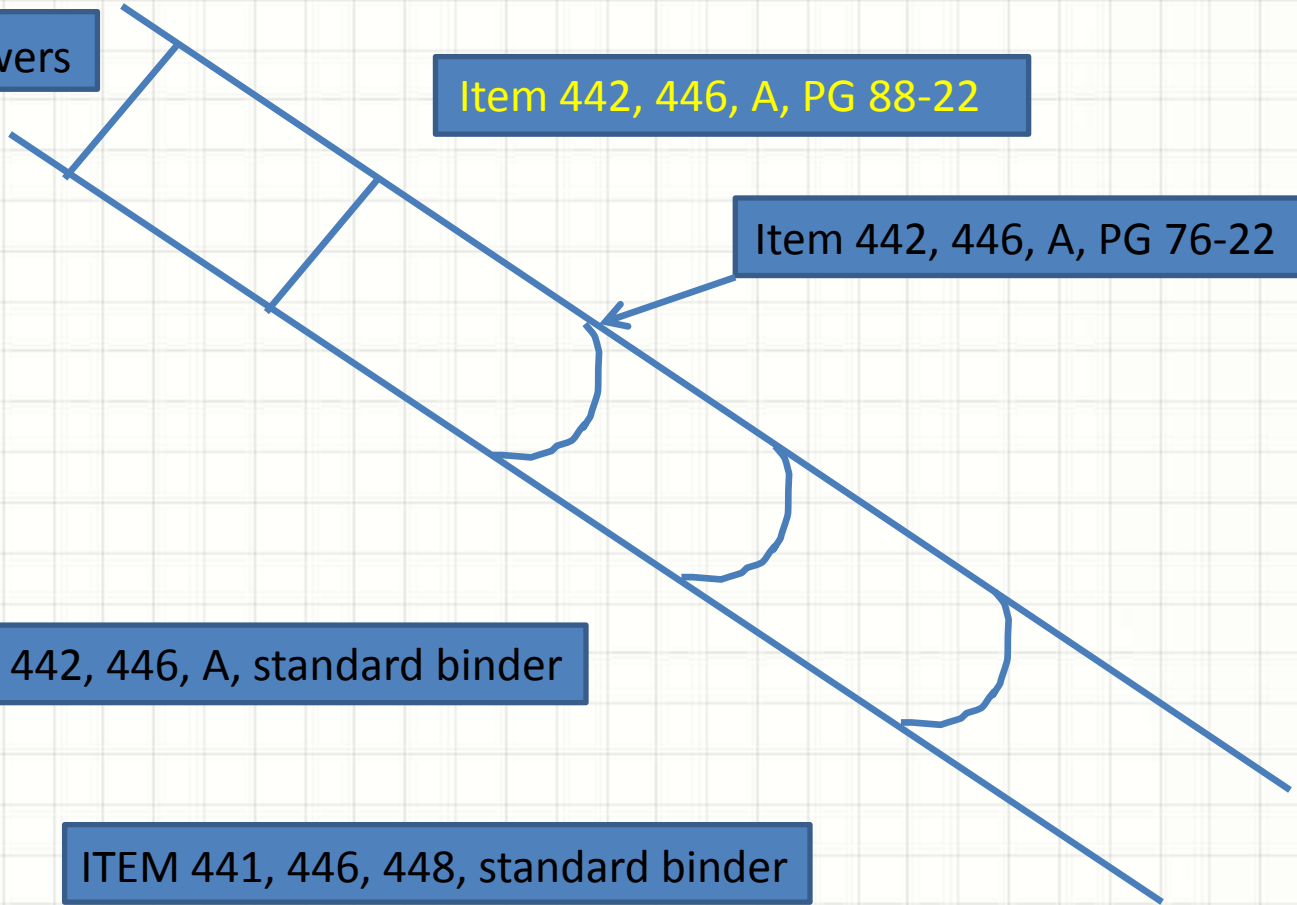
Call Dave Powers

Item 442, 446, A, PG 88-22

Item 442, 446, A, PG 76-22

Item 442, 446, A, standard binder

ITEM 441, 446, 448, standard binder



High Stress Location Next Step Approach

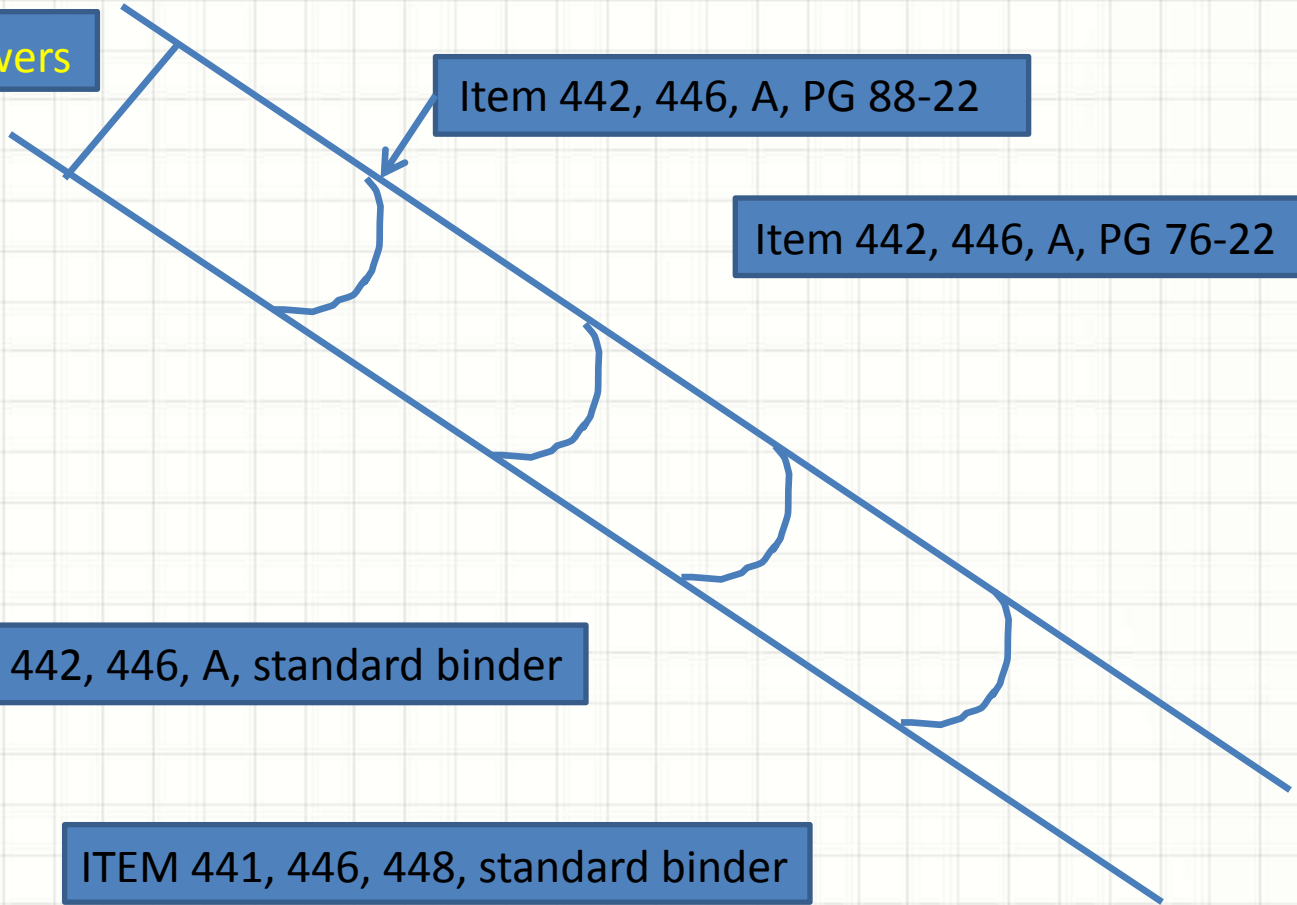
Call Dave Powers

Item 442, 446, A, PG 88-22

Item 442, 446, A, PG 76-22

Item 442, 446, A, standard binder

ITEM 441, 446, 448, standard binder



PG Binders - Stiffness

- Surface Course Options:
 - Standard Heavy (442)Traffic Binder → PG 70-22M
 - Standard Medium (441)Traffic Binder → PG 64-22
 - Extreme Options:
 - PG 76-22M
 - PG 88-22M
- High Stress Condition**
- Intermediate Course – PG 64-28 for 442
 - The need for stiffer binders in the intermediate course is debatable.



Case Study #1



Case Study #2



Case Study #3



Case Study #3



THE END

QUESTIONS???