# 12

# RECORDING AND CAPTURING SOUND

## 12.1 INTRODUCTION

Recording and capturing sound is a complex process with a lot of considerations to be made prior to the recording itself. For example, there is the need to know the type of sound or "production" that is required, the usage of the finished recording, etc. These are just a few of the considerations that are taken into account before the recording process actually starts.

In this lesson you will learn different production types and their respective requirements. You will also learn the process of recording sound, the techniques used to achieve optimum results during recording and the qualities required for any sound recording to be up to the professional standards.

## 12.2 OBJECTIVES

After reading this lesson, the learner will be able to :

●  discuss different production types and their process

●  explainthe recording process

●  explain how to achieve a high quality recording

## 12.3 PRODUCTION TYPES

The foremost part of any production is to contemplate its type. Every production type has its own requirements, its own target audience, its own production values and its own equipment setup. For example, if the production is talk or speech based, the production requirements will be an audible vocal range with no unnecessary noises. The target audience group will be people looking for

information, such as students, news enthusiasts etc. The production values will be information based such as educational, news, discussions, etc. The required equipment will be considerably very limited. The maximum list you might need will be a microphone, a mixer, a headphone, speakers, a recorder, an audio compressor, an expander and a limiter. On the other hand, for a musical production you might have to use a considerably larger setup. The equipment list might be as follows. A multichannel mixer with at least 16 inputs, microphones as per the instruments involved in the show, multiple headphones, external effects like reverb, delay, etc.. speakers, amplifiers, compressors, limiters, and the list might go on to cover cross faders, equalizers etc. This will be a relatively larger setup than a speech based production.

There are basically three types of production scenarios. They are,

1. Studio Sound

2. Film Sound

3. Live Sound

These can be further categorized into

(a) Speech based content; or

(b) Music based content

Let us take a look at these production types one after the other.

## 12.3.1 Studio Sound

Studio Sound production has high standards. The final product has to be of the highest quality in terms of sound and production values. The requirement is to have a really good sound with good frequency response a good dynamic range, good signal to noise ratio (SNR), etc. Basically, the end product has to be of industry/ professional standards. Such a sound can be only obtained in a controlled environment (a studio is built as a controlled environment to avoid unnecessary reverberations and noise).

This production type is used for recording different audio contents such as music albums, speech, dialogues, film scores, etc. If you notice these contents, when usually heard, are recorded in high quality. The usage of these contents is usually for commercial purposes and also for community services as well. For example, the film score as the name suggests is used as the background music for an entire movie. This production will involve a mixture of acoustic or "real" instruments and digital instruments. Usually these productions are done on a high scale, which requires a controlled environment. Thus a studio is used. For community uses special non - profit based,fully equipped studios are used to produce content.

Based on the studio's size and its amenities, the studio will be limited to one or several production types. For example, if the studio is 20ft x 30ft, the resulting area is not big enough for a 20 piece orchestra. Hence, recording a film score in such a small studio is very difficult. The studio, however, can be used for mixing the recordings done involving the 20 piece orchestra. The studio with the above mentioned measurements can be easily used to record a music album or dialogues for a film or television.

### 12.3.1.1 Production Process

This particular production type involves three stages:

1. Recording

2. Mixing

3. Mastering

1. **Recording**: In this stage only the recording is done. The main point that is to be kept in mind is to have an optimum level from the microphones without any distortion or "clipping". This is the most critical stage of the production process since without a good recording the next two stages will not be very effective. If a certain effect is to be recorded permanently during the recording process then it should be applied or included in the signal path at this stage.

2. **Mixing**: In this stage, the recorded material is mixed according to the requirements of the production. During this process, the final product is achieved partially with room for modifications. Any or every effect unit is applied during this stage. The program producer works closely with the editor and the final product starts to take shape. Until the mixing is finalised, the product cannot be forwarded to the third stage which is mastering.

3. **Mastering**: In this stage, the mixed product is "sweetened" in other words finalised without any further changes to be made. The only effects applied here will be for enhancing the final product for the target audience to hear. The audible "power" which is heard in commercial songs or film scores is achieved in this stage. The finalised product or "master" is further sent for multiple copy making or any other purpose (broadcasting, etc.).

### 12.3.1.2 Features of Studio Sound

The features of the studio sound production type are:

1. High quality results

2. Non – chronological workflow

3. Better control on the production process

1. **High Quality Results**: The main production value to use the studio sound is to record in high quality. The end product, as a result, is of high standards and quality.

2. **Non-Chronological Workflow**: This is regarded as the best characteristic in studio sound. The production does not necessarily have to start at the beginning and then go towards the end. In a studio, you can record the ending first and then go on to record the beginning and then record the in - between pieces. For example, in a situation of recording dialogues, one artist is available while the other is not. This will not be a problem as you can record the available artist at the time and then later record the other artist when he/she is available. The two artists might not even be involved in the same scene together!

3. **Better Control on the Production Process**: In studio sound there is a higher level of control on the production process. If we consider the above mentioned example, if the scene comprises of more than five people involved, the recording becomes difficult. The use of a studio enables the producer to schedule the artists to avoid such problems.

## INTEXT QUESTIONS 12.1

1. Classify the following production types based upon their work environment, whether they are outdoor or indoor or both:

    (i) Studio Sound

    (ii) Film Sound

    (iii) Live Sound

2. Classify the same above given options on their content type, whether they are speech based or music based or both.

3. Place the following steps in the studio sound production process in the correct order.

    (i) Mastering

    (ii) Recording

    (iii) Mixing

4. List the features of studio sound.

Let us go ahead and look at the second production type which is Film Sound.

### 12.3.2 Film Sound

As the name suggests, this production type is for films only. In this production type, the sounds which will be required in the film are decided and then recorded acoustically using live sound or reproduced digitally. These sounds include sound

effects, room ambiences or room tone, dialogues, background noises, etc. The sound designer, director and the producer work together with the script and decide the necessary sounds that are required. This process is called sound spotting. Once the sound spotting is done, the sounds are recorded and a library is made. This library in return will be used for the sound effects in the film or for any other purpose as well.

In this particular type of production, some of the sounds are recorded outdoors in the field and some are reproduced digitally indoors in a studio. For example, a gunshot sound effect cannot be recorded indoors but can easily be recorded outdoors whereas a foot step can be recorded indoors and has no need to be recorded outdoors. These kinds of decisions are made during the sound spotting stage. Sound spotting is the process in which the film's producer, director and the sound designer have a meeting and decide the required sounds for the film according to the script of the film.

### 12.3.2.1 Production Process

This production type has three stages as well:

1. Pre-Production

2. Production

3. Post-Production

1. **Pre-Production**: During this stage the sound spotting takes place and the required sounds are decided. It is during this stage that the sound team is also finalised and assigned to different jobs. The locations along with the equipment requirements are finalised at this stage.

2. **Production**: This is the most essential stage of the entire production process. The sounds are actually recorded using location recording equipment (portable recorders, microphones, etc.). The sound effects are recorded, the dialogues are recorded and the room tone or ambience is recorded. A detailed Edit Decision List (EDL) is also kept with all the details of the recorded files. For example, an on screen artist takes five attempts to achieve a perfect scene. Each take is recorded by the sound team. A log is made with each video recording or "take" and its respective sound recording. After this a particular recording is finalised as the "perfect take" and entered into the EDL. At the post production process the EDL will be helpful to locate and select the specific sound file for any given scene in the film. Once all the recordings are finished then the post production process starts.

3. **Post-Production**: This is also a very important stage in the production process. In this stage the finalised recordings are synchronised with the final cut of the

film. If there were any problems during the production stage, they will be solved here in this stage. For example, if the dialogue of one artist in a particular scene was not recorded properly because of too much of background noise like a train or an overhead airplane;then this particular dialogue is recorded in the post - production stage with the artist watching the film and re – enacting the scene. This process is called **Dubbing**. Sometimes the dialogues are re – written and are recorded at this stage while the artist watches the film. The background music of the film is also recorded and synchronized to the film at this stage. The surround sound encoding is also done (if necessary) at this stage. This stage takes the longest time of the production process. During this stage the sound track of the film,comprising of dialogues, music and sound effects, will be finalised and then the film is sent further for making multiple copies.

## 12.3.2.2  Features of Film Sound

The features of a film sound production type are as follows:

1.  Industry Standards are met and sometimes are newly created

2.  Combination of Studio and Location Recording

3.  Non – Linear Workflow

1.  In film sound the industry standards are met all the times and sometimes new standards are defined or created during some film's production. For example, a particular scene in a movie requires you to apply a certain method which has never been used or not used in the particular scenario; you create or "define" an industry standard at that very moment. The current standards that are prevalent in the film industry were defined previously by someone or the other.

2.  This particular production type is almost always a combination of studio and location recording. Most of the sounds are recorded at locations but a few which are not available in the outside world have to be created digitally and hence a studio is used. Also, the final stage in the production process, namely post – production, requires the use of a studio.

3.  This particular production type takes full advantage of the non – linear workflowmethod. Any film is not always recorded one scene after the other as the films chronology demands; but rather the scenes are recorded according to the availability of the artists. If one artist is available then his/her scenes are recorded on that occasion.

Let us now look at the third and the final type of production scenario which is Live Sound

## 12.3.3 Live Sound

This type of production is used for live shows or programmes. Almost all the work is done in "realtime", which means on the go. This is the most challenging production type. This production type makes everyone involved to be on high alert at all times. The program that will be performed will be live and hence there is very low opportunity for any mistake. The process involves the assembling of the equipment. The next stage is to do a sound check. Then the program is actually performed live in front of an audience or broadcasted live on the television. There is very little room for error in this production type. The sound engineer will be on the mixer controlling all the mixing while the sound assistant will be responsible for helping him with all the requirements for the event. A sound assistant will mostly have to help with the setting up of the equipment and has to make sure that everything works properly as per the orders given by the engineer or the performer. This particular production type also has three stages, namely, Assembling, Performance and Pack up.

## 12.3.3.1 Production Process

1. Assembling

2. Performance

3. Pack up

1. **Assembling**: This process includes the planning of the setup, determining the requirements of the event and then the assembling of all the necessary equipment. This is the most time consuming stage of the production process since the production team will face a lot of problems and they have to troubleshoot them as well in order to carry out the event successfully. This stage requires the maximum man power to do all the setup process. This is also a  stage requiring due care as the equipment handled will be very heavy and has to be set up /wired. If proper care is not observed then the results can be harmful (due to use of high power supply).Due care therefore is required to be taken as per safety precaution detailed in Chapter on Health and Safety considerations

2. **Performance**: This process is the most crucial stage of the entire production process. Since the event is live, there is next to no room for any errors. This stage relatively is simpler than the setting up stage. Only a few people are required to carry out this stage of production. The people usually involved are the sound engineer, the sound assistants and the stage technicians. This is the most challenging and the most entertaining stage in this production.

3. **Pack Up**: This is the final stage where the event is over and the equipment that was used has to be packed up. This stage also requires more man power.

**Notes**

It is also a stage requiring due care and attention since any equipment can fall and hurt someone. Most of the equipment used for live sound is very heavy and needs to be handled carefully.

### 12.3.3.2 Features of Live Sound

The features of the live sound production type are:

1. Realtime performance

2. No room for error

3. Time limit

1. **Realtime performance**: The program will be performed in real time, this means that all processing and decisions will be done or taken at the moment while also trying to achieving the best sound quality possible.

2. **No room for Error**: As the production is live, there is no scope for errors during this production. Any errors committed during the production will not be correctable in comparison to the other two production types.

3. **Time Limit**: The production has to be finished within a time limit. There is no freedom to make later changes to the content that was performed. All the processing has to be done simultaneously with the production.

### 12.3.3.3 Outdoor Recording

Recording outdoors is a challenge in its own. There are a lot of matters to be taken into account. There are a few parameters to be kept in mind while recording outdoors. These are as follows:

1. **The Location**: Always keep the location in mind. Every location will have its own limitations for recording sound. For example, every restaurant can vary one to another in its loudness. Every room will have its own reverberation time. The time taken for a sound to die in a room is called reverberation time. Do select an appropriate location as per the recording to be made.

2. **The natural circumstances**: These might not be suitable for a recording but the location could be perfect. This situation demands the use of certain equipment to neutralize these natural circumstances. For example, if the location is too windy, then a cover/wind shield can be placed on the microphone to take care of this problem.

3. **Equipment**: The equipment used for outdoor recording will be different than the ones used in a studio. They have to be rugged and sturdy for transportation and functioning. Always keep in mind to choose the right equipment while recording outdoors.

4. **Multiple Recordings**: Always record the same part at least twice like standby recording. This will help to have a choice when using the recording elsewhere.

## INTEXT QUESTIONS 12.2

1. Which of the three stages of film sound production is the most time consuming?

2. Enumerate the features of film sound and live sound.

3. Which is the most dangerous stage(s) of the live sound production process?

4. What are the parameters to be kept in mind while recording outdoors? List two.

## 12.4 RECORDING PROCESS

In the previous sections you have learned the different types of productions and you must have a obtained a simple understanding of the sound requirements for all of these production types.

In this section you will learn the most basic recording process which will slightly vary according to the various production processes. The recording process is as follows:

Know the Production Type → Equipment Selection → Assembling → Microphone Placement or "Miking" → Rehearsal → Recording
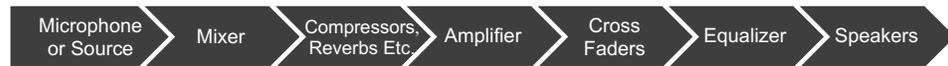
Let us take a look at these steps one after the other.

1. **Know the Production Type:** The first step in the recording process is to know the production type of the program to be recorded. This will help significantly in the next step of equipment selection. Every production type will change the list of equipment that will be required during the recording process. Knowing the production type is the first and the most important step in the recording process. Every decision taken afterwards will be on this step's basis.

2. **Equipment selection:** The next step in the recording process is to select the equipment required for the recording. Here, you will select your equipment keeping the production type in mind. For example, there will be a requirement of one or two microphones during a speech based program but a significantly larger number of microphones will be required for a music based program.

3. **Assembling:** The next step in this process is to assemble the equipment in a proper chain as mentioned in lesson on Assembling and disassembling of

equipment. This process is very critical as you will have to decide which equipment comes after another. The audio chain has to be decided in this step. The most basic chain is as follows:



Microphone or Source → Mixer → Compressors, Reverbs Etc. → Amplifier → Cross Faders → Equalizer → Speakers

4. **Microphone placement or "Miking":** This process is a very important step. The concept behind this step is that the microphone captures certain frequencies of the same source at different positions which then results in the source sounding different with every microphone placement. The aim to be achieved in this step is to attain a natural sound of the sound source. Try several microphone placements and experiment with the placement of the sound source itself!

You have learned different "miking" techniques in the lesson discussing microphones. There are a lot of ways you can "mike up" a sound source; and every time the source will sound a bit different. Do not be afraid to try new miking techniques here.

5. **Rehearsal:** It is always important to have a rehearsal before the actual recording starts. If the different microphone placements did not work to attain the desired sound, then this can be achieved using the other equipment. This step will enable you to tweak the sound source through the mixer and other outboard equipment to achieve the required sound. This process will also allow the sound source to practice with the new modifications around them. It is always helpful to request the artist to perform as if the recording is going on. This will help in setting up of the headroom for the recording process. Headroom is required to avoid sudden peaks in the recording signal. This is achieved by observing the loud parts of the program and then reducing the master fader to a comfortable level where these peaks will not distort even if they occur during the recording.

6. **Recording:** Once the rehearsal is complete, you will be ready to record the sound source. In the previous steps have been followed accurately, then the recording will be high quality and there will hardly be any requirement to tweak the equipment during the recording process. There are a few points to be kept in mind during recording. The studio has to be silent and the artistes have to be told not to make unnecessary sounds during the recording process. The headroom has to be constantly monitored as to avoid peaks. At the same time the audio signal should not become very weak as to not be audible.

Once these steps are carried out accordingly, the resulting sound or recording will be of a high quality and of professional standards.

## 12.5  THE PERFECT SOUND

In order to achieve a perfect "take" or "Sound", you will have to have a good knowledge of the theory part of Sound which you must have learned in the earlier chapters. The key elements to observe in a perfect take are as follows:

1. The Frequency Response

2. Distortion

3. Noise

4. Signal to Noise Ratio (SNR)

5. Headroom

6. Dynamic Range

A brief re-capulation of these parameters in the context of recording is given below:

1. **The Frequency Response**: The first and foremost factor to watch out for is the frequency response. Any good studio recording will have a noticeably good frequency response. This means that the frequencies recorded during the recording process are as flat or natural or "uncoloured" as possible. This process will include determining a good microphone to capture frequencies and "recreate" or record the sound source as accurately or natural sounding as possible. The equipment used to achieve this will have to be of high quality.

2. **Distortion**: Any sound which goes above the maximum amplitude acceptable in a recording is called as a distortion. This recorded sound will be too loud and eventually give a "tearing" sound when played through the speakers. To prevent such unwanted sounds, a brick-wall limiter is used or the headroom is managed to accommodate these loud sounds. Always try to avoid distortion while recording.

3. **Noise**: Any sound which should not be present in the recording is called a noise. This can be a crackle sound, a "pop" sound, hiss, hum, rustling of clothes, etc. these unwanted sounds are very unpleasant to hear and need to be taken care of. Usually these sounds are very low in amplitude but that does not mean that they are not there; but when amplified, these sounds can be heard. A simple Noise Gate can achieve the result of reducing these noises. What this effect does is to find a noise floor and then reduce any sound below that level to infinity, thereby eliminating these unwanted sounds.

4. **Signal to Noise ratio (SNR)**: This parameter defines the overall quality of a recording. What it means is the sound level between the noise floor and the

desired audio signal. You must have learned the concept behind this in the chapter discussing the measurements of sound. A good studio recording will have a high SNR whereas an outdoor recording might not have a good SNR.

5. **Headroom**: Always give a little bit of headroom when recording to accommodate loud sounds. These can be later edited and reduced to a desirable amount but while recording these loud sounds should not clip (see glossary). This factor is very important for live sound since there is always a possibility for loud noises during a live event. Always keep the master fader of the Audio mixer at least 3dB below the maximum setting on the board.

6. **Dynamic Range**: In order to give good headroom the most common mistake committed by theRecordist is that they compromise with the overall loudness of the content being recorded. This in turn affects the dynamic range of the recording. The dynamic range is the overall amplitude of the recording without the recording being distorted. This factor should always be kept in mind to not let the recording distort. There are a few ways to avoid this common mistake. An Audio Compressor or a Limiter can be used to keep the recording levels strong and within control at the same time.

Once you take all these factors into consideration, the resultant recording can and will be a perfect take.

## INTEXT QUESTIONS 12.3

1. List the steps of a recording process.

2. List the factors to be observed while recording.

3. At what level should the main fader of the audio console be?

## 12.5 WHAT HAVE YOU LEARNT?

After reading the lesson, one can say that following important points have been learnt:

● Different production types – Studio Production, Film Production and Live Production.

● The stages involved in studio sound production – Recording, Mixing and Mastering.

● The stages involved in film sound production – Pre Production, Production and Post Production.

- The stages involved in live sound production – Assembling, Performance and Pack up.

- Parameters to be considered while recording outdoors.

- The Steps involved in a good recording process.

- How to achieve a perfect take – Good Frequency Response, Low Distortion, Low Noise, Good SNR (Signal to Noise Ratio), good Headroom, good dynamic range.

## 12.6 TERMINAL EXERCISE

1. Briefly explain the three stages involved in studio sound and their importance.

2. Enumerate and discuss the characteristics of film sound production.

3. Describe the live sound production type.

4. What is a perfect take?

5. Explain Miking.

6. What is reverberation time?

## 12.7 ANSWERS TO INTEXT QUESTIONS

### 12.1

1. Studio sound – Indoors

   Film sound – Indoors and outdoors

   Live sound – Outdoors

2. Studio Sound – Music

   Film Sound – Both

   Live Sound – Both

3. Recording

   Mixing

   Mastering

4. High quality results

   Non – chronological workflow

   Higher control on the production process

**12.2**

1.  Post Production Stage

2.  Industry Standards are met and sometimes defined

    Combination of Studio and Location Recording

    Non – Linear Workflow

3.  Setting up and Pack up stages

**12.3**

1.  The Frequency Spectrum, Distortion, Headroom, Loudness

2.  3dB below the maximum setting on the audio console.

## 12.7 GLOSSARY

1.  Clipping – the point where the incoming audio source hits the highest possible loudness achievable by any equipment.

2.  Chronology – the order in which a process is carried out.

3.  Realtime – something done at the moment or while a process is running

4.  Distortion – any unwanted noise which sounds as the speakers are tearing during playback.