CASE HISTORIES OF MINE SHAFT SUBSIDENCE OF ABANDONED COAL MINES IN THE RICHMOND TRASSIC BASIN, RICHMOND, VIRGINIA

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Introduction

- Western Richmond Area in Chesterfield and Henrico Counties
- Richmond Triassic Basin
- First Mined Coal in New World
Coal first discovered circa 1701 by Huguenot settlers on banks of James.

Mining extended from 1700s to 1900s.

Most mining occurred during mid 1800s.

Mining operations range from “mom and pop” small-scale pits to large commercial production mines.

Mining techniques and practices evolve with time.
Much of the mining was undocumented.
Lack of records concerning mined locations.
Suburban sprawl encroached into previously mined areas in 1980s and 1990s and still continues.
Abandoned mine features pose threat to public safety.
Geology

- Triassic age rift basin
- Lenticular shaped
- Basin is about 30 mi long with maximum width of about 10 mi
- Bedrock is sandstone, siltstone, shale conglomerate and coal
- Mostly westward dipping beds
- Locally folded and faulted
Geology

Triassic Basins of Virginia

RICHMOND BASIN
Mining History

- Commercially mined from 1748 to 1927.
- Hundreds of drill holes, exploration pits, slopes, shafts and open pit mines.
- Multiple coal beds present. Thickness of beds ranges, but thickest is about 40 ft.
- Four dominant mining districts on eastern edge of basin where coal approaches surface.
- Type and size of mines vary significantly.
Figure 8. Coal production from the Richmond coalfield.
Figure 13. Cross section of the Coalbrook Slope.
Suburban Development
Case Histories – Chartstone Drive, Chesterfield County
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Case Histories - Chartstone Drive, Chesterfield County
Case Histories - Broad Street Mini Storage, Henrico County
Case Histories - Broad Street Mini Storage, Henrico County
Case Histories - Broad Street Mini Storage, Henrico County
Case Histories - Broad Street Mini Storage, Henrico County
Case Histories - Ashburg Drive, Henrico County
Case Histories - Ashburg Drive, Henrico County
Case Histories - Ashburg Drive, Henrico County
Case Histories - Ashburg Drive, Henrico County
Case Histories - Evansdale Road, Henrico County
Case Histories - Evansdale Road, Henrico County
Case Histories - Tarrington Subdivision, Chesterfield County
Case Histories - Coalboro Road, Chesterfield County
Case Histories - Coalboro Road, Chesterfield County
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Grove Shaft - Midlothian Mines Park, Chesterfield
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CAUTION

This project requires construction work over a hazardous and unprotected mine shaft. The contractor shall be responsible for thoroughly investigating the site conditions and scheduling equipment, equipment operators, operations, personnel, and safety procedures to prevent accidents and injuries.

GENERAL NOTES:

1. This drawing shows the general shape and approximate dimensions of the mine shaft and the mesh closure limits. Use this drawing as a guide for field layout of the closure. Field verify all dimensions prior to fabrication.

2. All work shall be done to the satisfaction of the engineer.

3. All persons working within 10 feet of the rim of the shaft shall wear safety harnesses and shall be tethered with a personal fall arrest system to a secure fixture. Fall protection shall be in accordance with OSHA regulations regarding fall protection.

4. See sheets S2 and S3 for closure details.

MESH NOTES:

1. Closure shall utilize macfaster galvanized and PVC coated rockfall protection netting or equivalent.
   - Length = 25m, Width = 4m, mesh type 8x10-Wire Diameter = 2.7/0.7mm, galvanize & PVC coated
   - Mesh shall be brown in color

2. Mesh shall be galvanized, PVC coated, hexagonal, double twisted 12-gauge steel wire, with a maximum opening of 3.15 inches (80 mm).

3. The mesh and associated infrastructure required (wire, clamps, clips, steel rings, lacing, etc.) shall be installed to the manufacturers’ specifications and as shown on these plans.

Midlothian Park Mine Closure Grove Shaft Chesterfield County, VA

Sheet S1.2 Sump Pit/Vent. Shaft Closure Layout
February 2013
Grove Shaft - Midlothian Mines Park, Chesterfield

MESH OVERLAP DETAIL

SCALE: N.T.S.

MESH NOTES:
1. Closure shall utilize Maccaferri Galvanized and PVC coated Rockfall Protection Netting or equivalent.
   - Length = 25m, Height = 4m, Mesh type
   - 6x6x3-Wire Diameter = 2.73.7mm; Galvanic & PVC coated

2. Mesh shall be Galvanized, PVC coated, Hexagonal, Double Twisted 12 Gauge Steel Wire, with a maximum opening of 3.15 inches (80 mm).

3. The mesh and associated infrastructure required (wire, clamps, clips, steel rings, lacing, etc.) shall be installed to the manufacturer's specifications and as shown on these plans.

VEHICLE CROSS SECTION

Shaft Coverage Cross Section

ANCHORED AT ENDS. SEE DETAIL

Max. 0.5 ft. from edge of depression

Max. 1.0 ft. below ground surface

Double twist mesh (lys)
Case Histories - Reeds Branch, Polyurethane Foam, Southwest, VA
SHAFT CLOSURE CROSS-SECTION

- Fill Void with Polyurethane Foam (PUF) Approximate Void Volume is 90 cubic yards
- Existing Soil Cover
- Existing Concreted Rock Fill Cover
- Compact Soil Backfill Upon Completion of Foam Placement
- Access for Spraying PUF
- Debris Plugged Shaft

Case Histories - Reeds Branch, Polyurethane Foam, Southwest, VA
Case Histories - Reeds Branch, Polyurethane Foam, Southwest, VA
Thank You!

Questions?