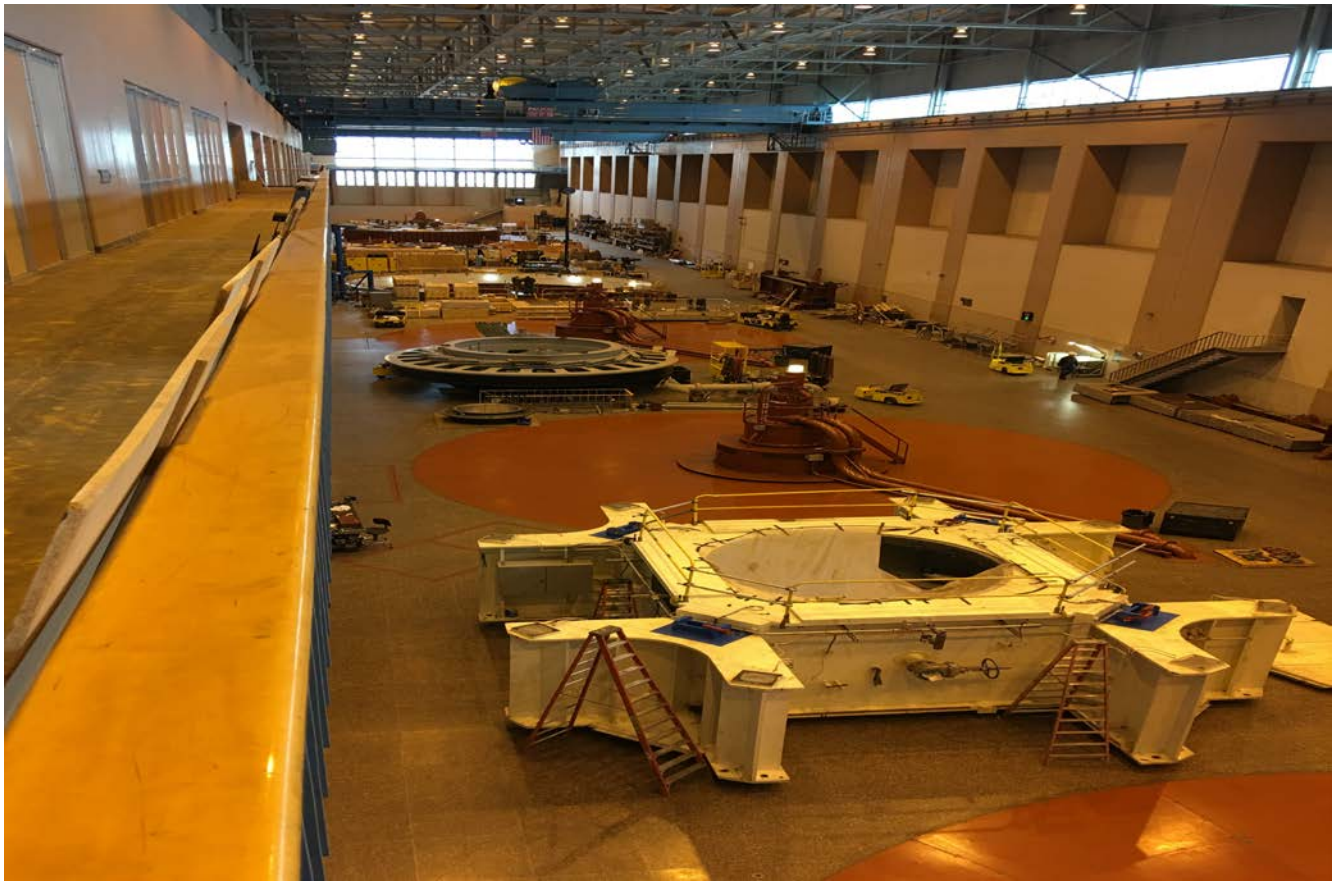
Electrical Test Engineer

1,000 Hour
Training Program



Presented by Canada Training Group International, Inc

In association with:

US Canada Training Group, Inc
Centuries of Leadership Development, Inc,
Dolphin87 Assessment Systems, Inc, and,
Evergreen Management Consultants, Inc.

1-877-286-7447

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Welcome to Electrical Test Engineer

This unique 1,000 hour training program has been designed to teach graduate engineers how to test, troubleshoot and maintain the electrical apparatus, systems and electronic/instrumentation controls in generating stations, substations and industry.

It is a detailed and comprehensive package of apparatus specific knowledge and skills that are not provided in technical institutes, colleges or universities.

It is comprised of four phases with an option of three further phases:

Phase One is a 200 hour online home study component.

Phase Two is an intensive, 800 hour program with practical exercises and projects comprising 90% of the program. This program will be taught in a combination of classroom and hands-on labs with field visits to electrical apparatus manufacturing or repair facilities, industrial facilities, partner firms and prospective employer locations.

Phase Three is a return to work, or the beginning of employment, to gain field experience.

Phase Four is preparation and support as graduates prepare to challenge industry certifications. Completion of these four phases, with accompanying field experience, will prepare graduates as facility maintenance engineers and advisors.

Phase Five is optional completion of a Master's degree in Electrical Engineering (MEng) with a partner university. Choosing this route will be done prior to commencing the program; completion and successful defense of a chosen thesis will complete their degree. Completion of these five phases, with accompanying field experience, will prepare graduates as facility maintenance managers and corporate maintenance advisors. We are currently in negotiations with several universities for this phase.

Phase Six is the optional completion of a Master of Arts in Leadership with a partner university. Completion of these six phases, with accompanying field experience, will prepare graduates as facility managers and corporate advisors. Several universities have been selected as potential partners.

Phase Seven is the optional completion of a Doctorate in Business Administration with a partner university; with accompanying experience this will prepare the graduate for executive level management in utilities or industry. Several universities have been selected as potential partners.

This program has been developed and is presented by Canada Training Group International (www.canada-training-group.ca) and our associated companies. We have been providing low, medium, high, and extra high voltage safety and technical training since 1980. We have experience to 550KV and have trained over 25,000 individuals in Canada and internationally. This program is designed for electrical engineers who possess a wealth of theory but lack the hands-on technical skills required as Electrical Test Engineers.

There are many jobs available in North America but they require advanced technical skills that usually take decades to acquire. These are dream jobs with most paying over $100,000.00 USD per year and many more than $200,000.00; the great majority have medical, dental and optical benefits and generous retirement packages. Specialists working in these jobs get to experience the most technically complex systems in the world utilizing the entire range of electrical technology.

This program compresses the skills required in critical industry standards into one unique, all-encompassing, program with the goal of providing utilities, industry and field service firms with individuals capable of independently testing electrical systems, apparatus and controls. Graduates will be theoretically and technically prepared to the following certification levels: NETA 4 Electrical Test

Technician, PEARL Level II Technician, NICET Electrical Power Testing Level IV, EGSA Certified Electrical Generator Systems Technician and NFPA CESCP.

The most recognized standards in North America are NETA standards; NETA is the InterNational Electrical Testing Association (https://www.netaworld.org/about/who-we-are). Their member companies are field service firms whose technicians are called in to test, troubleshoot, maintain and overhaul the most complex electrical equipment in the world.

NETA has four levels of Electrical Test Technician; NETA 1, 2, 3 and 4 (https://www.netaworld.org/certification-exam/technician-certification.) The bulk of this work is performed by NETA Level 3 Electrical Test Technicians who are internationally renowned for their knowledge, skills, experience and competence.

To become a NETA 3 ETT requires a combination of knowledge, skills and experience. A graduating electrical engineer would only have 50% of this required knowledge and 5% of the required technical skills as these skills are very specialized, (for example, tan delta testing a 500KV power transformer.) NETA 3 techs are highly sought after individuals and always in demand as there is a distinct shortage of their abilities, especially among electrical generation, transmission and distribution utilities.

This program has been specifically designed to provide graduates with the knowledge and skills to Level 4, the highest NETA Technician level, as described in NETA ETT and include every critical applicable industry standard.

NETA has developed three industry leading ANSI standards; ANSI/NETA ECS-2020, Standard for Electrical Commissioning Specifications for Electrical Power Equipment and Systems; ANSI/NETA ATS-2021, Standard for Acceptance Testing Specifications for Electrical Power Equipment and Systems; and ANSI/NETA ATS-2021, Standard for Acceptance Testing Specifications for Electrical Power Equipment and Systems. Graduates of our program will be capable of performing the studies and tests described in NETA ATS and MTS as specified in NETA ECS.

Graduates will also gain the knowledge and skills to meet the following additional certification standards:

NICET, National Institute For Certification In Engineering Technologies (https://www.nicet.org)

Electric Power Testing Level IV Technician

(https://www.nicet.org/certification-programs/electrical-and-mechanical-systems/electrical-power-testing)

EGSA, (https://egsa.org/)

Electrical Generator Systems Technician Level IV (https://www.nicet.org/nicetorg/assets/file/public/contentoutline_level4.pdf)

NFPA (https://www.nfpa.org/)

Certified Electrical Safety Compliance Professional (CESCP)

(https://www.nfpa.org/Training-and-Events/Certification/Certification/Certified-Electrical-Safety-Compliance-Professional)

Please note that some of these certifications have additional work time required; we will prepare each graduate for success when they are ready to challenge the certification.

A second critical set of industry standards has been created by PEARL, the Professional Electrical Apparatus Reconditioning League (https://pearl1.org/pearl-about). PEARL is a national trade organization for companies that supply quality surplus and reconditioned/remanufactured electrical equipment and apparatus. They are dedicated to developing, advancing and promoting safe reconditioning and remanufacturing practices.

PEARL has created two distinct sets of ANSI approved electrical standards for servicing various types of electrical equipment, the PEARL Inspect and Test Standard (https://pearl1.org/inspect-test-standard) and the PEARL Electrical Equipment Reconditioning Standard (https://pearl1.org/ansi-pearl-reconditioning-standard). PEARL has two levels of technician, Level I Technician and Level II Technician (https://pearl1.org/technician-certification-program-2) Our graduates will have the knowledge and skills to qualify as Level II Technicians.

Graduates will also be trained to the following standards with the opportunity to fast forward themselves through highly regarded industrial apprenticeships and potentially be credited 2 – 3 years of time in a 4 year apprenticeship.

Alberta Power System Electrician, (https://tradesecrets.alberta.ca/trades-in-alberta/profiles/046/)

> Journeyperson Power System Electrician
> (https://tradesecrets.alberta.ca/SOURCES/PDFS/CURRICULUM_GUIDES/046_OUTLINE.PDF)

Canadian Red Seal Industrial Electrician, (https://www.red-seal.ca/eng/trades/.3nd.5str.3.1l_.2l.2ctr.3c.shtml)

> Journeyperson Industrial Electrician
>
> (https://www.red-seal.ca/_conf/assets/custom/docms/industrial_electric_rsos2016_eng.pdf)

As Electrical Test Engineers, our graduates will be trained to test and troubleshoot the electrical systems, apparatus and controls in generating stations and substations in nuclear, thermal, hydro, wind, solar, biomass and other industrial systems.

Graduates will be trained to use the following test equipment:

> AC high potentiometer (hipot or hypot), battery AC conductance tester, battery DC load tester, battery ground fault locator, battery impedance tester, breaker time-travel analyzer, breaker timing tester, cable fault locator, cable tone generator, capacitance bridge, clamp-on ammeter, clamp-on ground resistance tester, contact timer, corona detector, current signature analyzer, current transformer tester, dielectric breakdown tester, dielectric response analyzer, dielectric withstand tester, dissolved gas in oil sampling kit, dynamic contact resistance tester, earth ground resistance tester, first trip tester, ground bond tester, ground resistance clamp on tester, growler, hot stick tester, hydrometer, infrared camera, insulating oil dielectric strength tester, kelvin bridge, megohmmeter, micro-ohmmeter (DLRO), milli-ohmmeter, minimum pickup tester, moisture in oil tester, motor/phase rotation meter, oil dielectric ac tester, optical time domain reflectometer, oscilloscope, partial discharge detector, phase angle meter, power factor test set, power quality analyzer, primary current injection tester, protective relay test set, rubber glove tester, RPM tester, safety ground tester, secondary current injection tester, sheath fault locator, step and touch voltage tester, sweep frequency response analyzer, tan delta tester, thumper, time domain reflectometer, time travel analyzer, transformer bulk oil sampling kit, transformer turns ratio tester, vacuum bottle integrity tester, VLF hipot, wheatstone bridge, winding inductance tester, winding impedance tester, winding resistance ohmmeter, winding surge comparison tester and others.

Graduates will be trained in deductive reasoning and be able to troubleshoot any industrial system, including automation, instrumentation, electronic, robotic, PLC, VFD and electro-mechanical systems including fluid power troubleshooting.

In addition to developing these skill sets, graduates will receive an understanding of mechanical, fluid power and other systems, cutting and welding, and be certified in rigging and hoisting, fire and fall protection, scaffolding, trenching, the operation of forklifts, manlifts and zoom booms, safe driving, equipment trailering, first aid, WHMIS, TDG, confined space entry and rescue, and environmental exposures.

From this training, graduates will be qualified in NETA, PEARL, NFPA, EGSA, IEEE and CSA standards, OSHA electrical and industry regulations, and North American industrial culture.

Companies choosing to participate in this program will have their electrical safety programs, procedures and processes incorporated into our CESCP curriculum.

Through our associate company, Centuries of Leadership Development, Inc, graduates will be trained in leadership, communications, planning and management, giving them the knowledge and skills to fast track into leadership positions. (www.centuries-of-leadership.com)

With this combination of theoretical education, and the advanced hands on skills training that is our hallmark, we will provide industry with electrical test engineers that are outstanding and immediately productive performers. Companies hiring our graduates will receive highly trained, safety oriented, motivated individuals with key safety certifications.

The tuition investment required from each candidate is $25,000.00 USD, which includes instruction, training materials, textbooks and PDF versions of critical standards*. Tuition does not include the cost of any industry certification testing, travel, accommodation or associated expenses.

All students are required to go through a screening process to qualify. This program is not open to the general public, candidates must be sponsored by an employer.

The following pages illustrate the standards that our graduates will be qualified to meet. Our goal is to provide employers with the most highly trained engineers in North America.

For more information please send an email to info@et-eng.com or call directly, 1-877-286-7447.

Sincerely

Dave Smith
President
Chief Instructional Designer
Canada Training Group International, Inc

* Included with tuition fees

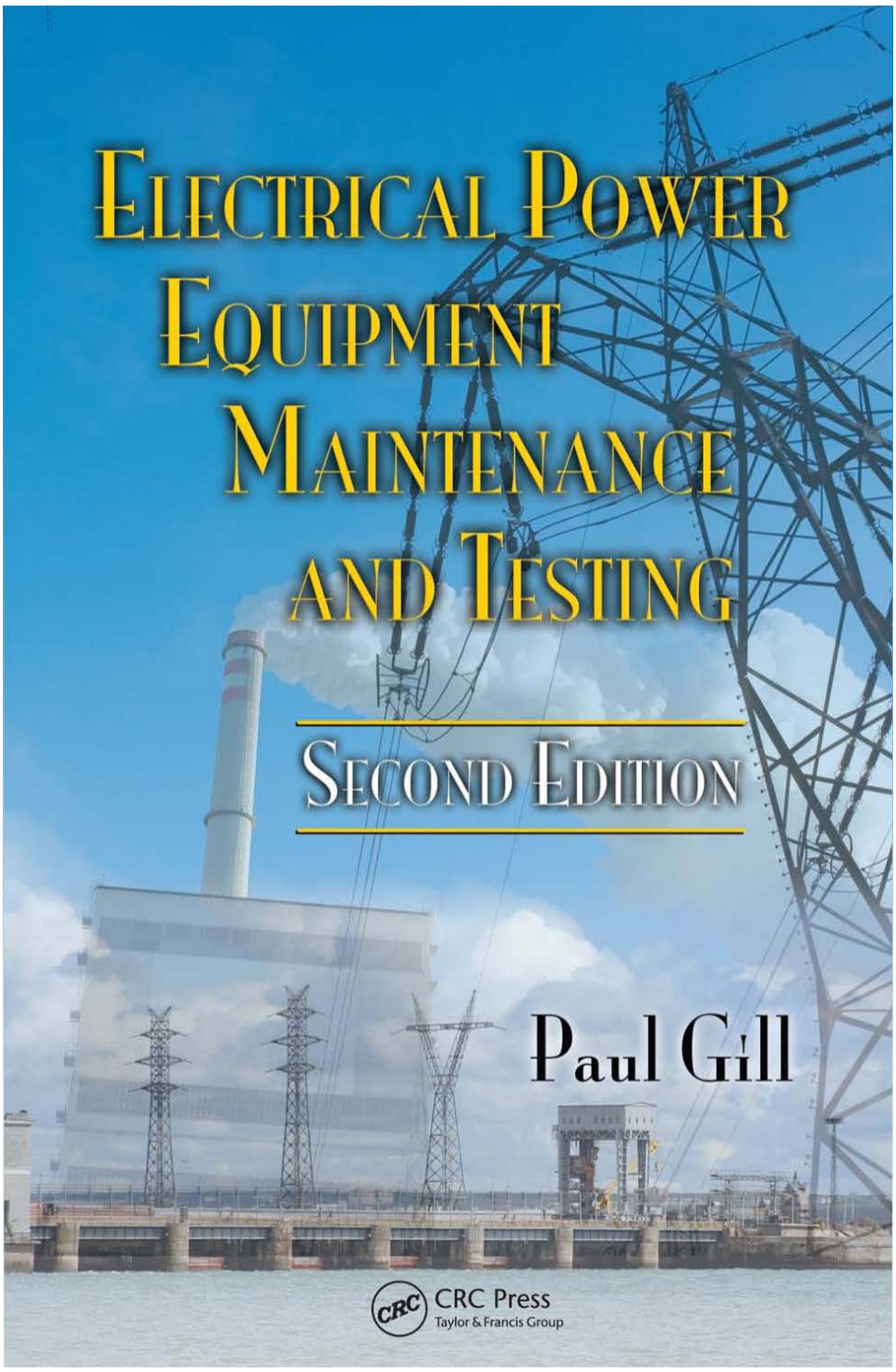
ANSI/NETA MTS Index

Our graduates will be specifically trained to test the apparatus listed and perform the required tests.

7.11.1 Metering Devices, Electromechanical and Solid-State
7.11.2 Metering Devices, Microprocessor-Based
7.12.1.1 Regulating Apparatus, Voltage, Step-Voltage Regulators
7.12.1.2 Regulating Apparatus, Voltage, Induction Regulators
7.12.2 Regulating Apparatus, Current – Reserved
7.12.3 Regulating Apparatus, Load Tap-Changers
7.13 Grounding Systems
7.14 Ground-Fault Protection Systems, Low-Voltage
7.15.1 Rotating Machinery, AC Induction Motors and Generators
7.15.2 Rotating Machinery, Synchronous Motors and Generators
7.15.3 Rotating Machinery, DC Motors and Generators
7.16.1.1 Motor Control, Motor Starters, Low-Voltage
7.16.1.2 Motor Control, Motor Starters, Medium-Voltage
7.16.2.1 Motor Control, Motor Control Centers, Low-Voltage
7.16.2.2 Motor Control, Motor Control Centers, Medium-Voltage
7.17 Adjustable-Speed Drive Systems
7.18.1.1 Direct-Current Systems, Batteries, Flooded Lead-Acid
7.18.1.2 Direct-Current Systems, Batteries, Vented Nickel-Cadmium
7.18.1.3 Direct Current Systems, Batteries, Valve-Regulated Lead-Acid
7.18.2 Direct-Current Systems, Chargers
7.18.3 Direct-Current Systems, Rectifiers – Reserved
7.19.1 Surge Arresters, Low-Voltage Surge Protection Devices
7.19.2 Surge Arresters, Medium- and High-Voltage Surge Protection Devices
7.20.1 Capacitors and Reactors, Capacitors
7.20.2 Capacitors and Reactors, Capacitor Control Devices – Reserved
7.20.3.1 Capacitors and Reactors, Reactors (Shunt and Current-Limiting), Dry-Type
7.20.3.2 Capacitors and Reactors, Reactors (Shunt and Current-Limiting), Liquid-Filled
7.21 Outdoor Bus Structures
7.22.1 Emergency Systems, Engine Generator
7.22.2 Emergency Systems, Uninterruptible Power Systems
7.22.3 Emergency Systems, Automatic Transfer Switches
7.23 Communications – Reserved
7.24.1 Automatic Circuit Reclosers and Line Sectionalizers, Automatic Circuit Reclosers, Oil/Vacuum
7.24.2 Automatic Circuit Reclosers and Line Sectionalizers Automatic Line Sectionalizers, Oil
7.25 Fiber-Optic Cables
8. SYSTEM FUNCTION TESTS
9. THERMOGRAPHIC SURVEY
10. ELECTROMAGNETIC FIELD SURVEY
11. ONLINE PARTIAL DISCHARGE SURVEY FOR SWITCHGEAR

Electrical Power Equipment Maintenance and Testing*

Our main course textbook covers all aspects of testing and maintenance of the equipment found in electrical power systems serving industrial, commercial, utility substations, and generating plants. It addresses practical aspects of routine testing and maintenance and presents both the methodologies and engineering basics needed to carry out these tasks. It is an essential reference for engineers and technicians responsible for the operation, maintenance, and testing of power system equipment. Comprehensive coverage includes dielectric theory, dissolved gas analysis, cable fault locating, ground resistance measurements, and power factor, dissipation factor, DC, breaker, and relay testing methods. This text will be supported by many subject specific documents.



Phase One - 200 hour self-directed learning component:

To preserve instructor time for valuable practical projects, Phase One is a 200 hour self-directed learning component that includes studying these texts: Electrical Power Equipment Maintenance and Testing* and Case Studies in Maintenance and Reliability*. It will also include mastering the understanding of the standards shown in this section: Standards Used in This Program.

Completion of these learning initiatives is required prior to Phase Two and are supported by competency assessments conducted at our Dolphin87 Assessment Systems website. (https://dolphin87.com).

Since 1987, Canada Training Group has assessed the competency of several thousand workers responsible for some part of their electrical systems. Our graduates will receive a very detailed final document clearly proving their knowledge, skills, experience and competencies to their employer.

This provides employers with a bullet proof, legally defensible, competency assessment system that proves, beyond the shadow of a reasonable doubt, that their managers have fulfilled their due diligence requirements, as determined by any court of law.

Phase Two - 800 hour directed learning component:

1. Low and High Voltage Electrical Equipment Maintenance and Testing

1.1. Electrical Systems: Generation, Transmission, Distribution and Production
1.2. Electrical Prints
1.3. Why Maintain and Test?
1.4. Overview of Electrical Preventive Maintenance
1.5. International Electrical Maintenance Standards
1.6. Planning an EPM Program
1.7. Overview of Testing and Test Methods
1.8. Review of Dielectric Theory and Practice

2. Direct-Current Voltage Testing of Low and High Voltage Electrical Equipment

2.1. Direct Current Voltage Testing of Insulation
2.2. DC Testing Methods
2.3. Transformers
2.4. Cables and Accessories
2.5. Electrical Switchgear and Circuit Breakers
2.6. Motors and Generators
2.7. Lightning Arresters
2.8. Capacitors
2.9. Evaluation of Test Data Readings
2.10. Precautions When Making Direct Current Tests
2.11. Practical Lab Projects
2.12. Practical Field Projects
2.13. Industry Tours

3. Insulation Testing

3.1. Air
3.2. Solid
3.3. Liquid
3.4. Gas
3.5. Vacuum

4. Power Factor/Dissipation Factor Tests

4.1. Power Factor and Dissipation Factor Test Methods
4.2. Description of the Power Factor Test Equipment
4.3. Basic Test Connections (Test Modes) for PF Testing
4.4. Safety Precautions with PF Testing
4.5. PF Testing of Electrical Apparatus Insulation
4.6. Evaluation and Grading of PF and DF Test Results
4.7. Practical Lab Projects
4.8. Practical Field Projects
4.9. Industry Tours
4.10. High Voltage Insulating Oil, Fluids and Gases
4.11. Insulating Oil
4.12. Less Flammable Insulating Fluids
4.13. Insulating Liquid Sampling Procedures
4.14. Maintenance and Reconditioning of Insulating Oil and Fluids
4.15. Insulating Gases

5. Low and High Voltage Transformers

5.1. Transformer Categories and Type
5.2. Application and Use
5.3. Transformer Fundamentals
5.4. Transformer Polarity, Terminal Markings, and Connections
5.5. Transformer Characteristics
5.6. Tapchangers
5.7. Preventive Maintenance of Transformers
5.8. Transformer Testing
5.9. Practical Lab Projects
5.10. Practical Field Projects
5.11. Industry Tours

6. Low and High Voltage Cables and Accessories

6.1. Cable Construction and Classification
6.2. Cable Characteristics
6.3. Cable Electrical Constants
6.4. Cable Ratings
6.5. Cable Selection and Application
6.6. Installation of Cables
6.7. Maintenance of Cables
6.8. Cable Failure and Their Analysis
6.9. Testing and Acceptance of Cable
6.10. Latest Trends in Cable Condition Monitoring and Aging Assessment
6.11. Cable Fault Locating Methods
6.12. Practical Lab Projects
6.13. Practical Field Projects
6.14. Industry Tours

7. Low-Voltage Switchgear and Circuit Breakers

7.1. Low-Voltage Switchgear
7.2. Low-Voltage Circuit Breakers
7.3. Overcurrent Protective Devices
7.4. Fuses
7.5. Disconnect Switches
7.6. Selection and Application of Low-Voltage Equipment
7.7. Low-Voltage Switchgear Maintenance and Care
7.8. Maintenance and Testing of Low-Voltage Protective Devices
7.9. Infrared Inspection of Electrical Equipment
7.10. Practical Lab Projects
7.11. Practical Field Projects
7.12. Industry Tours

8. High Voltage Switchgear and Circuit Breakers

8.1. Medium-Voltage Switchgear
8.2. Electrical Switchgear Maintenance and Care
8.3. Electrical Switchgear Testing
8.4. Control Power for Switchgear
8.5. DC (Battery) Control Power Equipment
8.6. AC Control Power Equipment
8.7. Maintenance and Care of Batteries
8.8. High Voltage Switchgear
8.9. Practical Lab Projects
8.10. Practical Field Projects
8.11. Industry Tours

9. Testing and Commissioning of Protective Relays

9.1. Instrument Transformers
9.2. Protective Relays
9.3. Relay Application and Principles
9.4. Types of Relay Tests
9.5. Testing and Maintenance of Electromechanical Protective Relays
9.6. Testing and Commissioning of Static and Digital Relays
9.7. Event Reporting

10. Low and High Voltage Motors and Generators

10.1. NEMA Classification of Motors and Generators
10.2. Applications of Motors and Generators
10.3. AC Motors
10.4. AC Generators Maintenance
10.5. DC Motors DC Generators
10.6. Motor and Generator Insulation Systems
10.7. Motor and Generator Maintenance
10.8. Testing of Motors and Generators
10.9. Other Insulation Test Methods
10.10. Motor Control
10.11. Practical Lab Projects
10.12. Practical Field Projects
10.13. Industry Tours

11. Batteries and UPS Systems

11.1. Introduction To Substation Stationary Batteries
11.2. IEEE 1657-2009: Recommended Practice For Personnel Qualifications For Installation And Maintenance Of Stationary Batteries
11.3. IEEE 450-2010: Recommended Practice For Maintenance, Testing, And Replacement Of Vented Or Flooded Lead Acid (VLA/FLA) Batteries For Stationary Applications
11.4. IEEE 1188-2005: Recommended Practice For Maintenance, Testing, And Replacement Of Valve-Regulated Or Sealed Lead-Acid (VRLA/SLA) Batteries For Stationary Applications
11.5. IEEE 1106-2005: Recommended Practice For Installation, Maintenance, Testing, And Replacement Of Vented And Sealed Nickel-Cadmium Batteries For Stationary Applications
11.6. Battery Chargers
11.7. UPS Systems
11.8. Practical Lab Projects
11.9. Practical Field Projects
11.10. Industry Tours

12. Electrical Power System Grounding

12.1. Selection of Grounding Method
12.2. Selection of Grounding System
12.3. Understanding Ground Resistance
12.4. Ground Resistance Values
12.5. Ground Resistance Measurements
12.6. Ground Grid Integrity Measurements
12.7. Practical Lab Projects
12.8. Practical Field Projects
12.9. Industry Tours

13. Power Quality and Harmonics

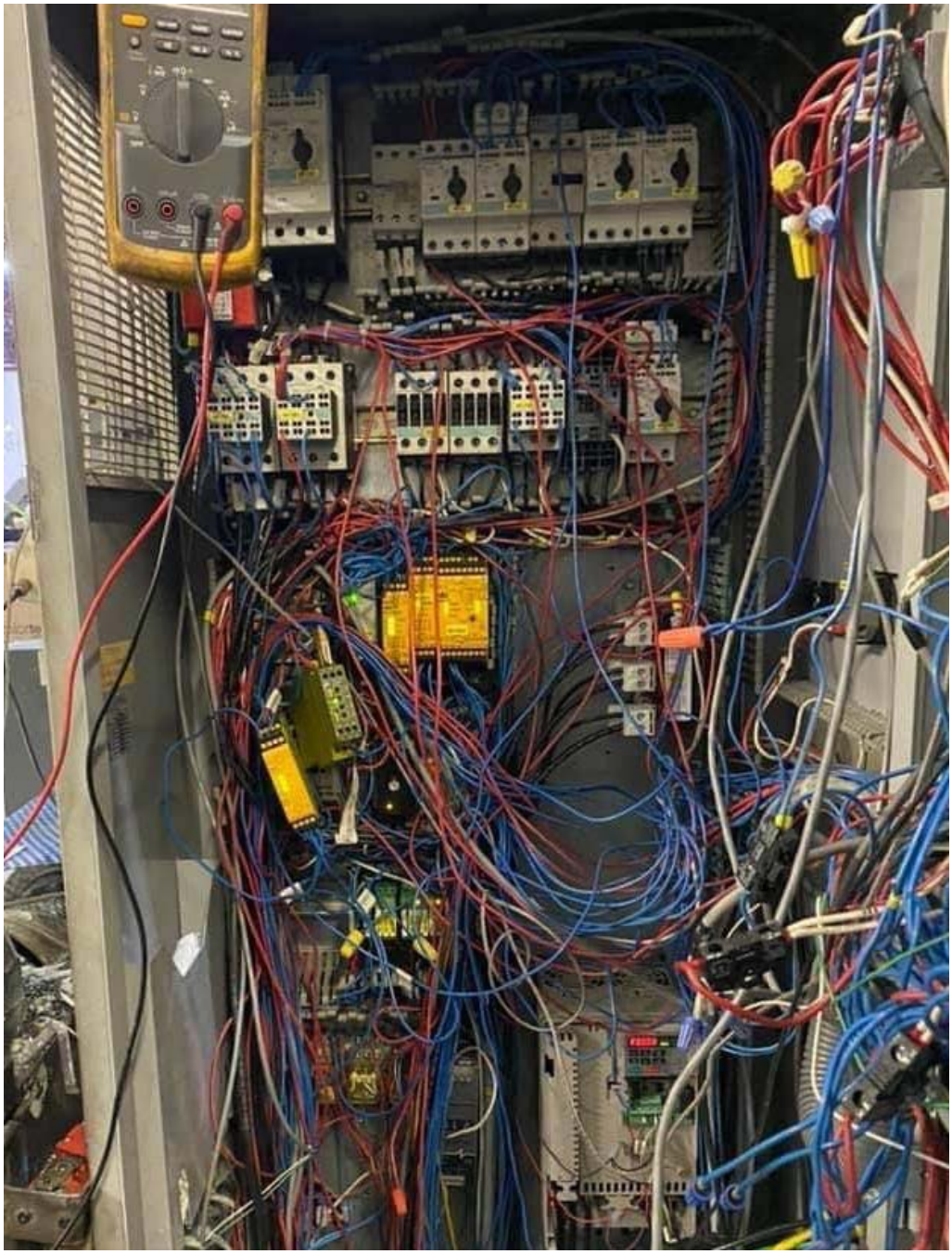
13.1. Background PQ Concept and Fundamentals
13.2. Origins of PQ Problems and Harmonics
13.3. Characteristics of Typical Linear and Nonlinear Loads
13.4. Effects of Harmonic on Power System Equipment and Loads
13.5. Predictive Maintenance and PQ Measurements
13.6. PQ Solution and Power Treatment Devices
13.7. Practical Lab Projects
13.8. Practical Field Projects
13.9. Industry Tours

14. Low and High Voltage Electrical Safety, Switching Practices and Precautions

14.1. Arc Flash Hazards (NFPA70E/CSA Z462)
14.2. Electrical Safety, Switching Practices, and Precaution
14.3. Electrical Fire Emergencies
14.4. Effects of Electrical Shock
14.5. First Aid
14.6. Practical Lab Projects
14.7. Practical Field Projects
14.8. Industry Tours

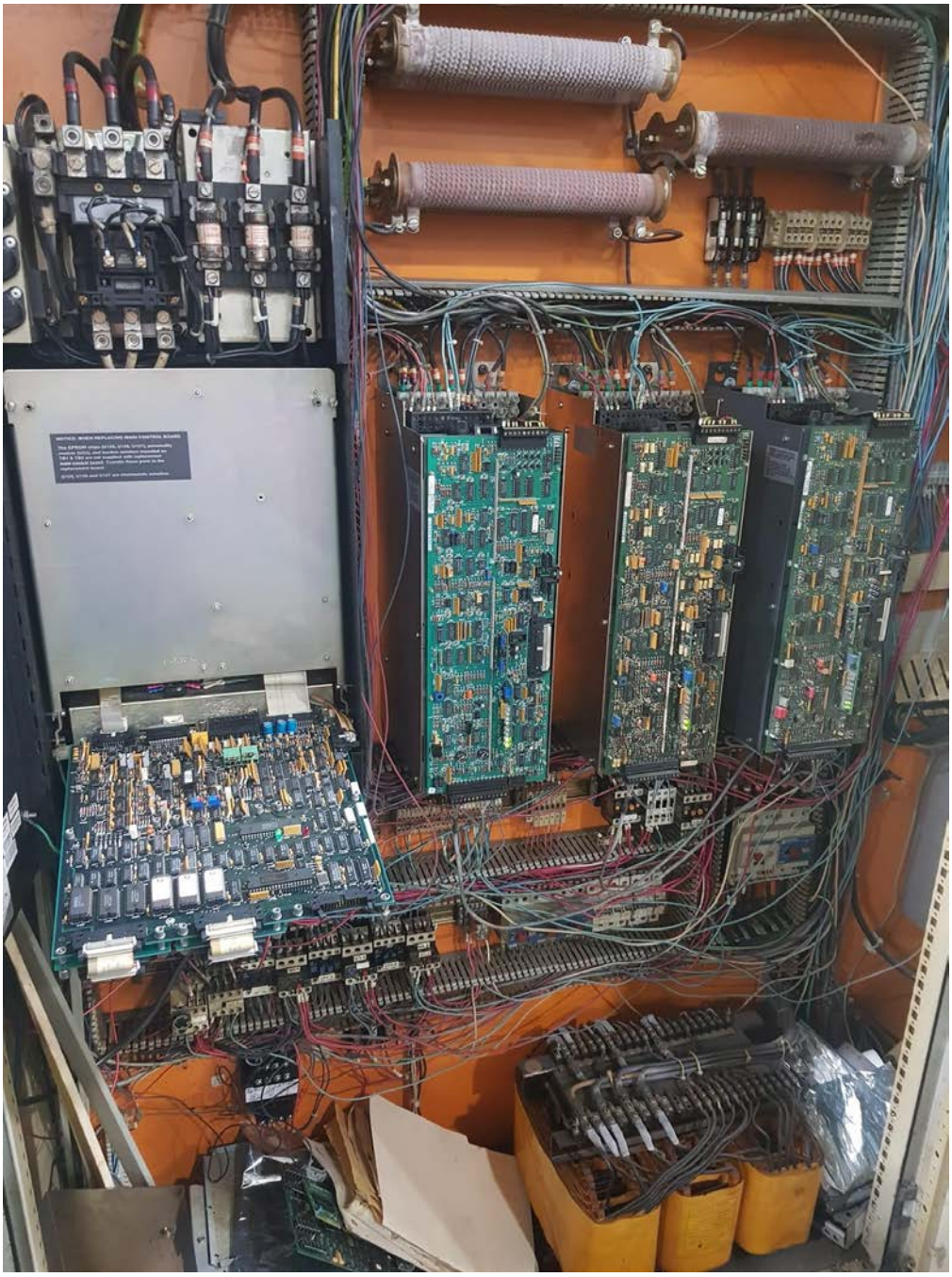
15. How to Analytically Troubleshoot Complex Electrical Systems Using Deductive Reasoning

15.1. Deductive Reasoning
15.2. E^3I
15.3. How to Troubleshoot a Mess
15.4. How to Troubleshoot Unknown Systems
15.5. Hard Wired Simulation
15.6. Software Simulation
15.7. Practical Lab Projects
15.8. Practical Field Projects
15.9. Industry Tours



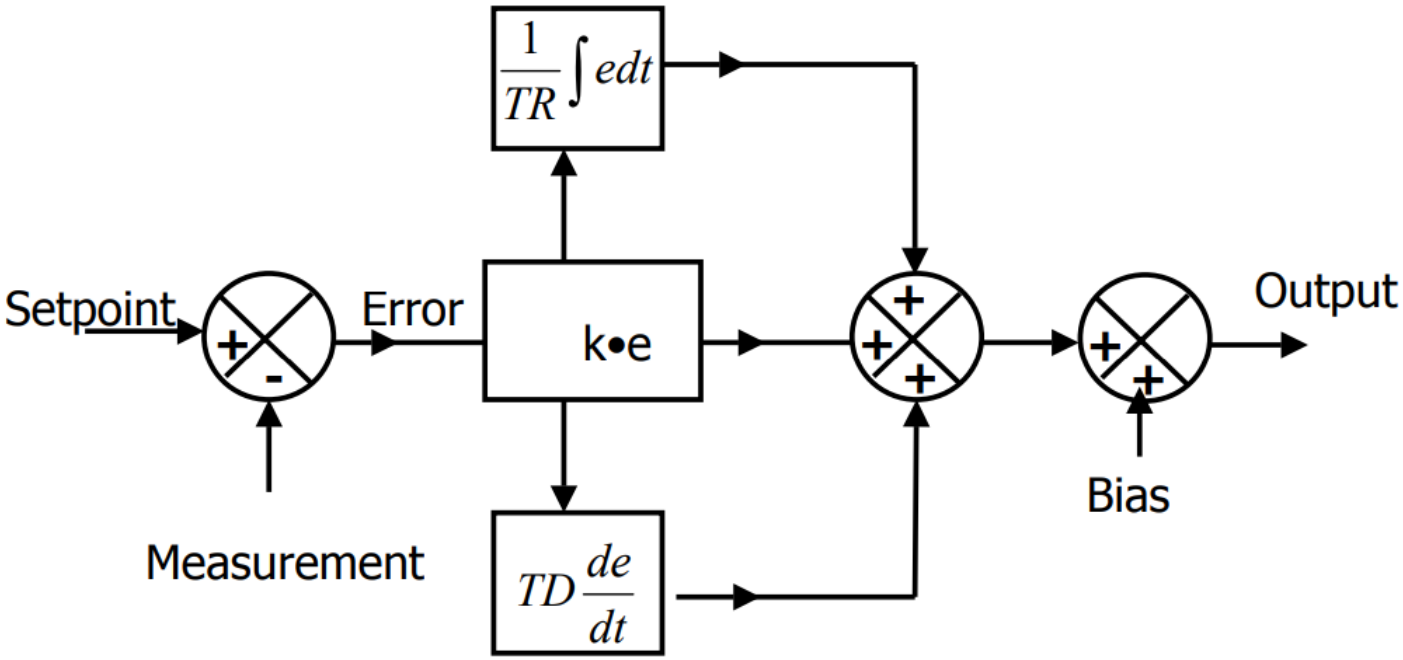
16. How to Analytically Troubleshoot Electronic Systems

16.1. Power vs Control
16.2. Electrical vs Electronic vs Instrumentation
16.3. Hardware vs Software
16.4. Hard Wired Simulation
16.5. Software Simulation
16.6. Practical Lab Projects
16.7. Practical Field Projects
16.8. Industry Tours



17. Process Control

17.1. Purpose
17.2. Basic variables
17.3. Advanced variables
17.4. Sensors
17.5. Actuators
17.6. P&IDs
17.7. PID Loops
17.8. Calibration
17.9. Safety keys



$$m = ke\left(+ \frac{1}{T_R}\int edt \right) + kT_D \frac{de}{dt} + bias$$

18. Programmable Logic Controllers and Distributed Control Systems

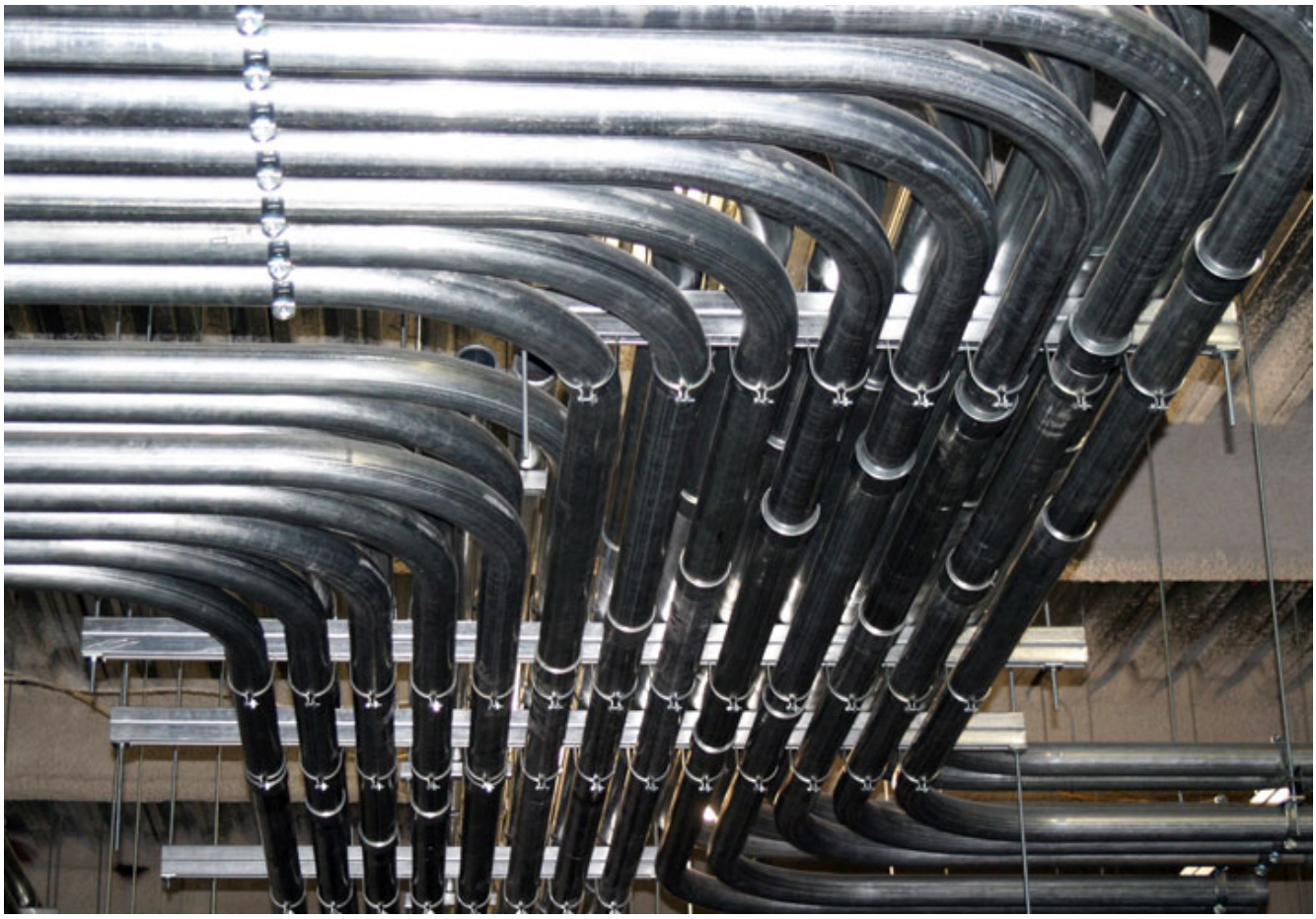
18.1. PLC's
18.2. Distributed Control Systems
18.3. Process Control Systems
18.4. Practical Lab Projects
18.5. Practical Field Projects
18.6. Industry Tours

19. Variable Speed Drives

19.1. DC Drives
19.2. AC Drives
19.3. Installation
19.4. Programming
19.5. Maintaining
19.6. Troubleshooting
19.7. Practical Lab Projects
19.8. Practical Field Projects
19.9. Industry Tours

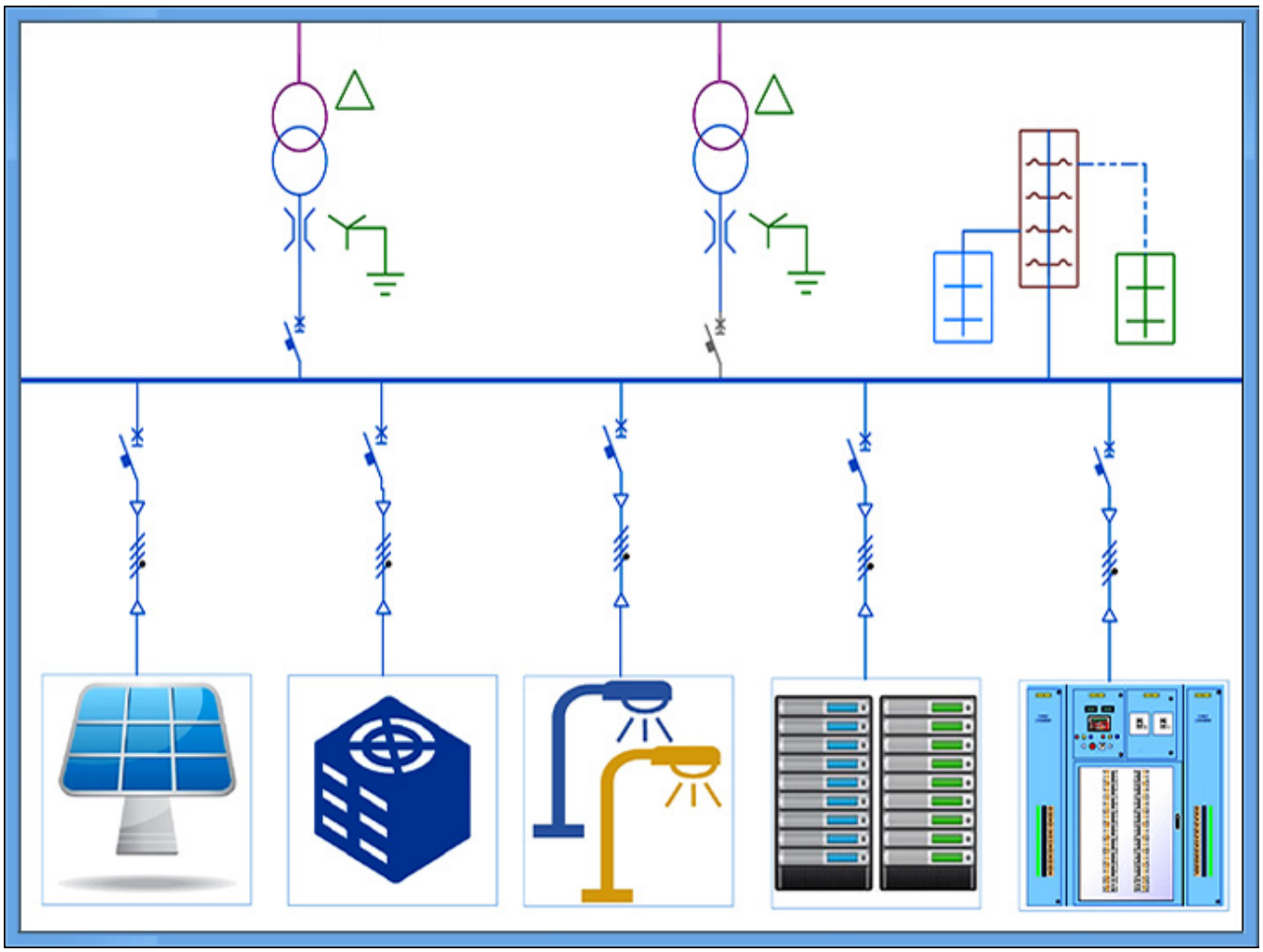
20. Electrical Codes and Standards

20.1. National Electrical Code NFPA 70
20.2. Canadian Electrical Code C22.1
20.3. Interprovincial Journeyman Exam
20.4. State Journeyman Exams
20.5. Master Electrician Exams
20.6. Practical Lab Projects
20.7. Practical Field Projects
20.8. Industry Tours



21. Electrical Systems Studies

21.1. System Studies
21.2. Load Flow Studies
21.3. Short Circuit Co-ordination Studies
21.4. Arc Flash Hazard Studies
21.5. Practical Lab Projects
21.6. Practical Field Projects
21.7. Industry Tours



22. Integrated Mechanical Systems

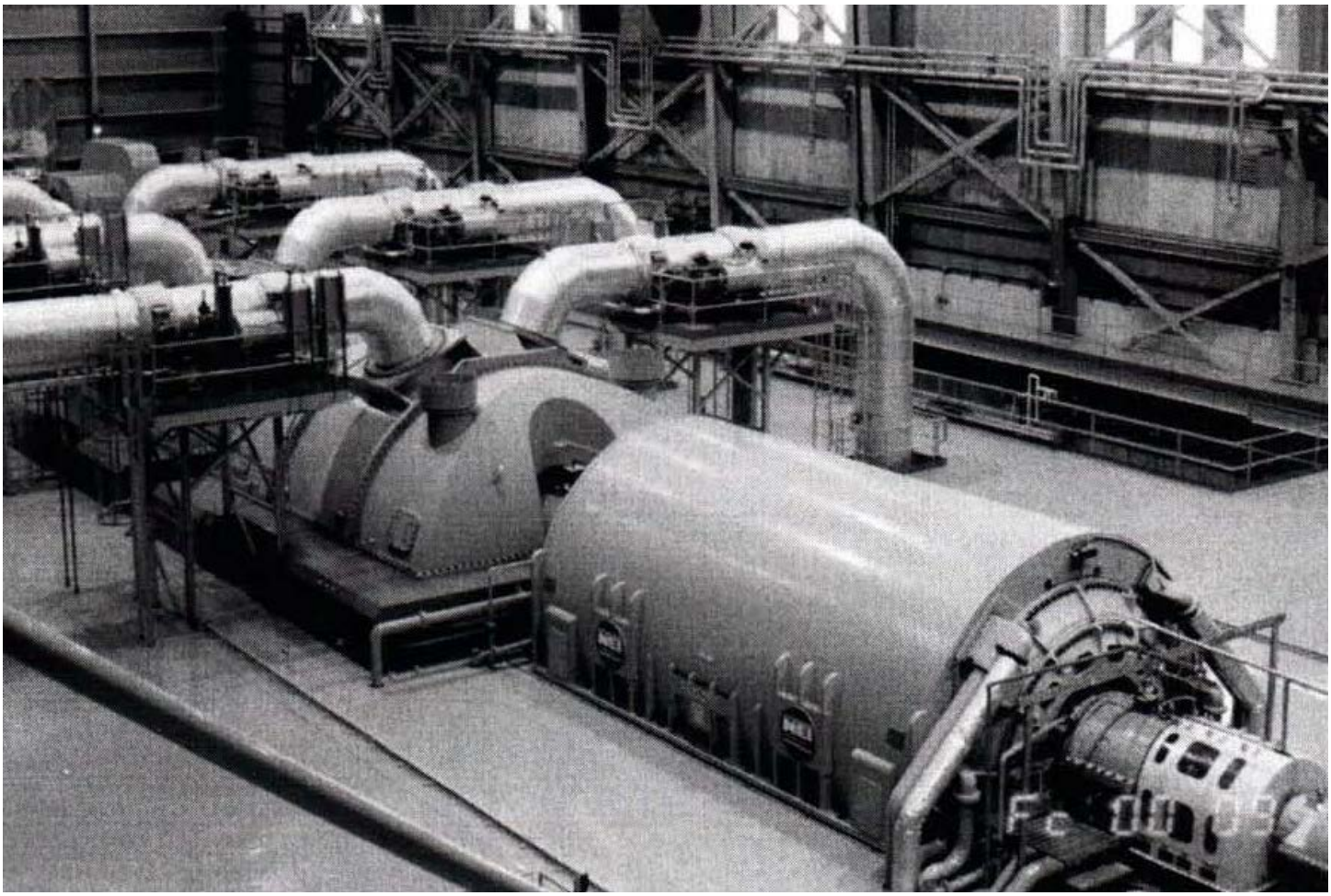
22.1. Hydraulics
22.2. Pneumatics
22.3. Prime Movers
22.4. Power Transmission
22.5. Conveyors
22.6. Final Drives
22.7. Practical Lab Projects
22.8. Practical Field Projects
22.9. Industry Tours

23. Basic Millwrighting

23.1. Mechanical Tools
23.2. Mechanical Drawings
23.3. Shop Tools
23.4. Heavy Equipment Installation
23.5. Rigging and Hoisting
23.6. Leveling
23.7. Leveling
23.8. Alignment
23.9. Balancing
23.10. Welding and Cutting
23.11. Machining
23.12. Practical Lab Projects
23.13. Practical Field Projects
23.14. Industry Tours

24. Generator Prime Movers

24.1. Human
24.2. Gas
24.3. Diesel
24.4. Natural Gas
24.5. Hydro
24.6. Coal
24.7. Nuclear
24.8. Wind
24.9. Solar
24.10. Tidal
24.11. Others

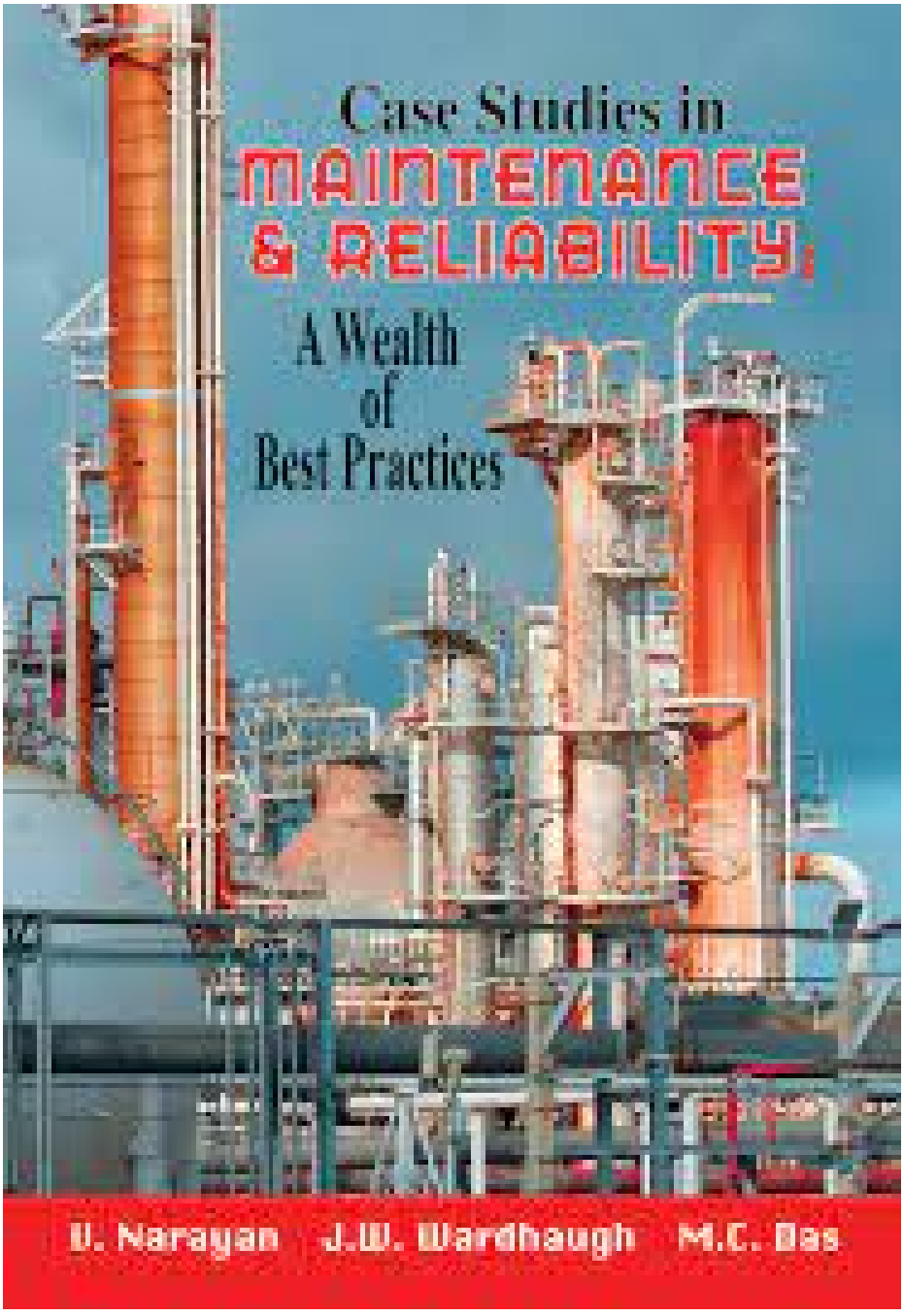


25. Mobile Equipment

25.1. Forklift
25.2. Ditch Witch
25.3. Working at Heights
25.4. Electric Scissor Lift
25.5. Zoom Boom
25.6. Cherry Picker
25.7. Light Crane
25.8. Practical Lab Projects
25.9. Practical Field Projects
25.10. Industry Tours

26. Case Studies in Maintenance and Reliability*

26.1. Leadership
26.2. People
26.3. Plan
26.4. Schedule
26.5. Execute
26.6. Analyze

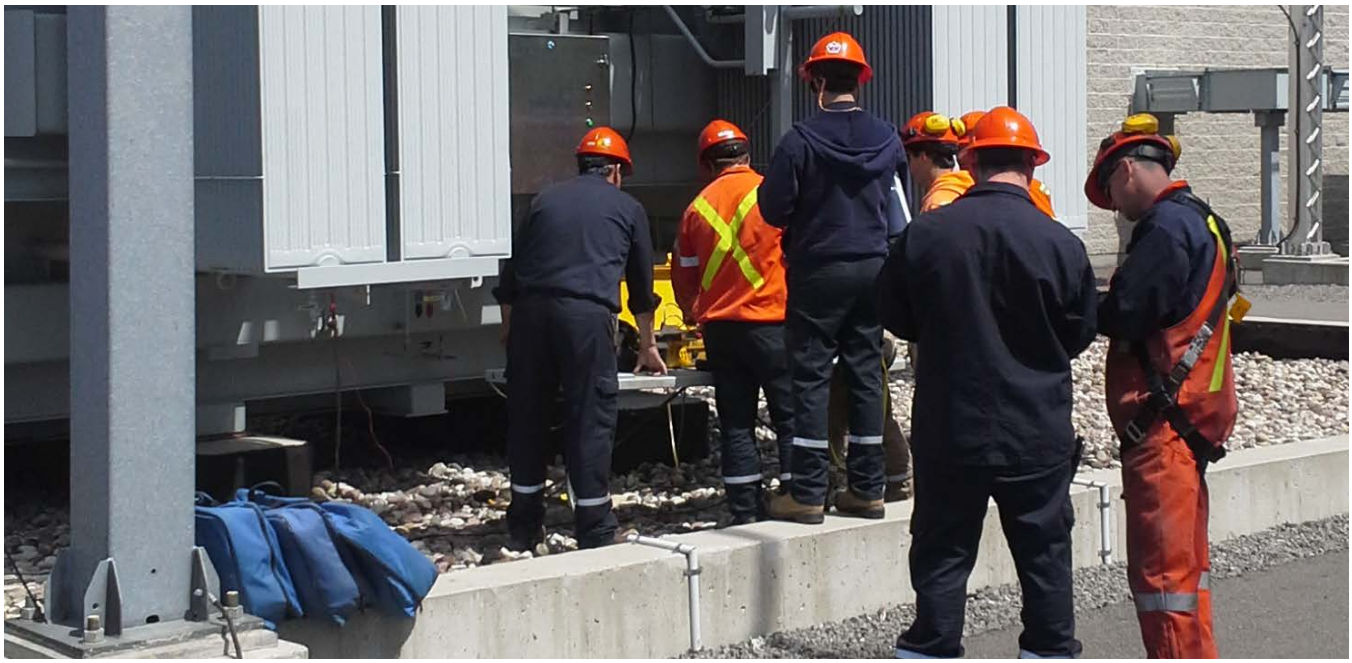


27. Industry Certifications

27.1. Ergonomics
27.2. Construction Safety
27.3. OSHA
27.4. First Aid
27.5. CPR
27.6. Confined Space
27.7. WHMIS
27.8. TDG
27.9. Drug & Alcohol
27.10. Fall Protection
27.11. Wildlife Safety
27.12. Asbestos Safety
27.13. Winter Driving

28. Management Studies

28.1. Communication Studies
28.2. Industrial Leadership
28.3. Leading Meetings
28.4. Maintenance Management
28.5. Project Management
28.6. Financial Management
28.7. Practical Projects
28.8. Industry Tours



Leadership and Management Training

Canada Training Group has been providing leadership and management training since 1986. Centuries of Leadership is our separately branded company that now provides this training

During this program graduates will be divided into rotating teams and they will each take their turn as group and small team leaders. They will be responsible for developing electrical maintenance programs, safety management programs, planning and managing projects, fulfilling all communication requirements involved including running daily safety meetings, and managing simulated leadership problems. Gender, discrimination, harassment, bullying and other current issues will be addressed in this training.

Faculty

Electrical Engineering Team

Joseph Kiceniuk, BSc, MSc, PhD: Electronics and Deductive Reasoning

Ahmed Abdelfattah, PEng, BSEE, MSEE, PhDEE: Power System Engineer

Lesya Drahula, BEng, MEng, MSEc: Power System Engineer

Peter Waugh, PEng, (Ret) BSEE, CHRP: Electrical Maintenance Engineer

Daniel Chartier, ing, (Ret) BScGE: Automation Engineer

Electrical Testing and Maintenance Team

Ed Rideout, RS JE, EET: HV Electrical Testing and Maintenance

Jim Roberts, RS JE, EET: HV Electrical Testing and Maintenance

Dave Neal, PME, EHV Safety and Loss Control Systems

Blaine Tapp, EET, EHV Station Grounding

Dave Smith, RS JE: Chief Instructional Designer

Paul Sherwood, RS JE: HV Electrical Testing and Maintenance

Wayne Jeffrey, RS JE/JI: Automation and Instrumentation

Dave Cox, RS JE: Robotics and Process Control

Norm Jewitt, RS JE/JM: Electrical Construction

Don Levy, EET: HV Rotating Machine Testing and Maintenance

Mak Makwana, EET, High Voltage Circuit Breaker Testing and Maintenance

Doug Baker, EET, PSE, JL: HV Transmission and Protective Relaying

Management Instruction Team

Pat Blais, BA, RN, MA, PhD: Leadership and Indigenous Communications

Ken Murchie, PEng (Ret), BASc, MEng; Leadership and Management

Javed Ahmed, ASc, BTech, MPA, MBA: Project and Financial Management

Dan Corneliuson, RSM, (Ret): Leadership

Mechanical Maintenance Team

Dan Gies, Red Seal Mechanic: Mechanical and Refrigeration Systems

Dave Winsor, Marine Chief Engineer: Electro-Mechanical Systems

Julien Beaudoin, Welder/Fitter, Rigging and Hoisting

Mobile Equipment Team

Levis Beaudoin, Mobile Equipment Operation

Frank Smith, Mobile Equipment Operation

Program Management:

This program is designed, presented and managed by Canada Training Group International in conjunction with their partners. Canada Training Group is a professional training company founded in 1980. Over 25,000 students have been trained in electrical management, operation, maintenance, troubleshooting, safety and other programs.

Canada Training Group electrical staff have over 800 years of combined national and international electrical experience up to 550kV in generating stations, wind and solar farms, substations, industrial plants, offshore platforms, commercial, and public institutions.

Program Organization:

Participants will complete a home study session comprising portions of Phase One prior to starting classes. Practical lab projects will be conducted in our 7,300 sq ft training facility located in Turtleford, SK, Canada as well as our mobile electrical training substations that have been custom designed and built by Canada Training Group. Field projects will be conducted in association with partner firms specializing in each subject matter area. Tours will be conducted in select industrial facilities, apparatus manufacturing or repair facilities and employer plants.

Quality Management:

We are ISO 9001 Quality Managed and all courses are designed and presented to the standards of the International Board of Standards for Training, Performance and Instruction as well as the standards of The Institute for Performance and Learning, and the Association for Talent Development. Our curriculum design team has over 120 years of experience developing courses and curricula in industry, military, law enforcement, aviation, technical institutes and universities.

Our curriculum design team is led by Dave Smith, president of Canada Training Group. His career as an educator began in 1966 when he first began small group instructing. In his career he has presented instruction to over 5,000 participants, all in small groups. He gained qualifications in instructional design in 1968 and curriculum design in 1969 and has designed, or led the design, of hundreds of training courses ranging from technical to management. He is the creator of the Engineered Training System, Canada Training Group's proprietary ISD system, as well as Dolphin87, our online assessment system.

Canada Training Group achieves accelerated learning results through the integration of practical exercises, technical performance labs, visuals, videos, class discussions of scenarios and case study analysis, handouts, self study and integrated online training, exercises and continuous assessments. Knowledge assessments are made using a combination of direct questions, class discussions, individual interviews, quizzes, tests, essays, and online assessments.

Our work is based on the pioneering human development work of Bloom, Mager, Kolb, Kirkpatrick, Gilbert, Rummler, Kantor, Knowles, Harless, Kaufman and others.

Graduates will receive 90 CEUs from EIC, the Engineering Institute of Canada (https://eic-ici.ca/)

Participants will not be accepted into this program unless they have prior knowledge, experience, and a demonstrated desire and commitment to excel within the program.

Standards Used in This Program

1. ANSI/NETA ETT-2022*

ANSI/NETA ETT-2022 (https://www.netaworld.org/standards/ansi-neta-ett) is the foundation standard for our program. It was created by NETA "to codify the experience, education, and training requirements necessary for an individual to obtain a level of competency as an electrical test technician".

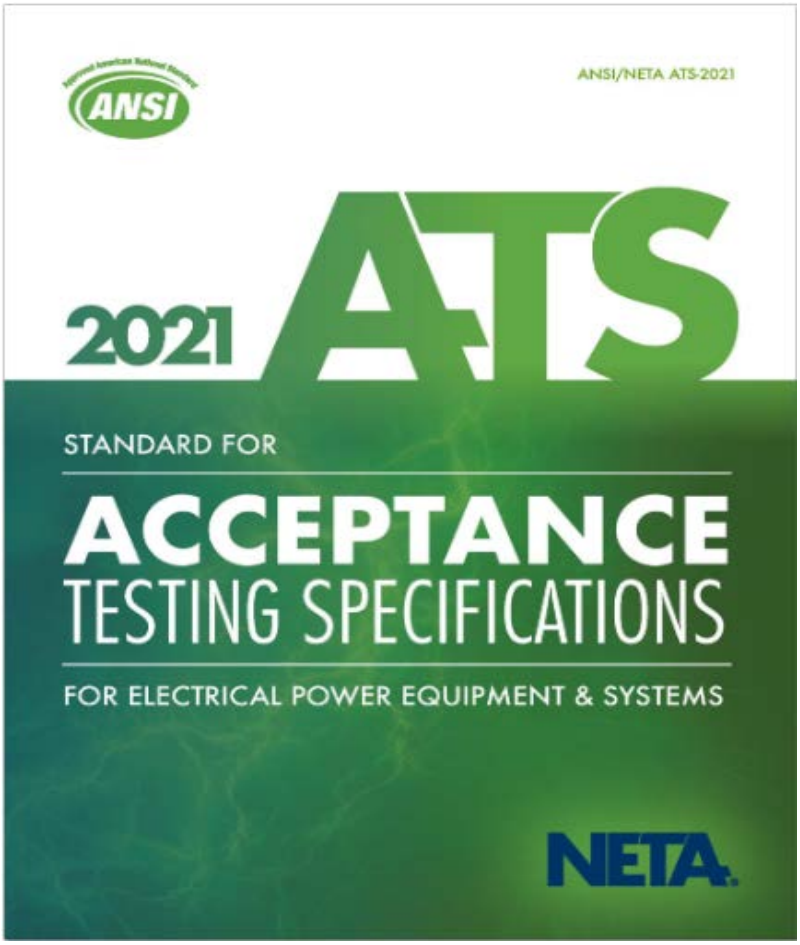
ETT-2022 establishes minimum requirements for qualifying and certifying an electrical testing technician, detailing the minimum training and experience required for competency within the role. It also provides criteria for documenting qualifications and certification for an independent and impartial certification system for electrical test technicians.

2. ANSI/NETA ECS 2020*

ANSI/NETA ECS 2020 was developed for use by those responsible for testing and commissioning newly installed or retrofitted electrical power systems and equipment to guide them in specifying and performing the necessary inspections, tests, measurements, and system performance verification to commission an electrical power system infrastructure.

Three voltage classes of equipment are detailed within the ANSI/NETA ECS: Low-Voltage Systems (less than 1,000 volts), Medium-Voltage Systems (greater than 1,000 volts and less than 100,000 volts), High-Voltage and Extra-High Voltage Systems (greater than 100 kV and less than 1,000 kV)

3. ANSI/NETA ATS-2021*



ANSI/NETA ATS-2021 specifications are designed to assure that tested electrical equipment and systems are operational, are within applicable standards and manufacturers' tolerances, and are installed in accordance with design specifications. ANSI/NETA ATS-2021 is a guide to ensure that electrical systems and apparatus not only meet project specifications, but that the manufacturer of the equipment supplied a product that will perform safely and reliably for many years to come.

It was developed for use by those responsible for assessing the suitability for initial energization of electrical power equipment and systems and to specify field tests and inspections that ensure these systems and apparatus perform satisfactorily, minimizing downtime and maximizing life expectancy.

4. ANSI/NETA MTS-2019*

The purpose of ANSI/NETA MTS-2019 Standard for Maintenance Testing Specifications for Electrical Power Equipment and Systems is to assure tested electrical equipment and systems are operational, are within applicable standards and manufacturer's tolerances, and are suitable for continued service. These specifications incorporate comprehensive field tests and inspections to assess the suitability for continued service, condition of maintenance, and reliability of electrical power distribution equipment and systems.

The ANSI/NETA Standard for Maintenance Testing Specifications for Electrical Power Equipment and Systems is a document that is used worldwide by individuals seeking to assure that the electrical power equipment and systems in their care operate reliably and safely in conformance with industry and manufacturer standards and tolerances.

5. PEARL Inspect and Test Standard

PEARL Inspect and Test Standard provides inspection, cleaning, testing, and documentation instructions and guidelines that when followed by trained technicians will provide evidence that an electrical device is free of inherent flaws or faults.

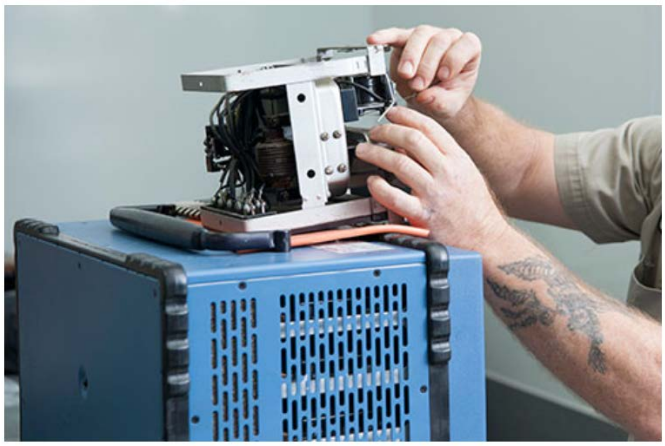
It is appropriate to use this standard to confirm the product is a good candidate for full reconditioning. The PEARL Inspect and Test Standard is neither a reconditioning standard, nor does it promise extended service life or improve reliability. It is intended to indicate that the equipment or device in its present state shows no indication of damage and tests satisfactorily to manufacturer or industry operational specifications.

Inspect & Test Standard

The Inspect and Test Standard provides inspection, cleaning, testing, and documentation instructions and guidelines that when followed by trained technicians will provide evidence that an electrical device is free of inherent flaws.

6. PEARL Electrical Equipment Reconditioning Standard

The PEARL Electrical Equipment Reconditioning Standard pertains to the reconditioning of electrical distribution equipment and accessories. The term ‘reconditioning’ is defined as “the process of returning electrical equipment to a safe operating condition as recommended by the original equipment manufacturer’s instructions or industry standards and tested by recognized industrial testing standards.” This standard has been developed based on manufacturer’s literature; industrial standards; NETA, NFPA, CSA, IEEE and NEMA, and PEARL member recommendations. It is focused on the most common types of industrial and commercial electrical equipment, including circuit breakers, transformers, motor controls, and switchgear, among other equipment categories.



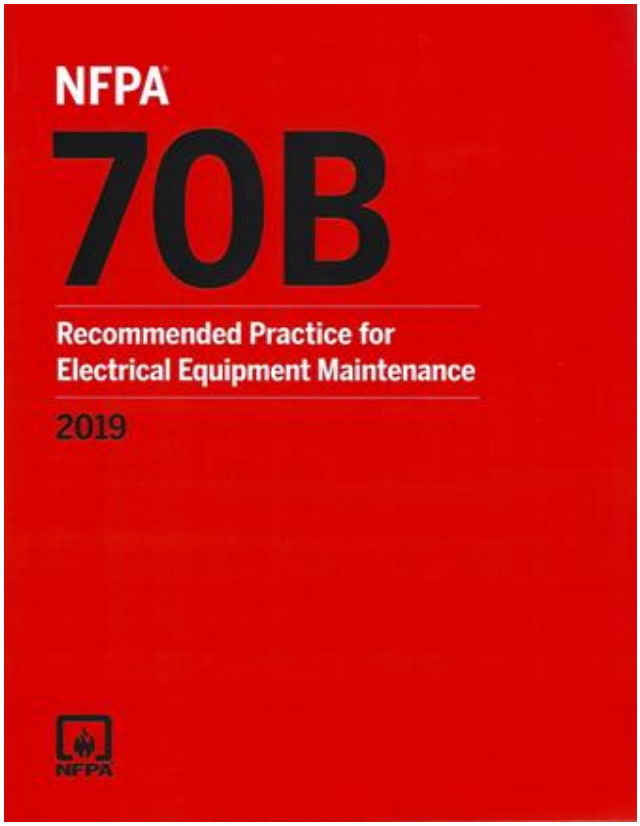
Reconditioning Standard

The Reconditioning Standard for Electrical Equipment, Components, and Apparatus defines the procedures required to assess, recondition and validate electrical equipment for safe reuse.

It also includes additional detail regarding suggested technician qualifications and the importance of manufacturer specifications for equipment performance, as well as expanded use of electrical industry terminology used by other electrical industry organizations, including IEEE and NETA. PEARL Reconditioning Standard purpose is to provide inspection, cleaning, reconditioning, testing and documentation instructions that, when followed by trained technicians, will return electrical devices to “as good as new” condition without compromise.

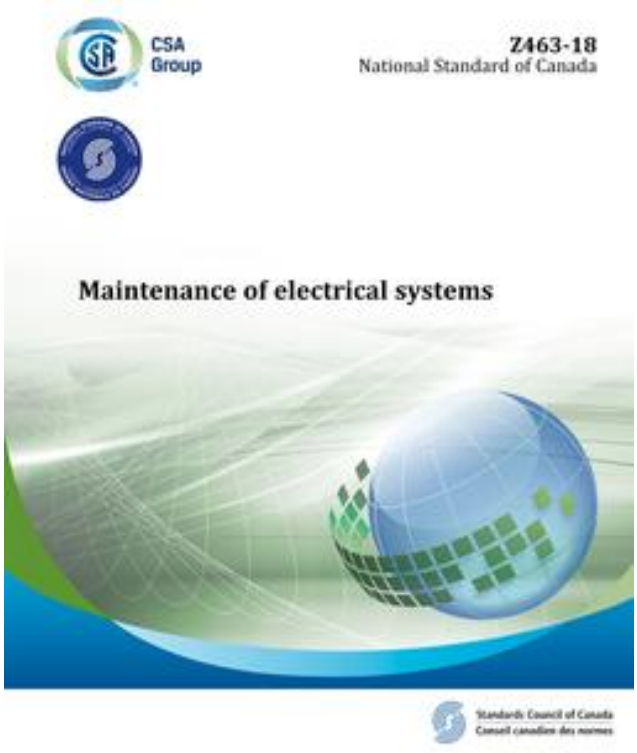
7. NFPA 70B, Recommended Practice for Electrical Equipment Maintenance*

The purpose of NFPA 70B, Recommended Practice for Electrical Equipment Maintenance, is to provide guidelines for creating an effective electrical preventive maintenance (EPM) program. NFPA 70B details what an effective EPM program consists of, why it is necessary, and how to develop a program that implements viable safety measures and maintenance methods. When properly implemented, an effective EPM program can help increase workplace safety; maintain or, in some cases, extend the life of equipment; and help to prevent losses in production which, in turn, result in lost revenue.



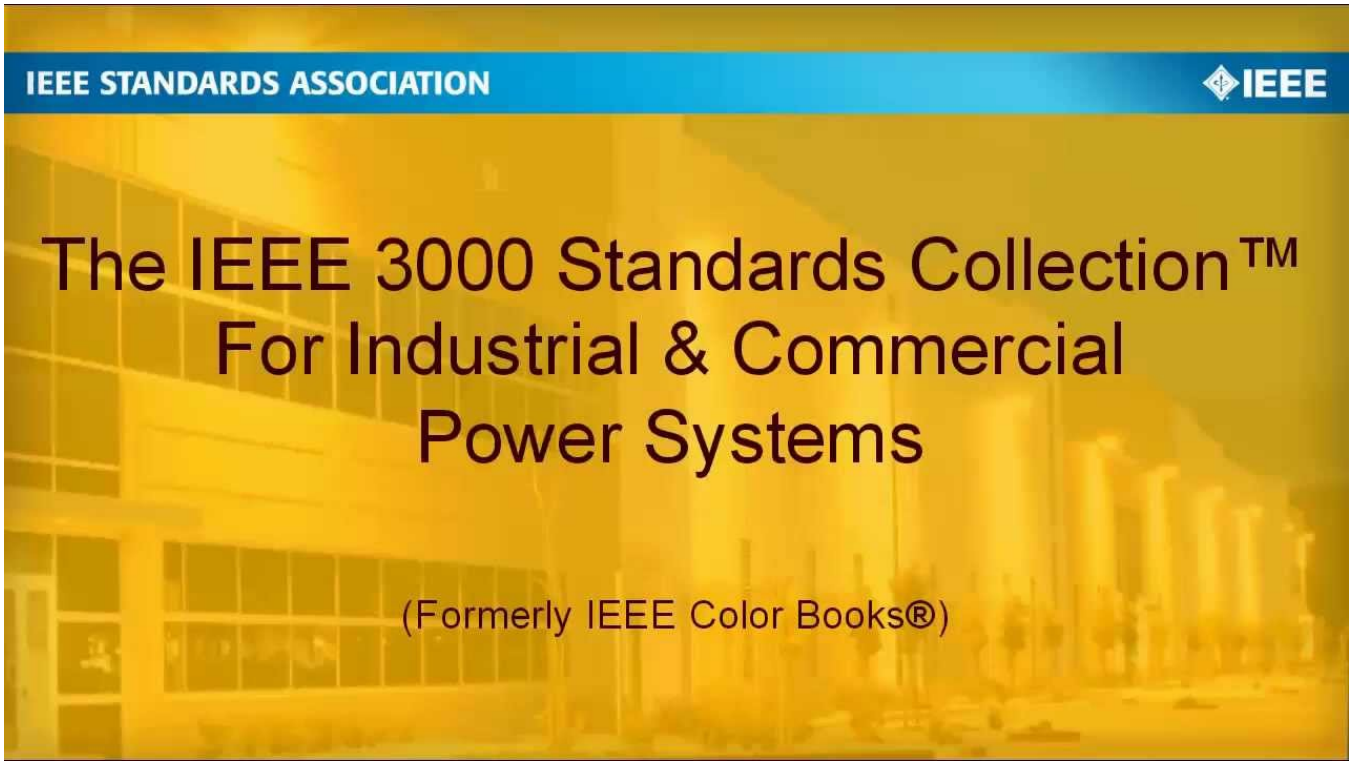
8. CSA Z463, Maintenance of electrical systems*

CSA Z463, Maintenance of electrical systems specifies basic requirements on maintenance of electrical systems based on principles of loss control and safety management systems. It also provides guidance on the selection of reference standards, equipment-specific maintenance procedures, and the assessment of electrical equipment to verify correct function.



9. IEEE 3000 Standards Collection™ for Industrial & Commercial Power Systems

IEEE 3000 Standards Collection™ for Industrial & Commercial Power Systems is the trademarked name of the family of industrial and commercial power systems standards formerly known as IEEE Color Books. The IEEE 3000 Standards Collection overall includes the same content as the Color Books but is now organized into approximately 60 IEEE "dot" standards that cover specific technical topics. This transition is currently ongoing with over 21 dot standards published to date and 10 active projects.



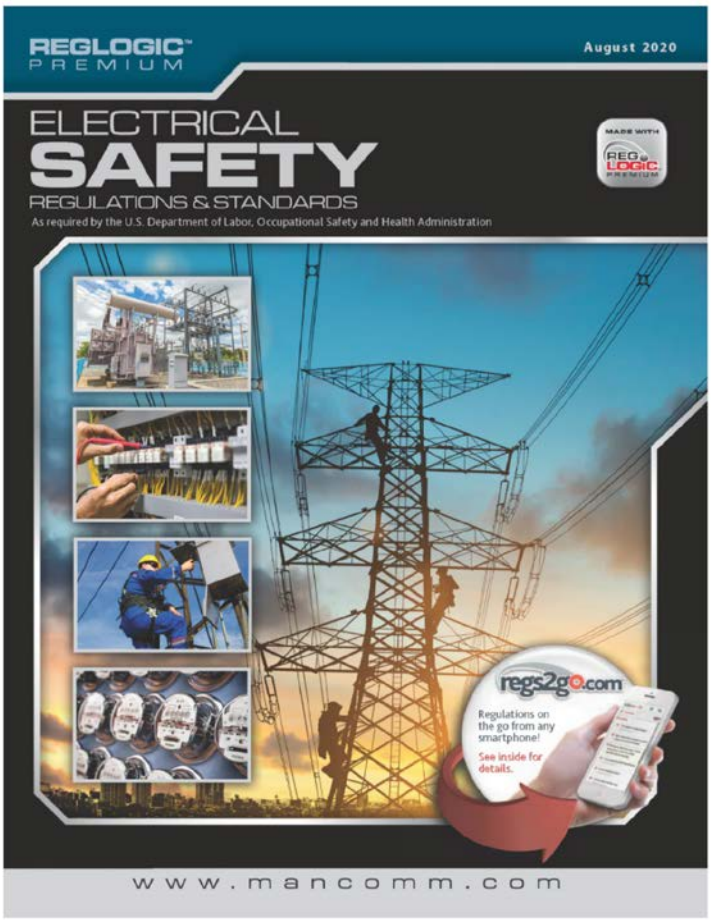
IEEE 3000 Standards: Fundamentals
Bridges the gap between the IEEE 3000 Standards Collection and the IEEE Color Books and provides fundamental guidance to the less experienced power systems engineer.
IEEE 3001 Standards: Power Systems Design covers material from IEEE Standards 141 (Red Book), 241 (Gray Book), and 602 (White Book)
IEEE 3002 Standards: Power Systems Analysis covers material from IEEE Standards 551 (Violet Book) and 399 (Brown Book)
IEEE 3003 Standards: Power Systems Grounding covers material from IEEE Standards 142 (Green Book) and 1100 (Emerald Book)
IEEE 3004 Standards: Protection & Coordination covers material from IEEE Standards 242 (Buff Book) and 1015 (Blue Book)
IEEE 3005 Standards: Energy & Stand-By Power Systems covers material from IEEE Standards 446 (Orange Book) and 739 (Bronze Book)
IEEE 3006 Standards: Power Systems Reliability covers material from IEEE Standard 493 (Gold Book)
IEEE 3007 Standards: Maintenance, Operations & Safety covers material from IEEE Standard 902 (Yellow Book)

10. Mancomm's OSHA 29 CFR 1910*

OSHA's mission is to ensure that employees work in a safe and healthful environment by setting and enforcing standards, and by providing training, outreach, education and assistance. Employers must comply with all applicable OSHA standards. They must also comply with the General Duty Clause of the OSH Act, which requires employers to keep their workplace free of serious recognized hazards. Our program utilizes manuals from https://mancomm.com.

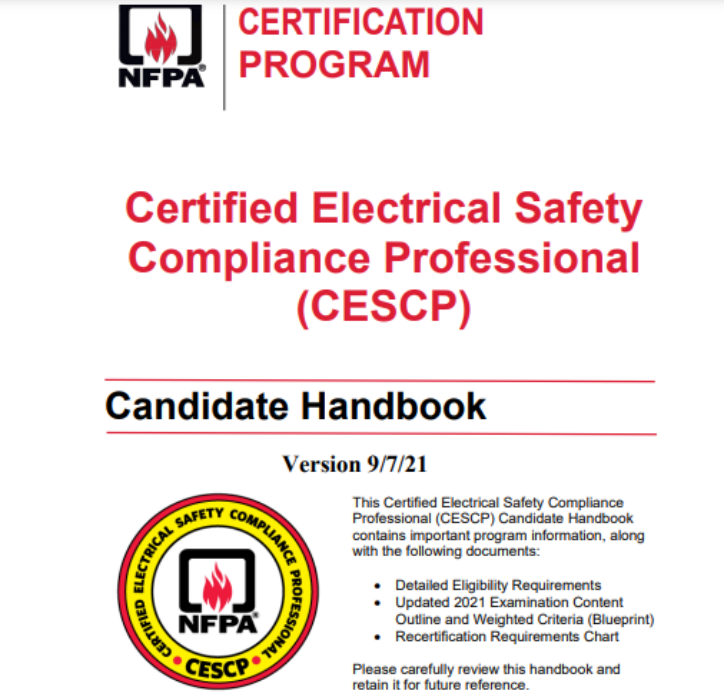
11. Mancomm's OSHA Electrical Safety: Regulations & Standards*

Mancomm's Electrical Safety: Regulations & Standards provides the federal regulations and standards workers need to know; it graphically formats the electrical regulations to make it easy to search for and quickly find all the information in the book or on a portable device. The parts and subparts cover the following: OSHA electrical standards, recognition of hazards related to electrical equipment and installations, grounding requirements, safety-related work practices and electrical protective equipment, industry-specific regulations, and more.



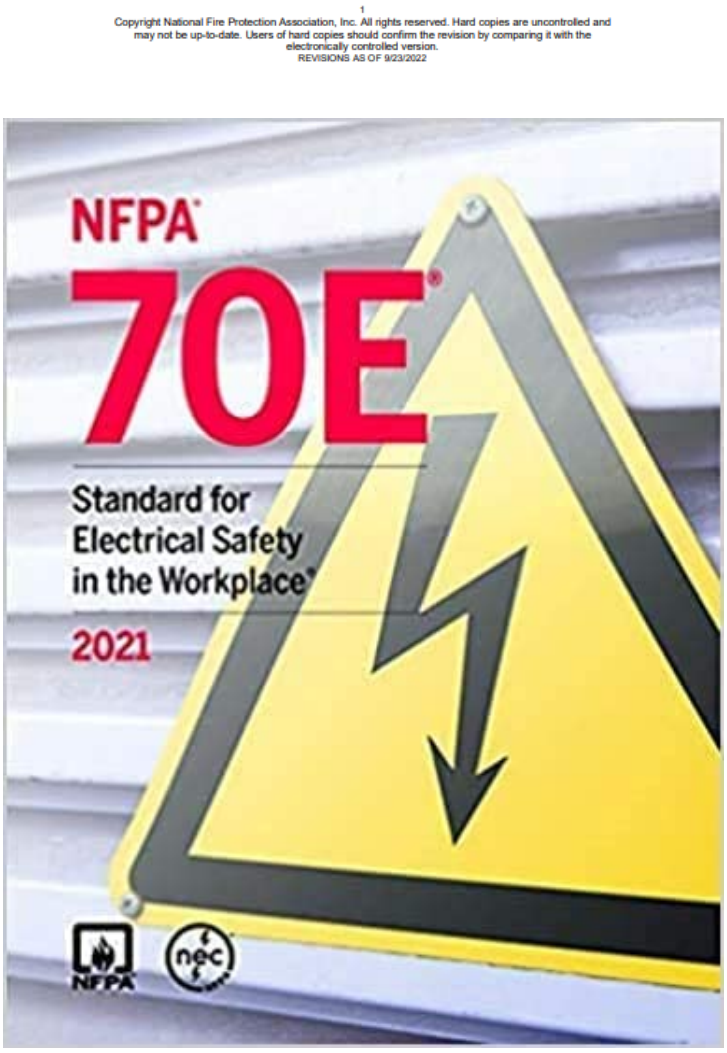
12. NFPA Certified Electrical Safety Compliance Professional (CESCP)*

The NFPA Certified Electrical Safety Compliance Professional (CESCP) certification program is designed to meet the needs of electrical and safety professionals who oversee electrical safety programs or who manage electricians and other personnel exposed to electrical hazards. It is also a useful credential for trainers and instructors, as it proves knowledge and competence in NFPA 70E.



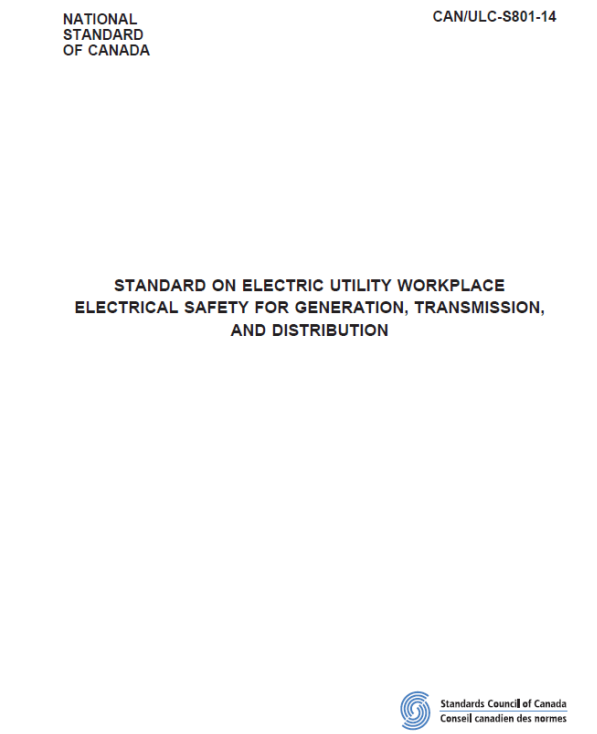
13. NFPA 70E, Standard for Electrical Safety in the Workplace®*

NFPA 70E, Standard for Electrical Safety in the Workplace®, is the quintessential resource for helping companies and employees reduce exposure to risks and reduce occupational injuries and fatalities. It was created to provide a document that meets the need of the Occupational Safety and Health Administration (OSHA) and is entirely consistent with the NEC and other applicable publications. NFPA 70E provides provisions that help comply with OSHA 1910 Subpart S and OSHA 1926 Subpart K. This essential standard for anyone with interest in ending electrical-related accidents, liability, and loss offers expert information on subjects ranging from safety-related work practices to special equipment and maintenance requirements. Informative Annexes provide in-depth coverage of personal protective equipment (PPE), developments in electrical design, risk assessment and control, human performance and electrical safety, and many other critical topics.



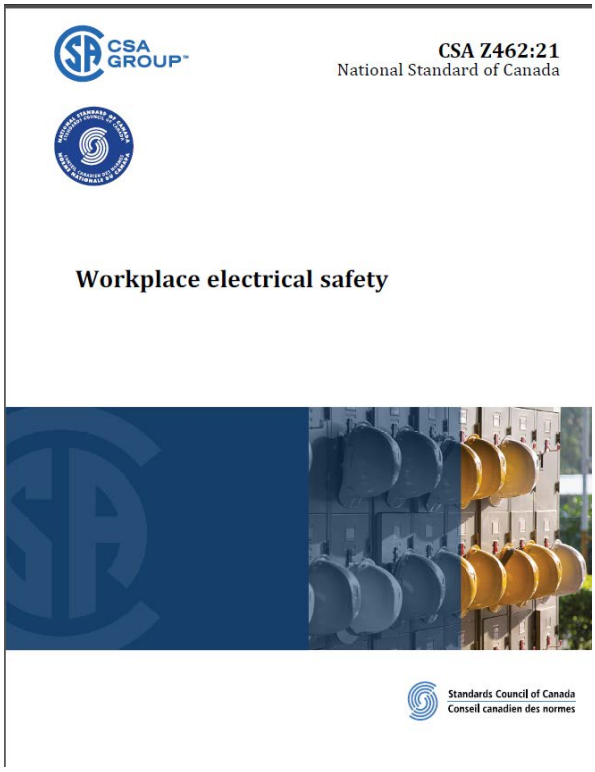
14. CAN/ULC-S801-14 STANDARD ON ELECTRIC UTILITY WORKPLACE ELECTRICAL SAFETY FOR GENERATION, TRANSMISSION, AND DISTRIBUTION*

This standard applies to the construction, operation, maintenance and replacement of electric utility systems that are used to generate, transform, transmit, distribute or deliver electrical power or energy to consumer services or their equivalent. The purpose of this Standard is to provide safety performance requirements for electric utilities, workers and employers involved in work on or near electric generation, transmission and distribution systems with voltage levels up to 800 kV AC line-to-line (L-L) and 600 kV DC.



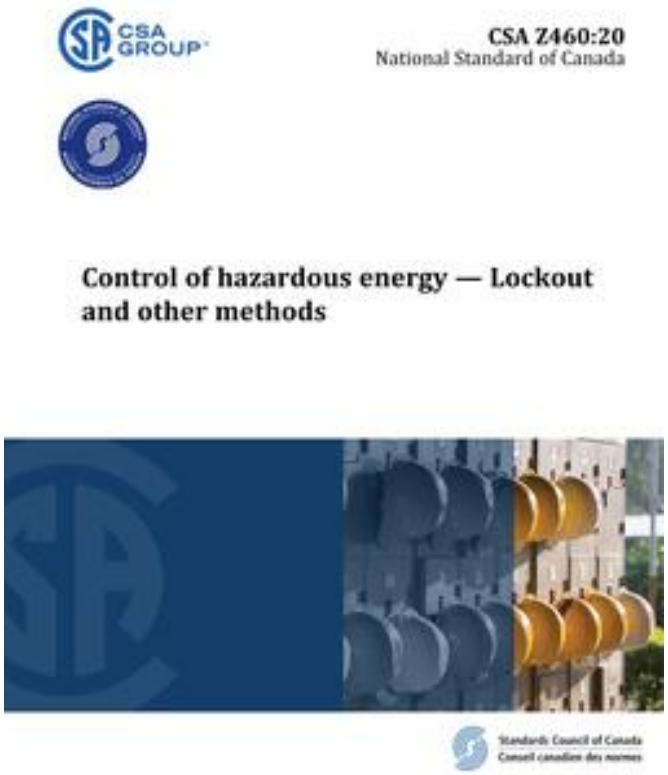
15. CSA Z462:21 Workplace electrical safety*

CSA Z462:21 is based on NFPA 70E, Standard for Electrical Safety for the Workplace, and has been harmonized with Parts I, II, and III of the Canadian Electrical Code; CSA Z460, Control of hazardous energy — Lockout and other methods; and CSA M421, Use of electricity in mines. This Standard specifies requirements for and provides guidance on safety management systems, safe work procedures, and selection of personal protective equipment and other safety devices for persons exposed to hazards associated with energized electrical equipment. In addition, this Standard sets out criteria for the identification and training of qualified electrical workers and for determination of hazardous work to be performed only by those qualified individuals.



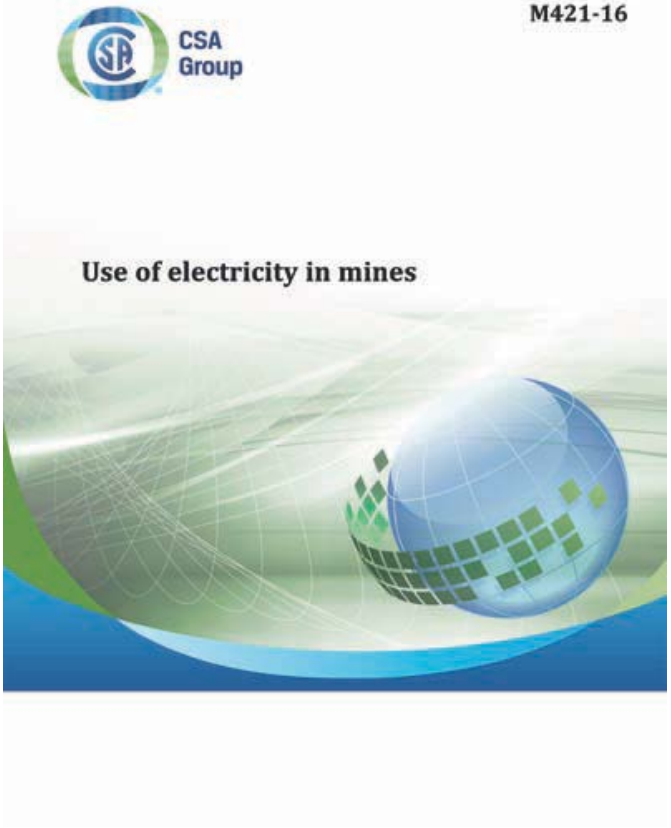
16. CSA Z460, Control of hazardous energy*

Lockout and other methods specify requirements for controlling hazardous energy associated with potentially harmful machines, equipment, and processes including mobile machinery and equipment. The purpose of this Standard is to specify requirements and performance objectives for procedures, techniques, designs, and methods to protect personnel from injury from the inadvertent release of hazardous energy.



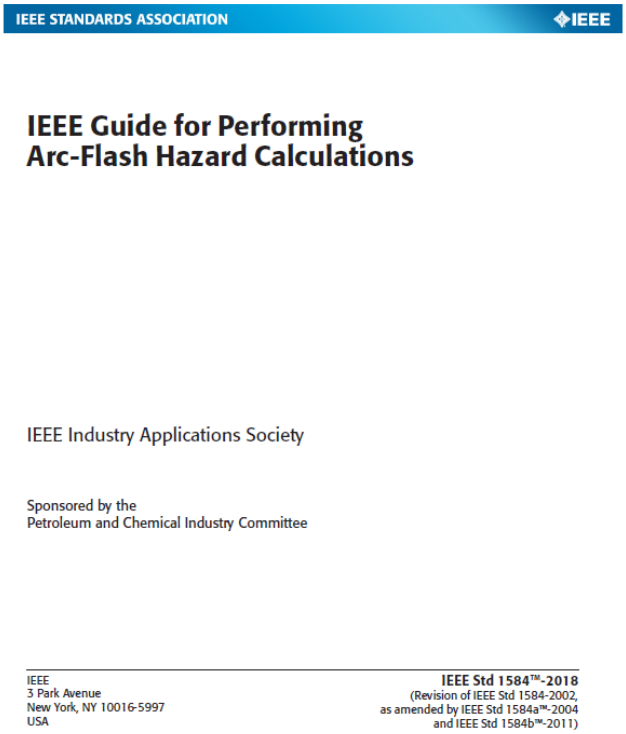
17. M421-16 Use of electricity in mines*

This standard establishes minimum requirements for electrical work and electrical equipment operating, or intended to operate, at surface mines, underground mines and quarries.



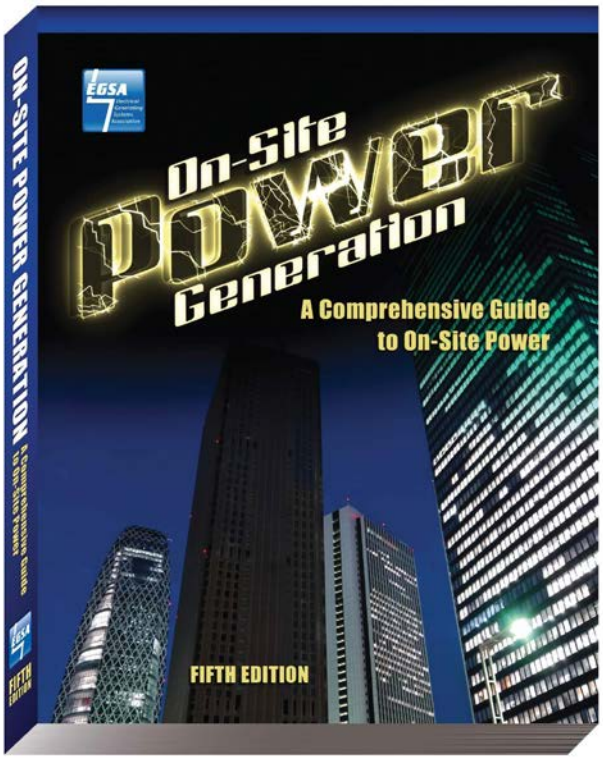
18. IEEE 1584-2018 Guide for Performing Arc-Flash Hazard Calculations

This standard provides models (ARC FLASH IE AND IARC CALCULATORS*) and an analytical process to enable calculation of the predicted incident thermal energy and the arc-flash boundary. The process covers the collection of field data if applicable, consideration of power system operating scenarios, and calculation parameters. Applications include electrical equipment and conductors for three-phase alternating current (ac) voltages from 208 V to 15 kV. The purpose of the guide is to enable qualified person(s) to analyze power systems for the purpose of calculating the incident energy to which employees could be exposed during operations and maintenance work.



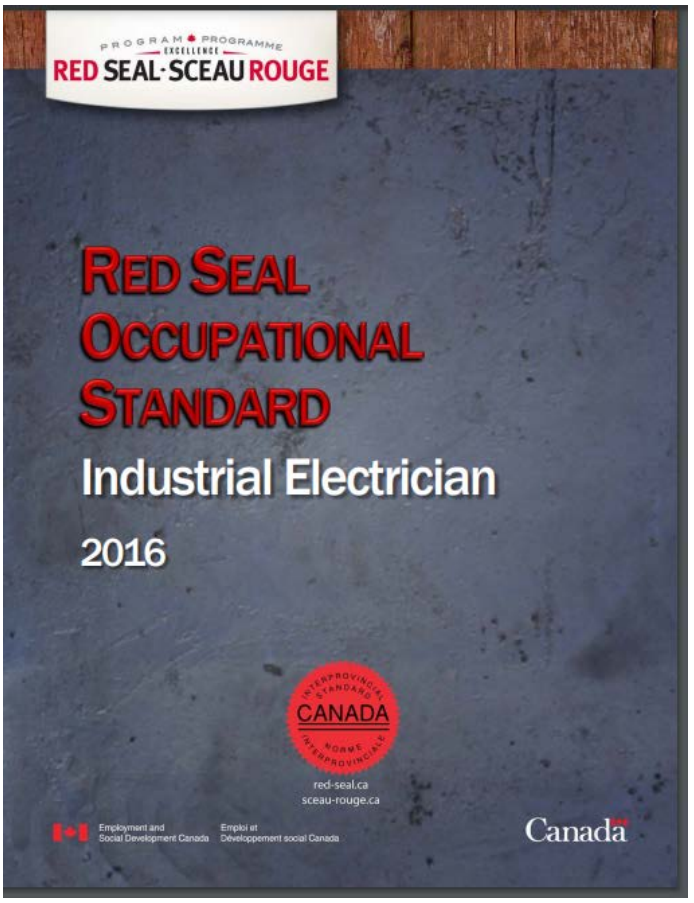
19. EGSA's On-Site Power Generation: A Comprehensive Guide to On-Site Power*

The Electrical Generating Systems Association (EGSA) is the world's largest organization exclusively dedicated to On-Site Power Generation. EGSA focuses specifically on "on-site electric power generation," which can be defined as: any method of producing power that will be used on or near the site at which it is generated. This includes demand response, prime power, and many others. It even encompasses alternative power sources such as wind, solar, and fuel cells. One of EGSA's prime functions is to participate in the writing of national standards involving the use of on-site power, e.g. The National Electrical Code. These standards include code listings, glossaries, and guides. EGSA's On-Site Power Generation: A Comprehensive Guide to On-Site Power book is usually referred to as the reference book or the "bible" of the industry and is used by technicians preparing for the Apprentice and Journeyman EGSA Technician Certification tests.



20. Red Seal Industrial Electrician*

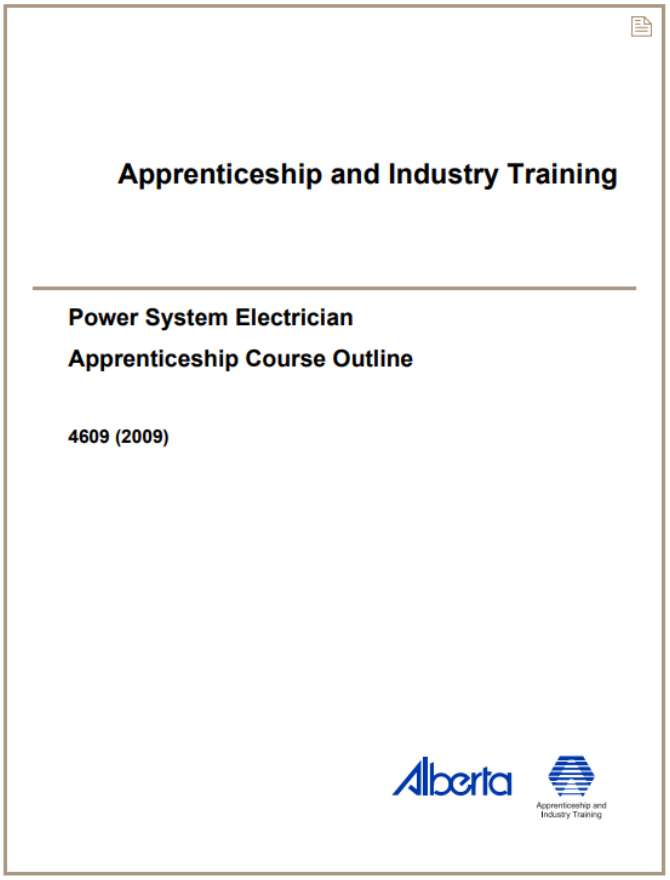
The Red Seal Program sets common standards to assess the skills of tradespeople across Canada. The Red Seal Industrial Electrician standard covers tasks performed by an industrial electrician. Industrial electricians install, maintain, test, troubleshoot, service and repair industrial electrical equipment and associated electrical protection and controls. These include equipment or components directly or indirectly exposed to electrical power such as motors, generators, pumps and lighting systems. Industrial electricians are employed by utilities, electrical contractors and maintenance departments of plants, mines, manufacturing facilities, government and other industrial establishments.



21. Alberta Power System Electrician*

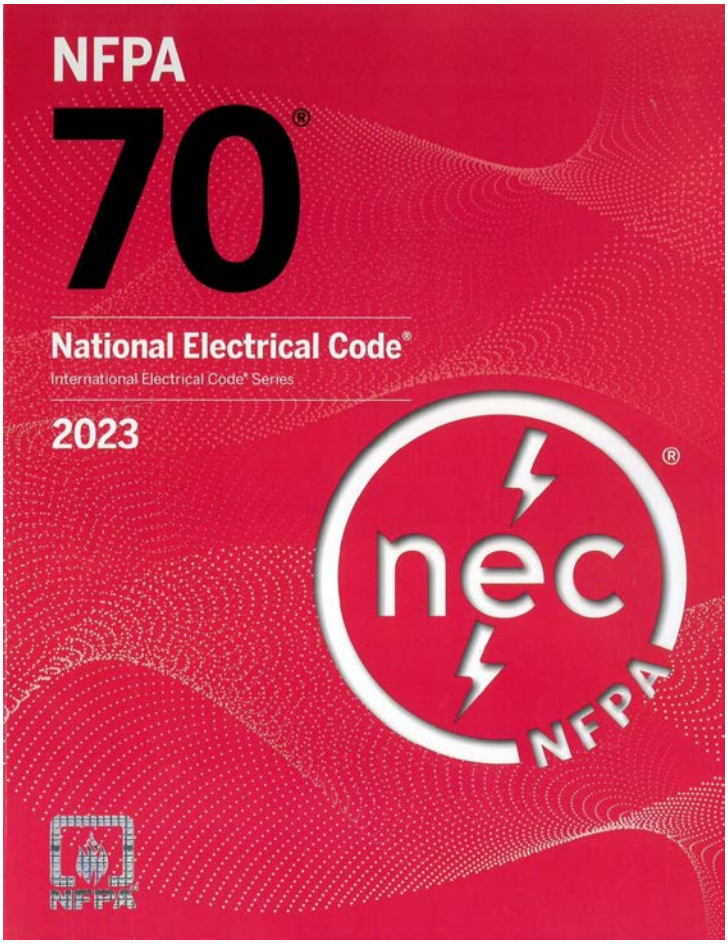
Alberta's Skilled Trades System - apprentices, post-secondary institutions, employers and government work together to create a training system that is industry-focused, resulting in a highly skilled, internationally competitive workforce.

Power System Electricians are employed in the utility, industrial, oil and gas, and renewable energy sectors. The duties include the installation, maintenance and repair of electrical power generation (including coal, natural gas and renewable energy), transmission and distribution systems and equipment. They work in the distinct areas of power generation, substation equipment, protection and control, and metering. Alberta registered apprentices who wish to advance and progress in their apprenticeship program have the following option to challenge the exam for that period of apprenticeship.



22. NFPA 70®, *National Electrical Code*® (NEC®)**

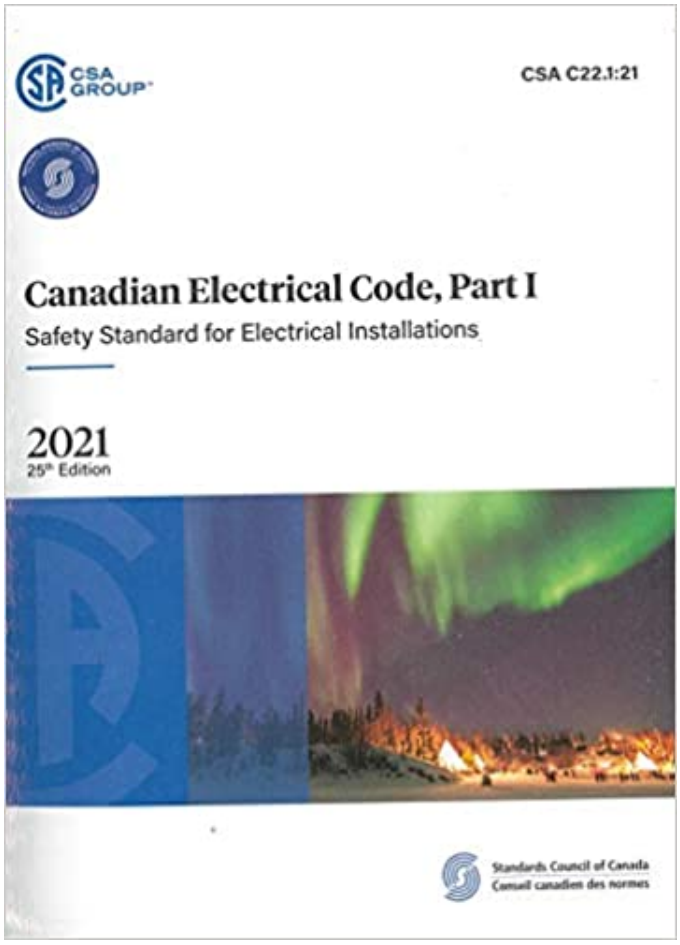
NFPA 70®, *National Electrical Code*® (NEC®), sets the foundation for electrical safety in residential, commercial, and industrial occupancies around the world. It is consistently reviewed and updated with input from active professionals in the field to help professionals stay ahead of the curve and, more importantly, safer on the job. Adopted in all 50 states, NFPA 70, National Electrical Code (NEC) is the US benchmark for safe electrical design, installation, and inspection to protect people and property from electrical hazards.



23. Canadian Electrical Code C22 Part 1**

The Canadian Electrical Code C22 Part 1 is adopted across Canada as the regulation for the installation and maintenance of electrical equipment. It is integrated with CSA electrical equipment standards (collectively known as the Canadian Electrical Code, Part II) to ensure that electrical products evaluated in accordance with the applicable Part II standard are suitable for installation in accordance with the Rules of Part I. The object of this Code is to establish safety standards for the installation and maintenance of electrical equipment. In its preparation, consideration has been given to the prevention of fire and shock hazards, as well as proper maintenance and operation.

Graduates will be prepared to challenge electrical certification in the country of their choosing. *



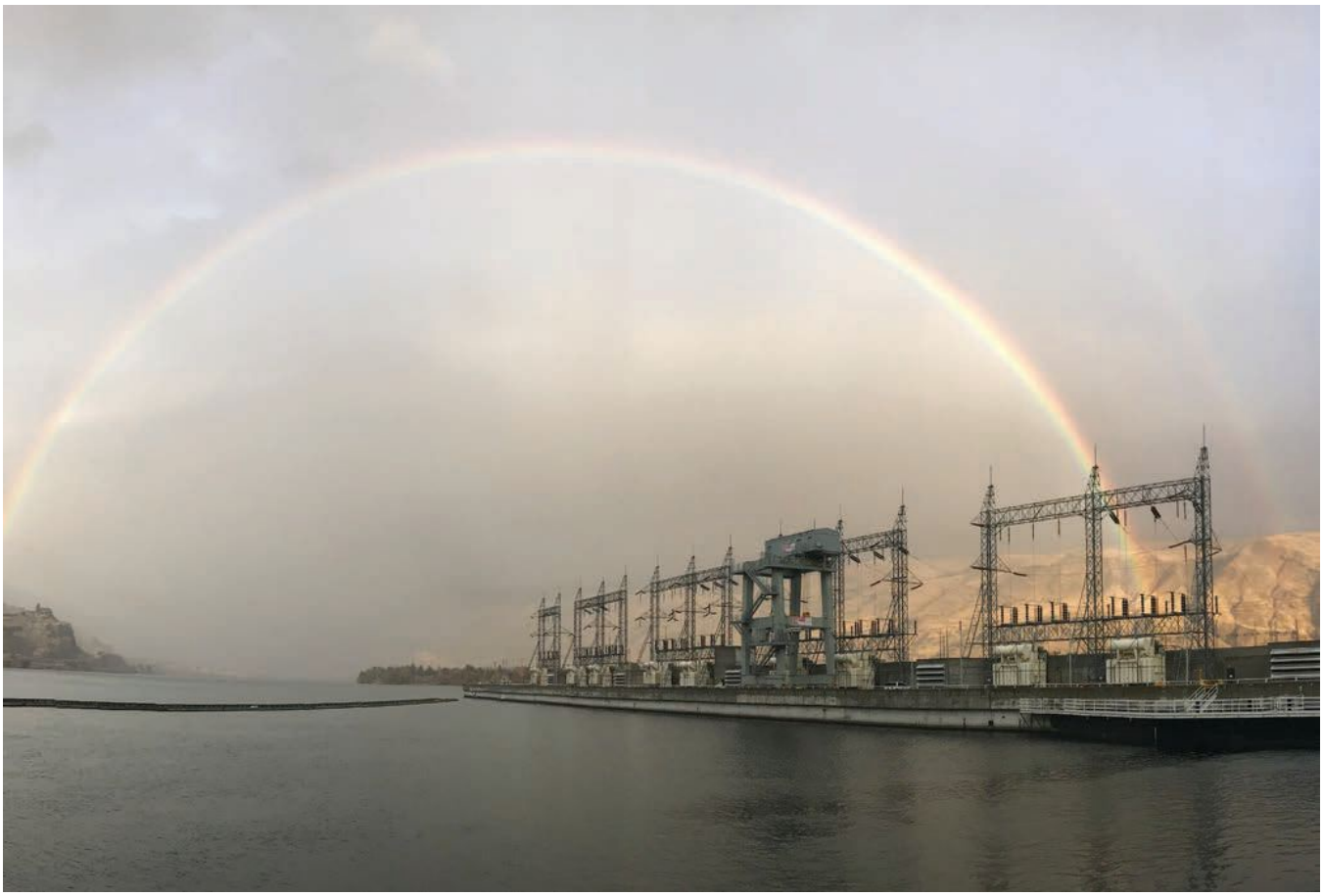
Summary

Graduates from this program will never lack work. It would take a decade to acquire many of these skills and some would never be gained.

Companies sending their engineers to this training will save tens of thousands of dollars in human development costs and countless thousands in outsourcing, downtime and rework.

Electrical Test Engineer

1,000 Hour
Training Program



Presented by Canada Training Group International, Inc

In association with:

US Canada Training Group, Inc
Centuries of Leadership Development, Inc,
Dolphin87 Assessment Systems, Inc, and,
Evergreen Management Consultants, Inc.

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