

Draft TMH 22

**ROAD ASSET
MANAGEMENT MANUAL**

March 2013

Committee of Transport Officials

Contents

- **Background**
- **Process**
- **Contents of Manual**
- **Quo Vadis**

Background

- New Manual for Road Infrastructure Asset Management
- Includes elements of
 - Austroads AGAM01 – A Guide to Asset Management
 - DOT RIAMP (Road Infrastructure Asset Management Policy)
 - TRH22 - PMS
 - Integrate with TMH9 and Structures
 - DPLG Asset Management Guidelines
 - ISO 55000/1/2 - Asset management
 - IMIESA - International Infrastructure Management Manual
 - AASHTO - Transportation Asset Management Guide
 - UK Framework for Highway Asset Management
 - TRH 26 - South African Road Classification and Access Management (RCAM) Manual
- Not just pavements but all Road Infrastructure Assets
- Include Policy and Manual

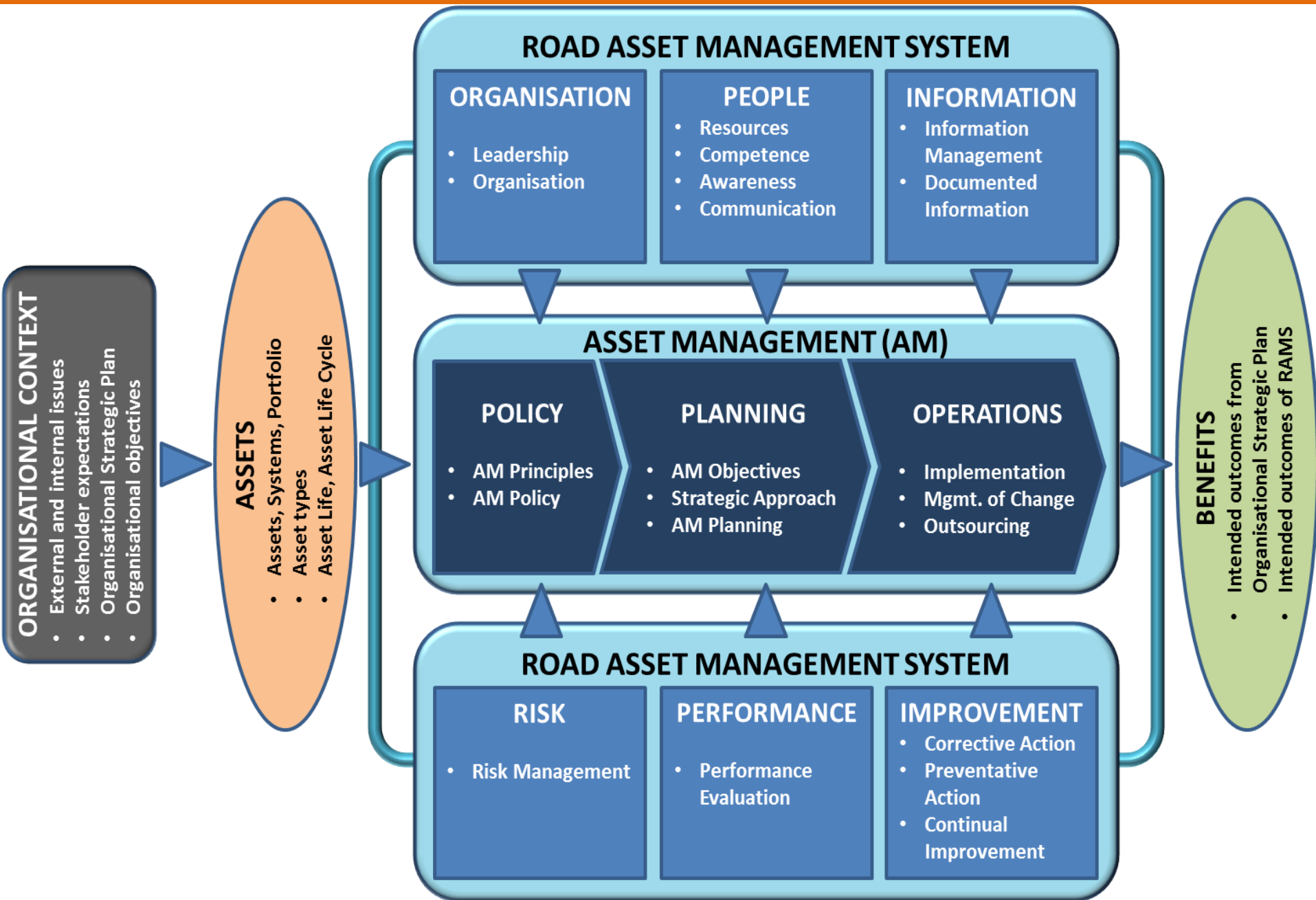
Background: Team

- SANRAL Steering Committee
- Working Committee
 - Benoit Verhaeghe - coordinator
 - Philip Joubert
 - Paul Olivier
 - Arthur Taute
 - Johan Viktor
- Inputs from
 - Louw Kannemeyer
 - Andre van der Gryp
 - Gerrie van Zyl

TMH22: Contents

- 10 Parts
 - Part A: General and Organisation
 - Part B: Inventory Data
 - Part C: Asset Valuation
 - Part D: Usage and Condition Data
 - Part E: Indices
 - Part F: Situational Analysis
 - Part G: Needs Determination
 - Part H: Asset Management Plans
 - Part I: Feedback Loop
 - Part J: Appendices

ELEMENTS OF ASSET MANAGEMENT



GENERAL AND ORGANISATION

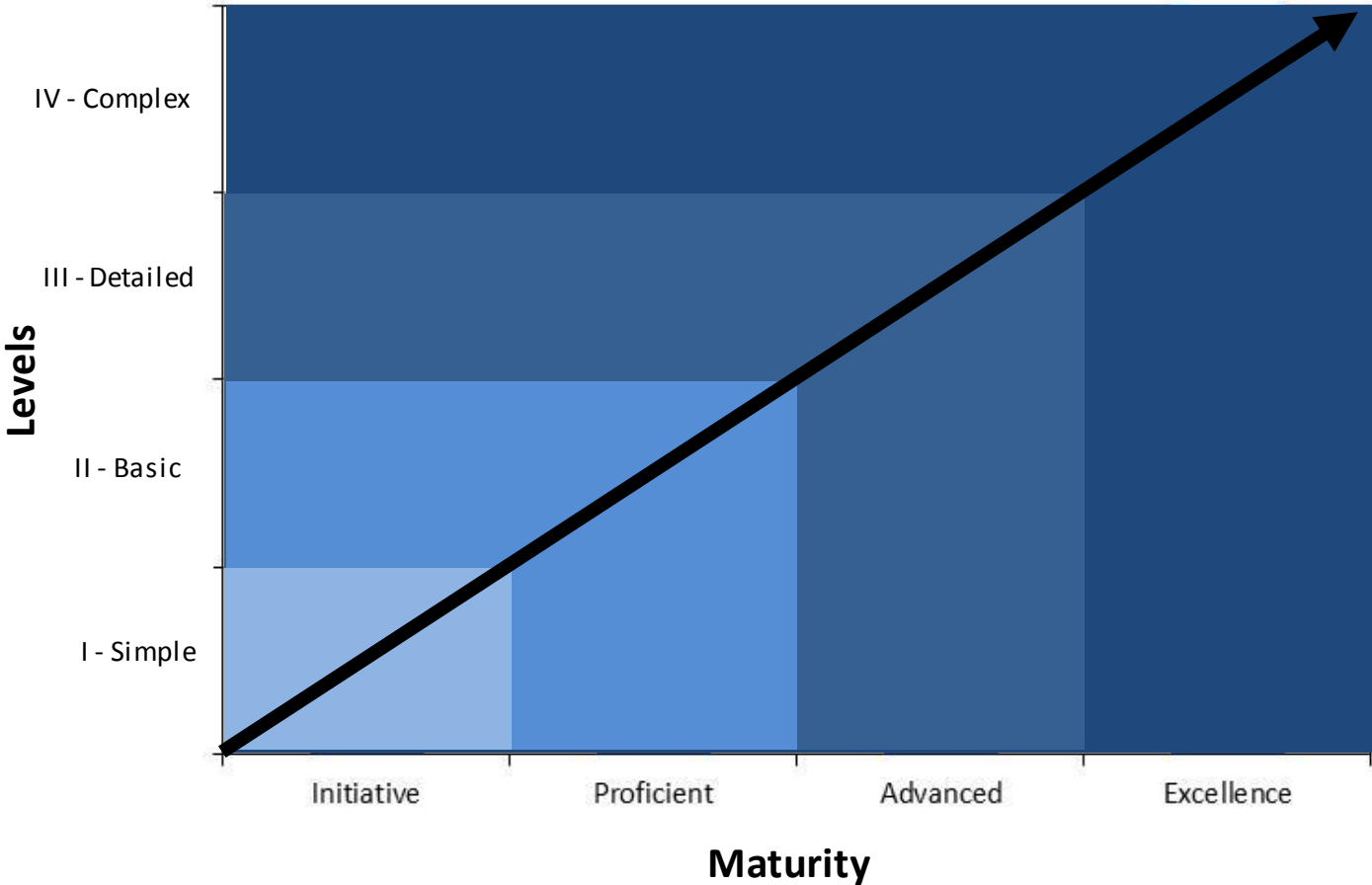
- Issues to Ensure Continuity and Sustainability

ORGANISATION

- Policy
 - Something to guide implementation and confirm commitment
- Stakeholder Requirements
 - Level of Service
- Levels of Asset Management
 - Levels of Maturity and Sophistication
 - Do not try to jump too far
- Gap Analysis
 - Where are we vs where do we want to be and programme
- Change Management
 - Manage changing roles and responsibilities
- RAMS System issues – computer system, data, procedures, staff, budget
 - Not just a computer system!

LEVELS OF ASSET MANAGEMENT

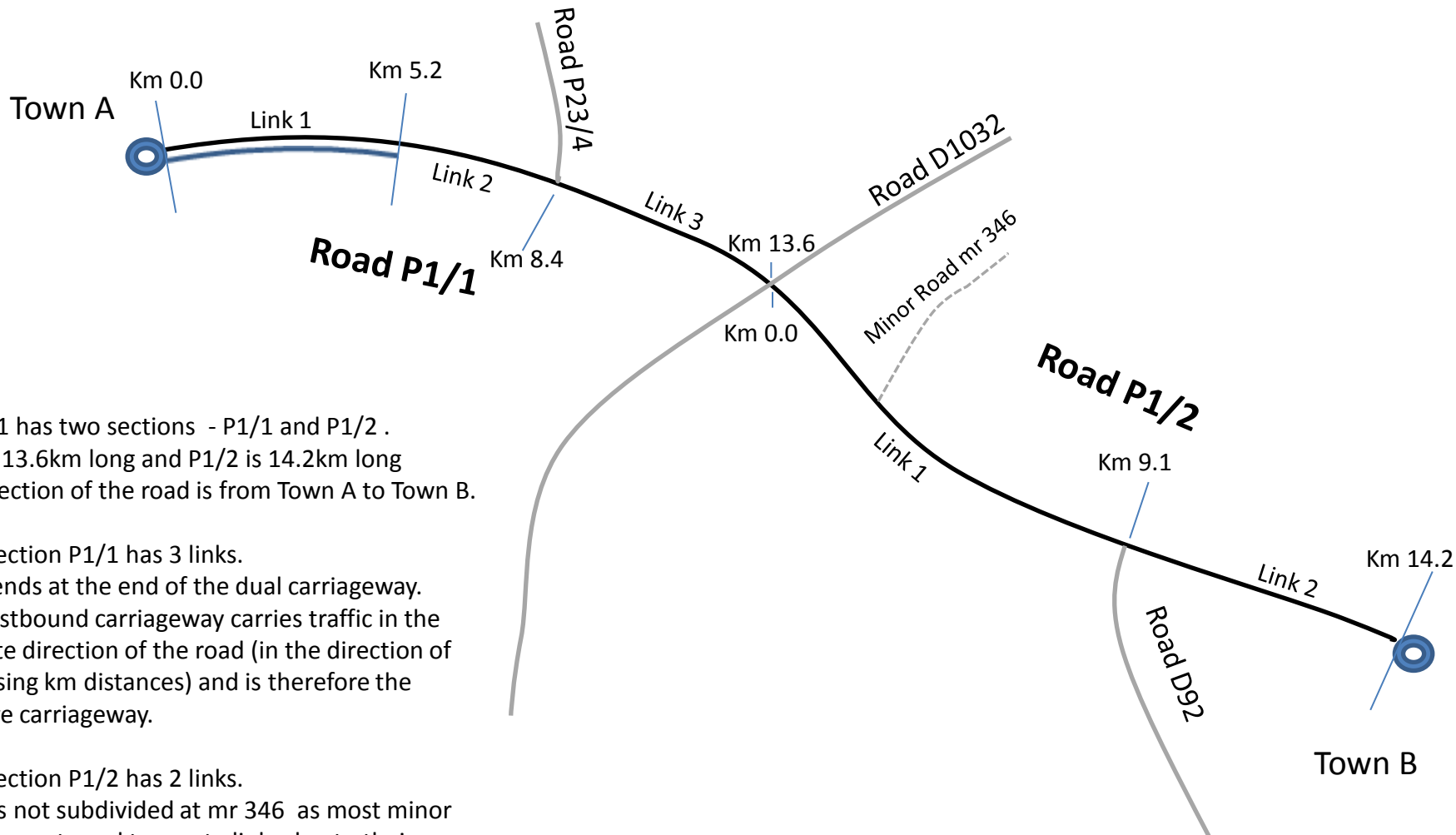
RAMS - Stages of Development



INVENTORY

- Identification and Location
- Identification of Fixed Assets
- Location Referencing
- Asset Hierarchy
- Asset Groupings
 - Asset Type, Topography
 - Environment
 - Physical eg Climate,
 - Social eg Urban/ Rural
- Fixed Asset Register
 - Assets, Components, Items

Typical Road and Link layout



Road P1 has two sections - P1/1 and P1/2 .
P1/1 is 13.6km long and P1/2 is 14.2km long
The direction of the road is from Town A to Town B.

Road Section P1/1 has 3 links.
Link 1 ends at the end of the dual carriageway.
The westbound carriageway carries traffic in the opposite direction of the road (in the direction of decreasing km distances) and is therefore the negative carriageway.






Road Section P1/2 has 2 links.
Link 1 is not subdivided at mr 346 as most minor roads are not used to create links due to their insignificant traffic volumes.

Asset Hierarchy

Facility	Asset	Component	Item	
Route / Group of Roads	Road Link	Surfacing		
		Pavement	Layers	
		Formation		
	Bridge	Structure		Deck
				Piers
				Abutments
				Foundations
				Barriers
				Bearings
			Joints	
Drainage Structures	Components as per bridge assessments manual	Items as per bridge assessments manual		

DATA COLLECTION

- Accurate
- Consistent
- Regular
- GPS/ GIS
- Visual
 - Pavements – Paved, Unpaved, Concrete, Block,
 - Structures
 - Ancillary Assets
- Surveillance
 - Riding Quality
 - Deflection
- Balance Practicality and Cost
- Different for different classes of road
- Consistent for different asset types:
 - Roads/ Structures/ Ancillary Assets

Comfortable Speed	IRI	Typical Condition
100 km/h	< 5 (3)	
80 – 100 km/h	7.5 – 5 (5.7)	
60 - 80 km/h	10 - 7.5 (8)	
45 – 60 km/h	12.5 – 10 (11)	
< 35 km/h	15 (15)	

ASSET VALUATION

- Current Replacement Cost (CRC)
 - Unit Rates x Quantity (km, m² etc)
- Depreciated Replacement Cost
 - CRC x RUL/EUL
 - CRC x % Condition (For straight line)
- Value at a Component Level – not lower at an item level

UDSAGE AND CONDITION DATA

- Traffic Counts
- Accident Records
- Condition Evaluation
 - TMH9
 - TMH Structures
 - Ancillary Assets
- Frequency of Data Collection
 - Traffic counts – 3 year cycle for Class 3 and higher, 5 year cycle for balance of network
 - Accidents – all personal injury accidents (PIA)
 - Visual - annually or every 2 to 5 years
 - Surveillance – every 2 to 5 years to N/A for urban low class
- Data Quality
- Data Storage

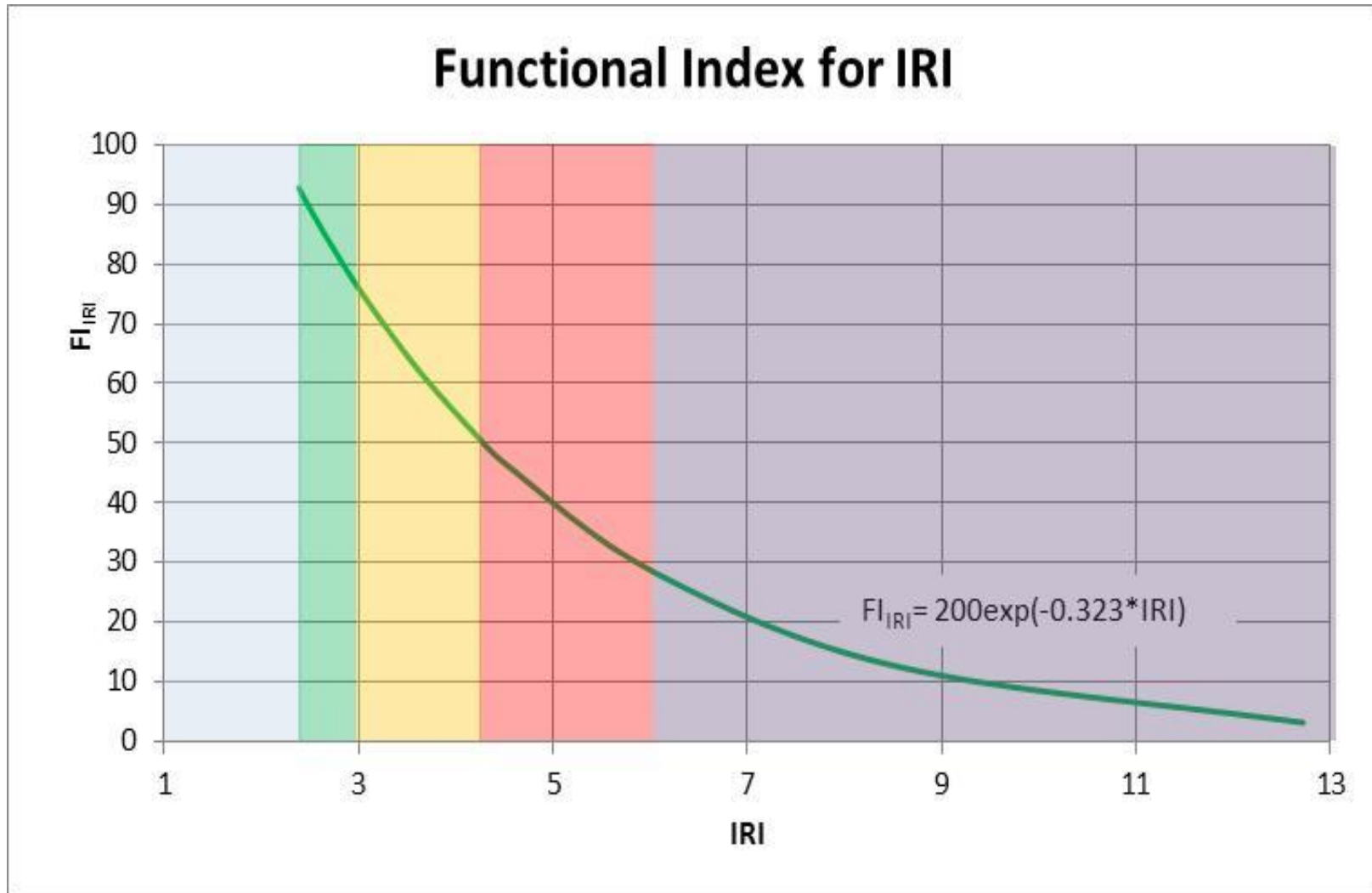
INDICES

- Engineering Condition Indices for Each Component using deduct points and based on:
 - Visual Inspections
 - Surveillance Measurements
- Functional Ratings for each Asset based on
 - Congestion – (Capacity Failure)
 - Riding Quality – (Serviceability Failure)
 - Safety - (Serviceability Failure)

Deduct Points

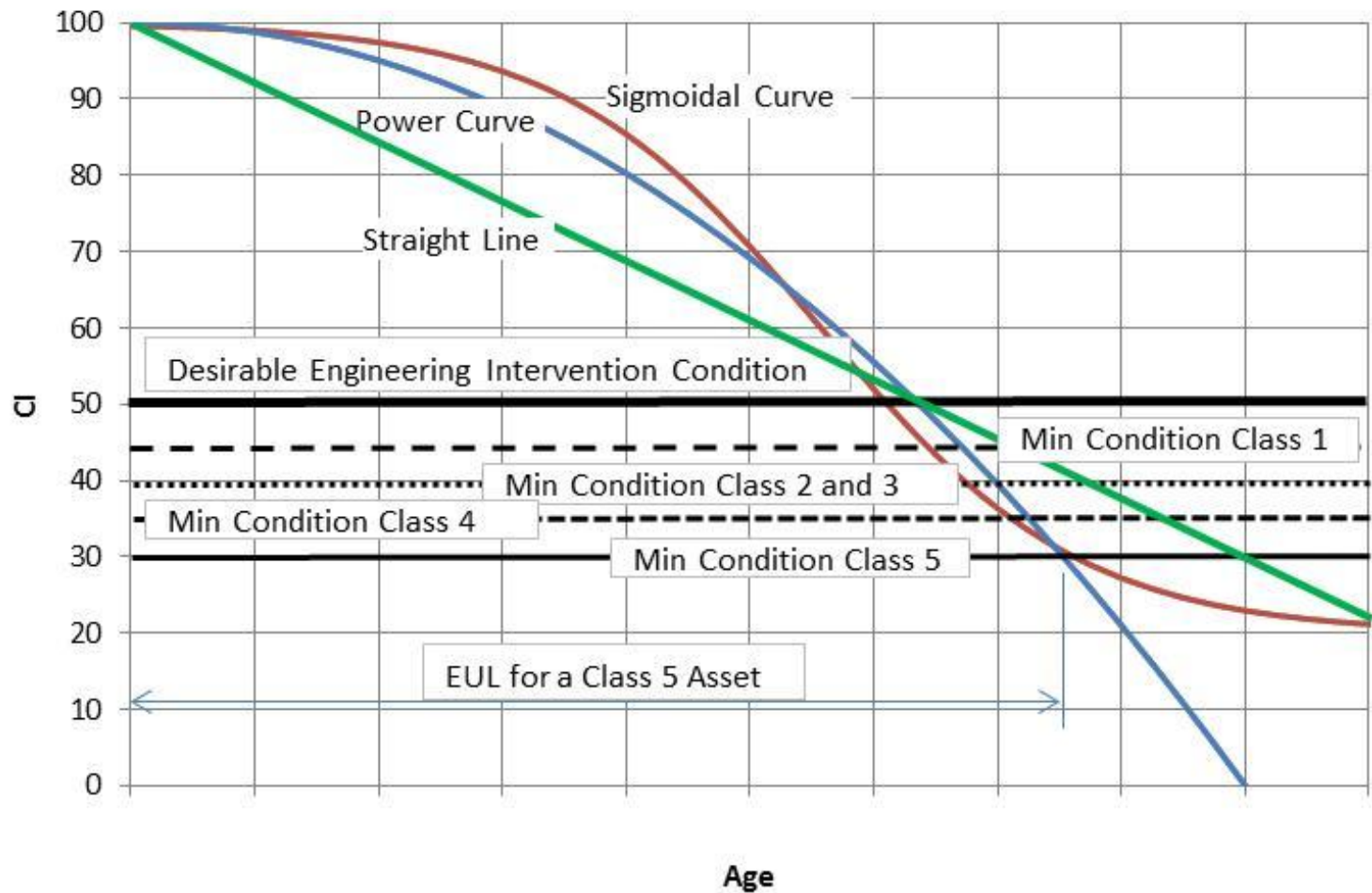
		Degree				
		1	2	3	4	5
Extent	1	VG (4)	VG (12)	G (16)	G (21)	G (28)
	2	VG (12)	G (18)	G (24)	F (30)	F (35)
	3	G (15)	F (30)	F (40)	P (50)	P (58)
	4	G (21)	P (50)	P (60)	VP (67)	VP (75)
	5	G (25)	P (55)	VP (70)	VP (75)	VP (80)

All data converted to indices for harmonisation



End of Life

Comparative performance curves



COMBINED INDICES

- Combination Indices
 - Combine indices for FI on congestion, riding quality and safety into a single FI based on deduct points
- Bundled Indices
 - Bundle CI based for an **asset** based on **component values** (CRC)
 - Bundle CI for a **Facility** based on **asset values**
 - Bundle FI for a **Facility** based on **usage** (vkm)
 - Bundle to regional and network levels for components and asset types

SITUATIONAL ANALYSIS

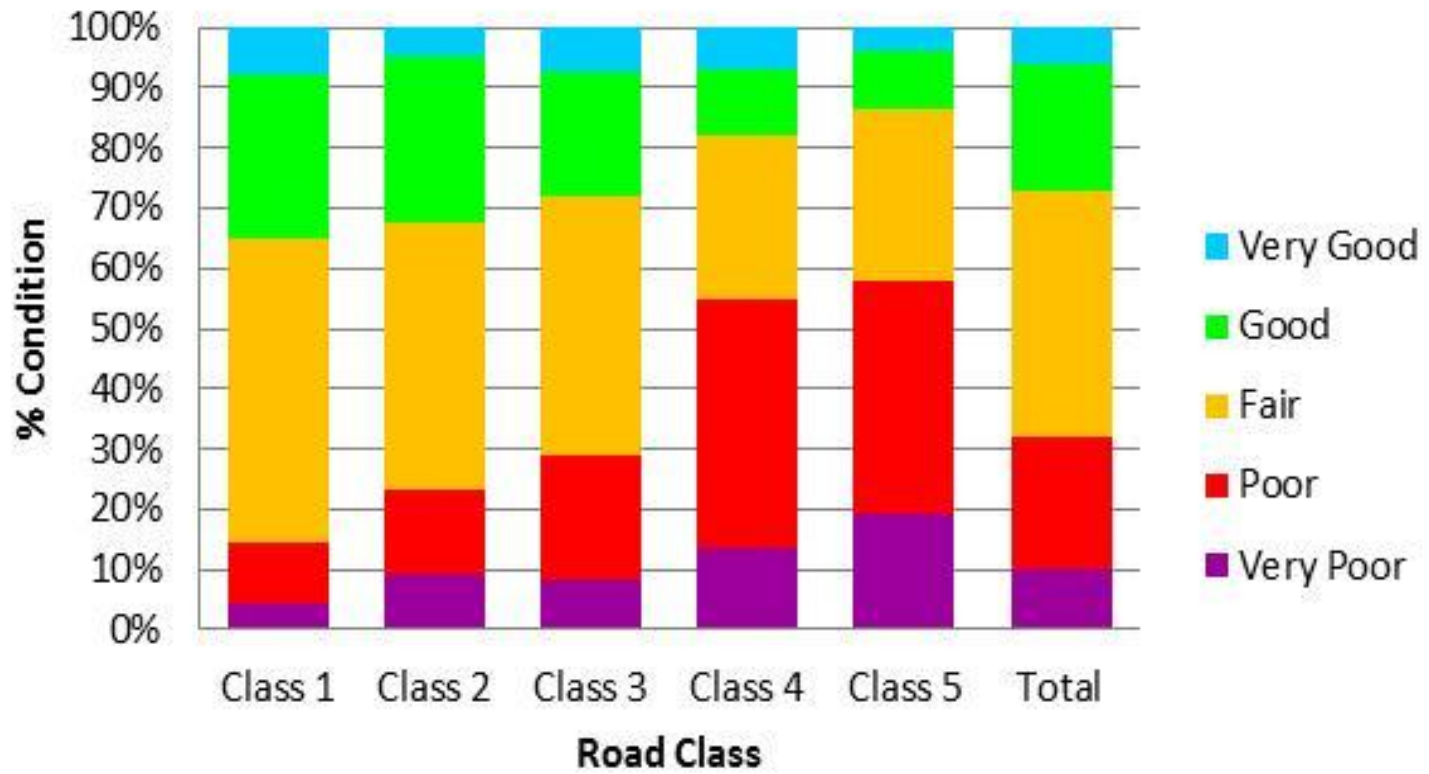
- What is the overall condition of the road network?
- How well is the network meeting its functional and structural requirements?
- What are the predominant problems that occur?
- What do past trends say about the efficacy of the Asset Management Plans?

SITUATIONAL ANALYSIS

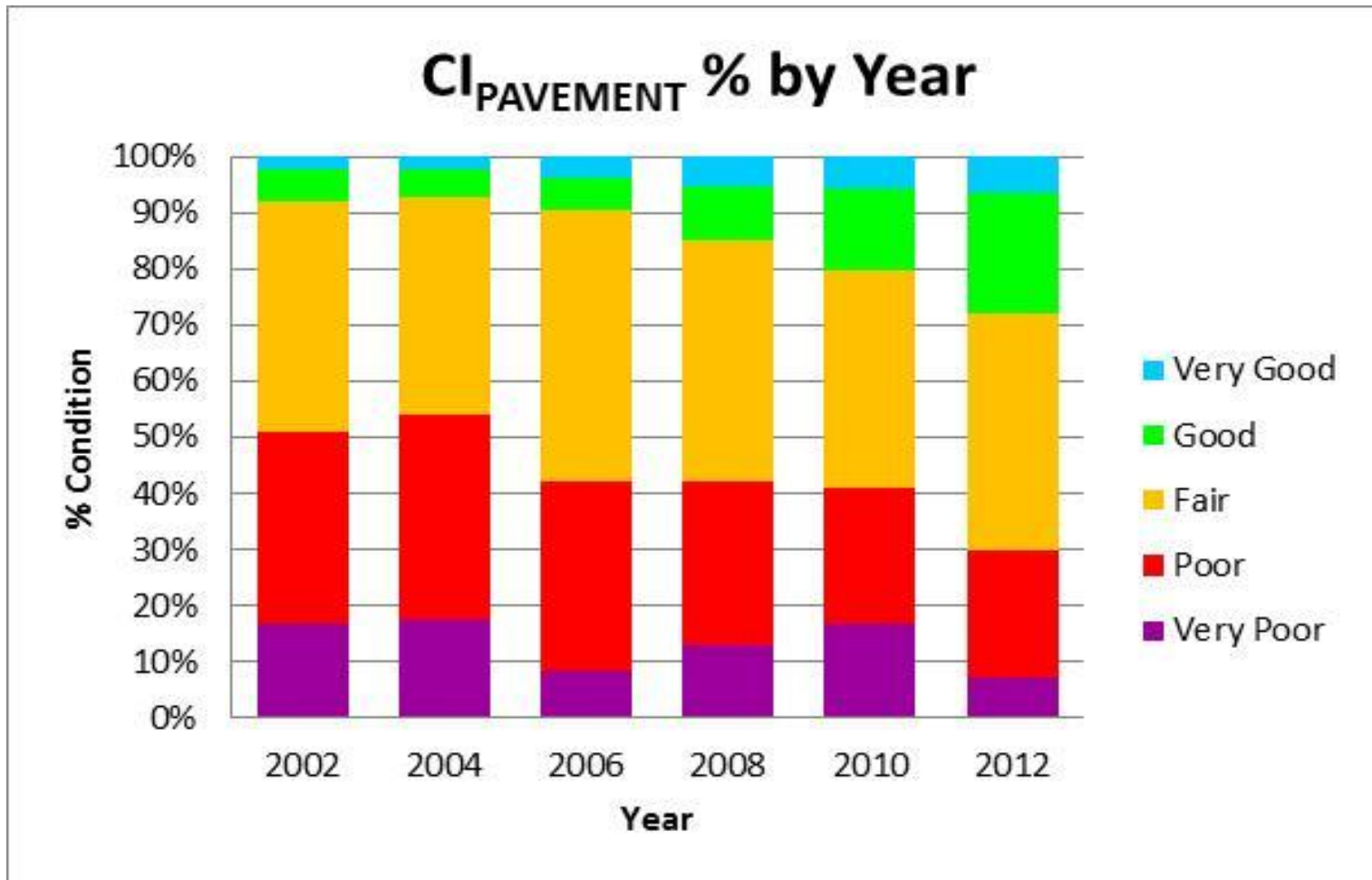
- Extent
 - Road Length of different types per road class per region
- Usage
 - Vehicle Kilometres being travelled in different conditions
- Condition Trends and Comparisons with set norms
- User Cost Consequences
- Depreciated Asset Values

Condition Comparisons

CI_{PAVEMENT} % by Road Class

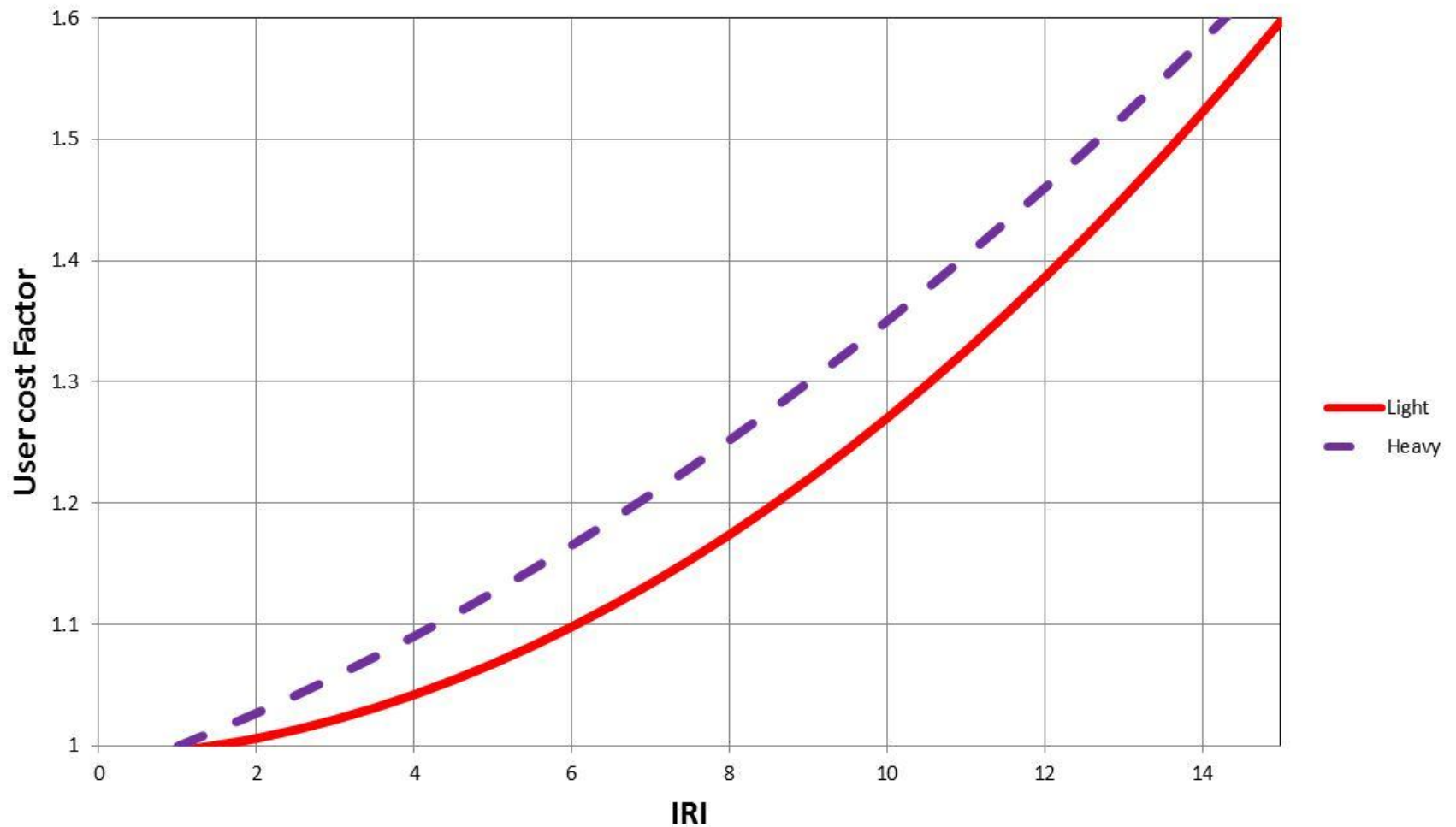


TRENDS



Excess User Costs

User Cost vs Roughness



NEEDS DETERMINATION

- **Questions on treatments and priorities**
 - Which categories of treatment and actions should be applied?
 - What should the relative expenditure on each category be?
 - What are the priorities for each road segment and its treatment?
 - Which series of treatments for each road segment represents optimal expenditure within the constraints of the current budget.
- **Questions on overall budget requirements and consequences**
 - How much money should be spent to retain the minimum required conditions?
 - How much money should be spent to achieve desirable conditions?

BASIC TECHNICAL NEEDS

- Routine Maintenance - Cyclical
 - Blading, Vegetation, Cleaning
- Routine Maintenance – Condition
 - Crack Sealing, Patching, Minor Repairs
- Periodic Maintenance
 - Surface Rejuvenation, Road Sign Replacement
- Resurfacing
 - Reseals, Regravelling
- Special
 - Extensive Repairs and Resurfacing, Bridge Joint Replacement
- Rehabilitation
- Reconstruction
- Upgrading
- New Roads

PRIORITISATION AND OPTIMISATION (Level III and IV)

- Life Cycle Needs
 - Extensive Data
- Decision Support Systems
- Prioritisation
 - Not worst first!
- Prediction Modelling
 - Benefits / Cost
- Optimisation
 - Options Analysis
 - Goal Seeking
 - Analysis of Consequences of Different Levels of Expenditure

TOP CONSIDERATIONS

1. Road Infrastructure Asset Management (RIAM) needs to be tackled in a consistent and sustainable manner
2. Not just a computer system and short term inspections
3. Needs a long term view with long term appointments of a range of service providers to support Owner/ Custodian
4. Start simple and Monitor Progress at top level
5. Preserve good roads first and tackle very bad ones in a prioritised fashion
6. Improve Gravel Road Maintenance to extend usage
7. Integrate RIAM with Maintenance Operations
8. Try and ensure similar processes for all assets

TMH22 ISSUES STILL TO BE DEALT WITH

- Harmonise CI and FI for all assets
- Formation/ Waterway inspections
- Ancillary asset inspections and integration
- Accident Records
- Consistency of CI/FI through application and careful evaluation of results and adjustments where necessary