

NEELACHAL ISPAT NIGAM LTD



Electrical Safety System

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Confidentiality Statement

The information in the document mentioned is not confidential and have been taken references from various sources as specified.

Abstract

Safe use of electrical tools & working near high voltage facilities.

About the Author

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Intended Readers

Applicable to all EPL project sites, Central EPC functions and supporting functions

Introduction

Description

9.1 All cables, plugs and socket connectors shall be maintained in good condition. Cables must be effectively attached to the plug connectors by efficient cord grips to relieve all strains on the flexible cable. Damaged cables should be replaced.

9.2 The use of several short leads to reach the power source increases the risk of electrical fault. A single extension lead shall be used in all cases and these should be routed accordingly to ensure that they do not present a tripping hazard.

9.3 Electrical tools shall be isolated from the source of supply when changing attachments, making minor adjustments or repairing.

9.4 If an extension lead has to be used, a proper connection beginning from the tool and working towards the power source shall be ensured. An improper connection or faulty tool will blow the fuse rather than shock the user. There must be good connection to earth.

9.5 When electrical tools are used in wet areas, the operator is exposed to greater hazard of electric shock. All insulation must be sound and insulating mats/rubber gloves shall be used, while handling such live tools.

9.6 All portable electrical tools shall be tested and inspected by a competent person on their first receipt, observation and test results to be logged.

9.7 All portable electrical tools shall be physically inspected regularly and if any defects found are rectified, they shall be logged.

9.8 Portable electrical tools used on platforms shall be provided with ground fault current interrupters.

9.9 All temporary electrical installations supplying electricity to any portable electrical equipment shall be provided by effective earth leakage circuit breakers (ELCB) with a tripping current of not more than 30 mA.

9.10 All plugs and sockets used for connecting any electrical equipment shall be heavy duty industrial type.

9.11 All electrical hand tools and equipment, including wires and cables shall be properly insulated with no exposed/naked wires or parts.

9.12 All wiring and cable connections shall be properly joined with cable or wire connectors.

9.13 Electric Shock Hazards

9.13.1 Some persons who handle electrical equipment mistakenly believe that their tolerance to electric shock is related to their ability to withstand the pain of the shock. Actually, the lethal incidence is a function of the amount and duration of current passing through the chest.

9.13.2 It is current, not voltage that heats a wire, and it is current that causes damage to humans. The following table shows effects of various currents on an

1 mA	Perception Threshold
1 – 3 mA	Mild sensation
3 – 10 mA	Painful sensation
10 mA	Paralysis threshold of arms
30 mA	Respiratory paralysis
75 mA	Fibrillation threshold (0.5%)
250 mA	Fibrillation threshold (99.5%)
4 A	Heart paralysis threshold
> 5 A	Tissue burning

9.13.3 As the magnitude of the current increases, the current proves to be more dangerous as a cause of burns than as a cause of heart failure

9.14 Work near high voltage facilities

9.14.1 When work is performed near high voltage electric supply equipment or lines utilizing air-insulated configurations, such high voltage supply equipment or lines shall be isolated and grounded or the high voltage facilities shall have suitable guards installed which preclude encroachment into minimum safe working clearances from the energized facilities.

9.14.2 When work is performed near insulated high voltage electrical cables and associated cable apparatus, cables and associated cable apparatus are not required to be de-energized. For such cases, when cables or cable apparatus are requested to be de-energized, one electrical break is required. Utilization of protective safety grounds is optional.

10 Measurements and Monitoring

Frequency	Responsibility	Parameter
Monthly	Supervisor	Fitness of all cables

Acknowledgement

References

IS: 3043 Code of practice for earthing
IS: 5216 Recommendations on safety procedures and practices in electrical works

