Department of Jute and Fibre Technology, Institute of Jute Technology,

University of Calcutta

Syllabus for Vocational Workers' Training for Jute Sector to be Conducted by Department of Jute and Fibre Technology, Institute of Jute Technology, University of Calcutta, Under Integrated Skill Development Scheme Project (ISDS) Sponsored by Ministry of Textiles, Government of India

Module: XIV - Electrical Maintenance and Energy Conservation
Total Contact Hours 150 (One month Training)

Theoretical Syllabus (50 Hrs.)

A) Knowledge of electrical circuit and electrical machines. Installation of electrical wiring system and corresponding IE rules. Electrical lay out of a jute manufacturing unit.

B) i) Design and installation of illumination scheme of a jute manufacturing unit with special reference to process and production machinery material handling and movement and accepted visibility throughout the working hours.
ii) Electrical machines used in the jute industry their starting method and control and related I.E. rules.

C) i) Basic idea of electrical motors with classification, their use in various machines (processing / production), their installation methodology and maintenance.
ii) Fundamental idea of starter, isolator and capacitor needed for a particular a motor and their installation & maintenance.
iii) The necessity of a transformer and its use with capacity and maintenance.
iv) The electrical sub-station of a jute manufacturing unit, its need and correct placement within the campus for optimal voltage.
v) The function of switch-gears, their placement and maintenance.

D) i) Higher mechanical load leading to higher current consumption.
ii) Higher value of co-efficient of dynamic friction lead to higher current consumption.

E) i) Incoming voltage reduction at the entry point of any jute manufacturing unit shall lead to higher current consumption.
ii) Longer the distance between the motor terminals and the sub-station, the current consumption shall be higher owing to higher voltage drop.
iii) If, any motor is subjected to re-winding of stator and/or rotor for more than ¾ times, there shall be reduction in energy efficiency and as much the same will lead to higher energy consumption.
iv) All motors should have the facility of power factor improvement.

Practical

A) The concerned electrician should be conversant with the relevant electrical circuit, electrical wiring system along with IE rules. A senior electrician should be able to distinguish between various electrical machines along with their respective functions and electrical layout respectively.

B) i) Electrician to be conversant with the illumination of different department of the unit and adjoining places.

ii) The relevant electrician should be conversant with all the electrical machines along with their respective controls and related I.E. rules.

C) i) To be conversant with the working and maintenance of various electrical motors of the unit including stator winding and rotor winding respectively including the size of super-enamelled Cu-wire.

ii) To be conversant with the maintenance activities of starter (with special care to inspect and clean the contacts, so that, there is no melting of contacts leading to single phasing followed by burning of the motor and replacement of starter oil if, at all the old one has deteriorated), isolator and capacitor (and to confirm the rating of the same as per motor h. p). In case the capacitor has ceased functioning then the same should be replaced by a working one of equivalent rating.

iii) The concerned senior electrician should be conversant with the transformer maintenance involving centrifuging of transformer oil and to test the acid value of the same annual maintenance.

iv) Though the correct position of the electrical sub-station should be at the central zone of the manufacturing unit for optimal input voltage but it may not be possible for all the units to have the said facility for the said units, lay out and planning and as such the senior electrician should be aware to receive near optimal input voltage and instruct the junior electricians to verify the voltage from time to time and report it to the concerned person (senior electrician).

v) The maintenance of switchgears are normally done during holidays, as because there is no scope to execute the work on a working day. The concerned electrician should take care of all the members of the switchgear which contribute to the on/off position smoothly without delay.

D) i) The concerned electrician along with his mechanical counterpart should endeavour to reduce mechanical mass through improved design after getting approval from the engineer for lesser current consumption and hence energy conservation.

ii) a) By resorting to appropriate lubrication and lubricant of processing/production machinery the mechanical load shall be reduced leading to Lesser current consumption.