Advantages and Challenges of High Resolution Manhole Scanners

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Outline

- Manhole History
- Why Inspect Manholes (Storm and/or Wastewater)
- Manhole Scanners and How They Work
- Challenges
- Advantages
- Questions

GOAL: To gain a greater understanding of the benefits and limitations associated with high-resolution 3D scanners, in place of older technologies, for manhole inspections.

Manhole History

- Lamping

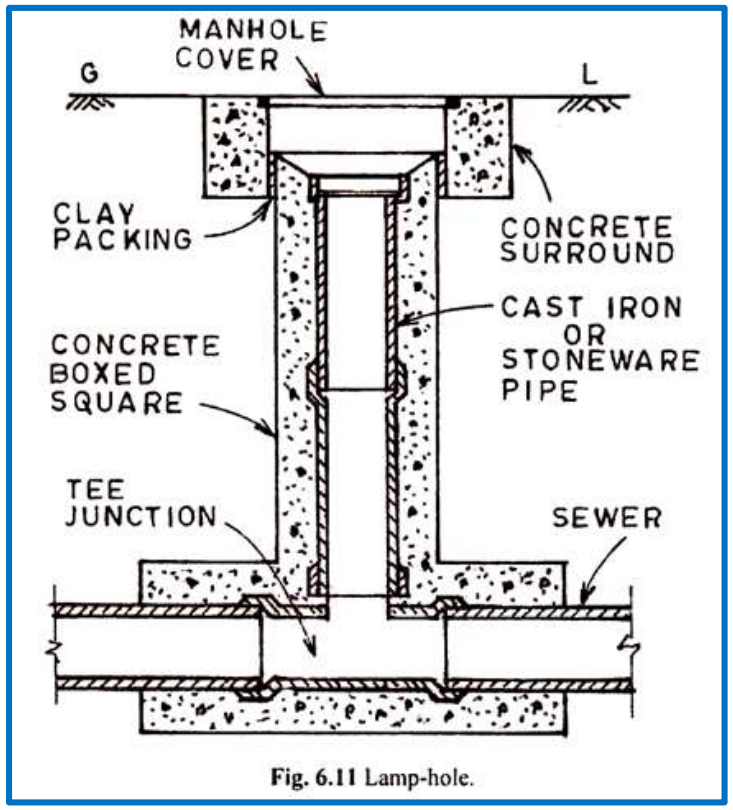
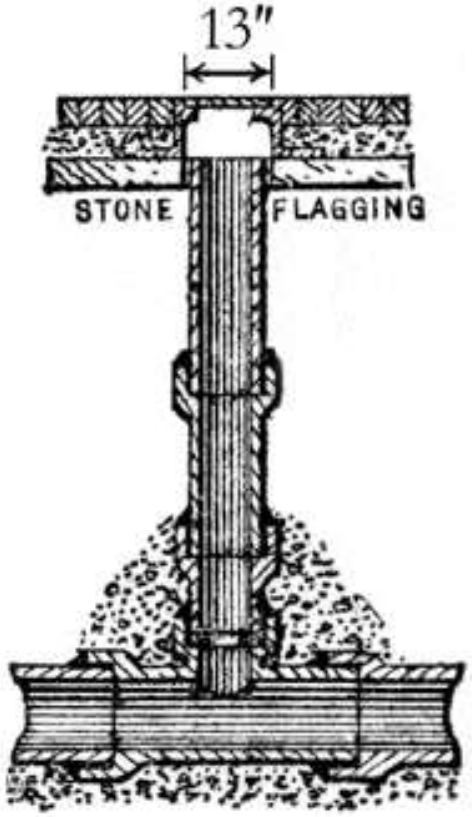
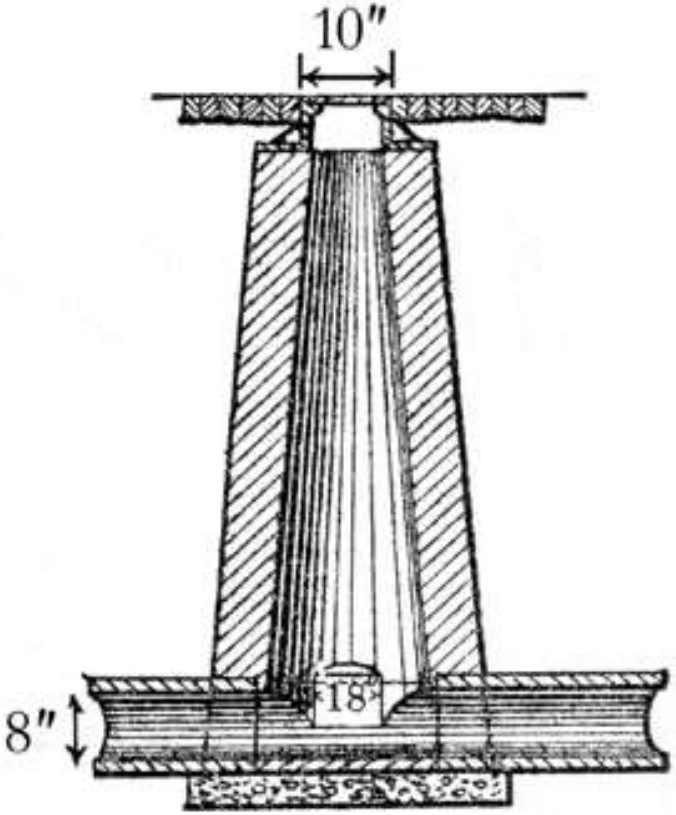


Fig. 6.11 Lamp-hole.



PIPE LAMPHOLE.



BRICK LAMPHOLE.

Why Inspect Manholes?

- Age
- Material
- Type
- Condition
- Parallel Systems/Unknown Manholes
- Depth – Ease of Access

Age

- Just because it's old doesn't mean it's bad
- Just because it's new doesn't mean it's good

Material

- Brick
- Concrete & Polymer
- Fiberglass
- PVC
- Lined/Unlined
- Other

Types

- Standard
  - -PreCast
  - -Cast in Place
  - -Shallow
  - -Deep
- Doghouse
- Junction Box
- Brick

Condition

- Deterioration/Corrosion
- Structural
- Obstructions
- Coatings
- I/I
- Other

Parallel Systems/Unknown Manholes

- Crossing Systems
- Parallel Systems
- Unknown Manholes
- Storm/WW/Other
- Manhole Numbers and Identification

Depth/Ease of Access

- Last Inspection
- No Inspection

Manhole Scanners

- Cues – Spider
- Cleverscan (Wincan)
- IBAK SI - Panorama
- Helix

Manhole Scanners

- IBAK SI - Panoramo
- Cues – Spider
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	Panoramo SI	Clever Scan	Spider	Helix
Cable Length	300 ft[1]	30 ft	Wireless[2]	Unknown
Cameras	2	5	4	6
Total Weight	700 pds	38 pds	28 pds	Unknown
Virtual	Yes	Yes	Yes	Yes
Unfolded View	Yes	Yes	No	No
Point Cloud	Yes	No	Yes	Yes
Portable	No (Need Truck)	Yes	Yes	No (Need Truck)
Laser	No	Yes	Yes	Yes
Operation	Complicated	Push Button	Unknown	Push Button
Computer	Rackmounted Computer	Part of Unit	Tablet	Tablet
Operational Software	Incl.	Incl.[3]	Incl.	Incl.
Power	Generator Required	Battery	Battery	Generator Required
Cool Feature		Highly Intergrated	Wireless	

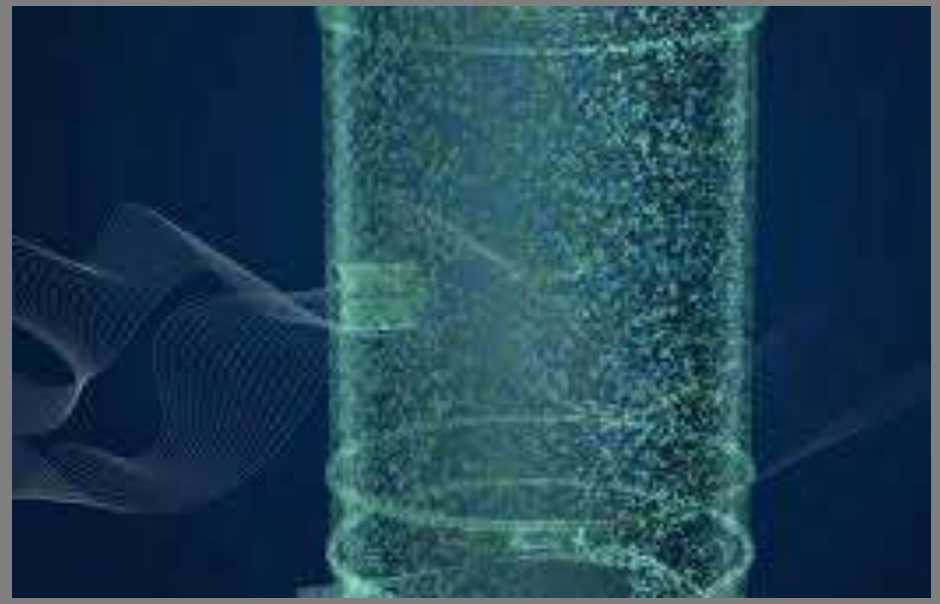
Notes:
1. Cable length determines the depth of the manhole you can scan.
2. Althought, the spider is wireless it still needs to be tethered so it can move in and out of the manhole.
3. It appears the Clever Scan has a tight integration with Wincan reporting software.

How They Work

- Laser – 3D Point Cloud
- High Resolution Cams (Multiple)
- Manual or Auto Tether

Where they Work

- MH's
- Junction Boxes
- Tanks



Challenges

- Proprietary Software
- Full Flow
- Sunlight at tops / time of day – noon
- Offsite MACP coding (Generally)
- Standard MACP Database Issues
- Some to large for elevated MH's – must mix cameras? Software
- Delicate (Recent Broken Lens)
- Can't look up pipes very far
- Cost
- Some need to be mounted to truck
- Long processing and QC time – usually a week lag time or more
- Re-processing into other proprietary software
- Rough Terrain – where a person could traditional go but harder for larger scanner

Advantages

- No Entry
- No Tiny Camera needed for inspection
- Pipe Connections can viewed with proper set up and lighting
- Accurate Measurements
- Speed – Avg 10 per day - up to 20 a day with one in rough areas – up to 50 per day in perfect conditions (Robert Korosec, PLS, Co Founder Subsurface Utility Imaging)
- Cost per scan
- Can be mounted to 4-wheeler or packed in on backpack
- No Relying on workers to document everything while in MH
- Minimal training for field staff

QUESTIONS

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