



*Producing the Best
By
Specifying the Best*

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February 9 thru 11, 2009

Association of Modified Asphalt Producers

Outline

- ❖ Introduction
- ❖ Basics
- ❖ Design/Build/Operate
- ❖ QC/QA Types of Specifications
- ❖ Summary



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Produce the Best

- ❖ Provide the lowest life cycle cost
- ❖ Consider first cost
- ❖ Consider user/non-user costs
- ❖ Be green & sustainable
- ❖ Be safe
- ❖ Contractor/suppliers make profits

Prevent or Minimize these Distresses

- ❖ Rutting
- ❖ Raveling
- ❖ Flushing
- ❖ Fatigue cracking
- ❖ Thermal cracking
- ❖ Water sensitivity
- ❖ Age hardening

Specify the Best

- ❖ Reward quality
- ❖ Specify quality
- ❖ Allow for innovation
- ❖ Enforce specifications

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Basic Requirements

- ❖ **Quality management system**
- ❖ **Quality control system**
- ❖ **Technician certification**
- ❖ **Laboratory accreditation**
- ❖ **Plant calibration program**
- ❖ **Asphalt binder management program**
- ❖ **Aggregate management program**
- ❖ **Minimum sampling, testing & reporting program**
- ❖ **QC technician & engineers report to non-operational person**

Minimum Sampling/Testing/Reporting Programs

- ❖ Process control
- ❖ Quality control
- ❖ Quality assurance
- ❖ Independent assurance
- ❖ Availability of third party testing

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Design/Build/Operate

- ❖ Best method to deliver project?
- ❖ Operate – warranty (long term)
- ❖ Relationship between designers (engineers) & contractors
- ❖ Materials selection
- ❖ Pavement design

Project Delivery?

- ❖ Best for large projects
- ❖ Limit number of contractors?
- ❖ Technology not available – risk is high
- ❖ Interaction between designers and contractors
- ❖ Allow/restrict innovation
- ❖ Proposal/bid evaluation
- ❖ Bonding

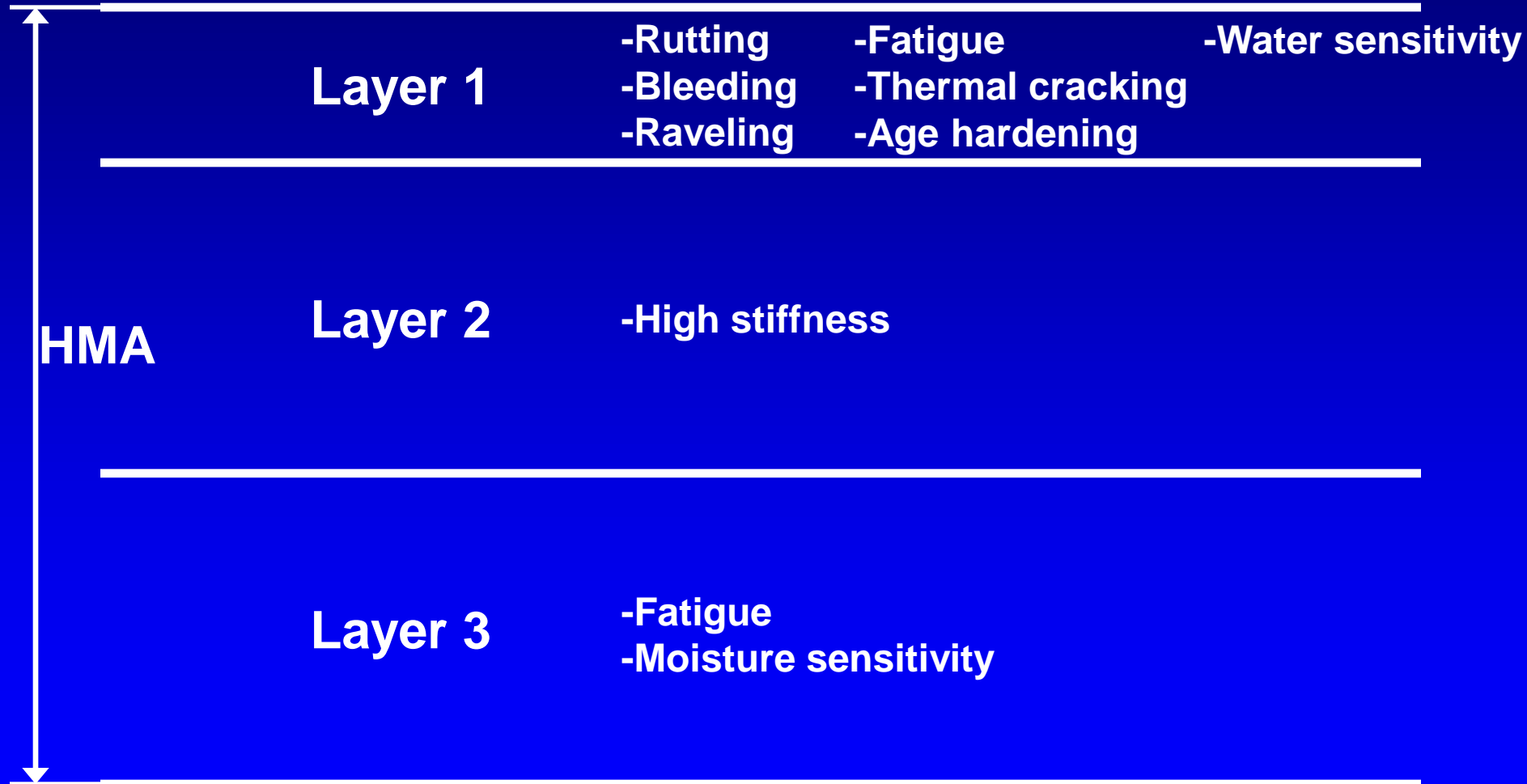
Warranty

- ❖ **Difficult to quantify**
 - ❖ Smoothness
 - ❖ Friction
 - ❖ Type, extent and degree of distress(es)
- ❖ **Difficult to quantify required**
 - ❖ Rehabilitation
 - ❖ Maintenance
- ❖ **Cause of premature distress**
 - ❖ Binder supplier
 - ❖ HMA producer
 - ❖ Placement/compaction contractor
 - ❖ Designer
- ❖ **Traffic**
- ❖ **Act of God**

Designer/Builder Relationship

- ❖ Quality of design team
- ❖ Quality of material supplier
- ❖ Quality of contractor
- ❖ Technical and financial ability to investigate alternatives

Materials Selection



Materials Selection

- ❖ Lab mixed – lab compacted
- ❖ Field mixed – lab compacted
- ❖ Field mixed – field compacted

Mixing Method



Lab



Field

Compaction Method

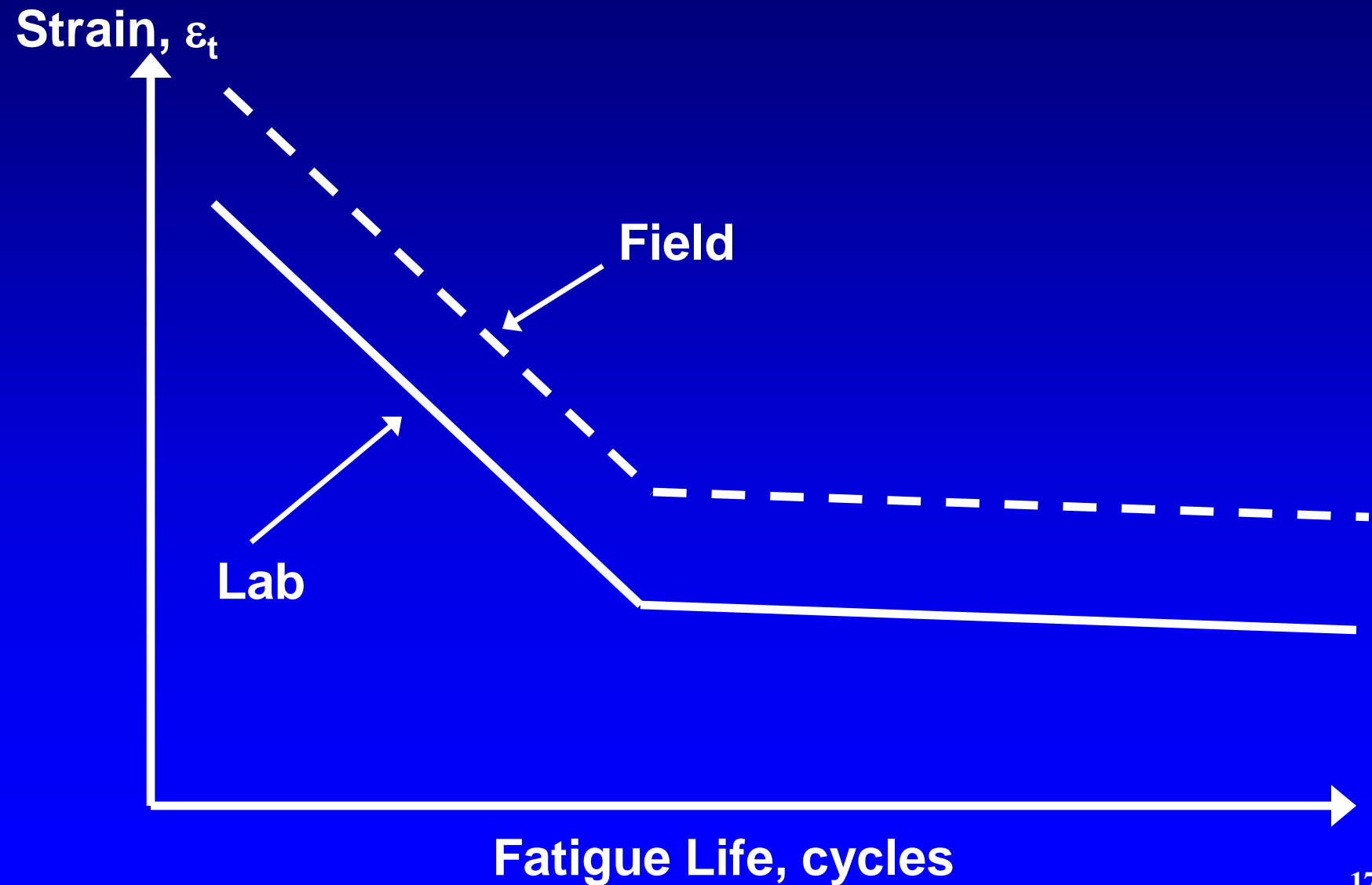


Lab

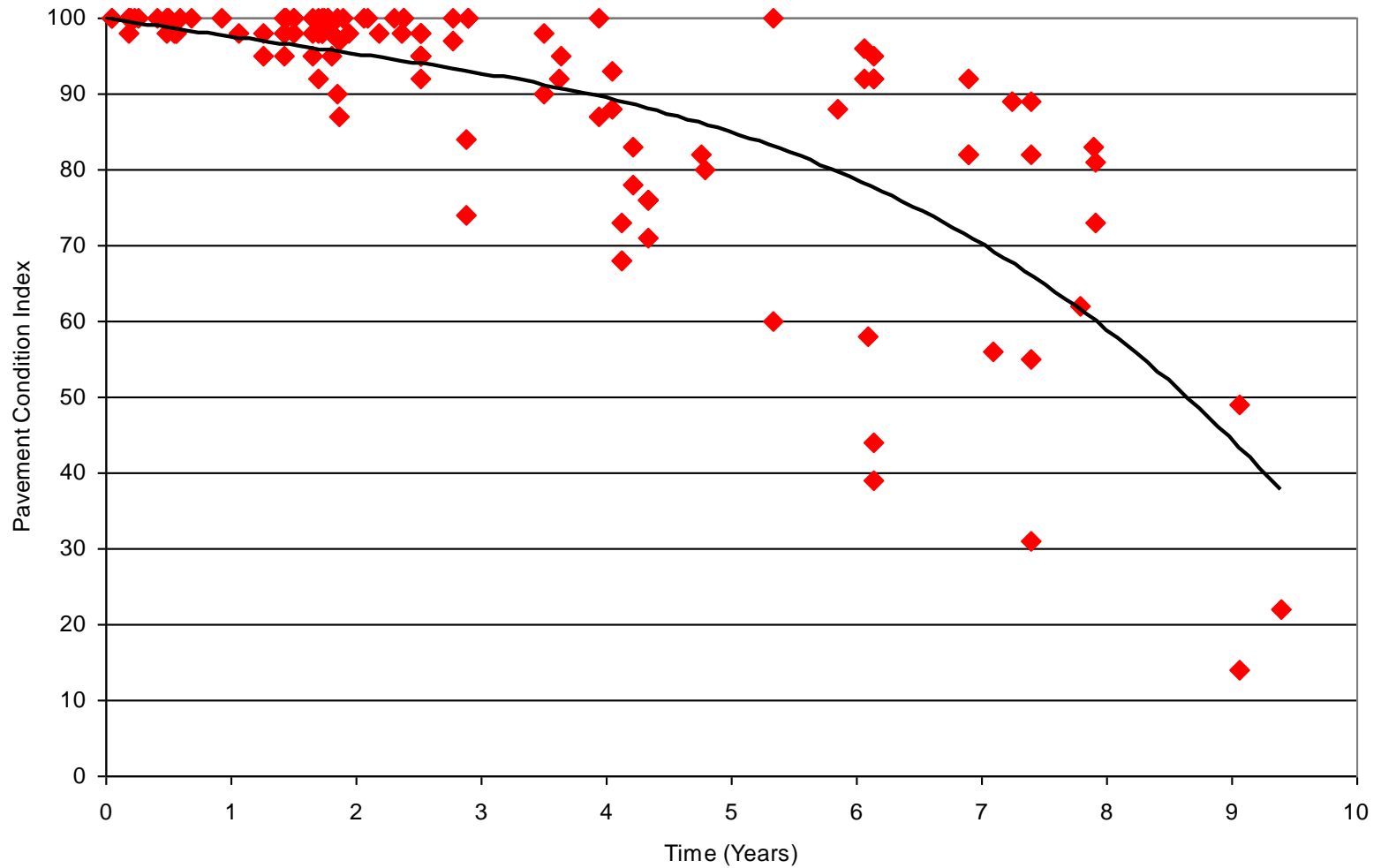


Field

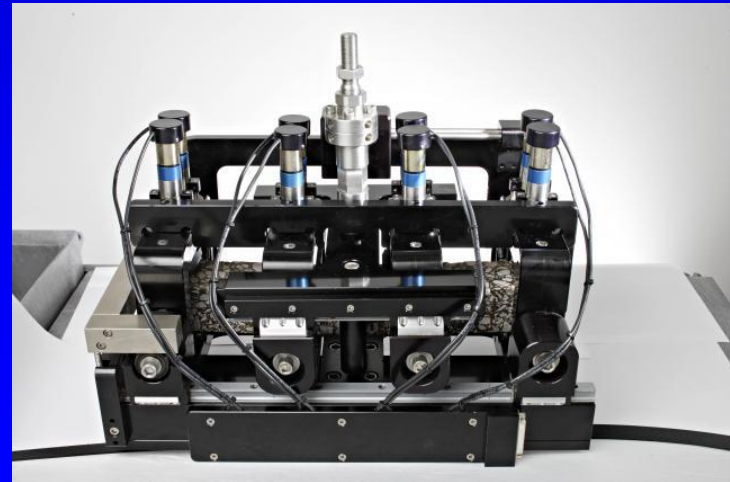
Pavement Thickness Design



Pavement Performance



New HMA Testing Equipment



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QC/QA Specifications

- ❖ Need basics discussed above
- ❖ Other key elements of specifications

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Other Key Elements

❖ Material specifications

- ❖ Asphalt binders
- ❖ Aggregates
- ❖ Additives

❖ Job mix formula

- ❖ Mix design
- ❖ Field trial section
- ❖ Adjustments during production

Other Key Elements

- ❖ **Process control/quality control limits**
- ❖ **Pay factor “control” limits**
- ❖ **Basis of limits**
 - ❖ **Historical**
 - ❖ **Periodic review of current specifications**
- ❖ **Comparison of QC/QA test results**

Key Attributes

- ❖ Asphalt binder content
- ❖ Volumetrics
- ❖ In-place density (air voids)
- ❖ Stiffness – E^*
- ❖ Rut depth
- ❖ Flow number
- ❖ Fatigue
- ❖ Thermal cracking
- ❖ Water sensitivity
- ❖ Age hardening

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Summary

- ❖ Produce the best
- ❖ Specify the best
- ❖ Provide incentives
- ❖ Allow innovation
- ❖ Require the “basics”
- ❖ Design/build/operate
- ❖ Enforce specifications
- ❖ Pay attention to details

Questions

