UDOT PERSPECITVE ON PAVEMENT MANAGEMENT DATA

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UDOT Keeping Utah Moving

NATIONAL PAVEMENT PRESERVATION CONFERENCE
nppc23
IMPACTS AND BENEFITS FROM PAVEMENT PRESERVATION

ncpp National Center for Pavement Preservation
MICHIGAN STATE UNIVERSITY

AASHTO TSP2 PAVEMENT PRESERVATION

ROCKY MOUNTAIN WEST PAVEMENT PRESERVATION PARTNERSHIP
SOUTHEAST PAVEMENT PRESERVATION PARTNERSHIP
MIDWESTERN PAVEMENT PRESERVATION PARTNERSHIP
NORTHEAST PAVEMENT PRESERVATION PARTNERSHIP

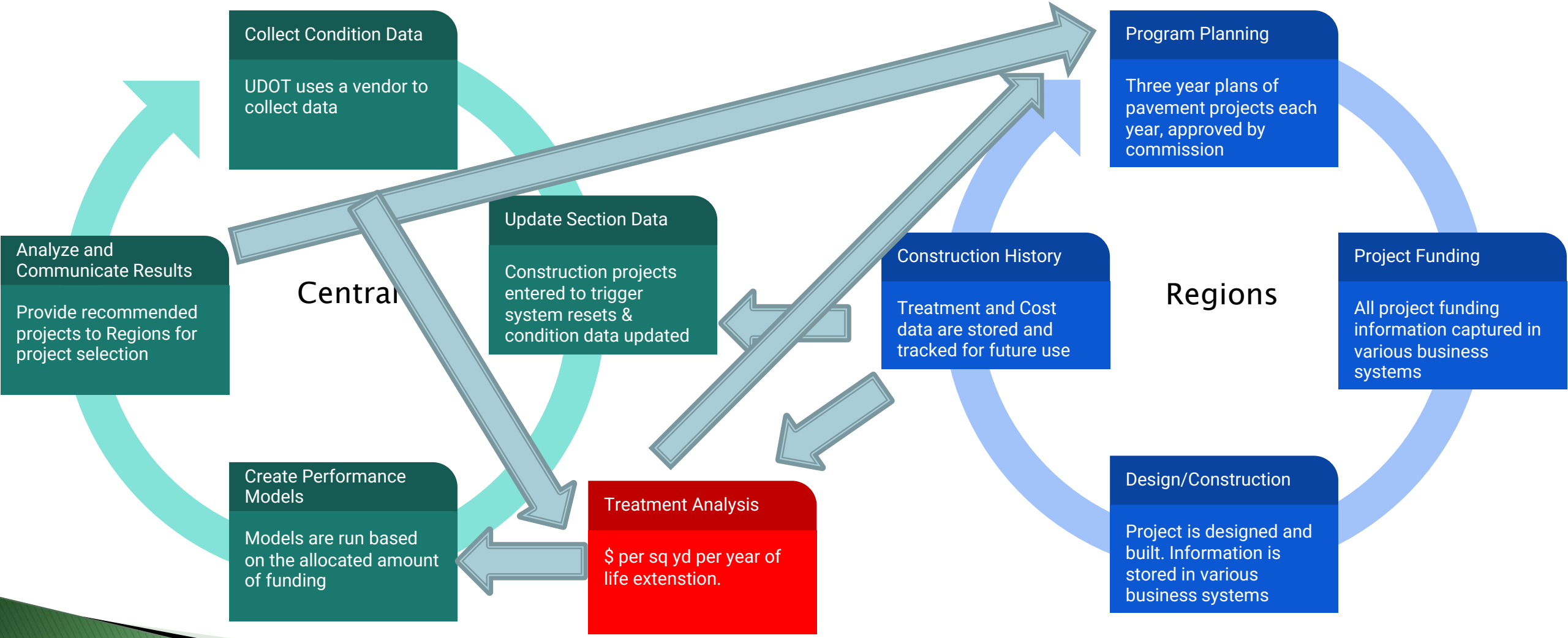
2023 UDOT Pavement Program Funding

- $160 Million High Volume
  - 23,300 Surface Areas (1 Surface Area = 7040 sq yd or 1 lane mile)
- $35 Million Low Volume
  - 4,600 Surface Areas
- $70 Million Reconstruction
- Additional maintenance money for in house chip seals
- Approximately $1.40 / Sq. yd. / Year

What does $1.40 / sq. yd. / year mean?

- Chip Seal = $5.00 / Sq. Yd.
  - 27% of network every year
  - Every section every 3 or 4 years
- Functional Repair (1.5" Overlay) = $22 / Sq. Yd.
  - 6% of network every year
  - Every section every 16 or 17 years
- Reality is we can touch every section about every 10 – 12 years

Pavement Management / Construction Program



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Pavement Management Data Objectives

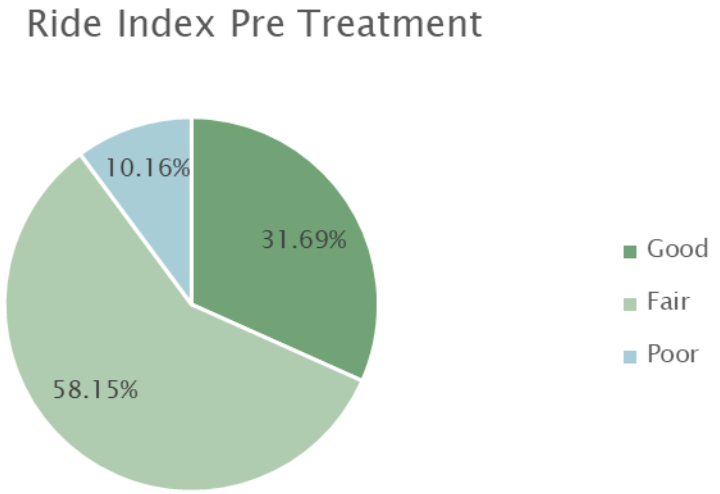
- Accurately predict condition based on different funding levels
- Provide accurate project recommendations
  - Recommendations stakeholders agree with
- Determine Treatment Life
- Update resets and deterioration curves
- Evaluate specification changes

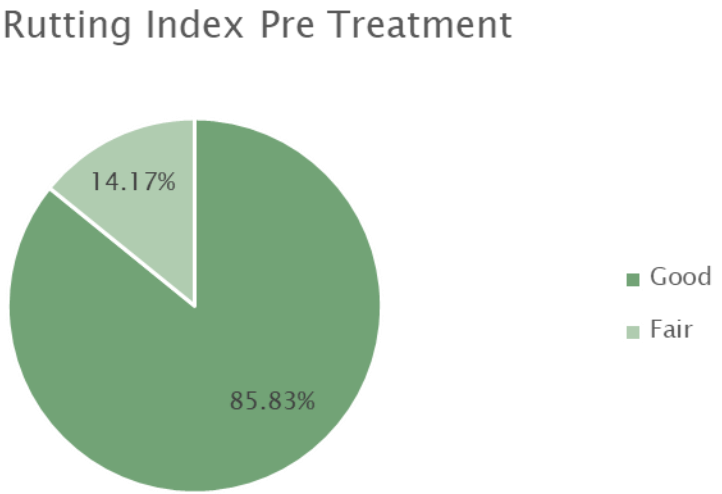
Treatment Life Analysis

- How do we define the life of a preservation treatment?
  - What about a rehab treatment?
- NCAT / MnROAD have controlled experiments
  - Good starting point
- Can we use pavement management data to determine the actual life of every tenth of mile of every treatment?
- Can we use this data to compare treatments using $ / Sq. Yd. / Year of Life extension?

Sample Data Set

- 2016 in-house Maintenance Chip Seals
  - 1072 tenth mile Sections
  - All data used, including some questionable data





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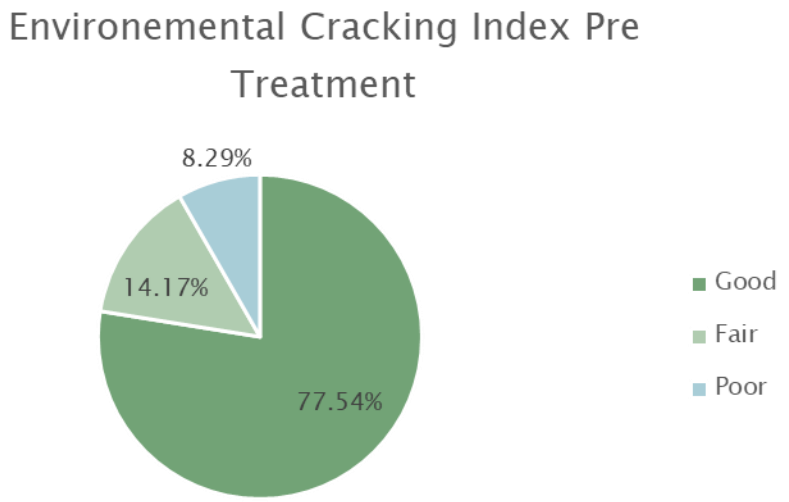
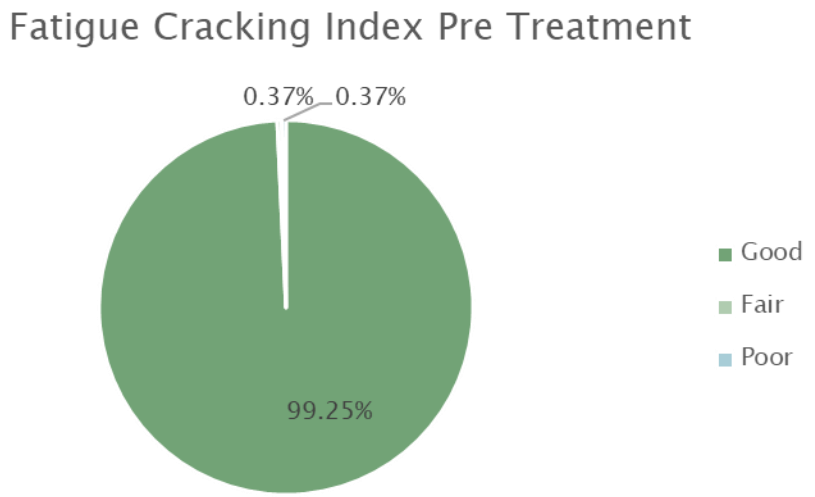
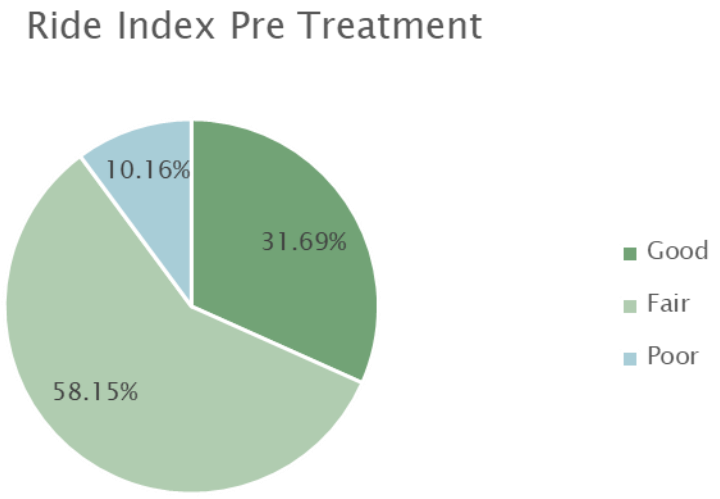
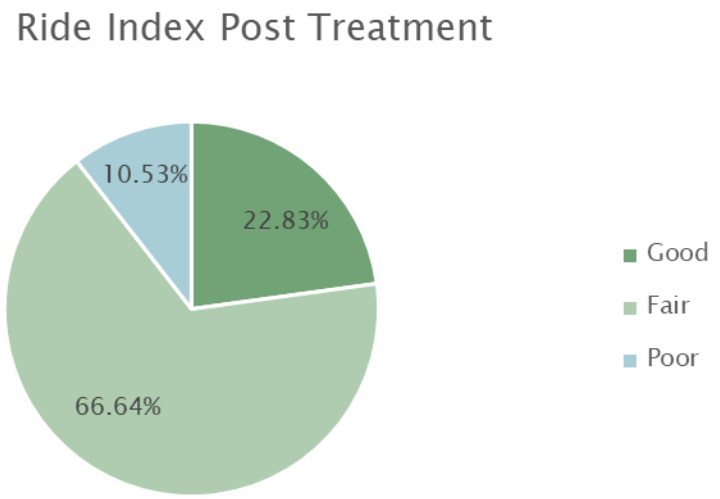




Ride Index Analysis

- 26% of section were worse after the treatment than before
- 40% of sections had IRI improvement less than 10



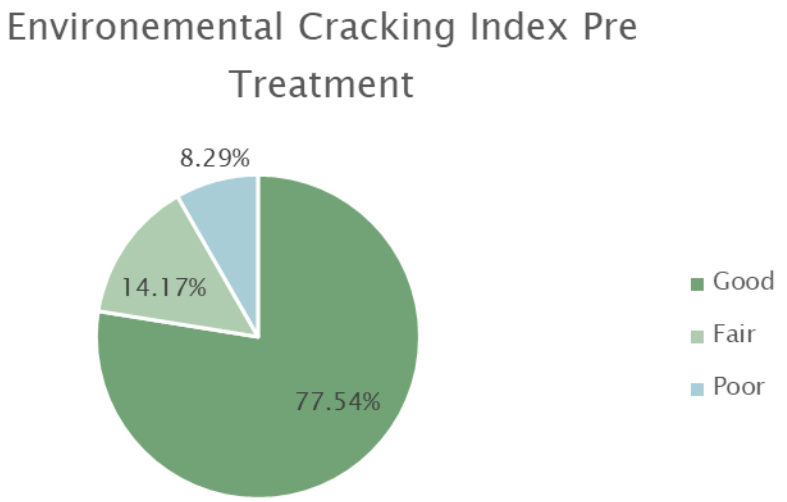


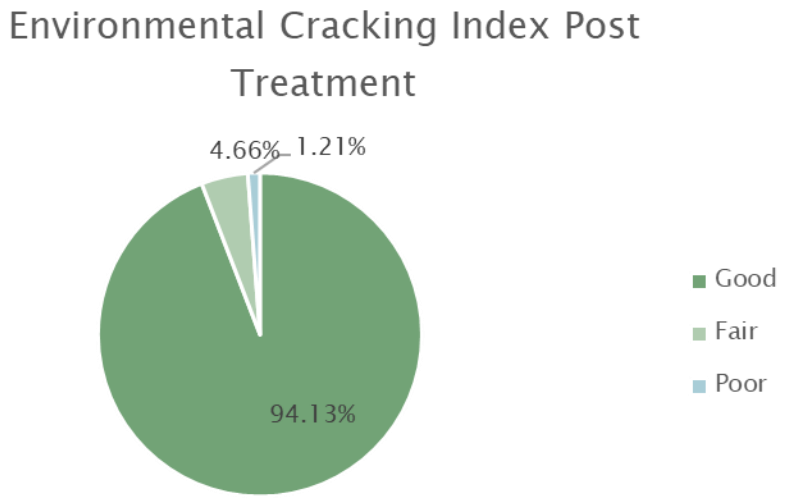
Ride Index Analysis

- Deterioration curve should be flatter after chip seal for some period of time
- Need a control section to compare
  - How many do we need statewide?
- Same logic applies to rutting and fatigue cracking for seals
- Indices may have value when analyzing rehabs

Environmental Cracking Index Analysis

- 56 Section had pre treatment index of 100
- 20 Section had pre treatment index of 0



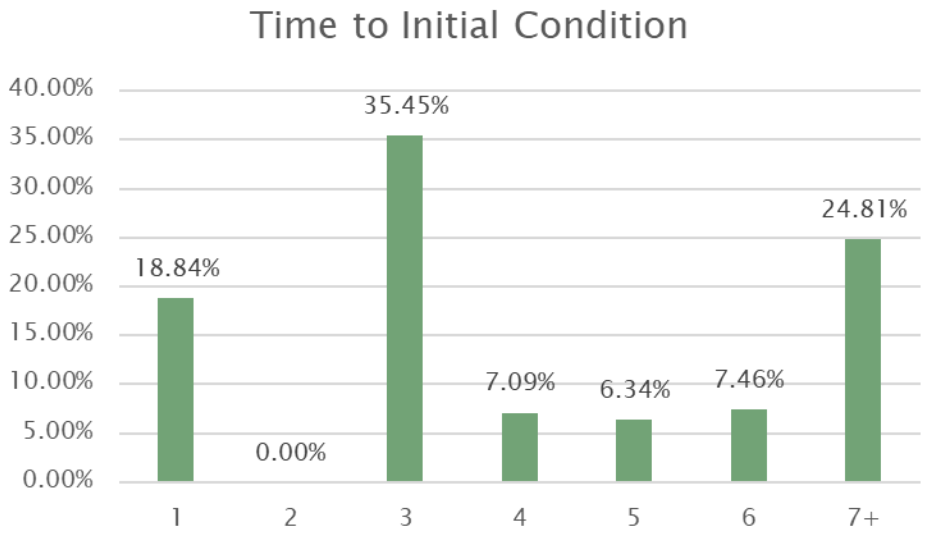


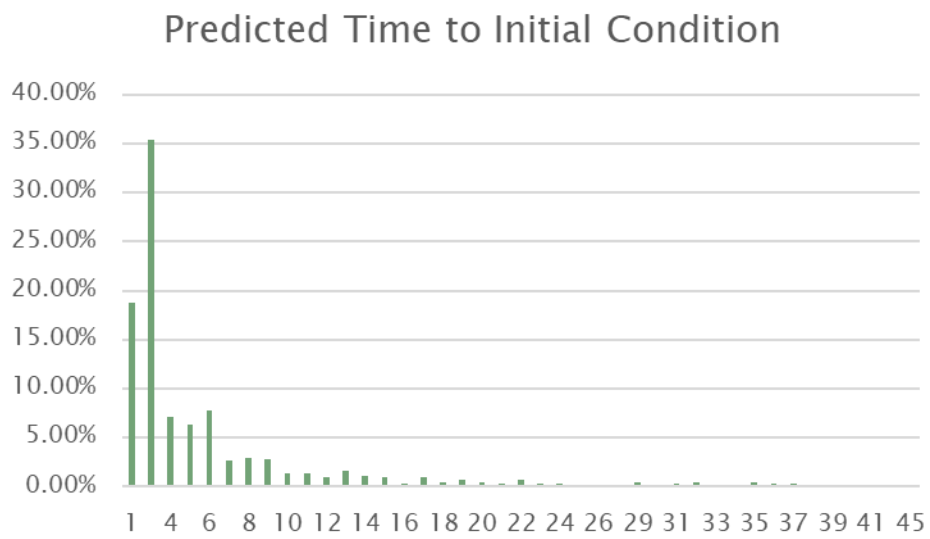
Treatment Life Definitions Considered

- Time to Initial Condition
  - Not great for outliers
- Time to Fair
  - Potentially good for seals
- Time to Poor
  - Allows comparison of all treatments
- What happens if do another treatment before definition is reached?
  - Predicted based on PMS deterioration curve
- 2017 data is post treatment data
  - If 2017 data reached “failure” threshold then treatment had one year of life

Time to initial condition

- Average Predicted Time to Initial is 6 years
  - However the standard deviation is 7
  - Questionable data in year 3





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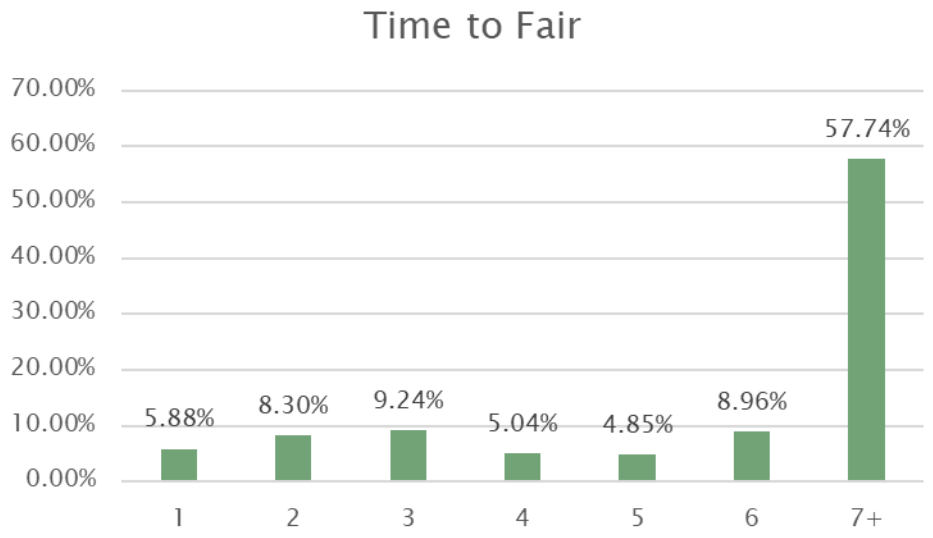
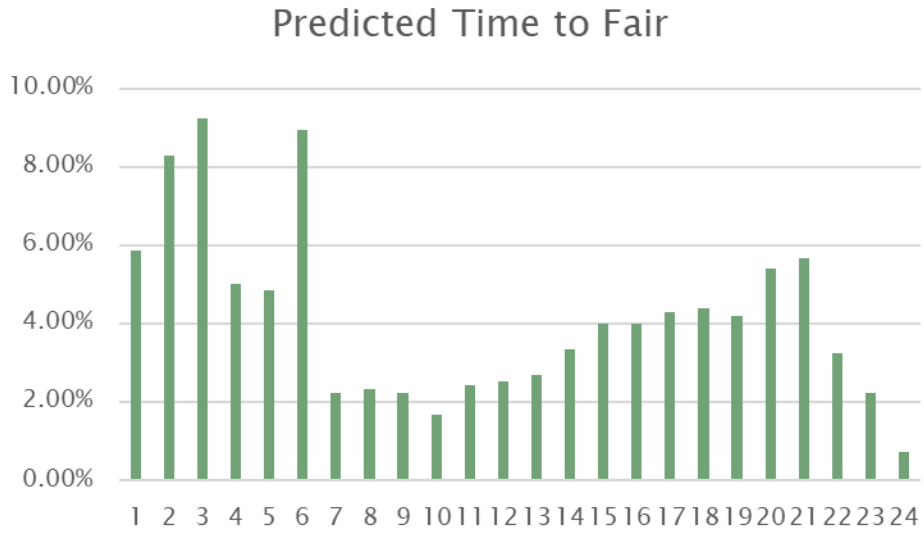
Time to fair condition

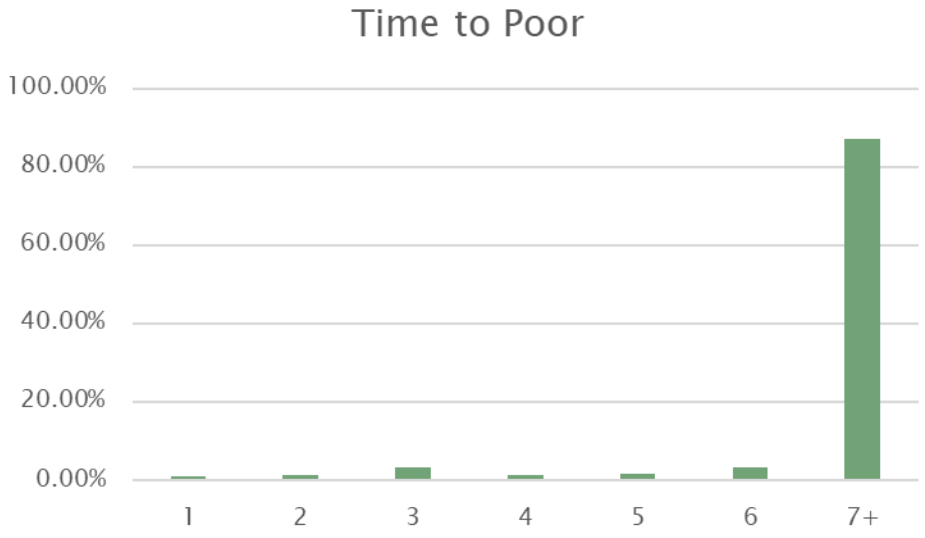
- Average Predicted Time to fair is 11 years
  - However the standard deviation is 7
- 49% predicted to last over ten years

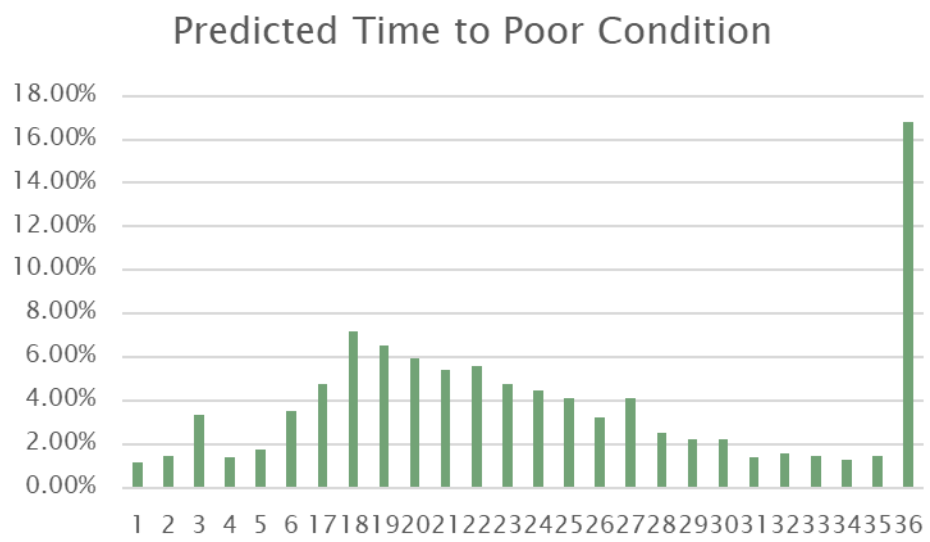




Time to poor condition

- Average Predicted time to poor is 23 years
  - However the standard deviation is 10
- 87% of sections predicted to last more than 15 years





$ / Sq. Yd. / Year of Life extension?

- If predicted time to initial is considered life extension
- Contracted chip seals are about $5 per sq. yd.
  - $1.85 / sq. yd. / year of life extension on average
  - $0.11 Minimum, $5 Maximum, $1.60 Standard deviation
- In-house chip seals are half of that cost

Thoughts / Challenges

- End goal is to be able to compare treatments
  - Or changes to specifications
- Consistent data collection is needed
  - Quality is just as important
  - Crack Density needs to replace UDOT's cracking index
- Poor predicted deterioration curves
  - Curve used is based on apparent age
  - Hopefully the data can be used to improve this
- Need to stay on top of LRS changes

Next Steps

- Transition to crack density and improve QC of data
- Figure out how to reduce that standard deviation
- Repeat for all treatments
- Compare treatments and update decision trees accordingly
- Manage pavements at lowest life cycle cost possible