

INITIAL EXPOSURE DETERMINATIONS FOR AIRBORNE CONTAMINANTS DURING REHABILITATION OF THE PORTSMOUTH DOWNTOWN TUNNELS PORTSMOUTH, VIRGINIA



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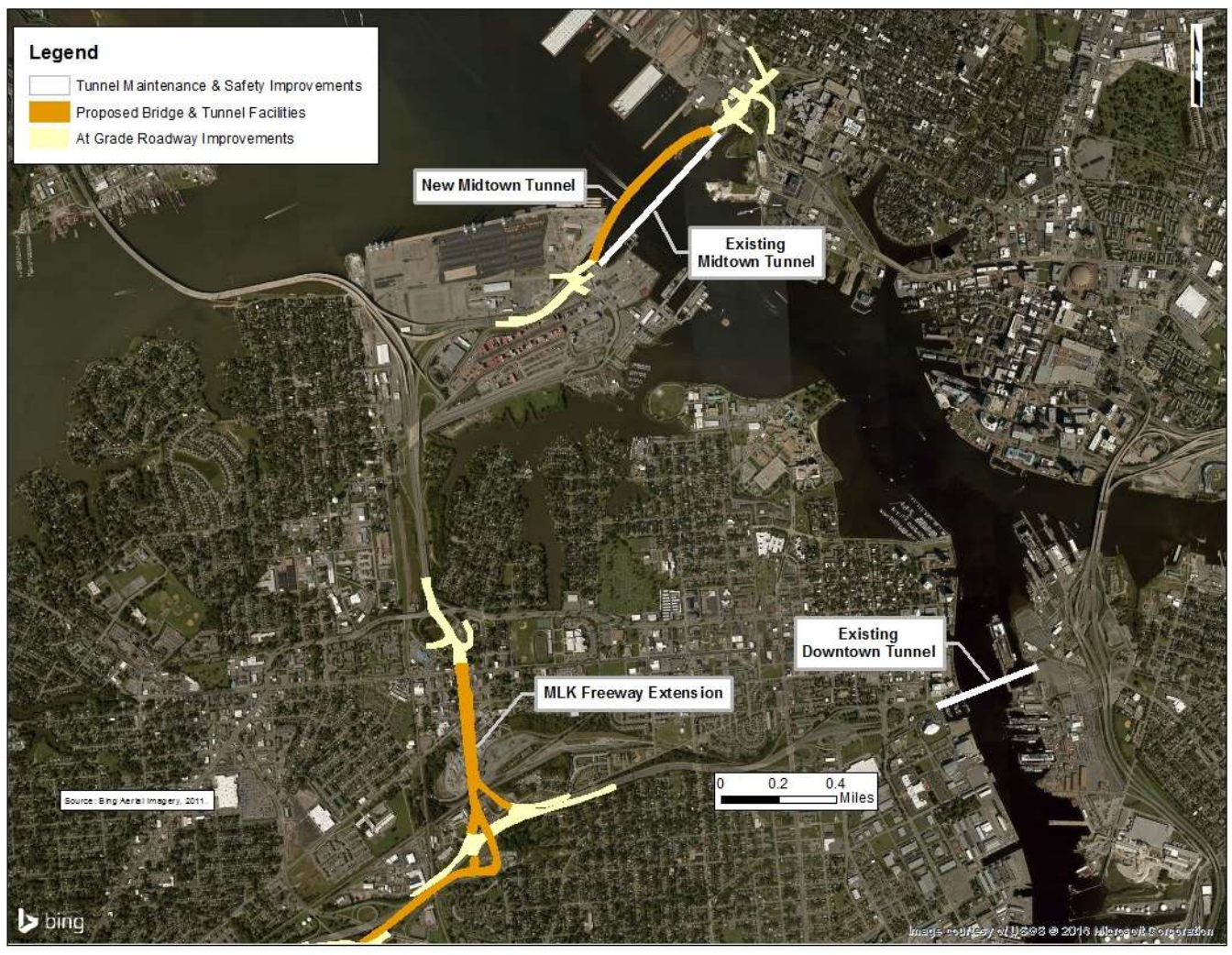
Downtown/Midtown Tunnel/MLK Extension

- ❖ Public-Private Transportation Act of 1995
- ❖ Comprehensive agreement with Elizabeth River Crossing
- ❖ Elizabeth River Crossing OpCo LLC (Concessionaire) is the overall manager and operator for the project
- ❖ Design/Build Team
 - SKW Constructors – Skanska USA Civil Southeast/Kiewit Construction/Weeks Marine
 - WSP-Parsons Brinckerhoff
 - 3e – Environmental Sub-consultant
- ❖ Start Construction - December 2011
- ❖ Scheduled Completion early 2018
- ❖ State contribution of \$508 million
- ❖ Total project valued at \$2.1 billion

Downtown/Midtown Tunnel/MLK Extension



Downtown/Midtown Tunnel/MLK Extension



Tunnel Rehabilitation Hazard Assessment

- ❖ Removal of Light Fixtures and Conduit
 - Sawcut Conduit and Removed in Sections
- ❖ Installation of Ceiling Fireproofing Panels and Jet Fan Anchors
 - Handheld Rotary Hammer Drills
- ❖ Installation of Electrical Conduit on Tile Walls
 - Handheld Rotary Hammer Drills
- ❖ Concrete Spall Repair
 - Handheld Saws and Air Hammer Chisels
 - With and Without Point of Source Dust Collection System

Tunnel Rehabilitation Hazard Assessment



Tunnel Rehabilitation Hazard Assessment

Primary Exposure Hazards

Airborne Lead Dust

(and other metals from vehicle emissions, brake dust, etc.)

Airborne Silica Dust

(from Tunnel Construction Materials)

Tunnel Rehabilitation Exposure Assessment

❖ Light Fixture and Conduit Removal

- Wipe samples from conduit
- Lead analysis
- Results ranged 70 – 140 $\mu\text{g}/\text{ft}^2$
- Lead Exposures well below PEL

❖ Recommendations

- Pre-clean dust from conduit at saw cut areas
- Damp rags and HEPA Vacuums
- Worker Decon

Tunnel Rehabilitation Exposure Assessment

❖ Installation of Fireproofing Ceiling Panels and Conduit on Tile Walls

- Hammer Drills with No Point of Source Dust Collection System
- Personal Exposure Sampling
- Lead and Silica Analysis
- Lead results well below PEL
- Silica results for drilling into concrete ceiling – Exceeded PEL
- Silica results for drilling into tile walls – Exceeded PEL

❖ Recommendations

- Use engineering controls (water, dust collection and ventilation)
- Respiratory protection (1/2 face APR)

Tunnel Rehabilitation Exposure Assessment



Setting up Sampling Pumps



Drilling into ceiling

Tunnel Rehabilitation Exposure Assessment

❖ Concrete Spall Repair (Roadway Level and Lower Air Duct)

- Handheld Saws and Air Hammer Chisels
- No Point of Source Dust Collection System (Roadway Level)
- Point of Source Dust Collection Systems (Lower Air Duct)
- Conducted Personal Exposure and Work Zone Air Sampling
- Lead and Silica Analysis
- Lead results well below PEL
- Silica results for Handheld Saws– Exceeded PEL
- Silica results for Air Hammer Chisels – Exceeded PEL
- Dust clouds traveled downwind (other trades in work zones)

❖ Recommendations

- Use engineering controls (water, dust collection and ventilation)
- Respiratory protection (1/2 face APR)
- Restrict downwind Trades to 100 feet or more

Tunnel Rehabilitation Exposure Assessment



Tunnel Rehabilitation Exposure Assessment



Very Dusty Downwind – even with dust controls implemented

3e



OSHA's Crystalline Silica Rule

- ❖ Construction Employers must comply by June 23, 2017
- ❖ Requires employers to limit worker exposures to crystalline silica
- ❖ Can use control method outlined in **Table 1** of Standard or measure worker's exposure
- ❖ Protect workers from respirable crystalline silica exposure above PEL of $50 \mu\text{g}/\text{m}^3$, over 8-hour day
- ❖ Use dust controls to protect workers from silica exposures above PEL
- ❖ Provide respirators when dust controls cannot limit exposures to the PEL

OSHA's Crystalline Silica Rule

**TABLE 1: SPECIFIED EXPOSURE CONTROL METHODS
WHEN WORKING WITH MATERIALS CONTAINING CRYSTALLINE SILICA**

Equipment / Task	Engineering and Work Practice Control Methods	Required Respiratory Protection and Minimum Assigned Protection Factor (AFP)	
		<4 hours / shift	>4 hours / shift
(xi) Handled grinders for mortar removal (i.e., tuckpointing)	<p>Use grinder equipped with commercially available shroud and dust collection system.</p> <p>Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.</p> <p>Dust collector must provide 25 cubic feet per minute (cfm) or greater efficiency and a cyclonic pre-separator or filter-cleaning mechanism.</p>	AFP 10	AFP 25
(xii) Handled grinders for uses other than mortar removal	<p>For tasks performed outdoors only.</p> <p>Use grinder equipped with integrated water delivery system that continuously feeds water to the grinding surface.</p> <p>Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.</p>	None	None

OSHA's Crystalline Silica Rule

Regardless of control measure used, employers must:

- ❖ Establish and implement a WRITTEN EXPOSURE CONTROL PLAN
 - Identifies tasks involving exposure
 - Identifies methods used to protect workers,
 - Identifies procedures to restrict access to high exposure work areas
- ❖ Designate a Competent Person to implement plan
- ❖ Restrict housekeeping practices that expose workers to silica where feasible alternatives exist

OSHA's Crystalline Silica Rule

Regardless of control measure used, employers must:

- ❖ Offer medical exams, including chest X-rays and lung function tests – every 3 years for workers who are required to wear respirators for 30 or more days per year
- ❖ Train workers on ways to limit exposure
- ❖ Keep records of workers' silica exposure and medical exams

With Table 1 Activities Why sample?

- ❖ Determine if silica is a concern
- ❖ Document compliance
- ❖ Establish historical records for similar activities
- ❖ Confirm effectiveness of control methods
- ❖ Confirm effectiveness of Dust Collection Systems
- ❖ Confirm employee using controls effectively
- ❖ Change in Materials or Equipment
- ❖ Multiple contractor worksites – exposure to other trades in work zone
- ❖ Defend Against Fraudulent Civil Claims
- ❖ Employee Requests to Observe Monitoring

QUESTIONS?



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