ACI Seminar on Performance-Specification for Concrete

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FHWA/ACI Cooperative Agreement

- Established to support technology transfer
  - Educational seminars
  - Workshops
  - Co-sponsor conferences
- Current seminar topics:
  - Chemical admixtures
  - Cementitous materials
  - Self-consolidating concrete
- Performance specification for paving concrete
  - 1.5-day seminar under development
  - Goal – promote the use of optimized concrete mixtures

Motivation for promoting the use of optimized concrete mixture

- Improve durability
- Achieve long life
- Sustainability

Keys to achieving long-life pavement

- **Effective structural design**
  - Good foundation – uniform support, non-erodible, adequate drainage
  - Adequate structural section
  - Appropriate design features
- **Durable material**
  - Durable surface – abrasion resistant
  - No material-related problems
- **Quality construction**

Why do we want long-life pavement?

- Economic sustainability is the biggest challenge facing DOTs today
- The long-life pavement approach greatly enhances the highway agencies' ability to meet the pavement needs
  - Building long-life, low-maintenance pavements
  - Taking proactive measures to preserve the pavement
- The sustainability is improved automatically

In theory there is no difference between theory and practice. In practice there is.

Yogi Berra

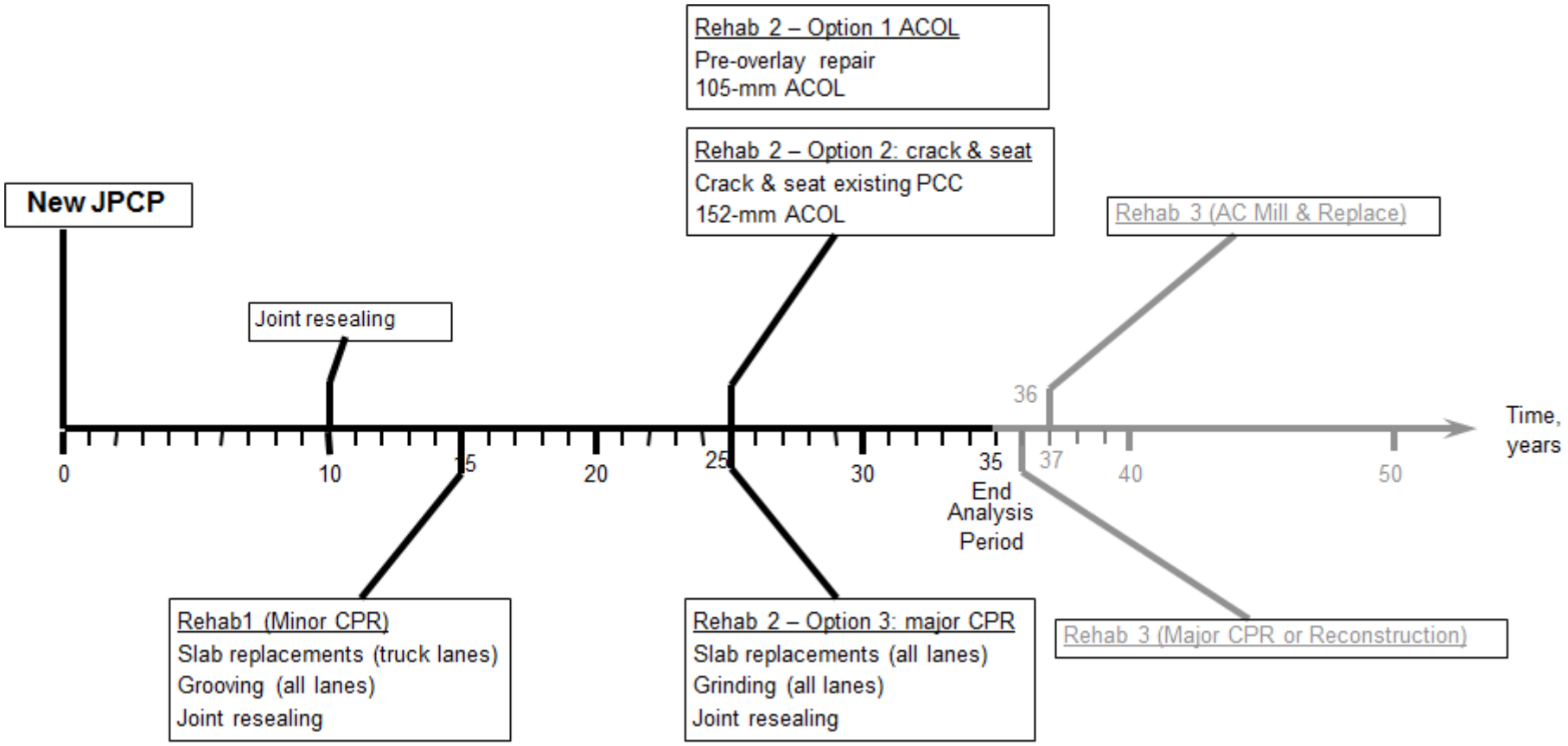
Things must work in theory to have any chance of working in practice.

Tom Yu

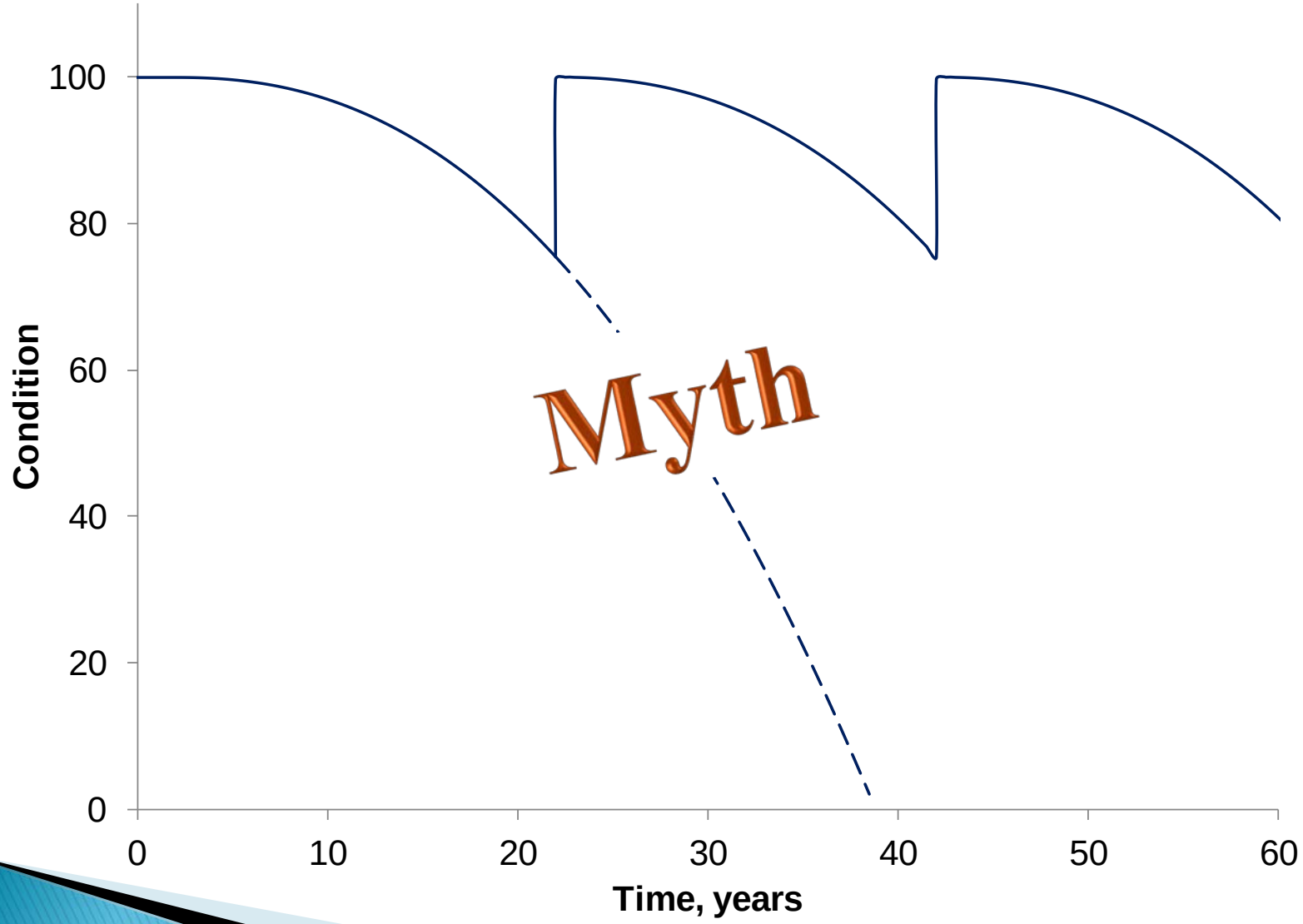
Current practice

- Pavements are designed to fail
  - Finite design period
  - Pavements are designed for relatively high levels of distress at the end of the design period
- Repairs are not made until distresses progress to high severity
- Structural overlays are used primarily as a corrective measure
  - Typically used on pavements in poor condition
  - A thicker overlay is generally required

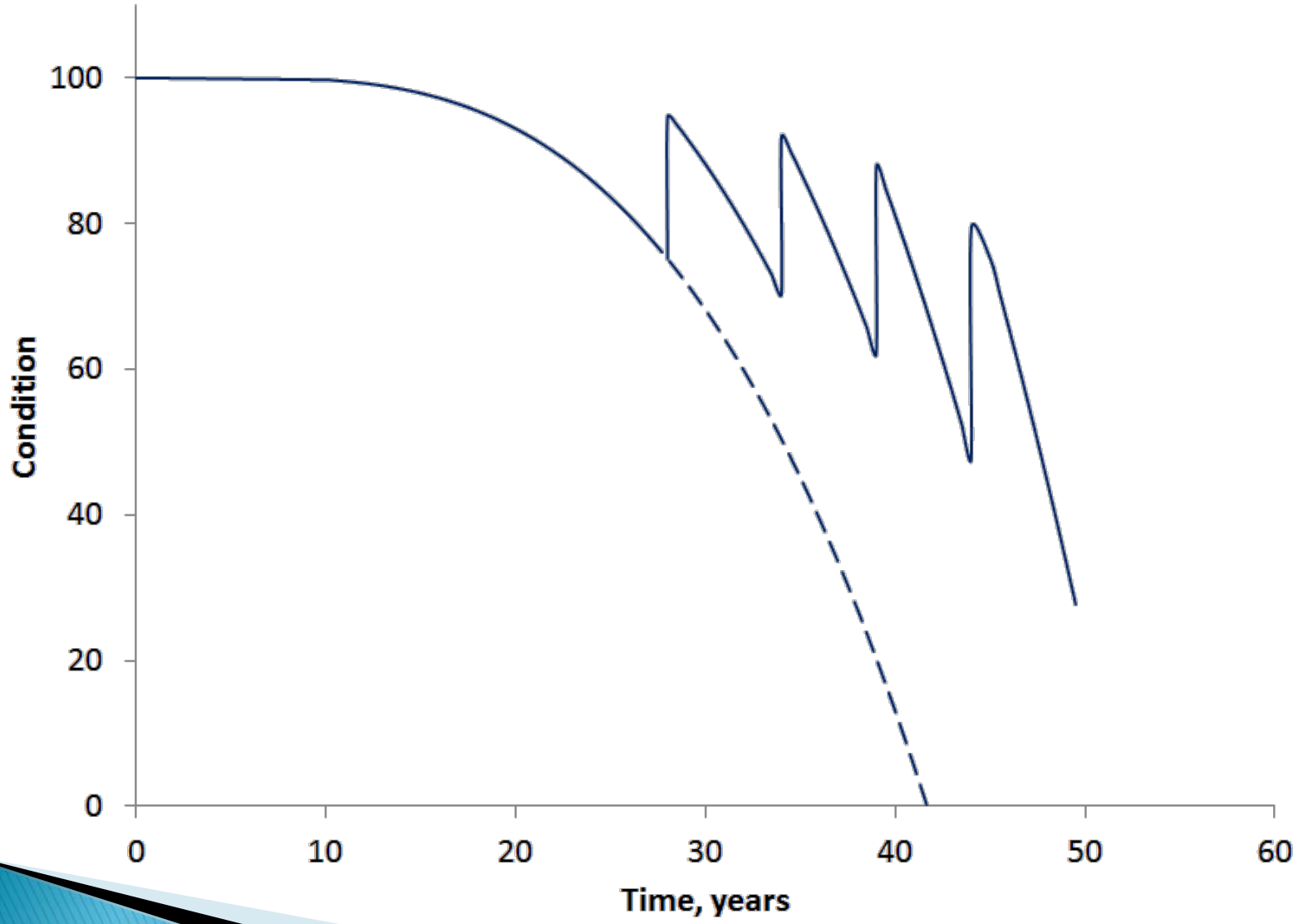
Example JPCP life-cycle model



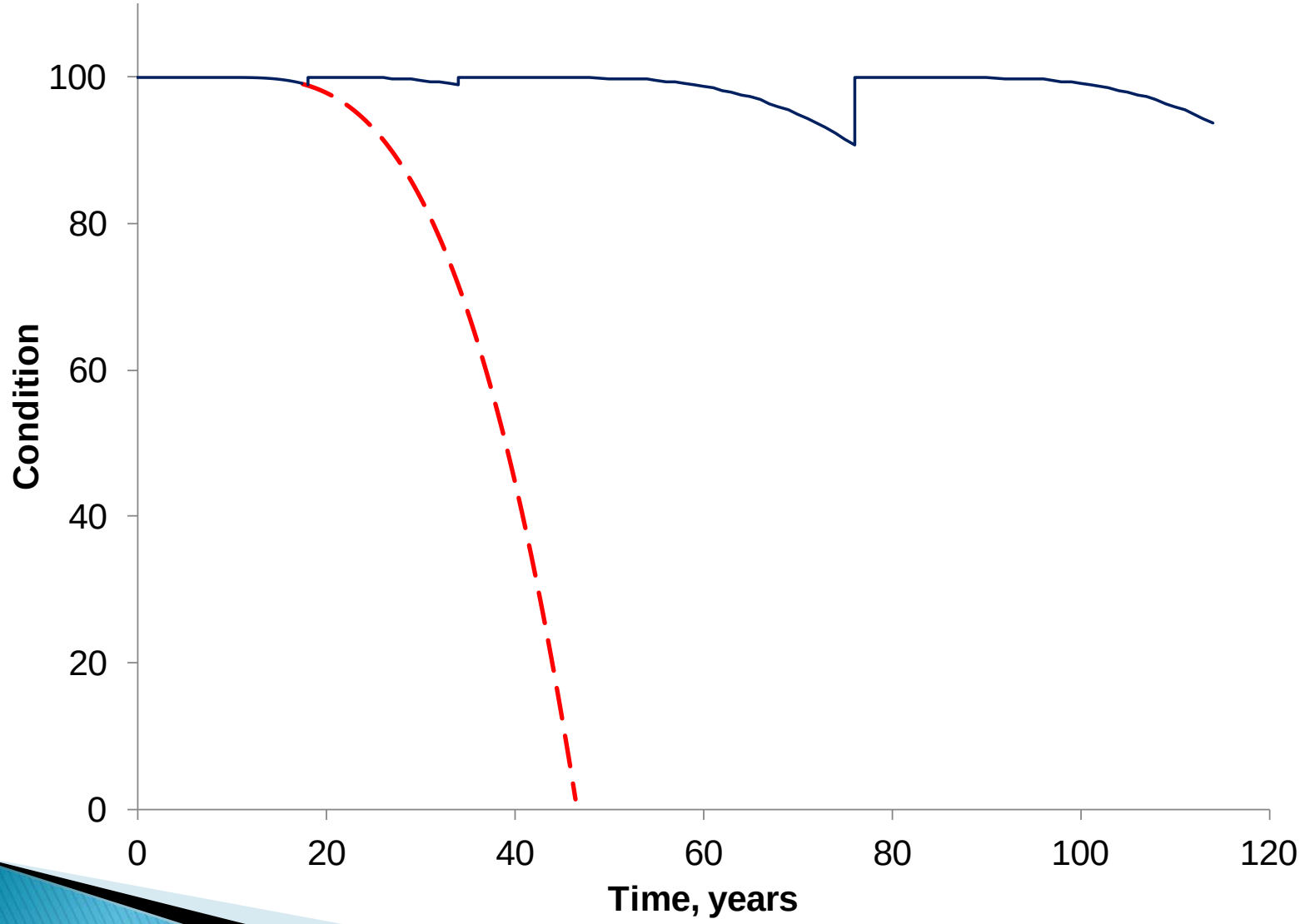
Pavement condition vs. age



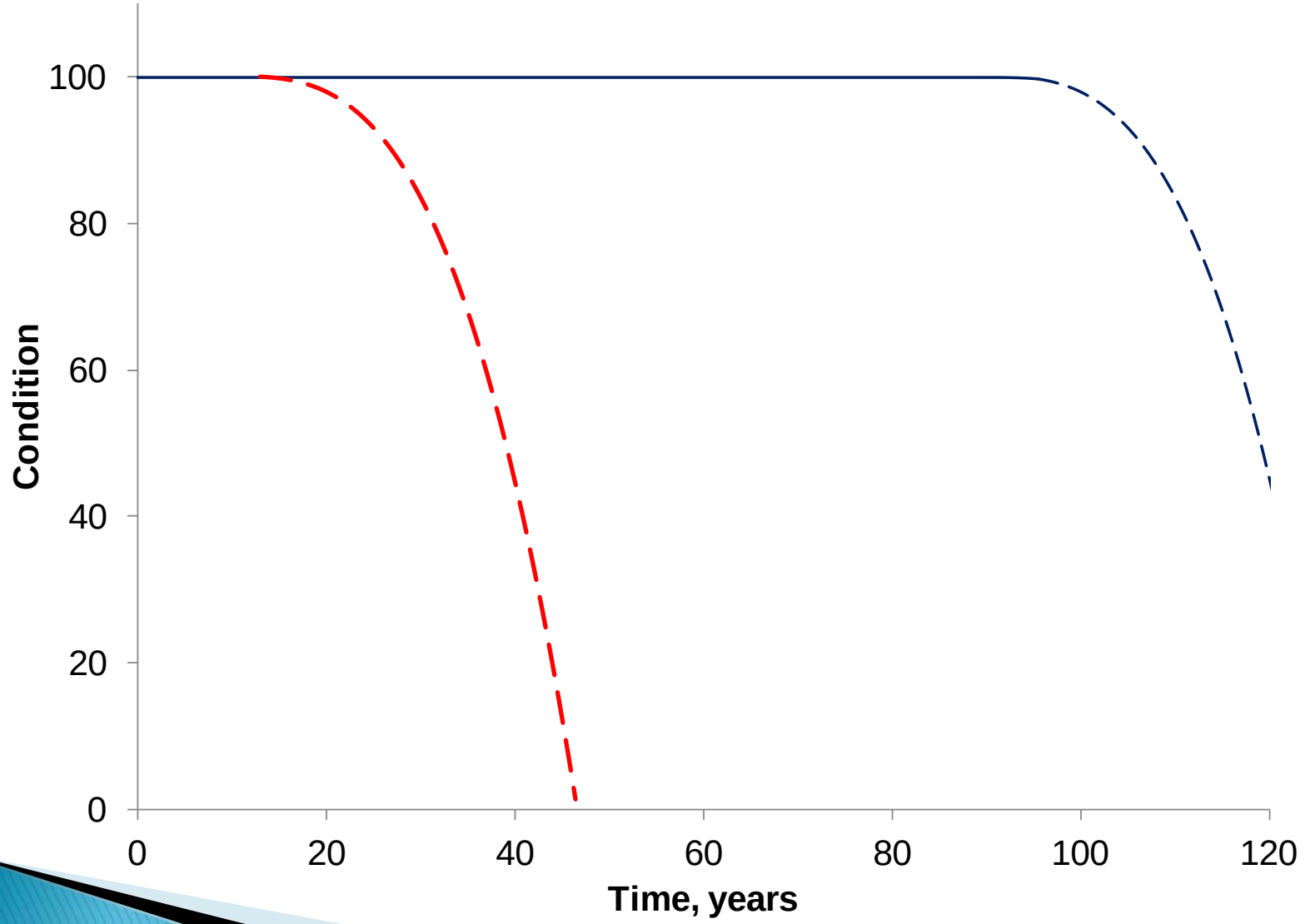
Pavement condition vs. age – current practice



Pavement condition vs. age – preservation approach



Pavement condition vs. age – long-life pavement



Cost Considerations

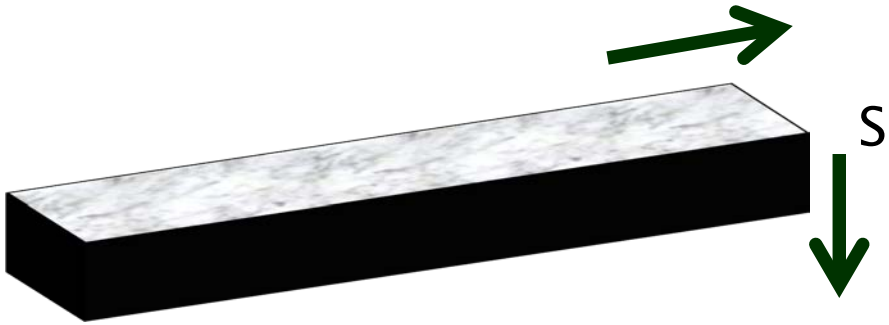
Current practice

Cost considerations

- Minimizing LCC of a single project does not provide the best results for the network
- Highway investment decision is a resource allocation problem
- At any given funding level, the optimum solution is one that buys the most service life for the network: total lane-mile-years

Two Dimensions of Paving

Coverage: lane-miles



Service Life: years

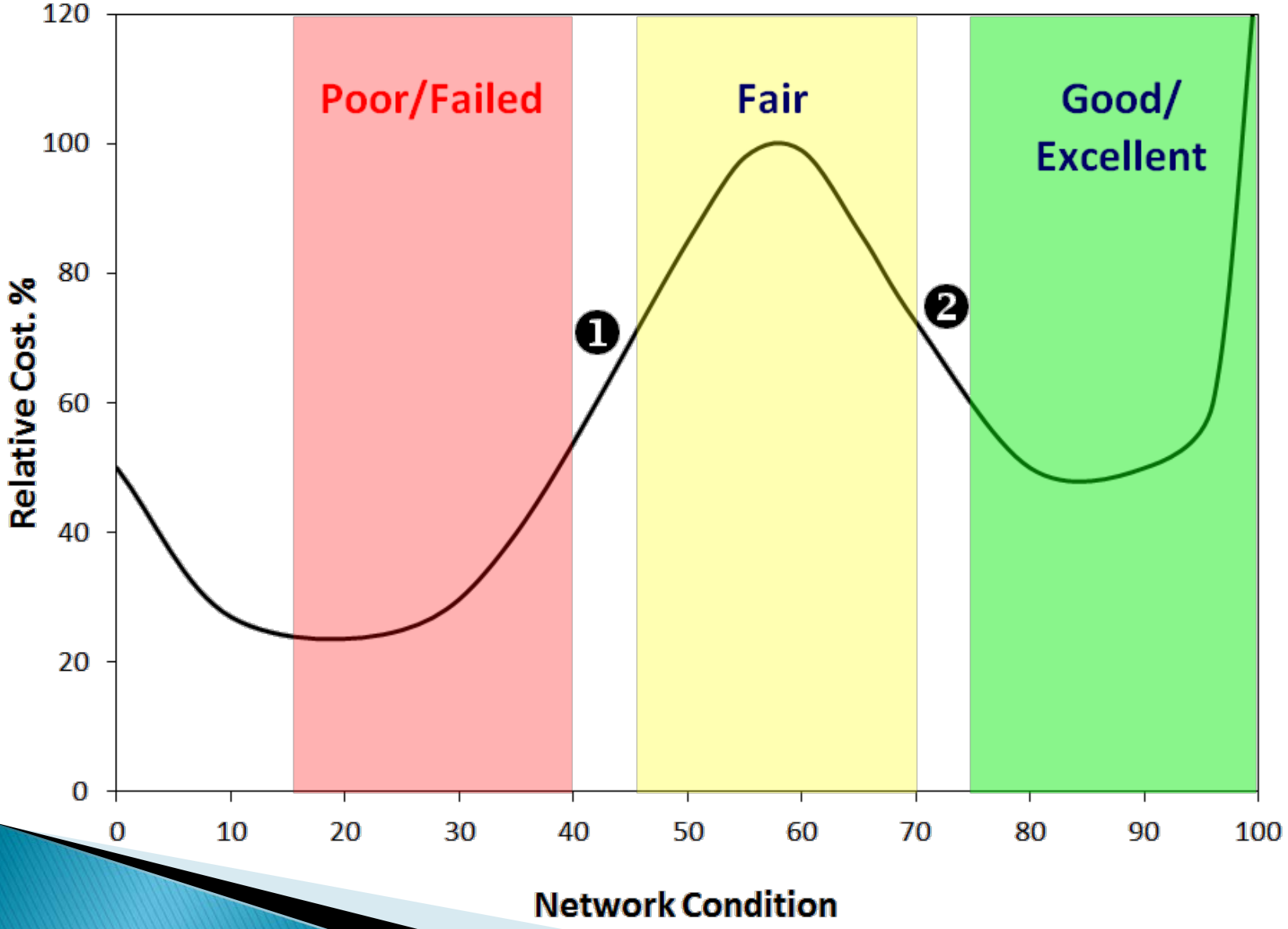
Unit of Paving = **lane-mile-years**

Unit of pavement cost = **$/lane-mi-yr**

A network of x lane-miles of pavement requires an addition of x **lane-mile-years** of service life each year to maintain status quo

A Quick Check of Your Highway Network Health: FHWA-IF-07-006

Network condition vs. cost

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QUESTIONS?

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