



Health & Safety Compliance

Electrical Services

Keeping people safe
where they live, work
and play



The background image shows two men in red shirts working on a building. The man in the foreground is holding a black electrical safety device with a white label that includes the text "L1 L2", "L3", and a warning symbol. The man in the background is on a ladder, looking towards the camera.

Electrical Safety for 'Duty Holders' A Connaught Guide

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1. A word about the authors

The author of this guide is Connaught Compliance Electrical Services. Connaught Electrical is the leading provider of electrical safety services in the UK.

As a result of the vast experience we have gained in assisting thousands of companies throughout the country to comply with current standards and legislation, we can rightly term ourselves the electrical safety specialists.

We help protect you, your people and your business from electrical risks

As a Duty Holder our goal is to assist you in understanding your responsibilities under legislation and to help you to discharge your responsibilities by creating an electrically safe place of work.

Keeping people safe, improving performance and saving costs

The Electrical Services team is just part of our wider health and safety offering.

Connaught Health and Safety Compliance is the UK's only provider of fully comprehensive, self-delivered health and safety solutions. You'll find we offer the broadest portfolio of services, across a wide range of locations, and are active in all sectors.

Connaught combines consultancy, training with field services plus 24/7 support and advice lines. This means that our capabilities not only ensure you comply with health and safety regulations, we also help you to:

- **Identify and minimise risks**
- **Remove avoidable costs**
- **Improve business performance**

While many organisations claim to provide comprehensive health and safety services, only Connaught combines consultancy with self-delivered services to cover your compliance requirements 24 hours a day, 7 days a week.

2. The issue of electrical safety

Businesses have never been under as much pressure as they are today. Competition from at home and from the emerging markets abroad means that operations must be carried out almost continuously with little or no downtime for necessary maintenance and safety checks.

There is also the difficulty of recruiting competent staff, particularly in the skilled engineering sectors to maintain operations safely and efficiently. Add to that the seemingly endless growth of 'red tape' and bureaucracy, much of it identified with health and safety legislation, all of which amounts to a major headache for businesses both large and small.

So, under pressure on all fronts, the last thing that any manager or director wants to hear is that the electrical installation in their factory or office block is in an unsatisfactory condition.

Well, the chances are that it is. A sample survey of electrical installations carried out by AXA Insurance showed that 42% had serious defects likely to cause a fire or electric shock.

Connaught Electrical has a wide ranging experience in the field of electrical safety and they have found that in excess of 75% of installations over five years of age breach electrical safety legislation to a greater or lesser extent. Indeed, many are failing close scrutiny by Insurance Surveyors who are increasingly concerned about electrical safety.

So how do you stand on this issue? Is your company or organisation even addressing the situation? Because

despite the pressures of the business environment 'Duty Holders,' persons ultimately responsible for electrical safety at your premises, cannot escape their responsibilities under the law, to themselves, their employees, their customers and other stakeholders in their business. They must discharge their responsibilities effectively and the aim of this booklet is to give a better understanding of how to do so.

But first...

3. Why should you be concerned over electrical safety?

There are a number of reasons why Building Operators should concern themselves with electrical safety and they are:

Electricity is the most dangerous form of energy known to man. It has been argued that it is even more dangerous than nuclear energy.

This is because:

- Electricity is all around us - we cannot run our modern world without it
- It is often in the hands of relative amateurs
- It can kill in seconds, whereas nuclear radiation may take weeks, months, or even years to have a fatal effect
- Despite the great danger many electrical installations are in an unsatisfactory or dangerous condition

No normal, responsible building owner/operator wants to kill or injure anyone, whether they are employees, subcontractors, or simply visitors to the premises.

No right thinking company manager would want the death or injury of another person on his conscience if it could be avoided by more attention to electrical safety.

Electrical accidents, fires and explosions seriously disrupt, cripple or even ruin businesses.

The insurance industry acknowledge that 75% of businesses that make a large loss insurance claim, never re-open for business, or close within 18 months. Added to the cost of business interruption, relocation to alternative premises, or fire damage to existing premises is the hidden cost of loss of reputation due to production failures, letting down customers and the bad publicity associated with an electrical accident or incident.

If you need another reason...

It is the law! The law demands that we use electricity safely.

Electrical safety is mainly addressed under the Electricity at Work Regulations 1989 (EaWR).

These statutory regulations are the law of the land. They do not get involved in specific detail, but provide the basic requirements for electrical safety.

The Regulations contain obligations which are either:

- **ABSOLUTE** - to be undertaken without regard to time, effort and expense or...
- **AS FAR AS REASONABLY PRACTICABLE** - where the danger can be weighed against the cost, time and expense involved in removing the risk

Note:

The HSE state that they will only condone you not spending the cost, effort etc., if the risk is grossly disproportionate to the cost. In view of the risks involved with electricity failing to act on the basis of cost etc., it is difficult to justify.

As with most health and safety legislation, prosecutions brought under the Electricity at Work Regulations commence with the premise that you are GUILTY until YOU prove yourself innocent. It is for YOU to prove yourself innocent or at least mitigate your guilt.

HSE Enforcement of existing Health & Safety legislation (pre-2007)

The HSE prosecute both individuals and companies for breaches of Health & Safety legislation.

The purpose of enforcement as stated by the HSE is to '...ensure 'Duty Holders' manage and control risks effectively, thus preventing harm'... and to 'ensure that 'Duty Holders' who breach health and safety requirements and directors and managers who fail in their responsibilities are brought to account...this may include bringing alleged offenders to court...' HSE's Policy Statement on Enforcement.

The HSE targets specific persons in its actions. Who are they? According to HSE '...action is focused on the 'Duty Holders' who are responsible for the risk and who are best placed to control it...'

HSE Enforcement - Corporate Manslaughter Act 2007

Where a death has occurred and this is the result of gross negligence on the part of the management of a company, the organisation may be prosecuted under corporate manslaughter legislation which came into effect in April 2008.

Previously it was difficult to identify a 'directing mind' at the top of the company (such as a director) to whom blame for a death could be attributed.

An organisation is guilty of the offense if the way in which its activities are managed or organised causes a death and amounts to a gross breach of a relevant duty of care to the deceased, particularly in the way activities were managed by senior management.

What will the courts look at?

They will look at:

- The systems of work used by employees
- Their level of training.
- Adequacy and safety of their equipment
- The immediate supervision and middle management presence which was available
- The organisation's strategic approach to health and safety
- Its arrangements for risk assessing, monitoring and auditing its processes
- How the formal systems were carried out in practice

Fines are unlimited and companies may be forced under a publicity order to tell their customers via radio, television, newspapers or their own literature etc., about their prosecution and conviction.

The courts will look carefully at what should have been done and what actually was done. The 'gap' between the two must represent such a serious failure as to constitute gross negligence.

If that is deemed the case then the organisation will have fallen far short of what could reasonably be expected in the way activities were managed - particularly by Senior Management. To avoid such a scenario it is imperative that you put yourself in a defensible position.

The Act itself does not introduce any new standards. The requirements under existing Health & Safety legislation will be applied.

Juries may also have regard to any relevant health and safety guidance. This includes statutory Approved Codes of Practice and other guidance published by regulatory authorities that enforce health and safety legislation.



If you are to blame for death, injury or loss, or if you are successfully prosecuted, you or your company could be sued by your employees or others.

We live in a litigious society where persons are encouraged to think: *'Where there's blame there's a claim!'*.

But I can claim on my insurance can't I?

Cover your losses! Insurance companies demand that we use electricity safely.

First of all you cannot be insured for non-compliance with Statutory Legislation. In addition, Insurers are being more proactive in demanding higher standards of risk management from clients.

Some Insurers now embed the requirement for premises to have current test/certification within the middle of policy wordings - do you read your policy wording?

Insurers are more willing to decline claim payments where there is reasonable justification. One major Insurance company has declined 3 claims in the last 3 years totalling £10 million because the fire was of electrical causation and the claimants could not demonstrate they had controlled their electrical risks adequately.

Electrical fires and explosions due to electrical faults accounted for around 20% or more of all large loss insurance claims.

Expect your Insurer then to look at the way you address electrical safety and the safety culture in your workplace before they renew your insurance. Insurers talk to each other and share data. If you are turned down by your present Insurer for reasons of unsatisfactory electrical safety management, the information is likely to be passed on to another potential Insurer.

Connaught Electrical is currently working with the Insurance industry to ensure that a consistent and pragmatic approach is made towards addressing deficiencies in electrical safety.

The aim is to introduce a scheme whereby organisations that mitigate their electrical risks receive due recognition from the Insurance industry for their efforts. Contact Connaught Electrical for more details.

So who carries the can in your company?

4. 'Duty Holder' responsibilities

What/who are 'Duty Holders?'

Everyone who is involved with electricity, i.e. working on it, working with it and/or using it, from the engineer in the main switch room to the person on the shop floor pressing the trigger on a power drill.

How far do the duties go?

Regulation 3(2)(b) of EaWR 1989 states that a 'Duty Holder' must 'comply with the provisions of the Regulations in so far as it relates to matters within his control.'

Who has prime responsibility?

The prime responsibility is placed on Employers, Directors, Managers (see Sections 2 & 37 HASAWA).

Management are deemed to have the resources and the authority necessary to provide a safety management system.

For a 'Duty Holder' there are three essentials for electrical safety:

- Safe procedures at work
- Safe places of work
- Safe people at work

Let's look at each one in turn...

5. Safe systems of work

What is a safe working procedure?

A safe procedure at work:

- Is a laid out and considered method of working
- Takes proper account of the potential hazards to employees and possibly others in vulnerable situations
- Provides a formal framework to ensure that all the steps necessary for safe working have been anticipated and implemented
- Demands forethought, planning and constant monitoring
- Requires the provision of adequate supervisory control and not just unthinking reliance on the good sense of the employees doing the work
- The adequate training and instruction of the people involved (see safe people at work)

- The selection and provision of suitable plant and equipment which is adequate for the operations to be performed (see safe places of work)
- Describes the physical layout of the job.
- If required includes the provision of warnings and notices.
- Includes the issue of special instructions such as Safety Rules and Safe Working Procedures

I'm the 'Duty Holder' - where should I start?

Where to begin?

Ask yourself:

1. Do I know the risks arising from our activities?
2. Do I know how to eliminate, control or reduce them?
3. How do I communicate the above information to my staff?
4. How do I know they are complying with those measures?
5. If I do not know the answers to those four questions, why not?

Things to do first:

- Make a risk assessment of your working practices, environment and equipment.
- Determine what can be done to remove the identified hazards and do it.
- Should hazards remain, develop a safe system of work.
- Where necessary, formalise these systems of work into Safe Working Procedures.
- Include in the procedures where necessary the use of permits to work coupled with physical lock-off systems if appropriate.
- Inform and train your staff and where necessary, your contractors.
- Monitor the observance of all parts of the procedure, modify if necessary.
- Keep monitoring.

Risk Assessment is not an idea of the 1990s. As long ago as 1865 a judge said:

“Although in general an employer was not liable unless he knew of the danger... it was his business to know if by reasonable care and precaution he could ascertain whether the apparatus or machinery were in a fit state or not.”

In other words the employer should assess the risks.

What should I look at next?

6. Safe places of work

What standards determine a safe place?

A safe procedure at work:

- **The Electricity at Work Regulations 1989 - STATUTORY**
- **IEE 17th Edition Wiring Regulations BS7671:2008 - NON-STATUTORY (Best Practice)**

BS7671:2008 has the status of a British Standard and relates principally to the design, selection, erection and inspection and testing of electrical installations. Whilst not statutory, the Regulations represent what is considered 'best practice' in these areas. There is a comment in the introduction of both the Electricity at Work Regulations 1989 and BS7671 which states that compliance with BS7671 is likely to achieve compliance with the relevant aspects of the Electricity at Work Regulations 1989. This is why all reports should be in accordance with Chapter 62 of BS7671, so they can if required be used for a defence in the event of an electrically related incident in the workplace. Bearing this in mind, it is essential that the installation is inspected and tested at appropriate intervals to establish its condition. This in turn may well give rise to certain remedial actions necessary to ensure the installation is safe to remain in service until the next scheduled inspection and test.

- **Guidance Notes - NON-STATUTORY (Best Practice)**

The Guidance Notes are a series of eight books issued by the IEE Wiring Regulations Policy Committee to enlarge and amplify the requirements of BS7671:2008. Greater detail with respect to inspection and testing and electrical drawings can be accessed via these documents with particular emphasis on Guidance Notes 1 & 3.

Do the Electricity at Work Regulations require inspection and testing?

Yes! Inspection and testing is required

The Electricity at Work Regulations 1989 in Regulations 4(1) and 4(2) lay down the requirement to ensure that an electrical installation should be designed, installed, constructed and maintained in a safe manner at all times.

No respite. No days off...at all times!

It then advises in its Guidance Notes that 'Records of maintenance, including test results...will enable the condition of the equipment and the effectiveness of maintenance policies to be monitored.' This is called 'effective monitoring.'

Comment:

Why follow the Electricity at Work Regulations Guidance Notes advice to inspect and test?

Doing so will satisfy the law and provide the defence that the 'Duty Holder' 'took all reasonable steps and exercised all due diligence in order to avoid committing an offense.' (Electricity at Work Regulations 1989: Regulation 29)

Can we do the inspection and testing ourselves?

Certainly - if you have the resources. Unfortunately most companies do not. Many organisations recognise the specialist nature of the work and out-source it.

Comment:

The maintenance staff of most organisations are too hard pressed keeping the plant running, sometimes around the clock, to carry out an effective regime of inspection and testing.

In addition most maintenance engineers, whilst being very effective in faultfinding, repairs and other such things, lack the necessary skills required for inspection and testing. It is a specialist activity.

The other factor to remember is that most electrical faults were designed and installed that way - they did not deteriorate into that condition. They were probably installed under very difficult conditions by persons trying to maintain production. In addition they may well have been put there by the maintenance electricians that are now being asked to comment on the installation in their inspection and testing reports.

So who could I choose to do the work?

Why not my favourite local contractor?

Before employing anyone to carry out this specialist work, check the following:

- What experience do they have in Periodic Inspection and Testing (existing installations)
- What are the qualifications of their testers?

Do they have:

- A formative recognised electrical apprenticeship
- City & Guilds 2382-10 - IET 17th Edition Wiring Regulations BS7671:2008)
- City & Guilds 2391-10 - Inspection, Testing and Certification of Electrical Installations.
- City & Guilds 2391-20 - Design, Erection and Verification of Electrical Installations. (Someone in the organisation should have this qualification - preferably the senior tester, who can comment on the installation and tell you if it has been design to current standards).
- Have you seen samples of their previous work?
- Did this contractor install any of the defective work previously? Are the operatives responsible for the defects the best people to identify them and put them right?

How about an approved contractor?

The NICEIC (NICEIC Group Ltd.) is a wholly owned subsidiary of the Electrical Safety Council which is an independent consumer safety body set up to protect users from unsafe and unsound electrical installations.

The Electrical Safety Council licences to the NICEIC a roll of approved contractors which the NICEIC assesses each year to ensure their work meets the requirements of BS7671 and other relevant technical standards.

An approved NICEIC contractor must have a Principal Duty Holder and employ one or more Qualified Supervisors.

The **Principal Duty Holder** is a full time principal or senior manager of the business responsible for the maintenance of the overall standard and quality of the electrical installation work undertaken by the business from a particular location. Principal Duty Holders are not subject to assessment.

The **Qualified Supervisor** is assessed as being electrically competent. He has specific responsibility on a daily basis for the safety, technical standards and the quality of the electrical installation work under his supervision. As part of the NICEIC assessment, they will have been assessed against the requirements previously listed in the contractor checklist.

So is NICEIC status enough?

Will any NICEIC contractor do?

Comment:

It is the first tick in the box as some NICEIC Approved Contractors do have appropriate skills, knowledge and experience to carry out Periodic Inspection and Testing of Installations.

It is, however, the 'Duty Holder's' responsibility to ensure that individuals undertaking the inspection and testing are competent to do so, by following the advice given on page 14 of this booklet.

Whilst the NICEIC assessment is rigorous with respect to the Qualified Supervisor(s) and their level of competence, the assessment does not extend to the individuals employed by the company, either as direct or sub-contract staff.

In order for the 'Duty Holder' to discharge his responsibilities with respect to competence, Regulation 16 (Absolute) of the Electricity at Work Regulations 1989 must be remembered: 'no person shall be engaged in any work activity where technical knowledge or experience is necessary to prevent danger or, where appropriate, injury unless, he possesses such knowledge or experience, or is under such degree of supervision as may be appropriate having regard to the nature of the work.'

In summary, the 'Duty Holder's' responsibility to employ competent persons is not automatically discharged by employing an NICEIC registered company, it is merely advisable as the first check. The 'Duty Holder' must look further.

Conclusion:

Choose a specialist testing organisation that can guarantee the competence of directly employed staff. Ask for qualifications and experience of the individuals booked to carry out work at your premises because there is now a clear distinction between an Inspector and an Electrician who undertakes inspection and testing now and again.

So, you have found yourself a good, proven testing organisation and a good contractor to put right what they find.

What records can I expect from them?

Do I need drawings?

Electrical Network Drawings

The current edition of BS7671:2008 (17th Edition Wiring Regulations) requires circuit diagrams and other information (Regulation 514.9). In commenting on this requirement - Guidance Note 3 to the Wiring Regulations (Inspection and Testing) indicates that it is also a legal requirement to have Network Drawings.

It states that:

'If the inspection and testing cannot be carried out safely without diagrams or equivalent information, Section 6 of the Health & Safety at Work Act 1974 can be interpreted to require their preparation.'

Furthermore:

Regulation 12 of the Electricity at Work Regulations 1989, an ABSOLUTE regulation, calls for methods of identifying circuits by marking, labelling or numbering.

Comment:

In order to proceed with inspection and testing in a safe manner, information diagrams/drawings are required so that correct isolations can be undertaken and cables verified.

This is also part of your 'safe procedures at work' covered earlier.

Note: most contractors and testing organisations are not aware of the legal requirement for network drawings and are not normally geared up to provide them, they are not able to point the client in the right direction.

Clients who do not know they are a legal requirement and therefore do not know to ask for them when placing orders for testing programmes.

Accurate network drawings in complex installations will not only provide a safe system of work for maintenance and other staff, but will also serve to improve the efficiency of maintenance and installation work.

What other records should I have?

What about certificates?

Essentially there are three types of certification associated with electrical inspection and testing, two of which are:

Electrical Installation Certificate

Designed for use when inspecting and testing a new installation or an alteration or addition to an existing installation where new circuits have been introduced. Electrical installation certificates will indicate the responsibility for design, construction and inspection and testing.

Note: be sure to ask for this documentation from your contractor!

Minor Works Certification

Designed for use when an addition to an electrical installation does not extend to the installation of a new circuit such as the addition of a socket, or light to an existing circuit or repair of remedial items highlighted in a Periodic Report.

Here is a sample of a Minor Works

'Certificates' that follow inspection and testing

Periodic Inspection Report (Not actually called a certificate)

Designed for use when undertaking routine periodic inspection and testing in order to produce a report on the condition of an existing installation. There is no mention of 'testing' in the title. This is quite simply because it is a **condition report** of the electrical installation supplemented by testing as required.

PART 3: INSPECTION AND TESTING OF THE MODIFIED CIRCUIT AND RELATED PARTS		Electrical inspection and testing
1 Confirmation that necessary inspections have been undertaken	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1 Dead-circuits: R_n , R_s , R_L or R_e , R_i	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1 Insulation resistance: * in a multi-phase circuit, across the lines or line-earth or equipment	Phase/Phase* <input type="checkbox"/> Phase/Neutral* <input type="checkbox"/> Phase/Earth* <input type="checkbox"/> Neutral/Earth <input type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
		1 Confirmation of the adequacy of earthing <input checked="" type="checkbox"/>
		1 Confirmation of the adequacy of substation bonding <input checked="" type="checkbox"/>
		1 Confirmation of correct polarity <input checked="" type="checkbox"/>
		1 Maximum measured earth fault loop impedance, Z_s <input type="checkbox"/>
		1 RCD operating time at $I_{\Delta n}$ of RCD (kVA) <input type="checkbox"/>
		1 RCD operating time at 100 mA, if applicable <input type="checkbox"/>

Agreed limitations, if any, on the inspection and testing:

PART 4: DECLARATION

I/We certify that the minor electrical installation works, as detailed in Part 1 of this certificate, have not impaired the safety of the existing installation, that the said works have been designed, constructed, inspected, tested and certified in accordance with BS 7671:2018 Wiring Regulations, amended on the date shown and that, to the best of my/our knowledge and belief, at the time of making inspection, the works comply with BS 7671:2018 except as detailed in Part 1 of this certificate.

Name (CAPS)	For and on behalf of
Signature	the client or
Position	Administration
Date	Address and Postcode
Contractor's Name	Branch number (if applicable)
	(This must be written in a separate document)

This form is based on the model shown in Appendix 8 of BS 7671: 2018 as amended 2019
Published by the National Inspection Council for Electrical Installation Contracting © Copyright NICEIC March 08

Please use this Model for Reference
for the reverse of this page.

Certificate (Parts 3 & 4 only)

Content of a Periodic Report

The Periodic Inspection Report will normally consist of a number of pages covering client information and details of the installation, supply characteristics and earthing arrangements, observation and recommendations, extent and limitations of testing, a summary of the inspection, test schedules and an inspection schedule.

Comment:

The majority of the space allocation is devoted to test results. Unfortunately, there is precious little room left for the most important part - the recording of observations and recommendations.

So what do I need? Three things:

1. Test Results - But they must be genuine and as a supplement to...
2. A Condition Report - Qualified against the standards i.e. BS7671 and EaWR. Bear in mind that up to 90% of faults can be found by a visual inspection undertaken by a competent inspector.
3. A Schedule of Defects - Coded 1, 2, 3 & 4 against BS7671 with recommendation remedial action as appropriate.

The foregoing emphasises the need to have competent testers who do not just know how to write down test results, but who are qualified to comment on the installation.

Connaught Electrical have developed their own method of reporting observations and recommendations, where the client can clearly see the condition of their electrical installation.

What should I do about any reported defects?

Must I rectify all defects?

The meaning of defects codes

Defects recorded in a Periodic Inspection and Testing Report will usually follow the definition suggested by BS7671:2008 - namely codes 1, 2, 3 & 4.

Each recorded observation should describe what the defect or omission is, where it is located and qualified by the appropriate BS7671:2008 Regulation number. It should be reported factually, given a recommendation coding of 1, 2, 3 or 4 and reported as a statement of fact and not as a proposal for remedial work. Reports detailing all the foregoing information will assist the client in carrying out necessary remedial action and ensure the electrical installation is safe to remain in service.

Recommendation Code 1

Any observation given this coding requires urgent or immediate attention and the 'Duty Holder' should be informed immediately in writing.

Recommendation Code 2

This code indicates that the particular observation requires improvement as soon as possible so the safety of the electrical installation does not deteriorate.

Recommendation Code 3

A code 3 recommendation indicates that the particular observation requires further investigation i.e. it is outside the agreed scope of works and should be looked at as soon as possible.

Recommendation Code 4

Observations with a code 4 mean that although there is non-compliance with the current edition of BS7671:2008, it is not in an unsafe condition. However, consideration should be given to improving these aspects of the installation.

Comment:

In our experience most clients immediately rectify only code 1 and 2 items and decide to remedy codes 3 and 4 as part of ongoing maintenance.

Carry out a Risk Assessment to determine what action is appropriate.

But I have never done any testing before - what should I do?

A programme to show 'Legal Intent'

If you have done little or no inspection and testing before then the chances are you will not have budgeted for the work.

How does one show intent to comply with the law without crippling the business? Whilst the HSE would probably never formally endorse the approach it appears to be normal practice in industrial situations for a comprehensive inspection and testing programme to be budgeted over, say, three years.

This decision must again be part of your risk assessment.

A typical programme might be:

Year 1, 2010 - Complete network drawings, 100% inspection and testing of approximately 1/3 of site.

Year 2, 2011 - 100% inspection and testing of another 1/3 of site.

Year 3, 2012 - 100% inspection and testing of final 1/3 of site.

Once comprehensive reports and drawings have been compiled, a future policy for inspection and testing must be decided upon.

The Connaught Approach

When an inspection, testing and training programme has been completed, for example, over a three year period, an Effective Monitoring Programme is introduced. This ensures compliance with the Electricity at Work Regulations 1989 and is considerably cheaper than the cost of the initial programme since the level of the inspection and testing will be reduced.

A typical programme of Effective Monitoring might be:

Year 4, 2013 - Update network drawings, 100% inspection and sample testing from 2010.

Year 5, 2014 - Update network drawings, 100% inspection and sample testing from 2011.

Year 6, 2015 - Update network drawings, 100% inspection and sample testing from 2012.

Is there any cheaper way?

Money is tight so could I just test say 20% as a sample?

Yes you can - as long as you have previous records of testing. But if you have no records how can you defend yourself in a court of law if you do not know the condition of the other 80% which has not been tested?

What does legislation say about sample testing?

To fully understand this contentious issue the 'Duty Holder' must undertake research and consult the publications which focus on Electrical Safety and understand their status in law. The documents that should be consulted are:

The Electricity at Work Regulations 1989
(Statutory - The Law)

17th Edition Wiring Regulations BS7671
(Non-statutory - Code of Practice/British Standard)

GN3 Inspection and Testing (Guidance)

The relationship between the documents

The introduction within the Memorandum of Guidance on the Electricity at Work Regulations 1989 (EaWR 1989) states that 'compliance with BS7671 is likely to achieve compliance with the relevant aspects of the Electricity at Work Regulations.'

GN3 Inspection and Testing whilst providing good guidance, does state 'while the publisher and contributors believe the information and guidance given in this work is correct, all parties must rely on their own skill and judgement when making use it.' Effectively a disclaimer.

What happens in practice?

Contractors generally take the contents of GN3 and use this as a basis for dilution in inspection and testing activities. They are not aware of do not consult what either EaWR 1989 or BS7671 have to say.

Regulation 4(1) of The Electricity at Work Regulations 1989 (The Law) states that 'all systems shall at all times, be of such construction as to prevent, so far as is reasonably practicable, danger.

System - anything from a battery to the National Grid.

All times - no respite, no days off.

Construction - designed, installed, maintained and operated.

Paragraph 69 goes on to state that: 'Records of maintenance, including test results must be kept; otherwise a 'Duty Holder' cannot be certain that the requirement for maintenance has been complied with.

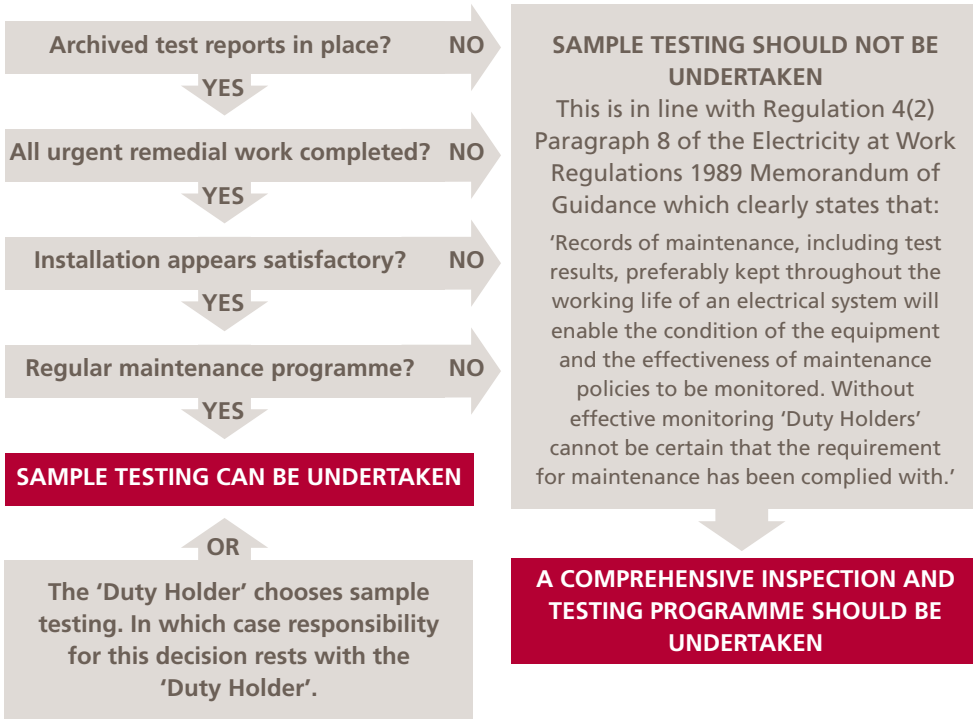
Regulation 621.1 of BS7671 (Code of Practice/British Standard) states that 'where no previous documentation is available, investigation of the electrical installation shall be undertaken prior to carrying out the periodic inspect and test.'

'Duty Holders' seriously need to look at this regulation before sanctioning sample testing.

Would Connaught ever sample test?

If the client has no inspection and testing records or network drawings we strongly advise 100% inspection and testing as far as reasonably practicable supplemented by the network drawings.

The following flowchart illustrates the conditions when comprehensive or sample inspection and testing programmes should be undertaken:



However, under certain circumstances, such as where the client is prepared to act against advice, or where money is so tight that the client cannot afford a 100% programme yet he wants to do something to mitigate his risks, we can modify our programmes accordingly.

Comment:

A number of testing companies carry out sample testing as a matter of standard routine. Unfortunately the emphasis is on test results rather than condition reporting and this is open to abuse.

Connaught Electrical has encountered a number of instances where a testing company carried out work in a subsequent year and has produced 'results' which are test readings of the same circuits with the same results as the previous year's sample test!

Regrettably a number of organisations employ 'testers' who are skilled at writing numbers down which the client has no competence to challenge and do not result in a safe place electrically.

Note: before employing any testing company check out:

- **References from other clients.**
- **Samples of previous work - documents, test reports etc.**
- **Qualifications of staff involved in the work.**
- **Issue comprehensive specifications that can be checked against quotations.**

So we have covered safe systems and safe places of work. Now what?

7. Safe people at work

What makes a 'competent' person?

Regulation 16 of the Electricity at Work Regulations 1989 states that: "No person shall be engaged in any work activity where technical knowledge or experience is necessary to prevent danger..., unless he possesses such knowledge or experience, or is under a degree of supervision as may be appropriate having regard to the nature of the work."

Competence is a 'cocktail' of items which includes knowledge of electricity, experience of electrical work, understanding the system being worked on, understanding all the hazards and precautions and ability to recognise danger and when it is safe to work.

Note: only YOU, the employer can declare an individual 'competent.'

What training would be appropriate for my staff?

City & Guilds Electrical Series - e.g. 17th Edition Wiring Regulations, Portable Appliance Testing, Inspection, Testing and Certification, Design etc. of Electrical Installations, Electrical Machine Safety, Electrical Risk Assessment, Electricity at Work Regulations course, 1 Day 'Duty Holders' course, Electrical Safety Awareness, 3 Day Basic Electrical.

Management of Health & Safety

- e.g. NEBOSH, The National General Certificate and IOSH, Managing Safely.

Partnering Scheme

Companies entering into inspection and testing programmes with Connaught Electrical are issued training vouchers which can be redeemed against brochured courses and assist in compliance with Regulation 16 of the Electricity at Work Regulations 1989.

Companies are also issued with our general Code of Practice for safe working on low voltage electrical systems, which if adhered to can help provide a defence in the event of an incident under Regulation 29 of the Electricity at Work Regulations 1989.

Connaught Electrical

Electrical Inspection, Testing and Drawing Programme
(Safe places of work)

+

Training Programme
(Safe people at work)

+

Code of Practice
(Safe systems of work)

Client

Compliance with Statutory Regulations
(Safe places of work)

+

Trained staff qualified to the latest City & Guilds and Management of Health & Safety standard
(Safe people at work)

+

Safe Working Procedures
(Safe systems of work)

=



Now that I have accurate records, how do I maintain or update them?

8. How to stay in control

Inspection and testing programmes and comprehensive reporting of the results is a crucial factor in creating and maintaining an electrically safe environment. But how do you continue to maintain that high standard? After all, having made a major investment in compiling accurate electrical inspection and testing records, distribution board schedules or electrical distribution drawings, there is always the danger that they can become outdated within a short space of time.

Contractors or maintenance staff undertaking electrical works and not updating the relevant documents can also compromise them. Conversely, if all works are being reported then records can also become clogged with just too much data. For example it may take an eternity to find certain information such as a correct distribution board schedule.

This situation could be considered something of an inconvenience when undertaking planned or reactive maintenance. However, if a maintenance manager is requested to produce all relevant records for an inspection, for example in order to comply with the Electricity at Work Regulations 1989, then the ability to locate and collate your information quickly can easily become paramount.

Connaught On-Line Management

An on-line Management and Control System can make achieving compliance so much simpler.

This unique web based system, allows the user to control all aspects of their company or organisation's inspection and testing records, distribution board schedules, electrical drawings etc.

Using the system is simplicity itself. Only a Microsoft Windows based PC and internet connection, ideally broadband, are required. It is completely secure however, indeed, the system has been designed to be as secure and resilient as possible with each user allocated a unique user name and password for access. This allows all changes and modifications to be tracked for security and reference purposes.

The key features of the Connaught on-line system are the Historic Records Document Management Module and the Change Control Management Module.

The Historic Records Document Management Module. This module is the central component of the system, providing full storage; access and management of all existing electrical records in a web based environment.

The system can accommodate all types of documentation including network drawings, remedial reports, periodic reports, dangerous electrical condition notification etc. It also stores information in a hierarchical order, giving the user the opportunity to access earlier or later versions of each document showing where and when documents were changed and when they were stored.

Records are stored as digital files within the system and can be accessed and updated by any authorised person from a PC with an internet connection. This makes ongoing management and updating much easier and effective than working with traditional paper based records and contributes greatly towards compliance with the relevant regulations.

The Change Control Management Module. This module allows users to record all changes made to their electrical infrastructure and ensure that the relevant records and documents are updated to reflect such changes. The Change Control Management Module has been designed to be intuitive and flexible with users being prompted for the information that they need to provide, depending on the type of work that has been carried out.

The system also incorporates electronic versions of Minor Works and Electrical Installation Certificates, removing the need to work with traditional paper forms. Full workflow and approval procedures are also built into the system, allowing managers to monitor and control the change notifications.

Additional Modules. In addition to these two key modules Connaught On-line Management System can be customised

as required to provide any additional management systems or procedures.

For example staff training records could be included, incorporating a tracking system with e-mail alerts for qualification expiry dates. The system allows total flexibility for the types of qualifications and other information that you may wish to store.

Meeting the needs of the 'Duty Holder'

Both the Historic Records Document Management Module and the Change Control Management Module can be used to good effect as a means of meeting regulatory requirements. For example, 'Duty Holders' have a legal requirement under Regulations 4(2) and 12 of the Electricity at Work Regulations 1989 to ensure that their responsibilities have been effectively discharged by ensuring circuits are identified at all times. They also have to be able to demonstrate evidence of maintenance including the archiving of electrical records for the "working life of the electrical system."

These two modules offer the user exactly that type of facility. The system can easily store and reproduce all the relevant records, maintenance schedules, current network drawings, all the information required by 'Duty Holders' to defend themselves under Regulation 29 of the Electricity at Work Regulations 1989.

Finally. What if I get an inspection?

9. An inspector calls

Remember that EaWR requires your electrical systems to at all times be maintained so as to prevent danger. Your Insurance Surveyor will expect no less. Try to look at your premises through their eyes. For example:

What does the client do on his premises?

- Does it involve work in wet conditions, cramped or confined spaces, in corrosive atmospheres around Fork Lift Trucks, where subject to mechanical damage etc.?

Are there electrical panels on site?

- What is their condition?
- Are they open to direct contact with electrical conductors?
- Are doors left open?
- Are trunking lids left off? If any of them are, the inspector will ask if they are designed to be that way.

What is the evidence of maintenance being carried out?

- How much down time for maintenance does production allow?
- Is production 24/7?
- Are maintenance staff 'fire-fighters?' Mechanical rather than electrical?
- Are there any maintenance records?

What is the condition of their machinery?

- Are there any damaged flexes, poorly routed and installed cables?
- Is there an atmosphere of neglect?

What is the attitude of management etc?

- Are there adequate resources for maintenance?
- Is maintenance out-sourced?
- Is the organisation which carries it out competent?

What does the installation look like?

- Is it untidy and dangerous looking etc?
- Who installed it? In-house? Out-sourced? Are they competent?

Has a suitable Risk Assessment been made?

- Is there a safe system of work in place?
- Have the staff been trained in it?
- Has any inspection and testing been done and are there records?
- Are drawings in existence and up to date?
- If the HSE find something wrong and issue an Improvement Notice they will give you a schedule of remedial action required.

What typically would be included?

10. HSE requirements

Improvement Notices

We reproduce here an actual Improvement Notice issued to a client.

(Note: These are not facsimiles)

Health & Safety at Work etc. Act 1974, sections 21, 22 and 224	
Improvement Notice	
To:	Name
	Trading as
Inspector's full name	I,
Inspector's official designation	one of Her Majesty's Inspectors of Health & Safety, being an Inspector appointed by an instrument in writing made pursuant to section 19 of the said Act and entitled to issue this Notice
Official address	of
Telephone number	hereby give you notice that I am of the opinion
Location of premises or place of activity	at
	you, as An employer
	are contravening the following statutory provisions
	Health & Safety at Work etc. Act 1974 section 2(1)
	Management of Health and Safety at Work Regulations 1999, Regulation 5
	Electricity at Work Regulations 1989, Regulation 4(3), 4(4), 14, 16
	The reasons for my said opinion are:
	Effective arrangements have not been made for ensuring that maintenance operations on electrical systems are carried out in such a manner as not to give rise to danger
Date for compliance	and I hereby require you to remedy the said contraventions or as the case may be, the matters occasioning them, by 31st October 2003
	and I direct that the measures specified in the Schedule which forms part of this notice shall be taken to remedy the said contraventions or matters
Signature	

Note the Electricity at Work Regulations referred to by the HSE:

- Reg 4(3) and 4(4) - Systems safe at all times (Safe System - Safe Place)

- Reg 14 - Live Working (Safe System)
- Reg 16 - Competence (Safe People)

Note the rest of the HSE findings...

The annotations and symbols featured are ours.

The initial findings of our investigation revealed that you had not assessed the risks associated with electrical maintenance or implemented any safe working practices for such work. You were relying on the individual electrical personnel to work safely.

Improvement Notice No.

I am therefore serving an Improvement Notice under the above regulations requiring you to implement suitable management arrangements for all electrical work on your premises. The schedule attached to the notice sets out the aspects of electrical safety that you will need to competently address in order to comply with the notice. Please read the Improvement Notice carefully as compliance will be measured against its contents.

You should begin by carrying out a risk assessment for work on electrical systems at your premises. Whilst the notice refers specifically to maintenance you should also consider the operation and use of equipment in your assessment.

Schedule

To comply with this notice you should either complete 1 and 2 and 3 or complete 4

1. You should implement a management system for electrical maintenance operations. This should include defined responsibilities for individuals, arrangements for the planning of work, providing and implementing of safe systems of work and the arrangements for supervision of employees and control of contractors.
2. Safe systems of work should be produced for work on electrical systems throughout the factory. These should specify the safeguards or control measures required to prevent injury. Including:
 - a. For routine electrical work generic systems of work are likely to be sufficient. For work identified as high risk specific written safe systems of work should be provided and implemented. This should include the use of permit to work systems where necessary.
 - b. You should identify the competencies of any personnel involved in electrical work and ensure they possess sufficient knowledge and experience for that work. Safe systems of work should identify who is authorised to carry out particular types of work or work on specific systems.
 - c. Safe systems of work should identify what electrical test equipment and tools are suitable for the type of work being undertaken.
 - d. Your management systems should include arrangements for identifying equipment where access is required into live control systems for example for fault finding or testing purposes. Safe systems of work should identify situations where the provision of suitable and sufficient shrouding, or other means to prevent contact with exposed conductors at dangerous voltages needs to be considered prior to work beginning.

Training should be provided for all electrical maintenance personnel in the new safe systems of work to be provided for maintenance operations.

Safe procedures

Safe people

Safe place

Safe people

Need more help? Then contact Connaught Electrical

The aim of this booklet is to give a better understanding of the elements that are necessary to provide electrically safe working conditions for your own staff, contractors and visitors to your premises.

It will also indicate:

- How to keep clear of prosecution by the HSE.
- How to avoid litigation from persons damaged or injured because of accidents and incidents.
- How to satisfy the increasingly onerous demands of your insurers.
- The levels of competence required of your staff and contractors.

It will help you to establish the three building blocks of electrical safety:

- Safe places of work
- Safe people at work
- Safe systems of work

Connaught Compliance Electrical Services

Bradmarsh Business Park
Rotherham S60 1BY

Tel: 01709 360 621

compliance.electrical@connaught.plc.uk

www.connaughtelectrical.co.uk

Connaught Health & Safety Compliance

For integrated compliance services call 0844 335 0135

compliance.enquiries@connaught.plc.uk

www.connaughtcompliance.com

Connaught Health & Safety Compliance is the UK's leading provider of integrated services to help businesses identify and minimise risk, remove unnecessary costs and improve performance.