Pavement Maintenance and Rehabilitation

Presentation Outline
- Types of Maintenance
- Identification and correction of defects
- Case studies

Types of Maintenance Activities

**Routine maintenance**
- reactive activities to slow deterioration

**Periodic maintenance**
- restore waterproofing, shape, or texture

**Rehabilitation**
- restore structural service level

Identification and Correction of Defects

**Visual Classification of Defects**
- Deformation
- Cracking
- Surface texture deficiencies
- Edge defects
- Potholes
- Patches
Deformation
- Corrugations
- Depressions
- Rutting
- Shoving

**Corrugations**

**NAME**
Corrugations (DC)

**SYNONYM**
Ripples

**DESCRIPTION**
Transverse undulations, closely and regularly spaced, with wave lengths of less than 2 m.

**ATTRIBUTES**
- Maximum depth under 1.2 m straight edge (mm)
- CREST to CREST spacing (mm)
- Length of pavement affected (m)

**POSSIBLE CAUSES**
- Inadequate stability of asphalt surface or base course
- Compaction of base in wave form

**Shoving**

**NAME**
Shoving (DS)

**DESCRIPTION**
Bulging of the road surface generally parallel to the direction of traffic and/or horizontal displacement of surfacing materials, mainly in the direction of traffic where braking or acceleration movements occur. Transverse shoving may arise with turning movements.

**ATTRIBUTES**
- Maximum depth of bulge under 1.2 m straight edge from high point
- Area affected (m²)

**POSSIBLE CAUSES**
- Inadequate strength in surfacing or base
- Poor bond between pavement layers
- Lack of containment of pavement edge
- Inadequate pavement thickness

**Rutting**

**NAME**
Rutting (DR)

**SYNONYM**
Longitudinal rut

**DESCRIPTION**
Longitudinal deformation in a wheel path. The thickness of rut may exceed 4.0 cm. Rutting can occur on any part of a lane.

**ATTRIBUTES**
- Maximum depth (under a transverse)
- 1.2 m straight edge (mm)

**POSSIBLE CAUSES**
- Inadequate pavement thickness
- Inadequate mix proportion in surfacing or base
- Inadequate stability (stability) in surfacing or base
Rutting

Visual Classification of Defects

Cracking
- Block cracks
- Crescent shaped
- Crocodile
- Diagonal
- Longitudinal
- Meandering
- Transverse

Crocodile Cracks

Visual Classification of Defects

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Crocodile Cracks

NAME
Crocodile Cracks (CR)

SYNONYMS
Alligator, chickenwire, fish net, polygonal cracks, crimping

DESCRIPTION
Interconnected or interlaced cracks forming a series of small polygons resembling a crocodile hide. Usually associated with wheelpaths and may have a noticeable longitudinal grain. Cell sizes are generally less than 150 mm across but may extend up to 300 mm.

ATTRIBUTES
- Predominant width of crack (mm)
- Predominant cell width (mm)
- Area affected (m²)

POSSIBLE CAUSES
- Inadequate pavement thickness.
- Low modulus base.
- Poor subbase and wearing course. (e.g. cemented, aged)

Crocodile Cracks

Longitudinal Cracking
**Longitudinal Cracking**

Possible Causes:

1. Occurring singly:
   - Reflection of a shrinkage crack or joint in an underlying base (commonly portland cement concrete, cemented base or asphalt base).
   - Poorly constructed paving lane joint in asphalt surfacing.
   - Daily temperature cycles or asphalt hardening.
   - Displacement of joint at pavement widening.

2. Occurring as a series of almost parallel cracks:
   - Volume change of expansive clay subgrade.
   - Cyclical weakening of pavement edge.
   - Differential settlement between cut and fill.

**Pavement Rehabilitation Workshop**

1. Photos of pavement / surfacing failure
2. 10 minutes on each scenario
3. Determine Type of failure
4. Determine cause of failure
5. Determine most cost effective treatment short/long term
6. Discuss group solution
References

- ARRB Sealed local roads manual
- AUSTROADS A guide to the visual assessment of pavement condition
- AUSTROADS Guide to Pavement Technology - Part 7: Pavement Maintenance