

MSP Light Rail Transit Tunnel

Minneapolis, Minnesota

PROJECT
PROFILE
002



SPEC MIX® SPECSHOT MS



SPEC MIX® SPECSHOT MSA

LICENSEES:

Billings Brick and Masonry Supply, Billings, MT
Central Pre Mix Concrete, Kent, WA
Central Pre Mix Concrete, Spokane, WA
EZ Mix Products, Sun Valley, CA
Gibraltar National, Detroit, MI
Great River SPEC MIX, Muscatine, IA
Materials Packaging, Memphis, TN
Materials Packaging, Draper, UT
Midwest Block and Brick, Kansas City, MO
Onondaga Dry Mix, Marcellus, NY
Package Pavement, Stormville, NY
Packaged Concrete Inc., Elburn, IL
Pre Mix Industries, Clinton, MD
Pre Mix Industries, Berlin, NJ
Pre Mix Industries, Eaton Park, FL
Pre Mix Industries, Chesapeake, VA
Precision Packaging, Jackson, MS
Precision Packaging, Fort Smith, AR
Precision Packaging, North Little Rock, AR
QUIKRETE Atlanta, Lithonia, GA
QUIKRETE Birmingham, Birmingham, AL
QUIKRETE Boston, Brentwood, NH
QUIKRETE Buffalo, Lackawanna, NY
QUIKRETE Carolina, West Columbus, SC
QUIKRETE Cincinnati, Harrison, OH
QUIKRETE Columbus, Columbus, OH
QUIKRETE Connecticut, Wauregan, CT
QUIKRETE Denver Holdings, Denver, CO
QUIKRETE Indianapolis, Indianapolis, IN
QUIKRETE Kentucky, Louisville, KY
QUIKRETE Miami, Miami, FL
QUIKRETE Nashville, Nashville, TN
QUIKRETE Peachland, Peachland, NC
QUIKRETE Pittsburg, Latrobe, PA
QUIKRETE Tennessee, Jefferson City, TN
QUIKRETE Wisconsin, Sussex, WI
Simpson Materials, Valley Park, MO
Superlite Block, Phoenix, AZ
Tri Delta Inc., North Las Vegas, NV
Tri State QUIKRETE, Flanders, NJ
Twin City Concrete Products, Mendota Heights, MN
Twin City Concrete Products, Des Moines, IA
Twin City Concrete Products, Vinton, IA
Twin City Concrete Products, Omaha, NE
Twin City Concrete Products, Fargo, ND
Twin City Concrete Products, Sioux Falls, SD



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MSP Airport Light Rail Transit Tunnel

Minneapolis, Minnesota

January 2003

PRODUCTS: **SPECSHOT MS, SPECSHOT MSA**
CONTRACTOR: **OBAYASHI/JOHNSON BROTHERS JV**
LICENSEE: **TWIN CITY CONCRETE PRODUCTS**

A COST-EFFECTIVE AND TIME-SAVING SOLUTION FOR AN UNDERGROUND TUNNELING PROJECT



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THE SOLUTION

Originally, the cross passages were massive concrete structures. Obayashi proposed a redesign that provided substantial savings without sacrificing quality. The redesign called for a combination of shotcrete and cast in place of concrete. First a top heading was advanced in four-foot increments across the entire length. Obayashi stabilized the ground with rockbolts, mesh and dry shotcrete. After completion of the top heading, the bench was removed. Walls were trimmed to line then coated with two to four inches of shotcrete.

With the strength gain of the SPECSHOT at 1,000-1,500 psi after 12 hours, Obayashi could work without interruption to their schedule. And with the close proximity of the Twin City Concrete Products plant, supplies could be delivered when they were needed.

PROJECT BRIEF

- 1 Project consisted of two running tunnels and ten cross passages
- 2 Tight deadlines, budget and performance requirements
- 3 Unstable ground permitted only four to five feet of mining at a time
- 4 Shotcrete, rockbolts and mesh used to stabilize ground
- 5 Shotcrete and cast used for cross passage tunnel construction
- 6 SPECSHOT strength gain reduced interruption to schedule

PHOTOS BELOW: LOOSE ROCK WAS REMOVED THEN THE GROUND WAS STABILIZED WITH SHOTCRETE. WITH THE GROUND SECURE, CONCRETE CAST PANELS WERE INSTALLED TO FINISH THE INSIDE OF THE TUNNELS.

THE CHALLENGE

The Minneapolis/St. Paul International Airport Light Rail Transit Tunnel and Station project consisted of the underground segments of the 11.8 mile Hiawatha Light Rail Transit route, which connects downtown Minneapolis to the airport. The underground segments included twin tunnels, which were mined 65 feet beneath a busy airport, and 10 cross passages connecting the two running tunnels at approximately 600-foot intervals. The construction was subject to challenging ground conditions, stringent performance requirements, tight schedules and budgets, and close public scrutiny.

The major challenge was hand mining the cross passages in the local sandstone. Unstable underground conditions permitted only four to five feet of mining at a time. A quick and cost effective solution was needed.

"[SPECSHOT IS] A VERY GOOD PRODUCT FOR GROUND STABILIZATION WHERE QUICK STRENGTH GAIN IS NEEDED. WE ALSO TESTED THE LONG-TERM STRENGTH AND WERE SURPRISED AND VERY HAPPY WITH THE 9,000-10,000 PSI STRENGTHS THAT WE OBSERVED. I WOULD DEFINITELY RECOMMEND THE MIX."

ROGER A. TOENIES, P.E.

PHOTO ABOVE: Twin underground tunnels bring the light rail system in and out of the busy Minneapolis/St. Paul International Airport. Unstable underground conditions permitted only four to five feet of mining at a time.

