McCook 33’ Diameter Steel Tunnel Liner, Chicago IL

Nash Williams-President
National Welding Corporation
In the early 1900s Chicago lacked means to control the water ways. They were overwhelmed to the point that the Chicago River actually flowed backwards and overflows including sewage ended up in Lake Michigan. This prompted development of a large scale system to control the flows.

In 1972, MWRDGC adopted the Tunnel and Reservoir Plan (TARP) is the largest water infrastructure undertaking in Chicago ($3.5 billion)

The McCook Main Tunnel System is one of the last segments to a 109 mile system of tunnels.
Mainstream Pumping Station and McCook Distribution Tunnel System (complete)
McCook Tunnel System Model

- McCook Reservoir Sump
- Gates
- To Stickney
- McCook Mainstream Tunnel (33ft dia.)
• McCook Tunnel is 1600 feet long and 33’ in diameter.
• When completed the system will provide 17.5 BG of CSO and flood storage for TARP with flow rates averaging 30 ft/sec
• The effluent will be pumped to the Stickney WWTP for treatment then discharged into the Des Plains River
Steel Liner Construction

National Welding Corporation – Assemble, Fit, and Weld Steel Tunnel Liner

Kiewit Infrastructure – General Contractor, Excavate, Concrete Lining, and oversight.

Selway Corporation – Shop Drawings and Fabrication of Steel Liner Pieces.
Preassembly Planning

Design

- 108 m (354 ft) of steel liner
- Bifurcation from 10 m (33 ft) to 4x9.8 m (19x32 ft)

- Designed for 6 High Wheel Gates for flow control
- Changing Geometry
- “T” Steel rings
Fabrication of Steel Liner Sections

- Tolerances
- Connections
- Preassembly

- Shipping Considerations
- 48 special loads from MT to IL
• 10 m (33 ft) Diameter Pieces Assembled Onsite
Rigging and Connections

- Bolted Connections
- Custom Rigging for each ring of liner
Liner Support

- Cross-Bracing Installation
Environmental controls

- Surviving Chicago’s Winter
- Temporary Shelter
Final Fit-up and weld-out

- Seam Fitting
- Roundness Tolerance

- FCAW Welding
Quality Control

- Magnetic Particle (MT) inspection
- Ultrasonic Testing (UT) Inspection
“J” Anchor Layout and Welding

- Over 16,000 Anchors-Field Installed
Changing Geometry

- Bull Nose
Handling 33 foot diameter sections

- Rotation of 164mt (180 tons)
Handling 33 Foot Diameter Sections

- Sections Lowered Down 91 m (300 ft) Shaft.
Tunnel installation

- Annular Bracing Installed
Circumferential Seams
Fitting and welding

Over 937 m (3076 ft) of CJP tunnel welds performed

Automatic and Semi-Automatic FCAW Welding
Finished Steel Tunnel Liner

KEY ELEMENTS OF SUCCESS

1. Team Approach
2. Capable Team Members
3. Careful Planning and Development
THANK YOU