Flexible Microsurfacing

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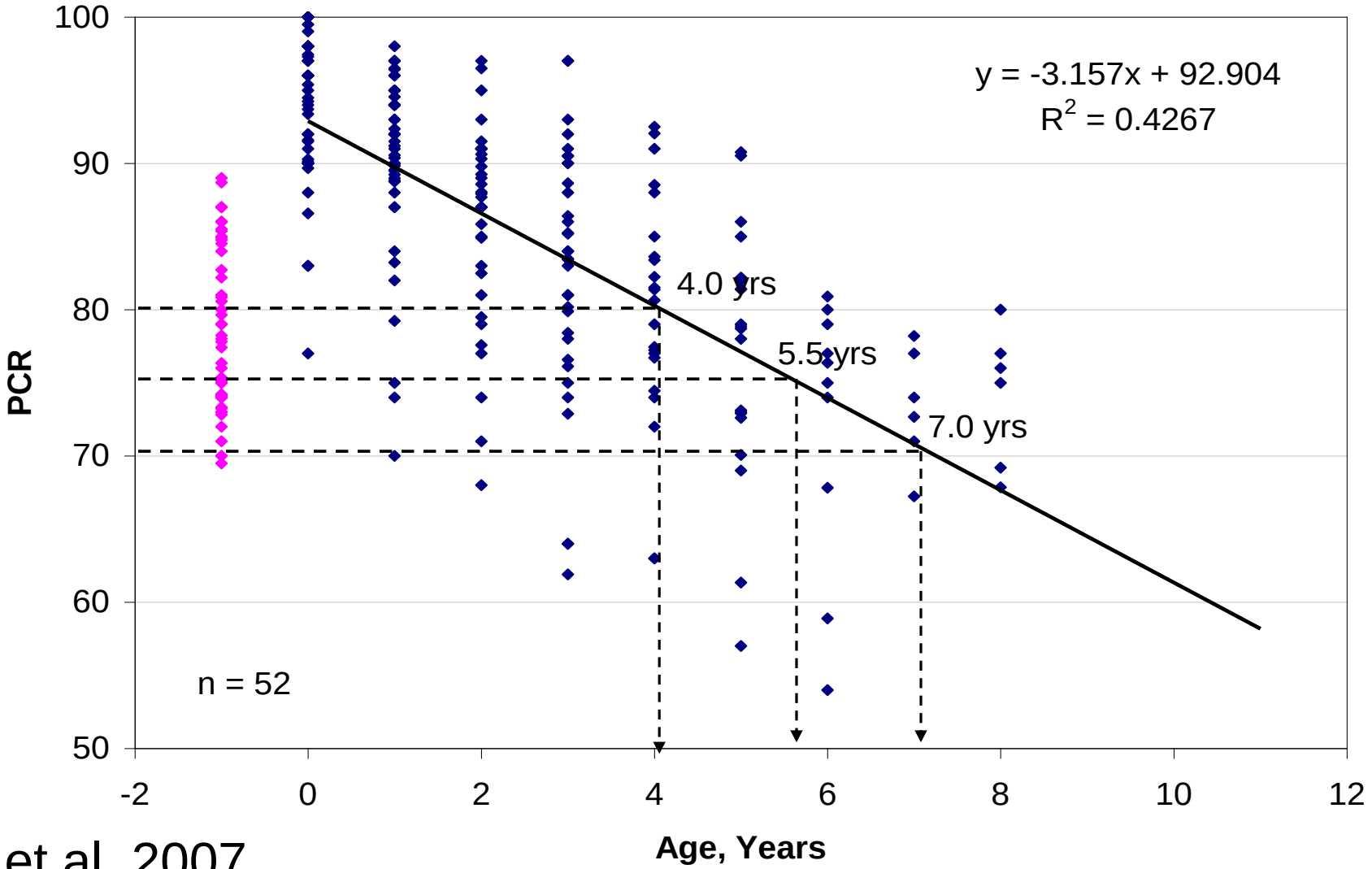
Northeast Pavement Preservation Partnership Annual Meeting
April 29—May 1, 2013
Annapolis, MD

Conventional Microsurfacing

- Developed in Europe in 1970's
- Introduced to the U.S. in 1980's
- Thin surface treatment
  - 2-3 times thickness of largest stone
- Not intended as a crack treatment
  - Cracks reflect through within a few years
- 4-7 year service life
- $2-3/sq. yd

Pavement Condition Rating (Conventional)



Rao et al. 2007

Flexible Microsurfacing

- ~~Flexible~~ Next Generation
- Last 5 years
- Additives
  - Polyester, Fiberglass, HiMA, others?
- Potential benefits
  - Crack resistance, Aggregate Durability, Workability
- 15-25% incremental cost
- Extension in service life (or benefits to cost) unknown
- Performance studies (Utah, Kansas, Minnesota)

Fiber Additive

Road Science, 2012

Courtesy: Road Science

HiMA Placement (Minnesota)

Western Builder, 2012

SBS polymer Kraton D0243

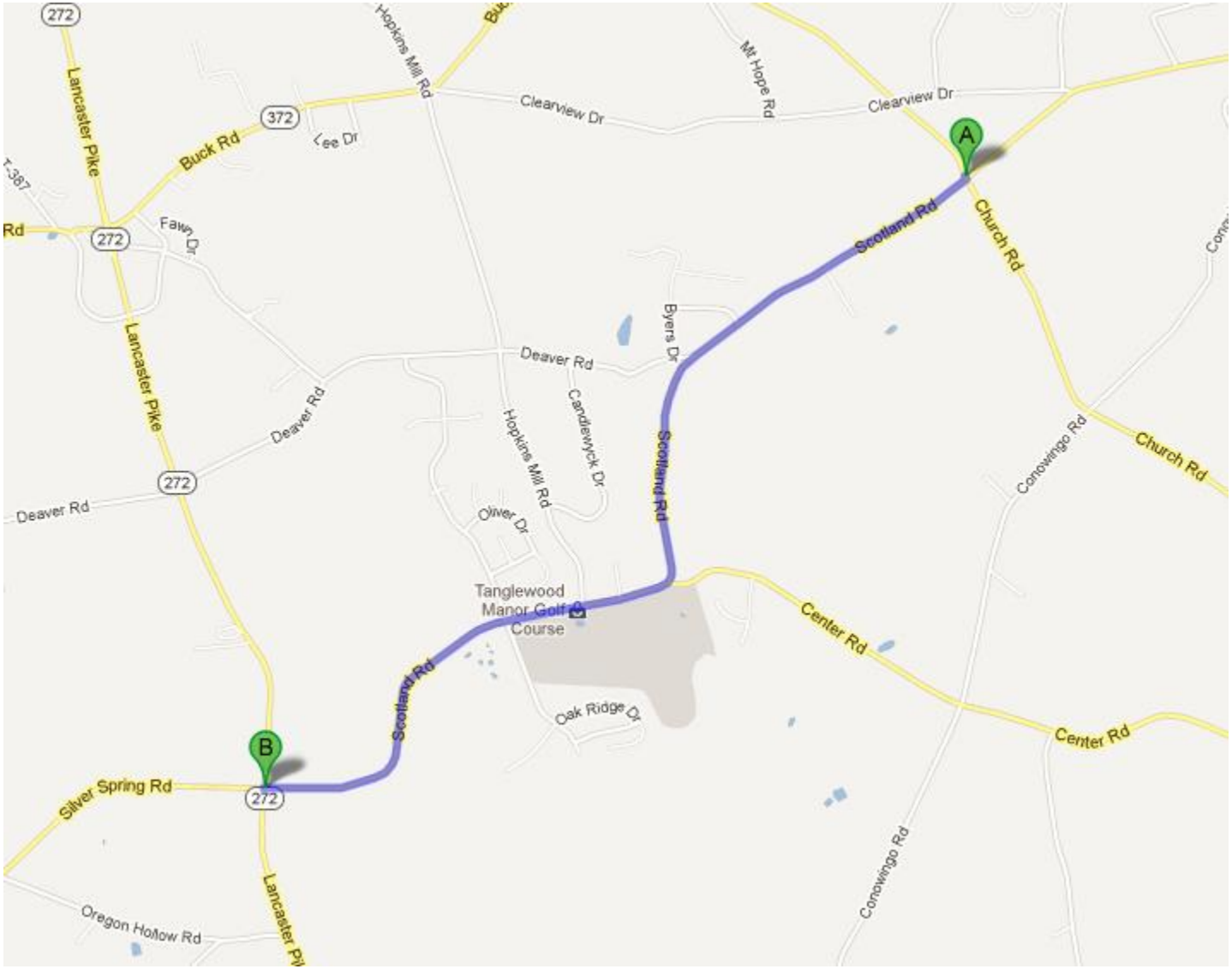
PennDOT Research

- Compare flexible microsurfacing with conventional microsurfacing
  - Literature review
  - Experiences of other highway agencies, and
  - monitoring and evaluation of a pilot project.
- Construction specifications
- Manuals, publications, and other documents
- Training materials and research report
  - Appropriate usage, QC/QA, field evaluation, laboratory testing, equipment

PennDOT Project

Lancaster County
SR 3010 (Scotland Rd.)
ADT: 1,347; Trucks: 9%
Speed limit: 45 mph

PennDOT Project



PennDOT Project

PennDOT Project

Total: 2.8 miles

- Control Section: Conventional microsurfacing
  (Segment 60, Segment 50; 4,576 ft)
- Test Section 1: Flexible microsurfacing (Road Science Polyester Fiber System)
  (Segment 40; 3,402 ft)
- Test Section 2: Flexible microsurfacing (Colas Durable Fiber Glass System)
  (Segment 30; 2,985 ft)
- Test Section 3: Flexible microsurfacing (Kraton® HiMA)
  (Segment 20; Segment 10; 4,073 ft)

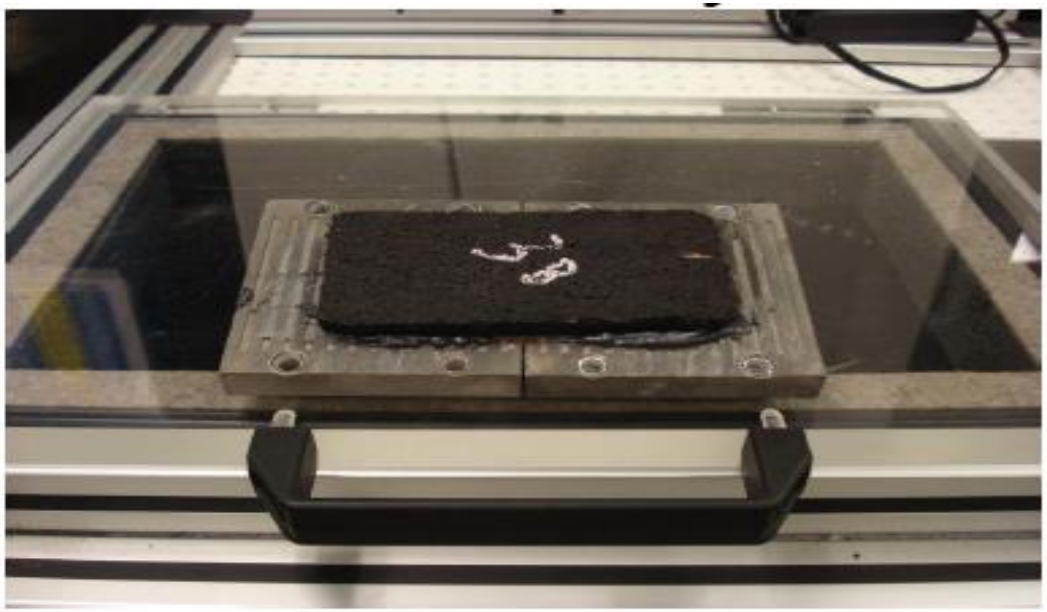
Same aggregate

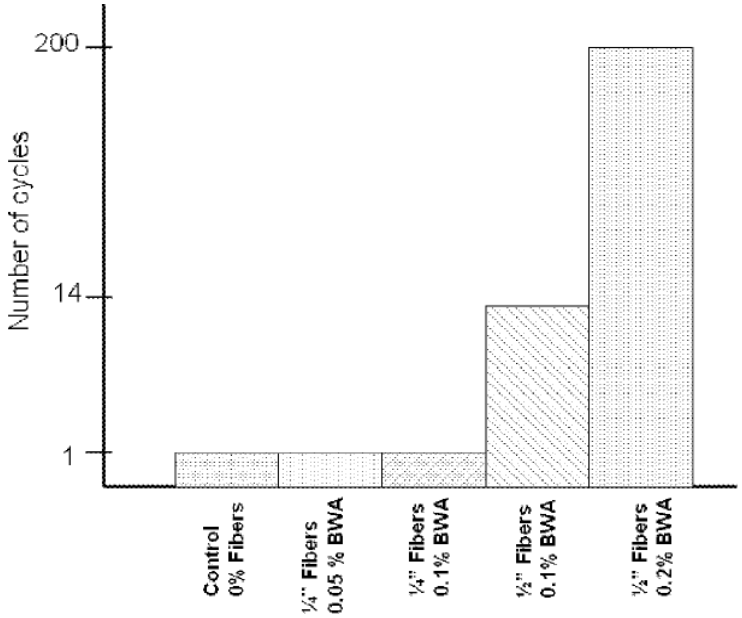
500 ft subsections for statistical analysis and modeling

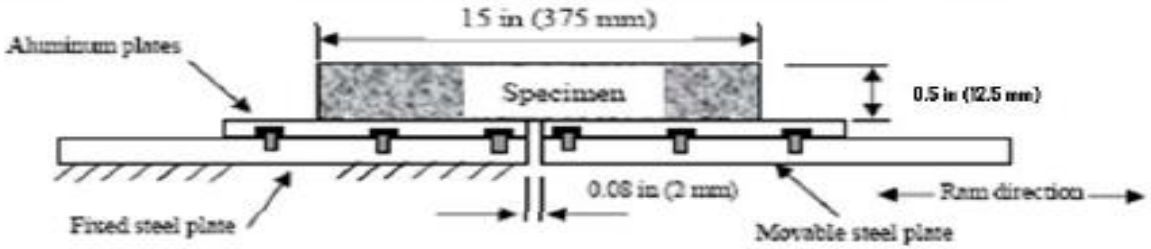
Preconstruction and Construction

- Mix Design
  - ISSA TB 139 (wet cohesion), TB 100 (wet track abrasion loss), TB 113 (mix time), TB 144 (compatibility), TB 114 (wet stripping), TB 147 (lateral displacement), TB 109 (excess asphalt), Tex-248-F (modified Texas Overlay Test)
- Construction Inspection (stoppages, etc.)
- Field Evaluation
- Field Samples
- Photos and Video for Training Material

Modified Texas Overlay Test







Courtesy: Road Science

Monitoring and Evaluation

Test	Month Following Construction					
	-1	0	3	6	9	12
Visual Distress	X		X	X	X	X
Digital Survey Vehicle & Profile	X			X		X
Ground Penetrating Radar		X				X
Locked Wheel Friction Tester		X		X		X

Digital Survey Vehicle (ICC)

Ground Penetrating Radar (Infrasense, Inc.)

Locked Wheel Friction Tester (ICC)

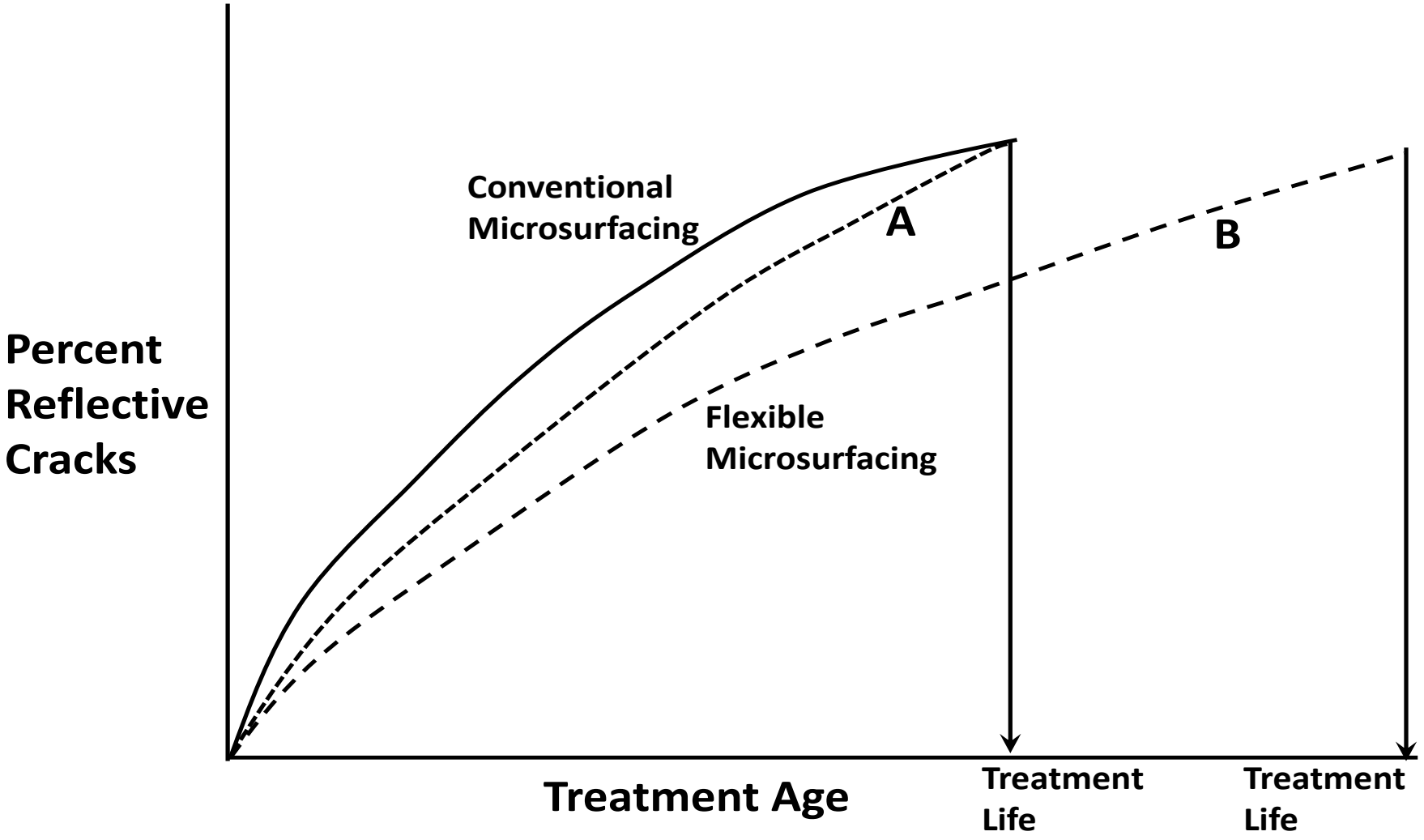
Construction Research Questions

- Specification Changes
  - Anticipating future needs
- Constructability issues
- Quality Assurance
  - What quality measures do we evaluate?
  - How do we know field product is consistent with design (e.g. fiber dosage)?
  - How do we measure consistency and uniformity?
  - What does a field inspector need to know?

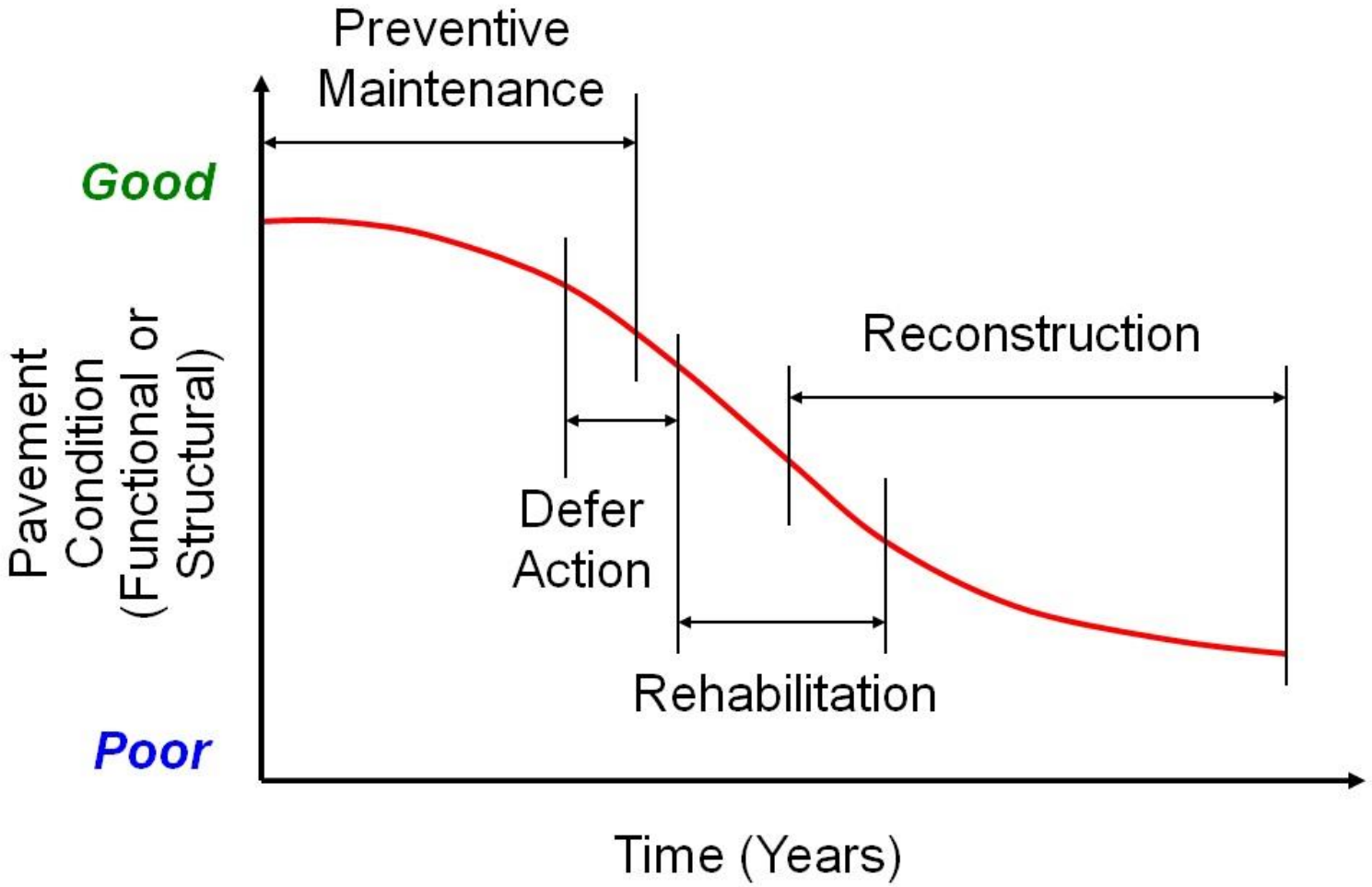
Performance Research Questions

- Incremental Cost
- Quantifiable Benefits
- Functional characteristics
  - surface profile, ride quality, and skid resistance
- Durability and aggregate retention
  - Winter maintenance, Horse/buggy traffic
- Does laboratory tests translate to field results
- Protection of underlying pavement
- Performance Curve

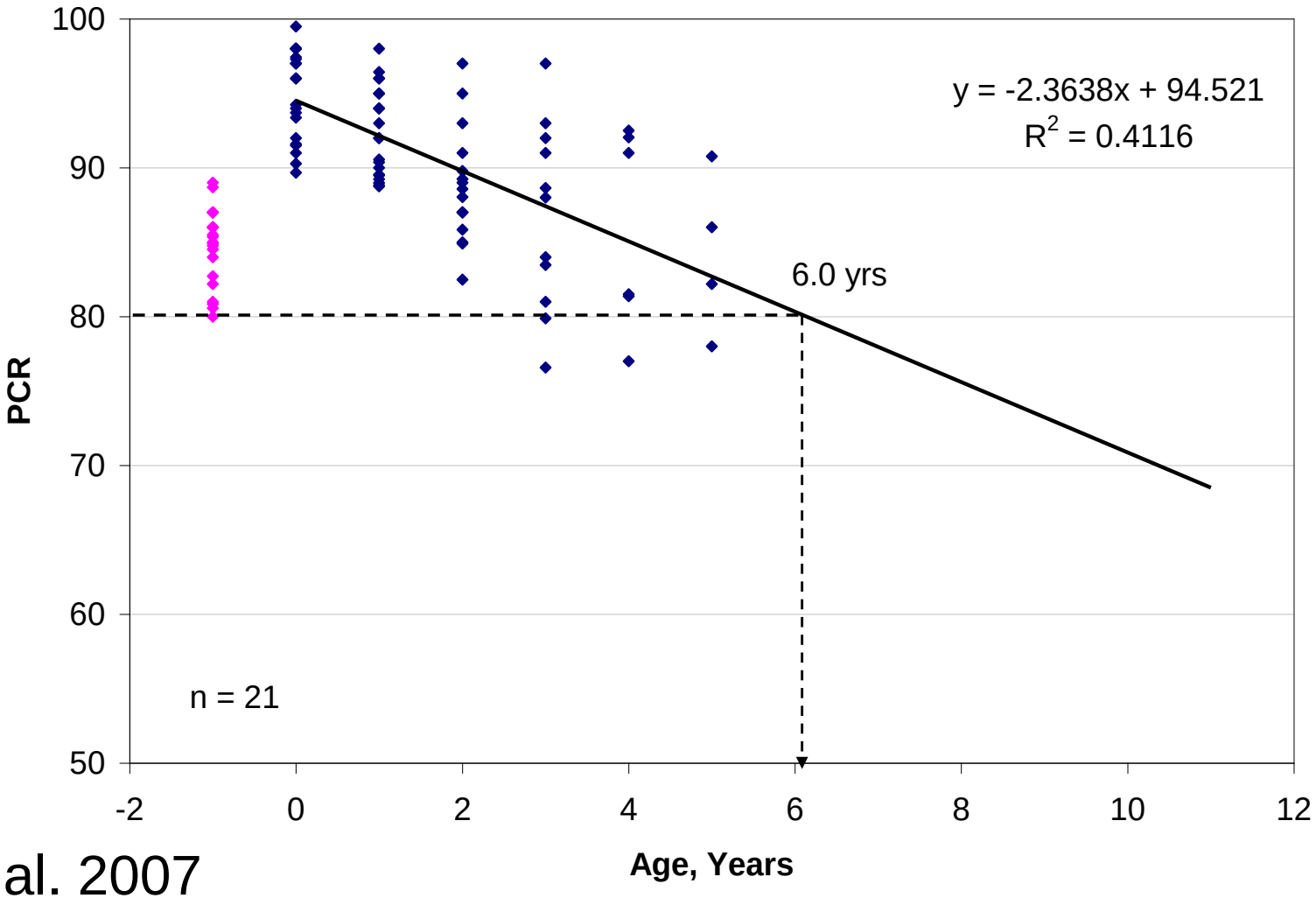
Service Life Extension



No Preservation Talk is Complete Until …



Pavement Condition Rating (Conventional)



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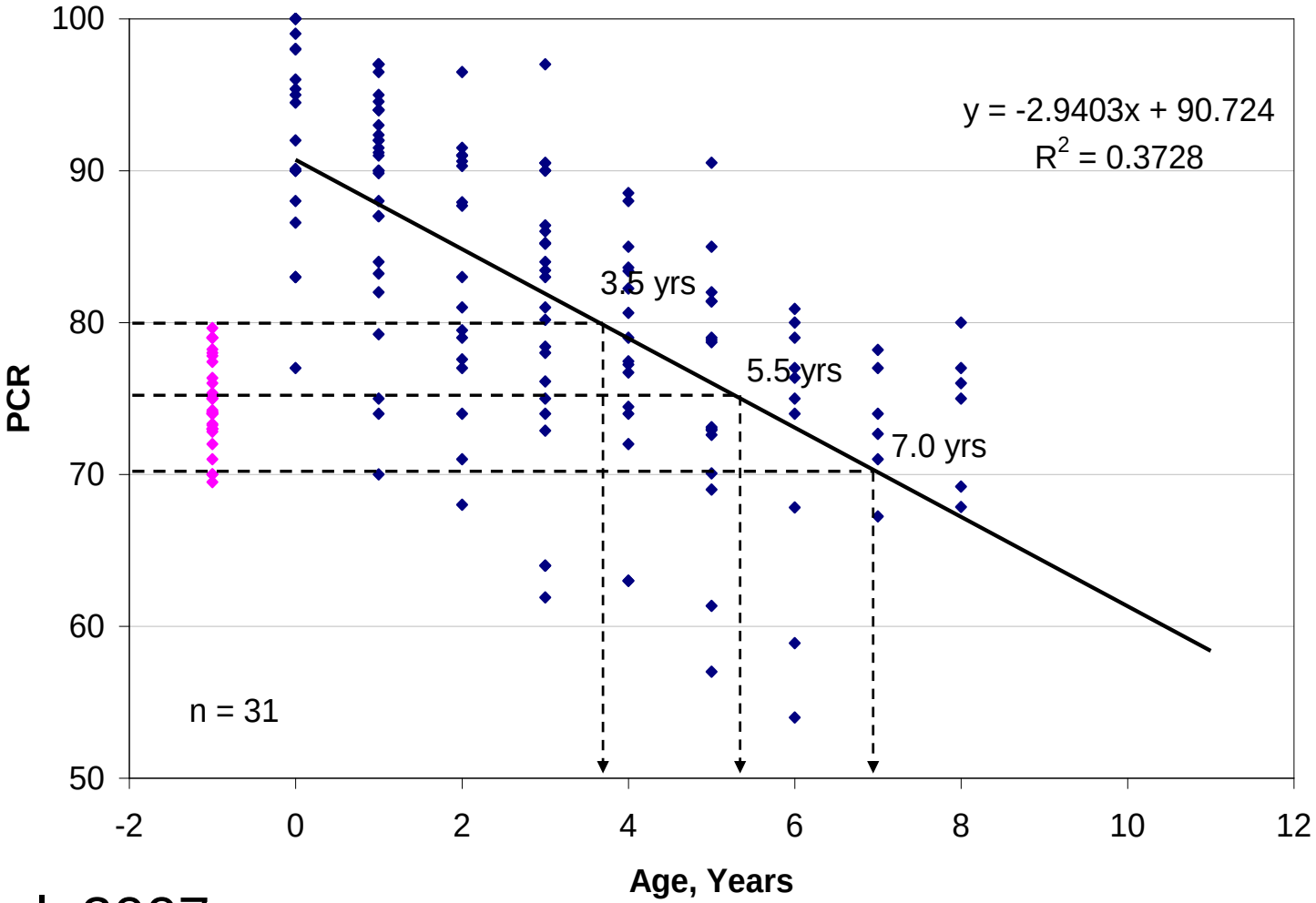

Rao et al. 2007

Project Schedule

Activity	Year	2013				2014				2015
	Quarter	1	2	3	4	1	2	3	4	1
Pre-Construction Data Collection			X							
Construction/Placement			X							
Collect Samples, Document Construction			X							
Post-Construction Field Evaluation			X	X	X	X	X			
Monitoring and Evaluation Report. Presentation and Recommendations.						X				
Update Specifications and Publications/Presentation.								X		
Technology Transfer (Training)									X	
Final Report										X

Thank You

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