



## ELECTRICAL SAFETY ON CONSTRUCTION SITES COURSE: BS7375

COURSE 375: 1 DAY: Max 8 Candidates

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 BS7375 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 the:

- 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 BS7375.**

# WHAT DO CANDIDATES ON THE CONSTRUCTION SITE SAFETY COURSE ACTUALLY DO?

The course on BS 7375 is often 'tuned' to suit the audience on the day, (dealing with mixtures of electrical engineers, site foremen and managers for example) and our instructors promote structured debates on the key topics within the Standard which are of interest to the candidates.

We look at the way in which electricity is distributed around a construction site: how reduced low voltage systems are used and what they can power; where 230V and 400V supplies are used, etc. It's important that the candidates know about the effects of electric shock so we cover that in detail, making particular mention of the fact that electrical shocks sustained in a construction site scenario are likely to be more dangerous than shocks sustained indoors in a dry environment. The candidates need to know about the dangers of overloading, short circuit and earth faults so we also look at these in a little detail and explain how fuses, circuit breakers and earthing are used to combat these dangers. These important issues are explained in a way that the candidates can understand without getting involved in all the theory behind the issues. The following are extracts from the course notes for this part of the course.

**Use of Reduced Low Voltages**

The use of reduced voltages, such as extra low voltages (SELV AC/230V DC), or reduced voltages (e.g. 110V AC/230V DC) can reduce the level of danger because the magnitude of current flow through the body is significantly reduced.

However, even these lower voltages can be dangerous depending on circumstances: climatic conditions, contact area, moisture, exposure atmosphere, etc. Reduced low voltage systems can be either single phase or three phase.

Reduced voltage supplies are available through:

- temporary installations
- mobile generators
- portable transformers for power tools.

**This is page 8 of the course notes for the BS7375 course, describing how RLV is used on construction sites**

In the pictures the three most common shock paths are shown. The most damaging shock is the hand-to-hand shock as the shock current travels past the heart, but usually there are earth impedances in the shock path (shoes, wooden floors etc) that reduce the shock current. The hand-to-hand shock is considered more dangerous as there are no additional impedances in the shock path and therefore higher currents tend to flow (but note that when the additional impedances are not present or hard to fault shocks that they would be more dangerous). The higher shock currents of 100mA would be sustained in shocks across the fingers. The following graph shows how the level of shock current and shock duration affects humans.

Shock duration effects may produce no noticeable effect but as the current level and duration increases pain, burns and the possibility of death increase.

**DC and Higher Frequency Shocks**

The body's impedance to AC is lower than the body's impedance to DC of similar voltage. A higher DC voltage is therefore necessary to cause the same level of current that AC would have done of similar voltage. However, at similar voltages the difference is minimal but the effects of AC current are far more damaging for humans than the effects of DC current (about twice as much at 50Hz AC). At higher frequencies (MHz) the skin's impedance reduces (due to skin effect) and the body's impedance is lower (as approximately 70 ohms of more voltages instead of 1000 ohms). Shocks from static, and military equipment (GHz) and satellite mobile power supplies or weather (MHz) can therefore be even more dangerous than 50Hz supply or DC systems.

**This is page 10 of the course notes for the BS7375 course, explaining the effects of electric shock**

**Circuit Breakers (CBs)**

The main difference between a fuse and a circuit breaker is that where a fuse must be replaced, a circuit breaker simply resets.

**Circuit Breaker Characteristics**

Another important difference between fuses and circuit breakers is that a circuit breaker contains two separate mechanisms, allowing it to discriminate between an overload and a short circuit.

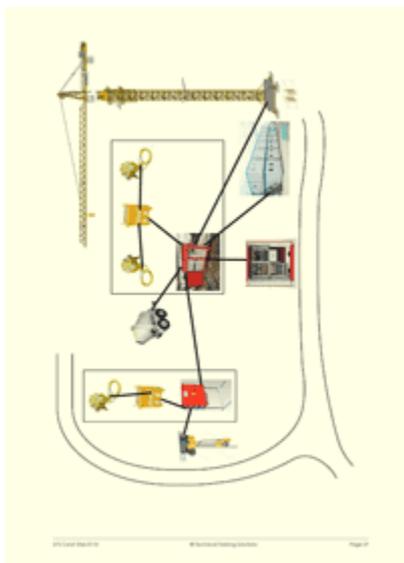
This means that a circuit breaker's characteristics look different from the single curve on the fuse's characteristics, as shown on the following graph for a selection of BS EN 60898 circuit breakers.

Overloads slightly higher than the full load current can be tolerated for several minutes. In order for the most CBs used in domestic to provide overload protection, at the other extreme, a short circuit would give rise to a current rise much higher in value than the full load current, and would require rapid disconnection. In a circuit breaker this is usually achieved using an overcurrent release.

Notice that for loads of currents just above the circuit breaker's nominal rating, operation is very slow and that to achieve a disconnection time of, for example 0.4 seconds, a current much larger than the nominal rating needs to flow.

**This is page 21 of the course notes for the BS7375 course, explaining how circuit breakers operate**

The course goes on to look at the requirements of BS7375 with particular emphasis on how cabling should be structured, the types of connectors that should be used, the required IP ratings, etc. The following are some of the course notes for this part of the course.



This is page 27 of the course notes for the BS7375 course, showing how electricity should be distributed around a construction site



This is the page 37 of the course notes for the BS7375 course, showing what sort of lampholders are required, how underground cables should be marked and the importance of proper isolation procedures

**Assessment for Course 375: Elec Safety on Construction Sites**

1. What voltage exists between L1 and N on a three phase delta board?

- a) 240V ac.
- b) 400V ac.
- c) 110V ac.
- d) 230V ac.

2. Raising provides protection against

- a) overloads
- b) short circuits
- c) direct contact shock
- d) indirect contact shock.

3. A TN-C-S earthing system has

- a) an earth electrode on the consumer's side of the supply
- b) a combined neutral and earth from the source to the supplier's intake assembly
- c) separate neutral and earth conductors throughout the system
- d) no need to have any earthing.

4. IPXX indicates that the item is

- a) unswitched
- b) capable of being immersed in water safely
- c) protected from contact with a protruded finger
- d) 2 times the normal protection in the IP standards.

5. A BS88 2 fuse rated at 16A will blow

- a) when 16A flows through it
- b) when 16A flows through it
- c) when 20A flows through it
- d) when the earth is disconnected.

This is the page 52 of the course notes for the BS7375 course - the first page of a 20 question multiple-choice assessment paper that the candidates have to complete to the instructor's satisfaction

The course finishes with a 20 question multiple-choice assessment paper, which tests the key issues that the candidates should have learned.

**If you would like to learn more about the course on BS7375 - Electrical Safety on Construction Sites then please call us.**

**CONTACT US**

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