

HPMS Rule on Collecting Pavement Condition Data

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Non-Interstate System NHS < 40 mph

- PSR is allowed only for this group
- Present Serviceability Rating - PSR
- Mean values of ratings by a group of highway users

Original PSR – AASHO Road Test

Acceptable ?		5	Very Good
Yes	<input type="checkbox"/>	4	Good
No	<input type="checkbox"/>	3	Fair
Undecided	<input type="checkbox"/>	2	Poor
		1	Very Poor
		0	

Rating

Section Identification _____

Rater _____ Date _____ Time _____ Vehicle _____



Non-Interstate System NHS < 40 mph

- PSR
- Only rating required
 - Others discussed later optional
- PSR can be reported
 - How do you determine it
 - How to conduct ratings

PSR (Present Serviceability Rating)

Table 4.4: Present Serviceability Rating

PSR	Description
4.0 – 5.0	Only new (or nearly new) superior pavements are likely to be smooth enough and distress free (sufficiently free of cracks and patches) to qualify for this category. Most pavements constructed or resurfaced during the data year would normally be rated in this category.
3.0 – 4.0	Pavements in this category, although not quite as smooth as those described above, give a first class ride and exhibit few, if any, visible signs of surface deterioration. Flexible pavements may be beginning to show evidence of rutting and fine random cracks. Rigid pavements may be beginning to show evidence of slight surface deterioration, such as minor cracks and spalling.
2.0 – 3.0	The riding qualities of pavements in this category are noticeably inferior to those of new pavements, and may be barely tolerable for high-speed traffic. Surface defects of flexible pavements may include rutting, map cracking, and extensive patching. Rigid pavements in this group may have a few joint failures, faulting and/or cracking, and some pumping.
1.0 – 2.0	Pavements in this category have deteriorated to such an extent that they affect the speed of free-flow traffic. Flexible pavement may have large potholes and deep cracks. Distress includes raveling, cracking, rutting and occurs over 50 percent of the surface. Rigid pavement distress includes joint spalling, patching, cracking, scaling, and may include pumping and faulting.
0.1 – 1.0	Pavements in this category are in an extremely deteriorated condition. The facility is passable only at reduced speeds, and with considerable ride discomfort. Large potholes and deep cracks exist. Distress occurs over 75 percent or more of the surface.

-
- Subjective panel rating
 - Rated using values in the following Table 4.4
 - Correlation
 - If sufficiency ratings of pavement condition are available, they may be used after a correlation between the sufficiency rating scale and the PSR



Instructions for Updates

Including the HPMS Data Items



California Department of Transportation
Division of Transportation System Information
Highway Inventory and Performance Branch

Revised April 2007

Can estimate PS
from PCI
Apx E

PSR vs PCI for PCC pavement

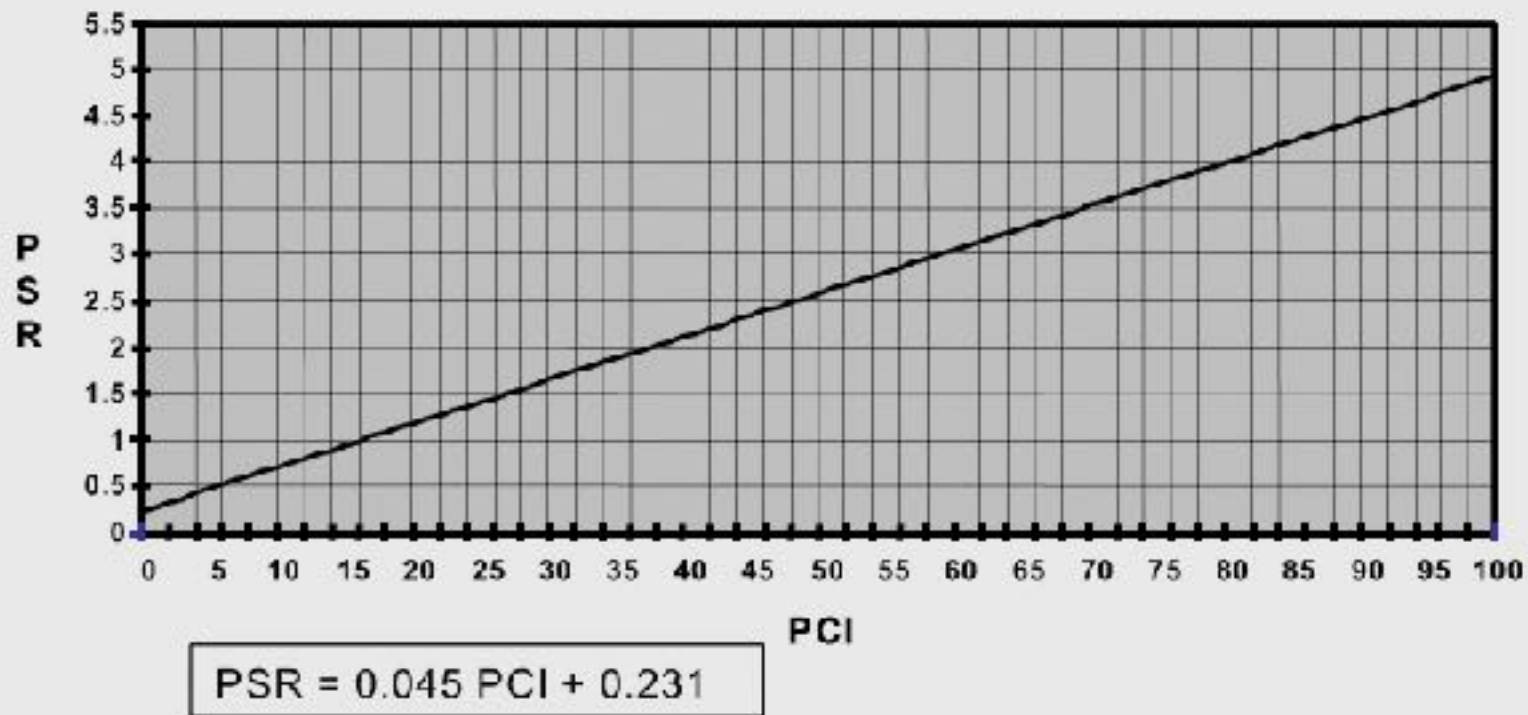
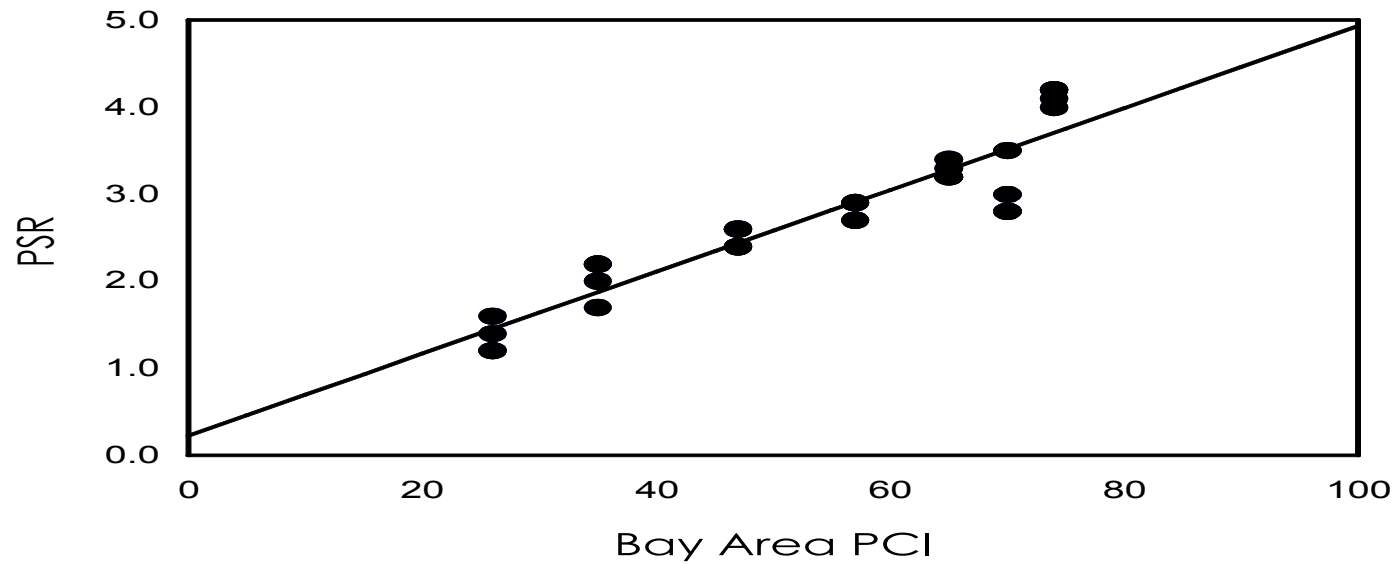
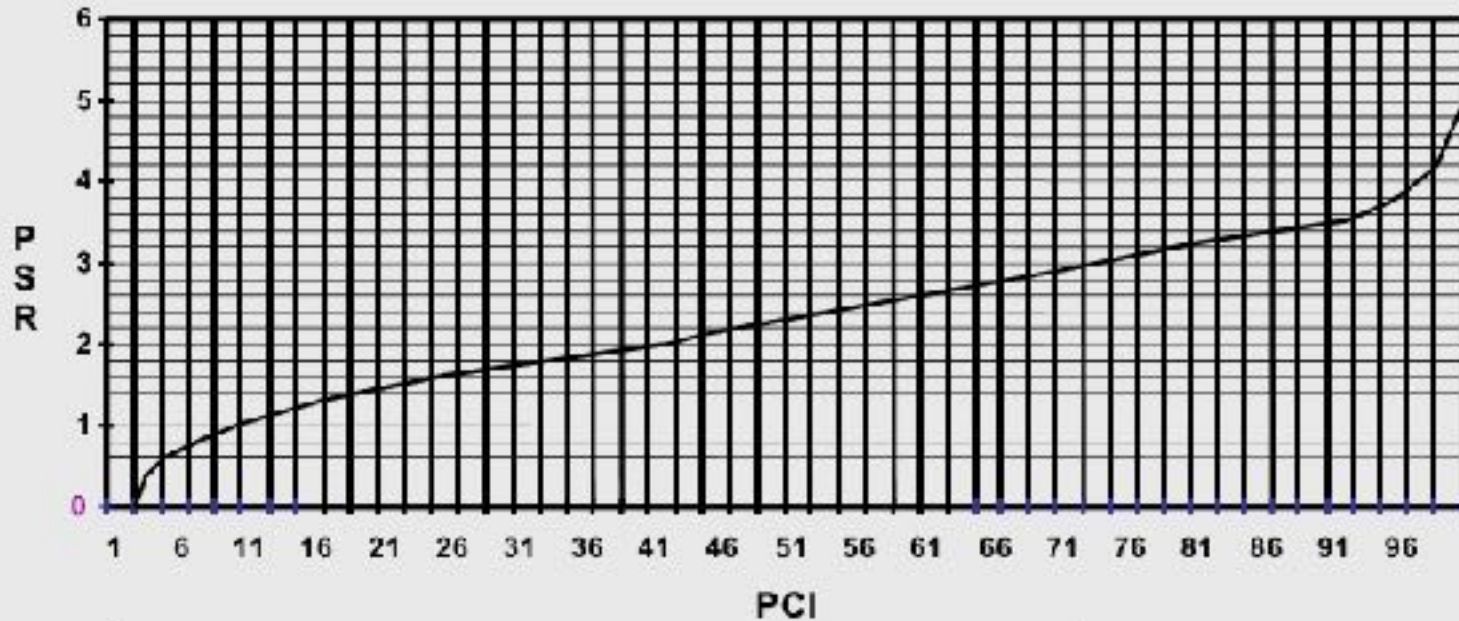


Chart E-1

PCC Data – $R^2 = 0.87$



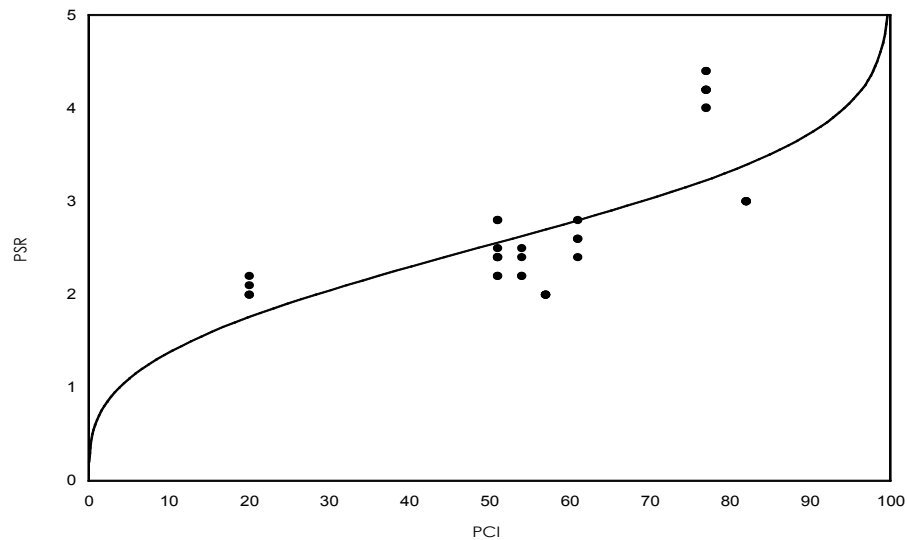
PSR vs PCI for AC pavement



$$PSR = - 0.55 \ln [(100 / PCI_{adj}) - 1] + 2.17$$

Chart E-2

AC Data – $R^2 = 0.75$



PCI adjusted

- PCI adjusted by removing deducts for
 - Low severity alligator cracking
 - Block cracking
 - Longitudinal and transverse cracking

Pavement Section	PCI	Deducts			PCI _{adj}
		Medium & High Severity Alligator Cracking	Medium & High Severity Block Cracking	Medium & High Severity Transverse & Long. Cracking	
A1	77	0	0	4	95
A2	82	0	0	0	94
A3	77	0	0	0	94
A4	54	0	8	0	73
A5	61	0	25	0	72
A6	20	67	0	0	33
A7	57	34	0	2	55
A8	51	4	0	2	56
A9	51	13	33	0	58

Issue

- FHWA defined Good Condition
 - $PSR \geq 4.0$
 - Federal Register, page 5940
 - States have to meet targets
- Study used original – Good $PSR \geq 3.0$
- OK for PCC ~80
- AC much too high



How to fix

- Need new relationship based on more data for AC
 - Panel rates using table 4.4; experienced raters determine PCI
 - Regression analysis & statistical validation
- Validate PCC
- Relationship must be accepted by Caltrans & FHWA



Collection Requirements

- Non-NHS (≤ 40 mph)
 - Collected manually by team or correlated based on PCI
 - Rightmost through lane – generally
 - Continuously collected – report for uniform section lengths of 0.1 mile
 - Biennial frequency



For PCI Correlation

- Will need 0.1 mile segments
 - Inspect at least 2 inspection units per 0.1 mi segment
- This has been implemented in Washington State

Non-Interstate System NHS ≥ 40 mph

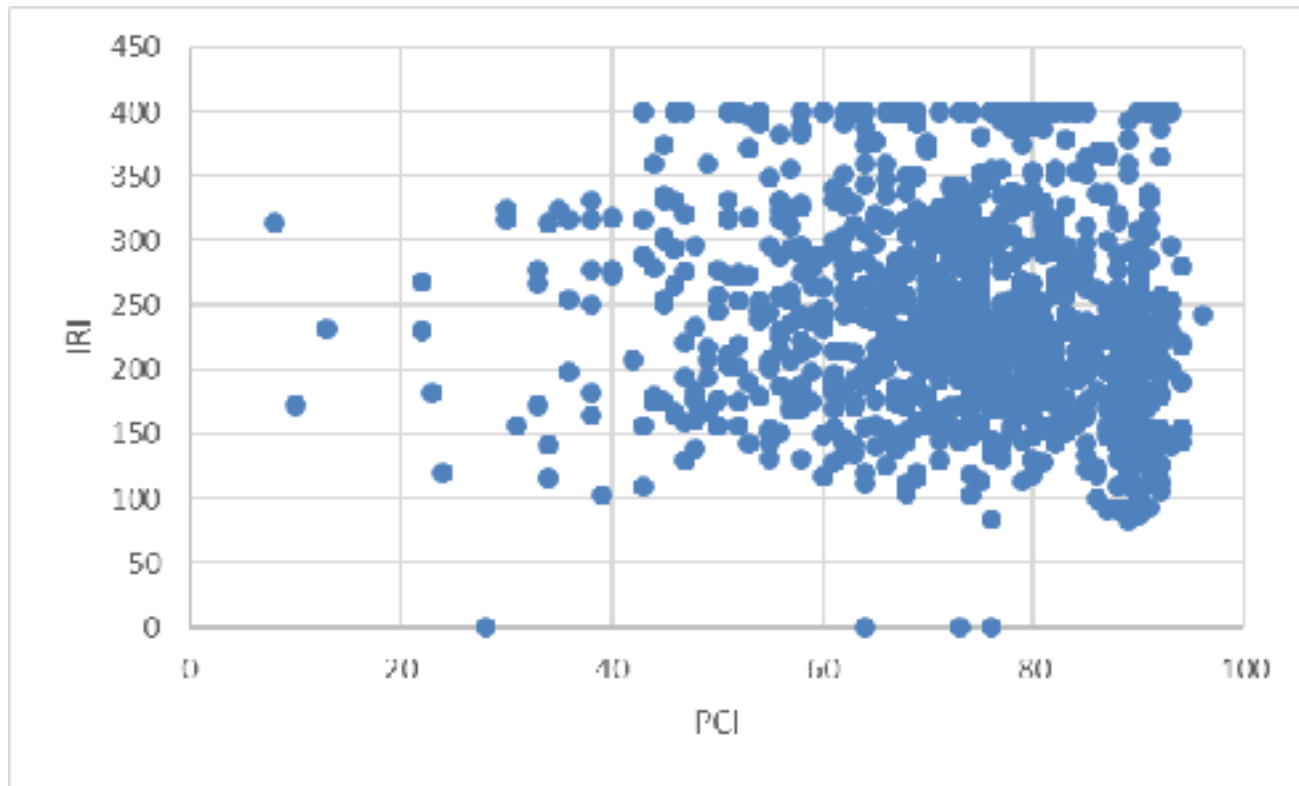
- Condition measures to be reported
- AC
 - IRI
 - Rutting
 - Cracking
- PCC
 - IRI
 - Faulting
 - Cracking



PCI & IRI Data Available

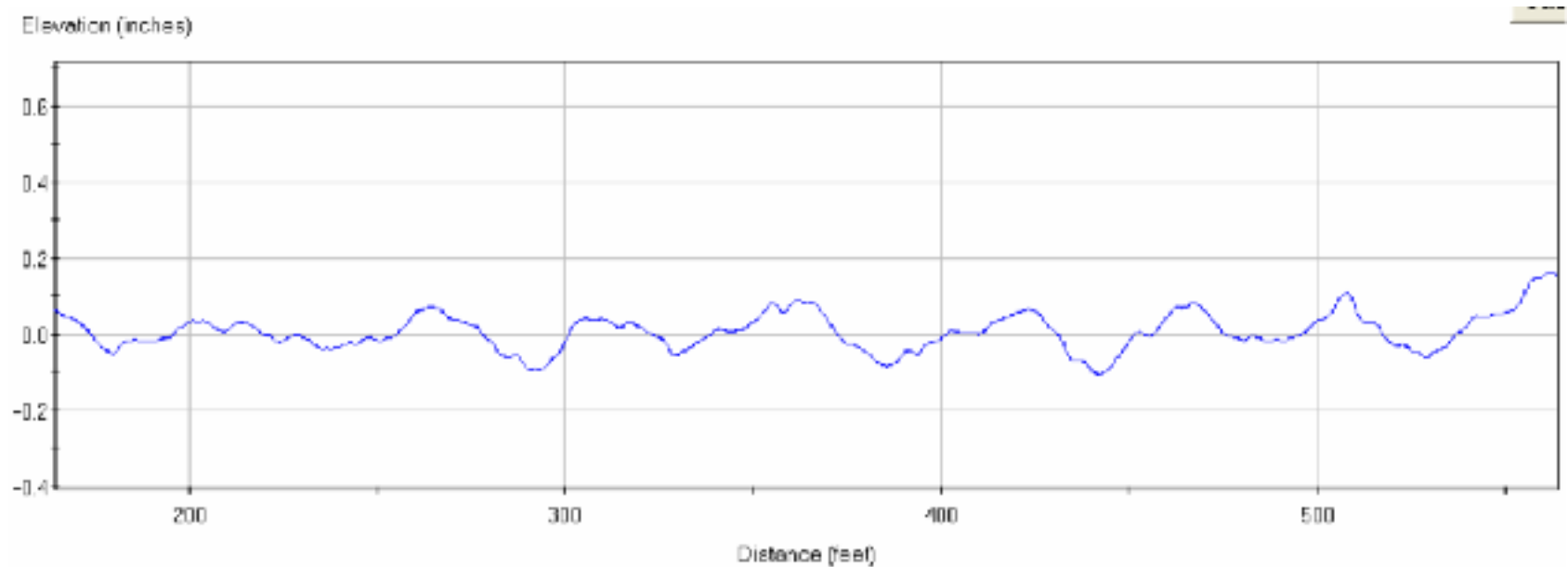
- For over 1000 segments
- CALTRANS collected IRI data
- Local agency/contractor collected PCI data

First Look at Data



IRI

- Estimate amount of roughness from a measured longitudinal profile



IRI

- Specifications
 - AASHTO M328 (equipment)
 - AASHTO R57 (procedure)
 - AASHTO R43 (calculation)





PCI

- Alligator Cracking
- Block Cracking
- Distortions
- Longitudinal and Transvers Cracking
- Rutting & Depressions
- Raveling
- Weathering

**Pavement
Condition
Index
Distress
Identification
Manual For
Flexible
Pavements**



Metropolitan Transportation Commission
375 Beale St
San Francisco, CA 94105

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Expected Impact of Distress Data on Roughness

Distress Type	Severity Level		
	L	M	H
Alig Crk		Moderate	Major
Block Cracking		Minor	Moderate
Distortions		Moderate	Major
Long & Trans Cracking		Minor	Moderate
Patching		Moderate	Major
Rutting		Moderate	Major
Raveling			Minor
Weathering			



Next Steps

- Compare IRI to Recalculated PCI values based on:
 - Distortion deducts
 - Patching high and medium deducts
 - Rutting deducts
 - Etc.
 - Various combinations



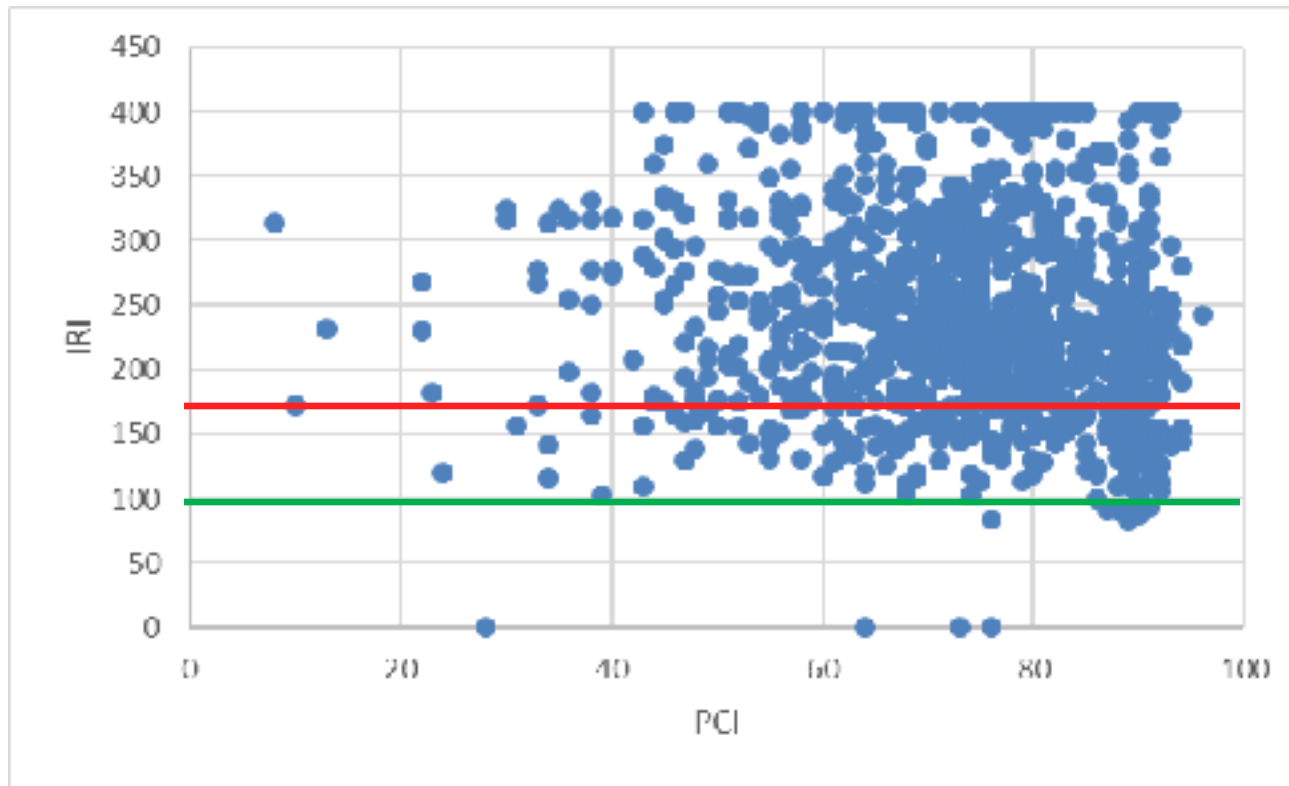
Current Status

- Data just now available
- Analysis in the near future



Stay Tuned for Updates

With Limits for Good & Poor



Poor

Good

Questions

