



# 11

## HEALTH AND SAFETY

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### 11.1 INTRODUCTION

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Safety considerations are integral part of any technical working area/ setup. Media and Entertainment industry or any studio technical production facility too has some safety issues. It is very important for a sound assistant or technician to know about related health and safety considerations and care required to be taken, to prevent the possibility of accidents. In this section, you will learn about the preparations which are made at the sound studio and precautions taken for various types of health and safety considerations.

The aim of this lesson is not only to let you know as to what measures should be taken to prevent bad happenings or accidents at production but also Do's and Don'ts to be followed in work environment. It is also to let you know about good habits/ precautions to be followed in a recording studio.

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### 11.2 OBJECTIVES

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After going through this lesson you will be able to:

- explain the necessity of safety in the studio area.
- describe the details of safety measures which are required to be taken for the safety at production area.
- enlist the safety measures to be taken care of while handling various sound recording equipments
- explain safety measures to be followed while handling electrical mains equipments
- describe how to handle fire fighting equipment and provide first aid.



## 11.3 RATIONALE

In previous lessons, you learnt about the working and components of various audio equipments. But, in order to get maximum yield from such equipments, it is necessary to follow certain preventive and corrective maintenance procedures to maintain healthy and safe work environment.

### 11.3.1 Observation of the Health and Safety Instructions

Safety instruction and guidelines should be observed by each and every person religiously in full manner, as non-observance of statutory orders of safety by any person causes accidents. Accidents do not differentiate between the level/ category/ gender of the person. In studio one should be aware of electrical hazards and risk of electronic malfunctions. As discussed previously, in any studio, you will see following equipments:

- Microphones
- Recorders
- Amplifiers
- Sound Mixers
- Speakers
- Routers
- Wireless Communication Devices
- Cables and batteries etc.

All these materials are packed with safety instructions and these instructions are available on the users' manual. It is advised that you study all the health and safety instructions during the installation or later as per your requirement. All manuals are also available on their websites. These instructions can be printed out for study and training purposes.

### 11.3.2 Role and Responsibility of Sound Technician

Sound technician is required to be alert at all the times, during recording hours and also after the recording hour to ensure that no lapses occur on the safety part at the recording area. It is the responsibility of the sound assistant/technician to instruct and make the crew aware about safety directives.



Sound Assistant has additional responsibility to:

- Impart awareness at the production area about the health and safety requirements.
- Procure all types of general and personal security/ safety devices for production crew.
- Non technical/untrained person should not be allowed to operate any production equipment like, mixers or recorders etc.
- Apart from these, other provisions to be taken care of with regard to safety have been discussed further.

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## **11.4 SAFETY DURING SOUND RECORDINGS**

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- All electrical equipments, like recorders, mixers, should always be kept at proper place.
- At the time of necessity, the personal safety equipment must be used.
- Compulsory observance of safety warning symbols must be followed
- Prohibited materials like liquids and shoes must not be brought at the production area.
- Smoking is strictly prohibited at the production area.
- Don't adopt any short cuts, it may be dangerous. Its always advisable to follow laid down procedure instead of shortcuts.



### **11.4.1 General Health and Safety Procedures**

The General Health & Safety procedures include :

- Do not wear anything with fringe or hanging material, that might get caught on equipment as you are trying to move something and might cause an accident.
- Wear closed toe, non-conductive shoes.



## Notes

## Health and Safety

- Anything with open toes or that can conduct electricity is not permitted in studio area. This prevents injuries while equipment is being moved and protects you from being electrocuted.
- Never ever move thing by yourself. Most of the recording equipment in the sound studio, is very large and heavy.
- Avoid back strain or other bodily harm by working with a partner.
- Never move anything, if you have previous injuries. If you have pre-existing back injuries, physical injuries or health issues that may be aggravated by moving an object, notify the Studio Production manager.
- Follow the safety instructions given in studios. This will decrease the risk of injury.
- Keep all food and drink in the designated areas. Food is banned on the recording area of the studio during production, practice, or preparation.
- Keep all exits free of obstruction and keep belongings in a designated area, out of the way of the main studio floor area.
- Turn off all cell phones or other electronic devices or set them to silent or vibrate mode.
- Never wear conductive shoes or clothing when operating equipment.

### 11.4.2 Sound Studio Safety

Individual technical person, production managers and production crew also have key health and safety responsibilities:

- Please be mindful of the plug you connect your audio cords into. If there is anything suspicious like a unusual smell or sparks, notify the Studio Manager immediately. This could mean that a plug is defective and might be a fire hazard.
- Make sure that the audio cords from the pillar to the talent are safely out of the way from people tripping on them.
- Take reasonable care of themselves and others who may be affected by what they do or fail to do/ to co-operate with the employer in carrying out activities intended to meet the employer's health and safety responsibilities, e.g. by following instructions, using personal protective equipment, reporting accidents and near-miss incidents.
- Work within the limits of their competence; to attend training as required by the employer.



Other aspects of sound studio safety include:

**(a) Protecting Studio Hardware**

You must have seen that sometimes there are lot of harmful line voltage fluctuations, above or below the normal power levels. These are very harmful to the studio equipment. Therefore in such circumstances one should use an adequately powered uninterruptible power supply (UPS).

A good quality UPS constantly charges the batteries so as to provide uninterrupted regulated power supply. This battery supply is again regulated and used to feed sensitive studio equipment such as computer etc. with a clean and constant voltage supply. This helps protect studio hardware equipment

**(b) Protecting studio software**

Software which initially come along with the equipment gets usually outdated after few years, therefore, one should periodically update it from time to time. Also, it should be ensured that it is malware free.

**(c) Reading Manuals while installing and disassembling sound equipments**

Before installation or disassembling, one should go through all the instructions written on the accompanied manual, in hard or soft copy, for better understanding of the finer points of the studio system.

**(d) Protecting recorded data**

To protect the recorded data, there should be rigorous and straight forward back up scheme. Generally data should be backed up at three places and one of these should be offsite.



## 11.5 PRECAUTIONS WHILE WORKING WITH ELECTRICAL MAINS OPERATED EQUIPMENT

After considering the practical aspects of the safety of the personnel, handling electric equipment at work, the following points are summarized:

1. Turn off the breaker to the circuit you are working on. Don't trust the labels in the breaker box. The preferred thing to do is first turn on some load (light, radio, etc) that is at the actual location that you are going to work on, and then observe that it goes off. It is difficult to work on old wiring as the previous repairs might have meshed up the wiring to the extent of creating chaos.
2. Confirm that the electricity is actually off by testing at the fixture you are working on with a voltage tester or series test lamp.
3. After following steps 1 and 2, use an insulated tool to short the live wire to the ground in the equipment you are working on.
4. Make Sure that the Electricity stays switched off all the time, while the wiring work is going on.
5. Notify everyone in the area that you are working on the electricity, and warn everyone not to fiddle up with it.
6. Unless you can clearly see the breaker panel from where you will be working, put a breaker lock on your breaker. If you don't have a breaker lock, then at least seal the breaker box with tape and place a bold note warning not to turn the electricity on. A breaker lock with the key in your pocket is best. Otherwise, a tape with a note may be used.
7. While at work keep in mind that power is available at the main switch. Make sure that nobody switches it on unknowingly. But, work very cautiously, assuming that you are working on live wire.
8. As a part of safety measures, wear shoes or boots that have thick insulated soles.
9. Avoid working on wet ground or floors. Never work on a panel or other live wire while standing in water, or while you are wet.
10. Use tools with insulated handles. You can observe senior electricians using screw-drivers that have insulated conducting part. Such measures will protect you from accidental physical contact with the metal part of the screw-driver in case it comes in contact with the live wire.



Notes

11. Make sure to use all the tools which are properly insulated as illustrated in Fig.11.1.



(a) Insulated Plier



(b) Nose Plier



(c) Neon Tester



(d) Wire Cutter



(e) Crimping Tool



(f) Hand Gloves

**Fig. 11.1:** Insulated hand tools used in electrical wiring.

12. Avoid overloading on an electrical socket by connecting several loads in one socket. Refer to Fig. 11.2.



**Fig. 11.2:** Overloaded power strip.

13. Make a habit of not touching the ground with one hand while you work with the other hand. That way if you get shock it won't be as severe. Some guys put one hand in their pocket if they are working on something live.



## Notes

14. The leading causes of electrical fires are loose connections. The leading causes of loose connections are distracted electricians. The electrician should develop good work habits, and eliminate distractions from work place usually due to presence of end users i.e., the customers.
15. Wear eye protection. Spark melted copper during electrical fire hazards adversely effects the human eye.
16. If you use a ladder, it should be made of wooden or another non-conductive material.

### 11.5.1 Additional Tips for Safety

1. Electrical safety is without question, the most important aspect of any electrical work. And just like anything we do in life, fear comes from 'not knowing'.
2. All it takes is one mistake. Some of the senior electricians usually boost and dare to work at live circuit with leniency. 230 volt AC is lethal. Shut the power off to any circuit that you are working on . Confirm the power is off with a simple pocket tester, a multi-meter, or lamp, blow dryer or another similar appliance.
3. Keep a torch near your electrical panel at all times. It will be useful during night hours just in case of a power failure.
4. Be extra careful and precautious on electrical systems in the rain, or in damp or wet locations, or where power is not completely shut off.
5. The best types of shoes are rubber-soled shoes and when possible stand on a rubber mat, or dry wooden floors or sub-floors. Never work barefoot or in socks or slippers and don't assume that it's safe to work without rubber-soled shoes on concrete floors. Concrete is conductive, particularly when it's damp.
6. Anything can conduct electricity if the conditions are right. Even an insulator also. By definition, a conductor allows the flow of electron and an insulator resists the flow of electrons. Similarly, dry concrete is bad conductor of electricity, while wet concrete conducts.
7. As soon as you turn off the power to an MCB, put a tape on the breaker. Provision to lock it off is even safer. Tag it out. This procedure is called as lock out/tag out.
8. If you are working with fuse panels instead of breaker panels, when you remove a fuse, use only one hand to remove it. Put your other hand either in your pocket or behind your back, and that's a good practice to develop





anyway. This helps to keep you from grabbing a circuit with two hands and providing a path for the electricity to flow through your heart. Now, electricity can still flow through one hand and one foot and pass through your heart, but if you've taken the other precautions as mentioned above, you will minimize your exposure to that hazard.

9. Last but not the least is an important tip about tool use. It is worth spending a little extra money to purchase quality tools. Hand tools like lineman pliers, screwdrivers, wire strippers, and other hand tools are used for electrical work. For instance, Good wire strippers will prevent you from nicking or skinning the wires. Good screwdrivers will prevent slipping out of screw heads or rounding them out. Good tools not only improve the quality of your workmanship, but improve your confidence as well.

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## **INTEXT QUESTIONS 11.1**

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1. One of the following statements is not true about electrical wiring:
  - (i) Notify the persons orally in the area that power is switched off for electrical maintenance.
  - (ii) Switch off the MCB, put sticker and fix a tag with the caption 'Electrical Maintenance in Progress, Please, DO NOT OPEN'.
  - (iii) Keep in mind that other side of the main switch is LIVE.
  - (iv) Take written permission from the shift incharge before starting maintenance work.
2. Write in your own words the steps of precautions, in sequence you should follow, in order to avoid electrical accidents?
3. State whether the following statements are true or false.
  - (i) One MCB may be connected to more than one sub-circuit at a time.
  - (ii) Once MCB is switched off, it is not important to test the load end for accidental presence of potential.
  - (iii) The bare steel rod of neon tester or screw driver may be covered with PVC tape to avoid accidental shock while working with live wire.
  - (iv) The damp cemented wall of your bathroom can never conduct electricity.



## 11.6 HANDLING ELECTRIC SHOCK

This is bio-medically proved that the current that a human body can safely endure is 5 milli amperes (mA) at 50 to 60 Hertz of supply frequency. When a person gets an electric shock, most often, the current passes through the breathing centre at the base of the brain and causing the centre to stop sending out nervous impulses which act upon the muscles responsible for breathing. As a consequence, breathing stops abruptly.

If the shock has not been severe, after a time the breathing centre recovers and resumes the necessary duty of sending impulses to the muscles of breathing. In severe cases, the immediate use of artificial respiration, substitutes the natural breathing blocked by the shock. The current may paralyze the breathing centre which may require even 8 hours of artificial respiration without a stop, for again causing the natural respiration to take place. Victims of electric shock are unconscious but in most of the cases, their hearts are working and blood circulation continues.

In case, the breathing centre has stopped working, this treatment requires prompt artificial respiration with greatest possible promptness. If at all, the heart is effected in the electric shock, greatest precautions prescribed by the experts is that no time should be wasted in trying to find out if heart is beating and working and cardio –pulmonary resuscitation (CPR) should be started. All staff should have prior training in CPR

### 11.6.1 How to Disengage a Person

1. The man connected to the supply should not be touched with bare hands.
2. If the switches are nearby, they shall be immediately put off.
3. Remove the person to a safer place.
4. If the switches are however not close or nearby and if they are unknown to first reaching person, he/she should make use of some insulating material such as wood, dry cotton or cloth, dry rope etc. to pull the person away from the mains.

### 11.6.2 Methods of Artificial Respiration and First Aid

There are three well known methods of artificial respiration. Just as soon as the person is disengaged from the mains, he should be laid prostrate. The mouth should be examined with a finger, if any false teeth, betel leaf, tobacco and chewing gum etc. are present. They should immediately be removed. The tongue



should also be examined and if it is in twisted position, then it should be brought into correct position.

### 1. Schafer's Prone Pressure Method

1. The person to give artificial respiration should seat himself over the patient with his/her knees spread around the hips of the victim and his two hands should be straightened.
2. He should lean forward exerting pressure with his hands on the small of back of the victim.
3. This way the chest of the victim should be pressed and he would artificially exhale as shown in Fig. 11.3.



Fig. 11.3: Schafer's Prone Pressure Method – step 1.

4. The operator should release the pressure and lean backward, the chest of victim would expand and he would artificially in-hale as shown in Fig. 11.4.



Fig. 11.4: Schafer's Prone Pressure Method – step 2.

5. The operator should synchronize the forward and backward motion with his own exhale and inhale, respectively.



## Notes

- This cycle of motion should be about 15 times a minute as normal rate of breathing is 15 times a minute.

Normally one person cannot give this drill continuously for an indefinite period, so at convenient intervals persons must change hands at the drill and continue it without a break. The convenient interval may be from 45 minute to 1 hour. While changing turns, the cycles of artificial respiration should not be broken.

This method is considered as best method.

## 2. Silvester's Method

- If it is not possible to lay the person prostrate because of injuries or burns, he/she is laid on his/her back as shown in Fig. 11.5.



Fig. 11.5: Schafer's Prone Pressure Method – step 2.

- The person to give this drill should seat himself on the side of head of the victim. He should hold the arms of the victim below the elbows.
- Press the arms on the chest of the victim and turn to bring toward his head as far as possible.
- While pressing the arms, the chest of the victim would artificially exhale while in backward motion of the arms, the patient would artificially inhale. It should be remembered again that the operator synchronizes his inhale and exhale to the pressing of the arms of the victim to his chest and flaring them backward. The cycle should be 15 times in minute.

## 11.7 EXTINGUISHING ELECTRIC FIRE

The following steps should be observed for putting out electric fire:

- Switch off electric supply to the affected area.



- (ii) Use fire extinguisher meant for dousing electric fire e.g., carbon-di-oxide, dry-chemical powder etc. Other fire extinguishers e.g., water, soda and foam type are not suitable for electric fire.
- (iii) After extinguishing fire, isolate the system and do not switch on till it is thoroughly checked by a qualified electrician/supervisor.

### 11.7.1 Types of Fire Extinguishers

Fire extinguishers are devices used for putting-out fires. There are good numbers of fire extinguishers available but all of them are not suitable for electric fires.

- (i) **Water:** Water is a cheap and easily available medium to extinguish fire. But it cannot be used on electric fires as it may cause death due to electric shock.
- (ii) **Sand:** Sand buckets are kept in the substation to extinguish fire. Sand can be used on electric fires as well.
- (iii) **Sodia-acid extinguisher:** This type of extinguisher consists of metal cylinder filled with sodium bicarbonate and water, when plunger mounted on the cylinder is actuated by striking the plunger over a hard flooring, a small container inside the metal cylinder containing  $H_2SO_4$ , is broken. This causes chemical reaction of sodium bicarbonate and acid resulting in formation of carbon-di-oxide which is used to extinguish fire. This extinguisher is not suitable for electric fire.

Its good to have practical demonstration of fire fighting and first aid arranged for all the staff working in the studio area at regular intervals.

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## INTEXT QUESTIONS 11.2

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1. A human victim has undergone shocking current of 300 mA between hand and chest. Consider his chances of survival.
2. Write the steps to put off electric fire.
3. Why water cannot be used for electric fire?
4. Fill the blanks:
  - (i) Sand buckets are kept in the substation to .....
  - (ii) On passage of ..... mA of current uncontrolled movements will take place due to fear.
  - (iii) Improper/no earthing in appliances, apparatus and installation is a source of .....



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## 11.8 WHAT HAVE YOU LEARNT

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- Safety precautions to be observed while working in studios
- Basic safety measures to be taken in order to avoid any electrical accidents during work.
- Steps of first aid in order to minimize the injuries after electrical accidents.
- Application of artificial respiration to the victim.
- Steps of fire extinguishing in case of electrical accidents.

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## 11.9 TERMINAL QUESTIONS

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1. What are various factors affecting severity of electric shocks?
2. Explain various sources of electric shock and how to avoid them.
3. Describe various methods of providing artificial respiration.
4. What are the causes of electric fires and how to avoid them?
5. What are various types of fire extinguishers? List any two fire-extinguishers suitable for use on electric fire.
6. What are the specific safety precautions to be observed while working in studios.

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## 11.10 ANSWERS TO INTEXT QUESTIONS

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### 11.1

3. (i) False      (ii) false      (iii) true      (iv) false

### 11.2

4. (i) extinguish fire  
(ii) 20 mA  
(iii) electric shock

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## 11.11 REFERENCES

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1. Electrical technician (601, 602) NIOS, August 2011.