

Fiber Reinforced Concrete Pilot Project Update

Transportation and Infrastructure Committee Briefing December 5, 2023

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Overview

- Background
- > Overview of Pilot Locations
 - ✓ Rolling Rock Lane
 - \checkmark Singleton Blvd
 - ✓ Ingersoll Street
- Concrete Compressive Strength Comparison
- Cost Comparison
- > Conclusions
- > Next Step

Background



- >On November 10, 2021 Council approved contract with University of Texas at Arlington (UTA)
 - ✓To develop a City of Dallas specification for synthetic fiber reinforced concrete (SFRC)
 - ✓To perform infield testing and data collection on SFRC vs. current City pavement types.
 - Continue the study and analysis to predict remaining service life of SFRC and existing pavement types



Background



What is Fiber-reinforced concrete? Synthetic Fibers with hooked shaped ends to knit concrete together Used as an additive to concrete in lieu of rebar



Background



- Concrete mix designs specs. and construction (completed)
- > Cost comparison analysis (draft completed)
- Data collection and condition assessments for steel reinforced and fiber reinforced concretes (ongoing)
- Remaining service life estimation of composite and conventional pavements. (ongoing)
- Technical specification for fiber reinforced concrete (draft completed)



Overview of Pilot Locations



Location	Average Daily Traffic	Council District	Construction Complete	Condition Assessments Complete
8800 block of Rolling Rock Lane (Local Asphalt)	2,172	10	March 2023	TBD
4700 block of Singleton Blvd (Arterial Asphalt on Concrete)	14,595	6	May 2023	TBD
3400 block of Ingersoll Street (Local Concrete)	1,872	6	August 2023	TBD

Expected Report Completion – Dec 2024



Rolling Rock Lane







Rolling Rock Lane



8800 block of Rolling Rock Lane

Fiber Reinforced Concrete Construction (Day 0)



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Fiber Reinforced Concrete Test Specimen Prep



Fiber Reinforced Concrete

Rolling Rock Lane



8800 block of Rolling Rock Lane

Concrete Coring for Lab Testing



1st set of cores in Sept 2023 Remaining cores 1-month intervals

Singleton Blvd



4700 block of Singleton Blvd

Fiber Reinforced Concrete Construction (Day 0)



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Fiber Reinforced Concrete (Day 3)



Ingersoll Street



3400 block of Ingersoll Street

Fiber Reinforced Concrete

Steel Reinforced Concrete









Concrete Compressive Strength Comparison



Location	Strength FRC	Strength SRC
8800 block of Rolling Rock Lane (Local Asphalt)	4,717 psi (3 Days)	4,720 psi (14 Days)
4700 block of Singleton Blvd (Arterial Asphalt on Concrete)	4,707 psi (3 Days)	4,628 psi (14 Days)
3400 block of Ingersoll Street (Local Concrete)	4,553 psi (3 Days)	4,497 psi (14 Days)

Expected Report Completion – Dec 2024



Cost Comparison

- Comparison based on materials, equipment, and labor
- Steel Reinforced Concrete achieved 4,500 psi at 28 days
- Fiber Reinforced Concrete achieved 6,000 psi at 28 days





Conclusions



- Reduction in time allowed for traffic from 7 days to average 3 days or less
- Fibers in lieu of steel minimizes cracking by increasing durability and potential reduction in life cycle costs.
- Elimination of supply and labor required for rebar installation
- > Average reduction of labor by 22.2%
- > Average reduction in traffic control cost by 12.2%



Next Step



- Continue the testing to evaluate the pavement life and performance
- Finalizing the specification to adopt the new pavement
- Incorporate the new pavement specification in Public Works Construction Standard and Design manual





Discussion/Questions





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