

A CASE STUDY OF COLLABORATION, EFFICIENCY, AND INNOVATION

REBUILDING PRAIRIE POWER INCORPORATED'S TRANSMISSION LINE
ELVASTON TO POWELLTON 69KV

POWER LINE
SYSTEMS

TOTH
& ASSOCIATES

THE TEAM AND SOFTWARE ENGAGED

Owner/Utility

Prairie Power, Inc.

Supporting Distribution Utility

Western Illinois Electrical Co-op

Engineer

Toth & Associates

- Lewis Wiles, P.E., Vice President & Transmission Department Manager
- Josh Sirb, P.E., Transmission Engineer & Engineering Manager
- Sam Whittington, E.I., Transmission Engineer
- Bob Hendricks, Field Survey Manager
- Nathan Carmichael, PMP, Project Manager

Construction Contractor

L.E. Myers Co.

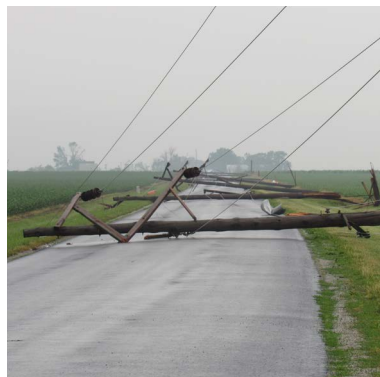
Design Software Company

Company: Power Line Systems

Software: Power Line Systems - Computer Aided Design and Draft (PLS-CADD)

PROBLEM TO BE SOLVED

A significant storm with high winds rolled through part of Prairie Power Incorporated's service area on **June 29, 2023**. The storm felled 120 transmission poles over nearly 6.5 miles from Elvaston, Illinois, to Powellton, Illinois. The loss of that line section resulted in over 1,500 members without power.



1,500 MEMBERS
WITHOUT POWER

120 TRANSMISSION
POLES FELLED

THE GOAL

The goal was to rebuild that line section as quickly as possible to fully restore power. The target in-service date was set for **August 18, 2023**.

INTRODUCTION

In June 2023, a powerful storm with high winds wreaked havoc across part of Prairie Power Incorporated's (PPI) service area, destroying 120 transmission poles and nearly 6.5 miles of line from Elvaston, Illinois, to Powellton, Illinois. The storm left over 1,500 members without power. To restore power as swiftly as possible, PPI engaged Toth & Associates (TOTH), a prominent electric utility engineering firm, to lead the rebuild design effort. The mission was clear: swiftly rebuild the 69 kV transmission line and 12.5 kV underbuild to restore power, with a targeted in-service date of August 18, 2023. This case study details the successful execution of the project, highlighting the crucial roles of the assembled team and the engineering design software, PLS-CADD developed by Power Line Systems, in achieving the goal.



JUNE 29

THE CALL TO ACTION

As the sun set on June 29, Lewis Wiles received a call from PPI. The call marked the demanding journey ahead. The nearly 6.5 miles of transmission lines, over 50 years old, had succumbed to the force of a 120 mph straight-line windstorm. One hundred twenty poles lay on the ground, and over 1,500 PPI members were in the dark. The TOTH team faced an urgent challenge to put together a rebuild plan, including Plan and Profile Drawings and a Bill of Materials, by the next day.

JUNE 30

EFFICIENT COORDINATION

The clock was ticking. TOTH's design team, led by Josh Sirb, engaged in an extensive coordination effort with PPI and their supporting distribution utility, Western Illinois Electric Cooperative (WIEC), and the eventual construction partner. Constant coordination was vital.

The design parameters were shifting rapidly. With limited pole and material availability on short notice, the team had to re-spot, re-span, and re-align the line by the hour. TOTH's expert use of PLS-CADD, the industry-leading transmission and distribution line design software, offered a suite of tools that transformed the daunting task into a manageable one. By 4:45 p.m., an initial design sufficient to start spotting poles was ready and sent to PPI. Simultaneously, TOTH team members Lewis, Nathan, Josh, and Sam had worked on producing the Primary Construction Request for Proposal (RFP). The RFP was delivered to PPI for bid on the same day.

JULY 3-4

ADAPTING TO REALITY

The following days were a flurry of activity. The IFB went out to bid for the transmission work. Traveling from Springfield, Missouri, to Powellton, Illinois, Lewis made a crucial field visit on July 3 to collect and relay vital field information. Remarkably, working extended hours, PPI had already cleared most of the debris from the site and roads, expediting the process while making the area safe for the public. The dedicated crews of PPI Operations collaborated closely with WIEC to bring temporary services to the nearby homes.

Information from the field was relayed to the TOTH team in the office. The team further refined the design, adjusting the PLS-CADD model to align more accurately with the centerline while factoring in distribution structures along the alignment. This endeavor demanded the team's unwavering commitment, prompting PPI crews and the TOTH team, several of whom canceled or cut short vacation during a weekend that coincided with the July 4th holiday, to work tirelessly toward the ultimate goal.

JULY 5

INITIAL CONSTRUCTION STAKING

On July 5, Bob Hendricks arrived at the job site with a challenging task ahead: stake roughly 6.5 miles from Elvaston to Powellton as accurately and quickly as possible. Bob, who had cut his holiday vacation short for this mission, swiftly staked the centerline, anchors, and references, along with taking quality control survey points for the 6.5-mile line. Remarkably, Bob managed to stake over two miles of it in less than three and a half hours. He took the data collected and fed it back into PLS-CADD for the engineers at TOTH to continue any further adjustments as necessary.



JULY 6

FIELD ADJUSTMENTS AND FINAL STAKING

On July 6, Josh and Sam hit the road to inspect staking placements from Elvaston to Powellton. Utilizing a laptop with PLS-CADD installed, they were able to make real-time adjustments on-site. The agility of PLS-CADD allowed in the field fine-tuning of guy lead lengths, structure shifts, clearance reviews, and foundation checks. The team was able to use the software to import detailed field data and export precise staking points in person to ensure quality was met even with the expedited timeline in place.

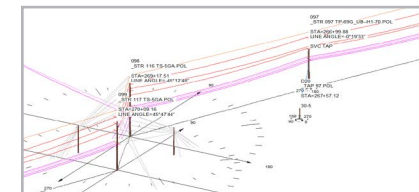
The construction project was awarded to the capable and experienced L.E. Myers Company with a targeted in-service date of August 18, 2023. And by the day's end, Bob had completed staking the entire line.

JULY 7-9

THE COUNTDOWN

Back at the office, the TOTH team began the meticulous task of refining the design based on the real-world observations made during their field visits. With PLS-CADD, they could make accurate refinements and enhancements, adjusting every element of the design. For two intense days, the team poured over their plans, double-checking every detail, ensuring that the new 69 kV transmission line would deliver power and do so with the highest safety and efficiency standards.

On July 9, Josh signed and sealed the final design, marking another significant milestone. While this achievement marked the end of one tireless effort, it signified the beginning of another, the physical reconstruction phase. As they looked ahead, the team knew the challenges were not over. The project's next phase would require seamless coordination with contractors, diligent oversight of construction, and the same level of dedication that had brought them to this point. Together, they were ready to see the project through to its rewarding conclusion.



JULY 10

DELIVERY AND COORDINATION



On July 9, Sam and Nathan traveled to the job site to deliver the Issued for Construction (IFC) set, a comprehensive package containing all the detailed plans, specifications, and instructions that L.E. Myers needed to begin construction.

The delivery of the IFC was not the end of the project for TOTH. Effective coordination was key to ensuring that every project element unfolded seamlessly. That involved not just sharing plans and documents but also maintaining open lines of communication. TOTH worked closely with L.E. Myers to address any questions or concerns that arose during this critical phase of the project. It was a dynamic process, where adjustments and clarifications were made quickly and sometimes in real-time to ensure everyone was on the same page.

One of the challenges that emerged during this phase was that pole spotting stakes had been inadvertently moved without prior approval. This seemingly minor issue had the potential to cause significant complications if not addressed promptly. However, the team was quick to respond. In collaboration with L.E. Myers, they used their collective knowledge and expertise to assess the impact of this deviation from the planned alignment. They devised strategies to rectify the situation while maintaining the project's timeline and quality.

JULY 31

GOAL ACHIEVED AND EXCEEDED

The culmination of these efforts came on July 31, 2023, when the transmission line was successfully energized. The achievement was nothing short of remarkable. The initial target for restoring power had been set for August 18, 2023, an aggressive date reflecting the urgency and complexity of the task. Yet, through the collective efforts of Prairie Power Incorporated, Toth & Associates, L.E. Myers, WIEC, and Power Line Systems, this goal was met and exceeded. The transmission line was successfully energized a full **18 days ahead of schedule**.



THE POWER OF PLS-CADD

The role of PLS-CADD in this achievement could not be understated. This software, tailored for transmission line design engineers, offered a suite of tools that transformed a challenging task into a manageable one. Playing a pivotal role throughout the journey, it facilitated real-time adjustments, streamlined design processes, and enhanced collaboration among the team members. From its comprehensive modeling capabilities to simulating real-world scenarios and calculating sag and tension in the lines, PLS-CADD proved indispensable. Notably, its dynamic modeling features allowed Josh and Sam to test adjustments in the field, ensuring precision and efficiency. That helped the team adapt swiftly to changing conditions, optimize the design, and ensure that every design element was precise and reliable.

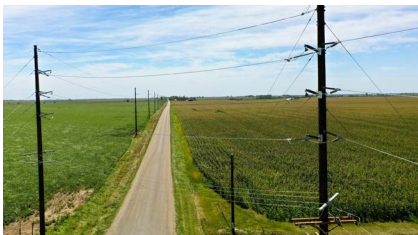
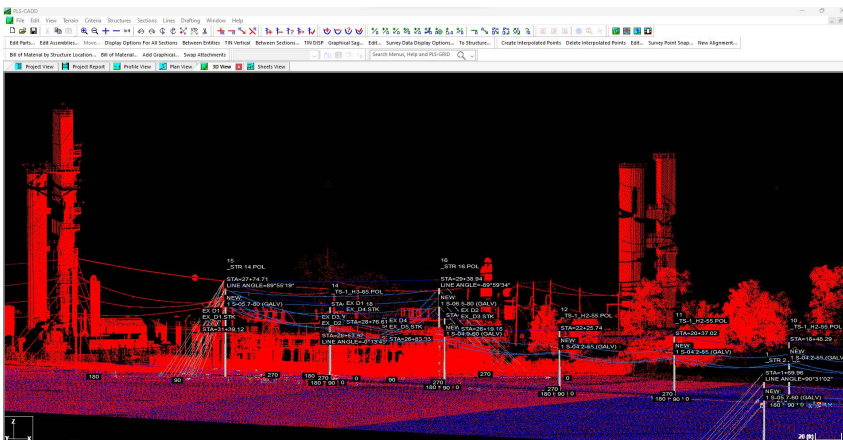
CONCLUSION

The successful reconstruction of the 69 kV transmission line following the devastating storm of June 2023 is a testament to the unwavering dedication, expertise, and collaboration of the teams at Prairie Power Incorporated, Toth & Associates, L.E. Myers, and Western Illinois Electric Cooperative, and skillful use of advanced technology in PLS-CADD. The project achieved its ambitious goal of restoring power and exceeded expectations by energizing the line a remarkable 18 days ahead of schedule. From line down to energization of 6.5 miles of single circuit 69kV and 12.5kV underbuild, a total of only 32 days or 23 business days.

This achievement was made possible, in part, through PLS-CADD, the engineering design software played a pivotal role throughout the project. PLS-CADD's comprehensive modeling capabilities, real-time adjustments, and dynamic features allowed for precise design modifications, ensuring efficiency and reliability in rapidly changing conditions.

This case study is a compelling example of how a committed team, cutting-edge technology, and effective coordination can overcome significant challenges and achieve remarkable results. The Prairie Power Incorporated transmission line restoration project demonstrates what can be accomplished when expertise, innovation, and determination come together to serve a community in need.

6.5 MILES OF SINGLE CIRCUIT 69kV & 12.5kV UNDERBUILD



18

Days Ahead of Schedule

32

Days Total

24

Hour Turnaround Initial Design Time

2

Miles of Staking in Less Than Three and a Half Hours



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