PASER MANUAL FOR CONCRETE ROADS

PAVEMENT ENGINEERING SERVICES – PASER RATING
SUNFLOWER VILLAGE HOMES ASSOCIATION
45800 HANFORD ROAD
CANTON, MICHIGAN

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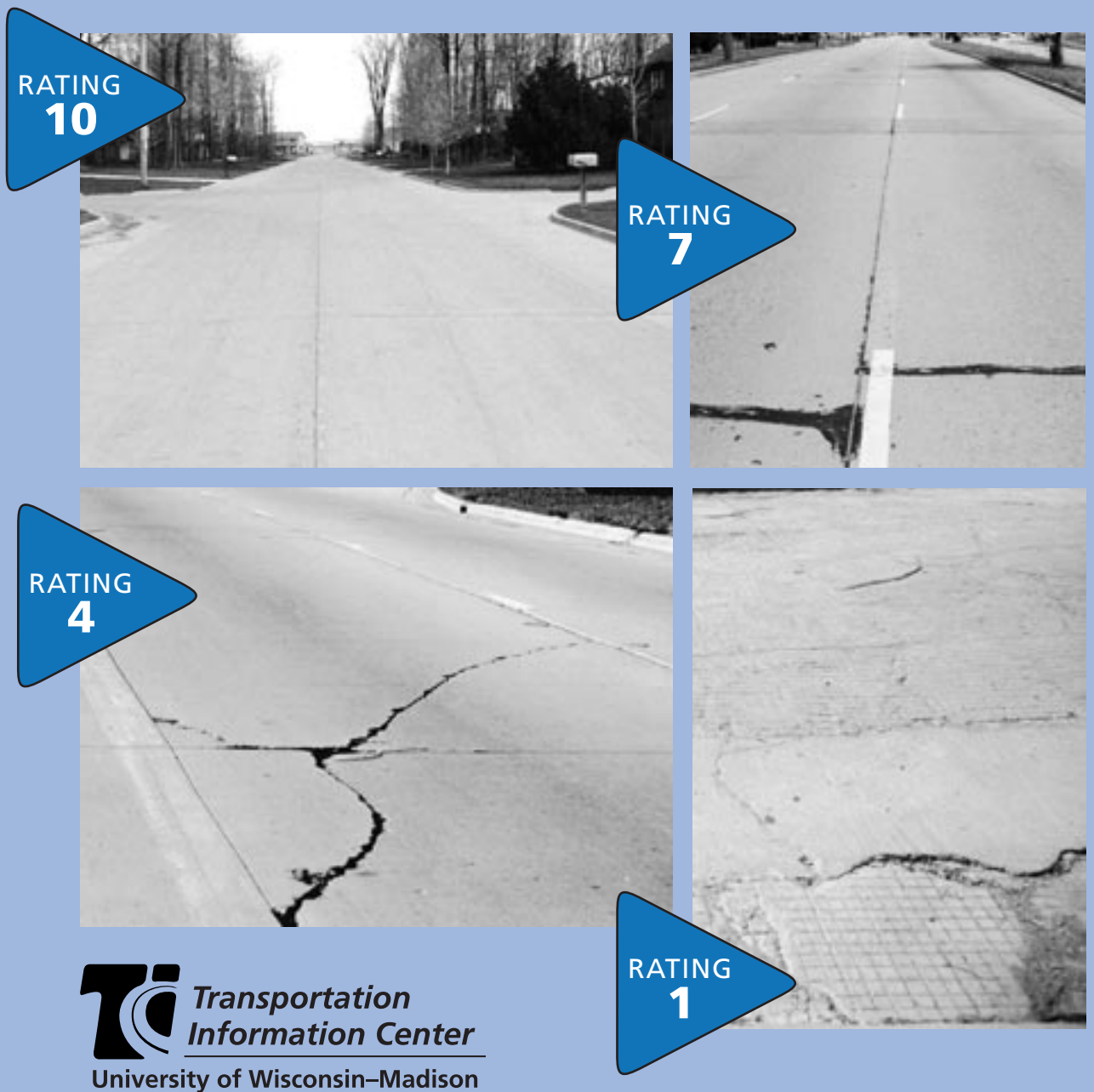
SME

Pavement Surface Evaluation and Rating

PASER Manual

Concrete Roads



Transportation Information Center
University of Wisconsin–Madison

Rating system

Surface rating	*Visible distress**	*General condition/ treatment measures*
10 Excellent	None.	New pavement. No maintenance required.
9 Excellent	Traffic wear in wheelpath. Slight map cracking or pop-outs.	Recent concrete overlay or joint rehabilitation. Like new condition. No maintenance required.
8 Very Good	Pop-outs, map cracking, or minor surface defects. Slight surface scaling. Partial loss of joint sealant. Isolated meander cracks, tight or well sealed. Isolated cracks at manholes, tight or well sealed.	More surface wear or slight defects. Little or no maintenance required.
7 Good	More extensive surface scaling. Some open joints. Isolated transverse or longitudinal cracks, tight or well sealed. Some manhole displacement and cracking. First utility patch, in good condition. First noticeable settlement or heave area.	First sign of transverse cracks (all tight); first utility patch. More extensive surface scaling. Seal open joints and other routine maintenance.
6 Good	Moderate scaling in several locations. A few isolated surface spalls. Shallow reinforcement causing cracks. Several corner cracks, tight or well sealed. Open (¼" wide) longitudinal or transverse joints and more frequent transverse cracks (some open ¼").	First signs of shallow reinforcement or corner cracking. Needs general joint and crack sealing. Scaled areas could be overlaid.
5 Fair	Moderate to severe polishing or scaling over 25% of the surface. High reinforcing steel causing surface spalling. Some joints and cracks have begun spalling. First signs of joint or crack faulting (¼"). Multiple corner cracks with broken pieces. Moderate settlement or frost heave areas. Patching showing distress.	First signs of joint or crack spalling or faulting. Grind to repair surface defects. Some partial depth patching or joint repairs needed.
4 Fair	Severe polishing, scaling, map cracking, or spalling over 50% of the area. Joints and cracks show moderate to severe spalling. Pumping and faulting of joints (½") with fair ride. Several slabs have multiple transverse or meander cracks with moderate spalling. Spalled area broken into several pieces. Corner cracks with missing pieces or patches. Pavement blowups.	Needs some full depth repairs, grinding, and/or asphalt overlay to correct surface defects.
3 Poor	Most joints and cracks are open, with multiple parallel cracks, severe spalling, or faulting. D-cracking is evident. Severe faulting (1") giving poor ride. Extensive patching in fair to poor condition. Many transverse and meander cracks, open and severely spalled.	Needs extensive full depth patching plus some full slab replacement.
2 Very Poor	Extensive slab cracking, severely spalled and patched. Joints failed. Patching in very poor condition. Severe and extensive settlements or frost heaves.	Recycle and/or rebuild pavement.
1 Failed	Restricted speed. Extensive potholes. Almost total loss of pavement integrity.	Total reconstruction.

** Individual pavements will not have all of the types of distress listed for any particular rating. They may have only one or two types.*

RATING 10 & 9

EXCELLENT —
No maintenance required

Rating 10 is for new pavement. Rating 9 is used for recent concrete rehabilitation or like-new condition. Some traffic wear. Slight map cracking or pop-outs. No maintenance required.

◄
RATING 10
New pavement with integral curb.

◄
RATING 9
Like new condition.

◄
RATING 9
Recent joint rehabilitation. Like new condition.

RATING 8

VERY GOOD — Little or no maintenance required

More surface wear, or slight defects showing in lanes. Pop-outs, slight surface scaling, partial loss of joint sealant, or isolated meander crack. Isolated manhole distress. Little or no maintenance required.

► **Slight scaling.**

► **Isolated spall at manhole.**

▲ **Partial loss of joint sealant.**

► **Isolated meander crack, tight and well sealed.**

RATING 7

GOOD — May require some routine sealing or maintenance

First signs of transverse cracking, patching or repair; more extensive pop-outs or scaling; some manhole displacement, isolated heave or settlement. May need some sealing or routine maintenance.

◄ **Residential street pavement in good condition after many years of service. May only need periodic joint sealing maintenance.**

◄ **Extensive pop-outs. Pavement is unsightly but still provides good level of service.**

◄ **Recent full depth pavement repair. In very good condition.**

◄ **Transverse crack. Tight, sound pavement.**

◄ **Well sealed transverse crack. Joint repairs in good condition.**

RATING 6

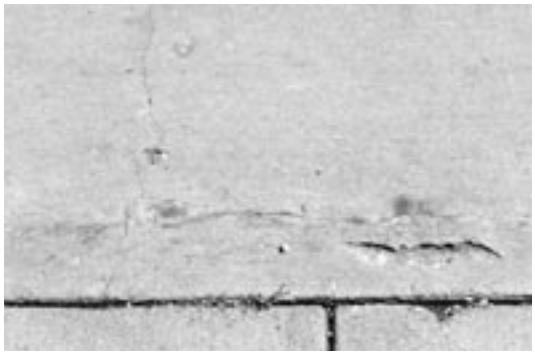
GOOD — Joint and crack sealing needed

First signs of corner cracking or shallow reinforcement. More frequent transverse cracks. Open (¼") joints and cracks. Moderate scaling. Needs joint and crack sealing.

► **Several transverse cracks. Tight or well sealed.**

► **Moderate scaling.**

Surface rust stain. Indicates shallow reinforcing. ▼



▲ **First signs of corner cracks.**

▲ **Isolated, tight meander crack. Several pop-outs. Remaining joints and cracks all tight and sound.**

RATING 5

FAIR — Partial depth patching and joint repairs may be needed

First signs of joint or crack spalling, or faulting. Multiple cracking at corners with broken pieces. Patching in fair condition. Surface texturing repairs may be necessary. Some partial depth patching and joint repairs may be needed.

◄
Faulting at longitudinal joint and spalling along joint edge.

◄
First signs of transverse joint faulting. Grinding will improve ride.

Open cracks with edge spalling. Corner crack and broken corner piece.

Isolated manhole problems and joint spalling. Full depth repair required adjacent to manhole.

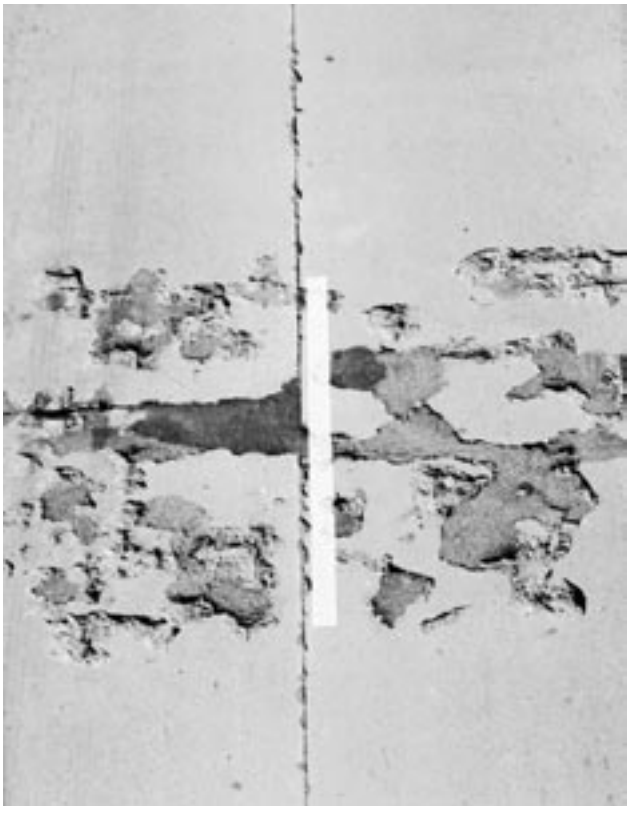
RATING 5

FAIR — (continued)
Partial depth patching and joint repairs may be needed

►
Broken corner pieces. Some joint spalling.

Patching in
▼ fair condition.

▲ Severe scaling over extensive areas. Patching or overlay needed.



▲ Spalling caused by shallow reinforcing steel. Temporary patching needs to be followed by extensive partial depth repairs.

RATING 4

FAIR — Some full depth joint or crack repair required

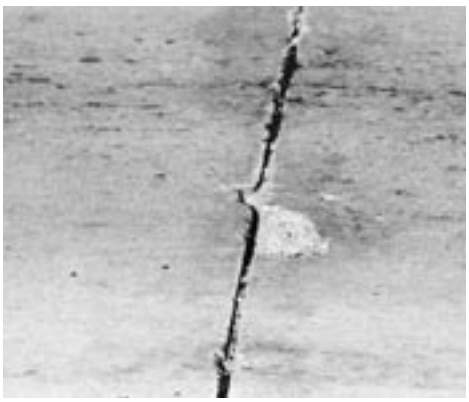
Severe surface distress requires asphalt overlay or extensive surface texturing. Multiple transverse cracks with spalling and broken pieces. Corner cracking with potholes or patches. Blowups. Some full depth joint or crack repair required.

Wide open meander crack (1") with edge spalling.
▼ Corner crack with spalling.

◄ All joints show some deterioration and spalling.

◄ Multiple open transverse cracks. Failed corner crack. Patches in fair condition.

▲ Corner cracking developed into small hole; moderate spalling of transverse crack.



◄ Moderate spalling at transverse joint.

◄ Moderate to severe longitudinal joint faulting. Transverse joint also has spalling.

RATING 3

POOR — Extensive full depth patching plus some full slab replacement required

Most joints and cracks are open (1"), spalled, or patched. D-cracking is evident. Severe (1") faulting. Extensive full depth patching required plus some full slab replacement.

► **Joints and cracks badly spalled. Patching is failing. Full depth repairs required.**

Multiple transverse cracks. Poor longitudinal joint with spalling. ▼

► **D-cracking (discoloration) at transverse joint and corner cracking. Needs full-depth repair.**

► **Discoloration at joints indicates D-cracking. Slab replacement needed.**

► **Badly spalled joint and open crack. Slab or joint replacement needed.**

▲ **Failed joint needs replacement.**

RATING 2

VERY POOR — Pavement recycling and reconstruction necessary

◄ **Failed patches. Replace entire portion of lane.**

▲ **Remove and replace pavement around manhole and inlet.**

◄ **Closely spaced transverse cracks and poor longitudinal joint. Replace slab.**

▲ **Extensive joint failure. Major rehabilitation or complete replacement needed.**

◄ **Severe deterioration. Requires extensive reconstruction.**

RATING 1

FAILED — Complete reconstruction necessary

► **Slab and patch failure.**

► **Broken slabs require complete rebuilding.**

► **Total failure.**

Practical advice on rating roads

Inventory and field inspection

Most agencies routinely observe roadway conditions as a part of their normal work and travel. However, an actual inspection means looking at the entire roadway system as a whole and preparing a written summary of conditions. This inspection has many benefits over casual observations. It can be helpful to compare segments, and ratings decisions are likely to be more consistent because the roadway system is considered as a whole within a relatively short time.

An inspection also encourages a review of specific conditions important in roadway maintenance, such as drainage, adequate strength, and safety.

A simple written inventory is useful in making decisions where other people are involved. You do not have to trust your memory, and you can usually answer questions in more detail. Having a written record also improves your credibility with the public.

Finally, a written inventory is very useful in documenting changing roadway conditions. Without records over several years, it is impossible to know if your overall road conditions are improving, holding their own, or declining.

Annual budgets and long range planning are best done when based on actual needs as documented with a written inventory.

The Wisconsin DOT local road inventory (WISLR) is a valuable resource for managing your local roads. Adding PASER surface condition ratings is an important improvement.

Averaging and comparing sections

For evaluation, divide the local road system into individual segments which are similar in construction and condition. Rural segments may vary from ½ mile to a mile long, while sections in urban areas will likely be 1-4 blocks long or more. If you are starting with the WISLR Inventory, the segments have already been established. You may want to review them for consistent road conditions. Obviously no roadway segment is entirely consistent. Also, individual pavements will not have all of the types of distress listed for any particular rating. They may have only one or two types. Therefore, some "averaging" is necessary.

The objective is to rate the condition that represents the majority of the roadway. Small or isolated conditions should not influence the rating. It is useful to note special conditions on the inventory form so this information can be used in project design. For example, some spot repairs may be required.

Occasionally pavement conditions will vary significantly. For example, short sections of good condition may be followed by sections of poor pavement conditions. In this case, it is best to rate the pavement according to the worst conditions and note the variation on the form.

The overall purpose of condition rating is to be able to compare each segment relative to all the other segments in your roadway system. On completion you should be able to look at any two pavement segments and find that the better surface has a higher rating.

Within a given rating, say 6, not all pavements will be exactly the same. However, they should all be considered to be in better condition than those with lower ratings, say 5. Sometimes it is helpful in rating a difficult segment to compare it to other previously rated segments. For example, if it is better than one you rated 5, and worse than a typical 7, then a rating of 6 is appropriate. Having all pavement segments rated in the proper relative order is important and useful.

Assessing drainage conditions

Moisture and poor pavement drainage are significant factors in pavement deterioration. Some assessment of drainage conditions during pavement rating is highly recommended. While you should review drainage in detail at the project level, at this stage simply include an

▼ **Urban drainage. RATING: Excellent**

▲ **Adequate rural ditch and good erosion control. RATING: Good**

overview drainage evaluation at the same time as you evaluate surface condition.

Look at the roadway crown and check for low surface areas that permit ponding. Paved surfaces should have approximately a 2% cross slope or crown across the roadway. Rural shoulders should have a greater slope to improve surface drainage.

Good drainage improves a pavement's ability to resist pumping, faulting and joint damage. Some new concrete pavements are being constructed with a special drainage layer and drain system to reduce water-related deterioration. These systems require inspection and periodic maintenance.

You should also check curb and gutter, culverts, and storm drain systems. Storm drainage systems that are silted in, have a large accumulation of debris, or are in poor structural condition will also degrade pavement performance.

The T.I.C. publication, *Drainage Manual: Local Road Assessment and Improvement,* describes the elements of drainage systems, depicts them in detailed photographs, and explains how to rate their condition. Copies are available from the T.I.C.

▲ **Reshape terrace behind curb to restore drainage and prevent damage to curb and street.**

RATING: Fair

► **Flooding. Curb and gutter need reconstruction.**

RATING: Poor

Planning annual maintenance and repair budgets

We have found that relating a normal maintenance or rehabilitation procedure to the surface rating scheme helps local officials use the rating system. However, an individual surface rating should not automatically dictate the final maintenance or rehabilitation technique.

You should consider safety, future traffic projections, original construction, and pavement strength since these may dictate a more comprehensive rehabilitation than the rating suggests. On the other hand, it may be appropriate under special conditions to do nothing and let the pavement fully deteriorate, then rebuild when funds are available.

Summary

Using local road funds most efficiently requires good planning and accurate identification of appropriate rehabilitation projects. Assessing roadway conditions is an essential first step in this process. This concrete pavement surface condition rating procedure has proved effective in improving decision making and using roadway funds more efficiently. It can be used directly by local officials and staff. It may be combined with additional testing and data collection in a more comprehensive pavement management system.

Transportation Information Center Publications

Pavement Surface Evaluation and Rating (PASER) Manuals

Asphalt PASER Manual, 2002, 28 pp.

Brick and Block PASER Manual, 2001, 8 pp.

Concrete PASER Manual, 2002, 28 pp.

Gravel PASER Manual, 2002, 20 pp.

Sealcoat PASER Manual, 2000, 16 pp.

Unimproved Roads PASER Manual, 2001, 12 pp.

Drainage Manual
Local Road Assessment and Improvement, 2000, 16 pp.

SAFER Manual
Safety Evaluation for Roadways, 1996, 40 pp.

Flagger's Handbook (pocket-sized guide), 1998, 22 pp.

Work Zone Safety, Guidelines for Construction, Maintenance, and Utility Operations, (pocket-sized guide), 2002, 58 pp.

Wisconsin Transportation Bulletins

#1 Understanding and Using Asphalt
#2 How Vehicle Loads Affect Pavement Performance
#3 LCC—Life Cycle Cost Analysis
#4 Road Drainage
#5 Gravel Roads
#6 Using Salt and Sand for Winter Road Maintenance
#7 Signing for Local Roads
#8 Using Weight Limits to Protect Local Roads
#9 Pavement Markings
#10 Seal Coating and Other Asphalt Surface Treatments
#11 Compaction Improves Pavement Performance
#12 Roadway Safety and Guardrail
#13 Dust Control on Unpaved Roads
#14 Mailbox Safety
#15 Culverts-Proper Use and Installation
#16 Geotextiles in Road Construction/Maintenance and Erosion Control
#17 Managing Utility Cuts
#18 Roadway Management and Tort Liability in Wisconsin
#19 The Basics of a Good Road
#20 Using Recovered Materials in Highway Construction
#21 Setting Speed Limits on Local Roads

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