Dissertations, Master's Theses and Master's Reports - Open

Dissertations, Master's Theses and Master's Reports

2011

Comparison of PASER and PCI pavement distress indices

Timothy P. Barrette Michigan Technological University

Follow this and additional works at: https://digitalcommons.mtu.edu/etds



Part of the Civil and Environmental Engineering Commons

Copyright 2011 Timothy P. Barrette

Recommended Citation

Barrette, Timothy P., "Comparison of PASER and PCI pavement distress indices", Master's report, Michigan Technological University, 2011.

https://doi.org/10.37099/mtu.dc.etds/502

Follow this and additional works at: https://digitalcommons.mtu.edu/etds



Part of the Civil and Environmental Engineering Commons

Comparison of PASER and PCI Pavement Distress Indices

By: Timothy P. Barrette

A REPORT

Submitted in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE

CIVIL ENGINEERING

MICHIGAN TECHNOLOGICAL UNIVERSITY

2011

© 2011 Timothy P. Barrette

This report, "Comparison of PASER and PCI Pavement Distress Indices," is hereby approved in partial fulfillment of the requirements for the Degree of MASTER OF SCIENCE IN CIVIL ENGINEERING.

Signatures:

Report
Advisor

Dr. Bernie Alkire

Department
Chair

Dr. Bill Bulleit

Table of Contents

Introduction	
Literature Review	
Network Selection	
PASER Analysis	
PCI Segment Selection	
PCI Analysis	
Comparison of PASER and PCI Ratings	
Conclusions	
Recommendations	12
References	13
Appendix 1: PCI Survey Data Sheets	14
Appendix 2: PCI Calculation Iterations	

List of Tables

Table 2:	PASER Pavement Evaluation CriteriaPASER Ratings of the Pavement Network	5
List of	Figures	
Figure 1:	Map of Study Area	2
	Breakdown of Standard PCI Rating Scale	
	Comparison of PASER and Base 10 PCI Pavement Ratings	
	Distribution of Pavement Ratings	
_		
Figure 5:	PASER and Base 10 PCI Rating Equality	. 11

Introduction

The purpose of this report is to compare two different systems of asphalt pavement rating, Pavement Surface Evaluation and Rating (PASER) which is described in the PASER Manual for Asphalt Roads⁵ and Pavement Condition Index (PCI) which is described in the book Pavement Management for Airports, Roads, and Parking Lots⁴. PASER data used in this report was collected in the fall term of 2009 while PCI data was collected in the fall term of 2010. The PASER method consists of a team performing a ride-over survey of a pavement network and rating each pavement segment based on the type and variety of distresses seen. For the data analyzed in this report, the team consisted of undergraduate students from the Michigan Tech Pavement Enterprise pavement management team and the author. The PCI method uses a sample of pavement segments from throughout the pavement network being rated based on actual measurements of the pavement distresses. The PCI survey was performed strictly by the author. Both of these methods are currently used by various organizations to help manage pavement and determine where to invest resources to keep the network in reasonable condition. This report will also discuss various articles pertaining to pavement rating.

Literature Review

Methods for effectively evaluating pavement distresses has been an issue to those in pavement related industries for a considerable amount of time. *The Unified Pavement Distress Index for Managing Flexible Pavements* was an early attempt to evaluate pavements using "fuzzy sets" which grade pavements A through E for various distresses and use the "fuzzy sets" to compute a Unified Pavement Distress Index from 0 to 1 with 1 being the worst.³ These "fuzzy sets" are mathematical equations which place weights on the various pavement distresses to compute the final rating, similar in form to the indices discussed in the article, *Assessing the Agreement among Pavement Condition Indexes*².

Of further interest is the correlation between various Pavement Condition Indices. In an article published in the Journal of Transportation Engineering, six different pavement condition systems were compared. It was found that what may appear to be similar indices can provide significantly different results.² In this article the authors performed surveys of several pavement sections using the Texas Department of Transportation's condition score (CS) and distress score (DS), the South Dakota Department of Transportation's pavement condition rating (PCR), Pennsylvania Department of Transportation's overall pavement index (OPI), and the Oregon Department of Transportation's overall index (OI). The authors concluded that significant differences can exist between pavement distress indices and that these differences generally result from distress types considered, weighting factors and mathematical forms of each index.²

PASER and PCI are two pavement evaluation systems which were developed after the use of "fuzzy sets" as other means to interpret the various distresses found in pavements. Both of these systems attempt to take the mathematical calculations out of the pavement evaluators' hands. The PCI method does this through the use of charts which give rating deduct values based on density and severity of various distresses. These deduct values are based on the percent of the pavement section affected and the severity of the distress. Using charts provided in *Pavement Management for Airports, Roads, and Parking Lots*, deduct values for each distress are determined. PASER pavement rating involves no calculation what so ever. By performing a drive over survey of the pavement network and providing raters with a detailed list describing what types of distresses are found at various ratings, PASER has made pavement rating possible for people of various backgrounds and qualifications to effectively rate pavement.

An issue of considerable importance when performing a pavement evaluation is that of the training of those performing the analysis. Allotment of resources from many agencies depends on the data that is provided by the pavement rater. It is highly suggested that agencies should establish thresholds limiting the differences between raters. ¹

Network Selection

The Pavement network to be evaluated was determined to be the local roads in Houghton, MI, bounded by Mac Innes Drive, Sharon Avenue, Agate Street, and US-41. Using Google Earth it was determined that this network consisted of approximately 4. 7 miles of asphalt pavement. This equates to approximately 24,700 linear feet of pavement. For the PASER rating, the network was broken down into 52 segments, most of which end at intersections.

For the purpose of rating using the PCI method, the pavement was broken down into segments of 2500 square feet, +/- 1000 square feet. For ease of breaking down the pavement 100 linear foot segments were used. When broken down into segments of 100 feet, with any remaining pavement at the end of a street becoming its own segment, a total of 250 measurable segments. Using a Network Level Analysis as described on page 25 of *Pavement Management for Airports, Roads, and Parking Lots*, it was determined that 10 percent of these segments would be rated using the PCI method.

The network is pictured in Figure 1 with the approximate locations of the PCI surveys.



Figure 1: Map of Study Area (©2011 Europa Technologies, ©2011 Google, Image USDA Farm Agency,)

PASER Analysis

PASER analysis of a pavement is based upon a scale of 1 to 10; with 10 representing brand new pavement. Based on the approximate amount of each varying type of pavement distress observed a rating is given as shown in Table 1. Certain distresses, such as alligator cracking, greatly reduce the rating while other distresses do not impact the rating as much.

The PASER survey was performed by undergraduate students in the Michigan Tech Pavement Enterprise with the help of the author of this report. All students were given a short training course by Tim Colling of the Local Technical Assistance Program where students learned to identify the various pavement distresses associated with PASER ratings. One student had previous experience with PASER ratings while working for a county transportation department.

By reviewing the PASER ratings for each segment, an average rating for the network was determined to be 4.4, as shown in Table 2. This was determined by multiplying the length of each segment by its PASER rating, and averaging the results by dividing the sum of the products by the total length of pavement in the network. Based upon the

standard PASER rating system, a rating of 4.4 qualifies the overall pavement network as being in fair condition.

Table 1: PASER Pavement Evaluation Criteria

	Table 1: PASER Pavement Evaluati	on Criteria
Surface Rating	Visible Distress	General condition/treatment measures
10 Excellent		New construction.
	None.	Recent overlay. Like new.
8 Very Good	No longitudinal cracks except reflection of paving joints. Occasional transverse cracks, widely spaced (40' or greater). All cracks sealed or tight (open less that 1/4").	Recent sealcoat or new cold mix. Little or no maintenance required.
7 Good	Very slight or no raveling, surface shows some traffic wear. Longitudinal cracks (open 1/4") due to reflection or paving joints. Transverse cracks (open 1/4") spaced 10' or more apart, little or slight crack raveling. No patching or very few patches in excellent condition.	First signs of aging. Maintain with routine crack filling.
6 Good	Slight raveling (loss of fines) and traffic wear. Longitudinal cracks (open 1/4"-1/2") spaced 10' or more apart, little or slight crack raveling. No patching or very few patches in excellent condition.	Shows signs of aging. Sound structural condition. Could extend life with sealcoat.
5 Fair	Moderate to severe raveling (loss of fine and coarse aggregate). Longitudinal and transverse cracks (open 1/2") show first signs of slight raveling and secondary cracks. First signs of longitudinal cracks near pavement edge. Block cracking up to 50% of surface. Extensive to severe flushing or polishing. Some patching or edge wedging in good condition.	Surface aging. Sound structural condition. Needs sealcoat or thin non-structural overlay (less than 2").
4 Fair	Severe surface raveling. Multiple longitudinal and transverse cracking with slight raveling. Longitudinal cracking in wheel path. Block cracking (over 50 % of surface). Patching in fair condition. Slight rutting or distortions (1" to 2" deep). Occasional potholes.	Significant aging and first signs of need for strengthening. Would benefit from a structural overlay (2" or more).
3 Poor	Closely spaced longitudinal and transverse cracks often showing raveling and crack erosion. Severe block cracking. Some alligator cracking (less than 25 % of surface). Patches in fair to poor condition. Moderate rutting or distortion (1" to 2" deep). Occasional potholes.	Needs patching and repair prior to major overlay. Milling and removal of deterioration extends the life of overlay.
2 Very Poor	Alligator cracking (over 25 % of surface). Severe distortions (over 2" deep). Extensive patching in poor condition. Potholes.	Severe deterioration. Needs reconstruction with extensive base repair. Pulverization of old pavement is effective.
1 Failed	Severe distress with extensive loss of surface integrity.	Failed. Needs total reconstruction.

Table 2: PASER Ratings for the Pavement Network

	e Z: PASEK Kati	T			T .
Road Name	Segment Name	From Desc	To Desc	Length	Rating
10th Ave	10th Ave	Agate	Birch	0.159	3
11th Ave	11th Ave	Agate	Birch	0.158	5
12th Ave	12th Ave	Agate		0.169	5
5th Ave	5th Ave	Agate		0.046	6
5th Ave	5th Ave	Emerald	Garnet	0.118	2
5th Ave	5th Ave	Garnet	Vivian	0.049	2
6th Ave	6th Ave	Agate	Emerald	0.129	4
6th Ave	6th Ave	Emerald		0.03	6
6th Ave	6th Ave	Garnet	Vivian	0.054	2
7th Ave	7th Ave	Agate St	Copper St	0.189	3
7th Ave	7th Ave	Copper St	Garnet	0.077	4
7th Ave	7th Ave	Garnet	Clark St	0.116	4
7th Ave	7th Ave	Clark St	Blanche St	0.09	6
7th Ave	7th Ave	Blanche St	East St	0.051	6
7th Ave	7th Ave	East St	Macinnes	0.069	6
8th Ave	8th Ave	Agate	Copper	0.195	5
Birch St	Birch St	10th	11th Ave	0.041	6
Birch St	Birch St	11th Ave	12th	0.052	6
Birch St	Birch St	12th		0.118	2
Blanche St	Blanche St	7th	Townsend	0.088	2
Clark St	Clark St	7th	Townsend	0.131	2
Copper St	Copper St	7th		0.092	5
East St	East St	7th	Townsend	0.084	3
Emerald St	Emerald St	Houghton	Jasper	0.03	8
Emerald St	Emerald St	Jasper	Ruby Ave	0.027	8
Emerald St	Emerald St	Ruby Ave	College	0.031	8
Emerald St	Emerald St	6th	5th	0.05	5
Emerald St	Emerald St	5th	Houghton	0.055	5
Garnet St	Garnet St	Sharon	Hickory	0.077	4
Garnet St	Garnet St	Hickory	Hickory Ln	0.111	4
Garnet St	Garnet St	Hickory Ln		0.087	4
Garnet St	Garnet St		7th	0.114	6
Garnet St	Garnet St	7th	Houghton	0.16	6
Hickory Ln	Hickory Ln	Garnet	Garnet	0.271	4
E Houghton Ave	E Houghton Ave	Franklin	Emerald	0.308	6
E Houghton Ave	E Houghton Ave	Emerald	Pearl	0.098	7
E Houghton Ave	E Houghton Ave	Pearl	Townsend	0.143	6

	Table 2 Con	tinued			
Hubbell St	Hubbell St	7th	Townsend	0.101	2
Jasper Ave	Jasper Ave	Agate		0.049	5
Jasper Ave	Jasper Ave		Emerald St	0.049	3
Jasper Ave	Jasper Ave	Emerald St		0.049	7
Jasper Ave	Jasper Ave		Pearl	0.048	5
Pearl St	Pearl St	Houghton	Jasper Ave	0.029	6
Pearl St	Pearl St	Jasper Ave	Ruby	0.028	5
Pearl St	Pearl St	Ruby	College	0.032	5
Ruby Ave	Ruby Ave	Agate	Emerald	0.098	5
Ruby Ave	Ruby Ave	Emerald	Pearl	0.096	5
Ruby Ave	Ruby Ave	Pearl	Vivian	0.092	5
Vivian St	Vivian St	7th	6th	0.065	2
Vivian St	Vivian St	6th	5th	0.04	2
Vivian St	Vivian St	5th	Houghton	0.043	2
Vivian St	Vivian St	Houghton	Ruby	0.046	2
			Length We	eighted	
			Avera	ge	4.429839

PCI Segment Selection

In order to provide a representative (not random) sample of the pavement network, each street within the network was broken down into 100 foot segments and 25 segments were selected for the network. To provide a representative sample of the network, depending on the length of the street each street had one or two segments randomly selected to be rated. North-South street segments were numbered starting in the North and East-West street segments were numbered starting in the West. This was used as a starting point for the ratings, but it was determined that if after a ride through of the street the segment did not seem to be representative of the pavement another segment would be chosen. However, this course of action was not determined to be necessary.

PCI Analysis

PCI⁵ Analysis was performed by the author in the fall of 2010 by measuring the severity of 19 different pavement distresses, most of which have 3 severity levels. Severity of each type of distress is typically differentiated by a measurable value, such as the depth of a pothole. The distresses measured for PCI Analysis were Alligator Cracking, Bleeding, Block Cracking, Bumps and Sags, Corrugation, Depression, Edge Cracking, Jt. Reflection Cracking, Lane/Shoulder Drop Off, Longitudinal and Transverse Cracking, Patching and Utility Cut Patching, Polished Aggregate, Potholes, Railroad Crossing,

Rutting, Shoving, Slippage Cracking, Swell, and Weathering/Raveling. Each type of distress varies greatly in how it effects the overall rating of the pavement i.e., low level raveling over the entire segment will not affect the rating nearly as much as a moderate severity pot hole. This is largely due to the fact that certain distresses do not indicate pavement failure while others indicate that something is structurally wrong with the pavement. Most of the pavement distresses observed were climate based. Low level Weathering/Raveling was very prevalent throughout the entire pavement network. Distresses such as rutting, bleeding and reflection cracking were non-existent. This is due to the light loads that are typically seen on local access roads.

The total amount of each type of distress found in each pavement segment was summed and gave a density in percent of each distress (at various severity levels) found in each segment. Using charts provided in Appendix B of *Pavement Management for Airports*, *Roads*, *and Parking Lots*⁴, each distress provided a deduct value ranging from 0 to 100, 100 being the highest possible severity. These deduct values were then summed to provide a total deduct value. The total deduct value then needed to be corrected through the iterative method outlined on pages 37 and 38 of *Pavement Management for Airports*, *Roads*, *and Parking Lots*. The calculation of each evaluated segments Pavement Condition Index can be seen in Appendix 2. The figure below is a summary of the standard breakdown of the correlation between a pavements PCI rating and the quality of the asphalt.

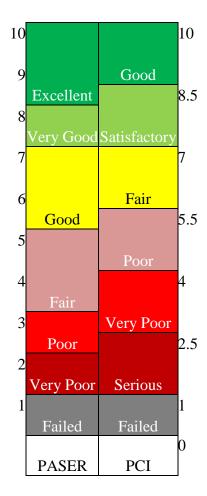


Figure 2: Breakdown of PASER and Base 10 PCI Ratings

The PCI survey data was collected by Tim Barrette in the fall of 2010. No formal training in collecting PCI data occurred. The student did however perform a sample PCI survey with Dr. Bernie Alkire in fall of 2009.

Comparison of PASER and PCI Ratings

As was discussed earlier, PASER analysis of the pavement network yielded a rating of 4.4 (the average for the segments from which a PCI survey was performed is 4.5), while the PCI method yielded a rating 53.56, which can be seen in Table 3 on the next page. The network average alone was determined to not be a strong enough indication of any relationship between the systems as it doesn't describe the relationship between the segment ratings. To further compare the results of the two rating systems, the ratings for each segment analyzed using PCI was compared to its corresponding PASER segment. For the sake of comparison, the PCI rating was divided by 10 to provide a more direct correlation with the PASER rating system. The results are shown in Table 3 and Figure 3.

Table 3: Comparison of PASER and PCI Ratings for evaluated Segments

<u></u> 1	able 3: Com	parison of P	ASER and	PCI Rat	ings to	<u>or ev</u> a	iluated Se	gments
					Lengt		Base 10	Appendix
No.	RoadName	FromDesc	ToDesc	PASER	h	PCI	PCI	1
1	5th Ave	Agate		6	0.046	2	0.2	Table 1
2	5th Ave	Garnet	Vivian	2	0.049	80	8	Table2
3	6th Ave	Garnet	Vivian	2	0.054	55	5.5	Table 3
4	7th Ave	Garnet	Clark St	4	0.116	42	4.2	Table 4
5	7th Ave	Blanche St	East St	6	0.051	38	3.8	Table 5
6	8th Ave	Agate	Copper	5	0.195	82	8.2	Table 6
7	10th Ave	Agate	Birch	3	0.159	63	6.3	Table 7
8	11th Ave	Agate	Birch	5	0.158	84	8.4	Table 8
9	12th Ave	Agate		5	0.169	20	2	Table 9
10	Birch St	11th Ave	12th	6	0.052	82	8.2	Table 10
			Townsen					
11	Blanche St	7th	d	2	0.088	62	6.2	Table 11
			Townsen					
12	Clark St	7th	d	2	0.131	0	0	Table 12
13	Jasper Ave	Emerald St		7	0.049	67	6.7	Table 13
			Townsen					
14	Hubbell St	7th	d	2	0.101	40	4	Table 14
	E Houghton							
15	Ave	Emerald	Pearl	7	0.098	82	8.2	Table 15
	E Houghton		Townsen					
	Ave	Pearl	d	6	0.143	3	0.3	Table 16
	Hickory Ln	Garnet	Garnet	4	0.271	58	5.8	Table 17
18	Garnet St		7th	6	0.114	78	7.8	Table 18
_			Houghto	_		_	_	
	Garnet St	7th	n	6	0.16	52	5.2	Table 19
	Emerald St	Houghton	Jasper	8	0.03	89	8.9	Table 20
	Emerald St	6th	5th	5	0.05	81	8.1	Table 21
22	Vivian St	Houghton	Ruby	2	0.046	24	2.4	Table 22
23	Ruby Ave	Emerald	Pearl	5	0.096	16	1.6	Table 23
			Townsen					
	East St	7th	d	3	0.084	56	5.6	Table 24
25	Copper St	7th		5	0.092	82	8.2	Table 25
	Network							
	Average			4.48885	4727	53.52	5.352]

As Table 3 showed, there is not a strong correlation between the PASER and PCI rating systems for each pavement segment. Using Microsoft Excel, a plot of segment numbers versus ratings was created and is shown in Figure 3. A correlation of 0.225 was calculated, indicating a very weak correlation between the pavement rating systems. It is also worth noting that even when both types of ratings are compared on a scale with a base of 10, the corresponding pavement qualities do not necessarily match.

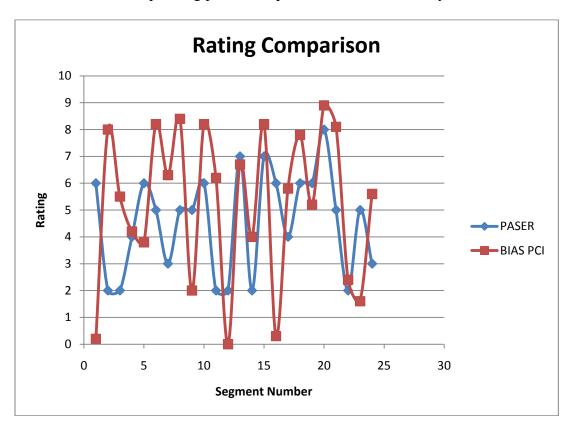


Figure 3: Comparison of PASER and Base 10 PCI Pavement Ratings

The distribution of the pavement ratings for the entire network is shown in Figure 4. This provides and accurate picture of the percentage of the pavement network that each rating represents for both methods of rating the pavement.

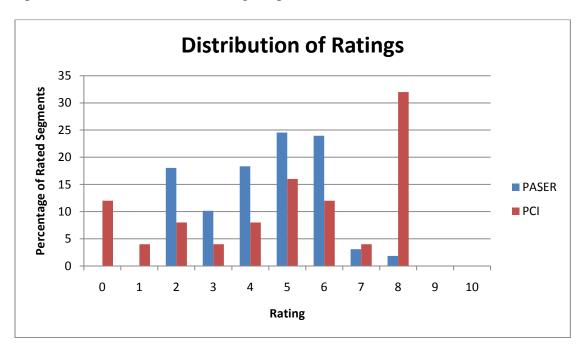


Figure 4: Distribution of Pavement Ratings

To further compare the relationship between the PASER and Base 10 Scale PCI ratings, a scatter plot was made with PASER ratings on the x axis and the PCI rating for the matching segment on the y axis. Segments whose ratings match would fall on the 1:1 equaity line. As Figure 4 illustrates, very few segments fall on the equality line.

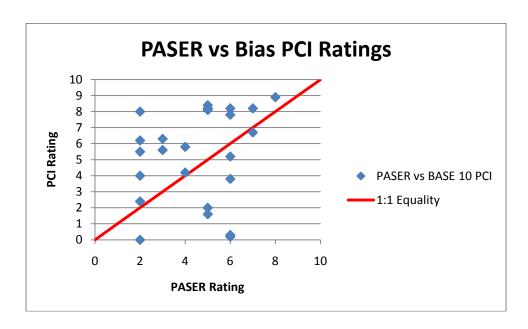


Figure 5: PASER and Base 10 PCI Rating Equality

There are several possible reasons why PASER and PCI do not show a strong correlation. First, the weights for various distresses do not correlate well between the rating systems. Because of this, a certain amount of disagreement between the indices could be expected. The amount of samples used for the PCI survey may not have been enough to provide a good indication of the condition of the individual pavement segments and the overall pavement network. The surveys were performed a year apart which may have led to a difference in the distresses observed. The PASER survey group received formal training while the author had little training in performing the PCI surveys. Finally, the roadway segments used for the PASER analysis were predetermined in RoadSoft, an asset management program used by the Pavement Enterprise at Michigan Tech. Had the segmenting been done differently, a stronger correlation may be found. Finally, several pavement segments stood out as strong outliers in the rating comparison. The distresses found in these outliers have very different outcomes for each distress index. Of particular interest are the 5th and 6th Avenue segments between Garnet and Vivian streets (segments 5 and 6), Emerald Street between 5th and 6th Avenues (segment 16), and Houghton Avenue between Pearl Street and Townsend Drive (segment 21). There are several possible causes to the extremely large discrepancies between the two types of ratings.

In the case of 5th Avenue, a large distress which was classified as a pothole was present. Although the severity of the pothole was determined to be moderate, the deduct value for the distress was 120. This pothole only represented less than 3 percent of the pavement surface. After all distresses were classified and the corrected deduct value was found, the PCI rating for this pavement was determined to be 2, suggesting a failed pavement. When this pavement segment was PASER evaluated the rating was 6, suggesting pavement in good condition. This rating differential may have occurred because when averaged out, potholes did not represent the entire pavement using PASER and therefore were not given as much consideration as they were in the PCI segment. It is also possible that while performing PASER evaluation of the pavement, the distress was not identified as a pothole.

On 6th Avenue, moderate block cracking and light raveling were detected over 100 percent of the PCI rated segment. This segment received a PCI of 55 due to the amount of block cracking present. When PASER rated the segment was determined to be a 2. This seems to indicate that alligator cracking exists in portions of the segment which were not evaluated using PCI.

On Emerald Street, a PCI rating of 81 was determined based on the amount of distress, the primary distress being raveling. As defined in the PASER manual, slight raveling of a pavement will reduce its rating to 6. Any other distresses present in the pavement would easily reduce its rating to 5.

Houghton Avenue received a PCI rating of 3, mostly due to a single, high-severity pothole. The pavement received a PASER rating of 6, due to the fact that a single

pothole only does not necessarily reduce a pavements rating unless the potholes occur occasionally throughout the pavement segment.

The correlation of the rating systems was rechecked after throwing out the above listed segments in an attempt to see how the ratings would be affected. Using Microsoft Excel, a correlation coefficient of 0.41 was calculated. This correlation is still not very strong, but shows that due to the stressing of different types of distresses by the PASER and PCI rating systems, a strong correlation may not be possible.

Finally, as PCI analysis was performed strictly on a network basis, not enough samples were taken to accurately compare them to PASER ratings on a street or street segment basis.

Conclusions

As previously discussed, network level analysis did not produce a correlation between PCI and PASER ratings for individual segments; however, looking strictly at the network average, PCI and PASER yield similar results. In the particular case of the local access streets in Houghton, MI, both systems yielded the results that the pavements are bordering between poor and fair condition. Low severity raveling was by far the most prevalent distress observed in PCI analysis, a distress that may have went largely unobserved when performing the PASER analysis. The PASER and PCI surveys were performed by students with limited experience in collecting the data which may have resulted in improperly identifying some of the pavement distresses and in doing so adding inaccuracy to the data.

Recommendations

A better method for comparing these pavement evaluating systems may have been to examine the systems at a project, or individual street, level. By providing more PCI samples per street, data may have correlated more with the PASER data. Doing this, however, was outside of the scope of the report and therefore this research should be conducted at a future date to better establish the correlation between PASER and PCI evaluation techniques.

References

- [1] Bianchini, S.M.ASCE, Alessandra, Paola Bandini, and David W. Smith (2010):

 "Interrater Reliability of Manual Pavement Distress Evaluations." *Journal of Transportation Engineering* 136.2 165-72.
- [2] Gharaibeh, M.ASCE, Nasir G., Yajie Zou, and Siamk Saliminejad (2010). "Assessing the Agreement among Pavement Condition Indexes." *Journal of Transportation Engineering*.
- [3] Juang, C. H., and S. N. Amirkhanian (1992). "Unified Pavement Distress Index for Managing Flexible Pavements." *Journal of Transportation Engineering* 118.5: 686.
- [4] Shahin, Mohamed Y (2005). Pavement Management for Airports, Roads, and Parking Lots. New York: Springer.
- [5] Walker, Donald, and Lynn Entine (2002). PASER Asphalt Roads Manual. Madison,WI: Transportation Information Center, University of Wisconsin--Madison.

Appendix I-Condition Survey Data Sheets

ASPHALT S	URFAC	ED ROA	DS	AND PAR	KIN	IG LOTS		T	ab	le 1		
CONDITION	N SUR∖	EY DAT	A S	HEET								
FOR SAMPI	LE UNI	Т										
		SECTI		SAMPLE								
BRANCH	5th	ON	3	UNIT								
SURVEYED				SAMPLE								
BY		DATE		AREA		2200					T	T
						L. Patching &	દ્રે					
1. Alligator		C D	. .			til Cut		16	. Sho	oving		
Cracking		6. Depre	essic	on		atching 2. Polished		17	CI:	page		
2. Bleeding		7. Edge Cracking				ggregate			. Əliş ackil			
2. Diceding		8. Jt. Re		_	~ξ	561 68016		CI	JUNII	'Б		
3. Block Cracl	king	Cracking			13	3. Potholes		18	. Sw	ell		
3. Block Gracking								19				
	9. Lane Shoulder							W	eath	ering/Rave		
4. Bumps and Sags Drop Off						ossing		lin	g			
			Γrans									
5. Corrugatio	n	Cracking	3		15	. Rutting						
DISTRESS				OLIANIT						TOTAL	DENSI	DEDUCT
SEVERITY	220		1	QUANT	IIY		ı	l		TOTAL	TY %	VALUE
401	220									2222	400	4.6
19L	0									2200	100	16
13M	60	1	1							62	2.8	120
1M	50	60								110	5	38
1H	60									60	2.7	45
					-							

ASPHALT S CONDITIO FOR SAMP	N SUF	RVEY DAT	_		KIN	IG LOTS		Ta	abl	e 2		
TON SAIVIE	5t	VIII	1	SAMPLE								
BRANCH		SECTION	6	UNIT								
SURVEYED				SAMPLE								
BY		DATE		AREA		2200						
					11	L. Patching	&					
1. Alligator						til Cut		16	. Sho	ving		
Cracking		6. Depress	ion			atching						
0.51 1:						2. Polished				page		
2. Bleeding 3. Block		7. Edge Cra	ackın	g	Αį	ggregate		Cra	ackir	ıg		
Cracking		8. Jt. Refle	ction	Cracking	13	3. Potholes		18	. Sw	ell		
8								19				
4. Bumps an	d	9. Lane Sh	oulde	er Drop	14	I. Railroad		We	eath	ering/Raveli		
Sags		Off			Cr	ossing		ng				
		10. Long &	Trar	ns								
5. Corrugation	on	Cracking			15	5. Rutting						
DISTRESS SEVERITY				OLIANTI:	τv					TOTAL	DENSIT Y %	DEDUCT VALUE
	20	100	1	QUANTI	I Y							
3L	20		4	_						160	7.3	7
10L	3			7						20	0.91	3
	220											_
19L	()								2200	100	16
					_							

ASPHALT S CONDITIO FOR SAMP	N SUR\	/EY DAT			KIN	G LOTS		Ta	abl	e 3		
		Sectio		SAMPL								
BRANCH	6th	n	18	E UNIT								
SURVEYED		5.475		SAMPL		2000						
BY		DATE		E AREA		2000	0					
1. Alligator						L. Patching of the control of the co	&	16	Sho	ving		
Cracking		6. Depre	ession	1		atching		10.	3110	vilig		
Crucking		o. Depre	233101			2. Polished		17.	Slip	page		
2. Bleeding		7. Edge	Crack	ing		ggregate			ıckin			
	8. Jt. Reflection				Ì	- -				=		
3. Block Crac	cking	Cracking				3. Potholes		18.	Swe	ell		
					19.							
	9. Lane Shoulder Drop								eathe	ering/Raveli		
4. Bumps an	d Sags	Off		Cr	ossing		ng					
	10. Long & Trans											
5. Corrugation	on	Cracking	5		15	5. Rutting					DENCIT	DEDUCT
DISTRESS SEVERITY		-		QUANTI	ΓΥ	 				TOTAL	DENSIT Y %	VALUE
	200											
3M	0									2000	100	43
	200											
19L	0	1	1							2000	100	16

SPHALT S	URFAC	ED ROAL	S AN	D PARKII	NG LO	OTS		Та	bl	e 4		
CONDITIO	ON SUF	RVEY DAT	A SHI	EET								
FOR SAM	PLE UN	NIT										
		SECTIO		SAMPL								
BRANCH	7th	N	16	E UNIT								
SURVEYE				SAMPL								
D BY		DATE		E AREA	11 [2400 Patching	0					
1. Alligator					Util	_	Q	16 9	Sho	ving		
Cracking		6. Depres	ssion		Patc			10.	5110	νρ		
		·				olished		17. 9	Slip	page		
2. Bleeding	•	7. Edge C	rackin	3	Aggr	egate		Crac	kin	g		
3. Block Cra	acking	8. Jt. Refl	ection	Cracking	13. F	otholes		18. 9	Swe	ell		
								19.				
4. Bumps a	nd	9. Lane S Off	houlde	r Drop	14. F			athe	ering/Raveli			
Sags		10. Long	g. Tran	c	Cros	sing		ng				
5. Corrugat	ion	Cracking	X II ali	3	15. F	Rutting						
		_										DEDUC
DISTRESS										DENSIT	T	
SEVERITY				QUANTIT	Υ			l		TOTAL	Y %	VALUE
1M	3	3								6	0.25	11
9H	100	20								120	5	20
9L	50									50	2.1	7
9M	30									30	1.25	5
10M	13									13	0.54	5
10L	13	6	12	15	11	4	8			79	3.3	8
3L	720									720	30	17
7L	30									30	1.25	4
13L	1									1	0	0
	240											
19L	0									2400	100	16

ASPHALT S	URFAC	ED ROA	DS A	AND PARK		Tab	le 5				
CONDITION	N SURV	'EY DATA	A SH	IEET					-		
FOR SAMPI	LE UNI	Т									
		SECTI	2	SAMPLE							
BRANCH	7th	ON	4	UNIT							
SURVEYED				SAMPLE							
BY		DATE		AREA		2400				Т	
						Patching &		46.61			
1. Alligator		6 Donro	sccio	n		il Cut		16. Sh	oving		
Cracking	Cracking 6. Depression		11		tching Polished		17. Slip	ากวสอ			
2. Bleeding	2. Bleeding 7. Edge Cracking		king		gregate		Crackii				
0		8. Jt. Ref				00 -0			J		
3. Block Crack	king	Cracking			13	3. Potholes		18. Sw	ell		
								19.			
			Shou	lder Drop		l. Railroad			ering/Rave		
4. Bumps and Sags Off 10. Long & Trans					Cr	ossing		ling			
5. Corrugatio	n	10. Long Cracking		rans	15. Rutting						
DISTRESS	3		13	o. Kutting				DENSI	DEDUCT		
SEVERITY				QUANTI	TY				TOTAL	TY %	VALUE
1L	400								400	17	40
	200										
3L	0								2000	83	26
4M	9								9	0.375	15
11L	9	56							65	2.7	6
10L	80								80	3.3	9
	240										
19L	0								2400	100	16
							_				
							\dashv				
							\dashv				
							_				
							_				

ASPHALT SURFACED ROADS AND PARKING LOTS									le 6		
CONDITIO	N SUR	VEY DATA	\ SH	HEET							
FOR SAME	PLE UN	IT									
		SECTIO		SAMPL							
BRANCH	8th	N	4	E UNIT							
SURVEYED				SAMPL							
BY		DATE		E AREA		2200					
					11	L. Patching	&				
1. Alligator					Ut	til Cut		16. Sh	oving		
Cracking 6. Depression						atching					
					12	2. Polished		17. Sli	ppage		
2. Bleeding		7. Edge Cı			A٤	ggregate		Cracki	ng		
		8. Jt. Refle	ectio	n							
3. Block Cra	cking	Cracking			13	3. Potholes		18. Sv	/ell		
								19.	nering/Ravelin		
4. Bumps an	nd	9. Lane Sh	oul	der Drop		1. Railroad					
Sags		Off			Cr	ossing		g			
		10. Long 8	ያ Tr	ans							
5. Corrugati	on	Cracking			15	5. Rutting					
DISTRESS										DENSIT	DEDUCT
SEVERITY				QUANTI	TY	I		1	TOTAL	Y %	VALUE
3L	40	0							40	1.8	3
19L	2200)							2200	100	16
					-						

ASPHALT SURFACED ROADS AND PARKING LOTS									Table 7					
CONDITION	N SURV	EY DATA	A SH	EET										
FOR SAMP														
		SECTI		SAMPLE										
BRANCH	10th	ON	5	UNIT										
SURVEYED				SAMPLE										
BY		DATE		AREA		2400								
						Patching 8	Ž.							
1. Alligator						il Cut		16. S	hoving					
Cracking		6. Depre	essior	า		ntching								
2 01		7 54	C I			2. Polished			ippage					
2. Bleeding		7. Edge			Αį	ggregate		Crack	ang					
3 Block Crack	kina	8. Jt. Ref		UII	12	3. Potholes		18. S	اامير					
3. Block Cracking Cracking						. rutilules		19.	well					
9. Lane Shoulder Drop						I. Railroad			hering/Rave					
4. Bumps and	4. Bumps and Sags Off													
	J	10. Long	, & Tı	rans		ossing		ling						
5. Corrugatio	n	Cracking	5		15	. Rutting								
DISTRESS										DENSI	DEDUCT			
SEVERITY		1		QUANTI	ΓY	1			TOTAL	TY %	VALUE			
			1											
1L	9	36	5	1					143	6	28			
10L	100	12	6						118	5	11			
4L	9	9							18	0.75	6			
	240													
19L	0								2400	100	16			
								\vdash						
	<u> </u>													
]										

ASPHALT SURFACED ROADS AND PARKING LOTS									hl	e 8		
CONDITIO					XII V	0 1013		1 6	וטו	G O		
FOR SAME			311	LLI								
TON SAIVIE	LL OINT	SECTIO	1	SAMPL								
BRANCH	11th	N	4	E UNIT								
SURVEYED				SAMPL								
BY		DATE		E AREA		2400						
						L. Patching 8	&					
						til Cut		16.	Sho	ving		
1. Alligator Cracking 6. Depression						atching						
2 Dlandina		7 54 0	اء ۔۔۔'	l.:		2. Polished				page		
Bleeding 7. Edge Cracking 8. Jt. Reflection						ggregate		Cra	ckin	g		
3. Block Crad	cking	Cracking	ecti	UII	13	3. Potholes		18	Swe	5 []		
3. Block Cla	CIVII B	Cracing				or i othloles		19.				
		9. Lane S	hou	lder					ering/Raveli			
4. Bumps an	id Sags	Drop Off						ng		_		
10. Long & Trans												
5. Corrugation	on	Cracking			15	5. Rutting						
DISTRESS					_,						DENSIT	DEDUCT
SEVERITY		<u> </u>	1	QUANTII	I Y	<u> </u>				TOTAL	Y %	VALUE
10L	24									24	0.01	0
19L	2400									2400	100	16
10M	1									1	0	0
					1							

	ASPHALT SURFACED ROADS AND PARKING LOTS CONDITION SURVEY DATA SHEET							Table 9					
			SH	EET									
FOR SAME	PLE UNIT	Γ											
		SECTIO		SAMPL									
BRANCH	12th	N	2	E UNIT									
SURVEYED				SAMPL									
BY		DATE		E AREA		2400							
						L. Patching &		16.6	l				
1 Alligator (racking.	6 Dansa	.cio	.		til Cut		16. S	no	ving			
1. Alligator Cracking 6. Depression					Patching 12. Polished 17. Slippage								
2. Bleeding		7. Edge C	`racl	king		ggregate		Crack					
8. Jt. Reflection						0004.0		5. 40		0			
3. Block Cracking Cracking						3. Potholes		18. S	we	·II			
5. Block Cracking Cracking								19.					
9. Lane Shoulder						1. Railroad		Weat	the	ering/Raveli			
4. Bumps an	d Sags	Drop Off			Cr	Crossing ng							
		10. Long	& T	rans									
5. Corrugation	on	Cracking			15	5. Rutting							
DISTRESS											DENSIT	DEDUCT	
SEVERITY	. – . –		1	QUANTIT	Υ		- 1			TOTAL	Y %	VALUE	
1L	1700									1700	71	57	
3L	50									50	2	2	
7M	3									3	0	0	
10L	100									100	4	10	
13M	1									1	0	0	
1M	400									400	17	54	
19L	2400									2400	100	16	
							1						
							1						
							\dashv						
							1						
							1						
				l									

ASPHALT SURFACED ROADS AND PARKING LOTS								Table 10						
CONDITIO	N SUR	VEY DAT	A SH	IEET										
FOR SAME	PLE UN	IIT												
	Birc	SECTIO	1	SAMPL										
BRANCH	h	N	1	E UNIT										
SURVEYED				SAMPL										
BY		DATE		E AREA		2200								
						L. Patching	&							
 Alligator 						til Cut		16. S	hoving					
Cracking		6. Depres	sion			ntching								
						2. Polished			lippage					
2. Bleeding5. Edge Cracking8. Jt. Reflection						ggregate		Cracl	king					
3. Block Crad	3. Block Cracking Cracking							18. S	well					
					13. Potholes			19.						
4. Bumps an	nd	9. Lane Sh	nould	ler Drop		I. Railroad		Wea	thering/Raveli					
Sags	Sags Off					Crossing								
		10. Long	& Tra	ins										
5. Corrugation	on I	Cracking			15	5. Rutting			T					
DISTRESS				OLIANITI	T\/				TOTAL	DENSIT	DEDUCT			
SEVERITY	220	<u> </u>		QUANTI	I Y				TOTAL	Y %	VALUE			
19L	220								2200	100	16			
10L	2:	2							22	1	3			
										1				
					<u> </u>					ļ				
										1				
					<u> </u>					1				
					<u> </u>					1				
										<u> </u>				

	ASPHALT SURFACED ROADS AND PARKING LOTS CONDITION SURVEY DATA SHEET								ble	e 11		
CONDITIO	ON SURV	'EY DATA	SHI	EET								
FOR SAM	PLE UNI	Т										
	Blanch	SECTIO		SAMPL								
BRANCH	е	N	2	E UNIT								
SURVEYE D BY		DATE		SAMPL E AREA		2200						
ОВТ		DATE		LANLA	11	. Patching 8	 ર					
1. Alligator					Util Cut			16.	Sho	ving		
Cracking		6. Depres	sion		Pa	itching				J		
						2. Polished			-	page		
2. Bleeding		7. Edge C 8. Jt. Refl	Αį	ggregate		Cra	ckin	g				
3. Block Cracking Cracking						B. Potholes		18. 19.	Swe	II		
9. Lane Shoulder Drop						I. Railroad			athe	ring/Raveli		
4. Bumps and Sags Off					Crossing ng							
	10. Long & Trans											
5. Corrugat	ion	Cracking				5. Rutting						
DISTRESS				OLIANITIT	,					TOTAL	DENSIT	DEDUCT
SEVERITY	25	<u> </u>	-	QUANTITY	<u>'</u> 			ı		TOTAL	Y %	VALUE
1L	25	6	6	12						49	2.2	18
4L	6									6	0.27	0
11L	240	70	3							322	15	20
11M	3	40	30) 4						77	3.5	18
10L	4									4	0.18	0
19L	1500									1500	68	14

ASPHALT S	ASPHALT SURFACED ROADS AND PARKING LOTS									Table 12					
CONDITIO	N SURV	EY DATA	SH	EET											
FOR SAME	PLE UNIT	Γ													
		SECTIO		SAMPL											
BRANCH	Clark	N	4	E UNIT											
SURVEYED				SAMPL											
BY		DATE		E AREA		2400						T			
						. Patching	&	10.0	. ـ ـ ـا						
1. Alligator (racking	6. Depres	cio	•		ll Cut tching		16. 5	no۱	/ing					
1. Alligator C	LIACKING	o. Depres	55101	ı		. Polished		17. 9	Slinr	1206					
2. Bleeding		7. Edge C	rack	king		gregate		Crac		_					
		8. Jt. Refl		_		-									
3. Block Crac	cking	Cracking			13	. Potholes	;	18. 9	Swe	II					
								19.							
4.5	1.0	9. Lane S		lder		. Railroad			the	ring/Raveli					
4. Bumps an	a Sags	Drop Off 10. Long		ranc	Cro	ossing		ng							
5. Corrugation	on	Cracking	απ	alis	15	. Rutting									
DISTRESS	-	0.008									DENSIT	DEDUCT			
SEVERITY				QUANTI	ΓΥ					TOTAL	Y %	VALUE			
1L	1	15								16	0.67	8			
1M	40	25								65	2.7	31			
3L	144									144	6	6			
4H	192									192	8	95			
10L	11									11	0.46	0			
10M	24	11								35	1.45	12			
11L	0.25	2	9	1	1	3	1	3		20.25	0.84	2			
19L	2400									2400	100	16			

ASPHALT S CONDITIO FOR SAME	N SURV	'EY DATA	_		KIN	IG LOTS		Tá	abl	e 13		
	Jaspe	SECTIO		SAMPL								
BRANCH	r	N	7	E UNIT								
SURVEYED				SAMPL								
BY		DATE		E AREA		2000					I	I
1 Alligator					11. Patching & Util Cut			16	Cha	vina		
1. Alligator Cracking		6. Depres	cior	,		atching		10.	Sho	virig		
Cracking		o. Depies		2. Polished		17	Slin	page				
2. Bleeding		7. Edge C	rack	ing		ggregate			ckin			
		8. Jt. Refl				JO - U			•			
3. Block Crad	cking	Cracking			13	3. Potholes		18.	Swe	ell		
					19.							
		9. Lane Sh	noul	lder Drop	14	1. Railroad		Weathering/Raveli				
4. Bumps an	4. Bumps and Sags Off					Crossing ng						
	10. Long & Trans											
5. Corrugation	on I	Cracking			15	5. Rutting					DENCIT	DEDUCT
DISTRESS SEVERITY				QUANTI	ГΥ					TOTAL	DENSIT Y %	DEDUCT VALUE
3L	1700			QUANTI						1700	85	26
-												
19L	2000									2000	100	16
11L	2									2	0.125	0
11M	12									12	0.6	7
1												

ASPHALT	ASPHALT SURFACED ROADS AND PARKING LOTS									Table 14						
CONDITIO	ON SURV	/EY DATA	A SHE	ET												
FOR SAM	IPLE UNI	IT														
	Hubbe	SECTIO		SAMPL												
BRANCH	II	N	1	E UNIT												
				SAMPL												
SURVEYE		D.4.T.F.		E		2400										
D BY		DATE		AREA	11 [3400 Patching	Q.									
1. Alligator					Util	_	α	16. Sho	nving							
Cracking								10. 5110	741116							
		•			Patc 12. F	Polished		17. Slip	page							
2. Bleeding	5	7. Edge C		-	Aggr	egate		Crackir	ng							
		8. Jt. Refl	ection													
3. Block Cr	acking	Cracking			13. F	otholes		18. Sw	ell							
		9. Lane S	haulda	or Dron	1/ [Railroad		19.	ering/Raveli							
4. Bumps a	ind Sags	Off	iiouiue	ы ыор	Cros			ng	ering/ Naven							
Bamps a	3053	10. Long	& Trar	าร	0.00	311.B		6								
5. Corrugat	tion	Cracking			15. F	Rutting										
DISTRESS										DENSIT	DEDUCT					
SEVERITY		T		QUANTITY	ı				TOTAL	Y %	VALUE					
1L	20	15	6	6	10				57	1.7	16					
10M	6	3	20	8	17				54	1.6	12					
11L	3	2	2	6					13	0.38	0					
19H	80								80	2.6	23					
17H	4								4	0.12	5					
11M	3								3	0.09	3					
19L	3320								3320	98	16					

ASPHALT SURFACED ROADS AND PARKING LOTS									Table 15						
CONDITIO	N SURVE	Y DATA	SHE	ET											
FOR SAME	PLE UNIT														
	Hought	SECTI	1	SAMPL											
BRANCH	on	ON	5	E UNIT											
SURVEYED				SAMPL											
BY DATE E AREA						2400									
						L. Patching 8	Ž.								
						til Cut		16. SI	noving						
1. Alligator (Cracking	6. Depre	essio	n		atching									
						2. Polished			ippage						
2. Bleeding		7. Edge		_	Ą٤	ggregate		Crack	ing						
l ₋		8. Jt. Re		ion											
3. Block Cra	cking	Cracking	3		13	3. Potholes		18. S	well						
		0.1	C.I.					19. Weat							
4 D	l C	9. Lane :		ılder		I. Railroad									
4. Bumps ar	id Sags	Drop Of			Cr	Crossing eling									
5. Corrugati	00	10. Long Cracking		rans	10	5. Rutting									
DISTRESS		Cracking	5		1.	o. Ruttilig				DENSI	DEDUCT				
SEVERITY				QUANTIT	Υ				TOTAL	TY %	VALUE				
19L	2400								2400	100	16				
10L	50								50	2.1	6				
102	30														
				1						l					

ASPHALT	SURFACE	D ROAD	S Al	ND PARKI	NG	LOTS		Tabl	e 16		
CONDITI	ON SURVI	EY DATA	SHE	ET							
FOR SAM	1PLE UNIT	=									
	Hought	SECTIO		SAMPL							
BRANCH	on	N	6	E UNIT							
SURVEYE				SAMPL							
D BY		DATE		E AREA		3800				T	T
						Patching Jtil Cut		16. Sho	vina		
1. Alligator	r Cracking	6. Depre	ssion	1		tching		10. 3110	viiig		
1.71	Cracining	o. Depie	331011			Polished		17. Slip	page		
2. Bleeding	g	7. Edge C	crack	ing		gregate		Crackin			
		8. Jt. Ref	lectio	on							
3. Block Cr	acking	Cracking			13	Potholes		18. Swe	ell		
						5 11 1		19.	. /5 !:		
4. Bumps a	and Cage	9. Lane S Off	houl	der Drop		Railroad ossing			ering/Raveli		
4. builips a	anu sags	10. Long	ጼ Tr	ans	Cr	ossiiig		ng			
5. Corruga	tion	Cracking		aris	15.	Rutting					
DISTRES											
S											
SEVERIT										DENSIT	DEDUCT
Υ				QUANTITY			1	1	TOTAL	Y %	VALUE
1M	3	1		9					13	0.34	13
3L	2400								2400	63	23
10L	30								30	0.8	2
10H	8	3	4.	5 2	2				60	1.6	25
11H	1								1	0	0
13H	0.5	8							8.5	0.22	73
19H	500								500	13.2	67
19L	3300								3300	87	15

ASPHALT S CONDITION FOR SAMP	N SURVE	EY DATA			ING	LOTS		Та	ble	17		
	Hicko	SECTI		SAMPLE								
BRANCH	ry	ON	7	UNIT								
SURVEYED				SAMPLE								
BY		DATE		AREA		2200						
						. Patching	ξ &					
						I Cut		16. 9	Shovin	g		
1. Alligator C	racking	6. Depre	essic	on		tching						
					. Polished			Slippa	ge			
2. Bleeding		cking	Ag	gregate		Crac	king					
3. Dil. C	Litina an	8. Jt. Ref		tion	42	Datla al	_	40.0	S D			
3. Block Crac	King		13	. Potholes	5		Swell					
		9. Lane S	Sho	uldor	11	. Railroad		19.	+h orin	ng/Rave		
4. Bumps and	4 Sage	Drop Of		uiuei		. Kaliroau Ossing		ling	шеш	ig/ Nave		
4. Bullips allo	ı sags	10. Long		Tranc	CIC	JSSIIIR		iiiig				
5. Corrugatio	n	Cracking		iiaiis	15	. Rutting						
DISTRESS			,							TOTA	DENSI	DEDUCT
SEVERITY				QUAN'	TITY					L	TY %	VALUE
10L	100	21	7	20	4	22	15	11	15	215	10	17
1L	250									250	10	34
19L	2200									2200	100	16

ASPHALT CONDITION FOR SAM)N SUR\	/EY DATA			(INC	LOTS		Ta	abl	e 18		
	Garne	SECTIO	1	SAMPL								
BRANCH	t	N	3	E UNIT								
SURVEYE				SAMPL								
D BY		DATE		E AREA		2400					•	ı
						Patching 8	&					
1. Alligator					l Cut		16.	Sho	ving			
Cracking		6. Depres			ching		4-					
2 Dlooding		7	n.~		Polished			Slip ickin	page			
2. Bleeding		7. Edge C 8. Jt. Refl		-	Ag	gregate		Cra	ICKIII	g		
3. Block Cra	cking	Cracking	CCIIO	"	13	Potholes		18	Swe	ell		
3. Block Cra	CKIIIB	Cracking			19. 14. Railroad Weathering/Raveli							
		9. Lane Sł	nould	der Drop	14.	Railroad				ering/Raveli		
4. Bumps a	nd Sags	Off	·	Crossing			ng		<u>.</u>			
		10. Long	& Tra	ns								
5. Corrugat	ion	Cracking			15.	Rutting						
DISTRESS											DENSIT	DEDUCT
SEVERITY				QUANTIT				1		TOTAL	Y %	VALUE
10L	24		2	6	3					41	1.7	5
9H	20	20								40	1.67	9
9L	40)								40	1.67	3
19L	2400)								2400	100	16
	<u> </u>											

ASPHALT S	URFACE	D ROAD)S A	ND PARK	G LOTS		Tab	le 19			
CONDITION	N SURVI	EY DATA	SH	EET							
FOR SAMP	I F UNIT	-									
	Garn	SECTI		SAMPLE							
BRANCH	et	ON	2	UNIT							
SURVEYED				SAMPLE							
BY		DATE		AREA		2200					
					11	. Patching &					
						il Cut		16. Sh	oving		
1. Alligator Ci	racking	essic	on		itching						
		_			2. Polished		17. Slip				
2. Bleeding5. Edge Cracking8. Jt. Reflection						gregate		Cracki	ng		
3. Block Cracl	flect g	ion	1 -	3. Potholes		18. Sw	الم				
3. BIOCK Craci	King	3		13	s. Potrioles		eii				
	9. Lane Shoulder							ering/Rave			
4. Bumps and	4. Bumps and Sags Drop Off							ling	.c 6/ 1.a.v.c		
	10. Long & Trans							J			
5. Corrugatio	n	_			15	5. Rutting					
DISTRESS										DENSI	DEDUCT
SEVERITY		1		QUANTI	ΓΥ	ı			TOTAL	TY %	VALUE
11L	3	3	1	1					8	0.36	0
3L	1320								1320	60	23
19L	2200								2200	100	16
3M	680								680	40	31
11M	3								3	0.14	3
		l		L						l	

ASPHALT S	URFACE	D ROAD	S A	ND PARK		Tá	ab	le 20				
CONDITIO						- `						
FOR SAMP		. 271171	•									
1 311 37 11111	Emeral	SECTI		SAMPL								
BRANCH	d2	ON	5									
SURVEYED				SAMPL								
BY		DATE	E AREA		2800							
						Patching 8	ķ					
				il Cut		16.	. Sh	oving				
1. Alligator C	Cracking	essio	on		tching							
2 Disadina		-1.5		. Polished				opage				
2. Bleeding		7. Edge 8. Jt. Re		_	ΑĘ	gregate		cra	ackii	ıß		
3. Block Crac	rking	riec	LIUII	12	. Potholes		12	. Sw	الم			
3. Block Clac	KIIIG	•		1.	o. i otiloles		19.		CII			
		ulder	14. Railroad Weathering/R									
4. Bumps an	d Sags			ossing		ling		- 0,				
		Trans		_								
5. Corrugation	on		15	. Rutting								
DISTRESS											DENSI	DEDUCT
SEVERITY		ı		QUANTIT	ΓY Τ. Ι. Τ. Τ.					TOTAL	TY %	VALUE
19L	933	90								1023	37	11

ASPHALT S CONDITIO FOR SAMP	N SURVE	Y DATA			NG	LOTS	Ta	abl	e 21		
FUR SAIVIP	Emeral	Sectio		SAMPL							
BRANCH	d 1	n	4	E UNIT							
				SAMPL							
SURVEYED				Е							
BY		DATE		AREA		2800					
						. Patching & il Cut	16	Sho	ving		
1. Alligator C	Cracking	6. Depre	ession			tching	10.	. 3110	villg		
						. Polished	17.	Slip	page		
2. Bleeding		7. Edge			Ag	gregate	Cra	ackin	g		
		8. Jt. Re		n				_			
3. Block Crad	cking	Cracking	3		13	. Potholes		Swe			
		0 lane	Should	der Drop	1/	. Railroad	19.		ering/Raveli		
4. Bumps an	d Sags	Off	Silouic	aci biop		ossing	ng	Jacin	ziiig/ naveii		
,	J	10. Long	g & Tra	ins		J	J				
5. Corrugation	on	Cracking	3		15	. Rutting			T		
DICTREC										DENSIT	DEDUC
DISTRESS SEVERITY				QUANTIT	,				TOTAL	Y %	T VALUE
19L	1900			Q07.11111					1900	68	14
1L	54	16	9						79	2.8	1
3L	100	10							100	3.6	4
10L	4	30	24						58	2.1	6
11L	1	30	27						1	0	0
116									1	0	0

ASPHALT	SURFA	CED ROA	DS AN	ND PARK	GLOTS	-	Table	e 23			
CONDITIC	N SUR	VEY DAT	A SHE	ET							
FOR SAMI	PLE UN	IIT									
		SECTIO		SAMPL							
BRANCH	Ruby	N	5	E UNIT							
SURVEYE				SAMPL							
D BY		DATE		E AREA		2400					
1. Alligator						L. Patching & til Cut		16. Sho	ving		
Cracking		6. Depres	ssion			ntching	_	10. 3110	viiig		
5						2. Polished	1	17. Slip	page		
2. Bleeding		7. Edge C	Cracking	3	Αį	ggregate	(Crackin	g		
		8. Jt. Refl	ection								
3. Block Cra	cking	Cracking			13	3. Potholes		18. Swe	ell		
4 D	- al	0 1 0	ملماني مما	. D	1 /	l Dailmand		19. Maatha	win = /Dayali		
4. Bumps ar Sags	ıa	9. Lane S Off	nouide	r Drop		I. Railroad ossing		weatne ng	ering/Raveli		
Jags		10. Long	& Tran	s	Ci	Ossilig	'	16			
5. Corrugati	on	Cracking	αu		15	5. Rutting					
DISTRESS										DENSIT	DEDUCT
SEVERITY		1		QUANTIT	Υ	T		T	TOTAL	Υ %	VALUE
	180										
3M	0								1800	75	40
1L	9								9	0.375	5
11L	10	6	15	20					51	2.125	5
13H	4	1							5	0.21	72
13M	1	0.5							1.5	0.06	25
7L	50								50	2.1	3
							t				
							+				
						+					
							+				

ASPHALT	SURFA	CED ROAI	DS .	AND PAR	NG LOTS		Tab	le 24						
CONDITIC	N SUR	VEY DATA	\ SH	HEET										
FOR SAMI	PLF UN	IT												
1 011 07 1111		SECTIO	1	SAMPL	I									
BRANCH	East	N	3	E UNIT										
SURVEYED				SAMPL										
ВҮ		DATE		E AREA		2400								
				l .	1:	1. Patching	&	ı						
1. Alligator					U	til Cut		16. Sł	noving					
Cracking		6. Depression Patching						ching & 16. Shoving g shed 17. Slippage ate Cracking holes 18. Swell 19. road Weathering/Ravelin g g ting DENSIT DEDL						
					12	2. Polished	shed 17. Slippage ate Cracking holes 18. Swell 19. road Weathering/Ravelin g g							
2. Bleeding								Crack	ing					
		8. Jt. Refle	ectio	on		les 18. Swell								
3. Block Cra	cking	Cracking			13	3. Potholes			lippage king DENSIT DEDUCT Y% VALUE 2100 88 42					
4. Bumps ar	nd	9. Lane Sh	oul	der Drop	14	4. Railroad		Weat	hering/Ravelin					
Sags		Off		Cı	rossing		g							
		10. Long 8	ያ Tr	ans										
5. Corrugati	on	Cracking			15	5. Rutting								
DISTRESS														
SEVERITY			ı	QUANTI	TY	ı								
3M	210	0							2100	88	42			
19L	2400	0							2400	100	16			
				\vdash										
	1				1									
	1			I .	1	1		1		1				

I SURVE	EY DATA			ING LO	OTS		Та	ble 25		
Copp	SECTI		SAMPLE							
er	ON	1	UNIT							
	DATE		AREA						1	
						ķ				
	6.5						16. 9	shoving		
racking	6. Depre	essic	on		_		47.0	N:		
	7 Edgo	Crad	sking							
		Aggre	gate		Crac	KIIIg				
king			.1011	13 Po	tholes		18 9	Swell		
VIII 16						, wen				
	9. Lane S	Sho	ulder	14. Ra	ilroad			thering/Rave		
l Sags						, in a second of the second of				
J			Γrans		J		J			
n	Cracking	5		15. Ru	tting					
									DENSI	DEDUCT
			QUANTII	Υ				TOTAL	TY %	VALUE
2000								2000	100	16
18	5	5	10					38	1.9	6
							-+			
							-+			
	N SURVE LE UNIT Copp er racking King I Sags n	SURVEY DATA LE UNIT Copp SECTI er ON DATE Tacking 6. Depre 7. Edge 8. Jt. Re King Cracking 9. Lane 9 10. Long n Cracking	SURVEY DATA SH LE UNIT Copp SECTI er ON 1 DATE Tacking 6. Depression 7. Edge Cracking 8. Jt. Reflection Cracking 9. Lane Shoot 10. Long & Top Off 10. Long & Top O	A SURVEY DATA SHEET LE UNIT Copp SECTI SAMPLE ON 1 UNIT DATE AREA Tacking 6. Depression 7. Edge Cracking 8. Jt. Reflection Cracking 9. Lane Shoulder 1 Sags Drop Off 10. Long & Trans Cracking QUANTIT	A SURVEY DATA SHEET LE UNIT Copp SECTI SAMPLE ON 1 UNIT DATE AREA 11. Pa Util Cu Tacking 6. Depression Patchi 12. Po 7. Edge Cracking Aggrey 8. Jt. Reflection King Cracking 13. Po 9. Lane Shoulder 14. Ra I Sags Drop Off Crossi 10. Long & Trans Cracking 15. Ru QUANTITY 2000	Copp SECTI ON 1 UNIT SAMPLE ON 1 UNIT SAMPLE DATE AREA 2000 Tracking 6. Depression Patching 12. Polished Aggregate 8. Jt. Reflection Cracking Cracking To Long & Trans Cracking To Long & Trans Cracking To Cracking To Long & Trans Cracking To Cyannia	A SURVEY DATA SHEET LE UNIT Copp SECTI SAMPLE ON 1 UNIT DATE SAMPLE AREA 2000 11. Patching & Util Cut Patching 12. Polished 7. Edge Cracking Aggregate 8. Jt. Reflection King Cracking 13. Potholes 9. Lane Shoulder 14. Railroad Crossing 10. Long & Trans Cracking QUANTITY 2000 QUANTITY	A SURVEY DATA SHEET LE UNIT Copp SECTI SAMPLE ON 1 UNIT DATE AREA 2000 11. Patching & Util Cut 16. Second 16. Second 16. Second 17. Second 16. Second	A SURVEY DATA SHEET LE UNIT Copp	A SURVEY DATA SHEET LE UNIT Copp

Appendix II-PCI Calculation Iterations

				Table	e 1: ·	7th A	ve.	Sec	tior	า 16		
#			Total	q	CDV							
1	20	17	16	11	8	7	5	5	4	93	9	40
2	20	17	91	8	40							
3	20	17	16	11	8	7	5	2	2	88	7	42
4	20	17	85	6	41							
5	20	17	16	11	8	2	2	2	2	80	5	40
6	20	17	16	11	2	2	2	2	2	74	4	40
7	20	17	16	2	2	2	2	2	2	65	3	36
8	20	17	2	2	2	2	2	2	2	51	2	37
9	20	2	2	2	2	2	2	2	2	36	1	37
	CDV= 42											
											PCI=	58

			Tal	ble 2	: Ho	ught	on A	٩ve.	Se	ction 6		
#			De	educt		Total	q	CDV				
1	73	67	25	23		218	6	96				
2	73	67	25	23		207	5	95				
3	73	67	25	23		194	4	97				
4	73	67	25	2		173	3	97				
5	73	67	2	2	2	2	2			150	2	94
6	73	2	2	2	2	2	2			85	1	85
7												
8												
9												
											CDV=	97

			Tal	ole 3:	: 5	th	Αv	e. S	Sec	tion 1		
#			Dedu	ct Va	lue	S				Total	q	CDV
1	120	45	38	16						219	4	98
2	120	17	16	155	3	94						
3	120	17	141	2	89							
4	120	2	2	126	1	100						
5												
6												
7												
8												
9												
											CDV=	100
											PCI=	0

			Tab	le 4:	11	Lth	Αv	e.	Sec	ction 4		
#		[Dedu	ct Va	lue	es				Total	q	CDV
1	16									16	1	16
2												
3												
4												
5												
6												
7												
8												
9												
				·						·	CDV-	16

			Ta	ble 5	: 1	2th	Α۱	/e.	Se	ction 2		
#			Dedu	ıct V	alue	es				Total	q	CDV
1	57	54	16	10	2					139	4	77
2	57	54	16	2	2					131	3	78
3	57	54	2	117	2	80						
4	57	2	2	65	1	65						
5												
6												
7												
8												
9												
											CDV=	80
											PCI=	20

			Т	able	6:	Jas	pe	r Se	ct	ion 7		
#			Dedu	uct V	alue	es				Total	q	CDV
1	26	16	7							49	3	32
2	26	16	2					44	2	33		
3	26	2	2							30	1	30
4												
5												
6												
7												
8												
9												
											CDV=	33

			Ta	ble	7:	Hi	cko	ory	Se	ction 7		
#			Dedu	ct V	'alι	ıes				Total	q	CDV
1	34	17	16							67	3	42
2	34	17	2				53	2	39			
3	34	2	2		38	1	38					
4												
5												
6												
7												
8												
9												
											CDV=	42
											PCI=	58

			Tal	ole	8 1	L0t	h A	ve	. Sc	ection 5	·	
#			Dedu	ct V	alι	ıes				Total	q	CDV
1	28	16	11	6						61	4	33
2	28	16	11	2				57	3	37		
3	28	16	2	2				48	2	36		
4	28	2	2	2				34	1	34		
5												
6												
7												
8												
9												
											CDV=	37

			Ta	ble 9): 7	th A	۱ve	. Se	ect	ion 24		
#			Ded	uct V	'alu	es				Total	q	CDV
1	40	26	16	15	9	6				112	6	62
2	40	26	16	15	9	2				108	5	58
3	40	26	16	101	4	58						
4	40	26	16	2	88	3	56					
5	40	26	2	2	2		74	2	52			
6	40	2	2	2	2	2				50	1	50
7												
8												
9												
											CDV=	62
											PCI=	38

			Tal	ole 10	0: 6	5th	Ave	e. S	ect	tion 18		
#			Ded	uct V	'alu	es				Total	q	CDV
1	43	16								59	2	42
2	43	2								45	1	45
3												
4												
5												
6												
7												
8												
9												
					•	•					CDV=	45
											PCI=	55

		Ta	able	2 1:	1:	Но	ugł	nto	n A	ve. Sect	ion 15	
#		D	edu	uct	Va	lue	es			Total	q	CDV
1	16	6								22	2	14
2	16	2							18	1	18	
3												
4												
5												
6												
7												
8												
9												
			•								CDV=	18
											PCI=	82

			Ta	abl	e 1	2:	5tl	n A	ve.	Section	16	
Table 12: 5th Av # Deduct Values 1 16 7 3										Total	q	CDV
1	16	7	3							26	3	14
2	16	7	2						25	2	19	
3	16	2	2				20	1	20			
4												
5												
6												
7												
8												
9												
											CDV=	20
											PCI=	80

			Т	abl	e 1	3:	8t	h A	ve.	Section	4	
#			Ded	uct	Va	lue	S			Total	q	CDV
1	16	3								19	9	13
2	16	2								18	8	18
3												
4												
5												
6												
7												
8												
9												
										·	CDV=	18
											PCI=	82

	Т	abl	e 14	1: E	me	era	ld (W	est	ern) St. S	Section 4	
#			Ded	uct	Total	q	CDV					
1	14	6	4	1						25	3	14
2	14	6	2	1						23	2	17
3	14	2	2	1		19	1	19				
4												
5												
6												
7												
8												
9												
		•	•	•							CDV=	19
											PCI=	81

	Table 15: Emerald (Eastern) St. Section 5											
		Tab	le 15	5: En	neral	d (E	ast	ern) 5	St. Secti	on 5	
#			Dec	duct \	/alue	es				Total	q	CDV
1	11			11	1	11						
2												
3												
4												
5												
6												
7												
8												
9												
						CDV=	11					
						PCI=	89					

			Ta	ble 1	L6: V	'ivia	n S	it. S	Sec	tion 3		
#			Dec	luct \	/alue	es				Total	q	CDV
1	53	34	19	19	14		141	5	70			
2	53	34	19	19		129	4	76				
3	53	34	19	2		112	3	70				
4	53	34	2	2	2	2				95	2	68
5	53	2	2	2	2	2				63	1	63
6												
7												
8												
9												
						•	CDV=	76				

			Ta	ble :	17:	Cla	rk S	t. S	Sec	tion 4		
#			Ded	uct \	/alu	es				Total	q	CDV
1	95	31	16	12	8		170	6	82			
2	95	31	16	12		166	5	84				
3	95	31	16	12	160	4	87					
4	95	31	16	2	150	3	88					
5	95	31	2	2	2	2	2			136	2	88
6	95	2	2	2	2	2	2			107	1	100
7												
8												
9												
				CDV=	100							
				PCI=	0							

	Table 18: Blanche St. Section 2												
			Tab	le 18	3: B	lan	che	St.	Se	ection 2			
#			Ded	uct \	/alu	es				Total	q	CDV	
1	20	18	18	14						70	4	38	
2	20	18	18	2						58	3	37	
3	20	18	2	2			42	2	32				
4	20	2	2	2			26	1	26				
5													
6													
7													
8													
9													
							CDV=	38					

			Ta	ble 1	9: H	ubb	ell :	St.	Se	ction 1		
#			Dec	duct	Value	es				Total	q	CDV
1	33	23	16	16	12		108	7	52			
2	33	23	16	16		107	6	52				
3	33	23	16	16		104	5	60				
4	33	23	16	16		94	4	54				
5	33	23	16	2	2	2	2			80	3	50
6	33	23	2	2	2	2	2			66	2	48
7	33	2	2	2	2	2	2			45	1	45
8												
9												
							CDV=	60				
							PCI=	40				

			1	able	20:	Eas	t St	. Se	cti	ion 3		
#		 								Total	q	CDV
1	42	16								58	2	43
2	42	2					44	1	44			
3												
4												
5												
6												
7												
8												
9												
							CDV=	44				

CDV= 44 PCI= 56

			Tabl	e 2:	1:	Co	рре	er S	it.	Section	1	
#			Dedu	ct V	'alι	ies				Total	q	CDV
1	16	6								22	2	15
2	16	16 2									1	18
3												
4												
5												
6												
7												
8												
9												
										·	CDV=	18
											PCI=	82

			Table	e 22	2: (Gar	ne	t St	t. S	ection 1	L3	
#			Dedu	ct V	alι	ıes				Total	q	CDV
1	16	9	5	3				33	4	14		
2	20	17	16	2			55	3	35			
3	20	17	2	2			41	2	28			
4	20	2	2	2						26	1	26
5												
6												
7												
8												
9												
		-	-								CDV=	35
											PCI=	65

	Table 23: Ruby St.												
				Т	able	e 2 3	: F	Rub	y S	St.			
#			Dedu	ıct \	√alι	ıes				Total	q	CDV	
1	72	40	25	5	5	3				150	6	72	
2	72	40	25	149	5	78							
3	72	40	25	146	4	82							
4	72	40	25	2	143	3	84						
5	72	40	2	2	2	2				120	2	82	
6	72	2	2	2	2	2				82	1	82	
7													
8													
9													
				CDV=	84								
				PCI=	16								

			Tab	le 2	4:	Gar	net	St	. S	ection 2		
#			Dedu	ıct \	√alι	ıes				Total	q	CDV
1	31	23	16	3			73	4	37			
2	31	23	16	2			72	3	48			
3	31	23	2	2			58	2	42			
4	31	2	2	2			37	1	37			
5												
6												
7												
8												
9												
-							CDV=	48				

				Та	ble	25	5:	Bir	ch :	St. Sectio	n	
#		D	ed	uct	Va	alue	es			Total	q	CDV
1	16	3								19	2	12
2	16	2								18	1	18
3												
4												
5												
6												
7												
8												
9												
											CDV=	18
											PCI=	82