South Africa

COTO

Committee of Transport Officials

TMH 9

MANUAL FOR VISUAL ASSESSMENT OF ROAD PAVEMENTS
PART C: CONCRETE PAVEMENTS

Committee Draft Final
May 2016

Committee of Transport Officials

TECHNICAL METHODS FOR HIGHWAYS

TMH 9

MANUAL FOR VISUAL ASSESSMENT OF ROAD PAVEMENTS

Part C: Concrete Pavements

Committee Draft Final
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Compiled under auspices of the:

Roads Coordinating Body (RCB)
Committee of Transport Officials (COTO)
Road Asset Management Systems (RAMS) Subcommittee

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Synopsis

TMH 9 provides the procedures for the visual assessment of the condition of roads. Assessment procedures and requirements for road segment information data are specified. Different distress types are classified and detailed descriptions of degree of distress (including photographic plates illustrating condition) for each of the distress types are given. TMH 9 is a companion document to TMH 22 on Road Asset Management Systems.

Withdrawal of previous publication:

This publication replaces the previous Draft TMH9 “Standard Visual Assessment Manual for Flexible Pavements” published in 1992. This previous publication is effectively withdrawn with the publication of this document.

Technical Methods for Highways:

The Technical Methods for Highways consists of a series of publications in which methods are prescribed for use on various aspects related to highway engineering. The documents are primarily aimed at ensuring the use of uniform methods throughout South Africa, and use thereof is compulsory.

Users of the documents must ensure that the latest editions or versions of the document are used. When a document is referred to in other documents, the reference should be to the latest edition or version of the document.

Any comments on the document will be welcomed and should be forwarded to coto@nra.co.za for consideration in future revisions.

Document Versions

Working Draft (WD). When a COTO subcommittee identifies the need for the revision of existing, or the drafting of new Technical Recommendations for Highways (TRH) or Technical Methods for Highways (TMH) documents, a workgroup of experts is appointed by the COTO subcommittee to develop the document. This document is referred to as a Working Draft (WD). Successive working drafts may be generated, with the last being referred to as Working Draft Final (WDF). Working Drafts (WD) have no legal standing.

Committee Draft (CD). The Working Draft Final (WDF) document is converted to a Committee Draft (CD) and is submitted to the COTO subcommittee for consensus building and comments. Successive committee drafts may be generated during the process. When approved by the subcommittee, the document is submitted to the Roads Coordinating Body (RCB) members for further consensus building and comments. Additional committee drafts may be generated, with the last being referred to as Committee Draft Final (CDF). Committee Drafts (CD) have no legal standing.

Draft Standard (DS). The Committee Draft Final (CDF) document is converted to a Draft Standard (DS) and submitted by the Roads Coordinating Body (RCB) to COTO for approval as a draft standard. This Draft Standard is implemented in Industry for a period of two (2) years, during which written comments may be submitted to the COTO subcommittee. Draft Standards (DS) have full legal standing.

Final Standard (FS). After the two-year period, comments received are reviewed and where appropriate, incorporated by the COTO subcommittee. The document is converted to a Final Standard (FS) and submitted by the Roads Coordinating Body (RCB) to COTO for approval as a final standard. This Final Standard is implemented in industry for a period of five (5) years, after which it may again be reviewed. Final Standards (FS) have full legal standing.

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PART C. CONCRETE PAVEMENTS

Note: Examples and actual dimensions presented in this Part are given as guidelines only and should not be regarded as fixed rules.

C.1. Introduction

This Part of the manual provides guidelines for the visual condition assessment of concrete pavements. These include Jointed Concrete plain (JCP) and dowelled (JCD) and Continuously Reinforced Concrete (CRC) and ultra-thin continuously reinforced concrete (UTCRC) pavements.

The items required for the visual assessment of concrete roads differ between the two main types and are listed as follows (Table C.1):

Table C.1: Visual Assessment items and requirements

Engineering Assessment	**JCP & JCD**	**CRC & UTCRC**
Random cracking	X	X
Transverse cracks	X	X
Longitudinal cracking	X	X
Corner cracking	X	
Cluster cracking		X
Pumping	X	X
Joint seal condition	X	X
Faulting	X	
Undulation/Settlement	X	X
Punch-outs		X
Shattered slabs	X	X
Patching	X	X
Texturing	X	X
Functional Assessment		
Roughness	X	X
Skid resistance	X	X
Surface drainage	X	X
General notes	X	X
Summary		
Overall Condition	X	X

C.2. General information

C.2.1. Road section

A road section is a length of road with a unique section number (see Part A of this document).

C.2.2. Assessment segment

An assessment segment is the length of road for which one assessment rating is recorded. It is 0.2km for concrete pavements.

C.2.3. Shoulder

A shoulder is the area adjacent to the slow lane (or fast lane on dual carriageway roads), but within 3.5 m of the yellow or white line (or edge of the slow lane). The shoulder does not extend beyond a kerb (if any). The paved shoulder condition is assessed as part of the adjoining lane.

C.2.4. Jointed concrete pavements (JCP or JCD)

Concrete pavements in which transverse joints are provided for the control of cracking are called jointed concrete pavements (Figure C.1). The longitudinal joints divide the carriageway into a number of concrete strips. The transverse joints divide each of these strips into blocks of concrete pavement, called a pavement slab. Generally short slabs (≤ 4.5m) are used and load transfer between slabs is created by aggregate interlock only (Jointed Concrete Plain, JCP) or by aggregate interlock and dowel bars (Jointed Concrete Dowel, JCD). Slabs are generally not reinforced, except where special conditions exist i.e. where the Length/Width ratio of a slab is >1.5.

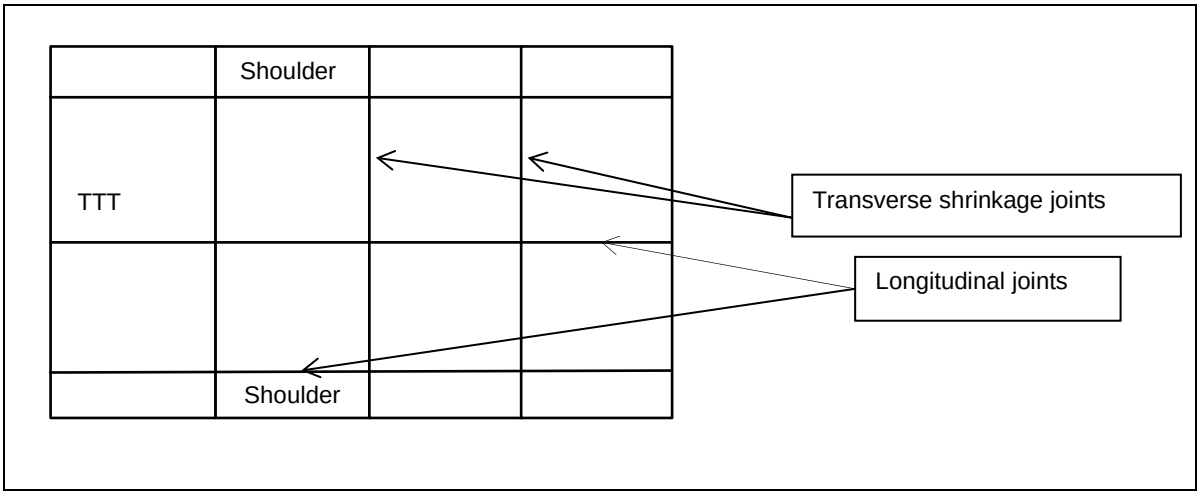


Figure C.1: Jointed concrete pavements with sealed transverse and longitudinal joints

C.2.5. Continuously reinforced concrete pavements (CRC) and ultra-thin continuously reinforced concrete pavements (UTCRC)

Continuously reinforced concrete pavements do not have transverse joints (except tied transverse construction joints) but have longitudinal joints which divide it into concrete strips (Figure C.2). However, due to the continuous steel reinforcement in the longitudinal direction, the CRC and UTCRC pavements develop narrow transverse cracks at close intervals. The crack spacing depends on the amount of longitudinal steel reinforcement, the amount of steel fibre and the tensile strength of the

concrete. Generally crack spacing varies between 1.0m and 2.0m for CRC (normally contains only longitudinal steel reinforcement) and between 0.3m and 0.7m for UTCRC (normally contains longitudinal steel reinforcement and steel fibres). These cracks are not sealed. When the paving operations are interrupted transverse construction joints are formed. Near structures, such as bridges, contraction joints are also provided.

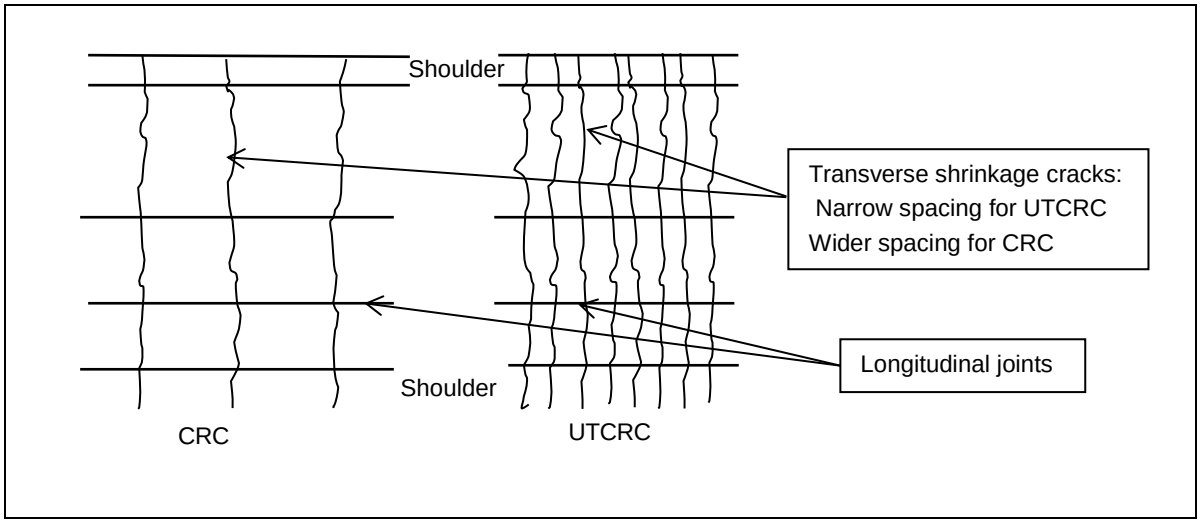


Figure C.2: Typical types of cracking and jointing associated with continuously reinforced concrete pavements

The degree of cracking is associated with the width of the crack as well as the spalling in the crack at the surface of the slab. Newly developed cracks extend vertically through the slab, but with time and traffic loading cracks widen, relative vertical movement between adjacent slabs develops and a small triangular section of concrete at the surface of the slab breaks off to form spalling. Wider cracks and spalling therefore is an indication of a loss in load transfer at cracks.

There are five different types of cracking that are considered. These are described in the next section.

C.3. Engineering Assessment

C.3.1. Random Cracking

Random, map, crazy or crocodile cracking occurs in any type of concrete pavement, normally initiates from the top of the slab and is associated with shrinkage occurring at an early age in the pavement. The visual appearance, crack width and spalling of cracks determines the degree (Table C.2).

Table C.2: Description of Degrees of Random Cracking

Degree	Description
1	Cracks are narrow (≈1 mm), not clearly visible and without spalling.
3	Cracks are wide (≈3 mm), clearly visible with minor spalling.
5	Cracks are wide (>3 mm), clearly visible and serious spalling occurring.

RANDOM CRACKING

1

X	2	3	4	5

Narrow cracks (≈1 mm) with no spalling

3

1	2	X	4	5

Wide cracks (≈3 mm) with minor spalling

5

1	2	3	4	X

Wide cracks (>3 mm) with serious spalling

C.3.2. Transverse cracks

Cracks parallel to joints, are recorded under this distress type. Transverse cracks normally develop in jointed concrete pavements as a result of joints not functioning properly. However unplanned transverse cracks can also occur in UTCRCP and CRCP, where it does not occur as part of cluster cracking. They usually are as a result of poor construction techniques close to construction joints, subgrade movements or crack reflection from lower layers.

Table C.3: Description of Degrees of Transverse Cracking

Degree	Description
1	Cracks are narrow (≈1 mm), not clearly visible and without spalling.
3	Cracks are wide (≈3 mm), clearly visible with minor spalling.
5	Cracks are wide (>3 mm), clearly visible and serious spalling occurring.

TRANSVERSE CRACKING

1

X	2	3	4	5

Narrow cracks (≈1 mm) with no spalling

3

1	2	X	4	5

Wide cracks (≈3 mm) with minor spalling

5

1	2	3	4	X

Wide cracks (>3 mm) with serious spalling

C.3.3. Longitudinal Cracking

Cracks parallel to joints, are recorded under this distress type. Longitudinal cracks normally develop in all types of pavements as a result of longitudinal joints not functioning properly. However unplanned cracks can also occur as a result of subgrade movements or crack reflection from lower layers.

Table C.4: Description of Degrees of Longitudinal Cracking

Degree	Description
1	Cracks are narrow (≈1 mm), not clearly visible and without spalling.
3	Cracks are wide (≈3 mm), clearly visible with minor spalling.
5	Cracks are wide (>3 mm), clearly visible and serious spalling occurring.

LONGITUDINAL CRACKING

1

X	2	3	4	5

Narrow cracks (≈1 mm) with no spalling

3

1	2	X	4	5

Wide cracks (≈3 mm) with minor spalling

5

1	2	3	4	X

Wide cracks (>3 mm) with serious spalling

C.3.4. Corner cracking

Corner cracks occur where two joints meet, normally observed in JCP pavements. At least one leg of the triangle formed where the crack and the two adjacent joints meet must be shorter than 1.0m.

Table C.5: Description of Degrees of Corner Cracking

Degree	Description
1	Cracks are narrow (≈1 mm), not clearly visible and without spalling.
3	Cracks are wide (≈3 mm), clearly visible with minor spalling.
5	Cracks are wide (>3 mm), clearly visible and serious spalling occurring.

CORNER CRACKING

1

X	2	3	4	5

Narrow cracks (≈1 mm) with no spalling

3

1	2	X	4	5

Wide cracks (≈3 mm) with minor spalling

5

1	2	3	4	X

Wide cracks (>3 mm) with serious spalling

C.3.5. Cluster cracking

Cluster cracking is a group of transverse cracks more closely spaced than planned for. For CRCP where transverse cracking is designed to occur at a spacing of 1.5m to 2.0m, cluster cracking is a group of transverse cracks spaced at less than 0.5m.

Table C.6: Description of Degrees of Cluster Cracking

Degree	Description
1	Cracks are narrow (≈1 mm), not clearly visible and without spalling.
3	Cracks are wide (≈3 mm), clearly visible with minor spalling.
5	Cracks are wide (>3 mm), clearly visible and serious spalling occurring.

CLUSTER CRACKING (CRCP)

1

X	2	3	4	5

Narrow cracks (≈1 mm) with no spalling

3

1	2	X	4	5

Wide cracks (≈3 mm) with minor spalling

5

1	2	3	4	X

Wide cracks (>3 mm) with serious spalling

C.3.6. Cluster cracking

Cluster cracking is a group of transverse cracks more closely spaced than planned for. UTCRCP is designed to have transverse cracking occur at a spacing of 0.4m to 0.7m and cluster cracking is where a group of transverse cracks are spaced at less than 0.2m.

Table C.7: Description of Degrees of Cluster Cracking

Degree	Description
1	Cracks are narrow (≈1 mm), not clearly visible and without spalling.
3	Cracks are wide (≈3 mm), clearly visible with minor spalling.
5	Cracks are wide (>3 mm), clearly visible and serious spalling occurring. This degree has not yet been recorded

CLUSTER CRACKING (UTCRCP)

1

X	2	3	4	5

Narrow cracks with no spalling

3

1	2	X	4	5

Wide cracks with minor spalling

5

1	2	3	4	X

Wide cracks (>3 mm) with serious spalling
This degree has not yet been recorded

C.3.7. Pumping

Pumping of fine material occurs whenever relative vertical movements occur at cracks or joints or at the edge of the pavement.

Table C.8: Description of Degrees of Pumping

Degree	Description
1	A slight discolouring of the concrete at the sides of the joint or crack
3	Discolouring of the concrete and signs of fine material at the sides of the joint or crack.
5	Fine material being pumped from below the concrete slab and deposited at the sides of the joint or crack.

PUMPING

1

X	2	3	4	5

Slight discolouring

3

1	2	X	4	5

Signs of fine material on sides of joint

5

1	2	3	4	X

Fine material deposited at the sides of the joint or crack.

C.3.8. Joint seal condition

Damage that occurs and which needs to be considered in the evaluation of degree includes seals that stand proud of the surrounding concrete surface, loss of bond with the concrete, seals that have been torn or damaged and obvious loss of elasticity.

The **ruler test** may be used to assist in the assessment of joint seal condition: Place a steel ruler vertically into the joint. Exert enough pressure to allow proper contact between the sealant and the short edge of the ruler. Turn the ruler through an angle of between 20 and 40 degrees and maintain this position while inspecting the adhesion face. If this action is able to loosen the seal from the sides, it indicates that the seal is in a fair to poor condition and has lost its adhesive ability to stick to the concrete and prevent water and foreign matter to infiltrate the joint.

Table C.9: Description of Degrees of Joint Seal Condition

Degree	Description
1	Seal still functional well but some indication of ageing and loss of elasticity.
3	Not functional i.e. sagging into the joint, protruding above the surrounding concrete and not adhering to concrete or torn.
5	Seal dislodged from joint allowing water to freely enter the pavement.

The extent of joint seal condition should be determined according to the definitions given in table A.2.

JOINT SEAL CONDITION

1

X	2	3	4	5

Seal still functional

3

1	2	X	4	3

Seal sagging into the joint

5

1	2	3	4	X

Seal dislodged from joint

C.3.9. Faulting at joints and cracks

Faulting is the difference in elevation across a joint or a crack and develops when eroded material (originating from the surface of the subbase) from under the leave slab builds up under the approach slab at a joint or crack. The result is that the leave slab settles due to the material being pumped out from under the slab leading to step forming or faulting at the joint. Faulting generally only occurs on jointed pavements where there is no or poor load transfer between the slabs. The rocking, warping or curling of the slab contributes to the joint faulting and could also lead to cracking as secondary effect.

Table C.10: Description of Degrees of Faulting

Degree	Description
1	The fault or step is less than 3 mm.
3	The fault is between 6 and 10 mm
5	The fault is more than 15 mm.

FAULTING

1

1	2	3	4	X

Fault is less than 3 mm

3

1	2	3	4	X

Fault between 6 and 10 mm

5

1	2	3	4	X

Fault is more than 15 mm.

C.3.10. Undulations/Settlement

Undulation and settlement of concrete pavements is defined as surface areas having elevations lower than those of the surrounding pavement. There is generally significant slab cracking in these areas due to uneven settlement. This distress type is usually associated with another type of distress. Pumping at the joints would lead to joint faulting and this might result in settlement. Consolidation of the lower layers could lead to settlement where compaction was uneven during construction, frequently above culverts or bridge approaches. Unevenness can also develop where pavements have been constructed over swelling or expansive clay subgrades. Settlement of concrete pavements usually occurs over a couple of meters because of the rigid nature of concrete.

Table C.11: Description of Degrees of Undulations/Settlement

Degree	Description
1	Undulations causes slight unevenness of road profile, ride is still smooth and comfortable
3	Undulation is clearly visible and has an effect on riding quality. Motorists may have to reduce driving speed if extent is more than merely localised.
5	Ride very poor and very uncomfortable owing to undulations, road unsafe at normal speed limit. Speed restrictions may have been imposed.

C.3.11. Punch outs (UTCRCP and CRCP only)

Punch-outs occur in UTCRCP and CRCP pavements once cluster cracking has reached the degree 4 stage and load transfer at cracks has been lost to a high degree. At this stage the transverse cracks of the cluster are linked by longitudinal cracks in the wheel paths of traffic and pumping starts to develop.

Table C.12: Description of Degrees of Punch outs

Degree	Description
1	Longitudinal crack develops between two transverse cluster cracks
3	Several longitudinal cracks between two transverse cluster cracks. Need to be repaired.
5	Several cracks leading to a loose block. Urgent repair needed.

PUNCH OUTS

1

X	2	3	4	5

Crack between two transverse cluster cracks

3

1	2	X	4	5

Several cracks between two transverse cluster cracks

5

1	2	3	4	X

Loose block

C.3.12. Shattered slabs

When a slab contains two or more random cracks of degree 3 or higher the slab is recorded as shattered. The cracks, other than joint associated cracks, divide the slab into three or more distinct pieces that move under traffic and need to be repaired by patching.

Note: When a slab is recorded as shattered it cannot be recorded as cracked. Do not rate other defects on a shattered slab since shattering implies a need for full depth repair.

Table C.13: Description of Degrees of Shattered Slabs

Degree	Description
1	The slab is fractured into not more than 3 fragments.
3	The slab is fractured into 5 fragments but no movement is evident.
5	The slab is fractured into 7 fragments or more and/or movement is clearly evident, i.e., the fragments are independent of each other.

SHATTERED SLABS

1

X	2	3	4	5

Fractured into not more than 3 fragments.

3

1	2	X	4	5

Fractured into 5 fragments and no movement.

5

1	2	3	4	X

Fractured into 7 fragments or more with spalling caused by movement.

C.3.13. Shattered slabs (UTCRP)

When a slab contains two or more random cracks of degree 3 or higher the slab is recorded as shattered. The cracks, other than joint associated cracks, divide the slab into three or more distinct pieces that move under traffic and need to be repaired by patching.

Note: When a slab is recorded as shattered it cannot be recorded as cracked. Do not rate other defects on a shattered slab since shattering implies a need for full depth repair.

Table C.14: Description of Degrees of Shattered Slabs

Degree	Description
1	The slab is fractured into not more than 3 fragments.
3	The slab is fractured into 5 fragments but no movement is evident.
5	The slab is fractured into 7 fragments or more and/or movement is clearly evident, i.e., the fragments are independent of each other.

SHATTERED SLABS (UTCRCP)

	1 X 2 3 4 5 Fractured into not more than 3 fragments.
	3 1 2 X 4 5 Fractured into 5 fragments and no movement.
	5 1 2 3 4 X Fractured into 7 fragments or more with spalling caused by movement.

C.3.14. Patching

The pavement is patched where failures have occurred. Degree 1 patches are isolated, small partial depth patches where cracking, scaling or surface damaged has occurred. Where shattered slabs or punch-outs have occurred, they can be regarded as a structurally failed pavement and full depth patches are therefore required which is defined as degree 5 patches.

Table C.15: Description of Degrees of Patching

Degree	Description
1	Isolated partial depth patch (not full depth and small).
3	Isolated full depth patch (patch a significant size).
5	Full depth patches (patch a significant size).

PATCHING

1

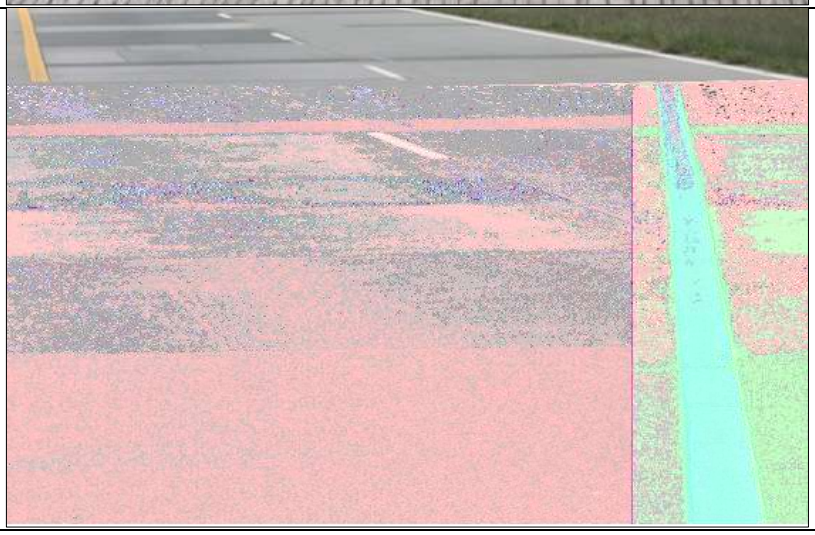
X	2	3	4	5

Isolated partial depth patch.

3

1	2	X	4	5

Isolated full depth patch.



5

1	2	3	4	X

Full depth patch.

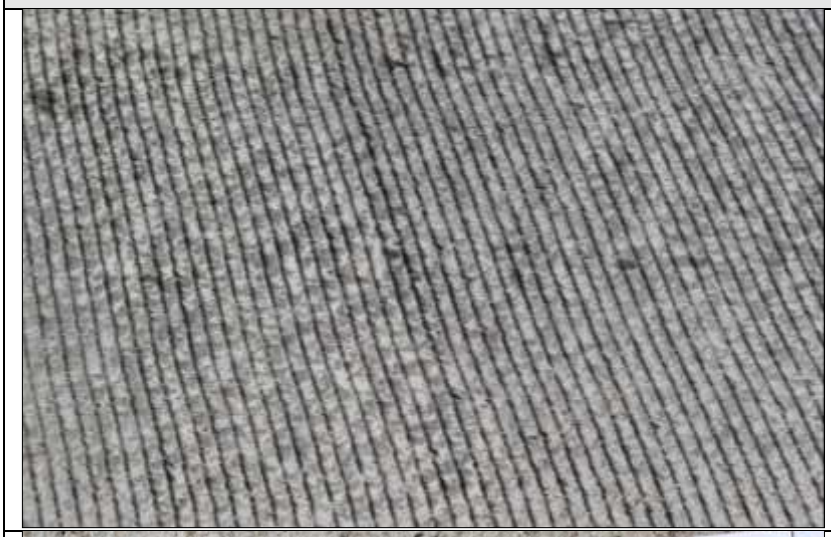
C.3.15. Macro Texture

Texturing of the pavement is required to ensure skid resistance under wet weather conditions.

Table C.16: Description of Degrees of Texturing

Texture Type	Description
Coarse	The surfacing ha a coarse appearance with significant texture, tined finish.
Medium	Significant texture, probably heavy brush finish.
Fine	The surfacing is smooth. No texture, probably only float finish.
Varying	This implies the variation of the texture in the cross-section of the road surface, e.g. the surface appears smooth in the wheel paths with a different texture elsewhere. If the texture is rated as varying, the different types of texture that are observed should also be noted.

MACRO TEXTURE

	Coarse Significant texture, tined finish
	Medium Significant texture, probably heavy brush finish
	Fine Significant texture, tined finish

C.4. Functional Assessment

The functional requirements of a road reflect the service it provides to the road user. They are predominantly those that govern the comfort, safety and speed of travel.

The various functional features to be assessed are the riding quality, surface drainage, the condition of the unpaved shoulders (un-travelled way) and the occurrence of failures or potential failures that have a significant effect on the useful life of the pavement. In this section they are assessed either on a three-point scale or being noted.

C.4.1. Roughness

The roughness of a pavement is defined as the general extent to which road users, through the medium of their vehicles, experience a ride that is smooth and comfortable, or bumpy and therefore unpleasant or perhaps unsafe. This is determined by the unevenness of the road profile (e.g. longitudinal deformation) and uneven patching. The description of degrees of roughness is given in Table C.17.

Table C.17: Description of Degrees of Roughness

Degree	Description
1	Ride very smooth and very comfortable, no unevenness of the road profile, no rutting, ravelling or uneven patching.
2	Ride smooth and comfortable, slight unevenness of the road profile, slight rutting, ravelling or uneven patching.
3	Ride fairly smooth and slightly uncomfortable, intermittent moderate unevenness of the road profile, moderate rutting, ravelling or uneven patching.
4	Ride poor and uncomfortable, frequent moderate unevenness of the road profile, frequent rutting, ravelling or uneven patching, comfortable driving speed below speed limit.
5	Ride very poor and very uncomfortable, extensive severe unevenness of the road profile, extensive rutting, ravelling or uneven patching, comfortable driving speed much lower than speed limit, road unsafe owing to severe unevenness.

Note: Problems resulting in poor roughness can be indicated on the assessment form (if required), by marking the appropriate block(s), if provided on the form.

These problems include:

- punch outs;
- shattered slabs;
- patching;
- undulations; and
- faulting.

C.4.2. Skid Resistance

Skid resistance reflects the general ability of the road surface to prevent skidding when wet, in all manoeuvres generally executed by vehicles. The property that largely determines skid resistance is the surface texture. The two characteristics of the surface texture are:

- the macro texture related to surface texture depth, and
- The micro texture related to the smoothness of exposed aggregate.

The description of degrees of skid resistance is given in Table C.18.

Table C.18: Description of Degrees of Skid Resistance

Degree	Description
1	Skid resistance adequate, coarse surface texture. Exposed aggregate rough with tining depth > 1mm.
3	Skid resistance intermittently inadequate. Surface texture medium to fine. Texture depth < 1mm.
5	Skid resistance inadequate. Exposed aggregate polished and surface smooth to the touch.

C.4.3. Surface Drainage

The surface drainage of a road is a measure of the general ability of the road to keep the riding surface clear of water. This is related to the speed at which water runs off during rain and to the extent of the ponding of water during and after rain. It is an important factor that affects skid resistance and the volume of water spray. Good surface drainage keeps the road surface clear of grit. Surface drainage includes only the area up to two metres from the outside yellow line (paved and unpaved shoulders).

The description of degrees is given in Table C.19.

Table C.19: Description of Degrees of Surface Drainage Ratings

Degree	Description
1	No visible problem that could retard the run-off of water from the road and shoulders.
3	Problems exist that could lead to general slight ponding or severe localised ponding.
5	Problems exist that could lead to widespread severe ponding in the wheel paths.

Note: Problems leading to inadequate surface drainage can be indicated on the assessment form (if required), by marking the appropriate blocks on the form.

C.4.4. Unpaved Shoulder Condition

The unpaved shoulder is rated in terms of providing a safe recovery area. Several problems might render the unpaved shoulder unsafe, for example:

- erosion of the shoulder by water;
- wearing out by traffic;
- differences in level between edge of carriageway and shoulder;
- the width of the shoulder is too narrow;
- the cross-sectional slope of the shoulder is too steep; or
- Overgrown by vegetation.

These problems can be indicated on the assessment form by marking the appropriate blocks.

The description of the degrees of unpaved shoulder conditions is given in Table C.20.

Table C.20: Description of Degrees of Unpaved Shoulder Conditions

Degree	Description
0	If the edge of the road is defined by a kerb or there are no shoulders e.g. in a mountain pass.
1	Shoulder can be safely used as stopping area at the posted speed limit.
3	Problems may be expected if the shoulder is used as stopping area at the posted speed limit (routine maintenance required).
5	Shoulder is unsafe to be used as stopping area at the posted speed limit. Scheduled maintenance required e.g regravelling or substantial work required

C.5. Summary

C.5.1. General Notes

Failures or potential failures that have a significant effect on the useful life of the pavement need to be noted. These are not common problems but should be recorded.

C.5.2. Overall Condition of the Pavement

The description of the overall condition of the pavement is given in Table C.21. A general rating for the condition of the pavement is useful for data verification.

Table C.21: Description of Degrees of Overall Condition of Pavement

Degree	Description
1	Very few or no defects. Degree of defects less than 2.
2	Few defects. Degree of engineering defects mostly less than 3
3	A few defects of degree 3 occur locally or seldom.
4	General occurrence of defects with degree 3.
5	Many defects. The degree of the majority of engineering defects is above 3 and the extent is predominantly general to extensive.

GENERAL NOTES

	Crushing of the slab as a result of expansion under hot weather as well as poor concrete.
	Blow-up or lifting of a thin UTCRCP slab as a result of expansion under hot weather. In this case at a construction joint.
	Clear signs of secondary reaction between aggregate and cement, probably alkali-silica reaction, occurring close to joints or cracks.

C.6. Assessment Form for Concrete Pavements

VISUAL ASSESSMENT : CONCRETE PAVEMENTS

South Africa COTO Committee of Transport Officials

ROAD AUTHORITY : _____ ROUTE CLASS :

1	2	3	4	5
VL	L	M	H	VH
Flat		Med		Steep
Flat		Rolling		Mount

REGION / SUBURB : _____ TRAFFIC :

ROAD NO / STREET NAME : _____ GRADIENT :

_____ TERRAIN :

SEGMENT (FROM - TO) : _____

SEGMENT DIMENSIONS : LENGTH _____ m WIDTH _____ m

ENGINEERING ASSESSMENT

	TEXTURE	COARSE	MEDIUM	FINE	VARYING
	DEGREE			EXTENT	
	MINOR	WARNING	SEVERE	ISOLATED	EXTENSIVE
	0 1 2 3 4 5			1 2 3 4 5	
RANDOM CRACKS					
TRANSVERSE CRACKS					
LONGITUDINAL CRACKS					
CORNER CRACKING					
CLUSTER CRACKING					
PUMPING					
JOINT SEAL CONDITION					
FAULTING					
UNDULATIONS / SETTLEMENT					
PUNCH OUTS					
SHATTERED SLABS					
PATCHING					
TEXTURE					

FUNCTIONAL ASSESSMENT

ROUGHNESS		1	2	2	4	5
	Problem	punch outs	shattered slabs	patching	undulations	faulting
SKID RESISTANCE		1	2	2	4	5
SURFACE DRAINAGE		1	2	2	4	5
	Problem	rutting	shoulders	undulations	failures	side drains
SHOULDERS (unpaved)	None	1	2	2	4	5
	Problem	eroded	overgrown	inclined	too high	too narrow

SUMMARY

GENERAL NOTES		Crushing		Blow-up	Alkali-silica
OVERALL PAVEMENT CONDITION	1	2	3	4	5

COMMENTS:

ASSESSOR : _____ DATE : _____