



Asset Management of Low Volume Rural Roads

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Content

Rural Road Network

Asset Management

Rationale for Rural Road Maintenance

Elements of Maintenance Policy

Role of Technology



Rural Road Network

Total length of road network more than **4.8** million kilometres

Total length of rural road network more than **3.25** million kilometres

Replacement value of rural roads is **Rs. 4860 billion**



Asset Management

a systematic evaluation of
asset needs and available
resources

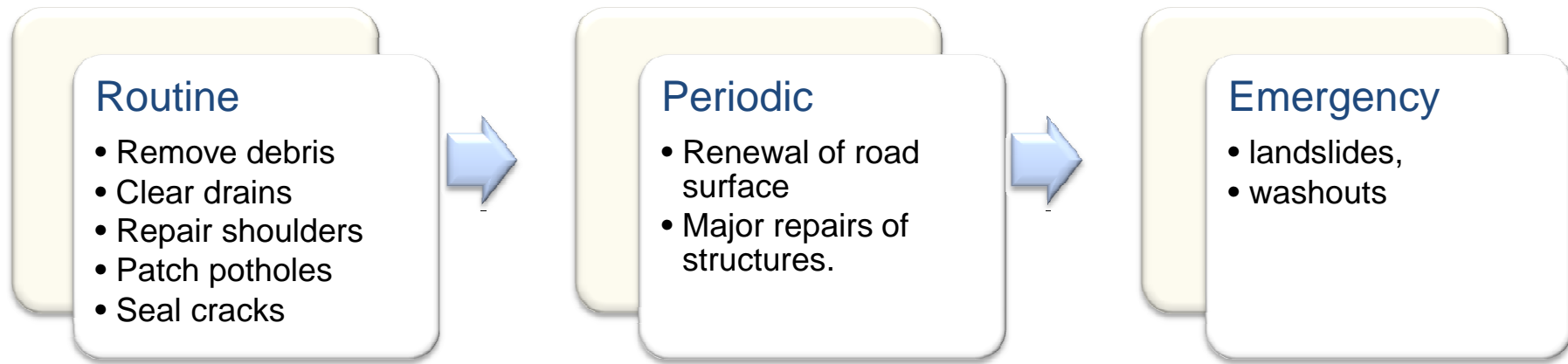
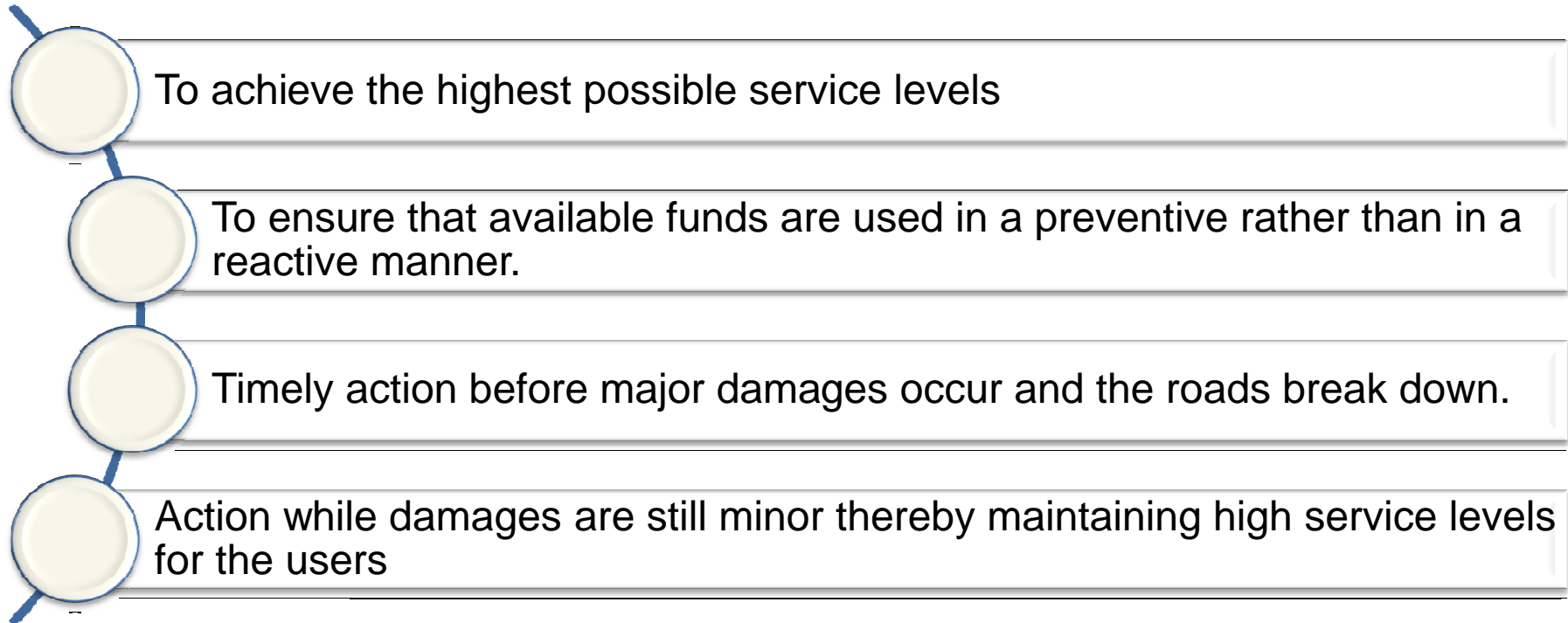
consideration of entire
asset lifecycle

combining engineering
and economic principles

data driven decisions and
investments

efficiency and cost
effectiveness as primary
outcomes

Rationale for Rural Road Maintenance



Elements of Maintenance Policy

Govt Commitment

- Asset value at the close of each financial year.
- Develop realistic norms for maintenance of rural roads
- Entrust the overall responsibility of planning and management of maintenance to one nodal road agency
- Ensure allocation of adequate funds

Adequate funding

- Empowered Committee to decide on annual allocation of funds for rural road maintenance
- Explore avenues for additional funds

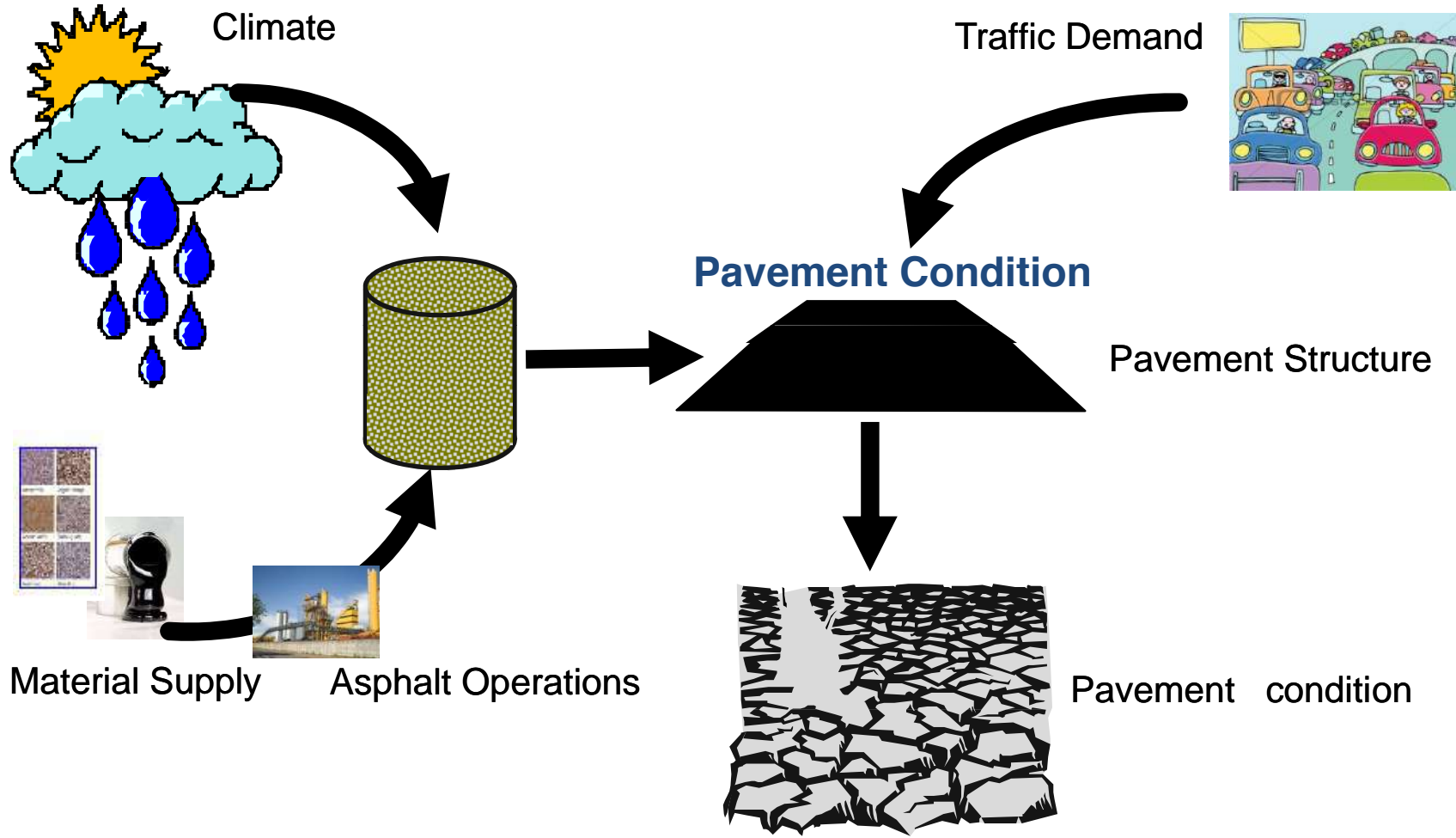
Institutional reforms

- Performance evaluation system
- Annual Maintenance Plan based on condition assessment
- Regular technical and financial audits
- Maintenance responsibility to Panchayat Raj Institutions (with funds / functionaries / technical support)

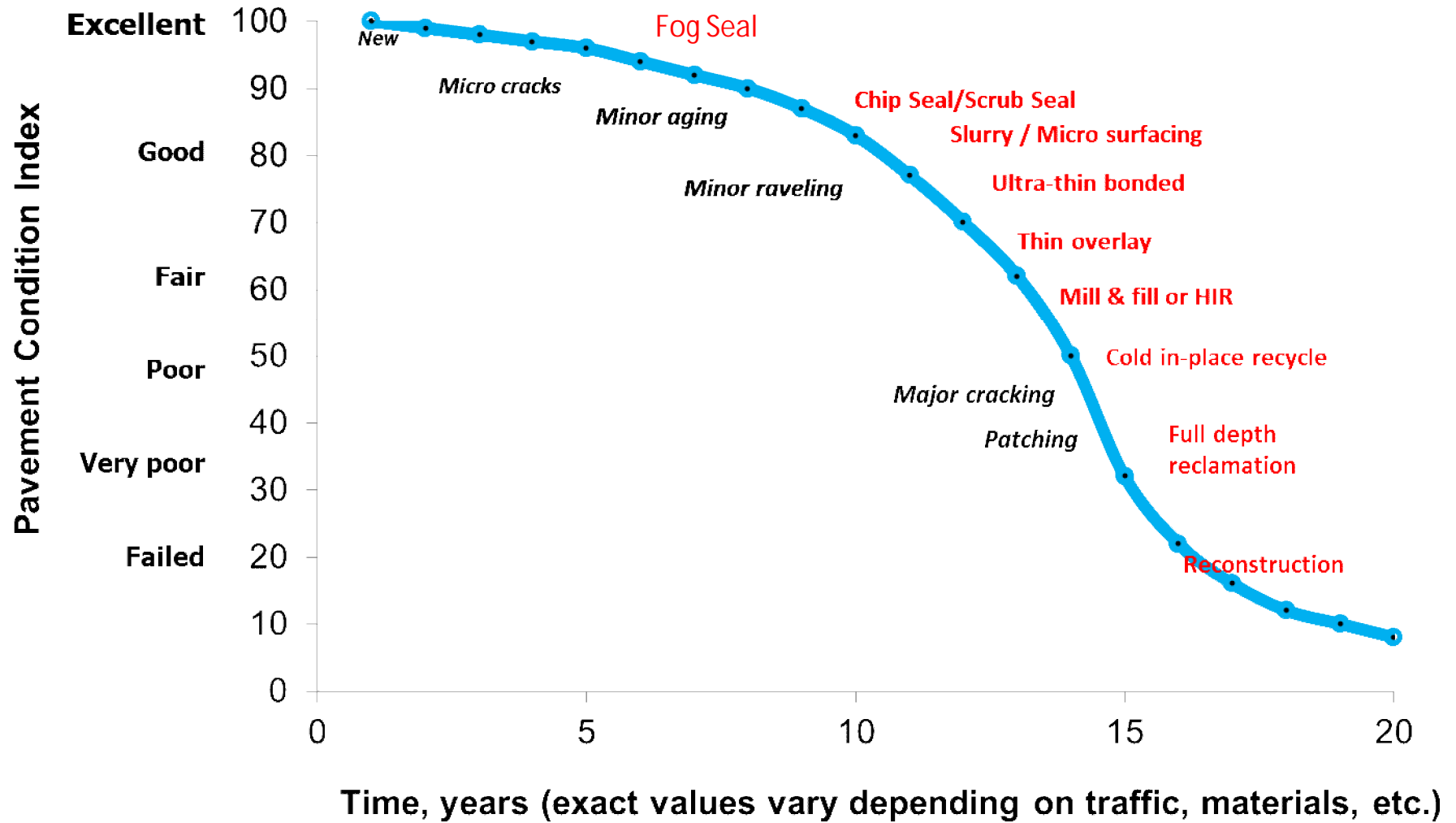
Implementation efficiency

- Training calendars / programmes.
- Support for training contractors
- Identify and pilot innovative and cost-effective technologies
- Road user satisfaction surveys.

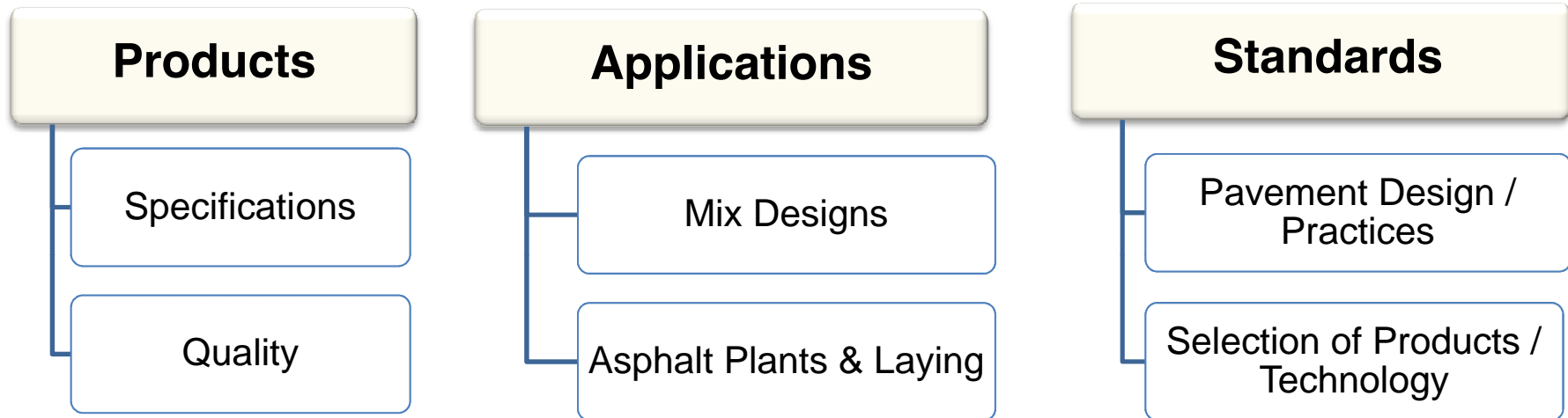
Role of Technology



Role of Technology



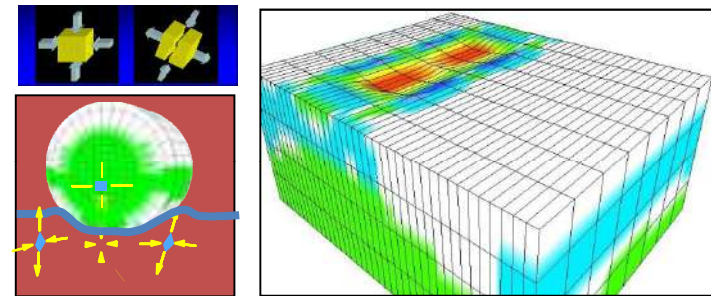
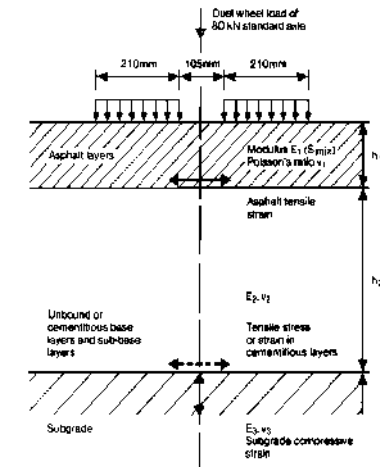
Role of Technology



Role of Technology

Flexible Pavement _ Balance between life expectancy of the road and construction/maintenance costs taking into account

- Traffic on road (LOADS)
- Climate condition (Environment)
- Soil (SUBGRADE) and Granular Material properties
- Bituminous Material Properties (Bound)



■ Empirical

- Based on years of research and known performance of design methods
- Limited to known materials only & standard design
- Charts & guidelines of design

■ Analytical

- Understanding of material behaviour in pavement structure
- Principles of linear elastic theory
- Approach
 - AASHTO (Mechanistic Pavement Design – MEPD)

Role of Technology

Common



Parameters	Range of Distress %		
	Good	Fair	Poor
Potholes	< 0.5	0.5 – 1.0	> 1.0
Patching	< 5	5 - 20	➤ 20
Cracking	< 10	10 - 20	➤ 20
Raveling	< 10	10 - 20	➤ 20
Pavement Condition Index	4 - 5	2 - 3	1

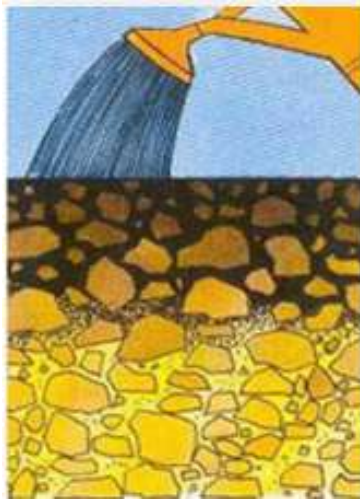
Innovative



WMM Surface Sealing

Waterproof top 15 mm

Prevent Dust generation



Fog Seal

An inexpensive way of arresting raveling and adding binder back to aged surfaces

Improve Sealing or waterproofing

Improve the surface appearance



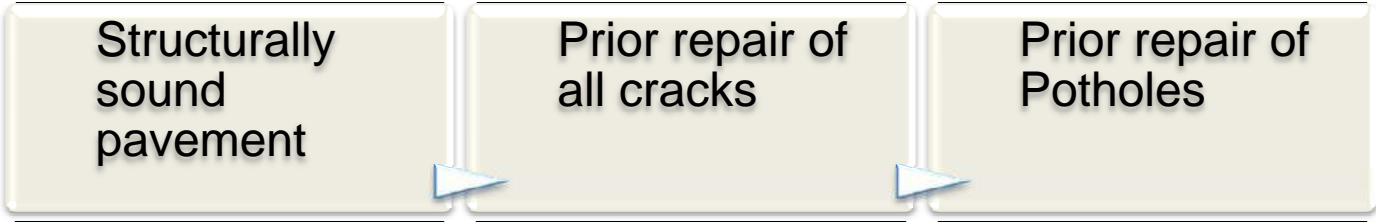
Fog Seal



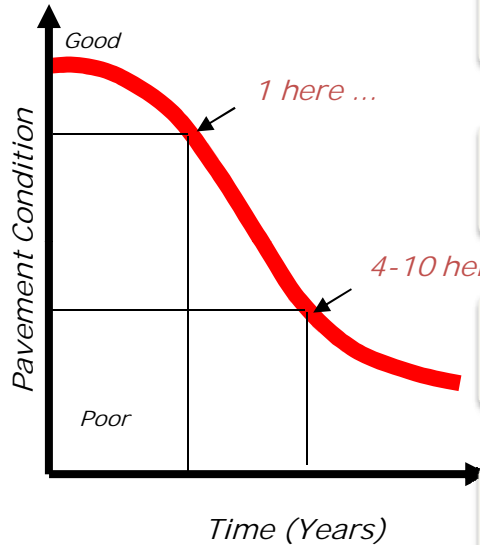
Fog seal
preventin
g water
intrusion

fog seal after 4yrs
in light rain

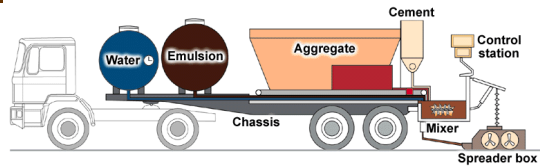
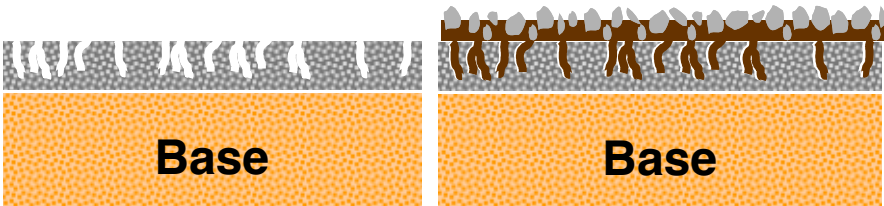
Slurry Seal / Micro surfacing



- Cost Effective
- Minimize Oxidation
- Reduce Water Infiltration
- Provide Skid Resistance
- Improve Aesthetics
- Correct Raveling
- Average Life : 5 – 7 years



- Chemistry and selection of emulsion components
- Emulsion properties for good and durable road performance
- Understanding aggregate quality,
- Application machinery and operators competence
- Construction procedures and management



Slurry Seal - Manual



Chip Seal



Description

Application of asphalt and aggregate chips rolled onto the pavement

Purpose

Seal pavement

Enrich hardened/oxidized asphalt

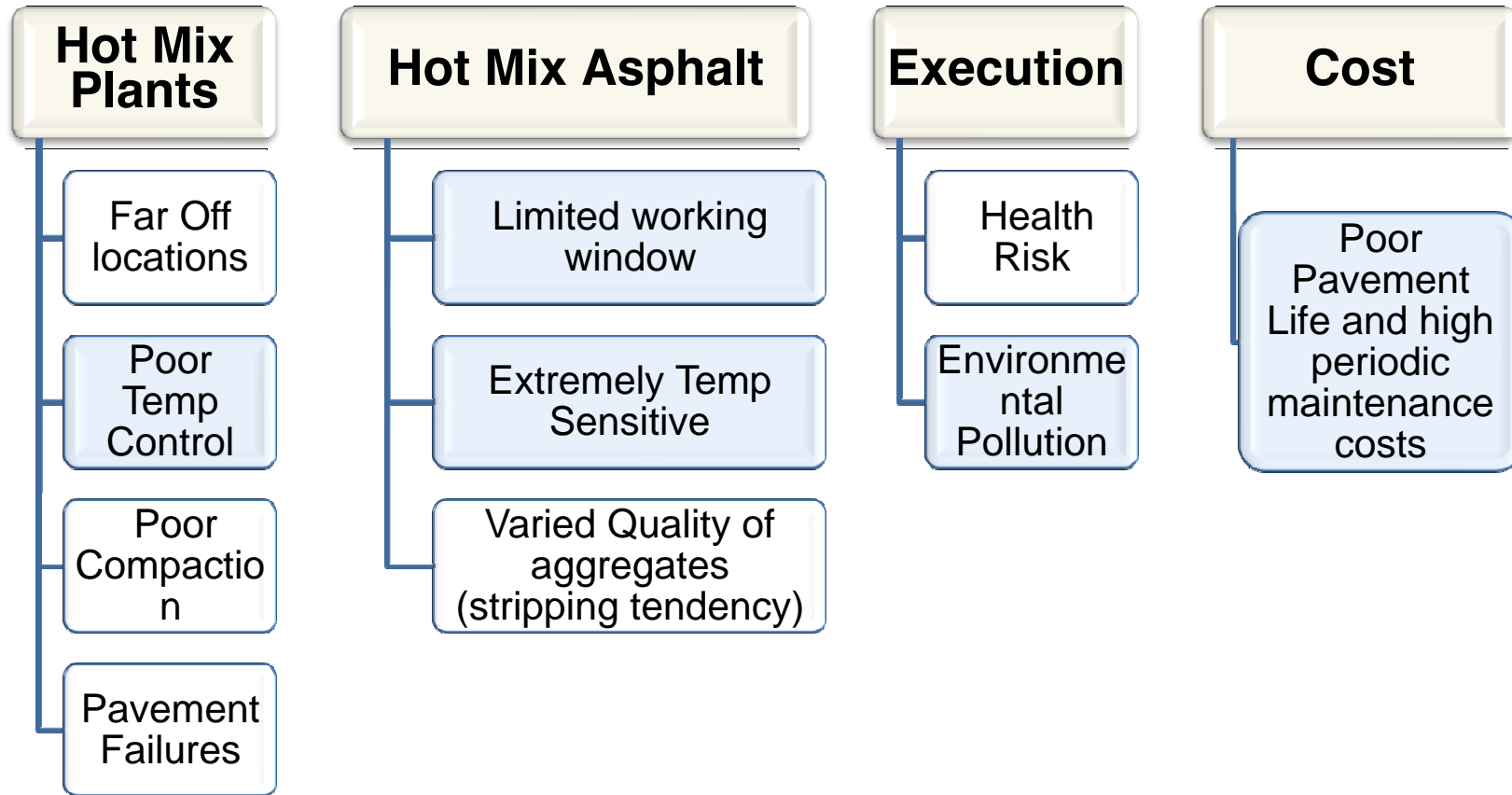
Retard reflection cracking on HMA overlays

Improve surface friction

Chip Seal consists of a spray applied bitumen emulsion and aggregates added to it

- Clean the pavement surface.
- Spray the custom made bitumen emulsion
- Apply aggregates into the emulsion treated surface
- Roll with pneumatic rollers.
- Sweep loose rock up.

Cold Mix



FibreMat

The Ultimate Stress Absorbing Membrane



0.90 - 1.10 L/m² PM Emulsion



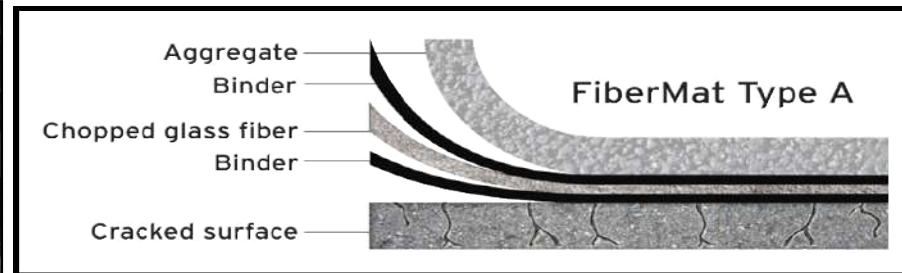
70 - 140 grs/m²
Glass Fibers



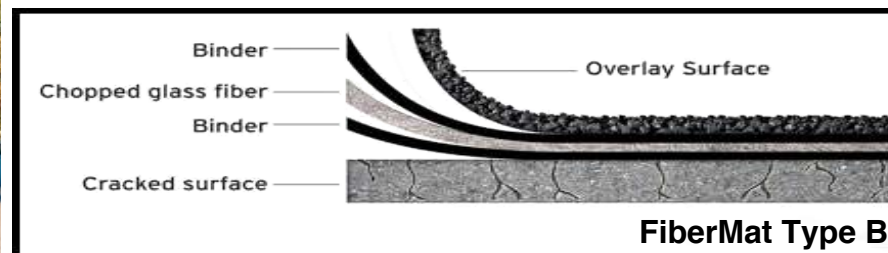
0.90 - 1.10 L/m² PM Emulsion



Reinforced Chip Seal:

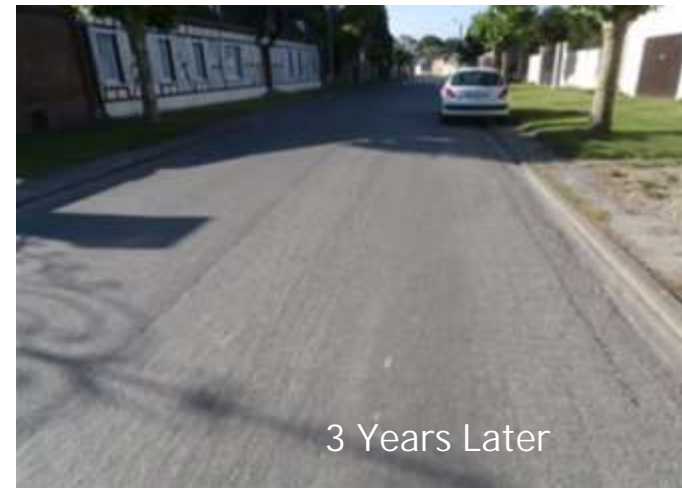


Stress Absorbing Membrane



FibreMat

The Ultimate Stress Absorbing Membrane
Arvillers, Picardy - France – September, 2011



Cracking is a predominant pavement distress

Stress Absorbing Membranes or geofabrics are efficient, but costly, disruptive or may pose problems for future recycling

FiberMat is a cost-efficient waterproof & crack inhibiting membrane

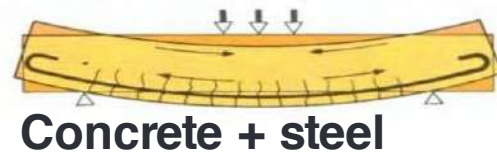
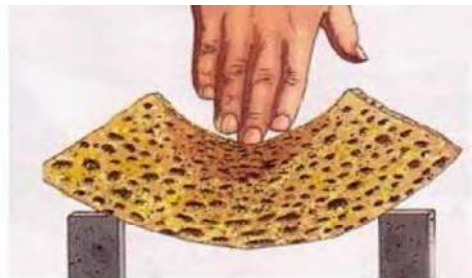
FiberMat is fast, non disruptive, versatile

FiberMat can be recycled

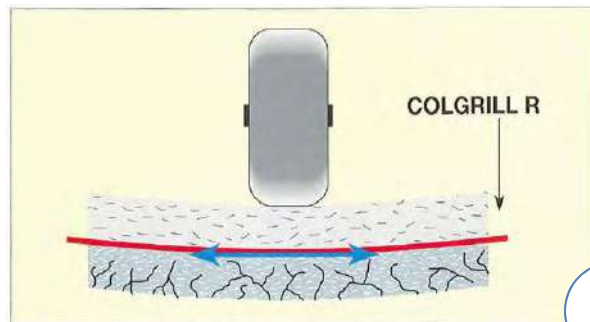
Colgrill

High-resistance reinforcement:

- □ Less material used
- □ Overall savings
- □ Environment-friendly technique



Concrete + steel



Asphalt + fibreglass

Reinforcement of old fatigued pavements

Differential reinforcement of traffic lanes

For new pavements: on a base of low bearing capacity

Significant reduction in course thickness

Well suited to highly deformable supports

Traffic: **all types of road and** industrial traffic

Effective against cracks and pavement

Conclusions

