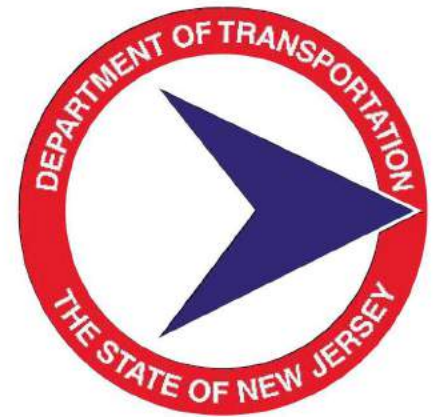


# New Jersey Department Of Transportation Bridges Case Study

Beginning in April 2014, Connell Industries has served as the sole automation control systems services supplier for the New Jersey Department of Transportation (NJDOT). Connell's mission was to meet NJDOT's goal to achieve and maintain 100% controls systems uptime for 20 movable bridges located throughout the state.

In addition to keeping the movable bridge Programmable Logic Control (PLC) systems functioning correctly at all times, NJDOT also asked for Connell Industries' help in eliminating a significant maintenance backlog and to provide control systems upgrades to enhance overall bridge safety and performance.



## Connell's approach to ensure the safety of New Jersey's Bridges

Connell Industries embedded an engineer on site to become familiar with each bridge and its important structural components. During this first phase, Connell's engineers evaluated each bridge for the following;

- All current electrical drawings, in digital and paper form
- Hard copies and Digital copies of all current PLC Programs
- Develop relationship with operating staff
- Study the marine and roadway traffic that each bridge handles
- Local area needs for services such as late-night parking
- Verify all PLC passwords via connection of a PC to the PLC
- Relevant phone numbers and contact information for bridge personnel
- Electrical contractors and electrical supplies for each location
- Spare parts inventory
- Learn about recent work performed by electrical contractors
- Nameplate information on all motors, brakes, components, etc.
- All necessary PC cables and software to connect to all devices
- Collect unreported and ongoing issues
- Location information on all PLC and drive cabinets
- Study each backup scenario: how many drives, motors, if diesel fuel is available, etc.

Once all the information was compiled, a digital case file for each bridge was created in XMind mind mapping software to capture critical bridge attributes and to help visualize data, facilitate internal communication, and to manage any future projects. This mapping created an excellent baseline that allowed Connell Industries to go on-site with a better understanding of each bridge's history, operability, capability and limitations.



## NJDOT bridge problems prioritized and solved

Connell Industries then tackled the controls systems maintenance backlog by jointly prioritizing the work load with NJDOT Operations Management and its General Contractor, IEW Construction. This backlog was prioritized by its overall impact on safety, operations and reliability. Then a list of problem statements was created for each bridge.

Using this list, Connell Industries sent Control Engineers to each site to connect to the PLC and first check for any errors internal to the PLC itself. If the PLC checked out OK, then the next step was to troubleshoot the Input/Output (I/O) system and the attached devices, components and equipment. Typically, this is where 80% of the problems reside. Once the testing was complete, a diagnosis was made and any repairs that could be done on-site were immediately performed by Connell Industries to quickly fix the problem.

In cases where the system problem required more extensive repairs to the PLC, I/O system, devices and/or components, a report was generated with Connell Industries' recommendations on how to properly effect the systems repairs or upgrades. Connell then worked closely with NJDOT Operations and IEW to move each project along to a successful conclusion as quickly as possible.

### New SCADA systems

Not only has NJDOT used Connell Industries to handle its bridge controls systems maintenance and upgrades, it also asked Connell to create a new SCADA network system for its bridges.

Connell's first SCADA system was developed and deployed on the Rt. 35 Manasquan Bridge, using Inductive Automation's Ignition software to power the platform. The flexibility, power and security of Ignition has now given select NJDOT managers the ability to view the bridge's operations and parameters in real-time. It can also alert them when certain parameters go out of limit, so they can pro-actively manage the situation before it becomes an even bigger problem that could result in a failure.

Connell Industries has met or exceeded NJDOT's expectations for technical excellence concerning its movable bridges' control systems. Read the NJDOT Letter of Recommendation that highlights our company's commitment to customer excellence.



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