Use of LTPP Pavement Performance Data in the Development of Pavement Management Systems

By

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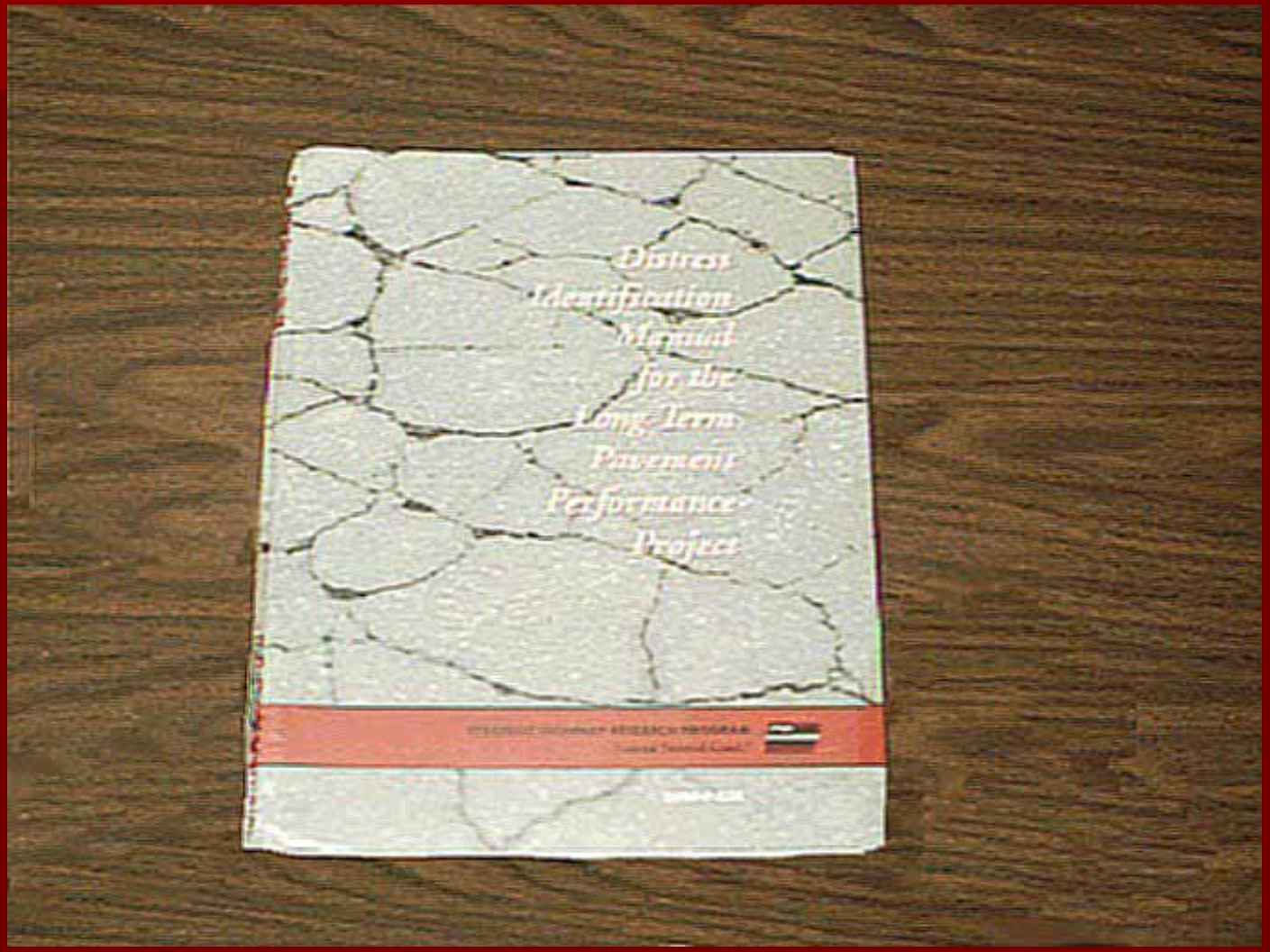
LTPP Data

- 2500 Test Sections
- Pavement Condition Surveys Began 1988
- Individual Pavement Condition Surveys
  - AC 10,500
  - JCP 4,000

LTPP Pavement Condition Surveys



Pavement Distress

Individual Distress Categories (Research Level)

- Severity
  - Low
  - Medium
  - High
- Extent

AASHTO Distress Survey Protocols

- Cracking protocols for:
  - Asphalt pavements
  - Jointed concrete pavements
  - Continuously reinforced concrete pavements
- Faulting protocols for concrete pavements
- Rut depth protocols for asphalt pavements
- Roughness protocols

Pavement Condition Indices

Composite

Individual Distress

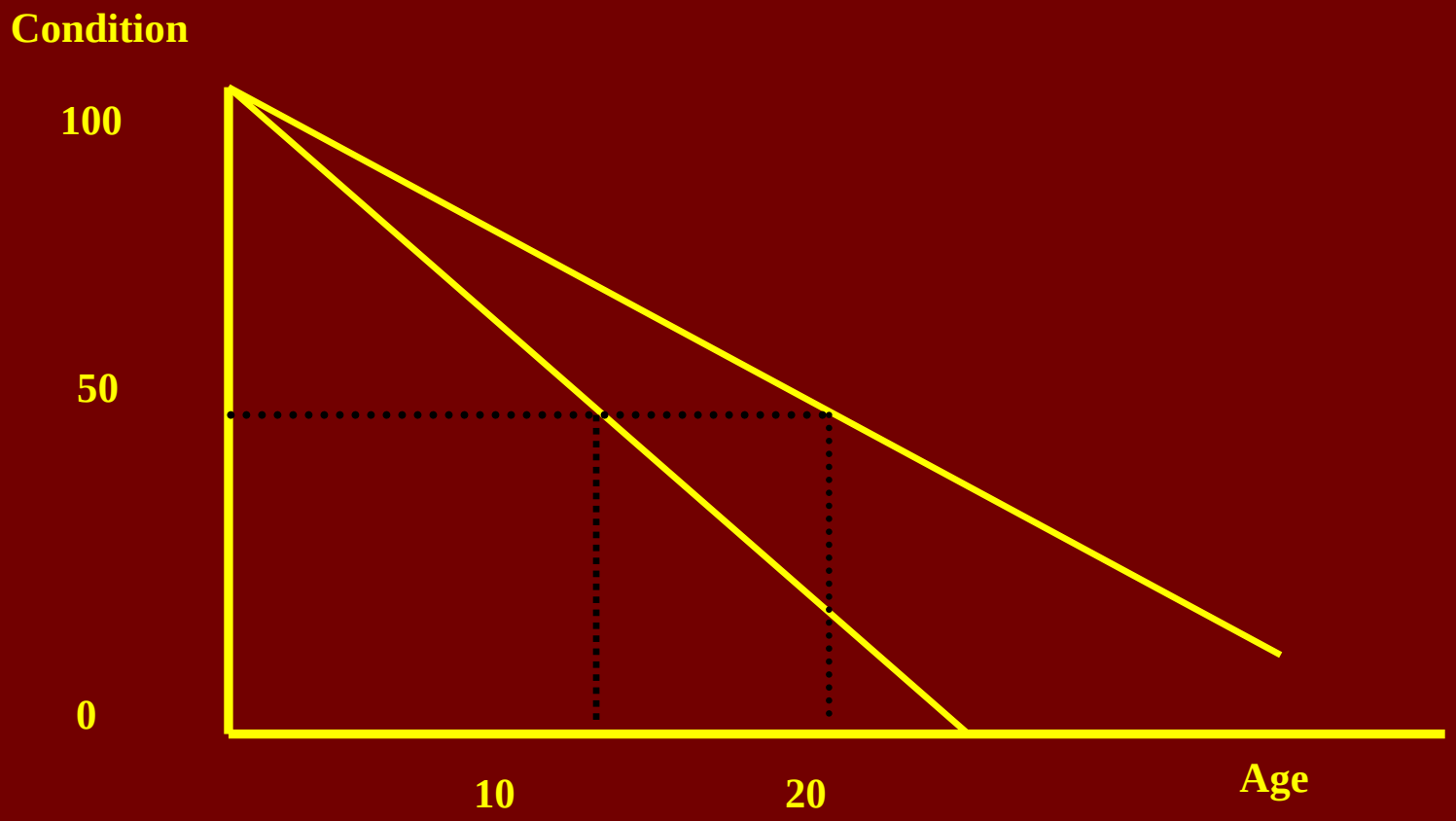
Maximum Scale Value – Sum Deduct Values

Deduct Values

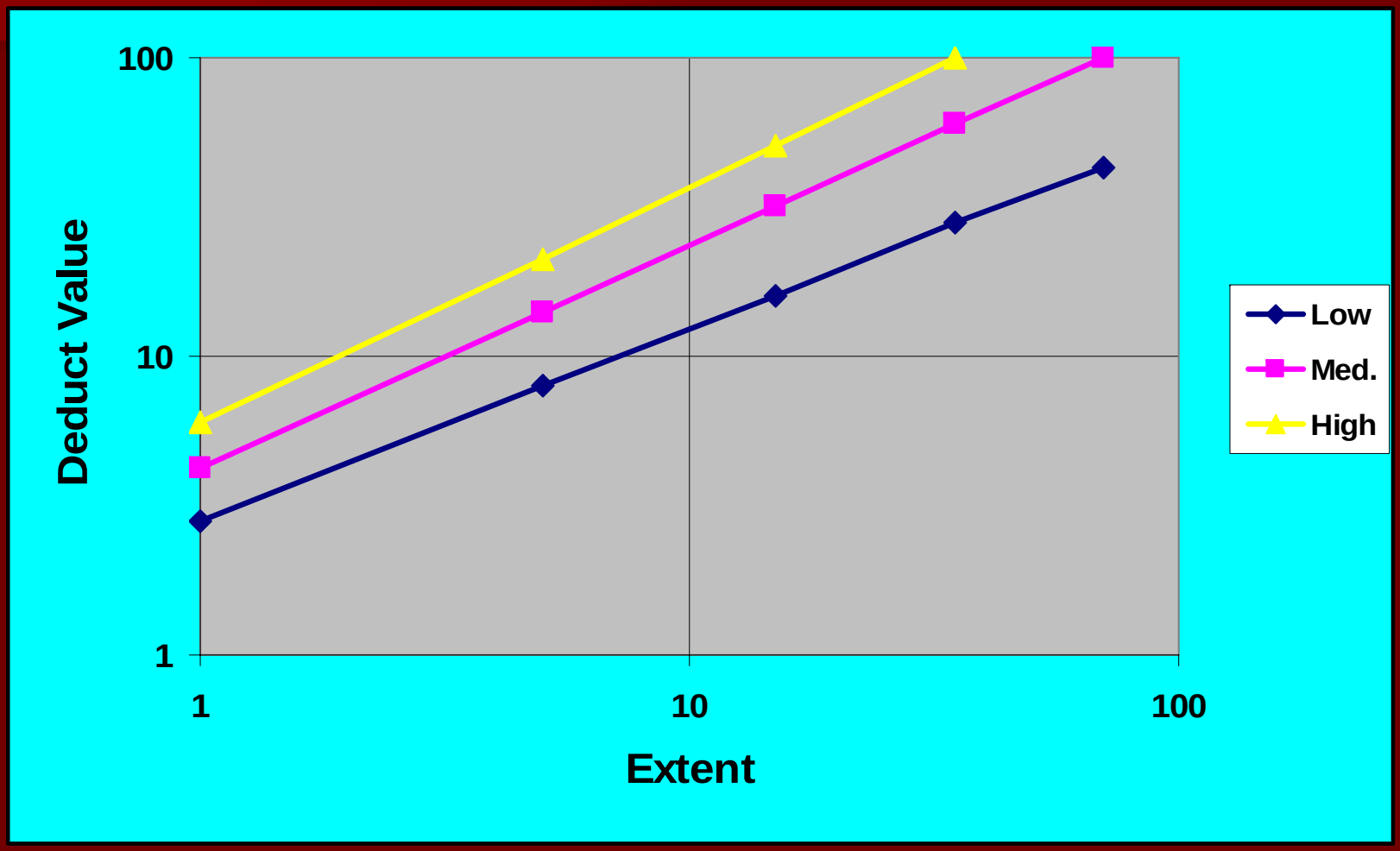
Expert Opinion

Engineering Criteria

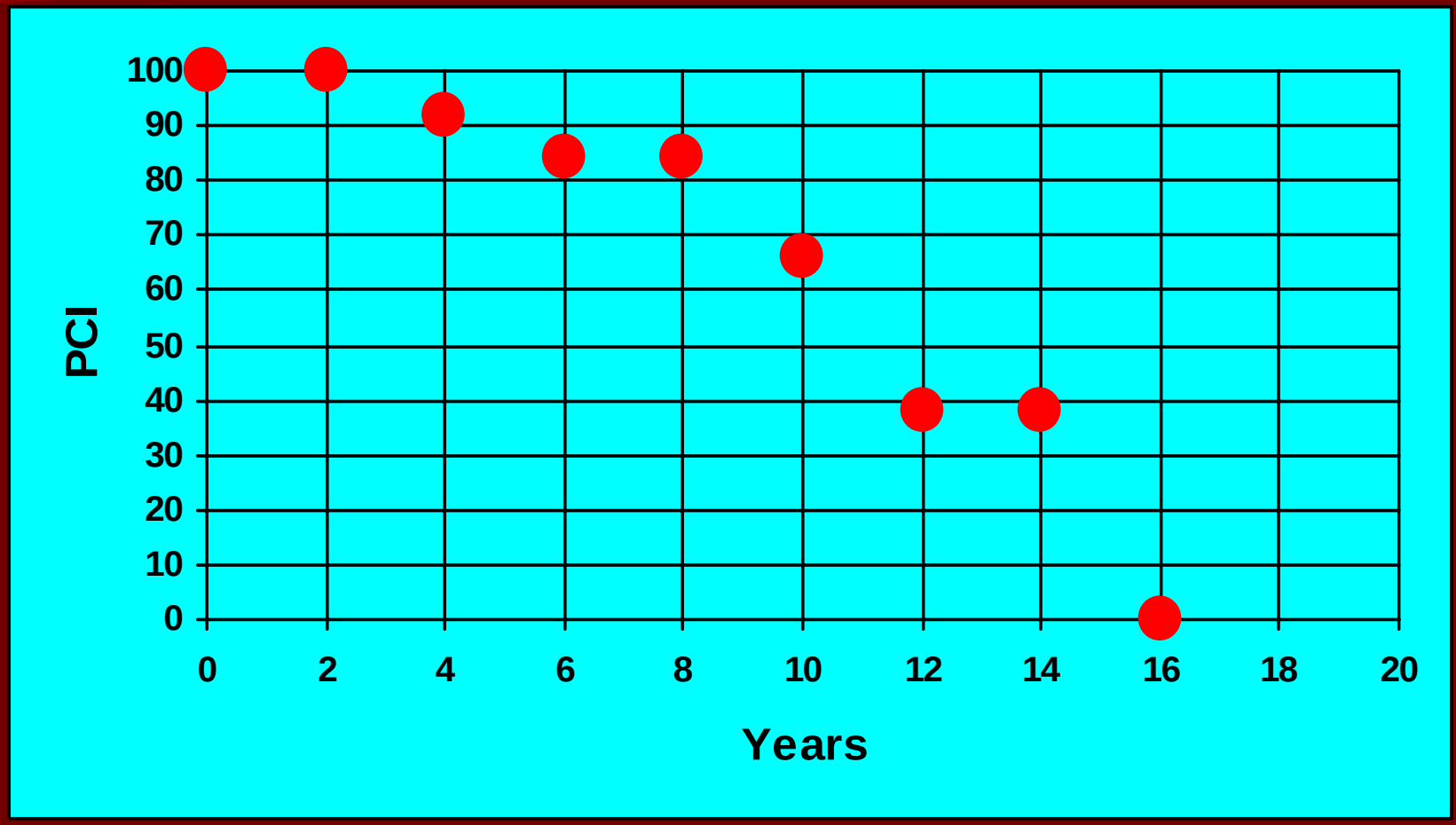
Pavement Condition Trends



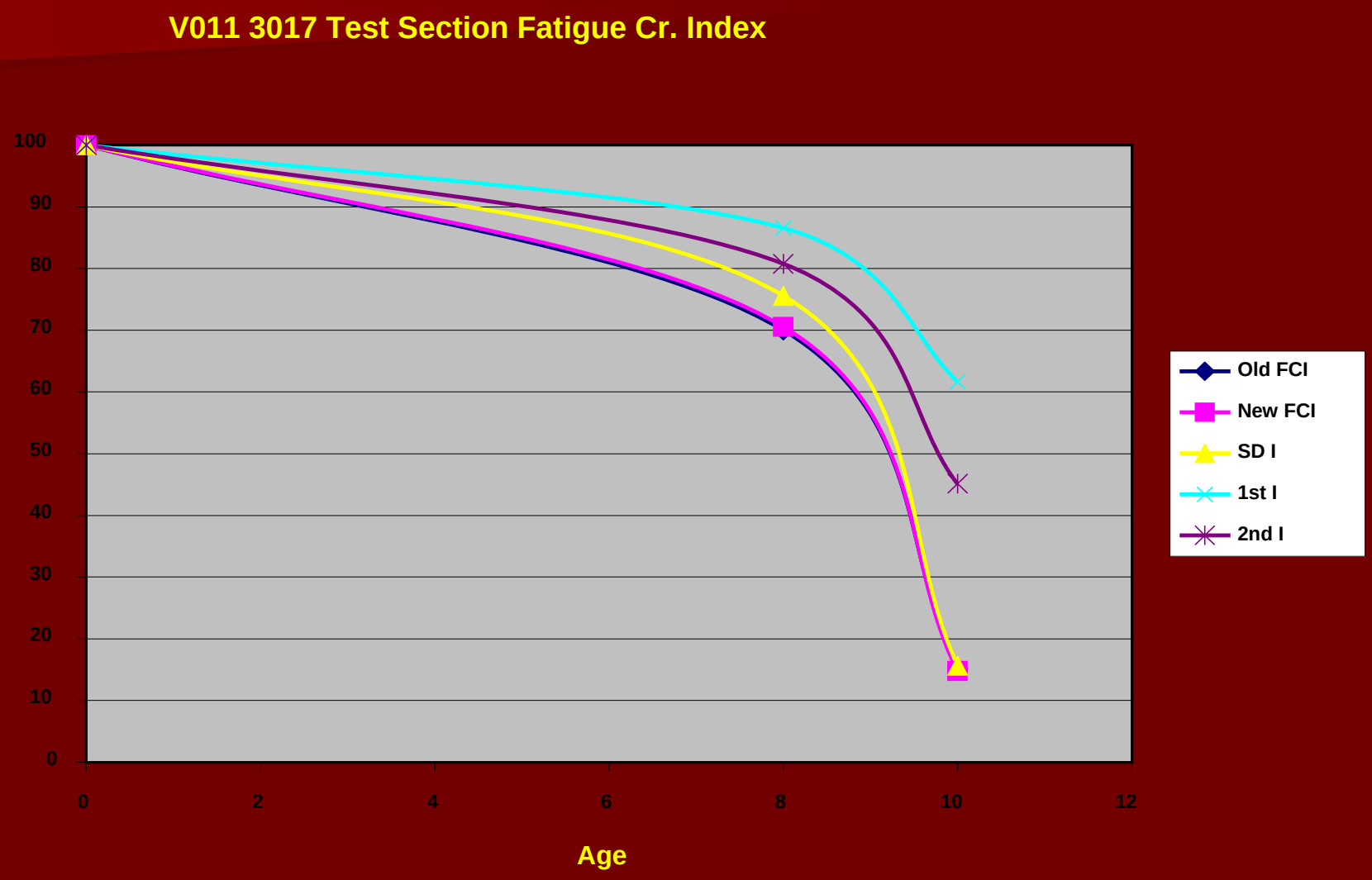
Distress Trends from Deduct Values



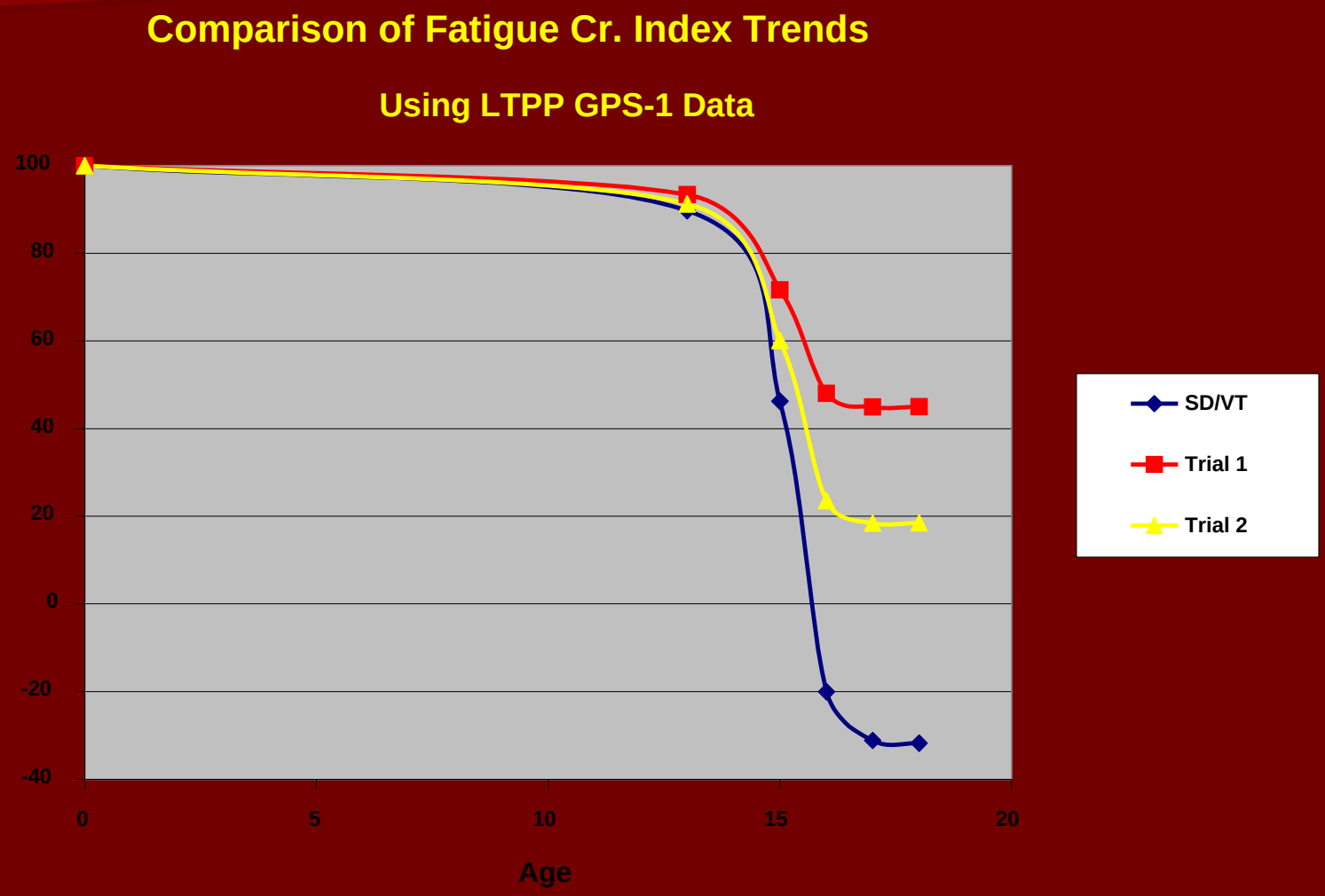
Deduct Values and Index Trends



Vermont Study of Deduct Values



Vermont Study Using LTPP Data



Use LTPP Data to Develop Typical Performance Trends

Where an Agency does not have any measured pavement performance data, they can initially use LTPP Data to help develop typical pavement performance trends.

Use of General Pavement Performance Trends for Local Areas

Long Term Pavement Performance (LTPP) Data Analysis Support: National Pooled-Fund Study TPF-5(013)

"Effect of Multiple Freeze Cycles and Deep Frost Penetration on Pavement Performance and Cost"

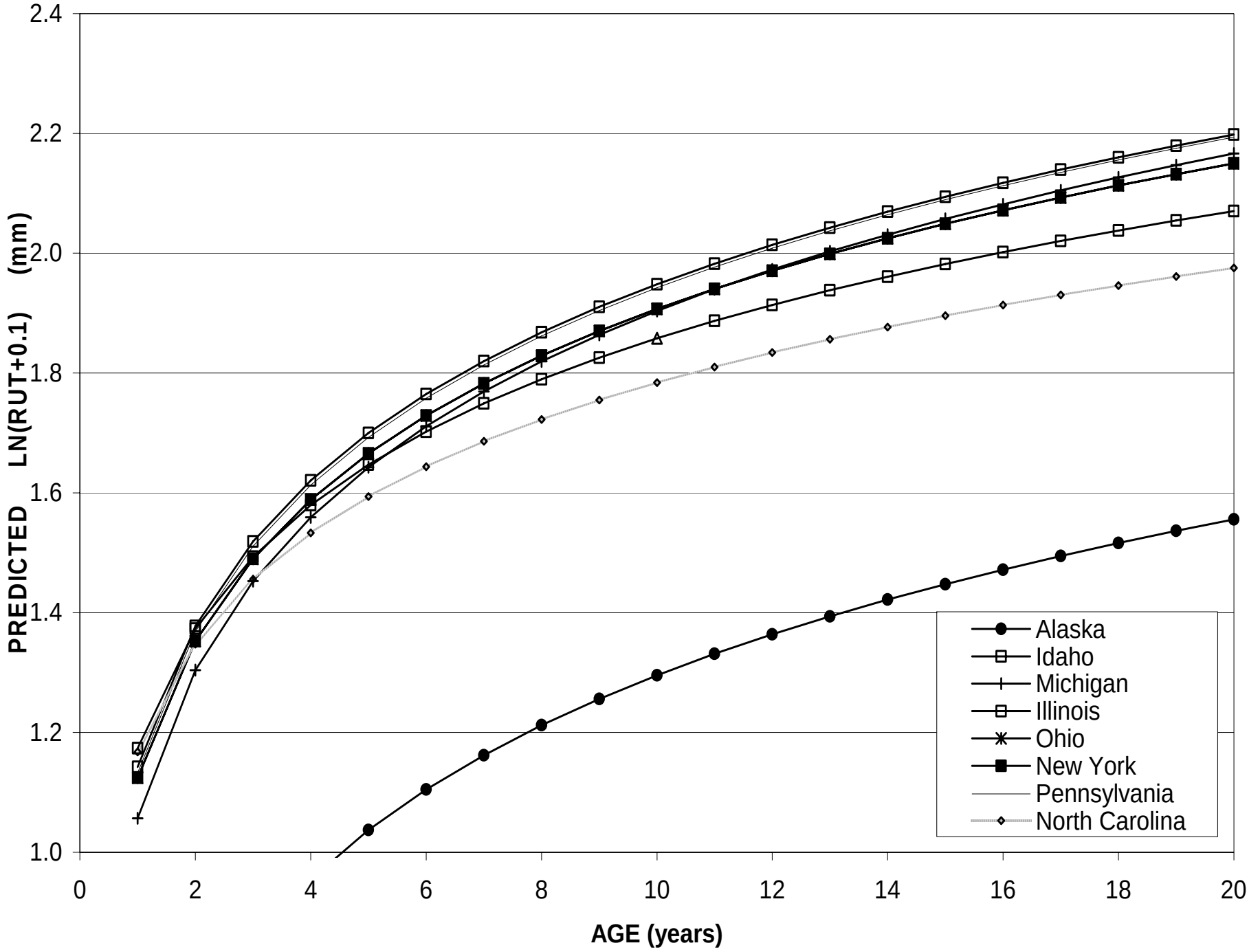
Pavement Performance Trends

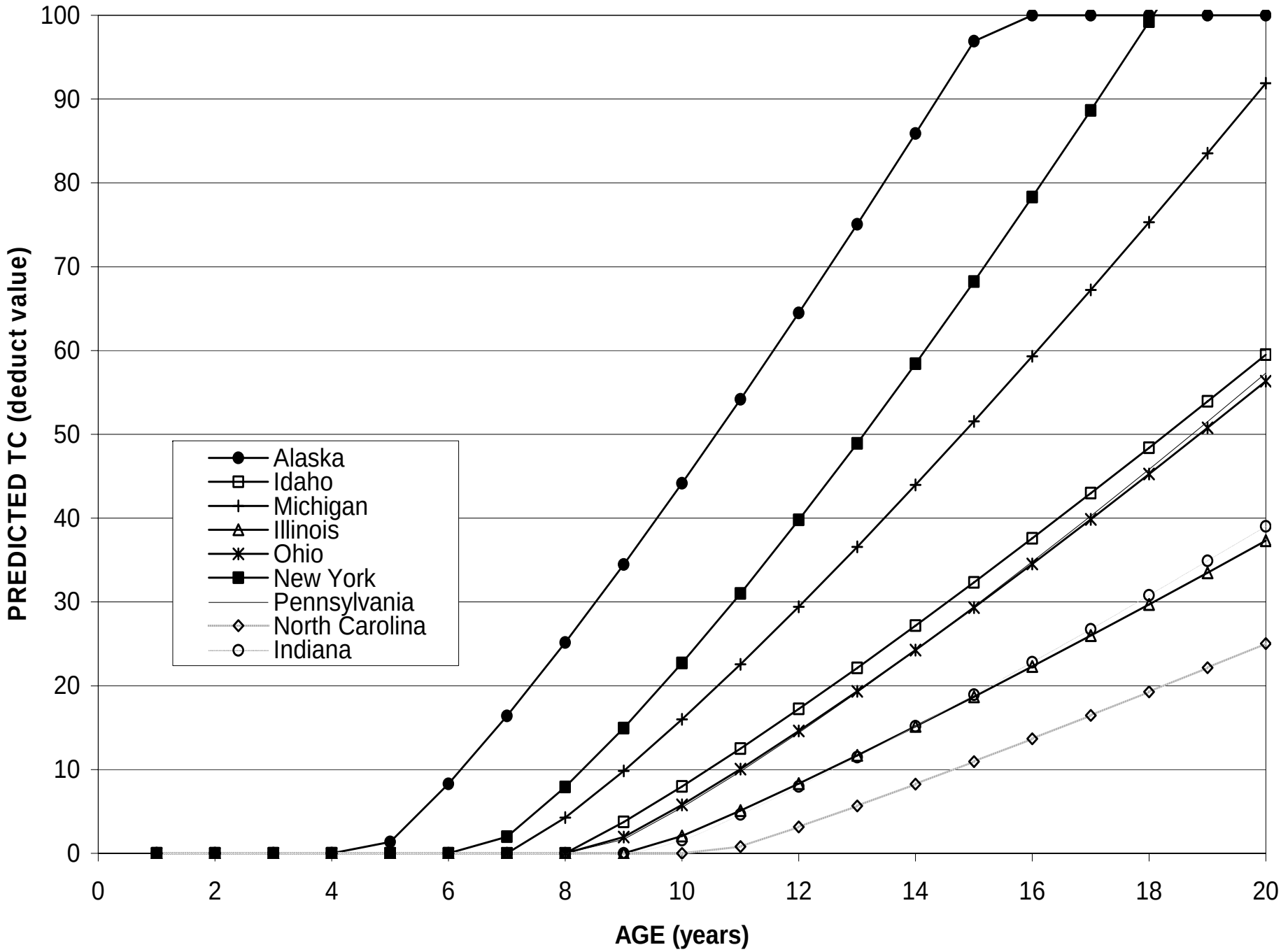
Based on Environmental Features

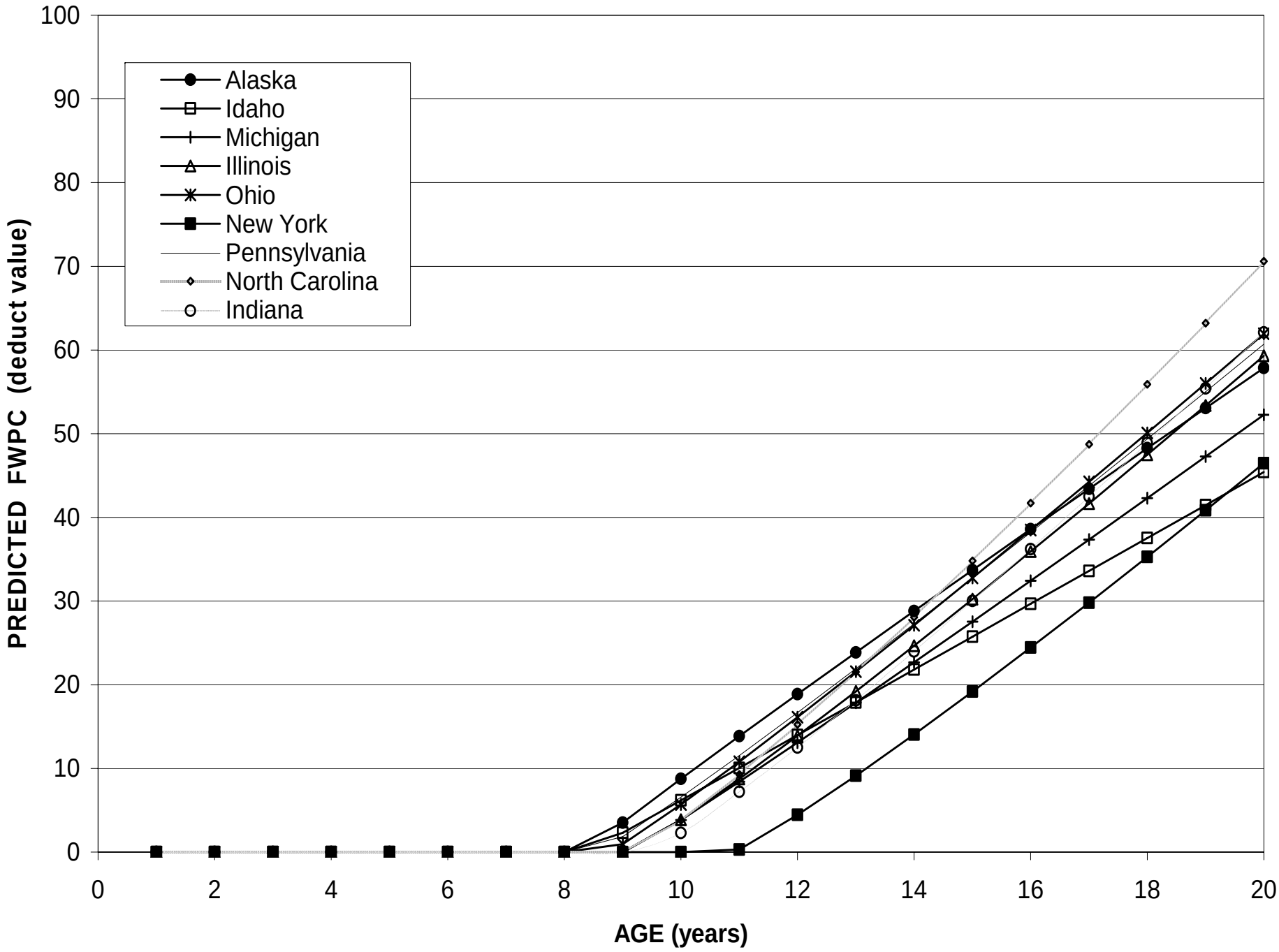
- Annual Cooling Index
- Annual Freezing Index
- Annual Number of Freeze-Thaw Cycles
- Annual Precipitation

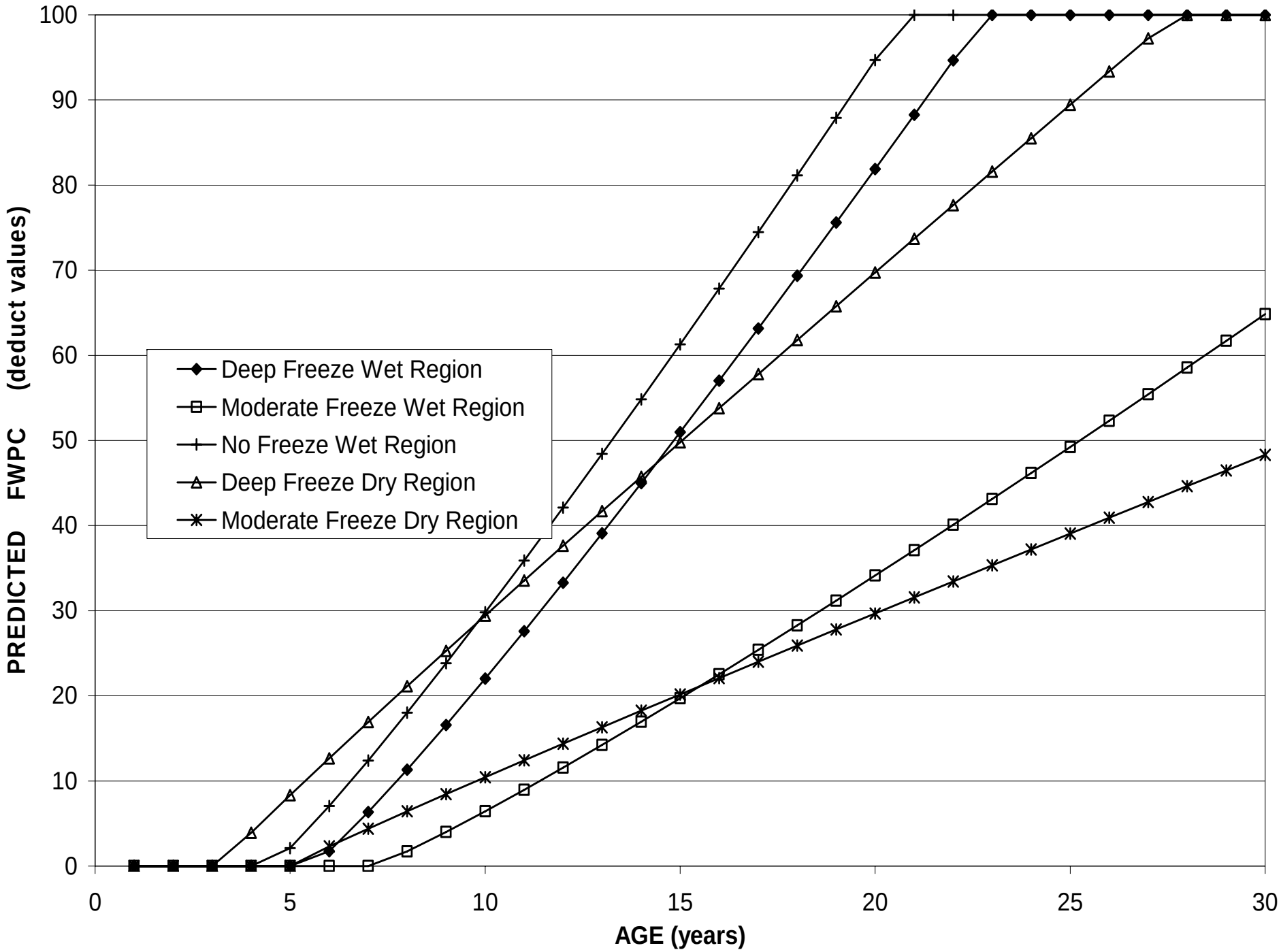
and Pavement Features

- Subgrade, Base, and Pavement Type
- Pavement Thickness and SN
- Annual ESALs
- Initial IRI


2.4
2.2
2.0
1.8
1.6
1.4
1.2
1.0
PREDICTED LN(RUT+0.1) (mm)
0
2
4
6
8
10
12
14
16
18
20
AGE (years)
Alaska
Idaho
Michigan
Illinois
Ohio
New York
Pennsylvania
North Carolina


PREDICTED TC (deduct value)
AGE (years)
0
10
20
30
40
50
60
70
80
90
100
0
2
4
6
8
10
12
14
16
18
20
Alaska
Idaho
Michigan
Illinois
Ohio
New York
Pennsylvania
North Carolina
Indiana


Alaska
Idaho
Michigan
Illinois
Ohio
New York
Pennsylvania
North Carolina
Indiana
PREDICTED FWPC (deduct value)
AGE (years)
0
10
20
30
40
50
60
70
80
90
100
0
2
4
6
8
10
12
14
16
18
20


PREDICTED FWPC (deduct values)
AGE (years)
Deep Freeze Wet Region
Moderate Freeze Wet Region
No Freeze Wet Region
Deep Freeze Dry Region
Moderate Freeze Dry Region
0
10
20
30
40
50
60
70
80
90
100
0
5
10
15
20
25
30

Transportation Pooled Fund Program

Effect of Multiple Freeze Cycles and Deep Frost Penetration on Pavment Performance and Cost

TPF Study Number: TPF-5(013)

LTPP Data Analysis Contract: DTFH61-02-000139

Sponsored by:
FHWA-LTPP

Study Partners:
Alaska DOT & PF
Idaho Transportation Department
Illinois DOT
Michigan DOT
New York State DOT
North Carolina DOT
Ohio DOT
Pennsylvania DOT

Contractor:

Nichols Consulting Engineers, Chtd.
Engineering and Environmental Services

www.ncenet.com

This program computes pavement performance predictions using the models developed as part of the above referenced contract and published in Report Number FHWA-HRT-06-121. Please see the **background** tab for instructions.

Click on the following button to compute Flexible Pavement Performance Predictions:

Flexible Pavement Predictions:

- Pavement Roughness-IRI (m/km)
- Fatigue Cracking (deduct)
- Fatigue Cracking (% wheelpath)
- Transverse Cracking (deduct)
- Rutting (mm)

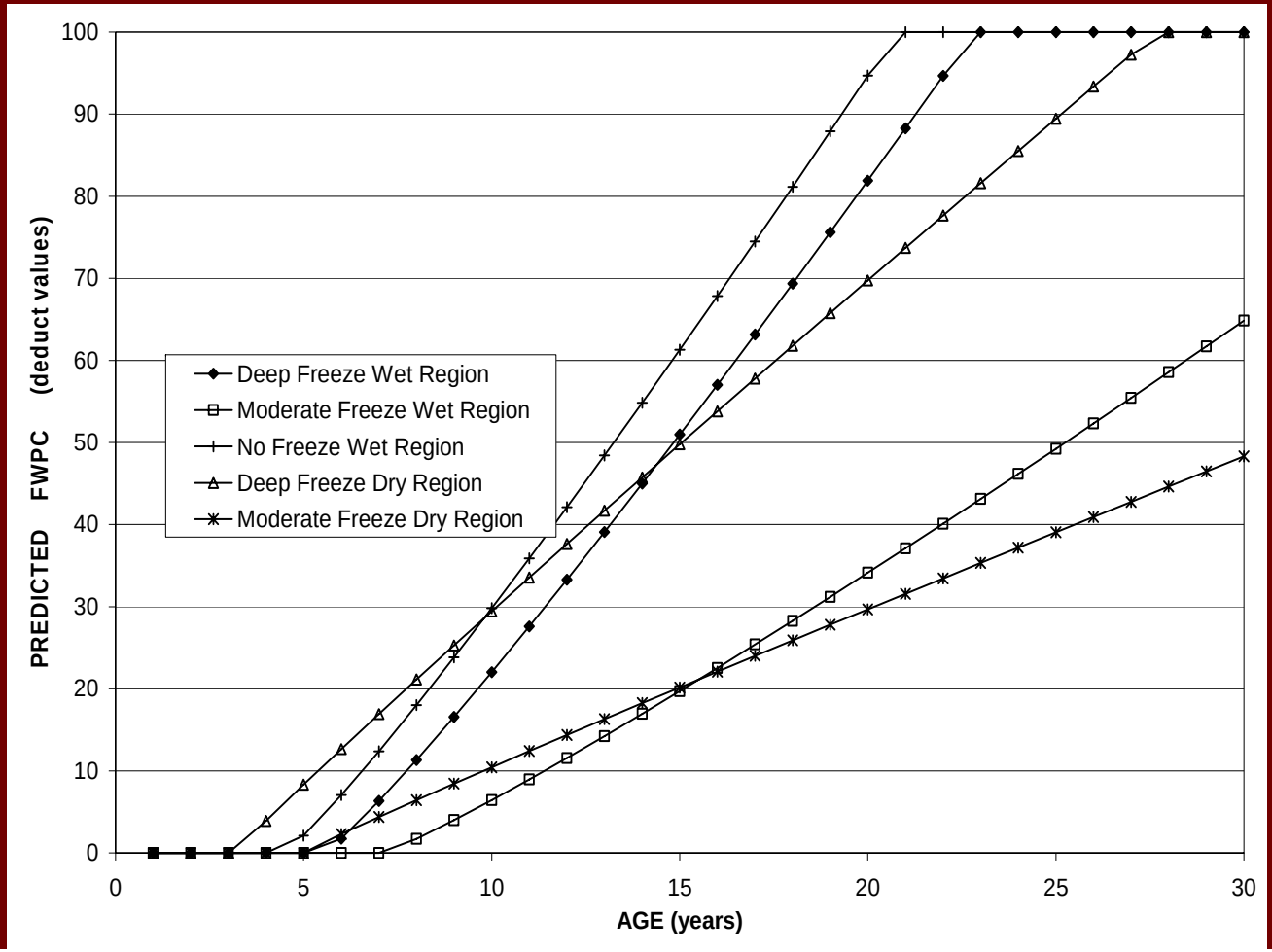
Click on the following button to compute Rigid Pavement Performance Predictions:

Rigid Pavement Predictions:

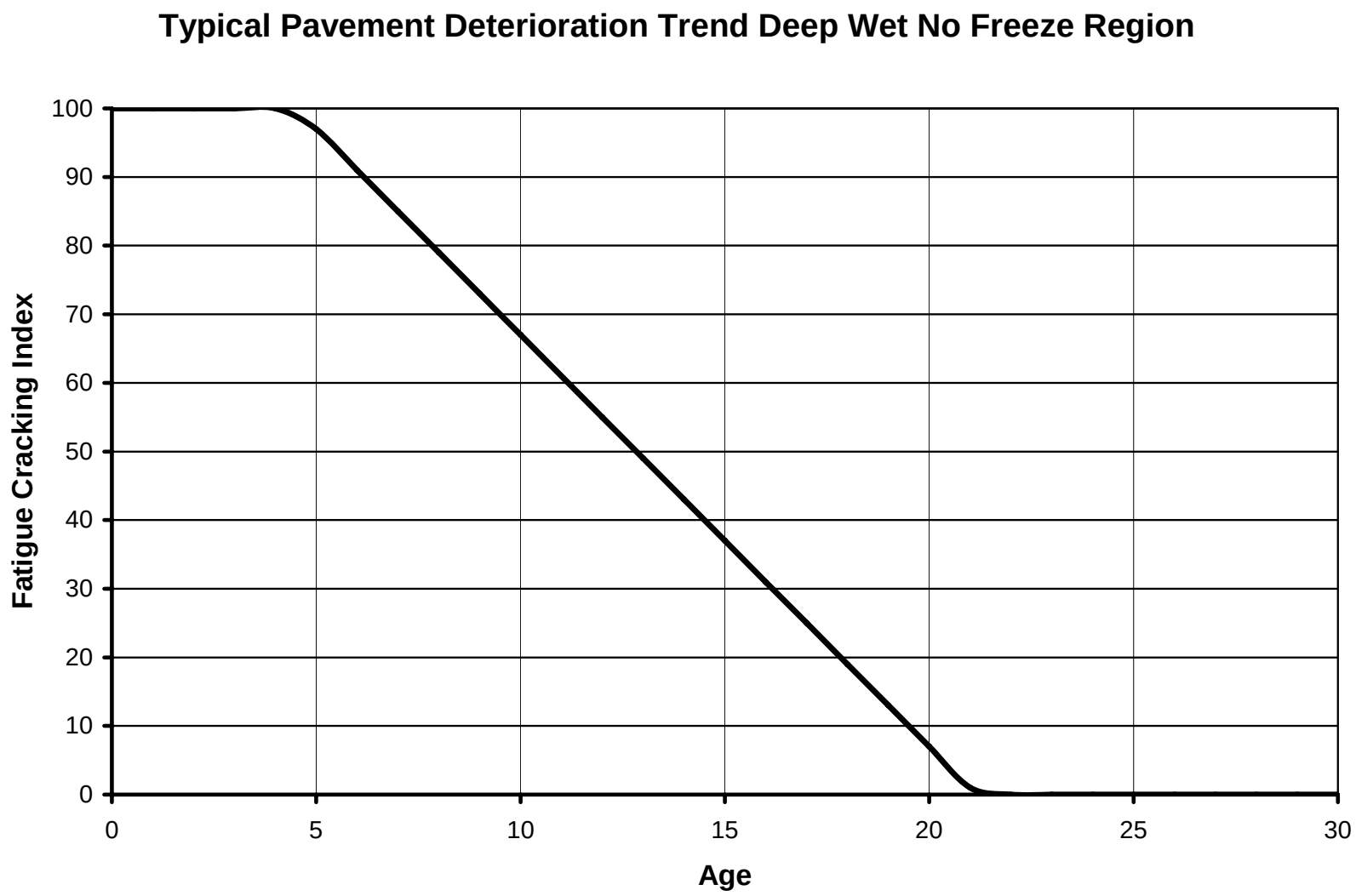
- Pavement Roughness-IRI (m/km)
- Longitudinal Cracking (% area)
- Transverse Cracking (% area)
- Transverse Joint Faulting (mm)

Example using Fatigue Cracking

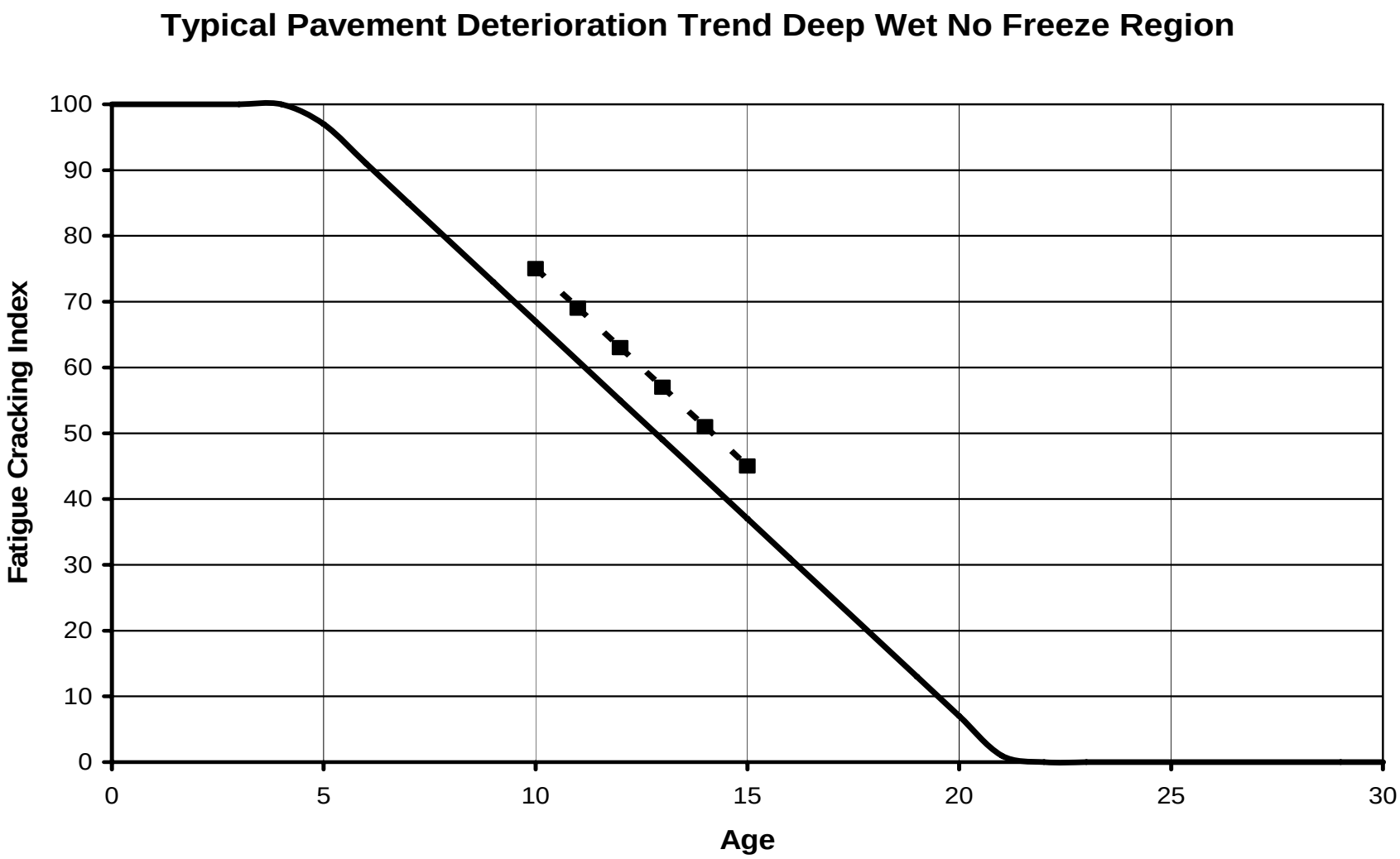
Develop a general trend for a typical highway and pavement type for an area.



Converting Distress to Pavement Condition Index and Typical Performance Trend



Using Trends Developed from LTPP Data to for Local Area and Highway Facility



Questions