TECHNICAL TRAINING SOLUTIONS

2027

PROVIDING PRACTICAL ENGINEERING SKILLS TRAINING FOR INDUSTRY



Technical Training Solutions is an engineering skills training company that has been providing training courses since 1980.

LEARNING BY DOING

Training courses created by Technical Training are designed to be relevant to the candidate's needs and delivered in an interesting and enjoyable way.

All unnecessary theory and academic observations are dispensed with - only those aspects that directly underpin the knowledge and skills specified in the course objectives are covered.

The courses employ lots of practical activities where candidates are given the opportunity to 'learn by doing'.

The use of real industrial components in practical exercises ensures that the experiences are realistic and industrially relevant.

This is made possible by a large investment in equipment used on the courses and the industrial experience, professionalism and dedication of our instructors.

COURSE DESCRIPTIONS

Technical Training Solutions describe their courses in straight-forward, clear terms, so that managers and prospective candidates can ensure that the courses are suitable and that they will lead to the acquisition of skills beneficial to their organisation. The courses shown in this brochure are all described using this straight-forward approach.

More detailed descriptions are available online.

THE COURSES

The courses provide candidates with the skills needed to design, maintain and install industrial and commercial systems, safely and in compliance with current Regulations.

For convenience we have divided the courses into the industry standard categories of Electrical, Instrumentation and Mechanical.



TESTIMONIALS

"Colleagues in Ashford say they are better prepared to do their job after praising the standard of an electrical maintenance course, designed specifically for them. It was met with a great response, with Training Manager Alex McFarlane declaring the training, which has been completed by 70 colleagues, an overwhelming success. "The best thing is being able to make it bespoke for our own needs, working with Tech Training to make it applicable to our everyday work. The skills that colleagues learned are very transferable to challenges faced on the frontline." Within 20 minutes of starting, each group is up and tackling wires on a circuit board. "This was hugely important training and the fact they are learning by doing is all the better" said Alex.
Extract from an article in Hitachi Rail's FUSION magazine

"The courses were targeted at the right level and by concentrating on the subject areas over the duration of a short course the trainees learned far more effectively than on a day release system or using self-study packages."
Bryan Dods, Training Project Co-ordinator (Engineering), UKAEA Dounreay

"We contacted several training providers and from the beginning it was clear that Technical Training was an excellent training company. The training was delivered to a very high standard, feedback was extremely positive, and the delegates have already put into practice what they learned."
Barry Kelly, Operations Manager
James Neill, Allied Mills

"Everyone passed their City & Guilds examinations, and it is a credit to the instructor at Technical Training Solutions. His teaching skills ensured that such a good result was achieved. We were delighted with the results of the training."
Bill Funnell, Process Control Engineer
Timet UK Ltd

"Thanks for coming to Eastbourne today. I got great feedback from the guys, they were impressed with how you didn't rush and explained the course content very well. They have been chatting about it all afternoon, always a good sign. They have been asking all the right questions of me, how does the trust carry out this etc. Thank Garry again, it is good to see a company like yourselves having a vast array of both electrical and mechanical courses suited to engineering maintenance. Thanks again."
Ian Snashall
Maintenance Supervisor (Electrical),
Eastbourne District General Hospital

"Thanks to the Team at Technical Training Solutions for the St Lucia Project. You all are definitely making waves in this Caribbean Island of St Lucia! My thanks go out to the Electrical Team at Tech Training for providing and delivering well structured courses through competent tutors and effective teaching methods. The training provided me with relevant skills and sound knowledge to become well versed and more competent in my field. It was well worth the trip from St Lucia (Caribbean) to the UK. Thanks to the entire team at Tech Training for making my experience from start to finish a satisfied and comfortable one."

Clive Antoine, Electrical Engineering Experts St Lucia

"Just wanted to say thank you for a brilliant 2 week course! You have taken me from a person who had no real knowledge of how electrics in an industrial context worked to being confident in understanding how many electrical systems function and understanding how and why they can fail and how to fix them. Lee was an excellent teacher who had the gift of being able to explain how and why components worked together. Thank you again - I certainly would recommend your company to any person who requires training in this field of operations and will not hesitate to send my staff to you for training in this field of expertise."

Tim Ogborne, Rotatrim Ltd

Peter Carey approached TTS 10 years ago when the Manchester factory had a specific need for a safe line breaking training course. "As you can imagine, the factory here is full of pipework systems that transport steam, compressed air and hot process materials such as syrup around the plant. To comply with safety legislation and to reduce the risk of injury when cleaning, repairing or maintaining pipework, we decided to look for a suitable line breaking training course. However, finding a suitable course was much more difficult than we expected." After searching online, Peter came across TTS. Although at the time TTS did not have a specific training course on line breaking, he asked if one could be developed. "We did some training requirements analysis to see exactly what we needed in terms of specific training. TTS took this information away and developed a course from scratch that precisely met our needs". Peter added: "Over the last eight years, more than 100 of our staff have attended the line breaking training from TTS and the feedback we've received has been excellent. Candidates enjoy the mix of theoretical and practical assessments, particularly the training simulation rigs, as they can go onto the factory floor afterwards and put what they've learned into practice by doing risk assessments on pipework."

Peter Carey, Technical & Reliability Manager Kellogg


ABB Motors
CE
C.l.F IP 55 IEC 34
Motor: 3~
Cos
Hz
rpm
kW
50
V 380-420 Y / 220-240 Δ
V 440-480 Y / 250-280 Δ 60

ELECTRICAL

The Electrical courses relate to work on industrial equipment like motors and heaters and their control panels, commercial power systems and fire alarms. There are also various courses about the Regulations related to working safely with electrical systems.

INDUSTRIAL ELECTRICAL MAINTENANCE	110	10 DAYS	8
PAT TESTING	160	1 DAY	9
FIXED EQUIPMENT TESTING	170	1 DAY	10
18TH EDITION IET WIRING REGULATIONS: BS 7671	310	4 DAYS	11
ELECTRICAL INSPECTION AND TESTING	340	4·5 DAYS	12
DESIGN OF ELECTRICAL INSTALLATIONS	350	5 DAYS +	13
ELECTRICAL SAFETY MANAGEMENT	360	0·5 DAY	14
TEMPORARY ELECTRICAL SYSTEMS: BS 7909	370	1 DAY	15
ELECTRICAL SAFETY ON CONSTRUCTION SITES: BS 7375	375	1 DAY	16
ELECTRICITY AT WORK (EAW) REGULATIONS	380	1 DAY	17
ATEX: EXPLOSIVE ATMOSPHERES / HAZARDOUS AREAS	390	1 DAY	18
ELECTRICAL DUTY HOLDER (AUTHORISED PERSON)	400	2 DAYS	19
ELECTRICAL ISOLATION & LIVE WORKING	420	1 DAY	20
FIRE ALARM SYSTEM DESIGN	460	2 DAYS	21
FIRE ALARM SYSTEM INSTALLATION AND MAINTENANCE	470	2 DAYS	22

INDUSTRIAL ELECTRICAL MAINTENANCE

Course 110 - 10 Days
Max 8 Candidates

This course is designed to provide basic electrical skills to those who need to perform first-line electrical maintenance tasks – including the safe isolation, replacement and testing of a range of common electrical devices (motors, sensors, heating elements, solenoids, etc) in a safe and effective manner. Importantly, the format of the course is specifically designed so that, when combined with suitable on-site consolidation of training, it will assist the maintenance manager in meeting the legal requirements for employee competence in electrical work.

PARTICIPANTS

No prior electrical knowledge is assumed. The structure and content of the course is aimed at those who currently fulfil a maintenance role, for example mechanical fitters. Many companies use this course to help introduce flexibility to their workforce, as part of a multi-skilling programme.

COURSE PRESENTATION

The course has an extensive 'hands-on' approach, placing emphasis on safe working practice and on the development of useful, practical skills. Comprehensive course notes are provided. Candidates with prior electrical knowledge may attend a shortened version of this course. An eligibility assessment is available on request.

COURSE OBJECTIVES

On completion of the course, participants will be able to:

- practice safe working methods on electrical systems
- understand the relevant regulative requirements
- demonstrate an understanding of electrical principles and units
- identify a wide range of electrical equipment & devices and understand their principles of operation and connections
- understand the principles of earthing / protection and associated protective devices
- demonstrate an understanding of electrical systems, switchgear and circuit types
- diagnose basic faults and recognise their associated symptoms
- work with a range of cable types and carry out correct terminations and connections
- recognise the most common industrial motor types and understand their operation, connections and maintenance requirements
- use electrical test equipment to fault-find and test a range of motors, solenoids, circuits and cables (using multimeters, insulation resistance testers, continuity testers & clamp meters)
- identify motor and power circuit faults
- use circuit diagrams as an aid to maintenance
- access electrical enclosures and replace fuses, reset overloads etc
- perform electrical isolation, testing for dead, etc on a wide range of devices and circuits safely.

Successful completion of the course leads to the award of the Technical Training Solutions Certificate of Competence 110: Industrial Electrical Maintenance.

PAT TESTING

Course 160 - 1 Day
Max 8 Candidates

It is a legal requirement that all electrical equipment (including portable appliances) used at work shall be adequately maintained. In order to meet this requirement, appliances should be inspected and tested at regular intervals. This course provides participants with an understanding of the legal requirements and the expertise to carry out the inspection and testing competently.

PARTICIPANTS

Ideally suited for participants with an appreciation of basic electrical concepts who are involved in either a maintenance or a contracting role and who need to undertake the inspection and testing of electrical equipment. The course is also suitable for participants with no electrical experience, as suitable guidance and support is provided.

COURSE PRESENTATION

There is a high 'hands-on' content within the course, with ample opportunity for participants to use a wide range of leading PAT testers. Comprehensive course notes are provided.

COURSE OBJECTIVES

On completion of the course, participants will be able to:

- understand the dangers associated with PAT testing
- recognise the precautions necessary both for safety – and for the protection of equipment
- understand the legal requirement for testing portable appliances
- assess the required frequency of inspection and testing
- understand the importance of specific identification of equipment
- recognise the testing requirements for different classes of equipment
- carry out visual inspection of appliances and equipment
- carry out the following tests using a wide range of proprietary PAT testers:
  - earth continuity
  - insulation resistance
  - load test
  - earth leakage
- correctly interpret test results and determine appropriate pass levels
- maintain a system of record keeping.

Successful completion of the course leads to the award of the Technical Training Solutions Certificate of Competence 160: PAT Testing.

FIXED EQUIPMENT TESTING

Course 170 - 1 Day
Max 8 Candidates

Where do Portable Appliance Testing and Electrical Inspection and Testing meet?

Hard-wired machinery needs to be electrically safe, not only for the employees but also for the system to which it is connected. There is a legal requirement for this to be so and this course is intended to fill the void that exists between plugged-in appliances and equipment connected via isolators, fused outlets or terminal boxes. This course covers the testing and inspection of equipment that is used frequently on site but is not classed as portable.

PARTICIPANTS

This is not an entry-level course. Electrical competence is assumed, such as that gained by completing course 110 or equivalent. A knowledge of the Electricity at Work Regulations and Portable Appliance Testing would also be advantageous - see course Nos 380 and 160.

COURSE PRESENTATION

This is a hands-on course. Continuity and Insulation testers will be used and isolation methods will be discussed and practiced.

COURSE OBJECTIVES

On completion of the course, participants will be able to:

- state the legal requirements for inspection and testing
- apply safe working practices and control measures
- recognise the importance of company policies and procedures
- carry out electrical isolations in a range of scenarios
- perform earth continuity testing
- perform insulation resistance testing
- describe common faults that could be encountered
- describe how records of inspection and testing should be kept.

Successful completion of the course leads to the award of the Technical Training Solutions Certificate of Competence 170: Fixed Equipment Testing.

18TH EDITION IET WIRING REGULATIONS

CITY & GUILDS 2382

Course 310 - 4 Days inc Exam Max 8 Candidates

The industry-standard qualification for all installation electricians and also increasingly regarded as essential for those involved in (or supervising) electrical work. The legislation regarding employee competence in electrical work requires that anyone involved in certain electrical activities – for example, selecting sizes of cable or types of fuse – must be aware of the requirements of the Regulations.

PARTICIPANTS

Ideal for all those involved in electrical work of any kind. Participants should have an understanding of electrical principles together with an appreciation of electrical installation work practice.

COURSE OBJECTIVES

This course is designed to provide participants with the knowledge necessary to successfully sit the City & Guilds 2382-22 examination, as well as gaining useful information about the technical issues in the Regulations that will help in their work activities. The thorough grounding provided by this course will also properly prepare candidates to progress on to the other City & Guilds courses (the inspection and testing and design courses).

COURSE PRESENTATION

The course is presented in a helpful and informative way, making frequent reference to typical electrical design problems and offering practical solutions. Students are loaned copies of the IET 18th Edition Regulations for use during the course – and are provided with a free copy of the Electrician's Guide to Good Electrical Practice. Success rates in the City & Guilds examination are currently around 98%.

On completion of the course, participants will understand:

- the regulative requirements
- the scope and object of the Regulations
- the fundamental requirements for safety
- the definitions and terms used in the Regulations
- how protection for safety is achieved
- the correct methods of selection and erection
- the requirements for special locations
- how inspection and testing should be carried out
- how to use the Regulations in the design, construction and maintenance of installations.

Successful completion of the course leads to the City & Guilds 2382-26: Level 3 Award in the Requirements for Electrical Installations (BS 7671: 2018).

ELECTRICAL INSPECTION & TESTING

CITY & GUILDS 2391

Course 340 - 4·5 Days inc Exams Max 8 candidates

Aimed at electrical personnel who either carry out or supervise the testing and inspection of installations, this course is designed for candidates who require the City & Guilds 2391 qualification. Most importantly, participants gain the skills and knowledge necessary to actually perform the inspection and testing procedures. The course also satisfies the NICEIC & ECA requirements for Qualified Supervisor status. The course incorporates a practical assessment and a theory examination.

PARTICIPANTS

Prospective candidates should have recently completed the IET Wiring Regulations (City & Guilds 2382) qualification, see course 310.

COURSE PRESENTATION

The emphasis is on achieving success and Technical Training pride themselves on their success rate in the examinations. Participants are able to practice on purpose-built training rigs of simulated electrical installations. Full course documentation is provided.

PRACTICAL INSPECTION & TESTING

During the course, candidates learn how to inspect and test using training rigs that simulate real electrical installations, using the test equipment provided or their own.

Candidates then complete the C&G practical assessment.

THEORY OF INSPECTION & TESTING

During the course, candidates learn about the complex background technical information concerning the many issues associated with inspection and testing. Many practical examples of the types of questions that might come up in the examination are provided and advice on how these should be answered is provided.

Candidates then complete the C&G theory examination.

Successful completion leads to the City & Guilds 2391-52: Level 3 Award in the Initial & Periodic Inspection and Testing of Electrical Installations.

Some of our customers prefer to learn about electrical inspection and testing without undergoing the C&G examinations. For information on the non-C&G version of this course, please enquire about course No 345: The TTS-Certified Electrical Inspection & Testing course.

DESIGN OF ELECTRICAL INSTALLATIONS

CITY & GUILDS 2396

Course 350 - 5 Days
inc Exam + Project
Max 8 candidates

This course provides participants with all the necessary skills and knowledge to design electrical installations. The ability to design is required before new installations are constructed and also when additions or alterations to existing installations are required.

The course develops the knowledge and ability of the candidates to the required level of competence for them to sign the Electrical Installation Certificates required by BS7671.

PARTICIPANTS

The course is intended for candidates who have already attended the 18th Edition / C&G 2382 (Course 310) and the Inspection, Testing & Certification / C&G 2391 (Course 340). The course builds on the knowledge and skills that candidates have gained from these courses.

COURSE PRESENTATION

Instructor-led practical examples of how electrical installations should be designed are given. The course consists of several design exercises for the candidates to carry out, which evaluate and explore the process of design in terms of general characteristics, protection for safety, and selection and erection. Comprehensive course notes are provided.

COURSE OBJECTIVES

On completion of the course, participants will be able to:

- design electrical installations, performing all necessary calculations
- verify that a design complies with the Regulations
- conduct an initial verification of a new electrical installation
- conduct an initial inspection of an electrical installation
- design, verify and inspect electrical installations in compliance with current safety legislation and BS 7671.

Candidates need to complete two components to achieve this qualification:
1 A 3-hour written examination paper set and marked by C&G
2 A 40-hour tutor-assessed design project.

Successful completion of the course leads to the City & Guilds 2396: Level 4 Award in the Design & Verification of Electrical Installations.

Some of our customers prefer to learn about electrical design without undergoing the C&G examination. For information on the non-C&G version of this course, please enquire about course No 355: The TTS-Certified Electrical Design course.

ELECTRICAL SAFETY MANAGEMENT

Course 360 - 0·5 Day
Max 8 Candidates

We know that there is a risk of injury when using electricity - but there are also issues such as disruption to business, financial penalties and prosecutions - which can impact on the positive aspects of day to day working. The IET have recognised this and have created a code of practice to give structure to managing electrical systems through safe principles of working.

PARTICIPANTS

This course is intended for Engineering and Maintenance Managers and other employees who have responsibilities for policies / procedures or the allocation of work or the condition of equipment. Prospective candidates should have recently attended the course on the EAW Regulations, see course 380.

COURSE PRESENTATION

During the presentation, candidates will explore the code of practice, reinforce their knowledge of management tools to assist in the electrical control issues and complete the self assessment evaluation for their business.

COURSE OBJECTIVES

On completion of the course, participants will understand:

- how to apply the IET Code of Practice
- how the code of practice impacts on policies, procedures and people
- how competence should be verified
- the control measures that may need to be employed against the hazards of electricity
- how to conduct a self-assessment of a company's electrical safety system
- how to interpret results and gather information to provide continuous improvement.

Successful completion of the course leads to the award of the Technical Training Solutions Certificate of Achievement 360: Electrical Safety Management.



TEMPORARY ELECTRICAL SYSTEMS

Course 370 - 1 Day
Max 8 candidates

BS 7909

This course deals with the requirements of BS 7909 - The Code of Practice for the creation and operation of Temporary Electrical Systems for Entertainment and Related Purposes. BS 7909 is used in a huge range of events beyond the scope of the IET Regulations. The Standard outlines the necessary management arrangements and the required range of electrical supplies, heavy-duty flexible cables and portable distribution units needed. The systems used range from very simple to highly complex and the Standard gives recommendations for all temporary electrical systems.

PARTICIPANTS

The course is intended for all those involved in electrical work that is required to comply with BS 7909. For candidates expecting to gain the necessary understanding to allow them to do work in temporary installations, an understanding of electrical principles together with an appreciation of electrical installation working practices is a pre-requisite of the course, and these participants should possess a recent City & Guilds 2382 qualification (IET Wiring Regulations, BS 7671 - Course No 310). For studio managers, production directors and other non-electrical candidates who need to gain an understanding of the Standard without the need to actually perform electrical work in temporary installations, there are no pre-requisites to the course.

COURSE PRESENTATION

The course is presented in a helpful and informative way, making frequent reference to the typical electrical problems encountered in these systems and offering practical solutions. Students are loaned copies of BS 7909 for use during the course – and are provided with Technical Training Solutions' course notes which provide explanations of the various requirements.

COURSE OBJECTIVES

This course is designed to provide participants with the knowledge necessary to successfully sit Technical Training Solutions' multiple-choice examination, as well as gaining useful information about the technical issues in the Standard that will help in their own work activities. On completion of the course, participants will understand

- the required management arrangements
- the meaning of 'small/simple' and 'large/complex' events
- the cables and connectors required
- the earthing and bonding arrangements required
- the requirements for RCDs
- why earth fault loop impedance and voltage drop limits are important
- how inspection and testing should be performed and the documentation required.

Successful completion of the course leads to the award of the Technical Training Solutions Certificate of Achievement 370: Temporary Electrical Systems - BS 7909.

ELECTRICAL SAFETY ON CONSTRUCTION SITES

Course 375 - 1 Day
Max 8 candidates

BS 7375

This course deals with the requirements of BS 7375: 2010 - The Code of Practice for the distribution of electricity on construction and demolition sites. BS 7375 complements the requirements of BS 7671: IET Wiring Regulations. The Standard outlines the necessary arrangements relating to materials, appliances and components, the required range of electrical supplies, system design and work on and off-site.

PARTICIPANTS

The course is intended for those involved in electrical work that is required to comply with BS 7375 or for construction and project managers who need to gain an understanding of the Standard without the need to actually perform electrical work on construction sites.

COURSE PRESENTATION

The course is presented in a helpful and informative way, making frequent reference to the way the Standard relates to practical issues. Students are loaned copies of BS 7375 for use during the course – and are provided with Technical Training Solutions' course notes which provide explanations of the various requirements.

COURSE OBJECTIVES

This course is designed to provide participants with the knowledge necessary to understand the information about the electrical construction site safety in the Standard that will help in their own work activities and ensure compliance with the H&S issues.

On completion of the course, participants will understand:

- how power should be distributed on a construction site
- the requirements of the Wiring Regulations regarding construction sites
- the electrical equipment and accessories that should be used
- the requirements for plugs, socket outlets and cabling on construction sites
- the safe working practices, signs and notices required
- how inspection and testing should be performed and the documentation required.

Successful completion of the course leads to the award of the Technical Training Solutions Certificate of Achievement 375: Electrical Safety on Construction Sites (BS 7375).

ELECTRICITY AT WORK REGULATIONS

Course 380 - 1 Day
Max 8 candidates

What makes a person legally competent to do electrical work? In what way is the requirement for competency in electrical work more stringent than for other types of work? Who is responsible for ensuring that electrical tasks at work are carried out correctly? When is it legally permissible to work live? These are just some of the questions dealt with on this informative course – essential for all electrical engineers, electricians, supervisors – indeed anyone who works with electricity.

PARTICIPANTS

This course is essential for anyone involved in any form of electrical work including those who are responsible for supervising the electrical work activities of others.

COURSE PRESENTATION

This important subject is illustrated throughout by reference to real-life situations and practical applications. Comprehensive course notes are provided.

COURSE OBJECTIVES

On completion of the course, participants will have a thorough understanding of the current legal requirements regarding:

- the concept of 'duty holder'
- electrical systems, work activities and protective equipment
- the strength and capabilities of electrical equipment
- electrical equipment in adverse or hazardous environments
- the provision of insulation, barriers, etc
- earthing, bonding and other means of protection
- the integrity of referenced conductors
- the suitability of electrical connections
- protection from overload and short-circuit currents
- disconnection and isolation of circuits
- precautions for safe isolation
- working live
- required working space, access and lighting
- the concept of 'competence' in electrical work.

Successful completion of the course leads to the award of the Technical Training Solutions Certificate of Achievement 380: Electricity at Work Regulations.

ATEX

HAZARDOUS AREAS & EXPLOSIVE ATMOSPHERES

Course 390 - 1 Day
Max 8 candidates

Explosive atmospheres or Hazardous Areas (where a flammable vapour, gas or dust is present) are found in many sectors of industry. This course provides participants with an understanding of the dangers of working in hazardous areas, the methods by which explosions are prevented and the requirements of the EPS, ATEX and DSEAR Directives.

PARTICIPANTS

Anyone involved in carrying out work in hazardous areas, or supervising others in carrying out such work will benefit from this course. No prior knowledge of explosion protection is required.

COURSE PRESENTATION

This informative course deals with practical issues in an informal way making full use of videos and providing plenty of opportunity for participants to raise their own questions. Participants are provided with useful reference documentation.

COURSE OBJECTIVES

On completion of the course, participants will have a thorough understanding of:

- the dangers of dust, gas, vapour and mist in the air
- zone diagrams and the meaning of Zones 0, 1, 2 and 20, 21 and 22
- equipment temperature classifications and gas grouping
- the upper and lower flammable limits of gases and vapours
- the factors that caused a range of example industrial explosions to occur
- identifying the protection methods used (Ex ia, Ex ib, Ex d, Ex p, Ex e, Ex m, etc)
- the commonly used ATEX symbols marked on equipment
- deciphering rating plates of ATEX equipment
- identifying the suitability of equipment for each zone
- the importance of assembling cable glands and enclosure seals correctly
- the dangers of explosive vapours travelling along ducts, channels, cable conduits etc
- evaluating the maintenance requirements of equipment in hazardous areas
- the application of the EPS, ATEX and DSEAR Directives.

Successful completion of the course leads to the award of the Technical Training Solutions Certificate of Achievement 390: ATEX (Explosive Atmospheres).

ELECTRICAL DUTY HOLDER
(AUTHORISED PERSON)

Course 400 - 2 Days
Max 8 candidates

Many employers are justifiably concerned that, in the absence of a formal and routine method of assessing competence, it would be difficult to prove compliance with current statutory regulations. This course is designed to provide real evidence that personnel can safely carry out electrical and mechanical isolations and safely work live. Repeating the course at regular intervals ensures that personnel retain the essential knowledge and continue to use best practices.

PARTICIPANTS

This course is not an entry-level course. Prior electrical competence is assumed. An eligibility assessment for access to this course is available on request.

COURSE PRESENTATION

The course covers the statutory regulations, safe systems of work, isolation procedures and working live. Each candidate must complete both a knowledge based assessment and a practical assessment to ensure their understanding of the issues and an ability to apply best practices. Comprehensive course notes are provided.

COURSE OBJECTIVES

On completion of the course, participants will be able to:

- understand the relevant statutory regulations (the Electricity at Work Regulations, etc)
- understand the dangers associated with electricity and moving machinery
- describe how mechanical isolations differ from electrical isolations
- correctly and safely test for dead in single and three phase systems
- perform safe electrical isolations in a range of common industrial scenarios
- understand how to legally justify live working
- recognise the precautions necessary for safety and protection of equipment
- understand the importance of using insulated tools
- safely carry out live functional testing procedures.

Successful completion of the course leads to the award of the Technical Training Solutions Certificate of Competence 400: Electrical Duty Holder (Authorised Person).

The Duty Holders course is a combination of the EAW Regs (380) and the Electrical Isolation & Live Working (420) courses. It combines an understanding of the legal requirements with performance of safe isolation and live working to produce strong evidence for the candidates' competence.

ELECTRICAL ISOLATION & LIVE WORKING

Course 420 - 1 Day
Max 8 candidates

This course is designed to provide evidence that personnel can safely perform electrical isolations and live work. These two subjects are inextricably linked, since any electrician will at some point find themselves attempting to isolate equipment and that equipment will potentially be live. The course explores the correct procedures to be adopted and the protective equipment necessary for isolation and live working. Repeating the course at regular intervals ensures that personnel retain the essential knowledge and continue to employ best practices.

PARTICIPANTS

This course is not an entry-level course. Prior electrical competence is assumed. An eligibility assessment for access to this course is available on request.

COURSE PRESENTATION

The candidates work on a series of training rigs which simulate the most common scenarios that are likely to be encountered in industrial situations. Comprehensive course notes are provided.

COURSE OBJECTIVES

On completion of the course, participants will be able to:

- understand the dangers associated with electricity and moving machinery
- describe how mechanical isolations differ from electrical isolations
- correctly and safely test for dead in single and three phase systems
- perform safe electrical isolations in a range of common industrial scenarios
- understand how to legally justify live working
- recognise the precautions necessary for safety and protection of equipment
- understand the importance of using insulated tools
- safely carry out live functional testing procedures.

Successful completion of the course leads to the award of the Technical Training Solutions Certificate of Competence 420: Electrical Isolation & Live Working.

Candidates for this course should consider attending the course on the EAW Regs (380) first, unless they are already conversant with the legal requirements. This course (No 420), when combined with course 380, is available as one complete course called 'Duty Holder' - this is course No 400, described on the previous page.

FIRE ALARM SYSTEM DESIGN

Course 460 - 2 Days
Max 8 candidates

It is the responsibility of the designer to ensure that a modern fire alarm system is fully compliant with both statutory and non-statutory regulations and standards, that false alarms are infrequent and that a real fire is detected quickly without damage to property or loss of life. This course provides delegates with the knowledge and skills necessary to design these systems competently. Candidates who attend this course may also like to attend course 470: Installation & Maintenance of Fire Alarms. Candidates who attend both of the fire alarm courses would be able to commission a fire alarm system.

PARTICIPANTS

The course is designed for those who have an electrical background (for example maintenance electricians) or for those who have successfully completed course 110: Electrical Maintenance Skills.

COURSE PRESENTATION

The course is structured to follow the same logical decision making processes used in the design of a fire detection and alarm system. Each candidate is loaned a copy of the latest standards for reference during the course. The use of on-going assessments and a complete design project ensure that the candidates are able to meet the objectives of the course. Comprehensive course notes are provided.

COURSE OBJECTIVES

On completion of the course, participants will be able to:

- understand the way in which a large fire alarm system would be designed and zoned
- specify the import of the British Standards and Regulations relating to fire alarm systems
- identify the advantages and disadvantages of 4 wire, 2 wire and analogue systems
- state the defining features of the three categories of fire alarm system
- identify the advantages and disadvantages of the various types of detectors, beacons and sounders used in fire alarm systems
- understand the requirements of BS 5839 with regard to the positioning of components
- identify the cabling requirements for mains supplies and detectors etc
- perform the necessary battery capacity calculations
- produce the required drawings, documents and certificates.

Successful completion of the course leads to the award of the Technical Training Solutions Certificate of Competence 460: Fire Alarm System Design.

FIRE ALARM SYSTEM INSTALLATION & MAINTENANCE

Course 470 - 2 Days
Max 8 candidates

Modern fire alarm systems require careful, validated installation and maintenance to ensure that false alarms are infrequent and that a real fire would be detected quickly without damage to property or loss of life. This course provides delegates with the knowledge and skills necessary to work on these systems competently. Candidates who attend this course may also like to attend course 460: Design of Fire Alarms. Candidates who attend both of the fire alarm courses would be able to commission a fire alarm system.

PARTICIPANTS

The course is designed for those who have an electrical background (for example maintenance electricians) or for those who have successfully completed course 110: Electrical Maintenance Skills.

COURSE PRESENTATION

The course is presented using 4 wire, 2 wire and analogue addressable fire alarm panels and associated components so that candidates learn how the devices fit into the system, how they function and the way in which they should be configured, connected and tested. On-going assessments are used to ensure that the candidates are able to meet the objectives of the course. Comprehensive course notes are provided.

COURSE OBJECTIVES

On completion of the course, participants will be able to:

- understand the way in which a large fire alarm system would be connected and zoned
- specify the import of the British Standards and Regulations relating to fire alarm systems
- identify the main connections, component parts and indications on typical fire panels
- identify the required end of line (EOL) terminations and the cabling requirements for mains supplies and detectors etc
- recognise the various types of detectors used in fire alarm systems
- identify the dangers involved in incorrectly connecting detectors and Manual Call Points (MCPs)
- find a range of common faults on panels and wiring
- use fault finding techniques to locate faults on panels and wiring
- test and inspect a fire alarm system using walk tests, testing for functionality of detectors etc
- complete the relevant certificates to validate a functional commercial system.

Successful completion of the course leads to the award of the Technical Training Solutions Certificate of Competence 470: Fire Alarm System Installation & Maintenance.

INSTRUMENTATION

Instrumentation involves working on high-tech electronic equipment such as industrial measurement systems, PLCs, inverters and controllers as well as fault finding to component level and fixing electronic circuit boards.

CONTROL AND INSTRUMENTATION	500	4 DAYS	25
INSTRUMENTATION	510	2 DAYS	26
3 TERM PID CONTROLLER TUNING	515	2 DAYS	27
PLC FAULT FINDING	520	3 DAYS	28
PLC PROGRAMMING	530	5 DAYS	29
FAULT FINDING IN ELECTRICAL CONTROL PANELS	540	2 DAYS	30
SOLDERING	560	3 DAYS	31
PRACTICAL ELECTRONICS	565	5 DAYS	32
ELECTRONIC FAULT FINDING	570	5 DAYS	33
AC INVERTER DRIVES	580	2 DAYS	34


1A
1B
2A
2B
3A
3B
HA
HB
HC
HD
HE
HF
24
24
VI
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CONTROL AND INSTRUMENTATION

Course 500 - 4 Days
Max 8 candidates

This course covers the key aspects of current instrumentation and process control technology and is designed to enable maintenance personnel to carry out commissioning, calibration and maintenance of the typical devices used for measurement and control in industrial systems.

PARTICIPANTS

The course is ideal for those who presently possess some electrical knowledge, work in a maintenance environment and seek to expand their activities to include process control and instrumentation systems.

COURSE PRESENTATION

The course is extensively 'hands on', giving participants considerable practical experience of the devices typically found in industry. Comprehensive course notes are provided.

COURSE OBJECTIVES

On completion of the course, participants will be able to:

- describe the main dangers of industrial measurement systems
- identify the various methods of signal transmission
- understand current loops and recognise the common devices used
- correctly connect current loop devices
- understand the equipment used in temperature, pressure, level and flow measurement
- correctly use a range of industrial calibration equipment
- correctly connect, commission and calibrate current loop devices, temperature transmitters, differential pressure (dp) cells, ultrasonic level meters, load cell amplifiers, I to P converters and HART devices
- understand the principles of pH and weight measurement
- identify the dangers of working with closed-loop control systems
- understand the relevance of the 3 term PID strategy used in controllers
- identify the capabilities of a controller from its exterior markings
- configure an electronic controller from its factory default settings
- manually tune an electronic controller
- determine when a controller is correctly tuned.

The Control and Instrumentation course is a combination of the Instrumentation (510) and the 3 Term PID Controller Tuning (515) courses. It combines the knowledge of industrial measurement and the skills associated with industrial controllers to ensure that candidates understand modern process control systems.

Successful completion of the course leads to the award of the Technical Training Solutions Certificate of Competence 500: Control and Instrumentation.

INSTRUMENTATION

Course 510 - 2 Days
Max 8 candidates

This course covers the key aspects of industrial instrumentation and is designed to enable maintenance personnel to carry out commissioning, calibration and maintenance of the typical devices used for measurement in industrial systems.

PARTICIPANTS & COURSE PRESENTATION

The course is ideal for those who presently possess some electrical knowledge, work in a maintenance environment and seek to expand their activities to include industrial instrumentation systems.

COURSE OBJECTIVES - PART OF COURSE 500

On completion of the course, participants will be able to:

- describe the main dangers of industrial measurement systems
- identify the various methods of signal transmission
- understand current loops and recognise the common devices used
- correctly connect current loop devices
- understand the equipment used in temperature, pressure, level and flow measurement
- correctly use a range of industrial calibration equipment
- correctly connect, commission and calibrate current loop devices, temperature transmitters, differential pressure (dp) cells, ultrasonic level meters, load cell amplifiers, I to P converters and HART devices
- understand the principles of pH and weight measurement.

The instrumentation course is the industrial measurements part of the Control & Instrumentation (500) course.

Successful completion of the course leads to the award of the Technical Training Solutions Certificate of Competence 510: Instrumentation.

3 TERM PID CONTROLLER TUNING

Course 515 - 2 Days
Max 8 candidates

Three-term controllers continue to play an important role in many industrial processes and this course is designed to provide the skills and understanding necessary to effectively maintain control systems which utilise this technology.

PARTICIPANTS & COURSE PRESENTATION

As per course 500

COURSE OBJECTIVES- PART OF COURSE 500

On completion of the course, participants will be able to:

- identify the dangers of working with closed-loop control systems
- understand the relevance of the 3 term PID strategy used in controllers
- identify the capabilities of a controller from its exterior markings
- configure an electronic controller from its factory default settings
- manually tune an electronic controller
- determine when a controller is correctly tuned.

The 3 Term PID course is the control part of the Control & Instrumentation (500) course.

Successful completion of the course leads to the award of the Technical Training Solutions Certificate of Competence 515: 3 Term PID Controllers.



PLC
FAULT FINDING

Course 520 - 3 Days
Max 8 candidates

Programmable logic controllers are commonplace in all areas of industry. Accordingly it becomes ever more important that maintenance personnel should be able to carry out effective fault finding on these systems.

PARTICIPANTS

This course will be invaluable to anyone involved in the maintenance of control systems which incorporate a PLC. Participants should ideally have an understanding of electrical principles.

COURSE PRESENTATION

The emphasis throughout is on useful, practical skills and their application in the context of common industrial situations. Much of the course is given over to 'hands-on' experience and the maintenance skills that are required when working with PLCs. The various main PLC manufacturers are represented on the course - Allen Bradley, Siemens, Mitsubishi and Omron. Candidates gain experience of each of these types, and this generic knowledge helps to prepare them to deal with any type of PLC in the future. Comprehensive course notes are provided.

COURSE OBJECTIVES

On completion of the course, participants will be able to:

- understand the safety issues involved with a PLC and appreciate the need for safe working practices
- understand how a PLC is incorporated into modern industrial control systems, and the typical applications they are put to
- understand the logic functions performed by basic PLC instructions
- understand the methods of addressing inputs and outputs of a PLC
- understand the various methods of transmitting signals to and from a PLC
- identify the range of I/O modules available
- understand the use of battery back-up and ROM
- recognise ladder diagrams, statement lists and control system flowcharts
- use personal computers to interrogate PLCs
- monitor I/O lines to determine correct operation
- modify timers and counters
- safely use I/O forces as an aid to fault finding
- find a range of commonly occurring faults on PLC controlled systems using systematic methods
- back-up programs and restore them back to a PLC.

Successful completion of the course leads to the award of the Technical Training Solutions Certificate of Competence 520: PLC Fault Finding.

PLC PROGRAMMING

Course 530 - 5 Days
Max 8 candidates

Modern PLC based control and automation systems often have improvements and modifications made, resulting in changes needing to be made to the PLC program. This course provides the skills necessary to understand how typical modern industrial PLC programs work, how to make changes to existing programs and how to create small programs from scratch.

PARTICIPANTS

The course is designed for those who have an electrical background (for example maintenance electricians) who have successfully completed course 520 (PLC Fault Finding). Candidates who subsequently attend more advanced manufacturer-specific programming courses will find that their progress is enhanced by this foundation in PLC programming.

COURSE PRESENTATION

The course is presented using a wide range of industrial PLCs so that candidates learn how different manufacturers employ the programming languages involved. Allen Bradley, Siemens, Mitsubishi and Omron PLCs are used to control a complex training rig incorporating conveyors, solenoids, motors and industrial sensors as a 'target' system to gain the necessary programming skills. Comprehensive course notes are provided.

COURSE OBJECTIVES

On completion of the course, participants will be able to:

- state the dangers of modifying PLC programs
- use subroutines to structure programs
- use labels and comments correctly
- employ logical commands
- select appropriate types of timers and program them
- select appropriate types of counters and program them
- program mathematical operations (greater than, equal to etc)
- create a PLC program to control a complex machine incorporating several motors, solenoids and sensors
- create programs on several different manufacturers' PLCs.

Successful completion of the course leads to the award of the Technical Training Solutions Certificate of Competence 530: PLC Programming.

FAULT FINDING IN ELECTRICAL CONTROL PANELS

Course 540 - 2 Days
Max 8 candidates

Electrical control panels often have complex circuits that incorporate relays, contactors, PLCs, variable speed drives and safety relays. This course provides candidates with the opportunity to find commonly-occurring faults in complex control panels that incorporate these devices under the supervision of our instructors.

PARTICIPANTS

This course is not an entry-level course. Prior electrical competence is assumed. An eligibility assessment for access to this course is available on request. It is suitable for experienced electrical maintenance personnel or candidates who have completed course 110. We advise that the PLC Fault Finding (No 520) and AC Inverter Drives (No 580) courses should also be attended for candidates without knowledge of these two subject areas before attempting this course.

COURSE PRESENTATION

The course is presented using demonstration rigs that incorporate real industrial motors and fairly complex control panels. Faults are introduced to the systems and participants are required to find them, with help and support from our instructors.
Comprehensive course notes are provided.

COURSE OBJECTIVES

On completion of the course, participants will be able to:

- work safely in electrical control panels
- read and understand complex circuit diagrams
- correctly use multimeters, insulation resistance testers, continuity testers & clamp meters
- find a range of faults on complex control panels that incorporate
    - contactors and relays
    - safety relays
    - variable speed drives
    - programmable logic controllers
    - open circuits in control panel wiring
- apply a systematic and logical approach to fault finding.

Successful completion of the course leads to the award of the Technical Training Solutions Certificate of Competence 540: Fault Finding in Electrical Control Panels.

SOLDERING

Course 560 - 3 Days
Max 8 candidates

This course provides all the skills necessary to work on modern electronic printed circuit boards. It is intended for candidates who have an understanding of electronics principles, but have little or no experience of working on modern electronic systems or equipment down to component level. It complements the Electronic Fault Finding (Course 570).

Throughout the course best practice will be observed as described in International Standards (such as IPC610).

PARTICIPANTS

This course is essential for anyone involved in repair and maintenance of electronic systems and equipment, including those who are responsible for supervising the repair and quality of electronic systems and equipment.

COURSE PRESENTATION

This important subject is presented throughout by reference to best practice (such as IPC610) and generous amounts of practical work. Comprehensive notes are provided along with all the necessary soldering and rework equipment.

COURSE OBJECTIVES

On completion of the course, participants will have a thorough understanding of the requirements involved in the repair and maintenance of printed circuit boards to the IPC610 Standard. Candidates will:

- apply safe working practices
- understand the problems of electrical over stress (EOS) and electrostatic discharge (ESD)
- identify the various types of components used:
  (through-hole, SMT, QFP, DIL, LCC, Gull-Wing etc)
- determine component values from case markings
- prepare wires for soldering
- select the correct grades of solder
- understand the hazards and use of fluxes and cleaning solvents
- correctly solder unsupported and supported through-hole PCB components
- correctly solder SMD devices, including QFP, DIL, LCC, Gull-Wing etc to PCBs
- remove and replace solder joints and components on PCBs using: solder wick, soldering irons, heated tweezers and hot air rework stations
- inspect PCBs to ensure compliance with industry standards.

Successful completion of the course leads to the award of the Technical Training Solutions Certificate of Competence 560: Soldering.

PRACTICAL ELECTRONICS

Course 565 - 5 Days
Max 8 candidates

A basic electronics course for candidates who wish to explore the fundamental building blocks of electronics. The course employs a practical approach based on simple explanations and hands-on exercises.

PARTICIPANTS

The course is intended for anyone that has studied the theory of electronic components and circuitry but have little experience of the practical application of that knowledge. Academic students of, for example ONC, HNC or HND electronics often find that this course provides the perfect complement to their studies. Candidates with no electronics knowledge should attend Course No 570 (Electronics Fault Finding) before attending this course.

COURSE PRESENTATION

The course provides participants with an understanding of the various commonly-used electronic components and how they would be employed in practical electronic circuits. Participants then build circuits incorporating these components and explore the functionality of them. We then make modifications to the circuit parameters by changing component values and measuring the effects. The course progresses from basic discrete electronic components like transistors and by the end of the course reaches components like analogue to digital converters (ADCs).

COURSE OBJECTIVES

On completion of the course, participants will be able to:

- read electronic circuit diagrams
- understand the operation of electronic components within circuits
- determine the optimum / required values of circuit components
- use electronic test equipment to analyse circuits
  (bench PSUs, multimeters, oscilloscopes, logic probes and function generators)
- build circuits on breadboard that involve transistors, op-amps, logic gates, flip-flops, counters and VCOs
- design and build an electronic circuit that incorporates ADCs, digital logic, analogue operational amplifiers and associated discrete components.

Successful completion of the course leads to the award of the Technical Training Solutions Certificate of Competence 565: Practical Electronics.

ELECTRONIC FAULT FINDING

Course 570 - 5 Days
Max 8 candidates

Many specialised electronic circuits used in industry do not have modern replacements available. This course provides participants with the knowledge and skills necessary to perform fault finding on electronic circuits like these to component level. It also provides the skills and knowledge required to understand electronic circuits and make repairs and modifications to them. It complements the Soldering & PCB Repair (Course 560).

PARTICIPANTS

The course is intended for those who have an electrical background and who wish to extend their work into the field of electronics. An eligibility assessment for access to this course is available on request.

COURSE PRESENTATION

The course provides participants with an understanding of electronic components and how they would be used in electronic circuits. Participants then develop their knowledge and their testing, measurement and fault finding skills on a range of industrial electronic circuits with switched faults, using oscilloscopes, logic probes and other test equipment to diagnose them. Comprehensive course notes are provided.

COURSE OBJECTIVES

On completion of the course, participants will be able to:

- apply suitable precautions when working on electronic equipment
  (anti-static precautions, electric shock hazards etc)
- identify electronic components and read their values
  (passive components, transistors, voltage regulators, ICs etc)
- understand the operation of electronic components within circuits
- read electronic circuit diagrams
- use electronic test equipment to analyse circuits
  (oscilloscopes, logic probes etc)
- apply a systematic approach to fault finding
- locate a range of faults to component level
  (on a wide and varied selection of simple to complex electronic circuit boards).

Successful completion of the course leads to the award of the Technical Training Solutions Certificate of Competence 570: Electronic Fault Finding.

AC INVERTER DRIVES

Course 580 - 2 Days
Max 8 candidates

Manufacturers of inverter drives report that of the units returned to them as faulty, up to 80% do not reveal any defects. Such returns are more a result of incorrect programming or fault diagnosis by maintenance personnel. This comprehensive course is designed to counter such difficulties by enabling the maintenance engineer to correctly set up, maintain and carry out effective fault-finding on inverter drive systems.

PARTICIPANTS

Suitable for anyone who is required to maintain or configure inverter drives (electricians, instrument technicians, etc). Whilst a knowledge of basic electrical principles is desirable, no prior knowledge of motor theory or electronics is necessary.

COURSE PRESENTATION

The practicalities of configuring, fault-finding and maintenance are demonstrated and then practised by participants on purpose built training rigs allowing considerable experience to be gained on a representative range of industrial drives. Candidates gain experience of using Danfoss, Siemens, Omron and Allen Bradley AC inverter drives. The course is supported by comprehensive course notes.

COURSE OBJECTIVES

On completion of the course, participants will be able to:

- apply safe working practices when working with variable speed drives
- understand the principles of operation of inverter drive systems
- correctly operate, monitor and take measurements on inverter drive systems
- return a drive to its factory default settings
- configure a drive from its factory default settings to work in a given application
- differentiate between drive faults and motor faults.

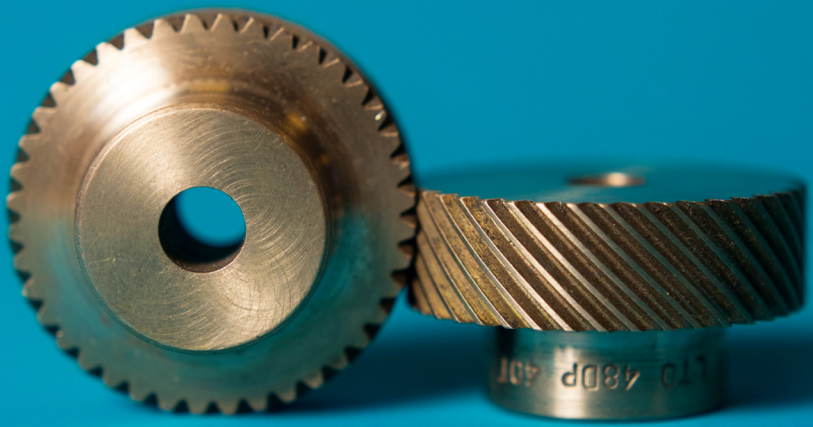
Successful completion of the course leads to the award of the Technical Training Solutions Certificate of Competence 580: AC Inverter Drives.



MECHANICAL

The Mechanical courses deal with issues such as operator asset care, fabrication, lubrication, tensioning, adjustment and alignment. Courses also cover the proper use of tools and more technical areas like pneumatics and hydraulics.

MECHANICAL ISOLATION	620	1 DAY	37
HYDRAULICS	650	4 DAYS	38
PNEUMATICS	660	4 DAYS	39
COMPRESSED AIR SAFETY: HSG39	665	1 DAY	40
MECHANICAL MAINTENANCE SKILLS	700	4 DAYS	41
SAFE USE OF HAND POWER TOOLS	710	3 DAYS	42
ABRASIVE WHEELS	720	1 DAY	43
MACHINE MAINTENANCE FOR OPERATORS	730	3 DAYS	44
PLUMBING FOR FACILITIES MAINTENANCE ENGINEERS	740	3 DAYS	45
LINE BREAKING: HSG253	760	1 DAY	46
BENCH FITTING	780	3 DAYS	47
WELDING	790	5 DAYS	48



MECHANICAL ISOLATION

Course 620 - 1 Day
Max 8 candidates

All employees working in and around moving machinery will at some time switch it off to perform cleaning, re-alignment or adjustments, changes to parts of the machinery, etc. In order to be confident that they are safely isolating the machine (in a mechanical context) this valuable course can be used to highlight the dangers, the issues they should be thinking about and also remind them of the best practices that should be applied when performing a mechanical isolation. It can also incorporate company-specific isolation procedures.

PARTICIPANTS

Aimed at process operators, supervisors, technicians, maintenance engineers and all employees who switch machinery off to carry out work. Candidates should bring safety boots / protective footwear for use during the course.

COURSE PRESENTATION

Various training rigs are used to show how a mechanical, isolation can be effected safely. The candidates practice writing down the procedure that they would follow and then apply it to the training rigs. Any deficiencies in their procedure are pointed out and they are reminded of the associated dangers. This process is repeated until they are able to perform the isolations correctly. The course is supported by comprehensive course notes.

COURSE OBJECTIVES

On completion of the course, participants will be able to:

- understand the legal issues associated with performing mechanical isolations
- identify the dangers of moving machinery (electrical, mechanical, stored energy etc)
- explain the difference between switching off, isolating and locking off
- describe how a mechanical isolation should be performed
- successfully produce a written SOP (Safe Operating Procedure)
- demonstrate an ability to apply best practice / company-specific procedures
- correctly perform mechanical isolations in a range of industrial scenarios.

Successful completion of the course leads to the award of the Technical Training Solutions Certificate of Competence 620: Mechanical Isolation.

HYDRAULICS

Course 650 - 4 Days
Max 4 candidates

This course provides the skills and knowledge necessary to carry out maintenance tasks safely on industrial hydraulic systems for maintenance personnel and production operators.

PARTICIPANTS

This course is suitable for anyone who wishes to work on or maintain industrial hydraulic systems. No prior knowledge of hydraulics is necessary. Candidates should bring safety boots / protective footwear for use during the course.

COURSE PRESENTATION

Participants gain useful practical experience on purpose-built training rigs which make use of typical commercial components and are designed specifically to simulate the hydraulic systems found in industry. Comprehensive course notes are provided.

COURSE OBJECTIVES

On completion of the course, participants will be able to:

- apply safe working practices when working with hydraulic systems
- understand the relevant theory (units, flow, pressure, temperature, forces, etc)
- understand the operation of hydraulic circuits and components typically used in industry
- identify the maintenance requirements of power units
- use flow meters and pressure gauges to determine the nature and location of faults
- construct a range of functional hydraulic circuits
- assess the condition of a hydraulic system by oil analysis
- use hydraulic circuit drawings as a systematic aid to fault-finding
- select the correct tubing and fittings for hydraulic applications
- correctly cut and bend tubing
- understand how to form ferrules
- understand the importance of pressure testing
- understand the importance of correct filter selection.

Successful completion of the course leads to the award of the Technical Training Solutions Certificate of Competence 650: Hydraulics.

PNEUMATICS

Course 660 - 4 Days
Max 8 candidates

This course provides maintenance personnel and production operators etc with the skills and knowledge necessary to carry out maintenance tasks safely on pneumatic and electro-pneumatic systems.

PARTICIPANTS

Suitable for anyone who is required to maintain industrial pneumatic systems. No prior knowledge of pneumatic or electrical principles is necessary. Candidates should bring safety boots / protective footwear for use during the course.

COURSE PRESENTATION

A practical approach is taken throughout this course with participants gaining valuable 'hands-on' experience on training equipment utilising industry-standard components designed to simulate industrial systems. Comprehensive course notes are provided.

COURSE OBJECTIVES

On completion of the course, participants will be able to:

- understand the need for safe isolation and be able to apply safe working practices when working with pneumatic and electro-pneumatic systems
- understand the relevant underpinning knowledge (units, pressure, forces, etc)
- identify and inspect:
  - pneumatic valves and electrical switches
  - valves (air and solenoid operated, sequence, directional control)
  - actuators (cylinders and rotary)
  - AND / OR elements, relays, timers, flow controls and quick exhausts
- use visual indicators and manual overrides to check operation of components
- carry out repairs to pneumatic systems, replace fittings, plastic pipework, etc
- use pneumatic circuit drawings as an aid to systematic fault-finding.

Successful completion of the course leads to the award of the Technical Training Solutions Certificate of Competence 660: Pneumatics.

COMPRESSED AIR SAFETY

HSG39

Course 665 - 1 Day
Max 8 candidates

This course is intended for maintenance staff and others concerned with or responsible for health and safety at work.

PARTICIPANTS

Suitable for anyone who is required to maintain compressed air plant rooms and distribution systems. No prior knowledge of pneumatic or electrical principles is necessary. Candidates should bring safety boots / protective footwear for use during the course.

COURSE PRESENTATION

A practical approach to the application of Health and Safety Guidance Note 39 is delivered using a combination of industry standard components, calibration exercises and documentation. Comprehensive course notes are provided.

COURSE OBJECTIVES

On completion of the course, participants will be able to:

- understand the need for accurate record keeping
- demonstrate relevant underpinning knowledge of HSG39
- understand the dangers of compressed air systems
- understand the need for regular inspection and maintenance
- identify the key components of a compressed air system such as compressors, receivers, dryers, chillers, safety valves and burst discs
- understand the need for safe isolation and system interlocking
- apply safe working practices and understand the dangers of live working.

Successful completion of the course leads to the award of the Technical Training Solutions Certificate of Achievement 665: Compressed Air Safety.



MECHANICAL MAINTENANCE SKILLS

Course 700 - 4 Days
Max 4 candidates

This course provides personnel with the necessary skills to perform mechanical maintenance, including the removal and replacement and alignment of equipment (pumps, gearboxes, motors and power transmission systems) and identification and rectification of bearing faults within these systems.

PARTICIPANTS

Designed to benefit anyone required to undertake mechanical maintenance on production and process equipment. This course is equally suitable for production operatives or for craft personnel already involved in maintenance activities. Importantly, the course also teaches the candidates how to isolate a machine so that is safe for them to work on it. Candidates should bring safety boots / protective footwear for use during the course.

COURSE PRESENTATION

The course format is very much 'hands on' with the emphasis on the development of sound practical skills within the context of safe working practices.

COURSE OBJECTIVES

On completion of the course, participants will be able to:

- understand the principles of preventive and first-line maintenance
- apply safe working practices
- describe a range of mechanical faults and plan suitable courses of action
- understand the principles of power transmission systems
- remove and refit taper-lock bushes, keyed shafts, belts, chains and couplings
- install and align shafts; tension drive train components
- identify types of bearing, their typical applications and common defects
- correctly remove and refit various types of bearings
- describe various methods of removing broken studs
- recognise stripped threads and correctly use thread repair equipment
- manufacture gaskets using industry standard techniques
- appreciate how to remove and replace seals and gland packing
- understand the operation of various gearboxes
- recognise various types of conveyor systems and their main components
- perform safe mechanical isolations on a working rig.

Successful completion of the course leads to the award of the Technical Training Solutions Certificate of Competence 700: Mechanical Maintenance Skills.

SAFE USE OF HAND POWER TOOLS

Course 710 - 3 Days
Max 4 candidates

Aimed at anyone that is expected to use power tools in the workplace, this course ensures that the candidates are able to use them correctly so that employers can be confident that the highest standards of safety are adopted when using these very dangerous tools.

PARTICIPANTS

The course is suitable for candidates with all levels of experience of power tools. No prior experience is required. Candidates should bring safety boots / protective footwear for use during the course.

COURSE PRESENTATION

The course involves a 'toolbox' talk about the safety issues of each tool that is used on the course, with syndicated exercises used to involve the candidates properly. Once the basic safety issues have been discussed and understood a practical exercise is employed to get the candidates using the tools for real - during which the instructor constantly re-assesses the candidates to ensure that they continue to apply all the actions necessary to use the tools safely. During the practical the instructor also provides lots of useful hints and tips on how best to set up and handle the tools.

COURSE OBJECTIVES

On completion of the course, participants will be able to:

- select the appropriate PPE
- show consideration for others in the vicinity
- isolate mains-powered and battery-powered tools properly
- perform safety inspections of tools before use
- use a selection of hand tools and power tools correctly and safely (including pistol drills, jigsaws, circular saws, routers and angle grinders).

Successful completion of the course leads to the award of the Technical Training Solutions Certificate of Competence 710: Safe use of Hand Power Tools.



ABRASIVE WHEELS

Course 720 - 1 Day
Max 4 candidates

For those who work with abrasive wheels, appropriate training is absolutely essential for reasons of safety. It is a legal requirement that those involved in the mounting of wheels should receive suitable and sufficient training. This course is designed to meet this requirement.

PARTICIPANTS

The course is suitable for anyone who works with abrasive wheels and is indispensable for anyone involved in the checking, dressing or replacement of wheels. No prior knowledge is assumed. Candidates should bring safety boots / protective footwear for use during the course.

COURSE PRESENTATION

Participants are provided with the sound practical skills they need in the workplace together with a thorough understanding of the relevant regulative requirements. Comprehensive course notes are provided.

COURSE OBJECTIVES

On completion of the course participants will have a thorough understanding of:

- the hazards arising from the use of abrasive wheels and precautions which should be observed
- the abrasive wheels regulations and HSE advisory literature
- methods of marking abrasive wheels as to type and speed
- correct storing, handling and transportation of abrasive wheels
- proper methods of inspecting and testing abrasive wheels
- how to determine when wheels need replacing
- the components used with abrasive wheels and their correct assembly
- the correct balancing of abrasive wheels
- the proper methods of dressing wheels
- the correct adjustment of rests.

Successful completion of the course leads to the award of the Technical Training Solutions Certificate of Competence 720: Abrasive Wheels.

MACHINE MAINTENANCE FOR OPERATORS

Course 730 - 3 Days
Max 4 candidates

This course provides operators with the basic engineering skills necessary to perform routine product line changes and maintenance tasks, including the removal and replacement of components, cleaning, lubrication and inspection.

PARTICIPANTS

Line operators with little or no engineering skills who wish to take on the responsibility of primary asset care. Operator asset care is the key to reduced downtime and a decrease of emergency repair work by the maintenance team. The course was developed to provide technically competent operators with a real sense of ownership of their production assets. Importantly, the course also teaches the candidates how to isolate a machine so that is safe for them to work on it. Candidates should bring safety boots / protective footwear for use during the course.

COURSE PRESENTATION

The course format is very much 'hands on' with the emphasis on the development of sound practical skills within the context of safe working practices.

COURSE OBJECTIVES

On completion of the course, participants will be able to:

- apply the principles of safe working practices to routine maintenance
- select correct components for the alignment of motor shafts, pulleys, belts and chains
- discuss machine manufacturer's recommended routine maintenance tasks
- select appropriate hand tools and use them correctly and safely
- recognise faulty/worn components
- remove and replace components that require cleaning, lubrication and/or inspection
- identify basic faults
- adopt a logical approach to hands-on mechanical work and to fault finding
- perform safe mechanical isolations on a working rig.

Successful completion of the course leads to the award of the Technical Training Solutions Certificate of Competence 730: Machine Maintenance for Operators.

PLUMBING FOR FACILITIES MAINTENANCE ENGINEERS

Course 740 - 3 Days
Max 4 candidates

Facility managers responsible for the maintenance of building services in office blocks, hospitals and educational establishments often seek to improve their organisation's overall effectiveness by extending the range of skills possessed by their maintenance engineers. This course is specifically designed to provide FM engineers with the skills needed to carry out first-line maintenance of the plumbing used in low pressure hot water (LPHW) heating systems, hot and cold water services and drainage systems – together with the associated pipe work, pumps, valves and ancillary equipment.

PARTICIPANTS

Facilities maintenance engineers and estates maintenance operatives of all kinds will benefit from this course. No prior knowledge is assumed. Candidates should bring safety boots / protective footwear for use during the course.

COURSE PRESENTATION

The emphasis throughout is on the practical application of skills necessary to deal effectively with first-line maintenance tasks. Comprehensive course notes are provided.

COURSE OBJECTIVES

On completion of the course, participants will be able to:

- apply safe working practices and meet relevant regulative requirements when working with mechanical building services
- understand different types of LPHW system
- describe the common faults on LPHW systems
- carry out bending of copper tube
- correctly assemble and tighten compression joints
- correctly fabricate soldered pipe-work joints
- describe how radiators, radiator valves and taps should be replaced
- identify the component parts of thermostatic mixer valves
- make joints in PVC soil piping using either solvent or 'O' ring type joints.

Successful completion of the course leads to the award of the Technical Training Solutions Certificate of Competence 740: Plumbing for Facilities Maintenance Engineers.

LINE BREAKING

HSG253

Course 760 - 1 Day
Max 8 candidates

Pipework is often broken when cleaning, repair or maintenance of industrial systems is performed. Compliance with a line breaking policy is essential to reduce the potential dangers. This course teaches participants the safe methods of breaking lines and the importance of possessing and complying with a line breaking policy or permit as well as the proper procedures as described in HSG253 to follow before, during and after line breaking.

PARTICIPANTS

This course is intended for engineers, supervisors, operators and anyone working in and around industrial systems where a line breaking policy or safe system of work for line breaking is in force. Candidates should bring safety boots / protective footwear for use during the course.

COURSE PRESENTATION

After reminding the candidates about the dangers of industrial fluids and the legal issues, the course then employs several training rigs, simulating real industrial pipework. Candidates can practice each of the skills that the course provides on these training rigs as well as performing the key ones for the purpose of the practical assessment. A separate knowledge-based assessment ensures that the candidates have achieved the necessary understanding. Comprehensive course notes are provided.

COURSE OBJECTIVES

On completion of the course, participants will be able to:

- identify the dangers of common industrial fluids
- state the requirements of the relevant legal statutes, codes of practice etc
- describe the safe operating procedures used in industry for line breaking in accordance with HSG253
- identify the fluids and direction of flow in industrial pipework
- identify potential failures in the common pipework jointing methods
- use the correct tools and PPE when breaking lines
- complete permit to work procedures
- perform pipework isolations using various methods
- secure pipework isolations using various methods
- break industrial lines safely.

Successful completion of the course leads to the award of the Technical Training Solutions Certificate of Competence 760: Line Breaking - HSG253.

BENCH FITTING

Course 780 - 3 Days
Max 4 candidates

This course provides candidates with the opportunity to acquire essential workshop bench fitting skills. The candidates fabricate a practical project, using hand tools and pillar drills. The project requires the reading of drawings, marking out, sawing, filing, drilling and tapping and these skills are taught as the candidates progress through the project.

The proper and safe use of tools coupled with the necessity to fabricate to the tolerances specified in the drawings ensures that the candidates improve their practical bench skills and also learn how to apply themselves to the exercise most effectively.

PARTICIPANTS

The course is designed to complement course 700: Mechanical Maintenance Skills and is suitable for craft personnel already involved in maintenance activities. Candidates should bring safety boots / protective footwear for use during the course.

COURSE PRESENTATION

The course format is very much 'hands on' - the emphasis being on development of sound practical skills within the context of safe working practices.

COURSE OBJECTIVES

On completion of the course, participants will be able to:

- apply safe workshop practices when performing bench fitting skills
- read and interpret engineering drawings
- correctly use measuring and marking out equipment
- practice the correct use of hand tools
- manufacture items within tolerance using hand tools
- select the correct drilling speeds for various materials
- drill, tap and ream holes
- safely operate a pillar drill
- understand the geometry of correctly sharpened drill bits
- apply correct methods of drill sharpening.

Successful completion of the course leads to the award of the Technical Training Solutions Certificate of Competence 780: Bench Fitting.

WELDING

(TIG or Stick)

Course 790 - 5 Days
Max 4 Candidates

The Welding course is focused on individual company's requirements. This course is provided on-site and is designed to provide candidates with the ability to produce welds safely and to industry standards.

PARTICIPANTS

The course is aimed at supervisors, technicians, maintenance engineers and any personnel involved in equipment maintenance. The course is designed for candidates with some welding experience, although it can be customised to suit all skill levels.

COURSE PRESENTATION

Classroom-based training is provided so that candidates understand the type of welding applications required by their employer. The course advocates the industrial health and safety best practices. The course incorporates an intensive practical section on welding. Candidates are provided with comprehensive course notes, describing welding best practices and other essential information.

COURSE OBJECTIVES

On completion of the course, participants will be able to:

- describe the dangers of fumes, gases and radiation when welding
- understand the mechanical hazards and dangers of over-exposure to noise
- correctly use appropriate PPE for welding
- use welding equipment safely, in compliance with Safe Operating Procedures (SOP)
- describe the various commonly-used welding joints
- set up an arc welding machine correctly
- correctly produce a good quality down hand fillet weld
- appreciate how lap and multipass joints should be made
- employ the appropriate welding process (TIG or Stick, as appropriate to employer's needs)
- weld to an acceptable standard in line with the company's requirements
- recognise common welding faults
- understand how safety can be compromised by poor weld quality
- perform a strength test on a completed weld.

Successful completion of the course leads to the award of the Technical Training Solutions Certificate of Competence 790: Welding.

DATES & PRICES

The following is a list of currently available dates for the courses. Please call for the latest information - courses fill up quickly and extra dates are often scheduled.

Each course cost is inclusive of course notes and refreshments.
VAT and C&G exam fees (for the C&G courses) are additional.

110 Industrial Electrical Maint
£3,400 + VAT 10 days
16 to 27 November 2026
18 to 29 January 2027
15 to 26 February 2027
17 to 28 May 2027
12 to 13 July 2027
16 to 27 August 2027

160 PAT Testing
£285 + VAT 1 day
1 December 2026
27 August 2027

170 Fixed Equipment Testing
£340 + VAT 1 day
30 November 2026
18 February 2027

310 18th Edition IET Wiring Regs
£900 + £90 exam fee + VAT
4 days (C&G)
15 to 18 December 2026
16 to 19 March 2027
23 to 26 August 2027

340 Elec Inspection & Testing
£1,350 + £190 exam fees + VAT
4·5 days (C&G)
21 to 25 September 2026
9 to 13 November 2026
1 to 5 February 2027
26 to 30 July 2027

350 Design of Elec Installations
£1,620 + £140 exam fees + VAT
5 days inc Exam + Project
(C&G)
30 November to 4 December 2026
7 to 11 June 2027

360 Electrical Safety Management
£285 + VAT 0·5 day
13 November 2026
15 February 2027

370 BS7909: Temporary Systems
£340 + VAT 1 day
4 December 2026
20 April 2027

375 BS7375: Electrical Safety on Construction Sites
£340 + VAT 1 day
25 June 2027

380 EAW Regs
£340 + VAT 1 day
10 November 2026
16 February 2027
21 April 2027
21 June 2027

390 ATEX
£340 + VAT 1 day
12 November 2026
9 February 2027

400 Duty Holder (Authorised Person) £680 + VAT 2 days
10 to 11 November 2026
16 to 17 February 2027
21 to 22 April 2027
21 to 22 June 2027

420 Electrical Isolation & Live Working £340 + VAT 1 day
11 November 2026
17 February 2027
22 April 2027
22 June 2027

460 Design of Fire Alarms
£680 + VAT 2 days
30 to 31 March 2027

470 Installation of Fire Alarms
£680 + VAT 2 days
2 to 3 November 2026
1 to 2 April 2027

500 Control & Instrumentation
£1,360 + VAT 4 days
2 to 5 November 2026
10 to 13 November 2026
5 to 8 January 2027
30 March to 2 April 2027
4 to 7 May 2027
28 June to 1 July 2027
2 to 5 August 2027

510 Instrumentation
£680 + VAT 2 days
2 to 3 November 2026
10 to 11 November 2026
5 to 6 January 2027
30 to 31 March 2027
4 to 5 May 2027
28 to 29 June 2027
2 to 3 August 2027

515 PID Controller Tuning
£680 + VAT 2 days
4 to 5 November 2026
12 to 13 November 2026
7 to 8 January 2027
1 to 2 April 2027
6 to 7 May 2027
30 June to 1 July 2027
4 to 5 August 2027

520 PLC Fault Finding
£1,020 + VAT 3 days
7 to 9 October 2026
23 to 25 March 2027
2 to 4 June 2027
13 to 15 July 2027

530 PLC Programming
£1,700 + VAT 5 days
14 to 18 December 2026
12 to 16 April 2027
26 to 30 July 2027

540 Fault Finding in Electrical Control Panels
£680 + VAT 2 days
21 to 22 December 2026
23 to 24 June 2027

More dates on next page

PLEASE CHECK ONLINE OR CALL US FOR THE LATEST DATES

560 Soldering
£1,020 + VAT 3 days
13 to 15 October 2026
2 to 4 June 2027

565 Practical Electronics
£1,700 + VAT 5 days
19 to 23 October 2026
24 to 28 May 2027

570 Electronic Fault Finding
£1,700 + VAT 5 days
14 to 18 September 2026
23 to 27 November 2026
11 to 15 January 2027
17 to 21 May 2027

580 Inverter Drives
£680 + VAT 2 days
27 to 28 October 2026
21 to 22 December 2026
9 to 10 February 2027

620 Mechanical Isolation
£340 + VAT 1 day
30 October 2026
26 February 2027
1 July 2027

650 Hydraulics
£1,680 + VAT 4 days
28 September to 1 October 2026
23 to 26 November 2026
12 to 15 January 2027
30 March to 2 April 2027
1 to 4 June 2027

660 Pneumatics
£1,360 + VAT 4 days
22 to 25 March 2027
31 August to 3 September 2027

665 HSG39
Compressed Air Safety
£340 + VAT 1 day
11 December 2026
8 April 2027
13 August 2027

700 Mechanical Skills
£1,680 + VAT 4 days
5 to 8 October 2026
9 to 12 February 2027
15 to 18 March 2027
4 to 7 May 2027
14 to 17 June 2027
6 to 9 July 2027
9 to 12 August 2027

710 Hand Power Tools
£1,260 + VAT 3 days
28 to 30 June 2027

720 Abrasive Wheels
£340 + VAT 1 day
21 December 2026
8 February 2027
23 July 2027

730 Machine Maintenance for Operators £1,260 + VAT 3 days
19 to 21 Apil 2027
20 to 22 July 2027

740 Plumbing Maintenance
£1,260 + VAT 3 days
23 to 25 February 2027

760 Line Breaking HSG253
£340 + VAT 1 day
26 October 2026
27 October 2026
27 November 2026
8 January 2027
22 April 2027

780 Bench Fitting
£1,260 + VAT 3 days
5 to 7 January 2027
5 to 7 April 2027

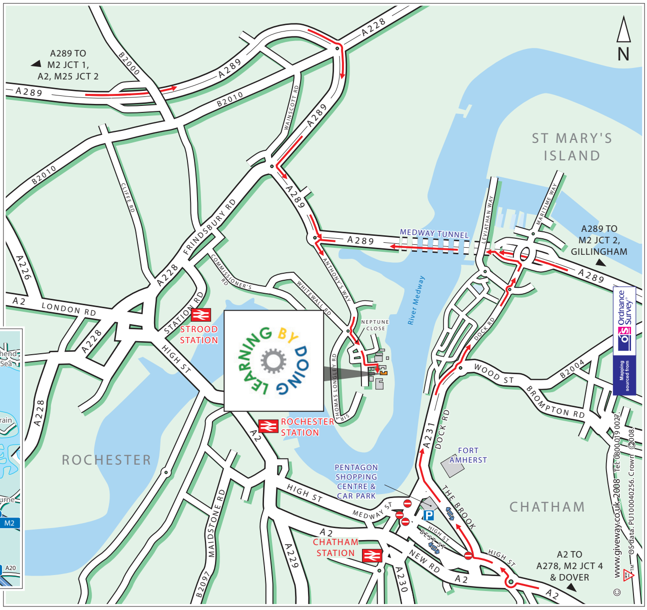
These dates compiled:
2 September 2026

PLEASE CHECK ONLINE OR CALL US FOR THE LATEST DATES

HOW TO FIND US

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ME2 4NZ
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E: tech.training@zen.co.uk





By Air

All of the London Airports (Gatwick, Stansted, Luton, Heathrow, City) are near to us. Rail links from these airports (via London) have very similar travelling times. If you are considering car rental or taking a taxi, then Gatwick or Stansted are preferable.

By Public Transport

Trains from central London (Charing Cross and London Bridge) run to Strood and Rochester. Taxis from Strood and Rochester to the Medway City Estate are available.

By Road from the North, South or West

(M40, M4, M1, M11 etc) Join the M25 heading towards the Dartford crossing. Leave the M25 on the A2 at junction 2 travelling towards Canterbury. Leave the A2 on the A289 and follow the Medway City Estate signs.

By Road from the Southeast

(M2, A2 etc) Join the M2 travelling towards Rochester and leave at junction 1 onto the A289. Follow the Medway City Estate signs.

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