2015
MUNICIPAL STREETS SEMINAR

PCC Rehabilitation Methods
City of Mason City, Iowa

November 18, 2015
Ames, Iowa
Snapshot of Mason City and Street Network

- Located in north central Iowa
- Population of 28,000
- Corporate limits encompass 27.8 sq. mi
- Approximately 195 miles of street network
  - Paved miles – 155
  - Unimproved miles – 40
    - Granular
    - Chip Seal
- Minor Arterial – 30 miles
- Collector – 18 miles
- Local streets
Street Panel and Curb Replacement Program

- City sponsored program since 1999
- Primarily funded with RUT and LOST
- Program varied significantly early on
  - In dollars and frequency
- Solid program since 2007
- Program addresses both street, and curb and gutter repairs
Historical Annual Costs

Annual Program Spending

- 1999
- 2000
- 2001
- 2002
- 2003
- 2004
- 2005
- 2006
- 2007
- 2008
- 2009
- 2010
- 2011
- 2012
- 2013
- 2014
- 2015

- $350,000
- $300,000
- $250,000
- $200,000
- $150,000
- $100,000
- $50,000
- $-
Program Priority Planning

- Street Classification
  - Arterial
  - Minor Arterial
  - Collector
  - Local

- Street Zones
  - Industrial
  - Commercial
  - Residential
Causes of Pavement Failure

- Insufficient Subgrade preparation
- Absence of or inadequate subbase material
- Poor compaction during utility installation
- Utility failures (undermining)
  - Storm sewer collapse
  - Water main break
- High ground water table
- Sump Pump discharge
Types of Pavement Failure

- Settlement (utility trenching)
- Shear settlement (subgrade shifting)
- Freeze/thaw damage
- Deep open cracking and separation
- Spalling
- Mix design
- Broken curb
Repair Components

- Full depth replacement
- Subgrade preparation and repair (soil types)
- Subbase Material
- Mix design (construction/maintenance)
- Dowel vs. No-dowel
- Broom or Rough finish
- Jointing and joint sealing
- Curing methods
Standards and Practices

- Mason City Standard Specification
- Iowa Department of Transportation
- SUDAS
- CP Tech Center
Pavement Failure Examples

Shear Settlement

Saturation Settlement
Pavement Failure Examples

Spalling

Cracked Panels
Pavement Failure Examples

Aged PCC Deep Cracking and Separation

Super Chlorinated Mix
Replacement Patch Preparation

Patching on Subbase Material

Patching on Grade?
Replacement Patch Preparation

Doweled Patches

Patches with Utility Box Outs
Replacement Patch Preparation

Baskets and Dowel Bar Reinforcement

Coordinate Signal Loop Installation
Finished Patches

Light to Heavy Loading
Finished Patches

- Commercial (top left)
- Industrial (bottom left)
- Residential (top right)
Finished Patches

Incorporate ADA Compliance
Program Statistics

- Cumulative Program Spending
  - $2,780,787.06
- Pavement Repaired – 35,480 SY
- Curb and Gutter Repaired – 19,103 LF
- Avg. Cost paid for 7” PCC - $43.27/SY
- Avg. Cost paid for 9” PCC - $55.00/SY
Program (PCC) Cost Trends

Cost per Sq. Yd

Program Year

7" PCC, 9" PCC, Linear (7" PCC), Linear (9" PCC)
Future Program Planning

- Increase the program monetarily and focus solely on local funding and local streets
- Use other programmed funds on arterial and collector street patching and reconstruction projects
- Explore and utilize additional pavement preventive maintenance methods such as partial depth patching and thin PCC overlays
- Perform more core sampling when in question
QUESTIONS