Manhole Inspection and Restoration

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Presentation Outline

• Types of manholes
• NASSCO MACP System
• Inspection techniques
• Types of common defects
• Overview of restoration methods
• Questions
Brick Manhole

View 1. Plan (bottom view) of manhole

View 2. Cross section of manhole
Precast Concrete Manhole

C.I. COVER AND FRAME
SET ON BRICK
COVER SLAB
CONCRETE SURROUND
CONCRETE RINGS SET ON BRICK FORMATION OR DIRECTLY ON TO CONCRETE
INLET FLOW
OUTLET FLOW
Cast-in-Place Concrete Structure
CONDITION ASSESSMENT
Manhole Assessment Certification Program (MACP)

- Developed by the National Association of Sewer Service Companies (NASSCO) to standardize inspections
- Grading system developed for defects noted
- Grading numbers coordinated with risk of failure
- Rating evaluation based on defect grades for a given structure
MACP Grading and Remaining Life

Grade 5  Failed or failure imminent
Grade 4  Failure likely in foreseeable future
Grade 3  Failure unlikely in near future
Grade 2  Minimal failure risk
Grade 1  Acceptable structural condition
Manhole Components

- Cover
- Frame
- Chimney
- Cone
- Wall
- Bench
- Channel
- Connections
Level 1 Inspection:
• Gather general information
• Evaluates general condition
• CSE not required

Level 2 Inspection:
• Gather detailed information
• Fully documents ALL Defects
• CSE or camera inspection required
• NOTE – all measurements must be field verified
INSPECTION TECHNIQUES
Manned Entry Inspection
Confined Space Entry

- CSE Permit required
- Atmosphere must be checked and monitored
  - May need ventilation
- Need certified entrant, attendant and CSE Supervisor
- Equipment needs
  - Air meter
  - Fall arrest system
  - Lighting
  - Traffic control
  - Cage around opening
Camera Inspection
Panorama Manhole Inspection
Panoramo Views
COMMON DEFECTS
Rim issues – missing brick or mortar / leaks
Off-set frame and cover
Infiltration
Grease Buildup
Deposits
Corrosion
Reinforcing Visible
RESTORATION METHODS
NASSCO Performance Specification Guideline for Manhole Rehabilitation

- Grouting
  - Chemical
  - Cementitious

- Coatings / Liners
  - Cast-in-Place
  - Cured-in-Place
  - Spray on liners
    - Cementitious
    - Polymer
    - Epoxy
    - others
  - Composite Liners
  - FRP Inserts

- Chimney Seals

- Adjustment materials
Spray-on Linings
Cementitious Linings
Grouting
Segmented Panel Linings
Manhole Encapsulation
Composite Manholes
Questions?

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