

# IDOT Technical Update

Illinois Asphalt Pavement Association 81<sup>st</sup> Annual Convention

Ryan Culton, P.E.  
Engineer of HMA & Aggregate  
Illinois Dept. of Transportation



Illinois Department of Transportation

# Topics

- Illinois Flexibility Index Test (I-FIT)
  - Implementation Task Force
  - 2017-2018 Round Robin Highlights
  - What's next for I-FIT
- 2017 Spec Revision Review
  - 2017 HMA Spec change highlights
- Longitudinal Joint Seal
- Automatic Solvent Extractors
- Intelligent Compaction
- PG Binder Usage

# Illinois Flexibility Index Test

- 11 Contracts in 2016 and 15 in 2017
- Uniformity Study with 34 Labs in 2018
- Effect of different I-FIT machines
- AASHTO TP 124 August 2018
- Task Force with Industry to Finalize Spec
- Interstates in 2019 and All HMA in 2020

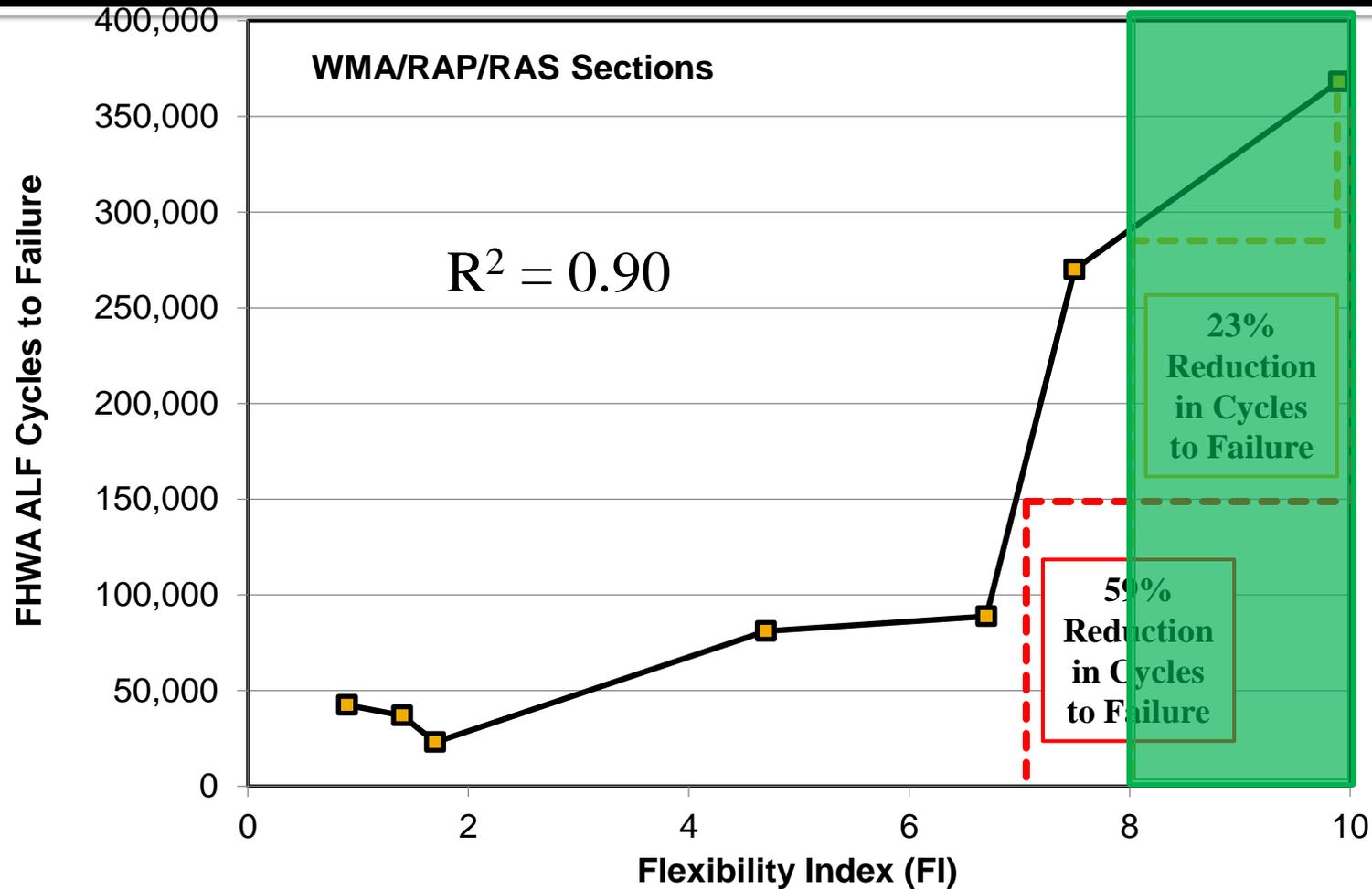
# Illinois Flexibility Index Test

Questions:

Why a Flexibility Index of 8?

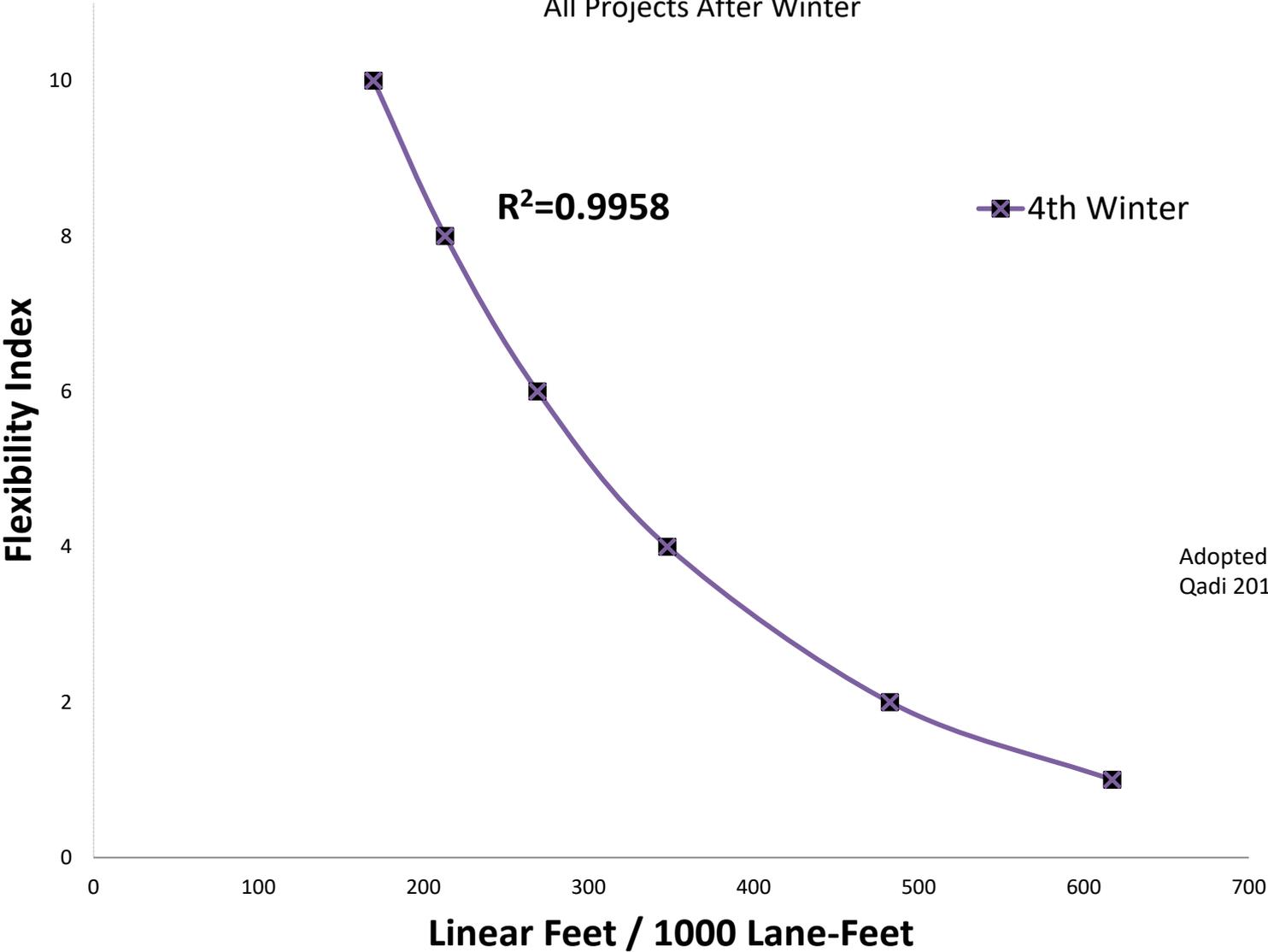
Can I-FIT accurately predict pavement cracking?

# Current Flexibility Index Threshold



# Flexibility Index vs. Transverse Cracking

All Projects After Winter



Adopted from R27-161 Al-Qadi 2017

# I-FIT: What's Next?

- Implement Long-Term Aging Protocol
- New Phase of Research on Binder Performance
  - Goal: Screening binder modifiers/additives

# 2017 Spec Revisions

---

# 2017 HMA Spec Revisions

1. Allow PFP Disputing of individual test results (PFP Spec - Nov 2017 Letting, details in MTP App. E5)
  - Requires Contractor to Participate in AASHTO PSP
  - Districts also participating in PSP
2. District Results within 10 Days of *Sub-lot* (PFP Spec - Nov Letting)
3. QCP: Dispute procedures (QCP Spec - Nov Letting)
  - District automatically rerun test when Precision Limits exceeded
  - Results from retest will replace initial results

# Spec Revisions throughout 2017

## 4. Increased PFP & QCP Pay Factors

- PFP - Max Pay Factor to 105% (MTP App. E1 - Aug 2017 Letting)
- QCP - Increased Max Parameter Pay to 105% (still capped at 100%) (MTP Appendix E6 - Nov 2017 Letting)

## 5. Moving random samples

- Allow moving Cores near **specified obstacles** or away from base defect (MTP App E3 - Jan 2017 Letting)
- Allow moving mix samples away from unsafe areas (MTP App E4 - Nov 2017 Letting)

# Spec Revisions throughout 2017

6. Lock Box for Random Locations (PFP Spec & MTP Appendix E3 - Nov 2017 Letting)
  - Engineer provides random locations & tonnages in a sealed envelope for Contractor to sign during Pre-Production Mtg or prior to paving
  - Sealed Envelope given to Contractor after paving is completed

# Oscillatory Roller Spec

Regional Engineers

Jack Elston

Special Provision for Hot-Mix Asphalt - Oscillatory Roller

## HOT-MIX ASPHALT – OSCILLATORY ROLLER (BDE)

Effective: August 1, 2018

Add the following to Article 406.03 of the Standard Specifications:

“(j) Oscillatory Roller ..... 1101.01”

Revise Table 1 and Note 3/ of Table 1 in Article 406.07(a) of the Standard Specifications as follow:

TABLE 1 - MINIMUM ROLLER REQUIREMENTS FOR HMA				
	Breakdown Roller (one of the following)	Intermediate Roller	Final Roller (one or more of the following)	Density Requirement
Level Binder: (When the density requirements of Article 406.05(c) do not apply.)	P <sup>3/</sup>	--	Vs, P <sup>3/</sup> , T <sub>B</sub> , T <sub>F</sub> , 3W, O <sub>T</sub>	To the satisfaction of the Engineer.
Binder and Surface <sup>1/</sup> Level Binder <sup>1/</sup> : (When the density requirements of Article 406.05(c) apply.)	V <sub>D</sub> , P <sup>3/</sup> , T <sub>B</sub> , 3W, O <sub>T</sub> , O <sub>B</sub>	P <sup>3/</sup> , O <sub>T</sub> , O <sub>B</sub>	Vs, T <sub>B</sub> , T <sub>F</sub> , O <sub>T</sub>	As specified in Articles: 1030.05(d)(3), (d)(4), and (d)(7).
IL-4.75 and SMA <sup>4/ 5/</sup>	T <sub>B</sub> , 3W, O <sub>T</sub>	--	T <sub>F</sub> , 3W, O <sub>T</sub>	
Bridge Decks <sup>2/</sup>	T <sub>B</sub>	--	T <sub>F</sub>	As specified in Articles 582.05 and 582.06.

3/ A vibratory roller (V<sub>D</sub>) or oscillatory roller (O<sub>T</sub> or O<sub>B</sub>) may be used in lieu of the pneumatic-tired roller on mixtures containing polymer modified asphalt binder.”

Add the following to EQUIPMENT DEFINITION in Article 406.07(a) contained in the Errata of the Supplemental Specifications:

“O<sub>T</sub> - Oscillatory roller, tangential impact mode. Maximum speed is 3.0 mph (4.8 km/h) or 264 ft/min (80 m/min).”

O<sub>B</sub> - Oscillatory roller, tangential and vertical impact mode, operated at a speed to produce not less than 10 vertical impacts/ft (30 impacts/m).”

Add the following to Article 1101.01 of the Standard Specifications:

“(h) Oscillatory Roller. The oscillatory roller shall be self-propelled and provide a smooth operation when starting, stopping, or reversing directions. The oscillatory roller shall be able to operate in a mode that will provide tangential impact force with or without vertical impact force by using at least one drum. The oscillatory roller shall be equipped with water tanks and sprinkling devices, or other approved methods, which shall be used to wet the drums to prevent material pickup. The drum(s) amplitude and frequency of the tangential and vertical impact force shall be approximately the same in each direction and meet the following requirements:

- (1) The minimum diameter of the drum(s) shall be 48 in. (1200 mm);
- (2) The minimum length of the drum(s) shall be 66 in. (1650 mm);
- (3) The minimum unit static force on the drum(s) shall be 125 lb/in. (22 N/m);
- (4) The minimum force on the oscillatory drum shall be 18,000 lb (80 kN); and
- (5) Self-adjusting eccentrics, and reversible eccentrics on non-driven drum(s).”

80xxx

# Longitudinal Joint Seal Spec

- Observations from 2017:
  - Samples **not** being taken at Project Site per Spec
  - LJS **not** being used under binder on Interstate
- CBM Spec Revisions:
  - SMA ~~12~~ 18 inches wide
  - Verification every ~~6000~~ 12000 ft
  - Elastic Recovery ~~65~~ 70 min
- BDE Revised for August 2018 Letting
  - **To Be Inserted in all HMA Contracts**

# HMA Automatic Solvent Extractors

- Districts 1 & 4 own Devices
- Other Districts Interested
- Devices Generate Minus #200 due to Tumbling
- CBM conducted Two Round Robins (6 Labs)
  - Dust Generation
    - 0.25% Hard Agg
    - 0.35% Soft Agg
- CBM will incorporate option into MTP for 2019

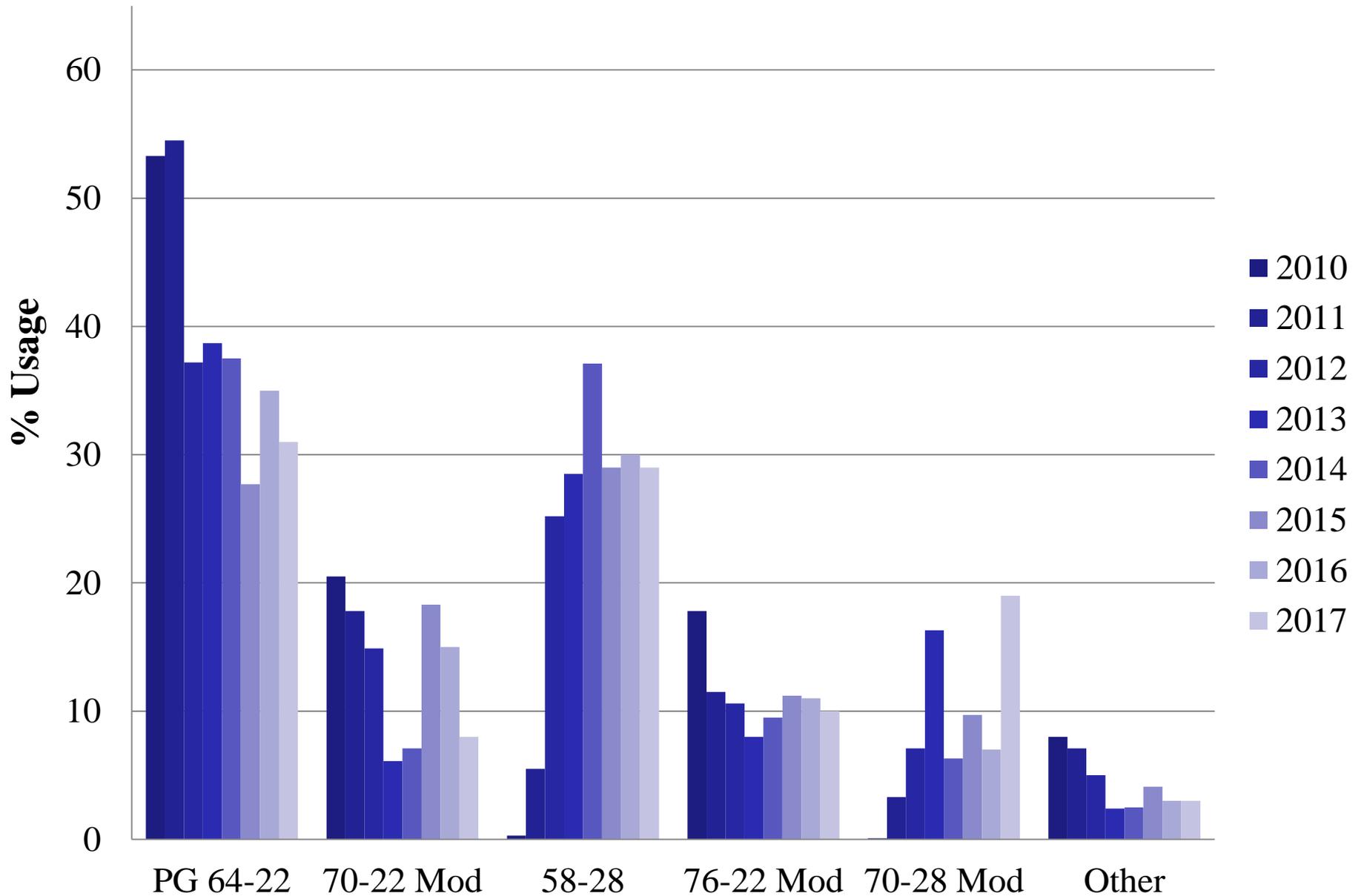
# Intelligent Compaction (IC)

- Monitoring Passes, Temperature & Speed Only
  - Goal: Leveling Binder and Intersections
- Pooled Fund
  - Intelligent Construction Data Management System (Veta) and Implementation
- IDOT / Industry IC Working Group

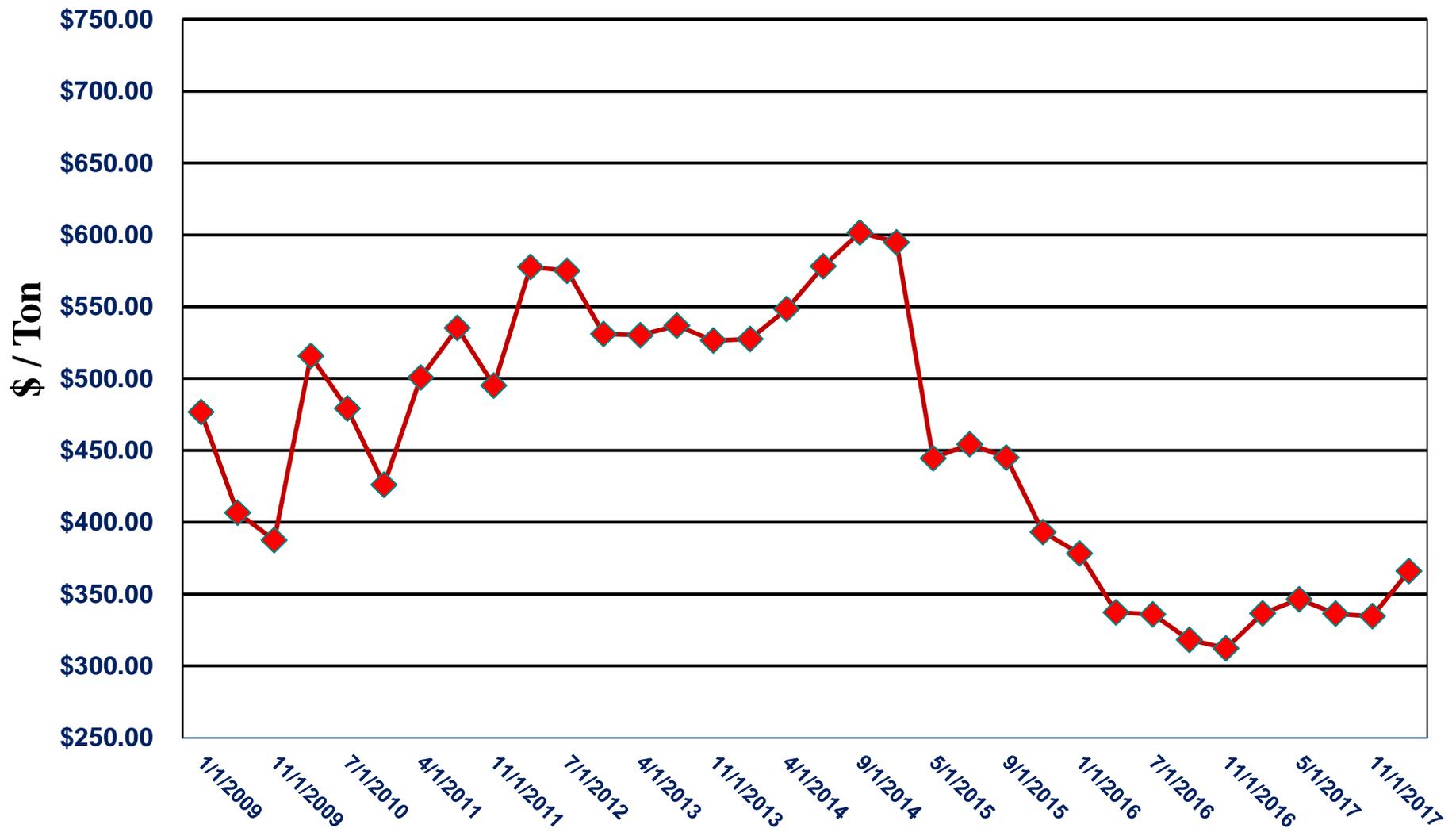
# PG Binder Usage

---

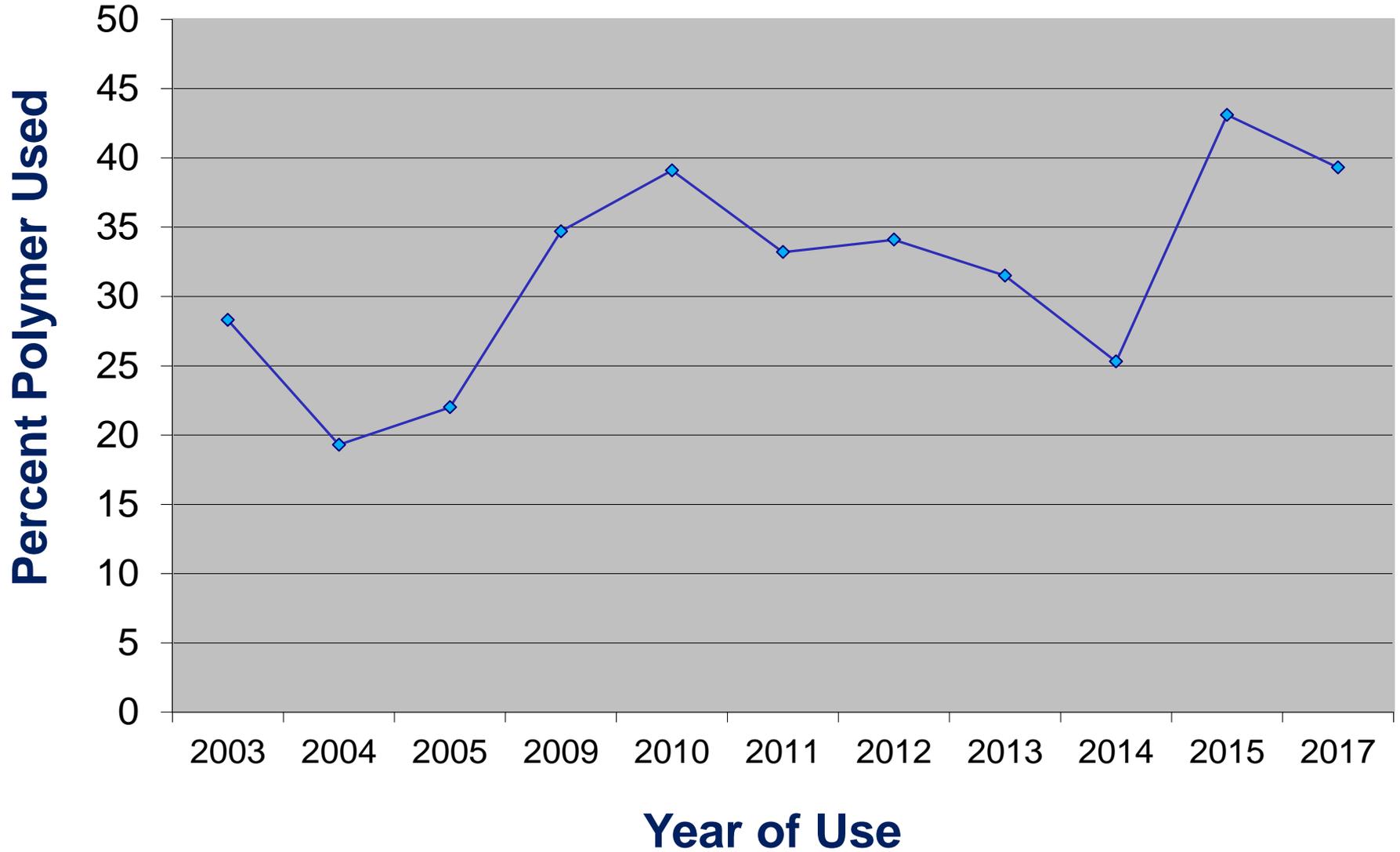
# 2010 to 2017 Grade Usage



# Bituminous Price Index



# Percent Polymer Used vs. Time



# Questions

