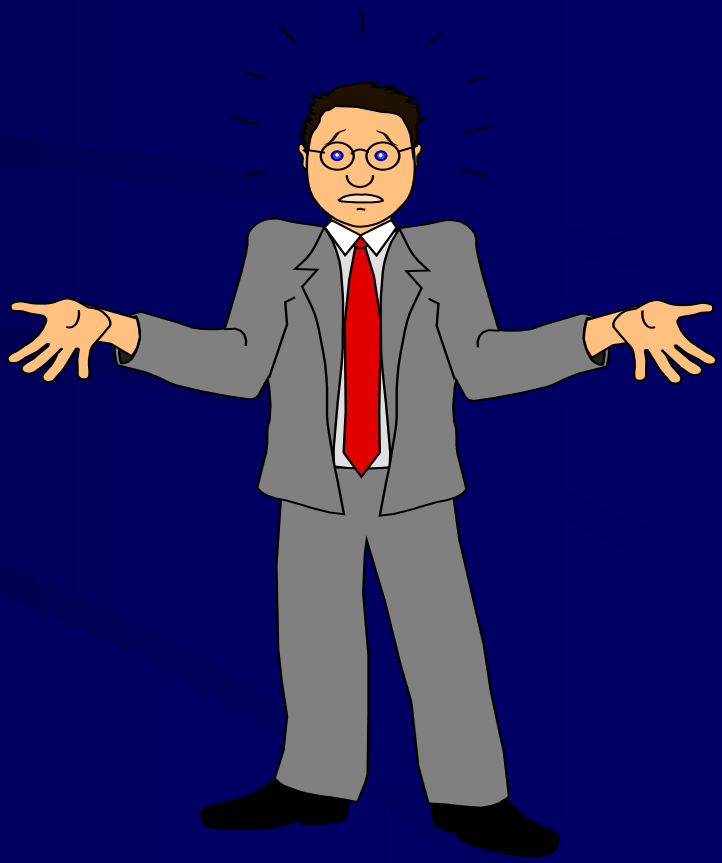
Pavement Preservation



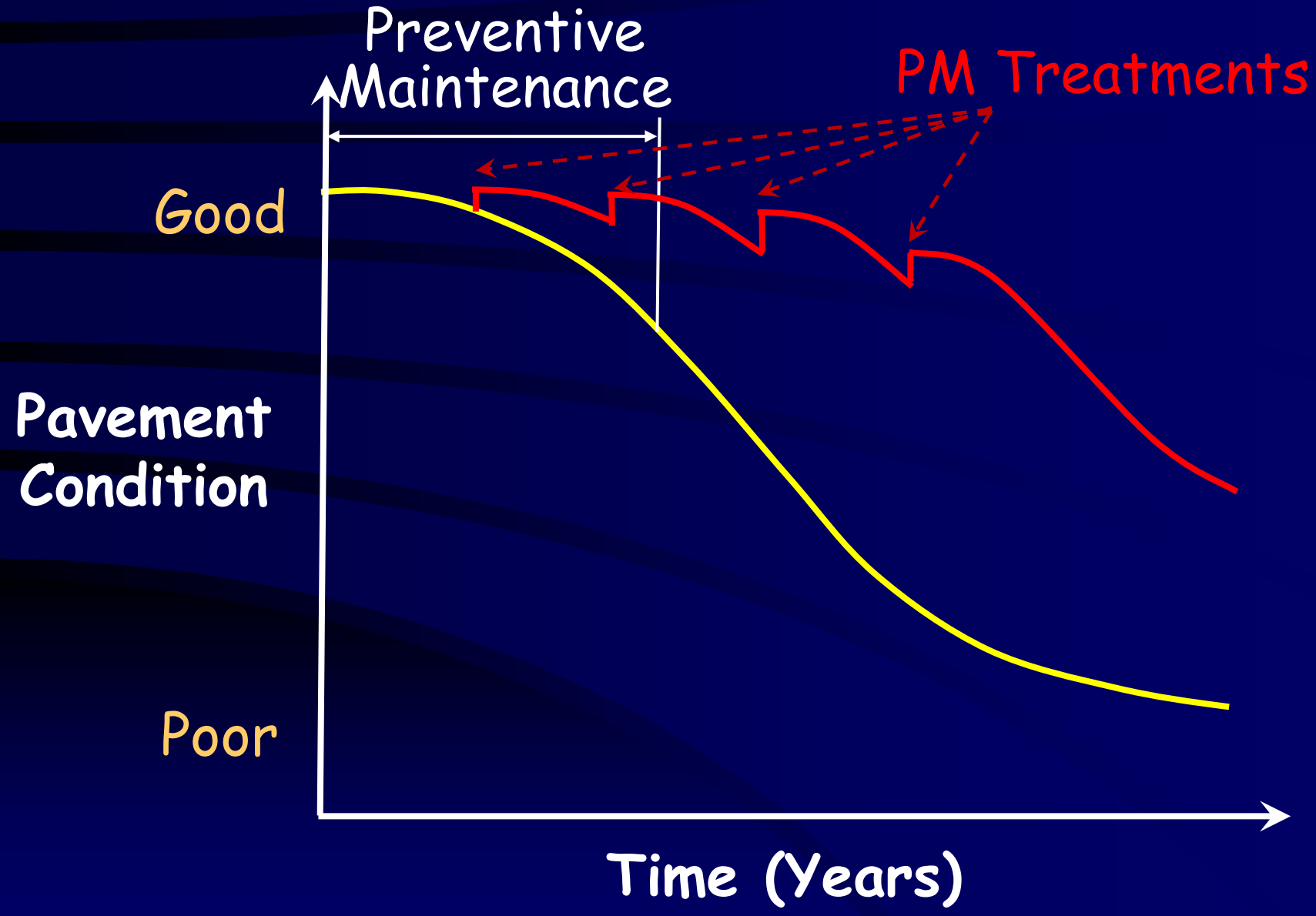
Concept of Preventive Maintenance


Typically
Low
Budget
High Needs
Preventive Maintenance Could
be the Answer

Objective of Preventive Maintenance

Keep the pavement condition above a level that would require other strategies

Preventive Maintenance



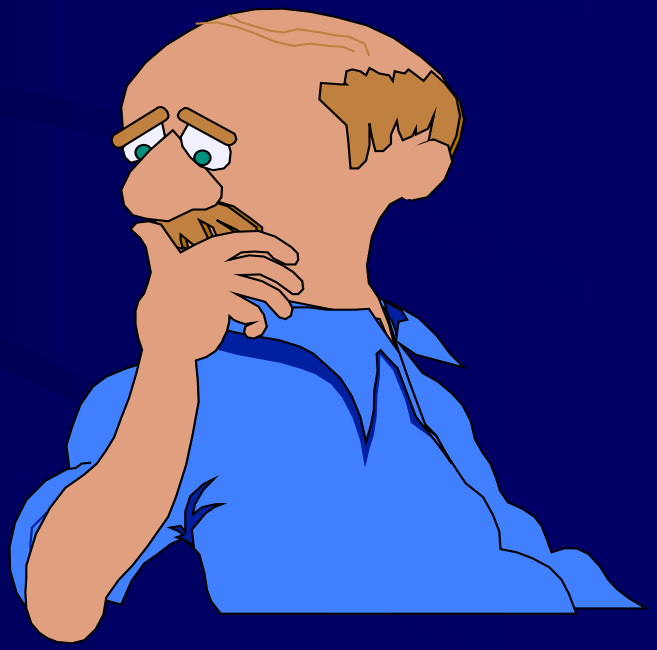
Treatments for Asphalt Pavements

- Crack treatment
- Fog seal
- Chip seal
- Cape seal
- Slurry seal
- Microsurfacing
- Ultrathin bonded wearing course (Novachip)
- Thin hot-mix overlay

Treatments for Concrete Pavements

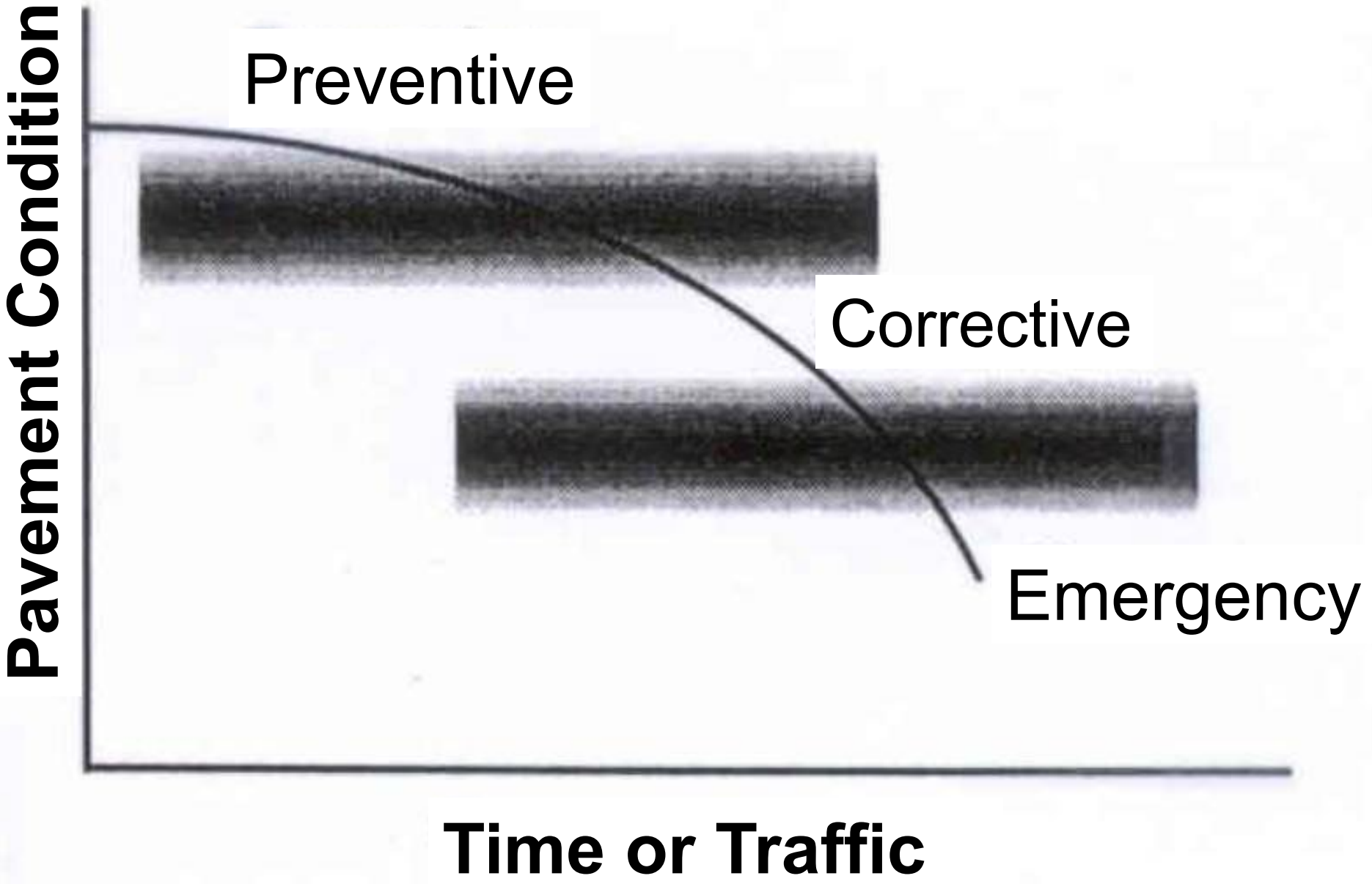
- Crack and joint sealing
- Diamond grinding

When should a pavement preventive maintenance treatment be applied?



How much oil should a car burn before changing oil?

Maintenance Types



Candidate for PM?

- Minor surface defect
- No structural damage

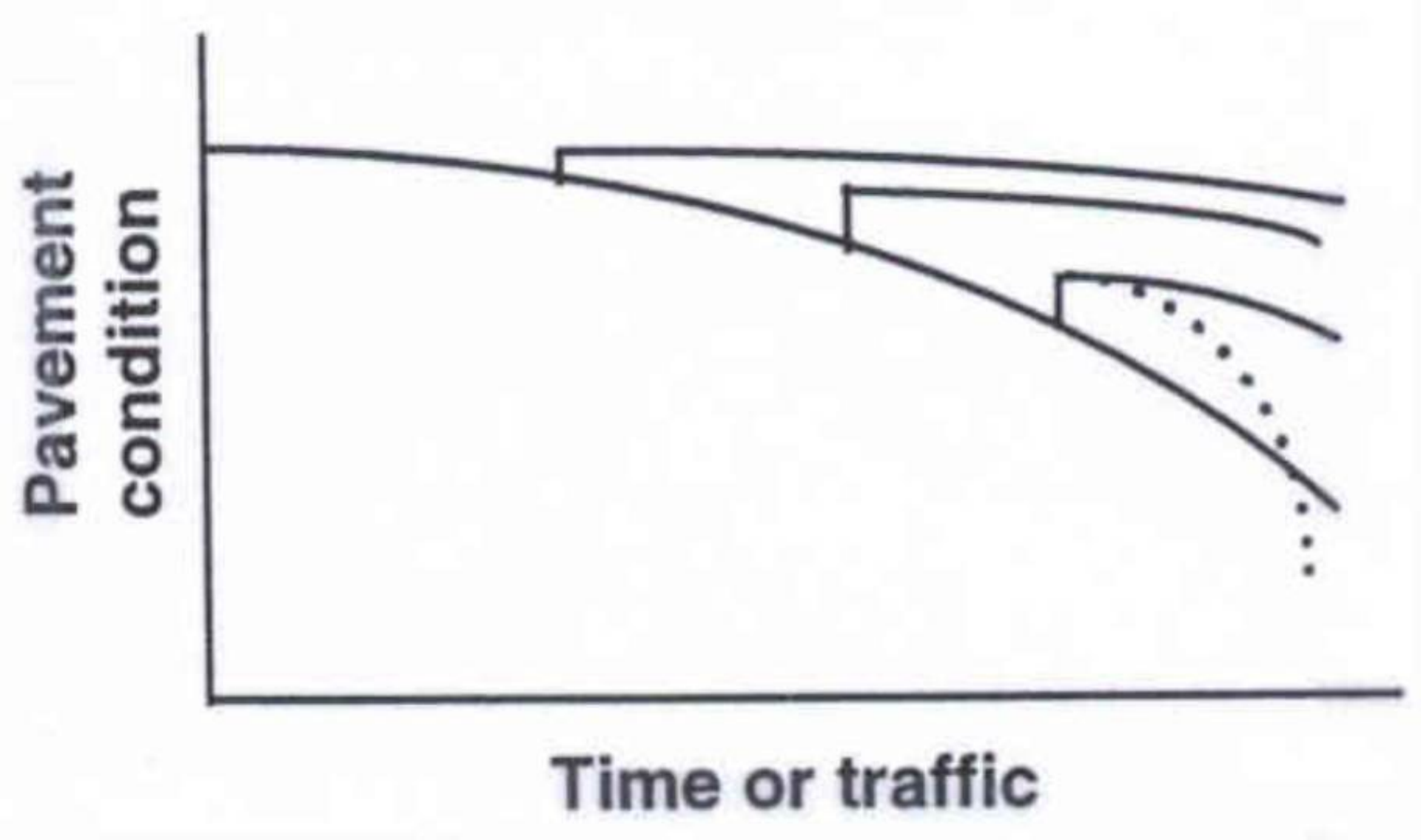
"Good Candidates" for PM

- No structural damage
- Minimal distress (extent & severity)
- Relatively young in age

How to Determine Condition

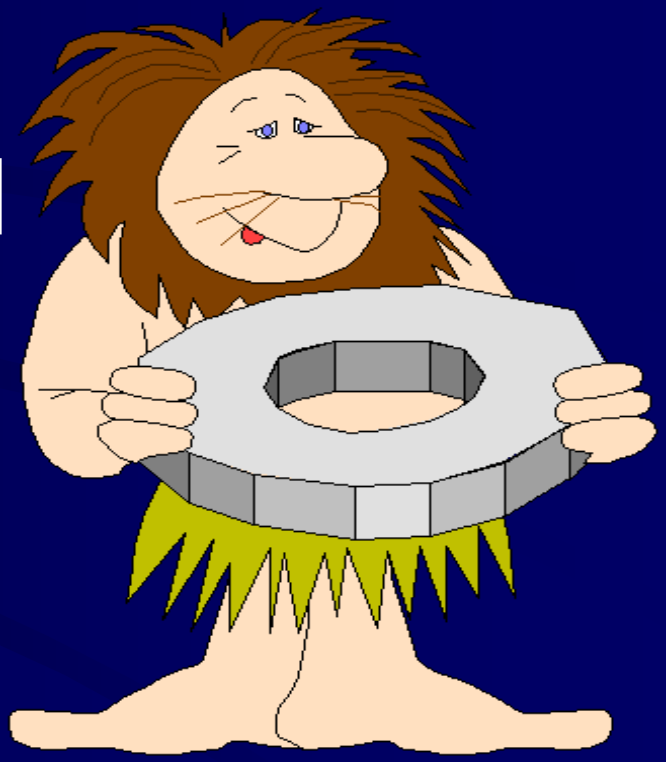
- Conduct surveys
  - Type, extent, and severity of distress
  - Identify *good*/*poor* PM candidates
- Additional information / historical records
- Engineering judgment

PM is Cost Effective



When is it Too Late for PM?

- Potholes
- Severely deteriorated cracks
- Unstable rutting
- Shoving
- Weak structure



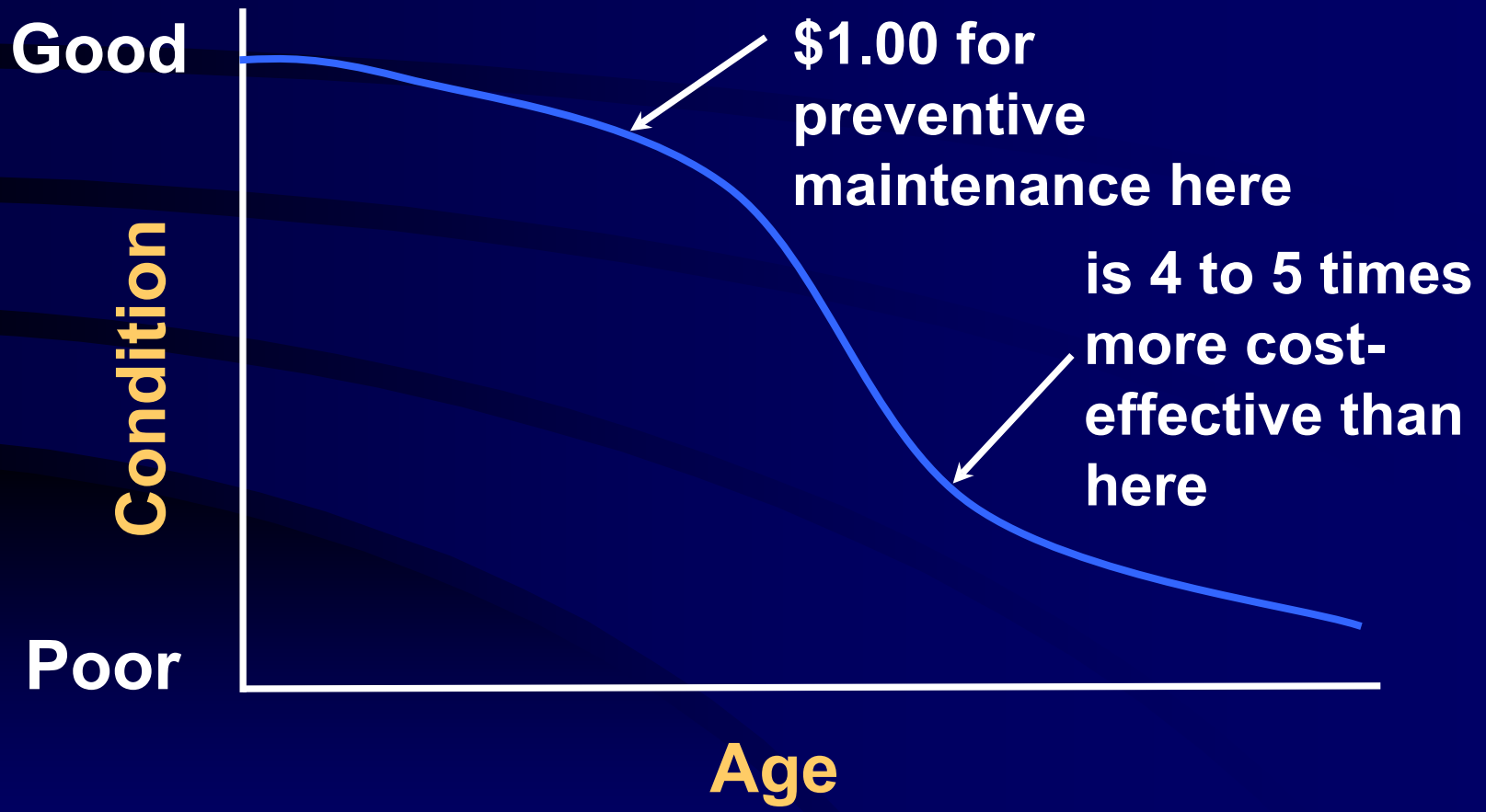
Functions of Maintenance Treatments

- Provide a new wearing surface
- Seal cracks in the surface
- Waterproof surface
- Improve pavement surface friction & surface drainage

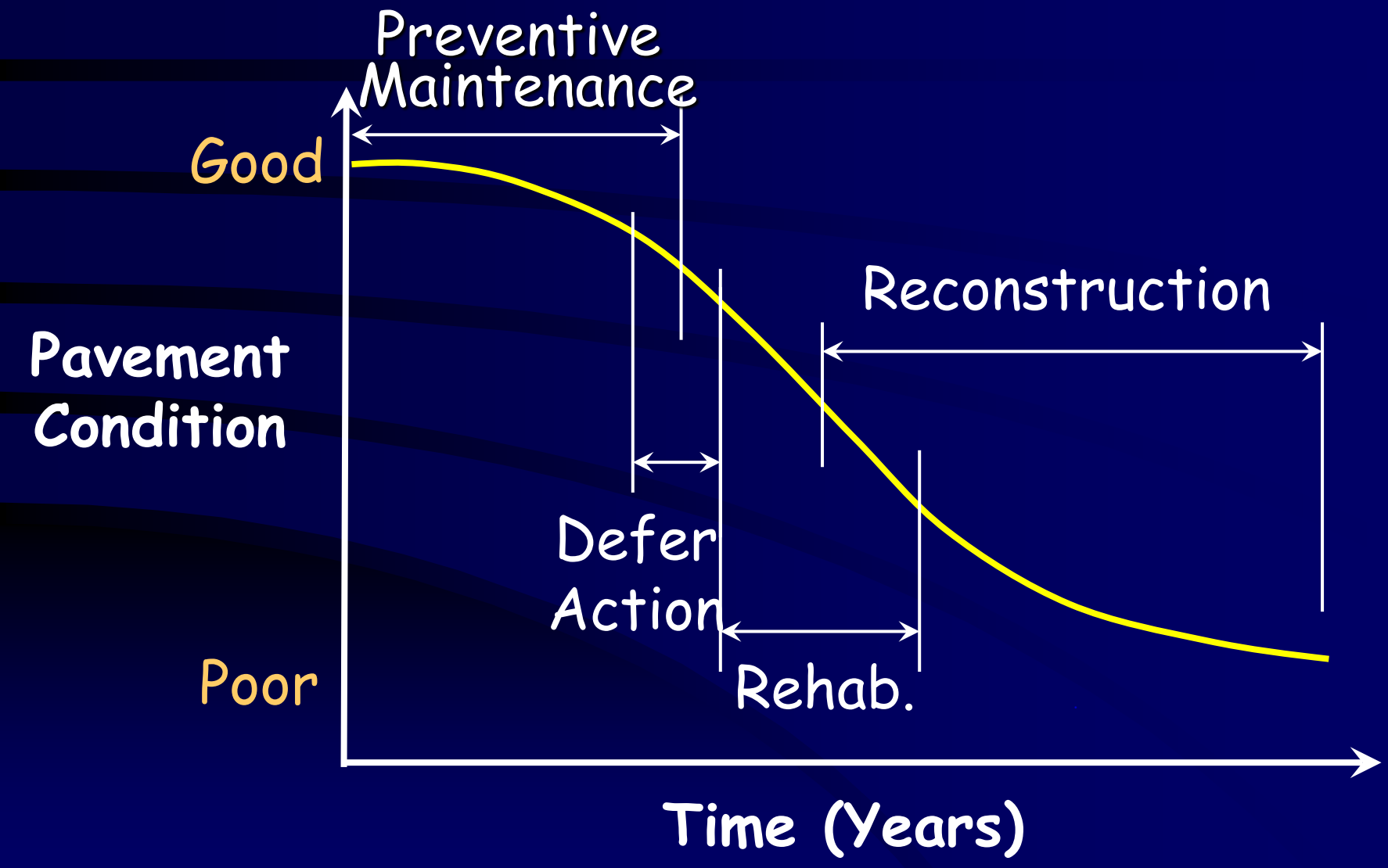
Functions of Maintenance Treatments (Cont.)

- Slow pavement weathering & aging
- Improve surface appearance

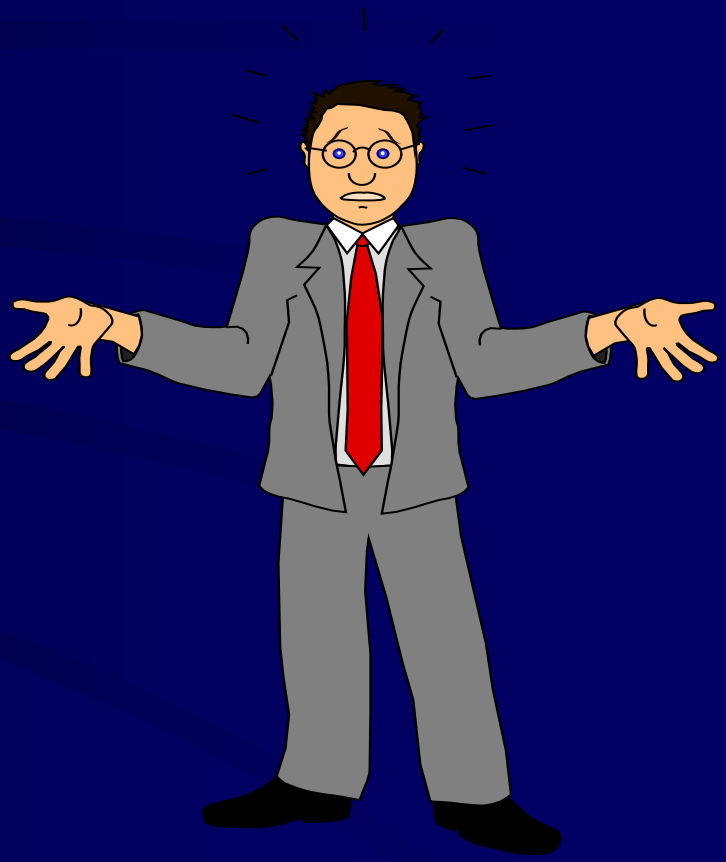
Effective Preventive Maintenance



When Should PM be Applied?



CRACK TREATMENT OF FLEXIBLE PAVEMENTS



Crack Sealing

- Routine maintenance
- Involves cleaning & sealing
- Prevents/reduces intrusion of
  - Water
  - Incompressible materials

Conditions for Success

Type of maintenance depends on crack

- Density
- Severity
- Pattern

Working vs. Nonworking Cracks

- Working cracks move more than 1/8 in. (transverse cracks)
- Nonworking cracks move less than 1/8 in. (longitudinal cracks)
- Sealing vs. Filling
  - Sealing for working cracks
  - Filling for nonworking cracks

Treatment Guidelines

Crack Density	Edge Deterioration		
	Low	Moderate	High
Low	None	CT ??	CR
Moderate	CT	CT	CR
High	ST	ST	Rehab.

CT = Crack Treatment (Sealing / filling)

CR = Crack Repair (cutting & patching)

ST = Surface Treatment

Preventive Maintenance

High Density, Moderate Edge Deterioration

Moderate Density, High Edge Deterioration

Low Density, Moderate Edge Deterioration

Low Density, Moderate Edge Deterioration

Sealant Materials

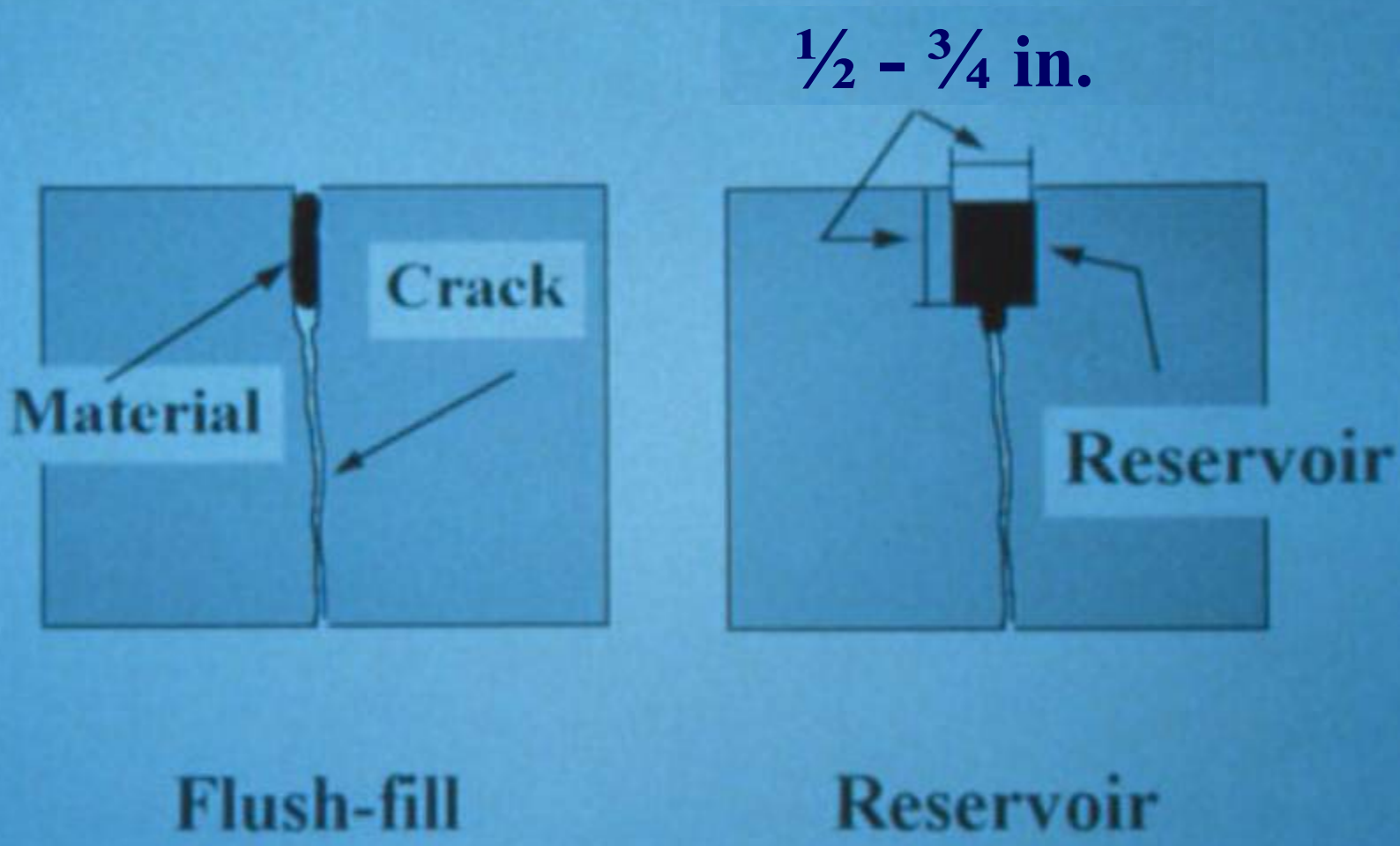
Bitumen-based materials

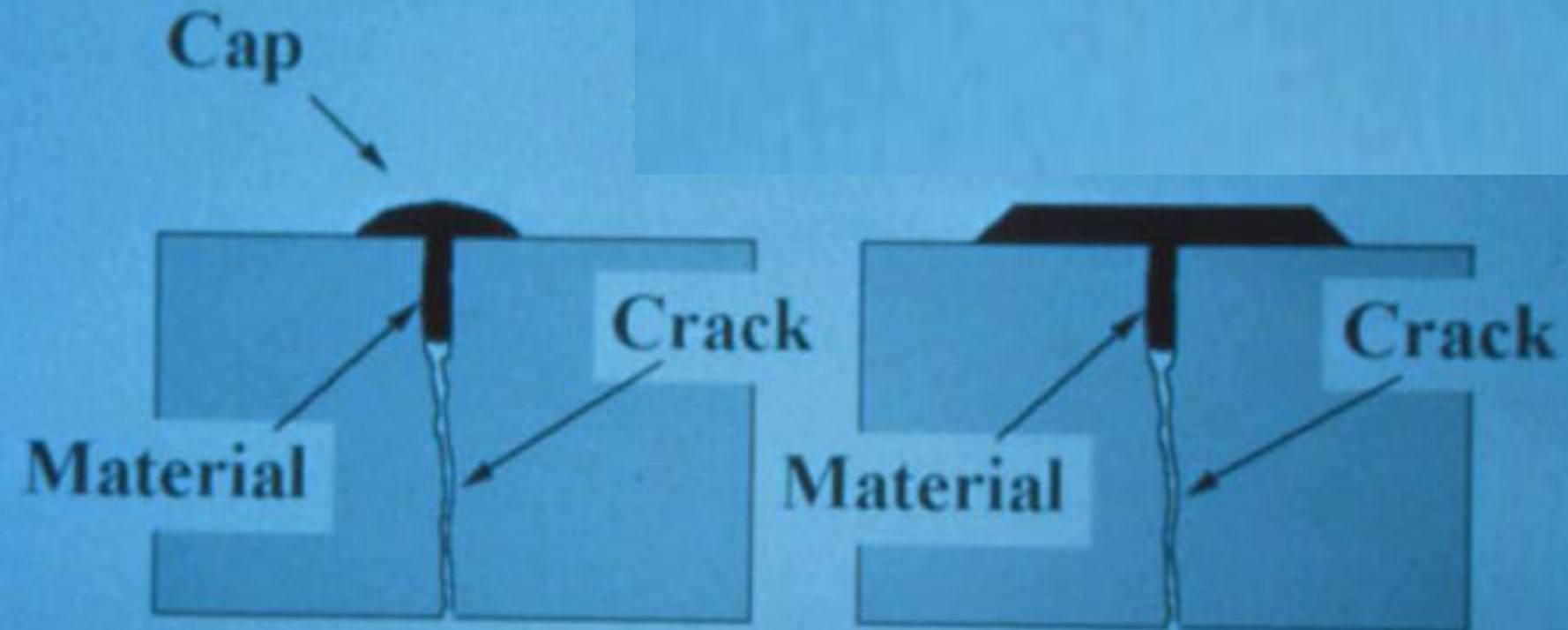
- ✓Hot Applied
- ✓Cold Applied
- ✓Usually rubber modified to increase flexibility

Sealing Configurations

- Flush-fill
- Reservoir
- Overband
- Combination:

  Reservoir and overband


½ - ¾ in.
Crack
Material
Reservoir
Flush-fill
Reservoir



Overband
(Capped)

Overband
(Simple band-aid)

Crack Treatment Procedure

- Crack routing (Optional)
- Crack cleaning & drying
- Material preparation & application
- Material finishing/shaping (Optional)
- Blotting/bond breaker (Optional)

Pavement Preparation

Crack routing

- Rotary-impact router
- Diamond blade

Rotary Impact Router

Diamond Blade Saw

Pavement Preparation (Cont.)

Cleaning & drying

- Broom
- Compressed air
- Sandblasting
- Hot air blasting (heat lance)

Cleaning the Crack (Air Blasting)

Drying the Crack (Heat Lance)

Sealing

Sealed Cracks

Edge Sealing

Covering Sealant with Bond Breaker

Crack Treatment Performance

- Retards deterioration
- Retards cupping deformation
- May extend life by 4 years

Crack Treatment Limitations

- Limited to low severity cracks
- Limited service life
- Must be repeatedly applied


Thanks for your attention!
Any
Questions?

FOG SEAL & REJUVENATORS

Fog Seal

Light application of diluted emulsion

- Renews surface
- Seals small cracks & voids
- Retards raveling

Conditions for Success

- Porous surface
- Low / moderate raveling
- High skid resistance
- Stable surface

Fog Seal Materials

- Diluted emulsion
  - Anionic / cationic
  - Slow / medium setting
- Proper consistency for application and filling cracks

Fog Seal Application

- Application rate 0.1-0.15 gal/yd^2 depending on weathering
- Not too much
- Spray temperature = 70-140^oF

Construction Considerations

- Pavement Preparation
  - Clean / no loose fragments
  - Dry surface
- Pavement temperature $\geq 60^{o}F$
- No rain threat


Cleaning

Emulsion Application

Tracking

May use sand to prevent tracking at intersections and driveways

Traffic Control

- Cures in 2 - 3 hours or more
- May reduce friction initially
- Better to reduce speed initially

Performance & Limitations

- Fairly short life (1 - 2 years)
- Not effective for
  - Large cracks
  - Low skid resistance
  - Bleeding
  - Rutting or shoving
  - Structural deficiency

Fog Seal No Fog Seal


STOP

Rejuvenators

Materials applied to aged, oxidized asphalt surfaces to

- Rejuvenate surface
- Prevent raveling
- Coat stripped surface
- May reduce crack development

Rejuvenator Materials

- Proprietary (CRX, Reclamite, …)
- Not proprietary such as
  - Recycling agents
  - Cationic oil in water emulsion of selected blend

Rejuvenator Limitations

- Same as fog seal
- Potential of damaging surface
- Always construct a test strip