BASIC HOME/OFFICE ELECTRICAL/ ELECTRONICS EQUIPMENT SERVICING

Level-II

Learning Guide-32

Unit of Competence: Apply Routine Problem Solving Techniques

Module Title: Applying Routine Problem Solving Techniques

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LO 2: Identify possible solutions

Instruction Sheet 1	Learning Guide # 32

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Considering safety and operating procedures
- Considering Strengths and weaknesses
- Corrective action

This guide will also assist you to attain the learning outcome stated in the cover page. Specifically, upon completion of this Learning Guide, you will be able to:

- Consider safety and operating procedures
- Consider Strengths and weaknesses
- Corrective action

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below 3 to 5.
3. Read the information written in the information “Sheet 1, Sheet 2,and Sheet 3.
4. Accomplish the “Self-check 1, Self-check 2, and Self-check 3.
5. Do the “LAP test” (if you are ready).

Information Sheet-1	Considering safety and operating procedures

2.1. **Electrical safety**

All systems which use electrical energy have the potential to cause serious harm.

Injuries caused by electric current

Electric current can pass through the body when the body becomes part of the electric circuit.

Electric current flowing through the body can cause:

Electric shock
Electrocution
Burns caused by electric current and arc flash

The severity of the injury depends on:

Amount of current flowing through the body.
Path of the current through the body.
Length of time the body is in the circuit.
The voltage of the current.

A person receiving a shock caused by grabbing a bare conductor can generally release himself when the current passing through his body is less than 15 mA.

The high resistance of a dry skin is rapidly broken down by a high voltage. High voltages can cause violent muscular contraction, often so severe that the victim is thrown clear.

An electric shock may injure the human body in several ways:

Contraction of chest muscles causing interference with breathing, leading to asphyxiation.

Temporary paralysis of the nerve center leading to breathing failure.

Ventricular fibrillation which is an irregular movement of heart muscles leading to failure of blood circulation. The heart cannot spontaneously recover, causing death.

Hemorrhage and destruction of nerves, tissues and muscles, caused mainly by heat.

When electricity passes through the body, it can interfere with the normal electrical signals between the brain and other body systems.

Arc flashes result in intense heat causing burns or ignition of other materials.

Contact with high voltage can cause burns in internal tissues.

Precautions to be taken while working with electricity

Check for damage on power plugs, wire and other electrical fittings. If found damaged, repair or replace damaged equipment immediately.

Keep electrical wires of equipment away from hot surfaces to prevent damage of the insulation.

Do not lay electric wires along passage. It can be a trip hazard. Further contact with sharp

edges can cause damage to insulation leading to short circuit.

Know the location of switches/circuit breaker boxes for use in case of an emergency.

All circuit breakers in the switch board must be clearly labeled for easy identification.

Access to circuit breakers must not be blocked.

Extension cords must be used only to supply power temporarily.

Do not handle electrical equipment when hands, feet or body are wet or perspiring, or

when standing on a wet floor.

Consider all floors as conductive unless covered with insulating matting of suitable type for electrical work.

Whenever possible, use only one hand when working on circuits or control devices.

Do not wear rings, metallic watchbands, chains etc. when working with electrical equipment.

Precautions to be taken while using power tools

before connecting the tool to the power supply, switch the tool OFF.

Disconnect power supply before making adjustments.

the tool must be properly grounded with a 3-wire cord with a 3-prong plug. Use double insulated tools wherever possible.

Do not use electrical tools in wet conditions or damp locations unless the tool is Connected to an Earth Leakage Circuit Breaker

Personal Protective Equipment

Personal Protective Equipment is an integral part of any employer's safety program. OSHA has determined that PPE although a good way to protect employees, should be used as a last line of defense and its important to understand the limitations of PPE in the workplace.

PPE for the Head

Employees must wear nonconductive head protection helemet wherever there is a danger of head in jury from electric shock or burns due to contact with exposed energized parts .

PPE for the Eyes & Face

Employees shall wear protective equipment for the eyes or face wherever there is danger of injury to the eyes or face from electric arcs or flashes or from flying objects resulting from electrical explosion.

When working on energized parts, the possibility of arc flash exists and the employee must be protected. Dangers could include heat, flying hazards and molten metal, therefore the PPE must be durable, non-conductive, heat resistant and provide deflection qualities

PPE for the Body (FR Clothing)

As we learned earlier, employees working in areas where there are potential electrical hazards must be provided with, and must use, electrical protective equipment that is appropriate for the specific parts of the body to be protected and for the work to be performed [see 1910.335(a)(1)(i)]. This would include flame resistant (FR) clothing.

During an arc flash event the temperatures can reach an excess of 35,000 degrees. Even at temperatures much lower, typical daily wear clothing would do little to protect the worker from being seriously injured. In fact, at such high temperatures, the clothing will ignite and continue to burn on the body well after the arc flash has dissipated. This is where serious injury and death often occur

PPE for the Hands (Gloves)

Since employees working on energized electrical parts are using their hands, obviously that part of the body (hands and arms) are most susceptible to electric shock and must be protected. Insulating gloves provide an excellent means of protecting the workers from
accidental electrical contact. To be effective the insulating gloves must have high insulation qualities, while also being comfortable, durable and flexible.

Written Test	Self Check #1

Name: _____Date: _____

Time Start: _____Time Finish: _____

Direction: <u>For each of the following questions choose the best answer</u>

1. Electric current flowing through the body can cause:
   A. electric shock
   B. paralyzes
   C. Burns caused
   D. All

2. Which of the following is not PPE?
   A. Glove
   B. T shirt
   C. helmet
   D. goggle

Information Sheet-2	Considering Strengths and weaknesses

2.2. Strengths and weaknesses

Requires to study the process to detail

Dedicate sufficient time for the breakdown

Study the steps of the process, interact with people, get data, documents, and understand tools:

All problems can be divided into smaller defined problems: by region, location, department, product,

channel, customers, etc.

Specify the point of cause: the problem is present in a specific part of the process

The Problem solving process is based upon; plan, do, check, act.

Problem sol Remove time lost in debate

Identify weak points in processes

Discover systemic causes

Explain with reasons why problem occurred

Gives a factual representation of the problem

Compare what actually happened against what happened, at any point during the incident.

Written Test	Self Check #1

Name: _____Date: _____

Time Start: _____Time Finish: _____

Directions: **WRITE TRUE IF THE STETEMENT IS TRUE OR FALSE IF THE STETEMENT IS FALSE**

1. Identifying weaknesses and strengths is help full remove time lost in debate.
2. Understanding the strengths and weaknesses helps to identify weak points in processes.

Information Sheet-3	Corrective action

2.3. CORRECTIVE ACTION:

A set of planned activities (actions)implemented for the sole purpose of *permanently* resolving the problem. Three Types of Corrective action Specific, Preventive, Systemic

These types of corrective action are quite different in how they are applied and what they do. Not understanding this leads to serious mistakes in fixing problems.

SPECIFIC CORRECTIVE ACTION

Action(s) taken to correct the direct cause,Corrects or improves the condition noted in the event, by changing the direct cause, or the direct cause and the effect.

- Also encompasses Containment
- Used to correct the Direct Cause
- Does not prevent recurrence!

Preventive corrective action

Action(s) taken that prevent recurrence of the condition noted in the event ,Preventive actions must directly address the root and contributing causes to insure effectiveness.

Preventive corrective actions focus on changing the root cause and any contributing causes.

You probably won't get a 100% effective fix at just one point the root cause.

You often have to consider two or more contributing causes to ensure the chain is broken

Systemic Corrective Action

Actions taken that address the failure in the supplier's quality system that allowed the event to occur**.** Usually is on a larger scale ,Probably can have an effect on other part numbers May have an effect on *other customers.*

Self Check #1	**Written Test**

Name: _____Date: _____

Time Start: _____Time Finish: _____

Directions: **WRITE TRUE IF THE STETEMENT IS TRUE OR FALSE IF THE STETEMENT IS FALSE**

1. Systemic Corrective Action address the failure in the supplier's quality system that allowed the event to occur**.**
2. Specific corrective action used to correct the Direct Cause
3. Preventive corrective actions focus on changing the root cause and any contributing causes.

Operation Sheet- 1	Considering safety and operating procedures

Techniques for Considering safety and operating procedures

Step1. Consider safety issues

Step 2. Identify OHS rule and regulations

Step 3 . Consider OHS rule and regulations

Step 4. List deferent operating procedures

Step 5 . consider appropriate operating procedures

Operation Sheet- 2	Corrective action

Techniques for Corrective action

Step 1. Analysis the problem

Step 2. Identify the problem

Step3. list the corrective actions

Step 4. Select appropriate corrective actions

Step 5. corrective actions

LAP Test	Practical Demonstration

Name: _____ Date: _____

Time started: _____ Time finished: _____

Instructions: Given necessary templates, tools and materials you are required to perform the following tasks.

Task 1: Considering safety and operating procedures
Task 2: Considering Strengths and weaknesses
Task 3: apply Corrective action

References; Troubleshooting & Repairing Solid-States TVs By **Homer L Davidson**