

Pavement Maintenance and Rehabilitation



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Slides are available at:

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<https://pavement.engineering.asu.edu/>

Click on Previous Conferences then 2023
Workshop

Workshop Agenda

Topic	Time
Introduction	8:00 – 8:30
Distresses of asphalt and concrete pavements	8:30 – 9:30
Break	9:30 – 9:45
Pavement evaluation techniques	9:45 – 10:30
Drainage	10:30-10:45
Break	10:45 – 11:00
Materials for maintenance and rehabilitation	11:00 – 11:30
Pavement preservation timing and treatments	11:30 - 12:00
Lunch	12:00 – 12:45
Pavement preservation (Continued)	12:45 - 1:30
Preparation before resurfacing or restoration	1:30 – 2:00
Break	2:00 – 2:15
Hot-mix asphalt overlay	2:15 – 2:45
Recycling of asphalt pavement materials	2:45 – 3:30
Concrete Pavement Preservation	3:30 – 4:30

Pavement Types

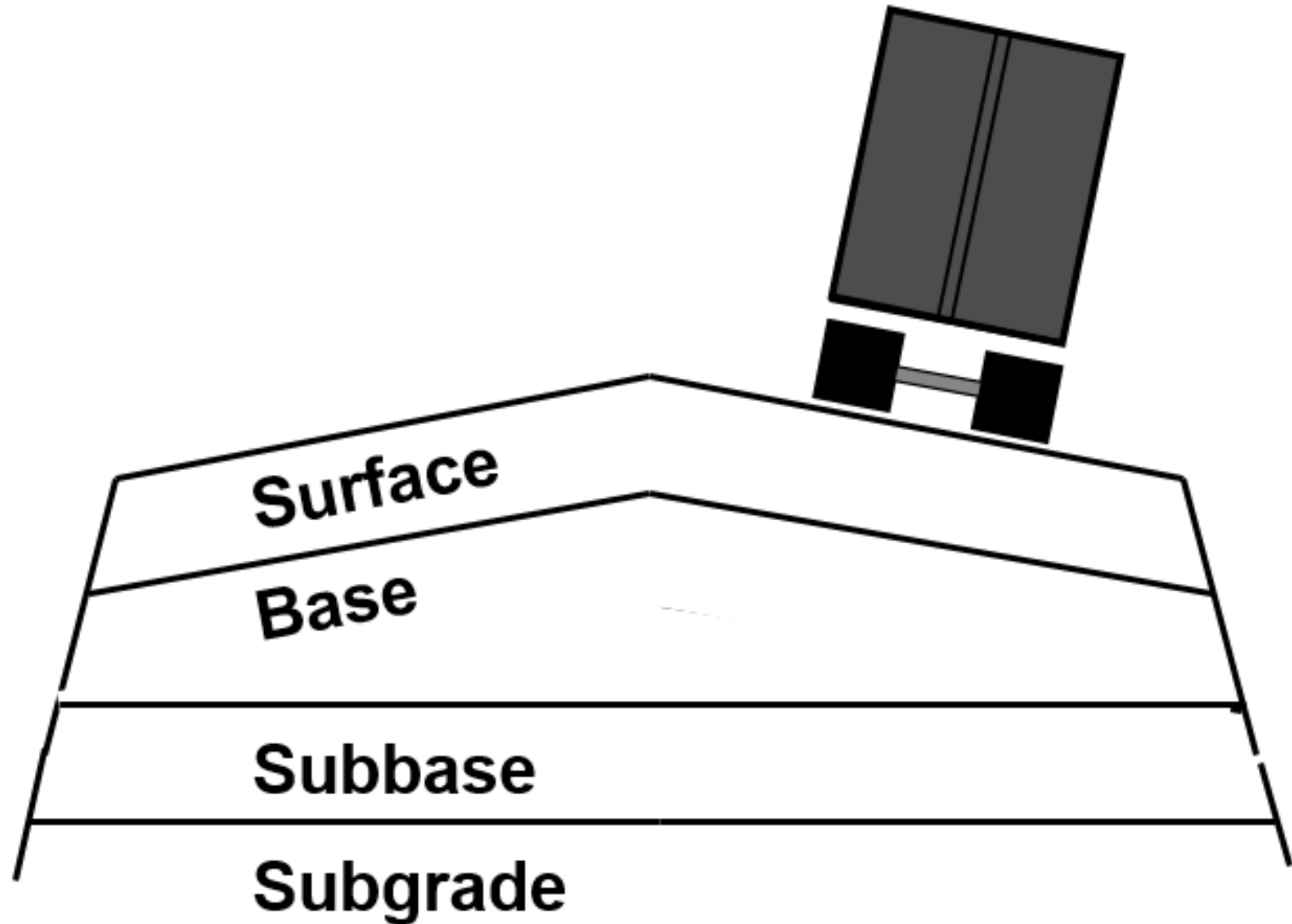
- Flexible (asphalt)
- Rigid (concrete)
- Composite



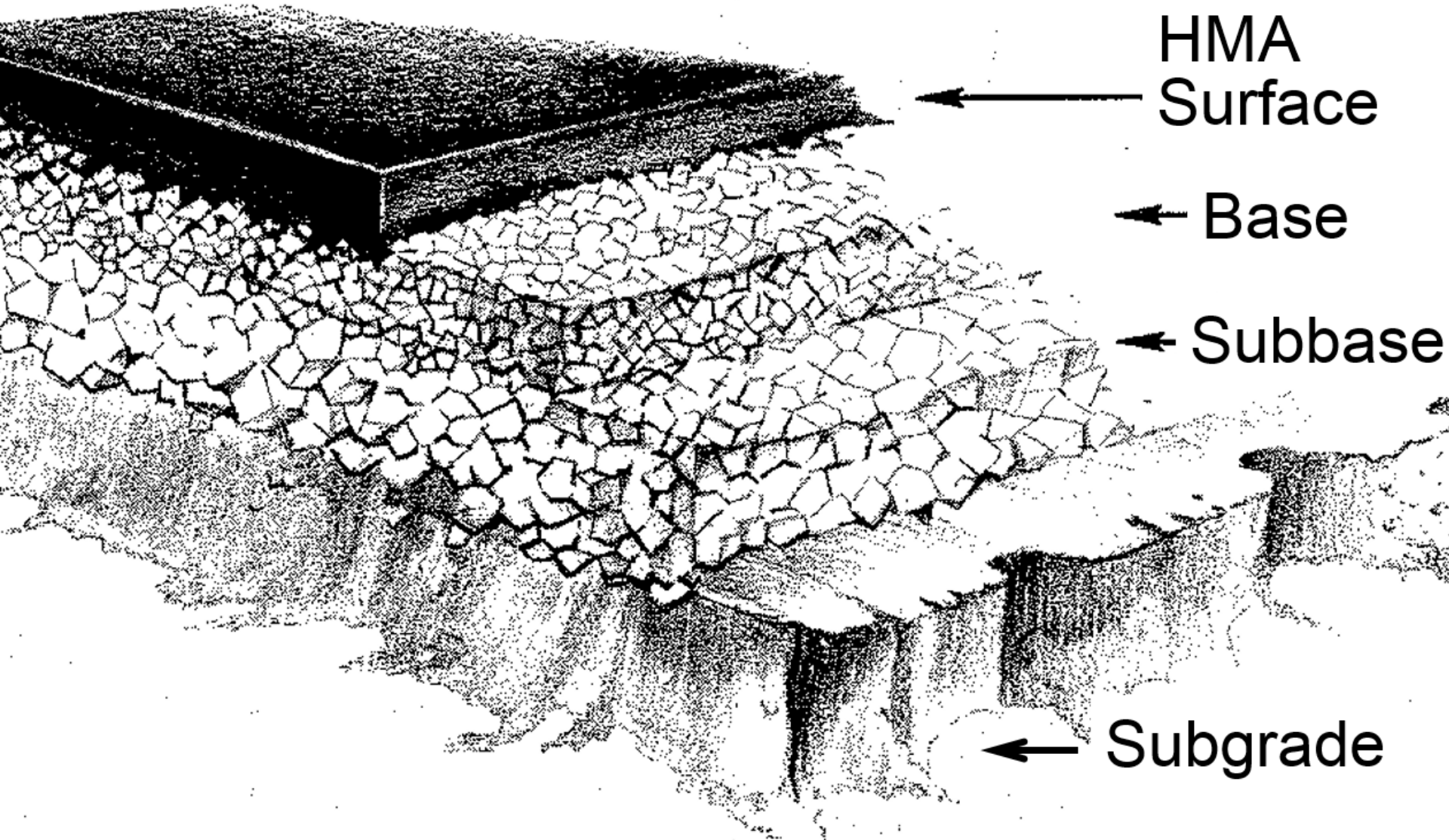
Comparison of Flexible and Rigid Pavements

- Asphalt roads are less durable
- Asphalt roads are less expensive
- 93% asphalt roads in the U.S.
- Selection should be based on life-cycle cost analysis

Asphalt Pavement

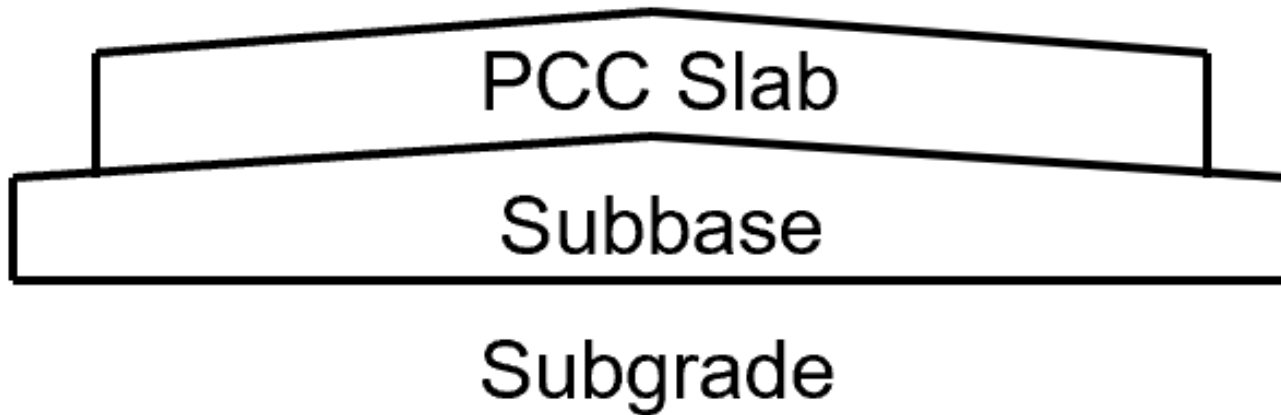


Asphalt Pavement

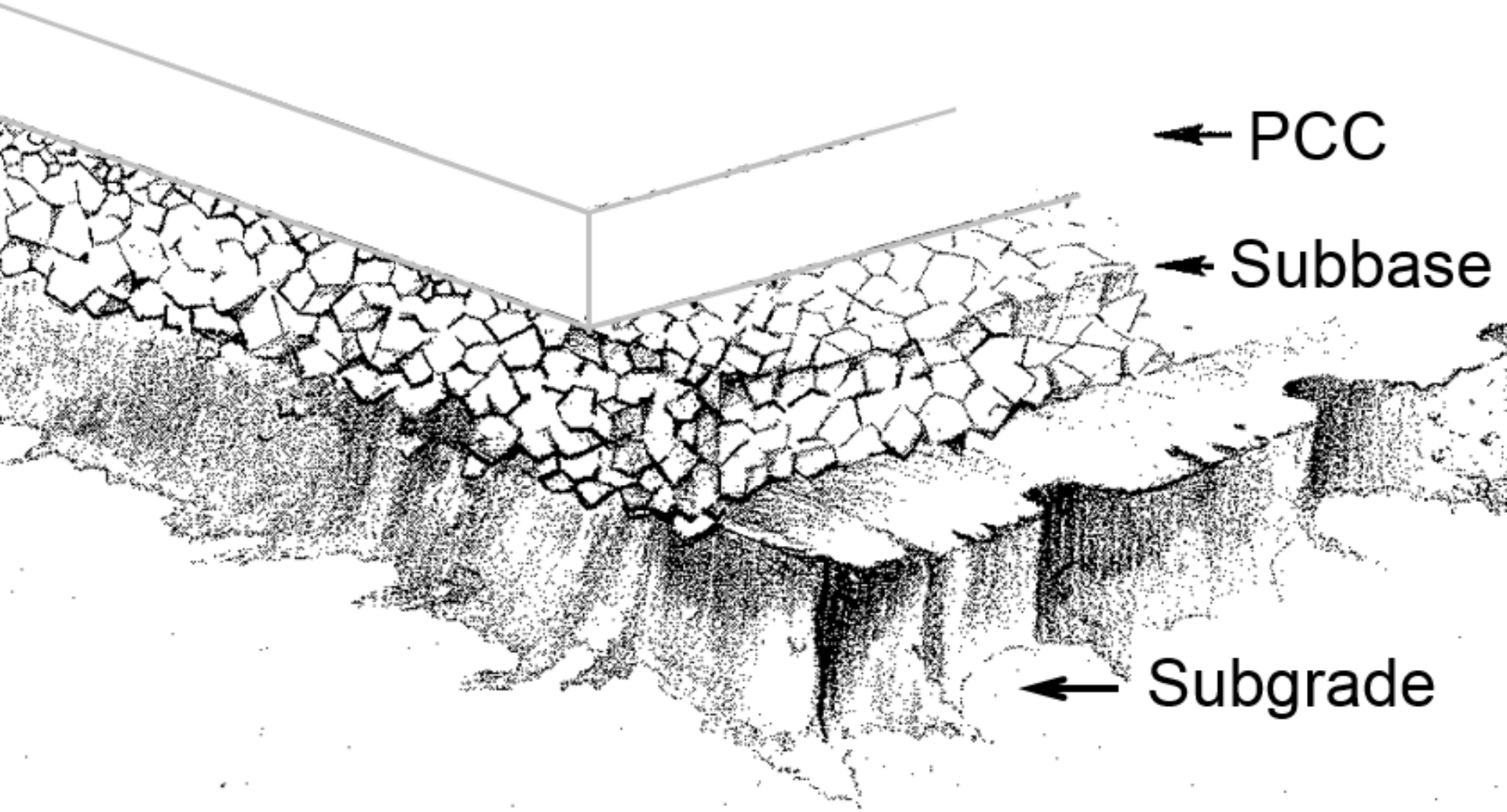




Concrete Pavement



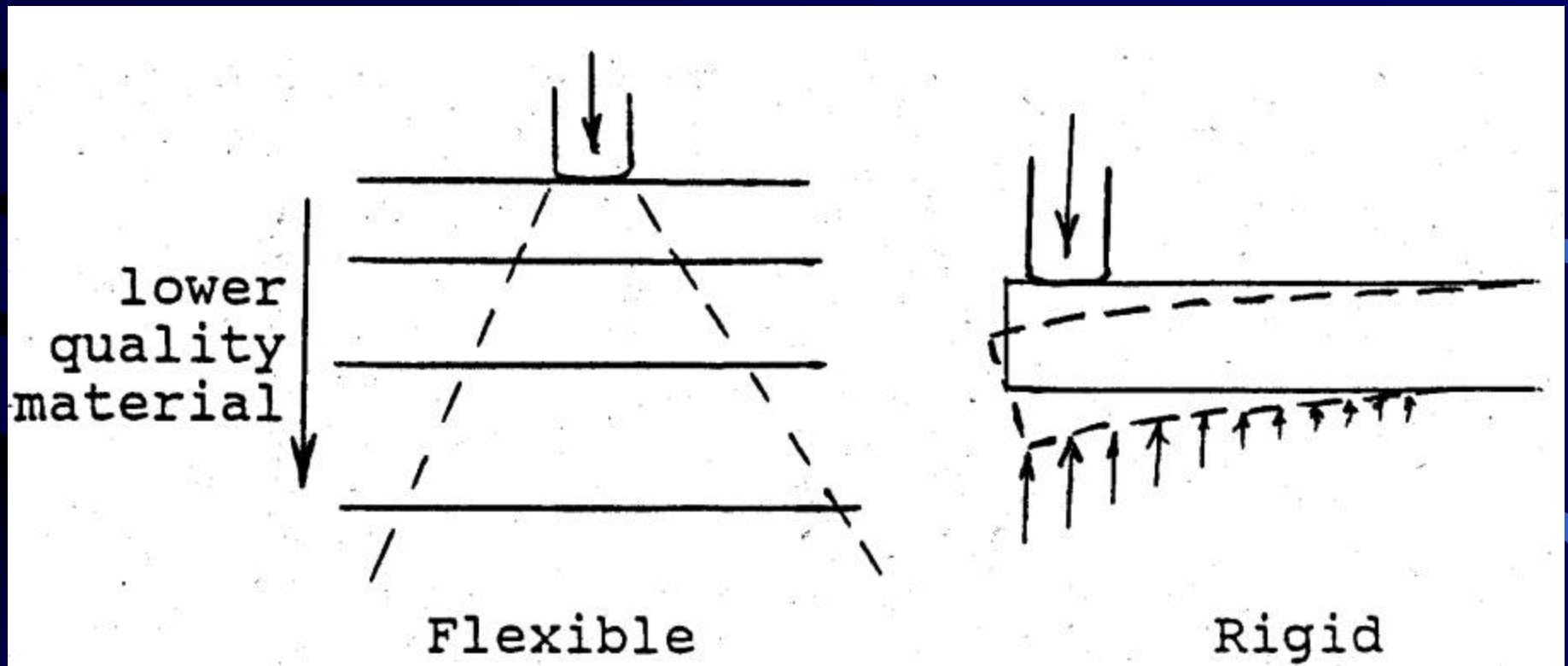
Concrete Pavement





- Asphalt roads have relatively short lives
- Asphalt roads are less expensive
- Selection should be based on life-cycle cost analysis
- 93% asphalt roads in the U.S.
- Maintenance and rehabilitation of existing roads represent most of the activities

Load Distribution in Flexible and Rigid Pavements



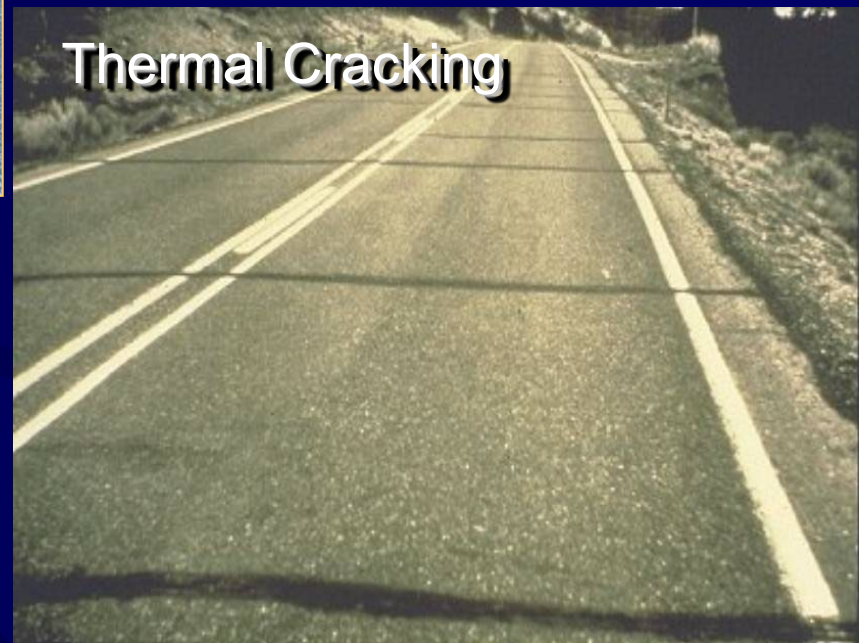
Challenges in Pavement Design

- Hard to estimate service life
- Different load magnitudes, configurations and speeds
- Multilayer system
- Viscoelastic, non-linear materials
- Material properties are affected by environmental conditions
- Unconventional definition of failure

Distresses vs. Failure

When a distress or a combination of distresses reaches a certain unacceptable level it is considered failure

Distresses in Asphalt Pavement



Distresses in Asphalt Pavement (Cont.)

Roughness



Shoving



Bleeding/Flushing



Distresses in Concrete Pavement



Distresses in Concrete Pavement (Cont.)

Alkali-Silica Reactivity



Scaling



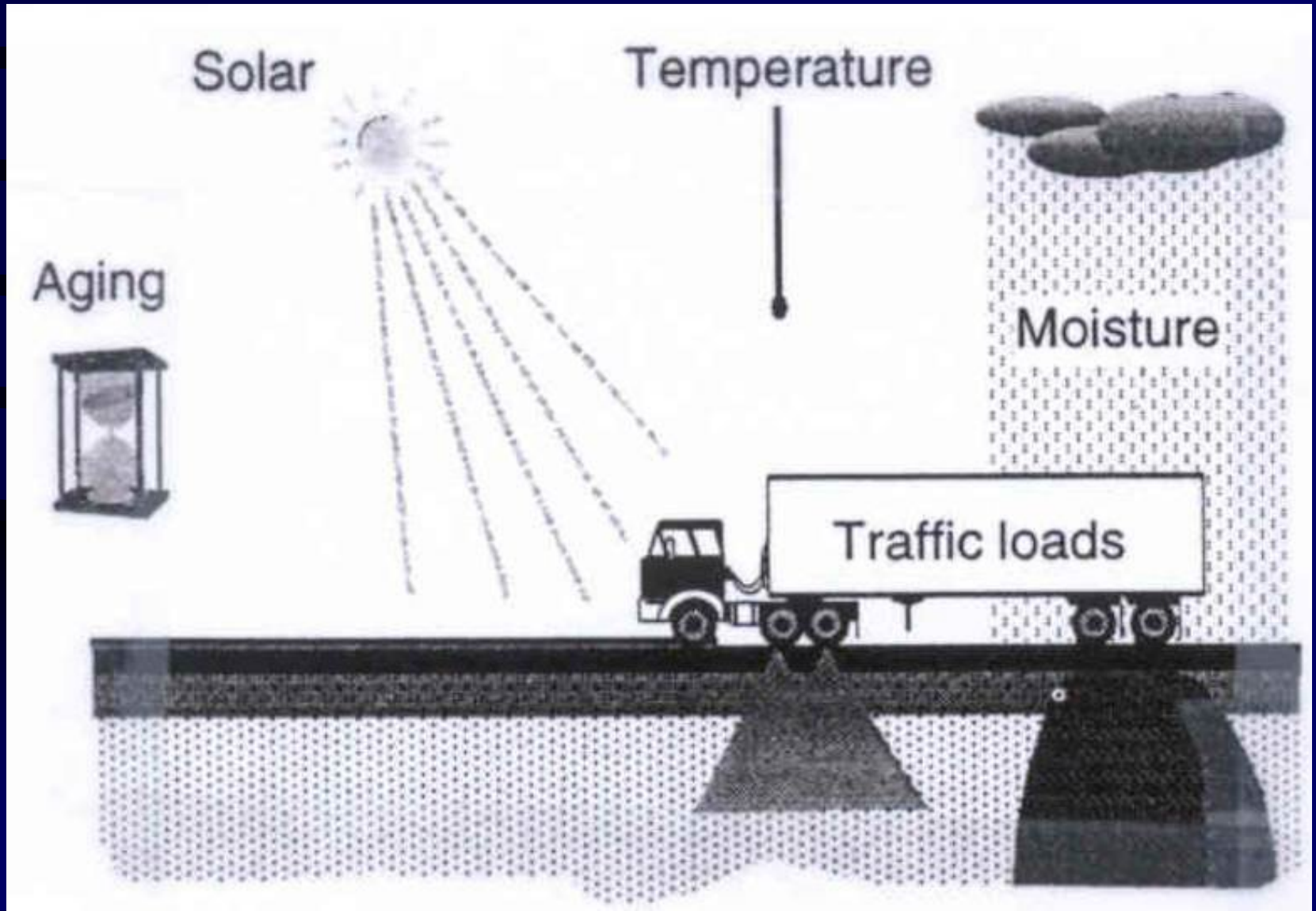
Joint Spalling



Major Research Projects

- AASHO Road Test (1958-1961)
- Strategic Highway Research Program (SHRP) (1987-1993)
- Mechanistic-Empirical Pavement Design (AASHTOWare Pavement ME Design)

Factors Affecting Pavement Performance



Factors Affecting Pavement Performance

1. Traffic

2. Soil and pavement materials

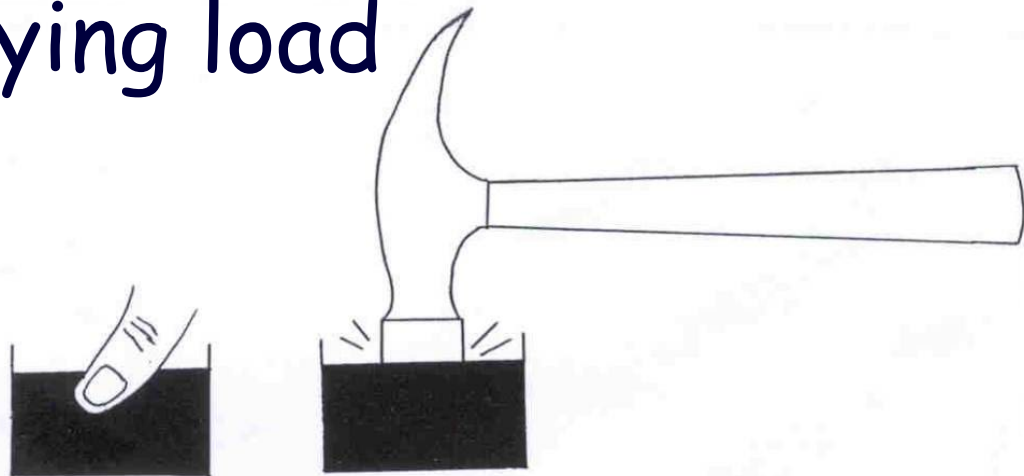
3. Environment

4. Construction and maintenance

Traffic

Traffic has a major effect on pavement performance

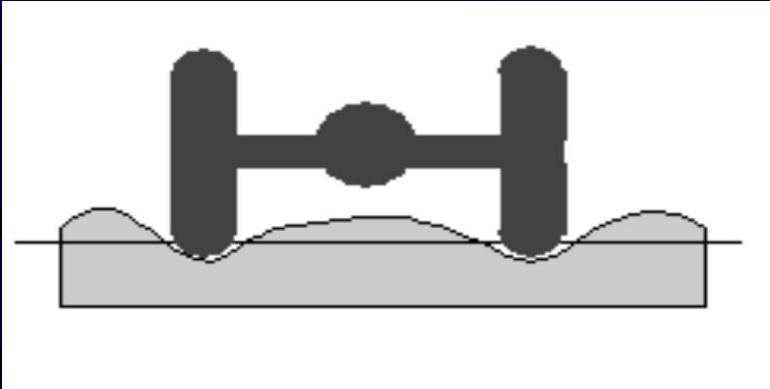
- Traffic volume
- Traffic load
- Tire pressure
- Rate of applying load



Severe Traffic Conditions



Heavy load and high traffic volume



High tire pressure



Slow moving vehicles

Factors Affecting Pavement Performance

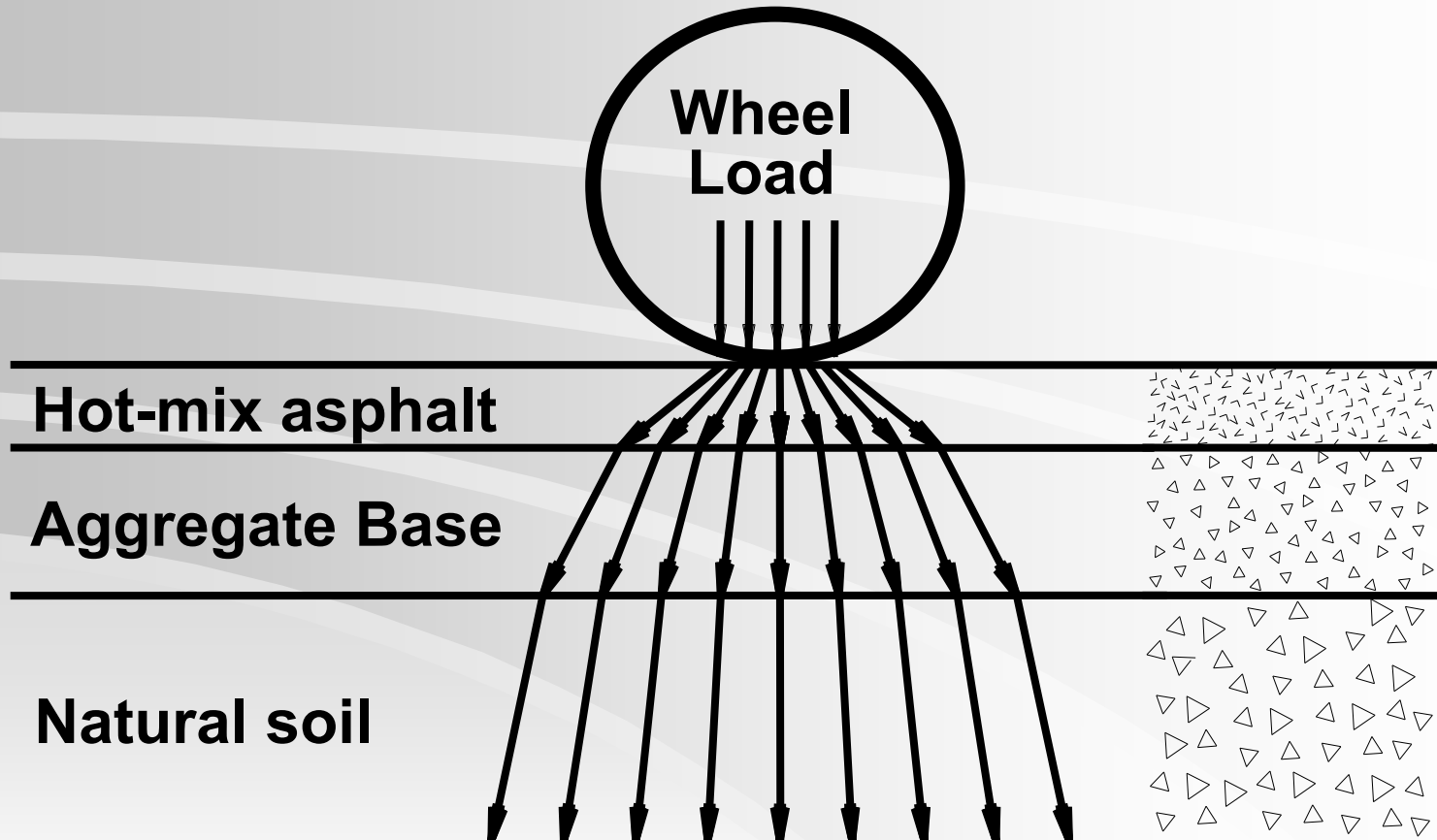
1. Traffic

2. Soil and pavement materials

3. Environment

4. Construction and maintenance

Material quality affects performance



Factors Affecting Pavement Performance

1. Traffic

2. Soil and pavement materials

3. Environment

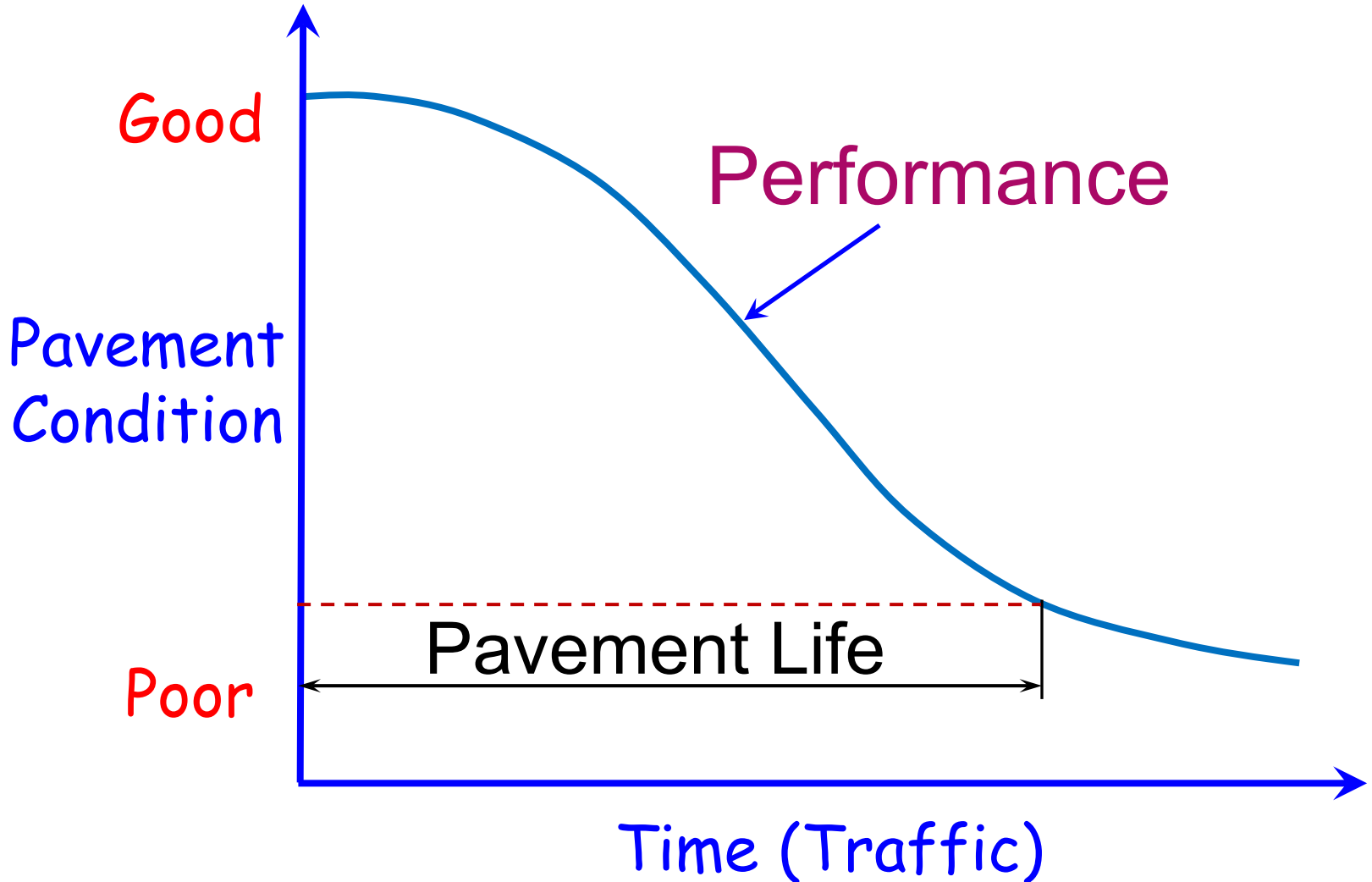
- Moisture
- Temperature
- Aging

4. Construction and maintenance

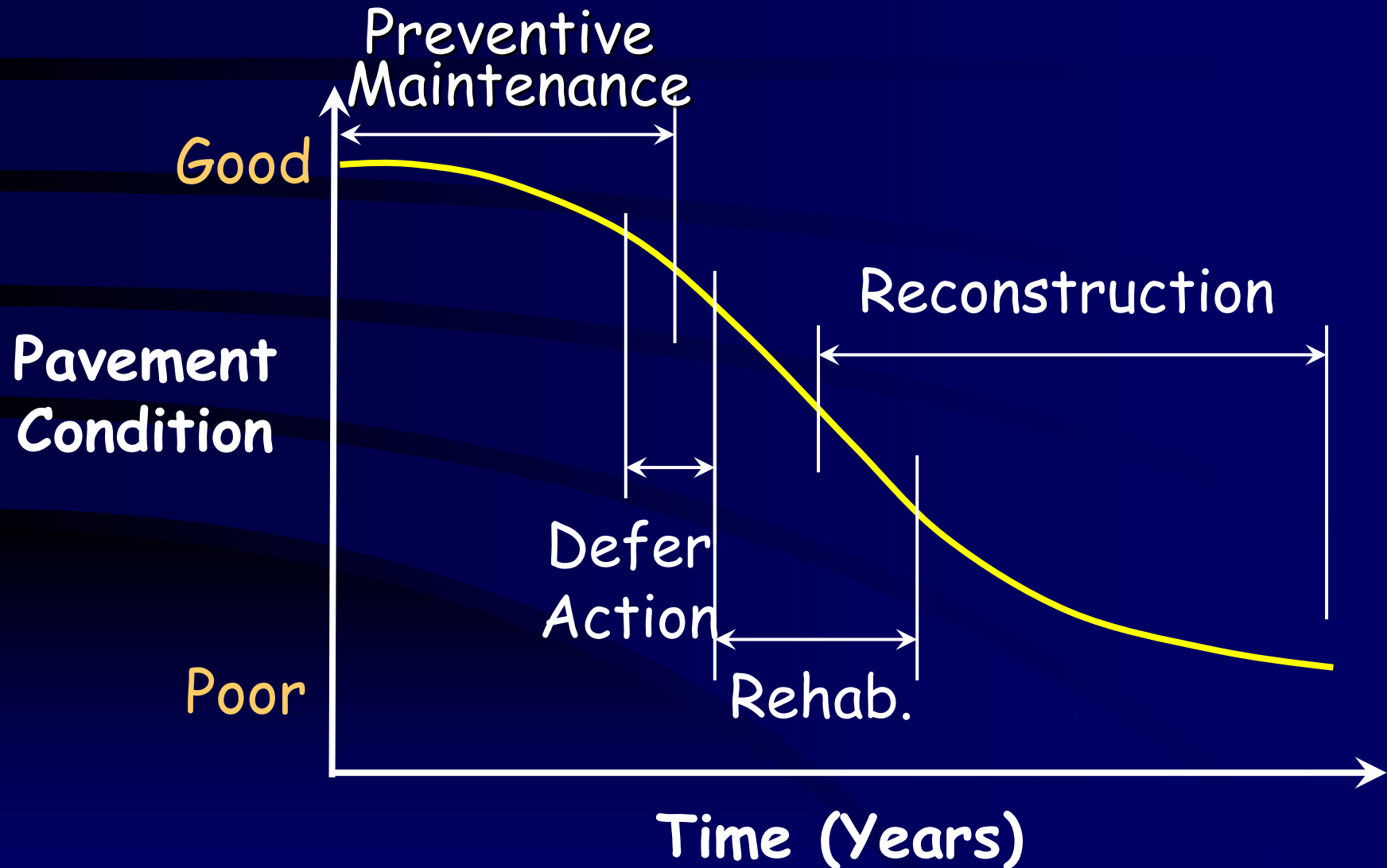
Factors Affecting Pavement Performance

1. Traffic
2. Soil and pavement materials
3. Environment
4. Construction and maintenance

Pavement Performance



Maintenance vs. Rehabilitation



Pavement Design Approaches

- Based on experience (ie, standard sections)
- Methods based on simple strength tests or soil formula
- Empirical (1993 AASHTO)
- Mechanistic-empirical (AASHTOWare ME Design method)

Questions?

- There is no such thing called dumb question.
- There are always dumb answers !!!

