



# Power Systems Engineering

## Why do you need Professional Engineering?

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Electrical and Control systems in the workplace can be very complex. Every production facility requires Professional Engineers who can provide guidance and recommendations that promote safety, assist with reliability, and assure continuous power with minimal interruption.

MTX Systems Engineering has the knowledge and experience to partner with facilities to accomplish the job effectively and efficiently. We can assist any of the following facility types:

- Commercial
- Industrial
- Oil & Gas
- Automotive
- Educational
- Healthcare
- Communications
- Mining
- Manufacturing
- Utility
- Government
- Food & Beverage

## Workplace Safety Information

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- Five to ten arc flash explosions occur in electrical equipment everyday in the United States.
- Facilities have a legal responsibility to provide a safe workplace for their employees and contractors, and to provide them with a place of employment which is free from recognized hazards that could cause serious physical injury or death.
- Arc Flash Risk Assessment analysis provides and identifies arc flash boundaries and appropriate levels of Personal Protective Equipment (PPE) for employees.
- Each analysis is presented in a clear, tabular format in accordance with NFPA 70E: Electrical Safety in the Work Place and IEEE Standard 1584.



INTEGRATING THE  
VALUE LOOP

**Electrical Engineering**  
Design & System Studies

# Types of Analysis



## Short Circuit Evaluation

- Software analysis performed based on national/international recognized software platforms on all types of industrial and commercial equipment.
- Addresses the safety and reliability of a facility's electrical system.
- Fault currents are calculated throughout the facility's system.
- Addresses the ability of the protective devices to respond under short-circuit or overload conditions.
- Underrated or misapplied equipment is identified.
- Recommendations that help the facility's electrical system comply with NEC Article 110.9 and other requirements or electrical industry standards.

## Coordination Study

- Provides information on over current protective devices ability to respond when a fault occurs in the electrical system.
- Provides the proper settings for settable protective devices, ensuring the correct protective device operates during a fault condition with maximum isolation to minimize the outage area.
- Provides optimal recommendations and settings for protective devices to help mitigate the arc flash incident energy levels at the protection zone.
- Provides the Time-Current Coordination graphs that show the upstream and downstream devices in an electrical system's path.

## Arc Flash Analysis

- Provides the incident energy levels at all points in the electrical system within the scope of work.
- Calculations based on data provided by on-site inspection of the electrical equipment using IEEE 1584 standards.
- Complies with the current NFPA 70E Electrical Safety in the Work Place guidelines.
- PPE level recommendations for all electrical equipment identified in the scope of work.
- Written report of findings and recommendations to reduce the arc flash incident energy levels and improve the safety of the worker.

## Power Quality Analysis

- Identifies and solves process disruptions and disturbances originating inside the facility or from the electric utility system.
- Helps to reduce the economic consequences of poor power quality and maintenance costs.
- Identifies wiring and grounding improvements.

## Circuit Loading Study

- A circuit loading study identifies actual electrical usage and utilizes onsite system measurements to determine available reserve capacity.
- Identifies power factor correction, improves the system capacity, voltage regulation, and loading.
- Focuses on key power system parameters that can indicate chronic or potential power system problems.
- Identifies excessive harmonic loading, poor power factor, heavily-loaded circuits, unbalanced voltages, and poor voltage regulation.

## Harmonic Assessment

- Assesses harmonic distortion with respect to IEEE 519.
- Identifies excessive harmonic loading and poor power factor.
- Evaluates harmonic mitigating savings opportunities.
- Optimizes the existing electrical distribution system.
- Helps to ensure proper operation of sensitive electrical equipment.
- Evaluates the economics of power factor correction and harmonic filters.

## Power System Modernization

The design of any power system can be complicated and time consuming. Not only is safety an important factor when in the design phase, reliability and cost must be taken into consideration. MTX Systems Engineering provides the engineering design and project management expertise required to complete the most challenging projects in a safe, reliable, and cost-effective manner.

Some advantages of the modernization of electrical systems include:

- State of the art electrical components provide fast and reliable operation when a fault occurs.
- Monitoring of the electrical components through the use of new technologies and communication protocols provides the end user with the tools for predictive and preventative operations.
- Helps to reduce the arc flash incident energy levels, enhancing the safety for the electrical worker when maintaining, troubleshooting, testing, or repairing electrical systems while circuits are exposed and energized.

