

CASE STUDY

BACKGROUND

Tunnel boring machines (TBMs) are highly complex mobile machines that rely on hydraulics and electronic controls to manage numerous simultaneous functions. These include digger arm positioning, axial drum cutting, articulated steering, thrust cylinders, and conveyor operation.

Scott Industrial Systems partnered with a tunnel boring OEM to upfit an existing machine frame with a modern hydraulic and electronic control system. The machine featured a 114-inch digger shield designed to excavate 1,240-foot tunnel alignments in both soft soils and hard rock.

CUSTOMER CHALLENGE

The customer needed to route a new water supply line while overcoming several technical and operational challenges:

- Controlling 20+ hydraulic actuators simultaneously
- Retrofitting a legacy machine frame
- Reducing system complexity and wiring
- Improving diagnostics and serviceability
- Simplifying operation compared to manual valve systems
- Ensuring safe control at the cutting face of the machine



SOLUTION

Scott Industrial Systems engineered and integrated a complete CAN-based hydraulic and control system using Danfoss technologies:

Key Components:

- Danfoss PVG100 flow-sharing valve system
- PVED CAN actuators
- MC38-010 PLUS+1 controller
- MPCAN communication network
- IK4 radio remote system

The PVG100 valve platform simplified hydraulic plumbing while enabling smooth, simultaneous motion control. CAN-based PVED actuators dramatically reduced wiring and enabled advanced diagnostics. The IK4 radio remote allowed a single operator to control excavator functions directly at the business end of the machine.



INTEGRATION

- Hydraulic design, controls, CAN programming, and safety systems
- Hydraulic tanks and pump/motor assemblies
- Electrical control panel assembly by **Sun Coast Controls Mfg**

RESULTS & BENEFITS

- Simplified hydraulic and electrical architecture
- Reduced wiring, plumbing, and installation time
- Improved operator safety and efficiency
- Enhanced diagnostics through CAN networking
- Scalable platform suitable for future machine updates

OUTCOME

A modernized Tunnel Boring Machine control system delivering **precise control, improved reliability, and reduced operational complexity** for a critical infrastructure project.

