CASE STUDY
REHABILITATION | SLIPLINING

Project Name:
3rd Street Sewer Interceptor
Rehabilitation Project Phase 2

Subcontractor:
Mladen Buntich Construction Company

Location:
Oakland, CA

Owner:
East Bay Municipal Utility District

Akkerman Equipment:
SLS 100 Modular Jacking Frame and
Diesel Power Pack

Pipe:
96-in. Hobas®

Total Length/Longest:
4,400-lf./2,520-lf.

PROJECT OVERVIEW

The South Interceptor Sewer was a 105-in. arch shaped reinforced concrete pipe sewer, originally constructed in the 1950s. It services a 10-miles stretch in the East San Francisco Bay area in Oakland, CA and connects to the Wood Street Wastewater Treatment Plant.

By the early 2000s, signs of deterioration and population growth caused flows at up to 50% full on a consistent basis and 100% full during high flows causing backups. In 2003, EBMUD's attempts to reline portions of the sewer using PVC sheets were time consuming, and required service interruptions for manned entry.

THE CHALLENGES

- Capacity preservation was critical
- Construction to take place in live sewer flows
- Heavy weight large diameter pipeline
- Weight on longest 2,520-ft. single push of 96-in. GRP pipe
- CIPP and manned entry methods deemed risky, time consuming, impractical, and cost prohibitive
- Active railroad crossed over pipeline

THE SOLUTION

Based on the pipeline's weight, location of the access shafts, and flows, the engineer and owner required the contractor to use Akkerman's specialized sliplining system with synchronized hydraulic chain driven motors. The all-in-one sliplining system with modular frame and power container allowed for rehabilitation of the pipeline without the need for bypass pumping and a reduction in the number of access shafts.

OUTCOME

- Successful revitalization of a heavily corroded 60-year old sewer
- No service interruptions
- Expedient installation, completed 3 months ahead of schedule
- One 2,520-lf. was noted as a 96-in. centrifugally cast GRP pipe record

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CASE STUDY
REHABILITATION | SLIPLINING

Project Name:
Q Line South

Subcontractor:
E.R. Itshaky-Microtunneling Ltd

Location:
Bat Yam, Israel

Owner:
Dan Regional Association for Environmental Infrastructure (IGUDAN)

Akkerman Equipment:
SLS 100 Modular Jacking Frame and Diesel Power Pack

Pipe:
70-78-in. (1,800-2,000mm), 98-10-ft. (2.4-3m) Length GRP

Total Length/Longest:
4,970-lf. (1,515m)/2,510-lf. (765m)

PROJECT OVERVIEW

Central Israel has experienced a revitalization causing rapid population growth, and capacity concerns for the Q Line Interceptor, its 40-year-old wastewater infrastructure.

The owner's inspections of the Q Line revealed signs of significant deterioration and the potential for a service failure. Dense existing underground infrastructure negated the consideration of adding new line by pipe jacking. They considered several technologies for the restoration before landing on sliplining as the preferred method.

THE CHALLENGES

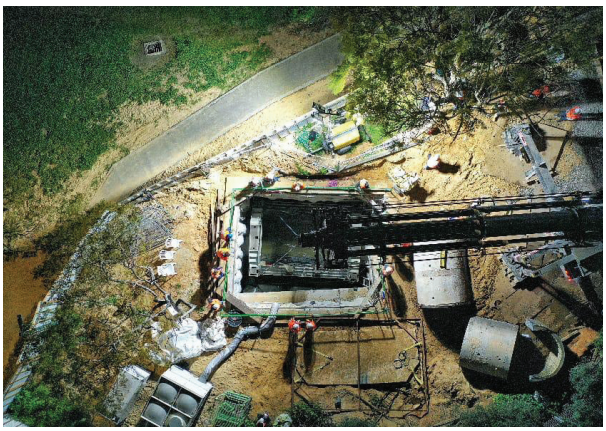
- Limited open space along the Q Line
- Live flow sliplining work could only be executed when stream level was at 50% of capacity, so limited to two, two-hour construction intervals in the early morning hours
- 60% of total installation had to be conducted in live flow
- Final, dry installation culminates with a curved section that emerges in a multi-level shaft

THE SOLUTION

The length and diameter of each section required equipment suitable for high jacking forces and execution under streaming sewage. The Akkerman SLS100 sliplining system complies with these parameters.

OUTCOME

- Successful installation of three sliplined alignments, two in live sewage flows
- Achieved a six pipe per hour production rate
- Due to the Israeli regulation to protect underground water pipes which are adjacent to sewage, the last section was performed in two stages in a dry environment
- All sections were completed within the original project timeline
- Q Line South project was the first of its kind in Israel and the largest sewer line installation while still underflow.



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CASE STUDY
REHABILITATION | SLIPLINING

Project Name:
Kirtland Air Force Base Trunk Sewer Rehabilitation

Subcontractor: RMCI, Inc.

Location:
Kirtland AFB, Albuquerque, NM

Owner:
Alburquerque Bernalillo County Water Utility Authority (ABCWUA)

Akkerman Equipment:
SLS 100 Modular Jacking Frame and Diesel Power Pack

Pipe:
48 and 66-in, 19-ft. length FRP

Total Length/Longest:
4,944-lf./1,842-lf.

PROJECT OVERVIEW

The Alburquerque Bernalillo County Water Utility Authority had a need to rehabilitate four segments of the critical 54 and 72-inch RCP trunk sewer on the Kirtland Air Force Base.

With noticeable reakdown of the exisiting trunk sewer and concern for its integrity the ABCWUA sought a solution. Sliplining rehabilitation with a CCFRPM was selected as the ideal method to extend the sewer's lifespan.

THE CHALLENGE

- Exisiting pipeline had to remain in opeation, without bypassing flow or shutdowns
- Proofing the exisiting pipeline revealed need for additional jetting due to volume of sediment

THE SOLUTION

RMCI, Inc. selected the Akkerman SLS100 Sliplining System to expedite installations of the four reaches, which allowed the contractor to engage in rehabilitation without disruption to utilities.

The contractor designed the project for minimal invasiveness by launching multipe installation from the same shaft.

OUTCOME

- Crew achieved a 20-ft. pipe segment per 5 minutes installation rate
-

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CASE STUDY
REHABILITATION | SLIPLINING

Project Name:
First Aqueduct Tunnel Rehabilitation Project, Oat Hills Portion

Subcontractor: Michels Trenchless Inc.
Design Engineer: Stantec

Location:
San Diego, CA

Owner:
San Diego County Water Authority

Akkerman Equipment:
SLS 100 Modular Jacking Frame and Diesel Power Pack System

Pipe:
63-in, 20-ft. Length Hobas® FRPM

Total Length/Longest:
3,600-lf.

PROJECT OVERVIEW

This project was part of the San Diego County Water Authority's plan for significant rehabilitation activities on the historic First Aqueduct. Originally constructed in 1947, it was the first to deliver imported water to the San Diego region.

The reliability of the 310-mile, large-diameter water pipeline is critical to the region's viability. The necessary upgrades were part of the water authority's proactive asset management program.

This project focused on the southern section of the First Aqueduct, called Oat Hills, that runs from the city of Escondido to the San Vicente Reservoir, through a design-build delivery method. The owner considered several rehabilitation methods.

THE CHALLENGES

- Requirement of dry installation in a single drive from one access shaft
- The existing pipeline could not be taken out of service
- Construction was required to take place during lower usage winter months
- Only three 10-day shutdown periods during winter months were allowable during all phases of construction, enabled through rerouted supply

THE SOLUTION

The Michels Trenchless Inc./Stantec contractor and engineer design-build team identified sliplining as the prevailing method as the most expedient means to meet the project's timeline and parameters. The was completed between December through March.

To facilitate the single, long drive and expedite the installation of the new pipe inside the host pipe, the contractor used an Akkerman SLS100 sliplining jacking frame and power system to succinctly install 20-foot pipe joints. The contractor placed spacers around the new pipe, and grout filled the annular between the host pipe and the new liner tunnel.

OUTCOME

- Sliplining the 3,600-lf. liner tunnel was completed in 55 hours
- All project challenges and deadlines were met or completed ahead of schedule
- All additional construction and grouting took place during the allowable shutdown periods
- Successful installation of one of the longest dry-pushed sliplining projects in North America

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