LISBOA 2010
MAY 25/28

16th World Meeting

www.irf2010.com

Threshold Values of Pavement Characteristics at the Initial Stage of a Road Lifetime

Prof. Anastasios Mouratidis, Dept. of Civil Engineering,
Aristotle University of Thessaloniki, Greece

Dipl. Civil Engineer, MSc, PhD Candidate

Grigorios Papageorgiou, Dept. of Civil Engineering,
University of Thessaly, Greece

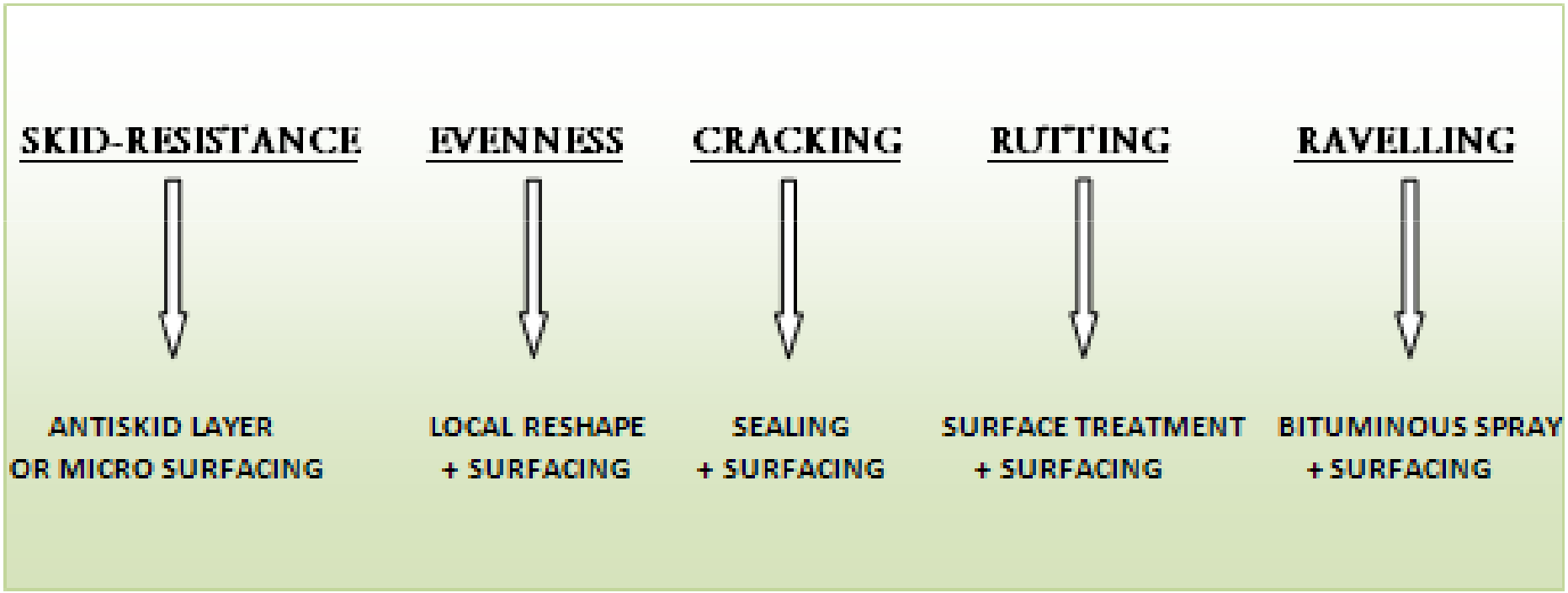
Pavement Performance and Maintenance Needs Issues

- Economizing funds and, at the same time, offering a performant road
- Occurrence of a road closure, either complete or by lanes

Pavement design

- Design of the pavement in a rational way, so that the deterioration is equally distributed to all parts and characteristics
- Balanced deterioration of the pavement, distributed among skid-resistance, evenness, surface integrity and structural condition

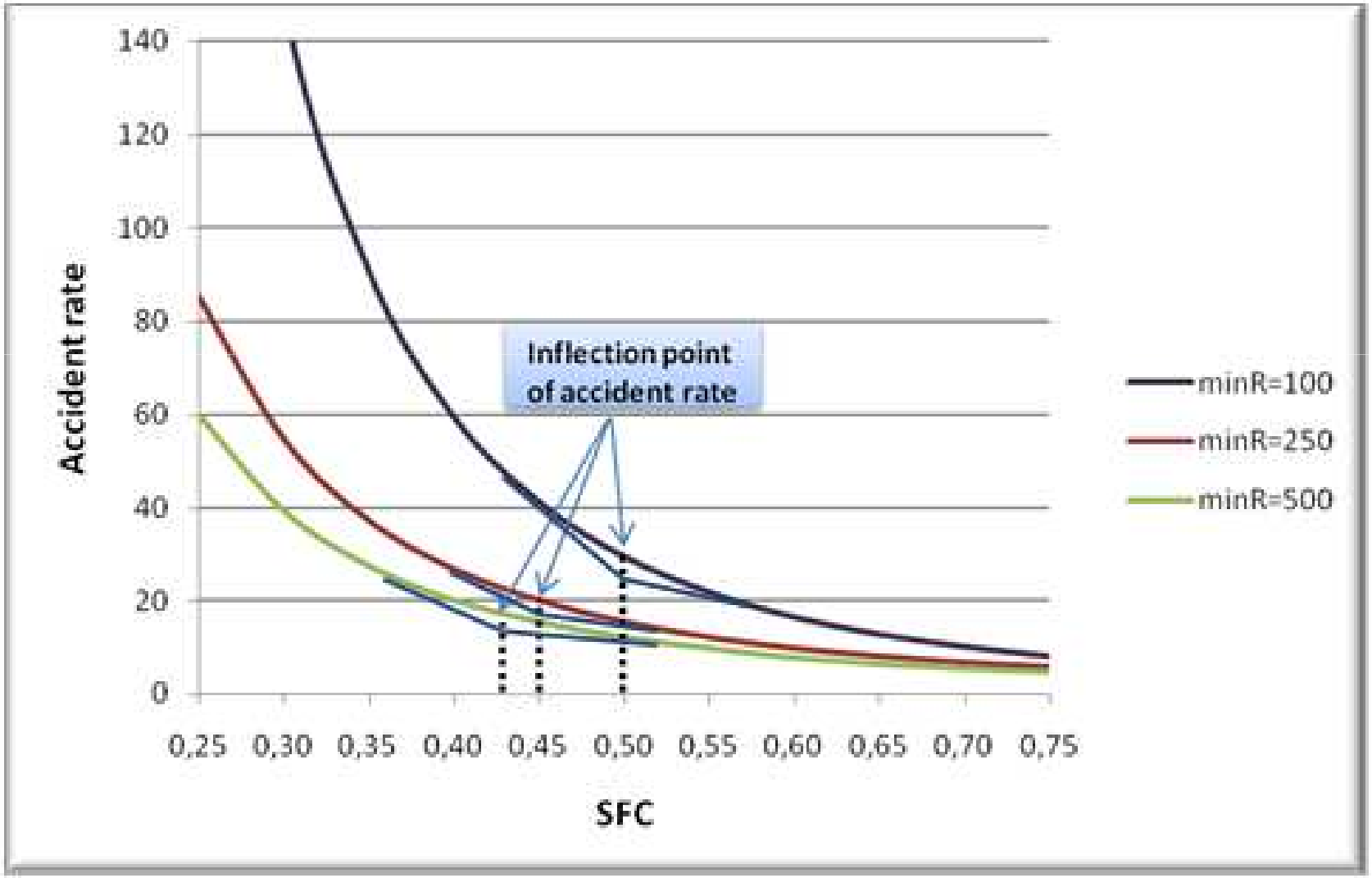
Rehabilitation Options for Pavement Defects



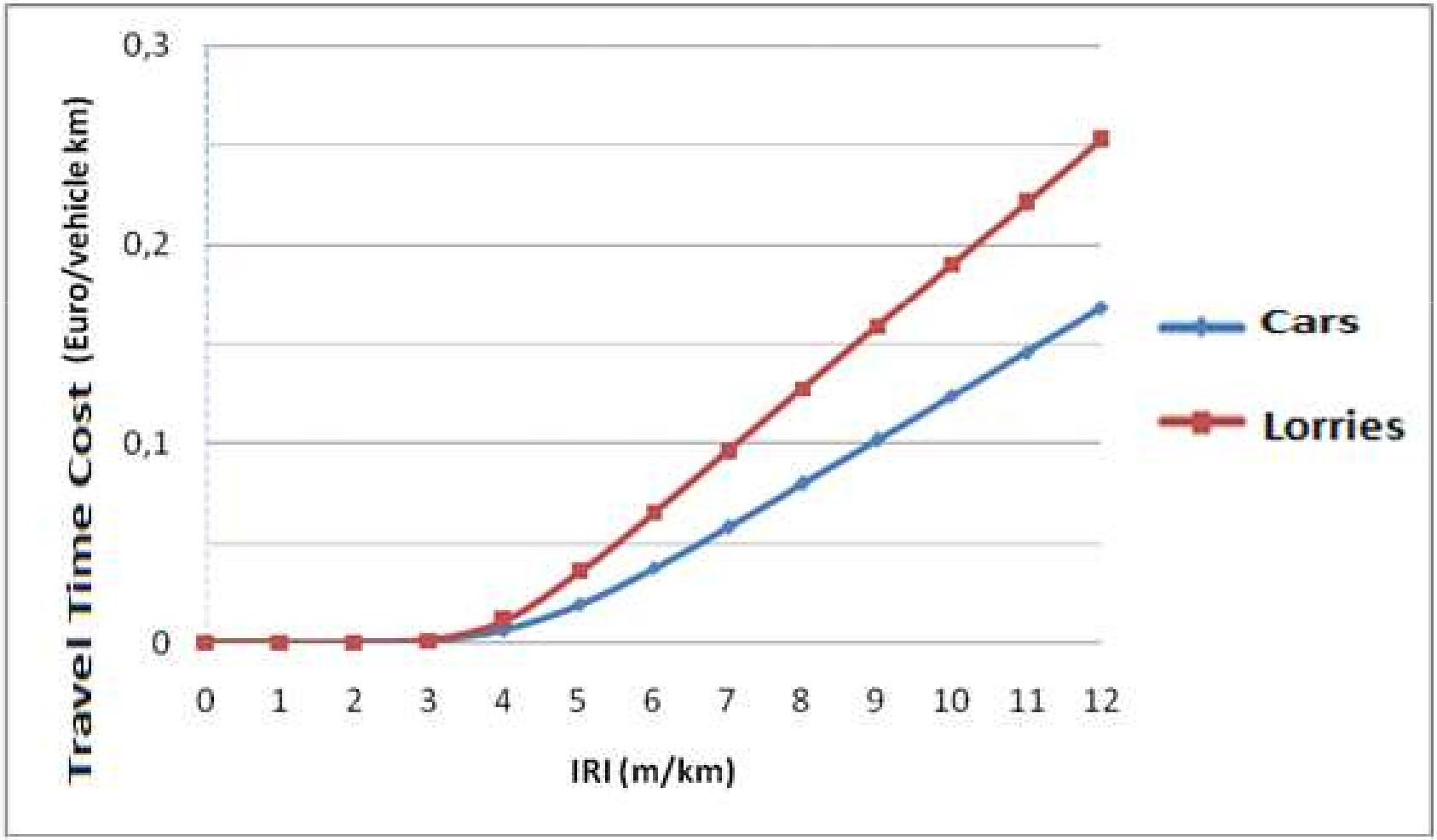
Criteria for Defining Limit Values of Pavement Characteristics

- Qualitative determination of limit values
- Quantitative determination of limit values

Criteria for Defining Limit Values of Pavement Characteristics



Criteria for Defining Limit Values of Pavement Characteristics



Traffic Relating Equations of Pavement Features

- $PSR = PSR_0 * [1 - a * \ln(1+T)]$

- $SFC = SFC_0 * (1 - \kappa * T)$
- $IRI = IRI_0 * e^{(0.059 * b * A)}$ or $IRI = IRI_0 * e^{\lambda T}$
- $RD = RD_0 + \beta * h_0 * T^{0.25}$

Long service life of pavement

- Rare maintenance operations
- Lower cost of upgrading works
- Minimum disturbance to traffic

Basic concept

- Definition of suitable values of pavement characteristics at the “opening-to-traffic” stage establishing high level-of-service for a long time
- Time schedule - the timing of future maintenance

Basic structure

- Definition of limit values at the operational stage

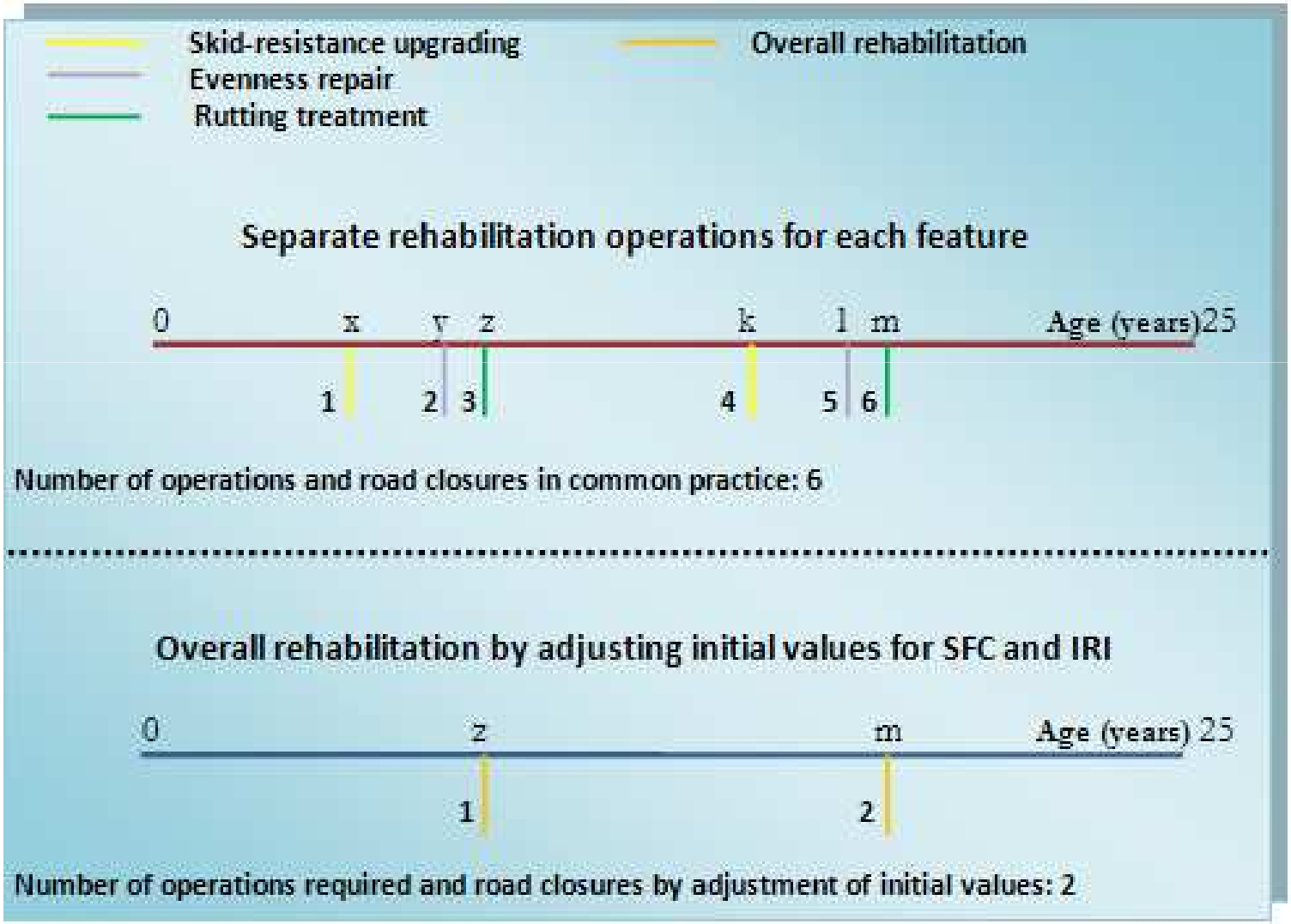
- Establishment of traffic – dependent equations

Basic structure

- Assuming RD=0, at the initial stage of a road lifetime

- Time elapsed and traffic volume introduced in traffic – dependent equations

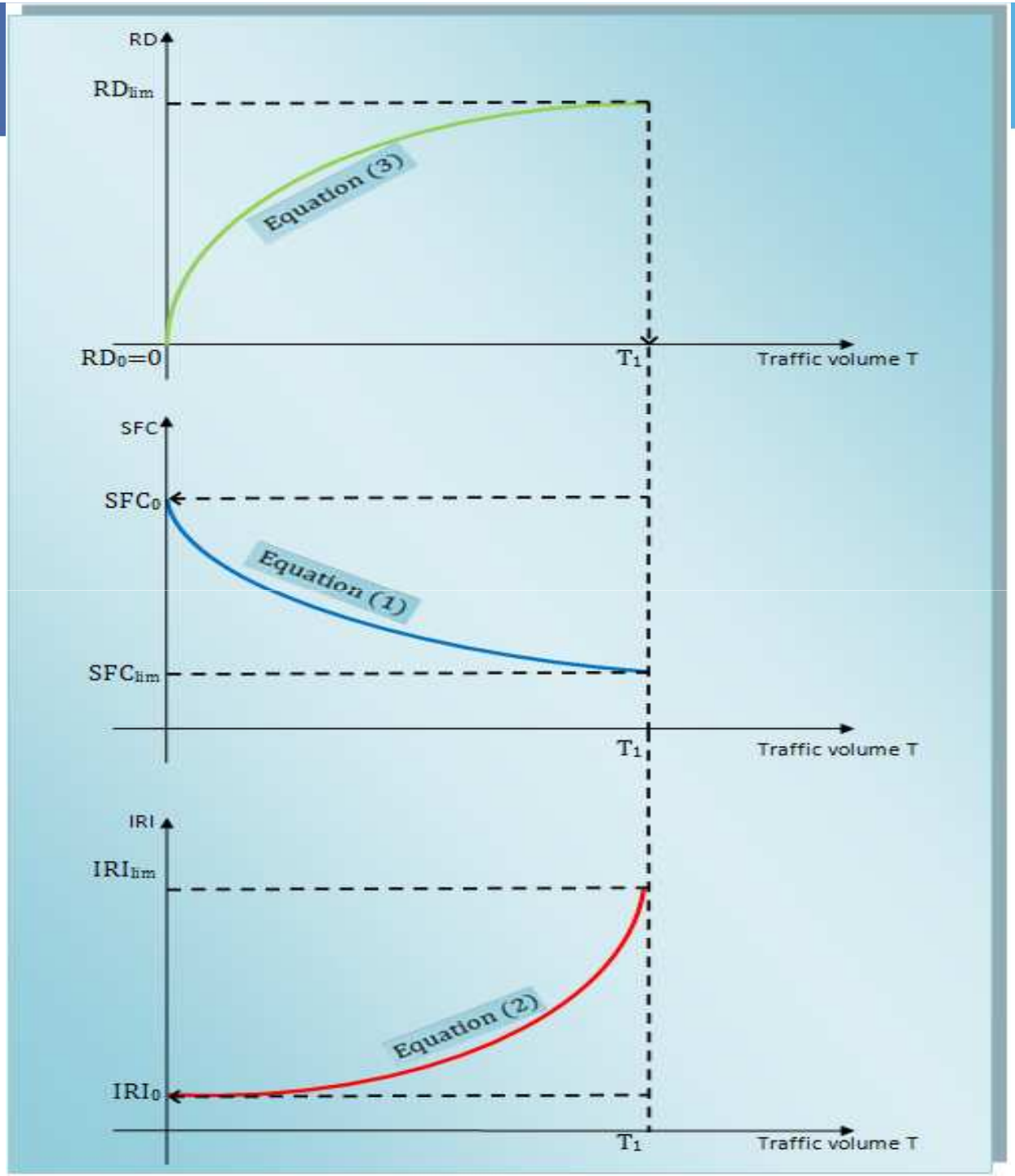
Common practice vs proposed methodology



Not uniform deterioration

Commonly used limit values of pavement features

Pavement feature	Indicator or factor used	Limit values at the operational stage of road life	
		National network	Regional network
Skid-resistance	SFC	0.40 - 0.50	0.40 - 0.50
Evenness	IRI (m/km)	2.65 - 3.00	3.00 - 3.40
Rutting	RD (mm)	6 - 15	12 - 20


RD
RDlim
Equation (3)
RD0=0
T1
Traffic volume T
SFC
SFC0
Equation (1)
SFClim
T1
Traffic volume T
IRI
IRIlim
Equation (2)
IRI0
T1
Traffic volume T

Benefits for the Road Operator - Conclusions

- Minimum required maintenance operations
- Useful tool for a rational policy of managing road assets with direct retributive profit in terms of maintenance expenses, users cost and ride discomfort