Remaining Service Life

Southeast Pavement Preservation Partnership Meeting

San Antonio, Texas

May 29, 2013

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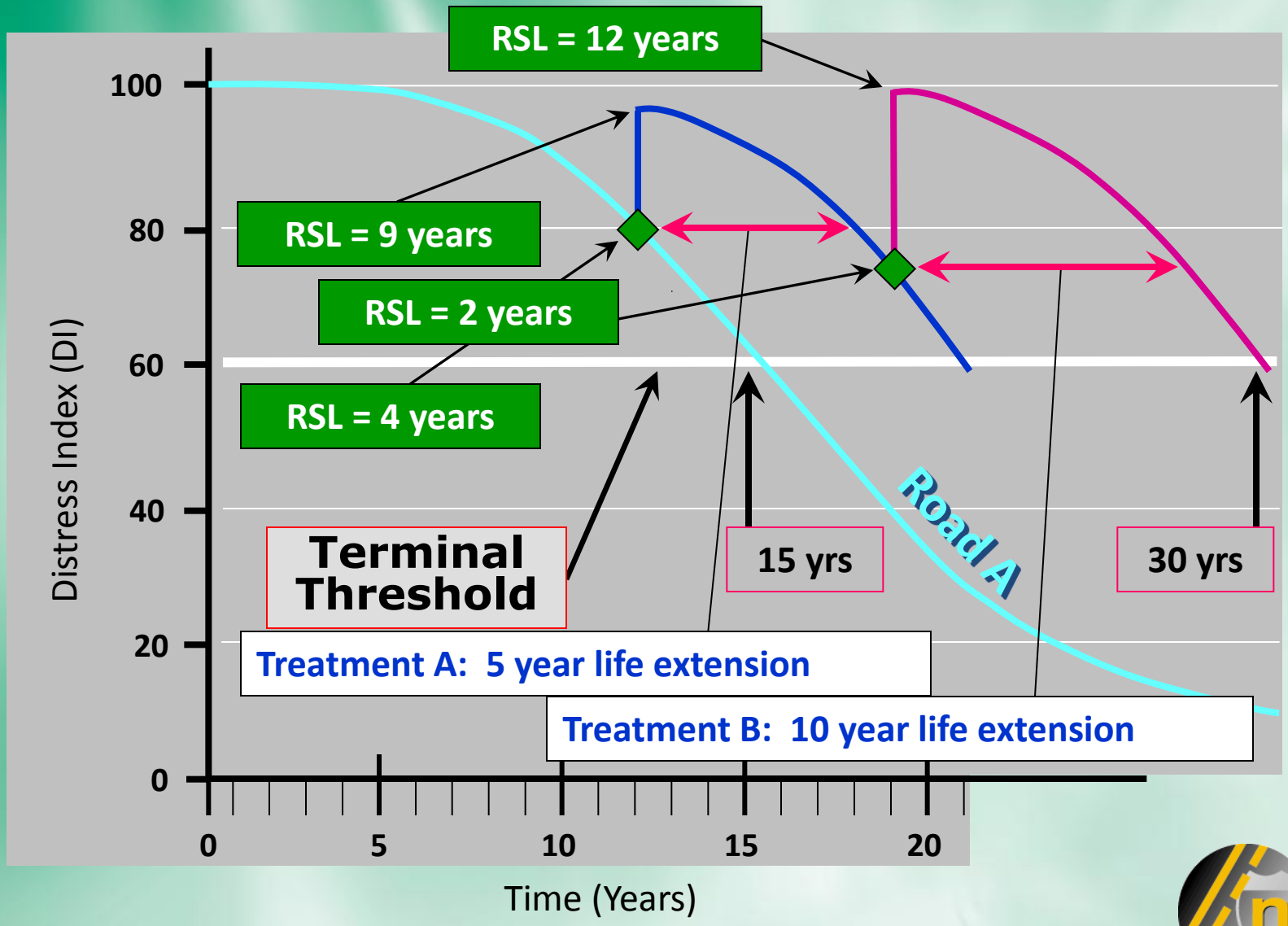
Remaining Service Life



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Definitions

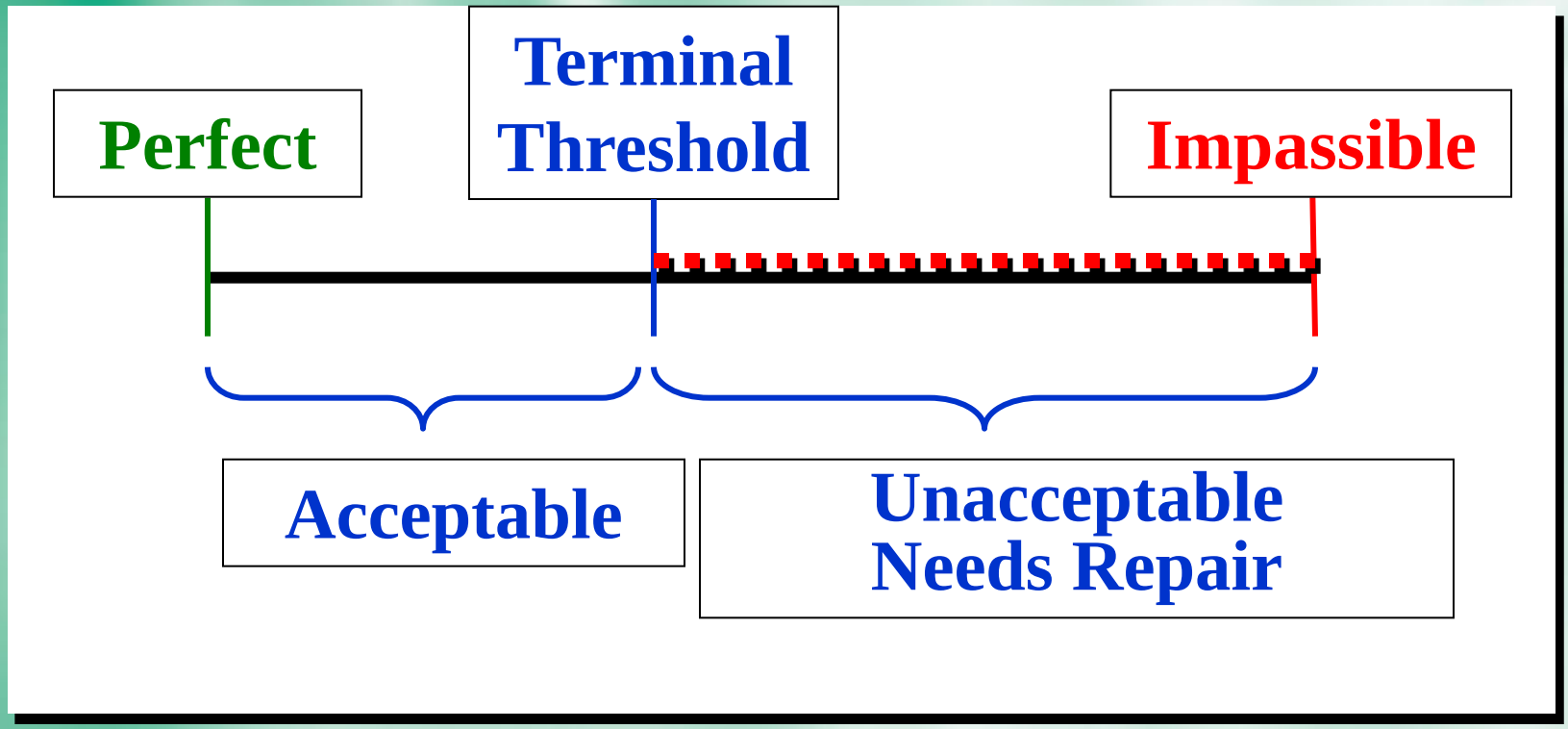
Service Life:

The period over which a pavement section adequately performs its desired function or performs to a desired level of service.

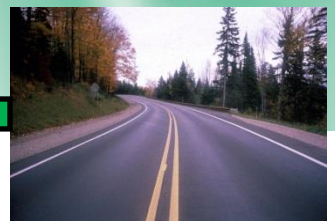
Remaining Service Life (RSL):

The amount of service life left.

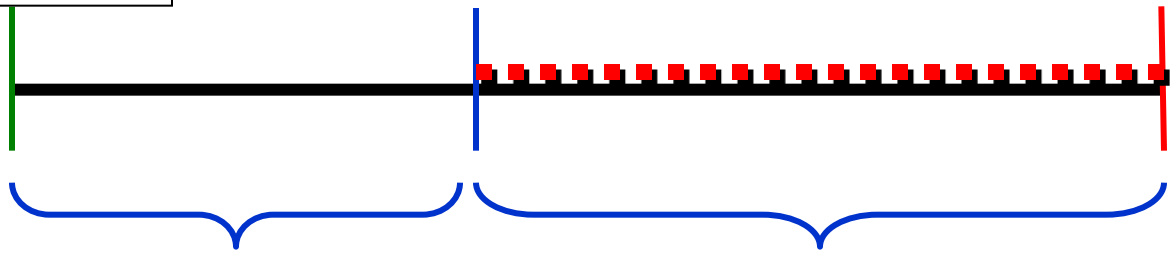
Condition Values



Perfect Condition



Perfect



Acceptable

Unacceptable
Needs Repair

Impassible Condition

Impassible

Acceptable

Unacceptable
Needs Repair

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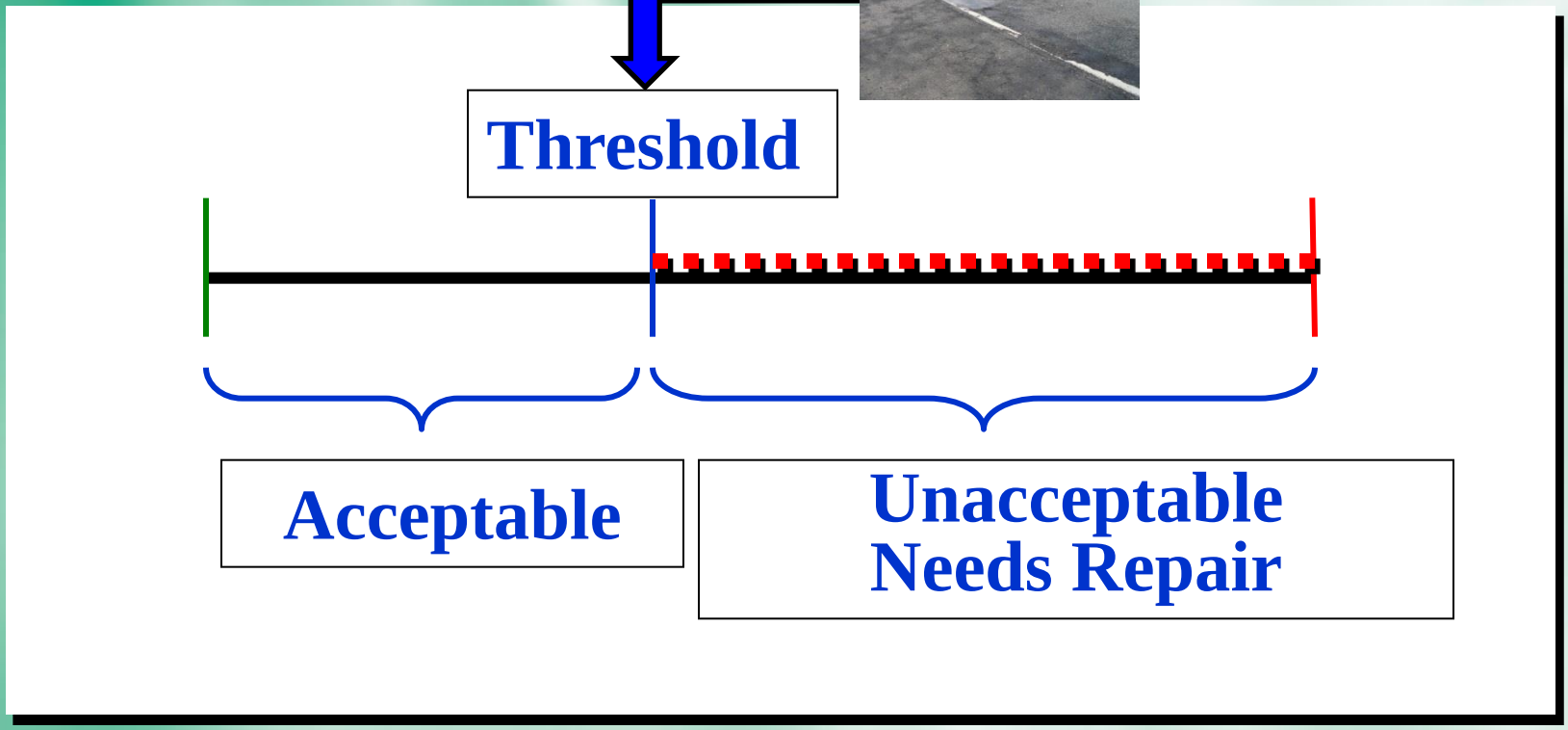
Terminal Threshold Value



Terminal Threshold Value Represents

- Only remaining cost-effective option is Reconstruction or Rehabilitation
- Agency begins receiving user complaints
- Pavement has zero service life: RSL = 0

Engineering Criteria

- **Ensuing Decisions -**
  Main Driving Mechanism
- **Addressing Distress Points**
  To Be Assigned
- **Assessing Weight Factors -**
  Maximum Extent of Distress

Rutting

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Friction

POLISHED AGGREGATE

Faulting

Distress

BLOCK CRACKING

Distress

ALLIGATOR CRACKING

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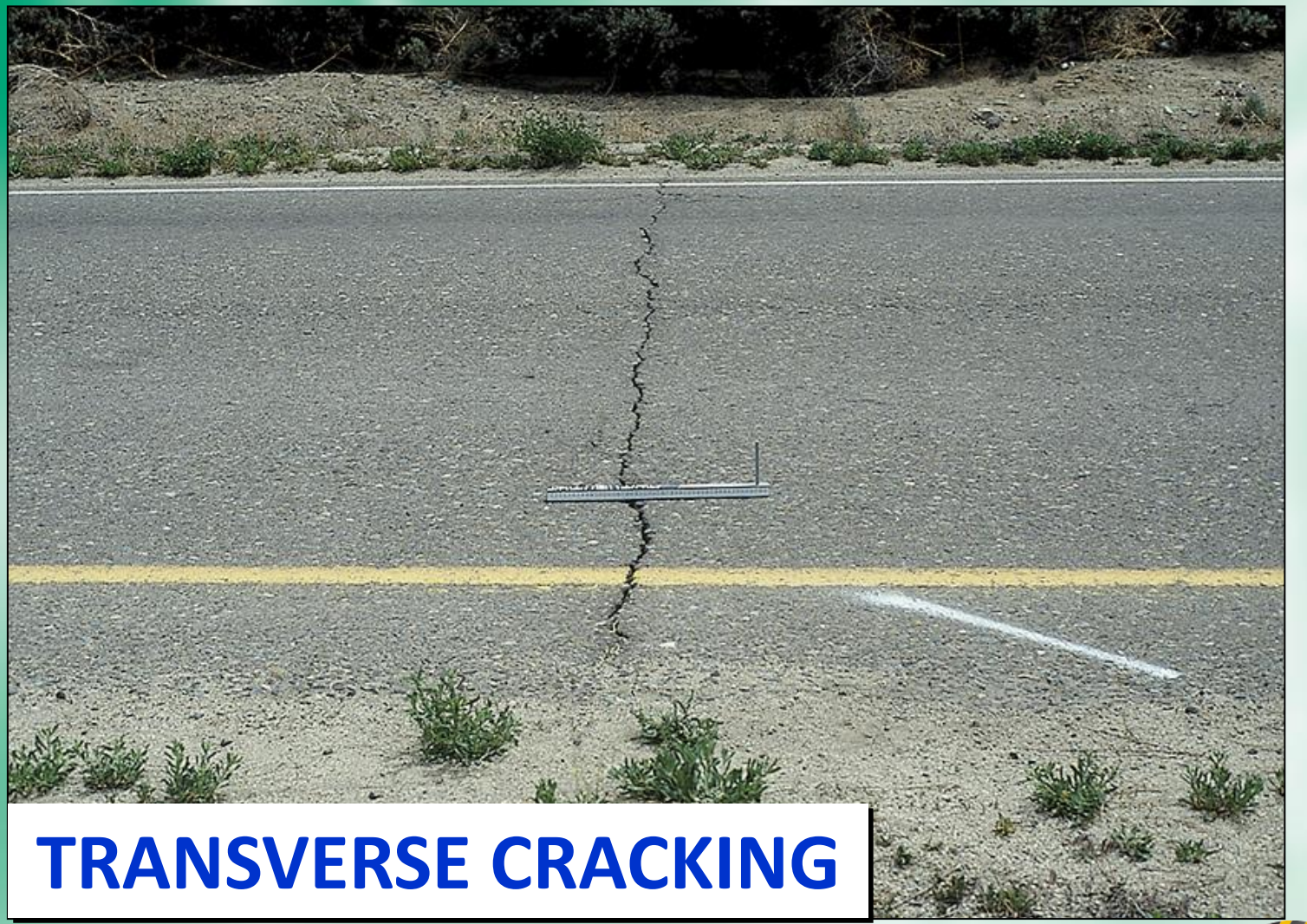
Distress



TRANSVERSE CRACKING

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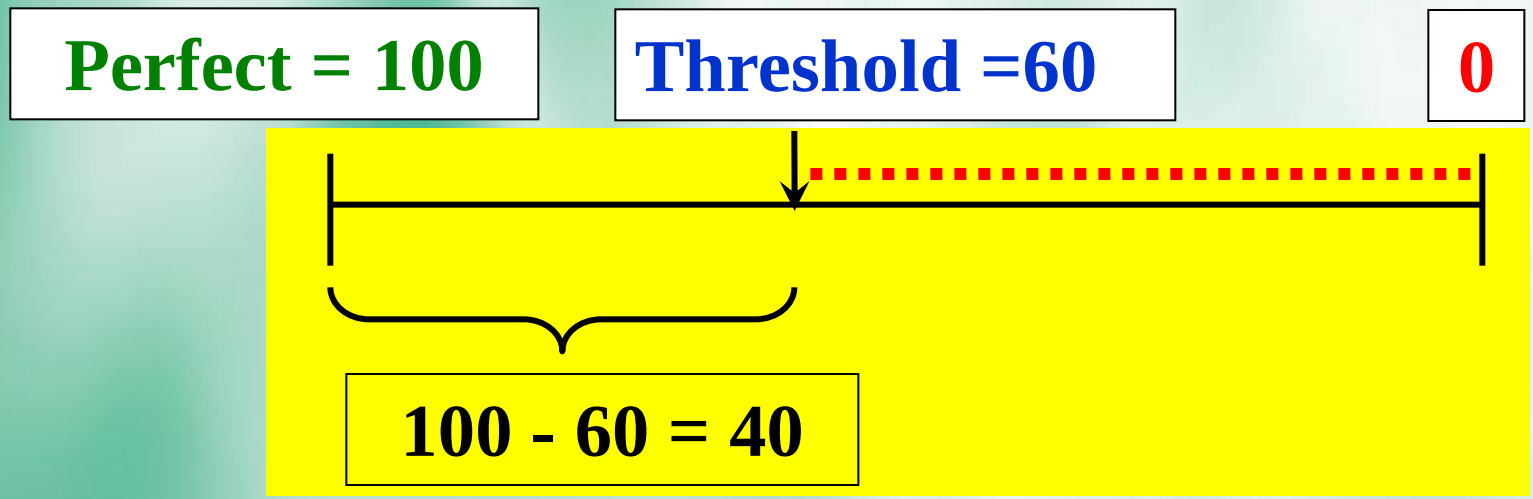
Distress Points Example
(Transverse Cracking)

- Maximum Allowable Number of TC = 20
- Distress Points per Crack = ?

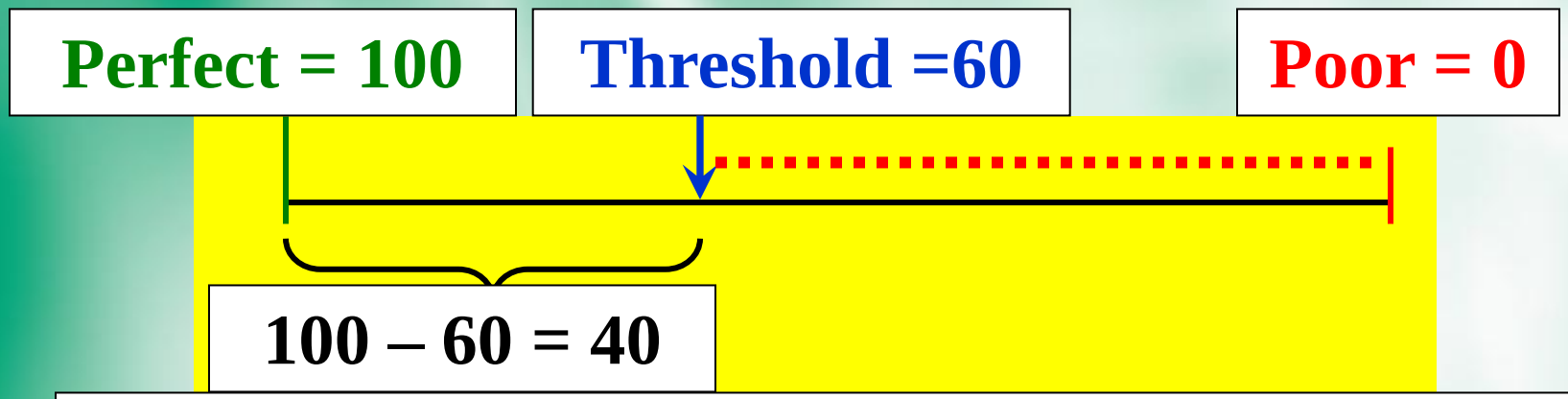


40/20 = 2 Distress Points per Crack

Distress Points Example (Alligator Cracking)

- Rating Scale: 0 to 100 (100 = Perfect)
- Threshold Value = 60
- Max. Allowable Extents for AC
  - Low Severity = 100 %
  - Medium Severity = 50 %
  - High Severity = 10 %
- Alligator Cracking Index (ACI) = ?

Distress Points Example
(Alligator Cracking)



Weight Factors : 40/100 = <u>0.4</u> for L.S. AC

40/50 = <u>0.8</u> for M.S. AC

40/10 = <u>4.0</u> for H.S. AC

ACI = 100 - (4 * H.S. + 0.8 * M.S. + 0.4 * L.S.) AC

Distress Points Example
(Alligator Cracking)

ACI = 100 - (4 * H.S. + 0.8 * M.S. + 0.4 * L.S.)AC

- Calculate ACI for a Section with
  - 20% L.S. AC
  - 10% M.S. AC
  - 5% H.S. AC

Distress Points Example
(Alligator Cracking)

$$ACI = 100 - (4 * H.S. + 0.8 * M.S. + 0.4 * L.S.)AC$$

$$= 100 - (4 * 5 + 0.8 * 10 + 0.4 * 20)$$

$$= 64$$

The Pavement Section is Still Acceptable!

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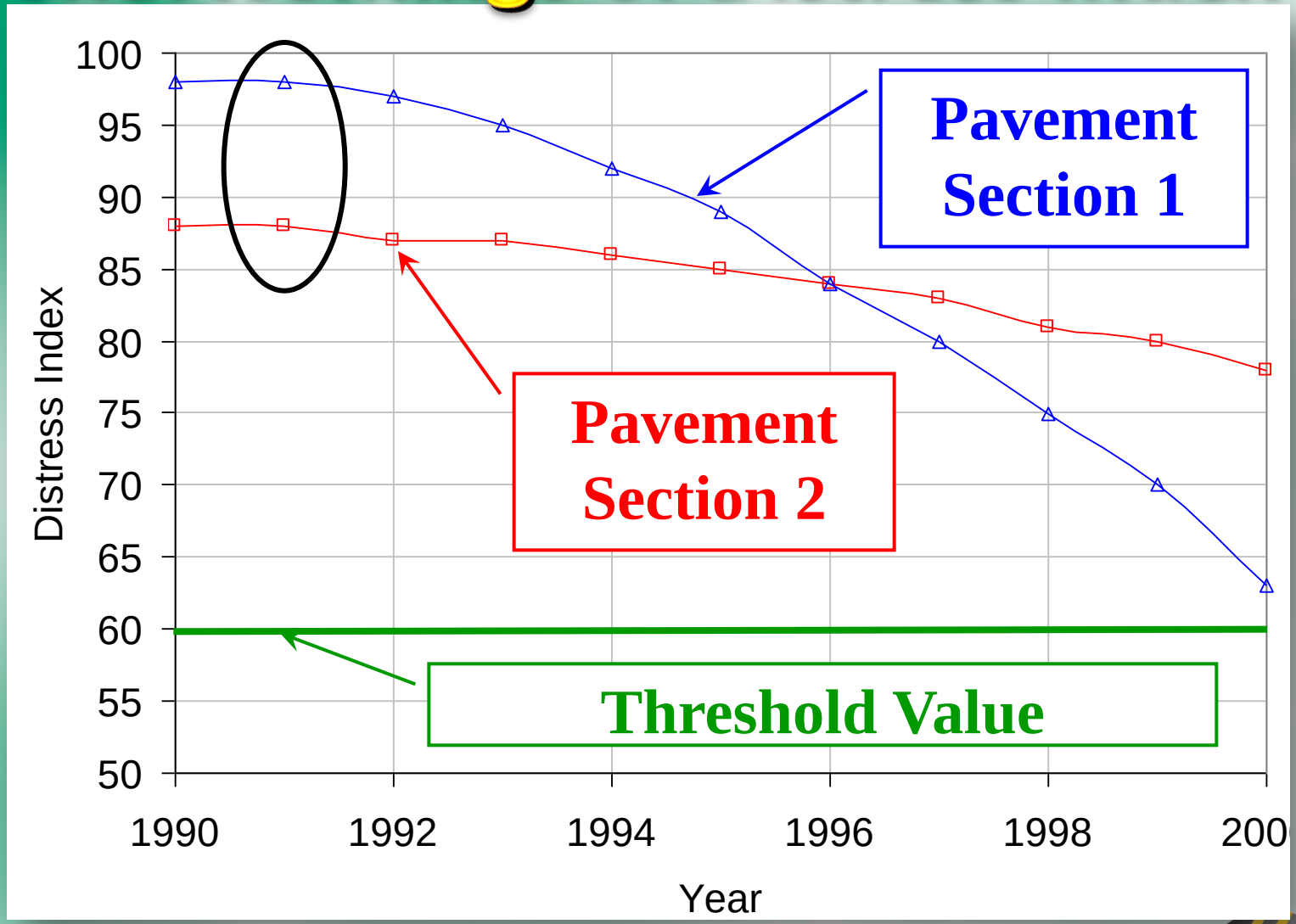
Advantages of Distress Index

- Improved Communication
- Standard Critical Threshold
- Ranks Roads/Highways
- Effects Various Design Decisions

Shortcomings of Distress Index

- Only Indicates Condition at Survey
- Does Not Account for Design Life Nor Rate of Deterioration
- Does Not Capture Long-Term Behavior

Shortcomings of Distress Index



Remaining Service Life (RSL)

- Overcome Shortcomings of Distress Index
- Examines Distress Index Over Time → Rate of Deterioration
- Assign Initial Distress Index Value as Function of Design Life

Remaining Service Life Example
(Transverse Cracking)

- Rating Scale: 0 to 100 (Perfect)
- Threshold = 60
- Built in 1990
- DI in 1999 = 75
- Estimate RSL & SL

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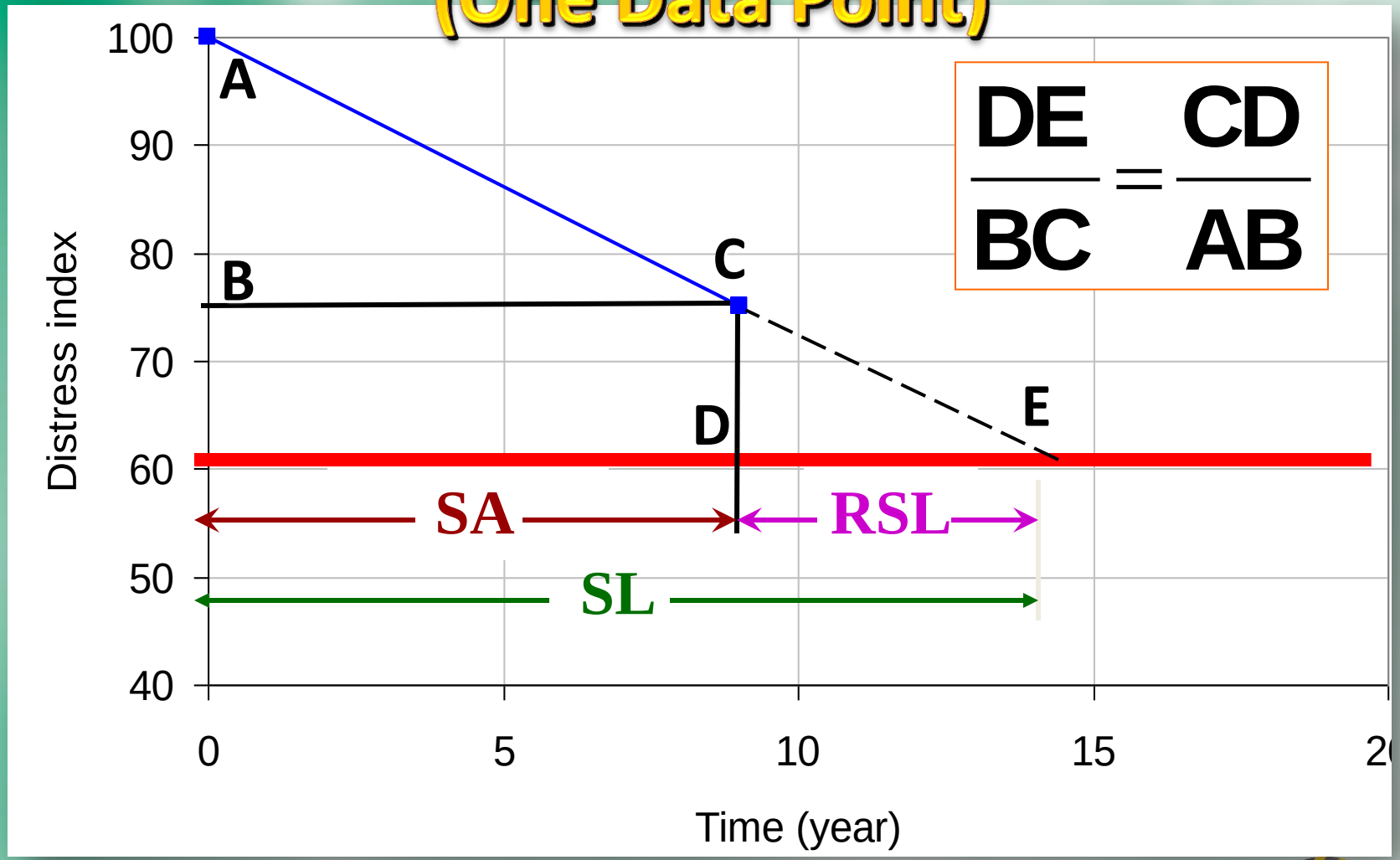
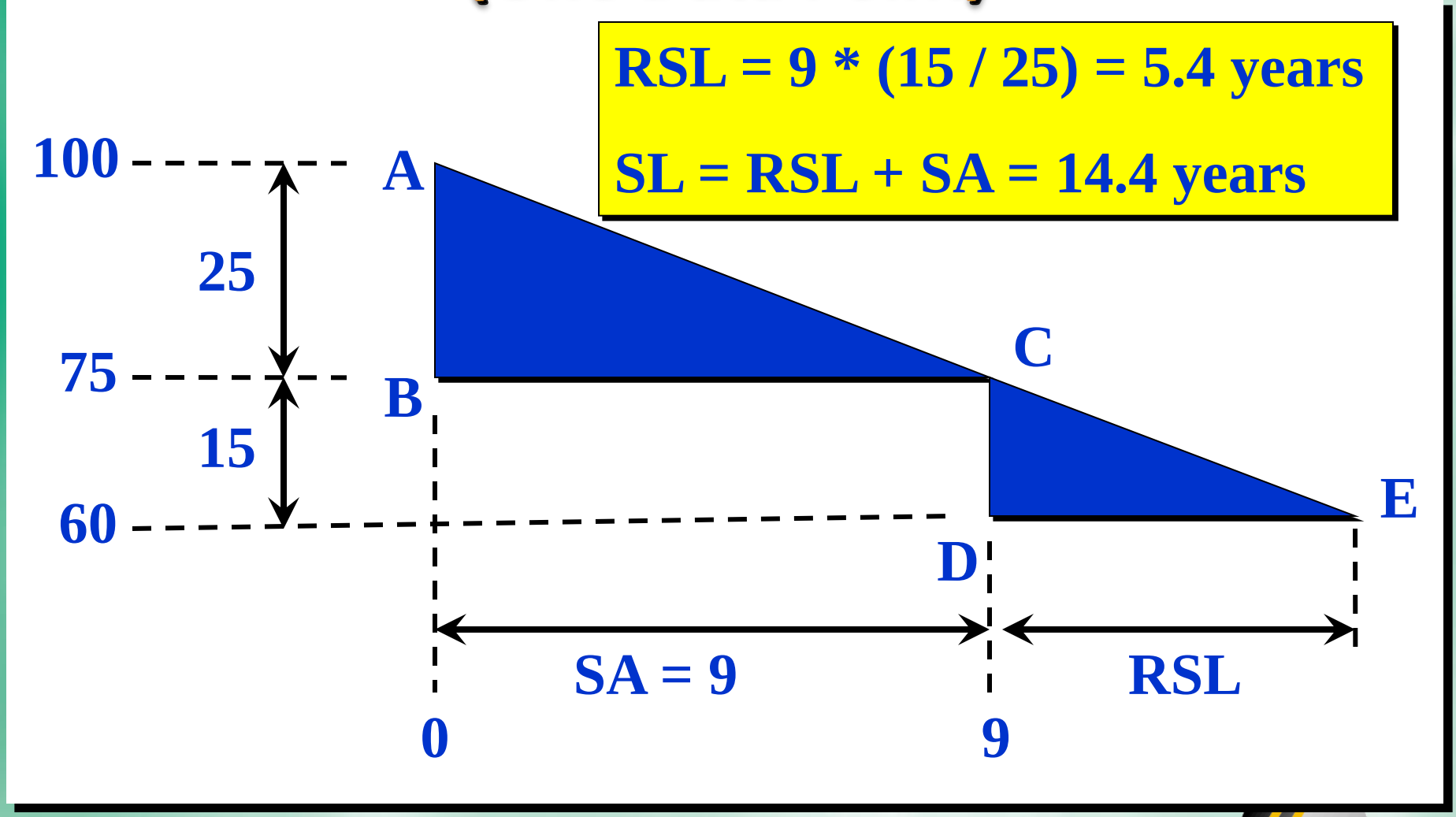
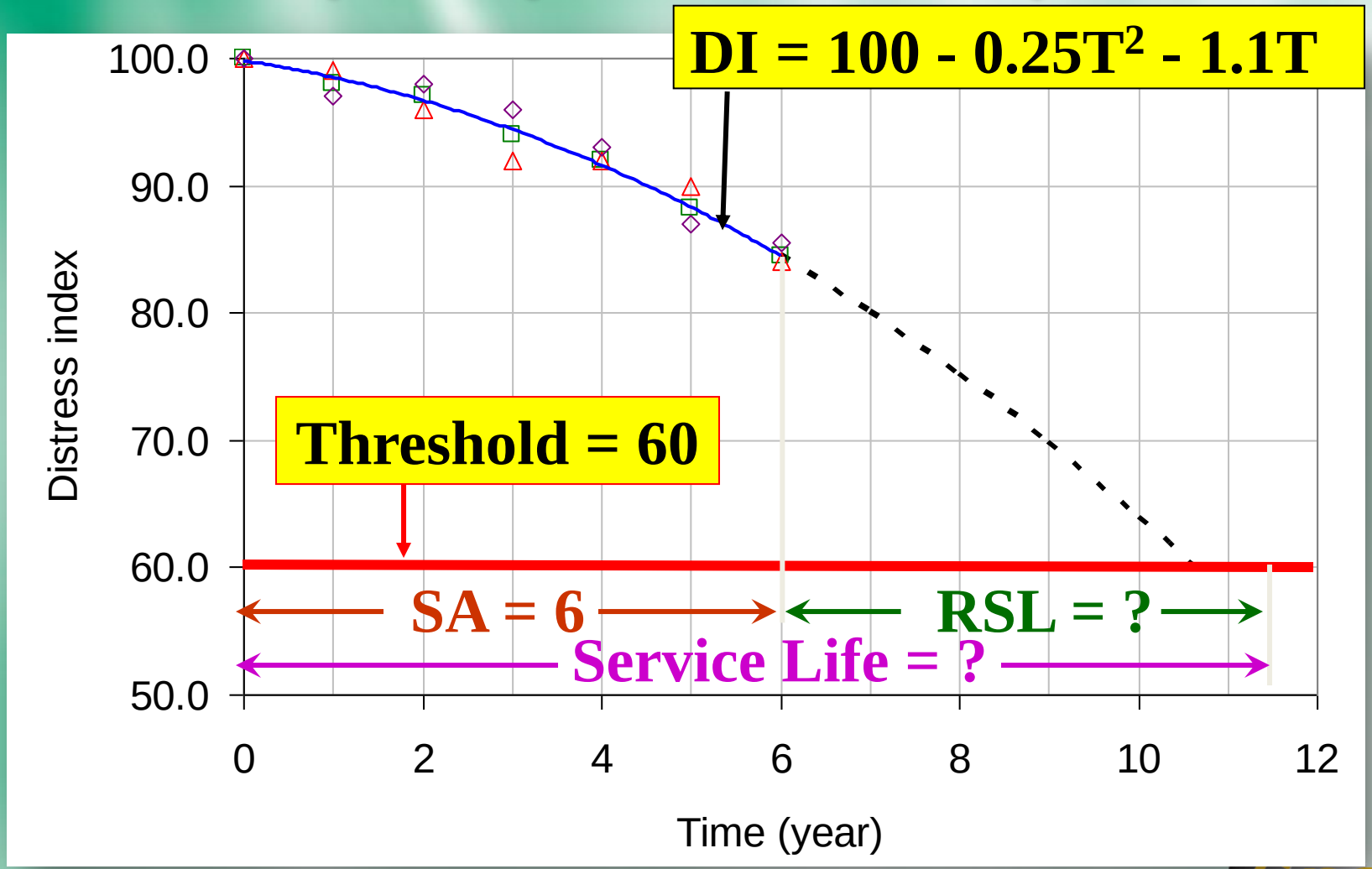
Remaining Service Life Example
(One Data Point)



Remaining Service Life Example
(One Data Point)



Remaining Service Life Example
(Multiple Data Points)



Remaining Service Life Example
(Multiple Data Points)

From Best-Fit Equation of DI;

$$DI = 100 - 0.25 * T^2 - 1.1 * T$$

Where T = Time in Years

Remember that when DI = 60, T = Service Life

$$60 = 100 - 0.25 * T^2 - 1.1 * T$$

T = SL = 10.6 Years

RSL = SL – SA = 10.6 – 6 = 4.6 years

Which Remaining Service Life should be used?

Index	RSL (Years)
Transverse Cracking	11
Longitudinal Cracking	14
Alligator Cracking	7
Block Cracking	18
Rutting	6

Uses of Remaining Service Life

- Average Remaining Service Life of Pavement Network (Network Health)
- Enhances Communication
- Forecasts Future Condition of Network
- True Benefits : RSL Gain
- Used to Determine Asset Values

Limitations of Remaining Service Life

- **Not Applicable to Some Distress Types (Such as Potholes & Blowup)**

Questions ?

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