2015 MIDWEST SOUND CLINIC

Sound Reinforcement 101:
Acoustical Performances

Introduction by JOSE

Initial introduction of Scott Bauer and Scott Steiner (the *SoundScots)*

• Professional audio engineers that successfully make the crossover between Live Sound and Recording disciplines.

• The SoundScots have been a team for almost 20 years as lead engineers for the Midwest Clinic and IAJE.

• They have independently toured extensively world-wide, performing in a wide array of venues and with a variety of groups and shows.

• During this clinic, they will introduce you to some sound reinforcement concepts and applications that can be used for a multitude of acoustic groups and how that relates to your stage performances.

CLICK to: Intro by Scotts

Introduction: by SOUNDSCOTS

• Thank audience for attending. We hope to be able to give you a couple of pieces of practical sound reinforcement information that you can take back and use with what kind of acoustical group you are working with.

- Sort out who's who: [MONITOR Scott - HOUSE Scott]

• You know that we are both engineers, but we wanted to let you know that we are musicians as well. Trombone and Sax. We both got started in our school band programs, and that early training allows us to pick up nuances in the music that we work with today and present a better product our audiences. So we have a lot of respect for all of the educators out there. We also believe in the Musicality of Mixing. *(but that's a different clinic)*

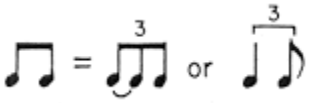
• Before we jump into some concepts and practices, we want to get on the same page regarding perceptions.

CLICK to: Objective or Subjective **1**

Is sound reinforcement Objective or Subjective? *(B instead of a Bb- Don Ellis)*

CLICK to: Objective or Subjective **2**

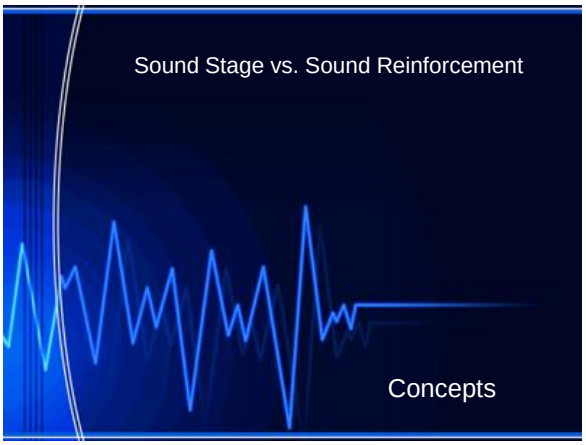
• Sound Reinforcement, like music, is mostly SUBJECTIVE. (*8th note example*)



• Dispel some perceptions about gear. May look the same, but will give you different results. (*use sax or trombone mouthpiece example*)

CLICK to: Concepts **STEINER**

Concepts



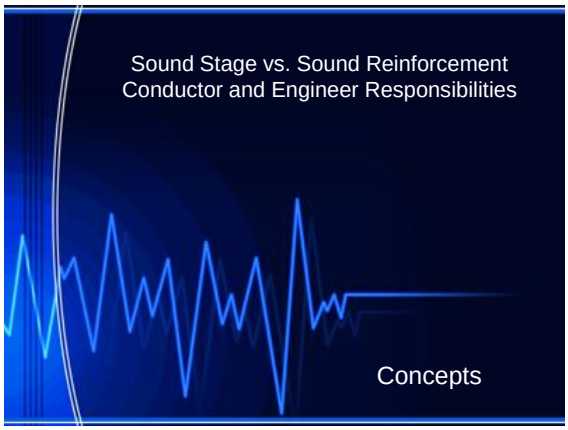
•Sound Stage – rock or pop show – audience hears mostly the sound from the PA and the shows are generally louder.

•Sound Reinforcement – jazz, classical – PA enhances acoustical performance – acoustic sound from stage is a larger component.

• Sound Reinforcement Definition: (*electronic reinforcement of an acoustical event*)

CLICK to: Conductor/Engineer Responsibilities **STEINER**

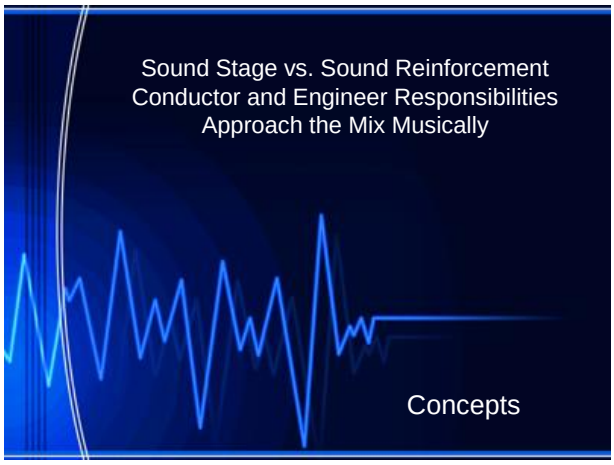
Conductor and Engineer Responsibilities



- Conductor is responsible for the *performance on stage*
- Sound Engineer is responsible for the *presentation to the audience*
- Engineer and Conductor should confer before sound check to agree upon goals – including what the show should sound like, overall desired volume and how the sound check will be run – engineer should run the sound check with the assistance of the conductor
- Be sure to designate a specific amount of time for SOUND CHECK – this should not be a rehearsal, but devoted entirely to SOUND – this is for the engineer to achieve the best results which ultimately benefits the audience and the performing group

CLICK to: Approach the mix musically **BAUER**

Approach The Mix Musically



- Listen to the stage before pushing the faders up
- be smooth in your movements, not abrupt
- focus and react quickly to what you hear
- mostly subjective- except for missing a cue or feedback

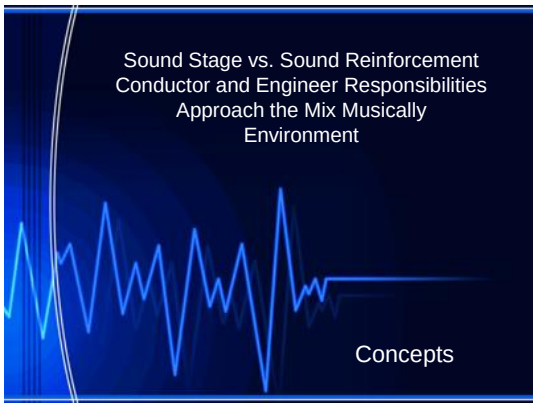
SEGUE

Now we come to the biggest difference between Recording and Reinforcement.

It's not the mixing consoles, it's not the microphones -----
it's the ENVIRONMENT!

CLICK to: Environment **BAUER**

Environment



• Recording Studios are very controlled, live venues not so much.

(How many of you have ever had to do a concert in a gym?)

• Mix considerations- type of venue, audience size and makeup, type of music.

• Mix under a highly reverberant hall; don't add to the noise field – additional sounds may add chaos rather than clarification.

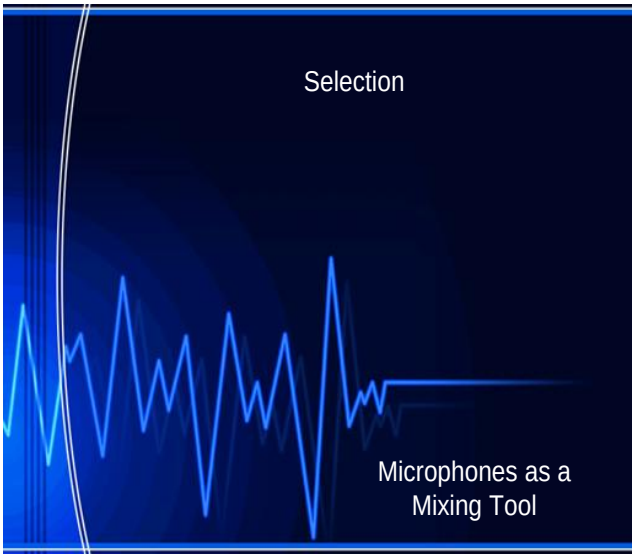
CLICK to: Microphones as a Mixing Tool **BAUER**

Microphones as a Mixing Tool (Meat of the clinic)

- Any mix has to start at on stage and at the microphones. Microphones are the major influence on what happens at the mixer.
- A little planning here can prevent catastrophic results once the show starts. *(Relay Chick Corea & German Big Band story)*

CLICK to: Selection **BAUER**

Selection



- Microphone selection is key in this process.
- The object is to choose microphones that will achieve a desired effect based on its design and intended application

- POINT: *don't use a mic with a presence peak on a trumpet if you don't want it to cut through like an ice pick; don't use a large diaphragm mic on cymbals if you don't want the tubs.*
- To accomplish this you should be familiar with a few microphone characteristics
-

TURN STAGE OVER TO SCOTT and GO TO FOH

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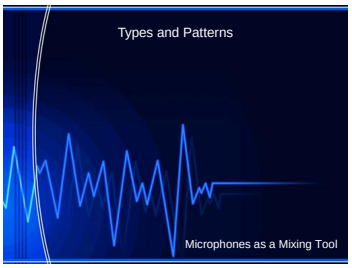
CLICK to: Types and Patterns **STEINER**



Types

CLICK

Dynamic- which is used the most in sound reinforcement because it will typically take more level and abuse.

CLICK

Condenser – which is more sensitive and fragile. It usually has a flatter response and is more accurate, but will have more bleed. These come in several diaphragm sizes. The small diaphragms are the most common in live sound. They usually cost more than dynamics.

CLICK

Pressure Zone mics are also referred to as Boundery Layer Microphones. They have useful, but limited applications in sound reinforcement.

CLICK

Ribbons- are normally very fragile and can be very sensitive. They may become damaged if voltage is applied to them. They are normally for special use.

CLICK

Patterns

Cardioid- (Uni-directional) most widely used pattern of all the microphones. Its pattern resembles the shape of a heart. Pick up sound from one direction.

- Super and Hyper-cardioids are even more directional than standard cardioids.

CLICK

Omni- pattern pick up everything everywhere. You don't want to place one these guys close to any speakers!

CLICK

Hemispherical- ½ an Omni pattern. Can adjust low response and directionality to some degree.

CLICK

Figure 8- can possibly help in isolation of adjacent instruments.

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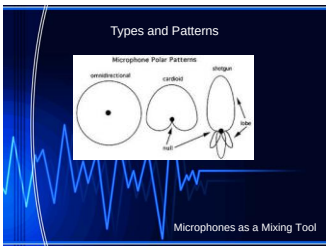

- Can a microphone be TOO good? Recording mics may be too sensitive for sound reinforcement applications (*Big difference between recording and SR is that the speakers and mics are in the same environment.*)

They can pickup extra background noise that you don't want making the mix more confused. *(relate German big band Neumann story)*

- ***Even though a microphone is labeled as directional, it still pickups sound from all directions.***
- *more directional= more gain*

LIVE GROUP DEMO difference of RE-20 and MD-441 on Bass, MD-441 tighter pattern resulting in less bleed and more gain. Run 2 bass lines and have the bass play by himself while doing an A-B. Then have the drummer play by himself and A-B the mics to demo the drum bleed, which should be more in the RE-20. Have both play together.

- ***LIVE GROUP DEMO*** C414 & Earthworks in piano. C414 picks up too much ambient information and the bottom end wants to take off, which results in less gain and control.

CLICK to: Application

Application

We would like to tell you about the microphones we have selected to use on our stage today.

- Every single mic is directional- either cardioids or hyper-cardioid.
- Typically the fewer mics the better, but it depends upon the application
- close miking will give you more gain resulting in more control over tone and balance.

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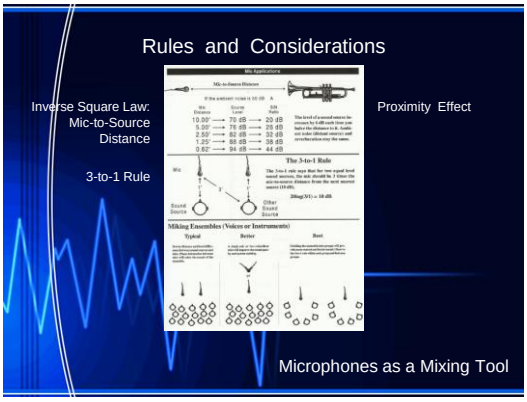
Rules and Considerations



mic next to drums; piano

- Proximity effect- cardioids has more than omni.
- **DEMO proximity effect**
- 3 to 1 rule (*prevents phasing issues when using multiple mics in close proximity, i.e.; Saxes, drums*)
- **DEMO Inverse Square Law: Mic-to-Source Distance *(double the distance- half the volume)***
- **DEMO distance**
- **DEMO Placement considerations; acoustic bass**

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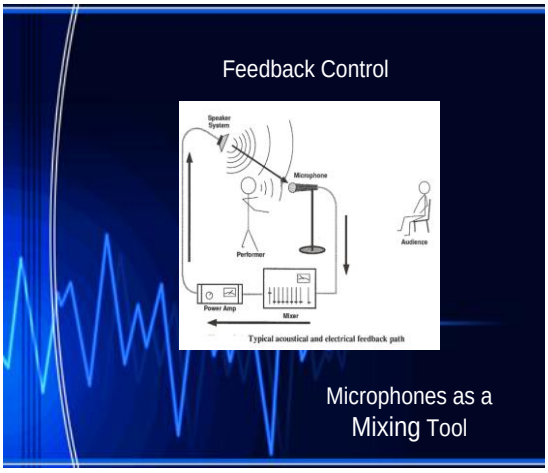
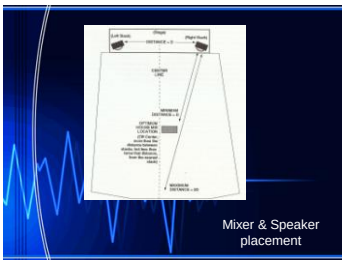
Feedback Control



- how is it caused
- how is it fixed *(follow considerations and rules above, reducing volume alone may not make it go away)*
- change relationship of mic to speakers
- change relationship of mic to source (*reduce distance, select a more directional pattern)*
- **DEMO feedback *(show cupping the mic, proximity to speaker, changing mic type, EQ)***

CLICK to: Mixer

Mixer & Speaker Placement



• Speaker placement – complete coverage of the audience area, speakers need to be in front of the microphones, focal point of mains should be behind FOH

• FOH placement – should be off-center, more than the distance between the main speakers, generally a little over half way back into the house

• Monitor speaker placement – goal is to be off axis to the microphone

CLICK

CLICK

RTA DEMO

Mixer

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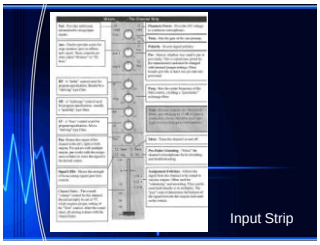

-review sections of input strip quickly: Sensitivity, Aux Sends, EQ, Channel Assignments, Fader

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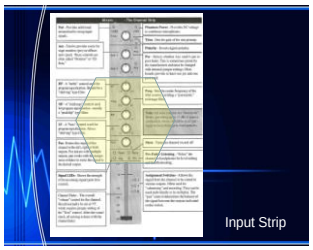

- use minimal amount of EQ
- cut instead of boosting when possible
- EQ may be used instead of volume to bring out a subject
- if more than 3dB of EQ, check placement and possibly change the mic

CLICK to Engineering Objectives

Engineering Objectives

Here are some of the basic goals an engineer should strive for

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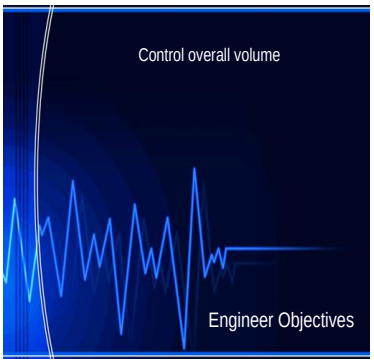
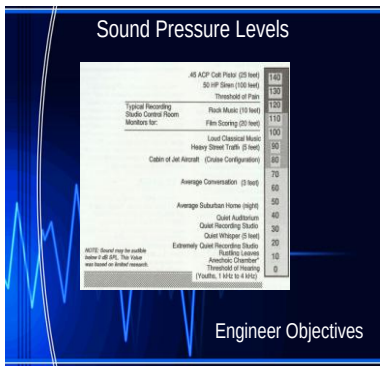
Control Volume

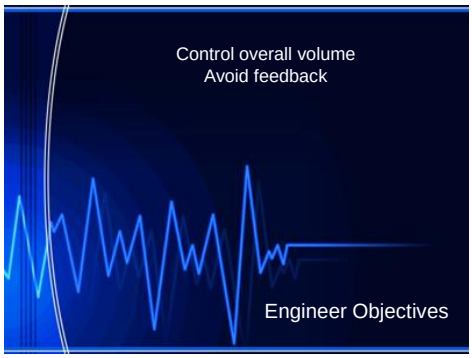




- most houses have a 90dB limit
- mixing too loudly will mask the acoustic instruments
- mixing too softly will result in lost definition
- don't mix for the last row (*every house has cheap seats - be considerate of the front row (they paid more)*

CLICK

Avoid Feedback



- follow the Rules we laid out earlier: 3-1 Rule; Mic-to-Source and Mic-to-Speakers orientation
- listen for microphones that are starting to "take off"
- don't over EQ
- choose the right mic for the job
- Remember that most sound reinforcement is mostly subjective, but ***feedback isn't***

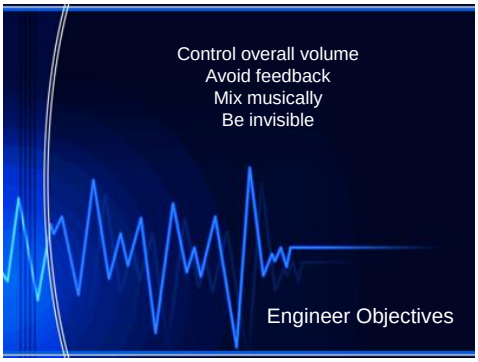
CLICK to Mix Musically **BAUER**

Mix Musically

- mix stylistically *(don't mix a kick drum like a disco drum if it isn't disco; don't bring saxes out front if it is a trombone soli)*
- realize that the primary source of the show is probably from the stage- not your mixer
- fix sound issues acoustically first
- stay focused and use finesse
- mix up to the loudest instrument

CLICK

Be Invisible



- you are there to enhance the audience's experience, not become it
- don't be a throttle jockey, try to be seamless
- mix should be in line with the desires of the director or producer

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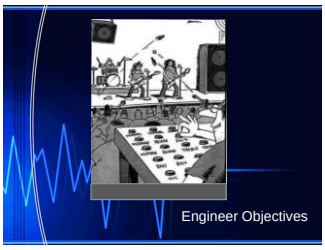

The ultimate goal is to go unnoticed by the audience!

CLICK

Closing:

Thank audience for attending

Acknowledge Midwest jazz board members:

(Dick Dunscomb, Tony Garcia, and Jose Diez)

Open for questions

DEMO: Patterns

Bass RE20 & MD441

1. A\B mics on SOLO Bass (441 should have more natural definition)
2. A\B mics with ONLY Drums playing (RE20 should hear more drums)
3. A\B Bass & Drums playing together (compare amount of drums in both mics)

Piano Earthworks and C414

1. A\B mics FLAT on Solo Piano (listen flat for a reference point)
2. Push A\B mics into feedback with Piano playing (which one can be pushed further)
3. A\B mics with ONLY Bass & Drums playing (listen to bleed)

DEMO: Rules and Considerations

1. Proximity Effect while speaking
2. Inverse Square Law/Mic-to-source (double the distance- half the volume)

DEMO: Feedback Control

1. Cup mic
2. Proximity to speakers (change orientation and distance)
3. Change mic type (change SM58 to M88)
4. EQ

DEMO: RTA

1. View room with Pink Noise from house mixer
2. Sweep frequencies from tone generator on mixer
3. View Feedback
4. Correct with EQ
5. Possibly Down & Dirty room EQ with SM57