

Independent Studies

Managing artistic control within a live music event

Jonathan Pearce

21/4/2009

A discussion and analysis of artistic control in live music events. Including a brief historical outline of sound reinforcement systems, several case studies of sound reinforcement systems that aimed/aim to reinforce sound in a more musical or naturalistic way and a discussion and analysis of who should have control of what and why.

Contents

Rationale.....	3
The growth of sound reinforcement in live music.....	3
The engineer as artist.....	4
Sound reinforcement – an extension of the musical instrument?.....	4
Volume.....	5
Tone.....	6
Effects.....	7
Spatiality.....	8
The Grateful Dead’s wall of sound.....	9
An alternative.....	11
What about the y axis?.....	13
Silent Stage?.....	14
Artistic modification of sound.....	16
Self mixing?.....	16
A corporate artist? – The Role of the Sound Engineer.....	21
Conclusions.....	23
Works Cited.....	26
Appendix - Interviews.....	28

Rationale

The sound reinforcement system is ever present at most concerts and events of any scale, from audiences of 50 to audiences of 50,000. However, does the sound reinforcement system simply reinforce, or does it serve a far greater, more artistic purpose?

Most current sound reinforcement systems (within medium-large events) place most, if not all, of the physical control over each musician's sound at a central control point, the mixing desk. In medium scale events this is often operated by a person who has never heard the band before and has little opportunity to find out what sound the musicians want to achieve, both individually and as a whole. This can result in the musicians feeling remote and almost helpless, whilst the sound operator is often left working against excessive backline levels or trying to make the drum kit sound big and 'fat' when the drummer has tuned it to be fast and 'pingy'.

Has the sound reinforcement system evolved into an element of the event that is on the same level as the artist? Should the booking of the sound engineer be viewed as important as the booking of the artist(s), or should the two even come as one, as united artists sharing the same vision and goal for the performance?

The growth of sound reinforcement in live music

The current industry standard methods have evolved over many years of amplified live music; however live music has existed for millennia; and, comparatively, centrally controlled amplification has only very recently been introduced.

Prior to this the musician has always had direct control of 'their sound', and whilst they may have been subject to the instructions of the conductor or musical director, the conductor did not have physical control of their instrument.

The first sound reinforcement systems were designed for vocals; to help singers be heard over large jazz bands and orchestras, these were simple units, consisting of a speaker and valve amplifier often built into a single box, with a high impedance microphone. They were usually positioned either close to the singer or on one side of the stage.

Soon after electric guitars became popular and another amplifier made its entrance to the stage, again the amplifiers were small and simple, and sat next to (or underneath) the guitarist. Acoustic instruments such as brass sections and percussion were loud enough on their own.

However as events grew larger (and crowds louder) it became necessary to amplify more of the band. A turning point was reached with the Beatles in the mid 1960s, where for most concerts all that could be heard was the crowd screaming. The small guitar amplifiers and acoustic drum kit were entirely drowned out.

Vox Amplification developed new amplifiers and speaker cabinets for The Beatles, and more of the band was amplified through the sound reinforcement system. Other bands and their respective amplification providers were facing the same issues, and by the 1970s a fairly standard system had evolved; consisting of stacked speaker cabinets either side of the stage, with all instruments mic'ed or amplified. By now most large touring bands also had their own sound engineer, mainly as someone was needed to set up the sound reinforcement system and maintain it.

The engineer as artist

This move to a central control position controlling the level and tone of each instrument, with the addition of dynamics processing and other effects essentially created a role that is both technical and artistic.

In order to understand why and how the engineer is an artist it is necessary to look at the control an engineer has over the sound and what an engineer and the system can change.

Sound reinforcement – an extension of the musical instrument?

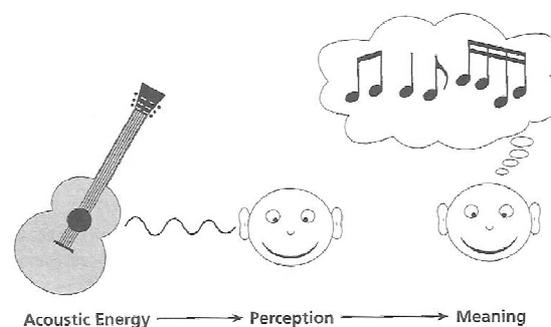


Figure 1 (Moylan, 2002)

Figure 1 demonstrates the fact that what needs to be considered is the perception of sound, rather than the sound itself.

At its most basic level the sound reinforcement system should reinforce the acoustic sound without any undesired modifications, thus not modifying the perception of the sound. Queen states that 'the simplest approach would be to add gain without changing any other characteristics. That is, to utilize every method to maintain naturalness' (Queen, 1964). However if all controls are set to zero except the gain is the system really providing a natural sound? Or, is there a distinction between objective natural and objective perceived natural, and thus in order for no change in 'any other characteristics' to be perceived, do characteristics actually have to be changed? A more important question to consider is whether naturalness is what is desired? Does the artist want what they already have but louder, or is further fine adjustment and polishing required?

Volume

The most basic way that a sound reinforcement system modifies an instrument's sound is by amplifying it; even using a hypothetical 'perfect' sound reinforcement system with a totally linear frequency response across all components from microphone to speaker, free from power compression, noise and any form of distortion, an instrument sounds very different at differing amplitudes. A drum has a very different tone when struck lightly to that produced when struck with force, similarly some sounds can only be produced at loud volumes, like a on-the-edge-of-feeding-back guitar, or a half open hi-hat sound. Hence a softly played instrument reproduced at high amplitudes could sound unnatural and confuse auditory cues. Similarly, a quiet instrument whose level in the mix exceeds the level of an obviously louder instrument is an unnatural scenario.

The fact of having sound reinforcement may also mean that the instrumentalist plays their instrument in a different manner or at a lower volume than they otherwise would, or that the composer/arranger writes differently. For example, before sound reinforcement musical theatre made strong use of chorus numbers, and solo pieces were sparsely accompanied; in order that the vocals could be heard. The singing style was more operatic and used the higher, more powerful ranges of a singer's voice. Modern musical theatre could not be performed without sound reinforcement, as the chorus line has largely disappeared and solo pieces make up a greater portion of shows, and commonly these solo pieces are often heavily accompanied by a loud ensemble. The presence of sound reinforcement has also altered the vocal style in musical theatre, with the modern vocal style being more relaxed and making greater

use of a singer's range; as the lower, less powerful, notes can be supported by the sound reinforcement system.

Another factor to be considered is the effect that volume can have on listeners. Although no firm research could be found it is known that loud music, especially music containing large amounts of low frequency energy, increases the adrenalin levels in listeners. (McGrath, 2006) Would a band such as Metallica sound the same if you could easily talk to the person next to you?

Tone

The hypothetical 'perfect' sound reinforcement system discussed earlier would reproduce an instrument exactly as it sounded acoustically, without altering frequency and harmonic content. However, microphones are (necessarily) placed closer to the instrument than the listeners' ears. Due to acoustic phenomenon such as high frequency air absorption and low frequencies tending to an omni-directional dispersion pattern whilst higher frequencies tend to a more directional pattern the microphone receives a different 'sound' to that received by the listeners' ears. Additionally, due to the differences in location and dispersion patterns the amplified sound will couple with and react with the acoustic of the room in a different manner to the acoustic output of the instrument.

As shown above, even for our hypothetical perfect sound reinforcement system the instrument already sounds different. If we now consider the imperfections of all sound reinforcement systems in use, such as proximity effect exhibited by pressure gradient microphones, non-linearity of amplifier stages, inter-modulation distortion, non piston motion of cone loudspeakers and resonances in cabinets etc; it becomes clear that a sound reinforcement system can significantly alter the tone of an instrument even when the system is being run as a transparent reinforcement system.

So, the system changes the tone of an instrument, and equalisers are partly provided on sound desks to allow for correctional equalisation. However the equalisation is also provided, and used, for artistic adjustment of the instrument's tone, to achieve a tone that the musician wants but cannot achieve acoustically or to sculpt a tone that sits better into the mix, allowing space for other instruments; or enabling it to pull past other instruments in the mix, bringing it to the foreground of perception.

Few microphones used in sound reinforcement systems have a flat frequency response, and in any case as most sound reinforcement microphones are pressure gradient operated the frequency response varies with distance from the microphone. Most microphones are 'voiced', given certain frequency responses in order to perform some the equalisation before the sound desk, usually the voicing is

specific to the source the microphone was designed for, for example a Shure Beta58 exhibits a broad boost at 4-5kHz in order to increase speech intelligibility and low frequency roll off to compensate for proximity effect (Shure, 2009).

Effects

With modern equipment the sound engineer has a large range of effects available to further modify and enhance the sound, an astounding variety of sound modifiers have been created for filtering, distorting, equalizing, amplitude and frequency modulating, Doppler effect and ring modulating, compressing, reverberating, repeating, flanging, phasing, pitch changing, chorusing, frequency shifting, analyzing, and re-synthesizing natural and artificial sound. (Bode, 1981)

Effects can be divided into two main subgroups, those typically run in parallel with the 'clean' unprocessed sound, and those typically run in series, where only the processed sound is used.

Effects that are typically run in parallel include reverberation models, comb filtering effects such as flange and time based effects like delays. Effects that are typically run in series include time correction delay, equalisation, dynamics processing units and pitch correction equipment. More exotic effects such as ring modulation, distortion and frequency modulation are applied in whichever topology is required to achieve the desired sound.

Correctional effects such as pitch correction raise deeper questions about artistic control, which we shall investigate later.

Dynamic Range

Aside from dynamic range alteration caused by power compression in the speaker system, which in a well configured and suitably sized system should be reduced to a workable minimum, dynamic range alteration is usually intended. This can be performed with automatic gain controllers such as compressors and expanders, or more simply with fader adjustments (often known as fader riding).

Dynamic range customisation is performed for a number of reasons. Compressing can change the perceived tone of a sound, and help the source sit better in the mix by ensuring that its quieter moments are not masked by a comparatively louder source. Expanding (increasing the dynamic range) or gating (increasing it to such an extent that all sound below a certain threshold is reduced to $-\infty$ dB) is often used to eliminate noise or unwanted resonance from sources. Performers who use electric or electronic instruments often have compressors as part of their onstage setup.

Spatiality

The original system of each instrument having its own dedicated amplifier and loudspeaker produced a mix that had contained spatial information about each instruments location on the stage. Each source had its own coordinates in x y and z , and also its own width, height and depth; a piano for example is not really one source, but a group of sources within a certain area onstage.

The modern approach of a stack or flown array either side of stage eliminates this spatial information, leaving the sound attached to that speaker cluster, with that clusters own x,y,z coordinates and width, height and depth. Clearly this does not provide an accurate model of the original source within its environment.

Stereophonic amplitude panning can help to return spatiality to the mix, by generating phantom images between the speakers, but as with all phantom image based reproduction the effect is at its best at a small sweet spot and soon falls apart outside of that sweet spot, as shown in Figure 2 below

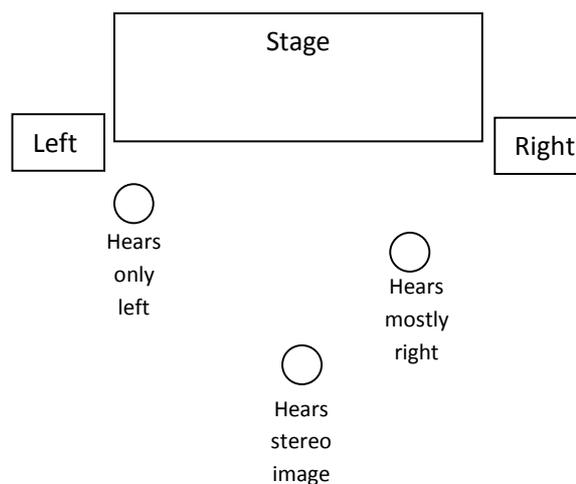


Figure 2 – The effect of listener position on perceived stereo image

In most concert venues the majority of the audience are outside of the sweet spot, and are much closer to one speaker than the other. Where the listener is outside of the sweet spot the phantom images pull to the nearest speaker; this means that for much of the audience the whole sound of the concert will be perceived to have come from the closest speaker cluster, and not from the artists onstage. Also, for audience members much closer to one speaker cluster than the other any 'information' panned to the far cluster may well go unheard, skewing the inter-instrument levels from the original mix.

Even when working at its best stereophonic amplitude panning alone only reproduces x coordinate, there is no provision for y or z , nor it is trivial to reproduce source width. However, for a large audience, most listeners are in the far-field where the distance from the source vastly exceeds size of the source, and therefore even the widest source approximates a point source. So height, width and depth of a source becomes less of a problem for a live event than for a recording, where the simulated listener would typically be in the near-field.

The Grateful Dead's wall of sound

Earlier considerations taken into account, it would seem that stereophonic amplitude panning is a far-from-perfect solution, and with the wealth of technology available to the modern sound engineer can a better solution be envisaged to restore spatiality to the mix?

A system could be constructed where each instrument (or source) onstage has its own speaker cluster, 'The Grateful Dead' toured with such a system until fuel shortages made it prohibitively costly to do so.

The Grateful Dead 'wall of sound' was designed by Ron Wickersham of Alembic Inc. The aim of the system was to return to a dedicated local amplifier for each instrument, but for that local amplifier to be able to adequately cover (in dispersion frequency and amplitude) a large capacity concert. The speaker layout is illustrated below in Figure 3 below.

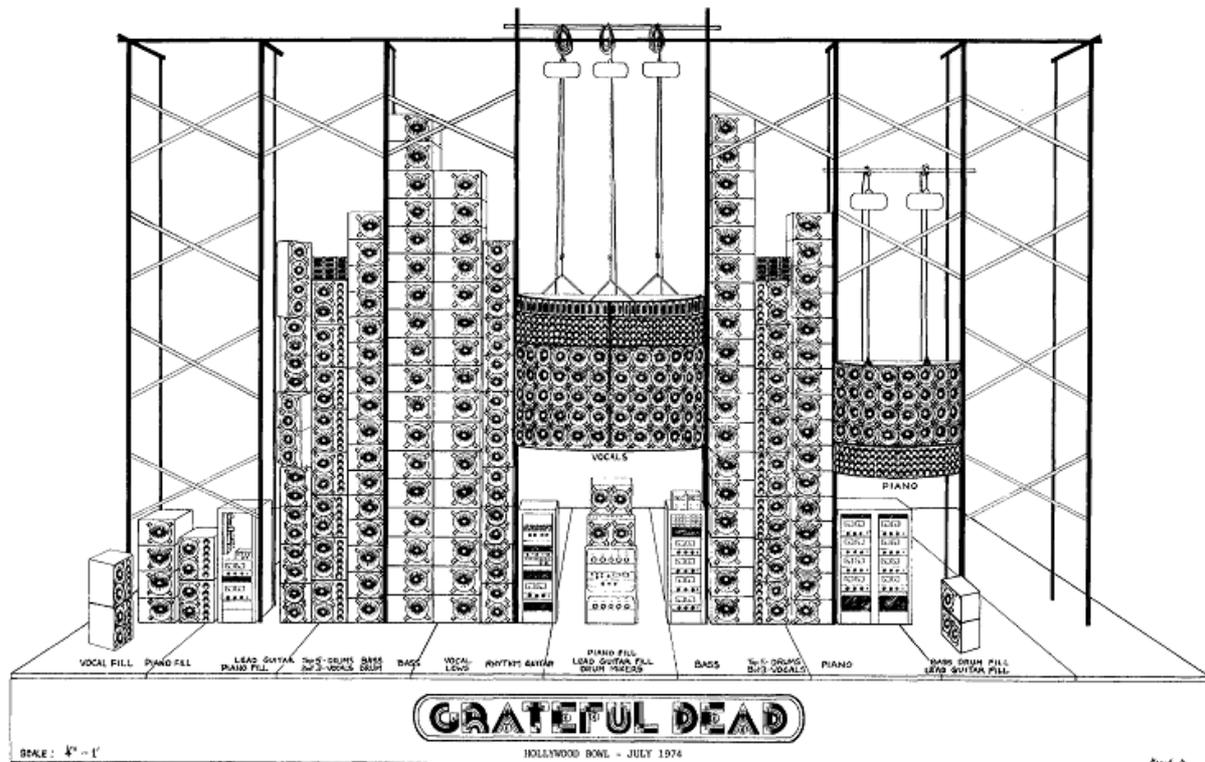


Figure 3 - The Grateful Dead's Wall of Sound (Davis & Wickersham, 1975)

This meant the system became what the audience heard and what the band heard, eliminating the need for a separate monitor system. The system was designed not as a sound reinforcement system, but each cluster was built to become part of the combined instrument that is the band. It is likened to a 'pipe organ' by Don Davis (Davis & Wickersham, 1975), and that comparison is very good one in that in the same way a pipe organ has many stops, the wall of sound had many individual clusters that combined together created a sound reinforcement system. The fact that each instrument was amplified through its own speaker cluster, local to the musician, restored the spatiality to the mix and provided an intuitive and interactive aural environment that the performer could '*could control emotionally and physically with his musical instrument*' (Davis & Wickersham, 1975). A compromise between perfect coverage and good performance was struck, on the grounds that '*Perfect acoustic coverage of the audience, if the performance is poor, is unsatisfactory to the audience, whereas quite uneven acoustic coverage will be tolerated at a concert where the performers have really "turned on" and done their thing, stimulated by a much sought after, seldom found, combination of the right music, a receptive audience, and a sound that bathes them physically as well as aurally.*' (Davis & Wickersham, 1975). This statement has many implications, some of which will be dealt with in later chapters.

Davis & Wickersham also list some fidelity benefits to the cluster per instrument approach. Firstly as each cluster is only reproducing the sound from one source, or combined source in the case of drum kit or keyboards, inter-modulation distortion between instruments is non-existent. Dave Rat created a system whereby vocals (and part of the drum kit) shared one system while all other instruments used another, he reports that the lack of inter-modulation distortion increases vocal intelligibility markedly, as does Mark Gay when, inspired by Dave Rat he tried a similar system. (Gay, 2009) (Rat, 2009).

Secondly since each instrument has only one acoustic location and hence source (assuming that as the wall of sound was designed for rock music the acoustic output of the instrument is small compared to the reproduced output of the cluster) then the RT60 of the combined acoustic system of sound reinforcement system and room is often vastly reduced, and any reverb heard will be perceived as coherent with the musical sound. On multi loudspeaker systems that use delayed loudspeakers off axis sound from loudspeakers and reflections from delayed loudspeakers can increase the RT60 of the combined acoustic system.

Another striking feature of the 'wall of sound' is that the mix was performed by the musicians from onstage (Thomas, 2007), the gain of the microphones was changed by altering the dc polarizing voltage, rather than using the more conventional mixing desk, and the control for this was placed with the musician. The system was capable of amplifying each string of the bass guitar independently to accurately model the acoustic summing of several strings, rather than the electronic summing of a normal system, this was found reduce inter-modulation distortion effects when chords were played across several strings. (Davis & Wickersham, 1975)

Further work planned for the system included electronic aiming, both to allow coverage aiming without having to tilt whole cluster and to enable the musicians to direct their sound to certain areas of the audience and to move that aim as a real-time effect.

An alternative

Instead of creating a system where each source has its own dedicated sound reinforcement system, which can be costly and results in a large system requiring more space and setup time than a conventional sound reinforcement system a compromise can be made.

By application of the precedence effect the ear can be tricked into believing the location of a sound is not where the majority of the received energy came from. The ear-brain system derives the location of a

source from the first arrival of the sound, thus by delaying the main loudspeakers and introducing a small reinforcement system local to the source the perceived location of the source can be pulled back to the actual location of the source.

A case study

A system based on this principle was installed in the *Playboy Club Hotel* in Wisconsin in 1968 by *Bolt Beranek and Newman Inc* (Tappan, 1968). The main sound reinforcement system consisted of 11 fifteen inch and 56 eight inch coaxial drivers, spread around the venue's ceiling, all mounted in hidden enclosures. This was a typical installed system for a club venue at this time; however *Bolt Beranek and Newman Inc* highlighted several key faults with such a system as listed below:

1. Auditory location cues for any amplified sources would be lost at all listening positions except very close to the stage. Singers and amplified instruments would be perceived to be located overhead, whilst acoustic sources would be perceived to be located onstage at their physical location. This is due to the amplified sound reaching the listener from the closest loudspeaker before the direct sound from the stage reaches the listener.
2. The sound from amplified sources would reach the listeners farthest from the stage about 5ms before the sound from unamplified sources. In some cases this delay could be musically significant.
3. The farthest listeners would hear an echo for sources which were close enough to microphones on stage to be amplified to some extent, but were simultaneously loud enough to be heard acoustically from the stage.

(Tappan, 1968)

Where this venue differed was the use of delays and additional speakers to shift the perceived image from a diffuse-above image to a locatable image onstage. Firstly delays were used to re-synchronise the speakers and to eliminate echo effects between acoustic and reproduced sound. Secondly, and more importantly for our discussion on artistic matters, a separate sound system was installed over the stage proscenium arch purely for the purpose of providing a single image point for the reproduced sound. Other systems have relied on the acoustic energy from the stage for precedence effect, but if there is a wide range of acoustic energy levels onstage the loudest sources tend to mask the quieter ones, and thus the precedence source for quieter sources becomes masked and the precedence effect works for

louder sources but not quieter sources, leading to a split image perception. This installation of separate precedence speakers prevented this from occurring.

By ensuring that sound from the precedence speakers arrived at the listeners ears between 5ms and 25ms earlier, and not more than 8-10dB quieter (widely recognised parameters for precedence effect) than sound from the ceiling system the perceived image was pulled back to the stage. Due to the lack of high quality, low maintenance delay devices available at the time of install a rudimentary delay tube was created; a tube with a speaker at one end and an anechoic plug at the other, with 2 microphones placed at the appropriate distance for the desired delay times. This gave only two delay times (22ms and 44ms), but the report comments that 'directional realism holds up surprisingly well' (Tappan, 1968).

The installation also considered precedence effect for the performers and the installed stage monitoring system (overhead speakers) were tried at all 3 time alignments, and 22ms was found to reduce the perception of a small enclosed stage and allowed the room response to be heard, and also allowed the acoustic output of onstage instruments to have precedence over the amplified monitor signal, giving the stage a more natural un-amplified feel compared to 0ms, where any amplified source was perceived to have emanated from the overhead speakers (Tappan, 1968).

What about the y axis?

The precedence effect system detailed above restores *x* axis location cues, but does not restore *y* or *z* location cues. Assuming that for most performances all the performers are on a single *z* plane, and that any deviation from that *z* plane (standing against seated for example) is insignificant when compared to the distance from the listener, then *z* axis location cues can for the most part be ignored, though arguably a system that could reproduce them would be of a higher fidelity and exhibit greater naturality.

Whilst deviations from the *z* plane may be insignificant, deviations from the *y* plane are more significant to a listener, especially for a large ensemble or a larger stage. They represent depth in the ensemble and without them reproduced or reinforced sound is often perceived to be located somewhere on a fixed line running through the speaker clusters that are heard first. Simulation of the *y* axis would enable the perceived image(s) to move away from this line, and restore depth to the perceived soundfield.

Delays have been used to perform this within classical music sound reinforcement, and it has been found to work, although much of the increase in depth perception is likely down to the added delay meaning that the acoustic source is heard first and thus takes precedence. Whether this system would

work as well when the acoustic output of the source is small compared to the sound pressure level of the reinforced sound is unclear.

A more workable and reliable system could take influence from the case study above and use precedence loudspeakers, but instead of having just one location for precedence loudspeakers there could be a grid, appropriately delayed, and each source could be assigned to its nearest precedence loudspeaker. This would form a compromise between the large and unwieldy 'wall of sound' system and the precedence loudspeaker system, where each source has a precedence loudspeaker but the majority of the sound pressure level is provided by a single high power full range sound reinforcement system, that could be configured to give good coverage with minimal excitation of room acoustics. Such a system would give the perceived spatial soundfield of the 'wall of sound', but would not require each instrument to have its own high power full range sound reinforcement system.

Of course such a system could also be expanded to include the z axis as well, though for most events, there is little useful information in the z axis, and the human ear brain system is not highly proficient at determining changes in the z axis.

Silent Stage?

Certain sound engineers, including some notably high profile engineers, advocate a silent stage. That is, a stage where all noise producing equipment is either acoustically shielded or relocated, or even eliminated. At its extreme guitar cabs are placed into acoustically damped flightcases or exchanged for amp simulators, drum kits are placed in plexiglass shields (often with a lid) or swapped for electronic drum kits and wedge monitors are replaced with in ear monitoring.

The proponents of this concept cite reasons such as better control of the mix, and the ability to create a more polished 'CD quality' sound through not having backline to compete with. Certainly it should vastly increase the dynamic range available to mix within. Peter Foulkes (Foulkes, 2009) comments that 'On my last tour at soundcheck the level at front of house was 106dB, the PA was then turned off and the level dropped to 105dB', this shows the very limited dynamic range available to the front of house engineer in such situations. However with a silent stage the engineer often has a background level of less than 80dB, allowing a far greater dynamic range, which in turn allows a more 'CD quality' mix to be produced. However is this extra quality gained at the cost of adrenalin inducing raw energy and power?

Paul Barnes (Barnes, 2009) voiced strong opinions on this topic in interview, saying that there is a 'trade-off required between [the engineers'] ability to control a mix and the natural energy of an onstage sound that is required at a rock show'; Dave Rat (Rat, 2009) supports this, introducing the concept that the perception of music is more than just sound and is 'Sound, volume, power and the nuances of musical collaboration'.

There is also some validity in that very few musical instrument amplifiers have uniform dispersion or a consistent frequency response on and off axis. Many professional guitarists favour the traditional 4" x 10" guitar cabinet; EASE modelling of such a speaker arrangement (using a spherical radiator to model the speaker) shows that the cabinet exhibits a very inconsistent frequency response across the dispersion in both axes, and some severe amplitude lobing. This contrasts with sound reinforcement speakers, where a considerable amount of money is spent in research and design to achieve a speaker cabinet that is free from amplitude lobing and has a consistent frequency response at all angles. A cabinet exhibiting such properties will deliver a different sound to each member of the audience, and the sound delivered to the performer will be markedly different still.

The acoustic interaction of instruments should also be considered. Whether desired or undesired this interaction is part of the natural sound of an instrument being played within an ensemble. For amplified instruments there is the important interaction between instrument and amplifier (or speaker cabinet), many guitarists make extensive use of the extra sustain that can be achieved by allowing a limited feedback loop to occur and then 'playing' this loop by carefully adjusting the attenuation due to distance.

In his interview Dave Rat noted that he makes use of 'the sounds on stage and how they combine and effect each other to enhance the experience'; he goes on to add that 'The beauty of a well set up stage and stage volume band is that each musician can effect what they hear by where they stand rather than trapped in a fixed mix bubble of in-ears'.

This reintroduces the concept introduced by The Grateful Dead's wall of sound, where the amplification system is one and the same for both the audience and the artists, and the artist can adjust their 'mix' by moving closer to the source they want to hear. Due to attenuation being in proportion to distance from source the artists receive the 'more me' mix that is usually desired, while the audience (if all is well) hear a well balanced mix. This is a more accurate model of normal human perception and a more intuitive and tactile system than the 'fixed bubbles' presented by an in-ear-monitor system, that can only offer a

mix that is independent of location and the surrounding soundscape, and is of course how orchestras and acoustic artists have worked since the very beginning of musical ensembles.

Peter Foulkes supports this approach with an example; 'I work with a bass player who has a pair of wedges in front of him with just his own vocal, a bass stack behind him and angled across the stage for bass and a sidefill with some drums, guitar and lead vocal. He moves around the stage when playing to find different sweet spots appropriate to what he wants to hear/feel throughout the set. A silent stage and consequently IEM would make him very uncomfortable on stage and this would impact the performance.' (Foulkes, 2009)

Artistic modification of sound

Of course in the land of art any choice is artistically valid, and therefore any of these modifications can be part of the art of the music.

For example, long before sound reinforcement systems, Berlioz regularly exploited spatiality in his compositions; his requiem featured a brass ensemble in each corner of the venue. (Wikipedia, 2009)

So we reach a split, the pure acoustic approach where the task of the sound reinforcement system is to recreate the acoustic sound as naturally as possible, only louder so that more people can hear it; and the artistic approach where the task is to supplement, enhance and fulfil the artist's vision for the sound.

However, if the sound reinforcement system is an integral part of the art of the performance who should control it?

Self mixing?

"The person in control of the mix should be responsible for the aspects of the mix that are controllable." (Rat, 2009) Dave Rat makes an obvious, yet often overlooked, statement. Many bands, particularly at amateur and semi-professional level, believe that running the sound reinforcement system themselves is a better option than trusting an unknown individual with their sound, and indeed many bands operate or have operated this way. The interviewed musicians expressed that it can be hard to entrust their sound to someone who has not heard their music before and whose mixing style and ability is unknown.

But is this really the best method? From onstage can the band really know what the audience hear, and perhaps more importantly can they perceive what the audience perceive?

Reviews of the Bose L1, a modern compact version of the Grateful Dead's wall of sound, seem to indicate that this is a major concern for many artists, and that typical sound reinforcement systems leave the performer with little indication of what the audience can hear, and furthermore whether what the audience are hearing is what the artist wants them to hear.

The Bose L1 is a compact, demountable line array system, designed as a personal amplifier for a single musician. The concept is similar to that of the wall of sound in that each musician has his or her own amplifier that is designed to sit behind the musician and act as monitor and front of house, but that that amplifier has been designed to give good coverage for the whole venue.



Figure 4 - The Bose L1 with musician (Bose, 2009)

'[Before buying the Bose L1] I couldn't hear myself half the time and when I did (through the monitors) I had no idea how it ever sounded 'out there' (Morrison, 2007), 'It was truly amazing. I heard what the audience heard. I was so unaccustomed to this, that when I first spoke into the mike I said "can everyone hear me okay?" I started laughing because I realized I'm not listening to a monitor, I'm listening to the same PA they are!' (Joe, 2006). A magazine review concludes its review of the Bose L1 with 'You will no longer be able to simply play at one level all night and rely on your sound engineer and/or PA to sort it out in the mix (Thomas, 2007); with comments such as these it seems Bose may

have succeeded in returning artistic control to the performer. However for every positive comment about the system there exists a negative.

The monitor and front of house system combined in one has its faults. If the crowd want it loud, it forces the stage volume up, one reviewer returned to a traditional system as 'we don't have to stand in front of them [Bose L1s] destroying our hearing' (Walker, 2007).

The Bose L1 system does however claim to have the advantage of being a line source system. This means that (within the near field) its attenuation over distance is 3dB per doubling of distance, rather than the 6dB of a point source loudspeaker. This means the level at the performers can be lower to get the same level halfway down the auditorium, and that people at the back can hear without deafening those at the front. However, this cylindrical propagation only works up to the critical distance, whereupon the attenuation tends to 3dB per doubling of distance. This distance is given by $0.006L^2f$ (Ureda, 2002), so for the Bose L1 the critical distance is 2.9 at 100Hz, 29 at 1kHz and 290m at 10kHz (for the L1 Model I or II with a radiating length of 2.2m, rather than the compact model that has a radiating length of 40cm, and performs rather less favourably). These results show beyond the front edge of the stage that the bass and very low mid will attenuate at almost double the rate of the treble frequencies. However air absorption is greater at high frequencies than low frequencies so the effect is not as bad as results above might indicate, and the Bose L1 line source is high pass filtered at 180Hz, lower frequencies are reproduced by a more conventional subwoofer. The results show good approximation of a line source in small to medium venues, giving the musician a useful advantage over a standard instrument amplifier.

Bose also claim that the system has a 180° dispersion, ensuring that everyone on stage can hear the output of each system; however one user took some measurements with an SPL meter and found that 'Despite that claims made by Bose, my unit did NOT give me anywhere near 170 degrees of even sound dispersion' (Shanahan, 2006). This lack of horizontal dispersion does limit the usefulness of the systems all in one concept, as the musicians may need to be a distance in front of the columns in order to hear the output of all columns.

Most user reviews that could be found came from those who had previously mixed from onstage or with in-house venue sound engineers, so the reviews may be misleading in that the performers have never worked with a sound engineer they can trust to make it sound good every time and therefore for them to have control and to be able to hear what they can control is a vast improvement. Perhaps for this

type of performance this type of system is ideal, but several reviewers expressed doubts that the system would scale up to a larger venue or to a louder event. This opinion is supported by the fact that the Bose L1 would not behave as a line source for the majority of a large venue, due to the small array length, requiring the Bose L1 to output a higher SPL at source, for which it is not designed.

Charlotte Evans describes herself as more 'an audio mixer rather than an engineer' (Evans, 2009); this highlights the fact that there are two rather different aspects to being a sound engineer; firstly there is the engineering of designing, constructing and configuring a sound reinforcement system, secondly there is the artistic side, the actual mixing of the band. It is possible (indeed at touring level it is considered the norm) for the two roles to be carried out by separate people, for instance Charlotte Evans only does the mixing, and leaves the system design to 'others who have the capability much more than myself and have worked hard for that title' (Evans, 2009). Is it then possible for a *sound reinforcement system engineer* (as opposed to the more conventional concept of a sound engineer) to engineer the system and then leave the artistic mixing to a/the performer?

There would be two main problems with a system of work as described. Firstly the performer responsible for the mixing, assuming a conventional sound reinforcement system, rather than a Bose L1 type system, would not be able to hear the output of the front of house system; even if a Bose L1 type system was in use the performer would not be able to hear the same acoustic mix that the audience hear. He or she would simply be too close to both the acoustic output of the instruments and the output of the amplification system for all sources to have comparable attenuation due to distance. Secondly the performer responsible for the mixing would then have to 'perform' the mix as well as performing on his or her instrument. This would mean their energy and concentration would need to be shared between the two tasks, meaning that either, one gets ignored and one is good, or both suffer.

There is an argument to be made that people can sing and play an instrument, so why can't they mix and play an instrument/sing? There are a number of reasons why this comparison is not a fair one. Playing two instruments requires two lots of noise-making, whilst listening is of course vital to making this noise into music; the listening comes with the noise-making. Mixing however requires critical listening, how is one supposed to critically listen whilst also making a loud noise? Also in the former case the two activities are strongly linked and the singing is (in most cases) musically related to the playing of the instrument. However, whilst some would compare operating a mixing desk to playing an instrument, is not often a case of doing certain things at set times like most musical performances. It is more a case

of responding to aural cues and thought processes, experimenting with the sound in order to best match the perception of the sound to the artistic vision for the sound.

There is also the issue that a sound reinforcement system works in absolutes, in objectively measured variables such as 12dB boost at 8kHz with a Q of 0.5, or a 5:1 compression ratio at a threshold of 4dBu etc. However, a performer's mind during creative musical performance (generally) works in subjective descriptors such as that source needs to be a bit brighter. No sound desk comes with brightness or boxyness controls, and the thought processes required to convert those subjective descriptors to objective parameters use a different part of the brain to that of the creative subjective thought processes. Asking a performer to use both thought processes simultaneously will cause one or both to suffer.

Perhaps the do-it-yourself approach works for solos and duets where most of the mixing during the performance can be performed acoustically, but for larger ensembles there is a need to have a dedicated person responsible for shaping the sounds parameters until they best meet the artistic vision for the performance. This need not be a sound engineer in the conventional definition of the term.

In the many years of music that have existed prior to sound reinforcement systems there has nearly always been one person in charge. For what many would call serious music such as choral and orchestral works this has been the conductor; whose role it is, through rehearsal notes and through body language and gestures, to shape the sound and guide the instrumentalists in dynamics, tempo and other expressions. In popular music there was often a band leader, who performed a similar role to that of the conductor, but perhaps with less grandeur; it was also not uncommon for the band leader to be playing an instrument which raises the interesting point in that how can a musician lead and play, yet not mix and play?

The role of conductor or band leader raises the question of who is the artist(s) and who are performers? If we take the conductor as the artist and the orchestra as performers, this ignores the artistic considerations each musician has put into their playing, and their tone, dynamics and technique at each point of the performance. So then, is there some rank of artistry where the conductor, being of a higher rank has more power? For the sake of the remainder of the report, a performer is one whose artistry stops at their acoustic output, and an artist is one who commands greater vision and control over the whole performance.

Mixing acoustically, as a conductor or band leader would, is a far more intuitive and tactile system than mixing at a mixing desk, it also does not require the subjective to objective 'conversion process' that was discussed earlier. Additionally, the leader is not performing the mix as such, more guiding the other performers to perform their portion of the mix with helpful advice from the leader, their decisions are not enforced on the performer in the way that they can be with a sound reinforcement system.

Back in the world of sound reinforcement systems, we have demonstrated that it is far from ideal for a musician within an ensemble to be performing the mix for the reasons listed below:

- Not in the same location as the audience
- Does not have the time or focus as they are already busy playing an instrument
- Creative and technical thought processes do not easily co-habit
- The musician is unlikely to be trained and/or have experience in sound reinforcement system engineering, or sound engineering

A corporate artist? – The Role of the Sound Engineer

Clearly what is needed is a dedicated mixing desk operator; again not necessarily a sound reinforcement system engineer, but an engineer of sound. Engineer is a good description, as it encourages images of big heavy machinery, beating and moulding things into shape, connecting things together, taking components and creating something that is greater as a whole than the sum of its parts. What is required is an artist whose medium is sound, one who can determine the artistic vision for the performance, in conjunction with the performers, director/leader/conductor, and composer if appropriate, then realise that vision using the plethora of sound modification equipment available in the world of the modern sound reinforcement system.

Many of the interviewees expressed opinions that the sound engineer 'needs to be good artistically, as well as technically' (Gay, 2009) and that 'A trusted sound engineer should have responsibility for the mix' (Barnes, 2009), illustrating that the artist is trusting the engineer to be able to create an artistic vision for the mix in his or head and then transfer that to real world values and settings.

Therefore, at least part of the role of the sound engineer is to translate between the artist's subjective descriptors and the sound reinforcement system's objective adjustments. However, performing this role is not as simple as looking up the artist's words in a conversion table, as each artist might use a slightly

different description, and the context will be different each time. The task becomes more than merely understanding the artist's comments, as what is actually needed is a deeper understanding of the artist's artistic vision for his or her sound and presentation. Considerations need to be taken beyond just the sound, and into the aesthetic of the sound, the energy contained within that sound, the quality of the sound, even the colour of the sound. Is pristine quality more important than raw energy for this artist? Simon West lists these considerations as the more important questions to ask an artist before soundcheck (West, 2009).

If the mixing desk operator is to become a part of both the sound reinforcement system and the collective of artists, surely he or she should be a permanent member of the ensemble? All the interviewed artists made it clear that working with a single sound engineer resulted in a faster soundcheck and more confidence that the audience heard what the artists wanted them to hear. 'We feel that our engineer is every bit as essential to creating the sound we want out the front as we are. It is never as good when we work without him, he is like the fifth member of the band.' (Alford, 2009).

This notion of the engineer being as significant an artistic contributor as the onstage performers brings in the concept of their being a 'corporate artist', performers and engineer(s) united in realising a single artistic vision.

Most of the interviewed sound engineers have some musical experience, and even if they now **don't** play most would consider themselves as 'having a musical ear' (Foulkes, 2009), and it would seem logical that having the ability to understand, interpret and process music would greatly aid the sound engineer in the task of understanding the artistic vision for the performance. However, there are many people who greatly appreciate music, and have studied it and can understand it at an intellectual level but lack the physical skills to be a musician. They would perhaps identify as having a musical ear or musical brain, despite potentially displaying a vast ineptitude with musical performance.

Another important role that the sound engineer has to fulfil is to ensure the performers are comfortable and confident that their contribution to the sound will be heard clearly at the right times and with the right sound. This perhaps is the greatest and most significant role. All discussions of perfect technical techniques can be drawn to an objective conclusion, but human minds work subjectively. As Dave Rat succinctly puts it 'Any effort to try and pigeon-hole an industry of creative humans into a repeatable common "way to do things" is flawed and silly' (Rat, 2009); some artists may prefer the intuitive, interactive soundscape of a well setup backline and monitors, while others might prefer the reliable

'fixed bubble' of an in ear monitoring system. Some artists have clear ideas and strong opinions on how they want to sound, whilst others are happy to let the sound engineer experiment and produce something that is perhaps different to the sound they would have created.

The role of keeping the band comfortable may often even extend into making compromises against the sound quality, a guitarist might play much better with an extra 3dB backline level than the sound engineer would like, and that extra 3dB might mean sacrificing all front of house control of that source; but if the artist is more comfortable and consequently plays better in some way then the audience have received a better performance. Great music and great performances shine through lower quality sound. Take recordings of early jazz for example, if bad quality sound rubbished the musicianship the early recordings would have long been abandoned, but they have not. Yet there is some (subjectively) awful musicianship recorded in comparatively high quality, but due to their poor musicianship these recordings often get no further than their creator and his or her friends. Paul Barnes comments that 'To try and create a CD quality listening experience is totally, utterly and entirely missing the point' (Barnes, 2009), surely if the audience wanted a CD quality listening experience the audience would stay at home and listen to a CD, it is after all cheaper, likely to be more comfortable, and far more convenient. Rather than trying to create a CD quality listening experience at the expense of the comfort and therefore prowess of the performers, we should be striving to deliver the best live performance possible to the audience. The sound quality should still be kept as high as possible, but never at the expense of the ability for the performers to perform to their full ability. Of course when taking that step of sacrificing fidelity for performers comfort the performer should always be informed, so that they are aware and can be included in that decision.

Conclusions

It has been shown that there are two main approaches to sound reinforcement; the scientific flat response system where the aim is as faithfully as possible reproduce the acoustic sound of the source, and the artistic approach where the sound reinforcement system is used to augment and modify the acoustic sound.

The second approach leads to a situation where the sound reinforcement system becomes an extension of the musician's instrument. The choice of microphone, the microphones positioning, the choice of pre-amplifier, the equalization and other processing and the tone of the amplifier/speaker combination come together to become an extension of the instrument. Now that the sound reinforcement system is

part of the instrument, there becomes a situation where part of the instrument lies out of the control of the musician. Several systems for restoring some of that control to the musicians were considered; the Grateful Dead's wall of sound was a revolutionary system in its design, and would have become even more so if the planned development had continued, but a system such as the wall of sound is impractical for all but the largest touring bands. The Bose L1 system aimed to recreate the concept of the wall of sound, but in a smaller more transportable package, though many negative comments have been published about it, it seems to have succeeded in returning spatiality to live sound and returning control to the artist. Whether the artist really wanted the control, and whether the artist has the time and focus to manage that control are matters that potential buyers ought to give strong consideration to. The Bose L1 system is suitable only for small to medium events due to its small size and power; many reviews commented that even the smallest loud rock gig was too much for the system. However for smaller or quieter groups the system may be ideal and it certainly offers some fidelity benefits by nature of each loudspeaker dealing with less sources.

Other methods of achieving the spatiality offered by a speaker-per-performer system were analysed, and a case study of a system utilising the precedence effect for auditory location cues showed that such a system can work very well in terms of making the sound reinforcement system locationally transparent and returning the aural location of a source back to the physical location of that source.

Acknowledging that the performers usually are best concentrating on performing, with someone else dedicating their attention and effort to controlling the sound reinforcement system, it was suggested that sound reinforcement system operation falls into two broad categories; design and configuration, and mixing. The separate roles could easily be, and often are, performed by separate individuals, one a sound reinforcement system engineer and the other a sound engineer. Having made this distinction the role of an engineer of sound was investigated, and a number of important roles were highlighted.

The sound engineer needs to be an integrated part of the artistic team. They should be working with the artist to ascertain the artist's (or artists') vision for the performance, then using their skills and knowledge to realise that vision through selection and use (and potentially design) of suitable equipment.

The sound engineer needs to make the performers comfortable in the knowledge that they can trust the sound engineer to make sure they can be heard, and to ensure that the sound and the aesthetic of the sound is as the performers intended. The sound engineer also needs to provide a monitoring system

that suits the performers and results in happy and confident performers, even to an extent where doing so may compromise the front of house sound. All of this, of course, can only be achieved through communication with the artist(s) and performers;

The sound engineer either personally, or in conjunction with a sound reinforcement system designer, needs to create a sound reinforcement system that best reinforces the performers' instruments in a style that suits the artistic vision for the performance, and that offers the highest fidelity without sacrificing the comfort of the performers or desired aesthetic for the sound.

If the sound engineer is to be such an integrated part of the ensemble, and to take such a key role in the artistic management, then it would seem logical for him or her to be a permanent integrated part of the ensemble, the interviews supported this, with several interviewees having or being a dedicated sound engineer. However in the world of touring artists, where fees often struggle to cover the costs of touring, adding an extra member to the touring party can be costly, and is therefore often ruled out. This means that ensembles are regularly mixed by sound engineers that have no prior experience with the artists.

It is obvious that communication is the key to good artistic management in a live music event, and that communication should result in a performance that has a single united artistic vision. Too often in the live music event environment there is not the time for this communication to take place, and too low a priority is placed on an integrated artistic vision, with dedicated sound engineers often being seen as too costly and house engineers often being too rushed to have the opportunity to speak with the artist(s) before soundcheck and performance.

This report has mainly dealt with the issues faced by artists/performers in the pop and rock music environment, though by careful consideration of who is an artist and who is a performer the ideas presented within could easily be transferred to other live event scenarios such as musical theatre and orchestral performances.

Works Cited

- Alford, T. (2009, February 16). Interview with Tim Alford of [dweeb].
- Barnes, P. (2009, February 10). Interview with Paul Barnes of Sonic Boom Six.
- Bode, H. (1981). History of Electronic Sound Modification. *70th Convention of the Audio Engineering Society*. New York: Audio Engineering Society.
- Bose. (2009, March 21). *L1® Model I single bass package*. Retrieved March 21, 2009, from Bose: http://www.bose.com/controller?url=/shop_online/speakers/portable_amplification_systems/l1_model1/l1_model1_single_pkg.jsp
- Davis, D., & Wickersham, R. (1975). Experiments in the enhancement of the artist's ability to control his interface with the acoustic environment in large halls. *51st Convention of the Audio Engineering Society*. AES.
- Evans, C. (2009, February 8). Interview with Charlotte Evans.
- Foulkes, P. (2009, February 04). Interview with Peter Foulkes.
- Fry, D. (1992). *Live Sound Mixing*. Victoria, Australia: Roztralia Productions.
- Gay, M. (2009, February 5). Interview with Mark Gay.
- Joe. (2006, November 21). *Bose L1 Cylindrical Radiator: Harmony Central User Reviews*. Retrieved March 25, 2009, from Harmony Central: <http://reviews.harmony-central.com/reviews/Guitar+Amp/product/Bose/L1+Cylindrical+Radiator/10/2>
- McGrath, T. (2006, March). Is Life Too loud? *Men's Health*, pp. 106-110.
- Melchior, F., Gatzsche, G., Strauss, M., Reichelt, K., & Dausel, M. (2006). Universal System for Spatial Sound Reinforcement in Theatres and Large Venues - System Design and User Interface. *120th Convention of the Audio Engineering Society*. Paris, France: Audio Engineering Society.
- Morrison, W. (2007, January 28). *Bose L1 Cylindrical Radiator: Harmony Central User Reviews*. Retrieved March 25, 2009, from Harmony Central: <http://reviews.harmony-central.com/reviews/Guitar+Amp/product/Bose/L1+Cylindrical+Radiator/10/2>
- Moylan, W. (2002). *The Art of Recording - Understanding and Crafting the Mix*. New York: Focal Press.
- Queen, D. (1964). Considerations for naturalness in portable sound reinforcement systems. *16th Annual Meeting of the Audio Engineering Society*. Audio Engineering Society.
- Rat, D. (2009, February 16). Interview with Dave Rat of Ratsound Inc.

Shanahan, P. (2006, May 11). *Bose L1 Cylindrical Radiator: Harmony Central User Reviews*. Retrieved March 25, 2009, from Harmony Central: <http://reviews.harmony-central.com/reviews/Guitar+Amp/product/Bose/L1+Cylindrical+Radiator/10/3>

Shure. (2009, March 20). *Beta58A Vocal Microphone*. Retrieved March 20, 2009, from Shure Pro Audio: http://shure.com/ProAudio/Products/WiredMicrophones/us_pro_Beta58A_content

Tappan, P. W. (1968). An unusual nightclub sound reinforcement system. *The 35th Convention of the Audio Engineering Society*. Audio Engineering Society.

Thomas, B. (2007, December). Bose L1 Model II. *Performing Musician* .

Upton, K. (2009, January 12). Interview with Kat Upton of Out of Embers.

Ureda, M. S. (2002). Pressure Response of Line Sources . *113th Convention of the Audio Engineering Society*. Audio Engineering Society.

Walker, P. (2007, May 22). *Bose L1 Cylindrical Radiator: Harmony Central User Reviews*. Retrieved March 25, 2009, from Harmony Central : <http://reviews.harmony-central.com/reviews/Guitar+Amp/product/Bose/L1+Cylindrical+Radiator/10/2>

Wallach, H., Newman, E. B., & Rosenzweig, M. R. (December 1973). The Precedence Effect in Sound Localization. *Journal of the Audio Engineering Society* , Volume 21 Issue 10 pp. 817-826.

West, S. (2009, February 1). Interview with Simon West.

Wikipedia. (2009, March 26th). [http://en.wikipedia.org/wiki/Requiem_\(Berlioz\)](http://en.wikipedia.org/wiki/Requiem_(Berlioz)). Retrieved March 30, 2009, from Wikipedia: [http://en.wikipedia.org/wiki/Requiem_\(Berlioz\)](http://en.wikipedia.org/wiki/Requiem_(Berlioz))

Appendix - Interviews

Kat Upton – Bass guitarist, Out of Embers

1. What music do you play, where do you play it (size of venue)?

We play fast Girl Rock, a mixture of punk/pop/rock/post hardcore with metal undertones, our own style really.

Usually play where ever we can get a good gig.

We do have to take into consideration stage size, good PA, the venue its self.

The places I tend to play are medium sized venues. Depends if we are on Tour support for a bigger band. occasionally play smaller pub gigs. But we tend to avoid them as we have a lot of gear,

2. How often do you use a PA system?

All the time. It is essential for the style of music we play.

We're pretty loud!

3. How much goes through it?

Definitely two microphones as we have two lead singers. Depending on the size of the PA rig we'll often have our lead guitarist's guitar coming through as she likes to hear it. I'm happy to just hear my guitar from the stage sound only. However on a bigger stage when i'm more free to move I have mine through the monitors. Drummer likes to hear a bit of everything. But at a lot of gigs we are limited to what we can put through the monitors.

4. Do you use your own sound guy or venue guys?

In the past I've had our own sound man. But a lot of the time if we're on the road we need to take as little people as possible. So we mostly use the provided sound man.

5. Who should be in charge of the mix? Is this usually what happens?

The ... sound man.

We tell him/her what we want to hear back and it is in their control.

6. Have you played on a silent stage where everything is DI'd or moved offstage and in ears are used instead of monitors?

Nope

7. Do you think the PA becomes part of your instrument? (think compression, effects etc)

Not so much. We only really have a bit of reverb on the vocals to make it sound extra cool.

8. Do you normally feel like the engineers on your side or working against you?

In my years of playing live around the UK and in Europe it all depends if you're headlining or supporting. If you're headlining a show, the engineers tend to be very accommodating and take time to learn your names and provide you everything you need to hear. But if you're the first or second band on they tend to rush you and be really arsey towards you.

When I was on tour with My Vitriol, when we played in Manchester our manager was talking to the soundman and he said he was just going to check Enjoy Destroy very quickly, and didn't give a shit about Out of Embers. RUDE

9. Do you normally chat with the soundguy pre-gig about your sound, if so what do you talk about?

It is usually polite to talk to the sound guy when you get the venue. It is just good manners cos he/she is going to provide you with the service you need for you to perform.

Just tend to introduce yourself and talk about how many members you have and what gear you'll need to go through the PA.

Even if the sound person is being a complete arse-hole you still must say please and thank you.

Cos if you're rude he'll only sabotage your set

Charlotte Evans – FOH engineer for a classic rock band

1. Describe your work. Do you work within one genre more than others? If so, which? Do you work mainly with one artist or with a large amount of artists? What kind of venues do you work in? Etc

I am now primarily working FOH though in the past I have done many shows at monitors. I prefer FOH as it suits my fondness for the freedom of expression!

In the late 80's I studied at the School of Audio Engineering to give me a reasonable grounding on the principles of audio. Unfortunately my capability in mathematics has always been extremely poor and

therefore I have felt that continuing with courses such as V-dosc training would have not been a wise idea.... I even have problems with working calculators!

Therefore I prefer to call myself an audio mixer rather than an engineer. I like to leave that description to others who have the capability much more than myself and have worked hard for that title!

I work very closely with system technicians who are able to translate what my objectives are and to achieve the most even coverage to all part of the listening area.

When I first started I was fortunate to work as a house technician at some terrific venues in London (Marquee Club both at Wardour St and Charing Cross Rd, The Astoria and Kentish Town Forum) which gave me the opportunity to work with many styles of music plus the odd jazz gig and even some stuff at the Royal Festival Hall. The great thing about jazz and to especially classical music is that it should be "sound reinforcement"if someone came to me and complained of over-amplification, I had failed! Delicacy was the order of the day.

Nowadays I work with one Classic Rock band for the past 17 years and since I have moved out of London I don't really work as a house tech anymore apart from if I get a phone call saying that someone is ill and can I cover for them. Fortunately we have a pretty busy schedule that takes us all over the world so the bank manager is kept reasonably happy! I am more than happy with this arrangement as I get to use some terrific systemsand some pretty bad ones too which is all part of the fun and a real challenge.

With every booking I have to examine the technical specs and then liase if any extras need to be brought in.

Venues can be anything from an 800 capacity to a couple of whoppers that were in excess of 200,000. Generally it is around 2000-3000 indoors to around 12,000-20,000 at open-air festivals in either support or headline capacities.

Strangest gig was in a potash mine in Merkers, Germany where we performed an acoustic set in a massive salt cavern 800m below the surface....load in started at 3.00am because all the gear had to be taken down by pit elevator, each trip taking 45 minutes through tunnels! The mine is famous for the US Army discovering a huge stash of stolen gold and other treasures hidden by the Nazis towards the end of the Second World War.

One thing I do have to point out to promoters is that the technical requests I make are for the benefit of the band, not a “wish list” for myself, so I take particular care with monitor requirements.

2. Do you have any musical talent? If so do you play regularly and in what context?

I studied piano from the age of about seven and worked up to grade 8 whilst at school. Unfortunately the distraction of all the excitement of being a teenager meant that I quickly neglected my playing, though music terminology and still being able to sight read has been useful to me.

I also had oboe lessons and was a not very helpful contributor to the school orchestra and did countless piano recitals and competitions; I particularly hated the competitions and the general “pushyness” and I think that is what gave me stage fright which has stayed with me to this day.

I thought that maybe learning the bass guitar and playing in a band with some friends would help....it didn't! I used to spend most of the show in a blind panic as to how the next song started! Not for me, I prefer to be in the dark behind a mixing desk!

3. Do you advocate the silent stage idea? Why and how far do you take it? (DI guitars? Electronic kit? Guitar cabinets offstage?)

Chance would be a fine thing!

I did a gig once with a band that totally DI'd and used a drum machine. Not quite a silent stage as it was before IEM's became into wider usage so the floor wedges were pretty cranked up but it was still a pleasant experience not fighting backline and real cymbals.

Even using plexi screens around drum kits has affected the overall drum sound to some extent but if it makes backing singers or string players happier, then so be it.

4. Do you often feel you're working against, not with, the backline levels?

Very much so, especially at smaller shows. Even to the extent that I need to pan the guitars in the PA to balance out the opposite side of the stage from where the guitarist has his gear. Fortunately most of the backline cabinets are in a line with the front edge of the drum riser so I frequently time align the system to the backline which makes things a bit more coherent.

Open air festivals I don't really care...they can crank up as much as they want!

Drums, especially the cymbals are a problem with bleed down vocal microphones. For this reason I usually sound check all open mics like overheads and vocals and keep them open whilst moving onto the close mic'd stuff (a technique that is used by Big Mick Hughes who does Metallica).

5. How receptive do you find artists to being asked to turn the backline down?

Hah! Well the guitarist I work with is very co-operative, he is loud but many years ago we started using a Marshall Power Brake (now changed to a THD HotPlate) so that the stage volume can be reduced without compromising the tone of the Marshall valve head.

The bass player is a totally different kettle of fish, as much as I love him and he is probably one of the most underrated players today, he is just plain *loud*; he uses 1 Ampeg 8x10 and a 2 x 15 cabinet irrespective of the venue...complete overkill when playing a small club... and it is still not loud enough! In small places I usually find that I don't need to put him in the PA at all.

Neither musician is comfortable with IEM's unfortunately.

6. How do you respond to the concept that 'the sound reinforcement system is an extension of the musician's instrument'?

I like to think that a sound reinforcement system, or more accurately, the mixing desk is like an instrument in itself. It is one thing to amplify an instrument but there also lies in how a mix comes together like an artist using a paint palette and I do treat a mixing desk as a palette for colours (I don't have synesthesia by the way but I do associate sounds as "textures").

The skill is defining those instruments but in a natural and balanced manner and adding depth or other perceptions through careful and subtle use of effects. I would much prefer a strong effect as a single instance than having a mix awash with the stuff, sometimes that huge reverby hall can work to your benefit, though there have been plenty of times when I wish there was such a thing as an "anti-reverb" device!

7. Have you ever used a split system, where certain sources use a separate speaker system to other sources? Why did you use it and did you feel it improved clarity, and spatial perception?

No I haven't but I would love to try it after reading many write-ups by Dave Rat!

8. Who should have ownership and responsibility for the mix? Is this usually the case?

Well I wouldn't actually say that I "own" the mix but I would be expected to be credited for it on any commercial release. I *am* responsible for the mix and there lies the element of trust between myself and the band....they are up on stage and I am left to my own devices up front! Word generally filters back to the band if I have done a decent job or not though!

9. Do you normally speak with the artist before the soundcheck/show about what they want from the sound reinforcement? Is this something you would like to do, but don't get to do? What questions do you ask?

Nowadays generally not as I know most of the songs backwards. Occasionally I will freshen things up a bit by trying things out, if it works...fine otherwise it gets quietly dropped. I will warn the band of some of these "experiments" but they usually give me complete free rein. They often ask me if there is anything that needs looking at too, like in arrangements or certain sounds.

One very important point is if the keyboard player incorporates new patches I will always go through them to make sure that we have consistent output levels. Done once, saves a lot of heartache later....I don't particularly like "cheating" by putting a comp/limiter across his mix!

In the past working with other bands I always made a point of asking them if they wanted any special reverbs or delays etc. They know their material and I don't and it's part of my job to sell the band in a winning light!

10. Please give any further comments and opinions on artistic control in a live music scenario.

I have noticed over time the amount of "control" that engineers are using. By this I mean the use of compressors and gates...even double compressing on a channel and across a group output.

I can understand this when you are not familiar with a band but find it a little puzzling when you know a band well. Maybe it is something our cousins "over the pond" favour more. To me it takes away all the dynamics of the performance, exactly like the travesty of brick wall compression that seems to be the in thing in recorded music.

I very rarely use gates on drums nowadays and when I do it is generally on the toms to keep out excessive cymbals. Bass drum? Generally no....all those little subtle grace strokes are lost but I suppose it depends on the skill of the drummer and if he can tune a kit *properly*; how many times have I seen drummers screwing away at the top lugs when it's the bottom skin that needs adjusting!

Microphone choice and careful placement are the order of the day but can be forgiven to have a few "safety's" at those gigs where there is no sound check!

Whilst we all want our mixes to sound as pristine as possible I don't think it's a good idea to treat it, disinfect it and generally squeeze it until it is devoid of all character!

I would much rather have a quick squeak of feedback....shows that it's live innit!

Tim Alford – Lead singer '[dweeb]'

1. Describe your work. What kind of ensemble and genre do you play in? What kind of venues do you work in? Etc

I am part of UK rock outfit [dweeb]. We in play in venues all over the UK and overseas ranging from small pubs and clubs to large events and festivals.

2. How often does your ensemble use sound reinforcement?

Always.

3. What scale of sound reinforcement is used? (Vocals only, full mic'ed, FOH and monitor desk?)

Usually we will have all amps and drums mic'ed and running through the front of house. Very occasionally we will back line drums and amps and just have vocals through the front of house. At bigger festivals, usually when there are many bands, we will also use a separate monitor desk.

4. Have you used/do you use your own sound engineer?

Yes, we work with Simon Kemp of audiomsg.

5. Who should have ownership and responsibility for the mix? Is this usually the case?

Our engineer. In most circumstances this is the case, though occasionally we will meet with a difficult in-house engineer who makes this difficult.

6. Have you played on a 'silent' stage (with in ear monitoring and DI'd instruments/relocated guitar amps)? What did you think of it and would you do it again?

We regularly use IEM's. However we would never DI guitars because the majority of the tone of your guitar is created by the amps you use, especially when you use valve amps as we do.

7. How do you respond to the concept that 'the sound reinforcement system is an extension of the musician's instrument'?

Certainly. We feel that our engineer is every bit as essential to creating the sound we want out the front as we are. It is never as good when we work without him, he is like the fifth member of the band.

8. Which do you more often feel, that you working with the engineer, or battling against them?

When it is with our engineer it is certainly working together. When we work with in-house engineers it varies. Sometimes you get people who are really passionate about it and who want to get the best sound possible out of you. But just as often you meet engineers who have mixed one too many bands and couldn't care less what you sound like as long as they get their pay cheque. So it's a mixture.

9. Do you normally speak with the engineer before soundcheck about what kind of sound you want? Is this something you would like to do, but don't get to do?

We would always make this a priority.

Dave Rat – Head of Ratsound and engineer for the Red Hot Chilli Peppers

1. Describe your work. Do you work within one genre more than others? If so, which? Do you work mainly with one artist or with a large amount of artists?

I tend to focus on alternative music or what used to be called alternative. Though I have mixed everything from 60 piece classical orchestra's, corporate shows, big band, rap, political events, protects and mariachi music.

Currently I only mix shows Red Hot Chili Peppers and shows where I am filling in for other engineers or favors for managers and bands.

2. What kind of venues do you work in?

I have worked in every conceivable venue type from fields, sheds, arenas, stadiums to churches

3. Do you have any musical talent? If so do you play regularly and in what context?

Ha! used to play drums but too noisy! Naw, I focus on sound design and the tech side of the music world.

4. Do you advocate the silent stage idea?

I believe in the sensation of experience. Sound, volume, power and the nuances of musical collaboration. That makes as much sense to me as a motionless rollercoaster, or taking a holiday by watching a movie of a sunny beach.

4a. Why, and how far do you take it? (DI guitars? Electronic kit? Guitar cabinets offstage?)

I avoid it. I use the sounds on stage and how they combine and effect each other to enhance the experience; whenever possible. A loud drumfill adds resonance and depth to the drum sounds, the sound of a singer standing near a guitar rig increases the complexity of the guitar sound.

The beauty of a well set up stage and stage volume band is that each musician can effect what they hear by where they stand rather than trapped in a fixed mix bubble of in-ears. That said, each musician or band has a unique angle and I support whatever gives the performer the sound they need to achieve the performance they wish to present. Any effort to try and pigeon-hole an industry of creative humans into a repeatable common "way to do things" is flawed and silly.

5. Do you often feel you're working against, not with, the backline levels?

At times but that is the nature and beauty of life. That is like asking "Do you ever feel that while riding your bicycle that the wind or hills are working against rather than with you?" It is pushing things to their extremes and overcoming the challenges that keeps thing interesting and enjoyable.

6. How receptive do you find artists to being asked to turn the backline down?

That really depends. Perhaps like telling a car driver to slow down. If it is a teenager, perhaps the excitement of driving inspires recklessness. Yet for a professional racer, to tell them to slow down just highlights the ignorance of the person asking. As far as receptive, well, to bark out a request without a

valid explanation and without presenting some sort of better way, would be quite arrogant and unprofessional. I have found that if I help a band reach a balanced stage volume, that they are happier and receptive. A band is a relationship; each member has self priorities and group priorities. Helping a band find a balanced compromise can be challenging but if the outcome benefits all, the receptiveness is generally quite good.

7. How do you respond to the concept that 'the sound reinforcement system is an extension of the musician's instrument'?

Well, the guitar rigs, bass rigs are definitely part of the sound with amplified bands. I think it can go either way. A sound system can strive for transparency as it does in classical, or it can augment and enhance as it does with rock or it can become an instrument of its own with bands like Pink Floyd or Janes Addiction.

8. Have you ever used a split system, where certain sources use a separate speaker system to other sources?

Yes, I have spent significant time developing a workable method of touring large scale venues with a dual system

8a. Why did you use it and did you feel it improved clarity, and spatial perception?

Improved clarity due to the reduced Inter modulation and Doppler distortion. The spatial perception increase was noticeable but not dramatic as I strove to keep the systems close together to maintain identical coverage patterns.

9. Who should have ownership and responsibility for the mix?

The obvious reply is "The person in control of the mix, should be responsible for the aspects of the mix that are controllable."

To determine whether or not a mix is being responsively created, one must first determine "Who is should be in a position to judge the quality of the mix and for that matter, the volume of the mix as well?"

The band? The band manager? The audience? The venue rules? Some group of outside observers?

My experience has been that there are always a wide range of opinions, not unlike musicians on stage trying to balance out stage volumes. Often these opinions are in contrast and good sound engineer will seek out and create a balance between these forces and come up with something that most are happy with.

The attempt to quantify a single answer and blanket it across the multitude of music styles seems frivolous to me. May as well ask me "what is the best food for animals to eat?"

10. Do you normally speak with the artist before the soundcheck/show about what they want from the sound reinforcement? Is this something you would like to do, but don't get to do? What questions do you ask?

Well, Peppers rarely sound check and I already have a good idea after 18 years of working with them as to what they want. When working with a new artist, I listen to what they have recorded, I sit in on rehearsals and hear what they like to hear when they are working out their music, I listen to their stage sound they start with at sound check, I talk to them about what they do and do not like about those various situations as well as ask them what they want to audience to hear. Every artist and band is different. Some know exactly what they want presented while others enjoy the aspect of the engineer 'making them sound awesome.' And just as often, there will be several conflicting opinions from a single band.

11. Please give any further comments and opinions on artistic control in a live music scenario.

The most important thing a sound engineer brings to the table is inspiring the confidence in the performer that each and every show will sound as good as it possibly can, and then following through.

Simon West – Freelance Sound Engineer

1. Describe your work. Do you work within one genre more than others? If so, which? Do you work mainly with one artist or with a large amount of artists? What kind of venues do you work in? etc

Freelance audio engineer across many genres and organisations, generally not fixed to any particular artist but do work regular with a good variety.

2. Do you have any musical talent? If so do you play regularly and in what context?

Guitar, I do play regular but only for fun.

3. Do you advocate the silent stage idea? Why and how far do you take it? (DI guitars? Electronic kit? Guitar cabinets offstage?)

Silent stages are great, this is in respect to feedback issues, stage to audience noise ratio, noise at work act considerations and so forth. However, this approach does take a lot of 'feel' away from the performance. This can be expressed with the idea that a lot of bands these days like in ear monitoring systems with whatever capture method it's good sounding (DI, Sampled kit etc etc), but still like wedges there which produce good amounts of low end / mids because they can still feel the power in their feet and chests.

So yes, silent stage = good. I'd take it as far as what would sound the best, if that means everything DI'd or offstage cabs or whatever, then I'd fight for that.

4. Do you often feel you're working against, not with, the backline levels?

Most low level / medium sized gigs yes. However, larger events inc arena sized it is not too much of an issue. Generally it is down to how educated the artists are!

5. How receptive do you find artists to being asked to turn the backline down?

A good 60% are co-operative as they 'understand'. However, the less educated or older generations (i.e. the ones who say they were doing this whilst we were in our nappies!) are the problem. However, this as time is going by, is filtering

6. How do you respond to the concept that 'the sound reinforcement system is an extension of the musician's instrument'?

It can be, as systems have their own personalities. Granted, a sound reinforcement system in text book sense should be a flat lined response which reproduces all qualities accurately. But in real terms, different systems enhance particular parts of anything entering its spectrum... or takes things away. But then again, how far to you define the 'system'. As the mic is part of the system, cable, system processor, desk, all of it is the system. So really yes, it is an extension, eg we use a beta 52, d6 or whatever to 'enhance the capture' of a particular part of the instrument...thus being an extension. A bit like a finely tuned helmholtz resonator or a wood type on a guitar.

7. Have you ever used a split system, where certain sources use a separate speaker system to other sources? Why did you use it and did you feel it improved clarity, and spatial perception?

Yes, it does work. Examples can be found in large scale systems (chilli peppers) or simple monitoring systems where a pair might just be vocals and the centre wedge be everything else. By asking a driver to do one particular function, it is concentrating more on one particular function.

My usage is mostly in monitor world, as in FOH world I've not had the budget or big enough need/chance/backing to do this.

8. Who should have ownership and responsibility for the mix? Is this usually the case?

I believe a combination is sometimes good, as when a FOH engineer works they sometimes personalise most aspects of an instrument. but leaving a director or lead singers girlfriend to decide is sometimes worse!!! Usually on larger shows, the FOH engineer is left to their own devices as they are hired to engineer the show as a trusted person. On midsized shows / smaller shows, everyone's a 'sound engineer'.

In general the FOH and Artistic director / producer should be responsible, with respect to be shown for the FOH engineer as they are the ones trying to get the best out of **** most of the time.

9. Do you normally speak with the artist before the soundcheck/show about what they want from the sound reinforcement? Is this something you would like to do, but don't get to do? What questions do you ask?

When possible, but mostly its not because they are protected by their 'people'. I'd always love to speak to artists properly, but depending on their age (eg, if they've been around then usually they are quite arrogant to everyone) i'd make the attempt. I'd simple ask, "what is it you want to gain out of the mix, such as are you looking to knock peoples heads off with raw power, or maximum speech intelligibility and so forth; generally try and get an understanding of how they want their music to be portrayed.

10. Please give any further comments and opinions on artistic control in a live music scenario.

Where possible, its good. EG, Prince used to make his FOH engineer mix from stage left so Prince could edit bits and bobs as and when (prince also tried doing his own monitors). But some would argue that may lead to disaster. The the end of the day, any artist is an artist and if they truely do know what they want and wish to 'control' it, let them. Engineers are there to assist the artist, not be the artist. If the artist truely makes a Cock up, then the engineer steps in... hopefully educating the artist along the way (<< sign of a truely good engineer)..either way, its always going to be horses for causes.

Peter Foulkes – Freelance Sound Engineer

1. Describe your work. Do you work within one genre more than others? If so, which? Do you work mainly with one artist or with a large amount of artists? What kind of venues do you work in? Etc

I am a self employed live sound engineer. Sometimes I mix front of house other times I do monitors. In the past I have worked for various PA companies as a systems tech. The live sound work that I do now tends to be exclusively for a specific artist and I am hired by the artist or their management. To put it another way, if you book Artist X, no matter where the show is, or which PA company you use, I will turn up with Artist X to mix them.

The majority of bands I do are in the rock genre. I do all ages of rock, currently my regular clients are an English rock band that is nearly 40 years old and a somewhat more youthful gothic rock band more likely to be found on posters in Kerrang. I have mixed most other genres.

2. Do you have any musical talent? If so do you play regularly and in what context?

I learned piano as a child. I have a bass guitar and an acoustic guitar. I can't really play any of them to a degree of competence. I entertain my toddler at home with nursery rhymes and have been known to do the same on stage. I am not a musician! I can hear when something is out of tune or wrong. Whilst not being a competent musician I would regard myself as having a musical ear (if that makes sense).

3. Do you advocate the silent stage idea? Why and how far do you take it? (DI guitars? Electronic kit? Guitar cabinets offstage?)

No.

Live music requires the players to feel some emotion whilst playing. A silent stage becomes a very sterile environment. In ear monitoring (IEM) can also be a very sterile working environment. As a monitor engineer my role is primarily to make the band feel comfortable on stage. Isolating members from each other does not help. There are some people, notably vocalists, who benefit from a quiet stage or IEM but others would be disadvantaged by it. For example: I work with a bass player who has a pair of wedges in front of him with just his own vocal, a bass stack behind him and angled across the stage for bass and a sidefill with some drums, guitar and lead vocal. He moves around the stage when playing to find different sweet spots appropriate to what he wants to hear/feel throughout the set. A silent stage

and consequently IEM would make him very uncomfortable on stage and this would impact the performance.

That said, there is definitely a place for creating some isolation on stages. I have worked with 2 bands whose setup involves a keyboard riser and drum riser next to each other. If we were able to put a plexiglass shield between the 2 players we would at the drop of a hat. Sadly budget and the logistics of freighting a large sheet of plexi stop this from happening. Quite often escalating stage volumes can be blamed on one member of the band causing a knock on effect for everyone else. Deaf keyboard players have a lot to answer for. The problem with keyboards is that they don't occupy their own frequency range. Getting clarity in a mix is often about giving each instrument its own space in the frequency spectrum. Bass, guitars, vocals all have their own little pockets, keyboards are everywhere and that's why they cause problems. Brass sections tend to be have quite selfish monitor mixes, they will mostly want to hear themselves. There are these little plastic disc things, I forget what they are called, that you clip onto the mic. Stupidly simple, they basically reflect the sound straight back to the player whilst also giving a little bit of isolation to everyone stood in front of the player. That works.

4. Do you often feel you're working against, not with, the backline levels?

I do monitors, I am mainly employed to make stuff in the monitors louder than the stuff coming out of the backline. As noise restrictions are increasingly being imposed we have become more conscious of the levels and have measured them with an spl meter. On my last tour at soundcheck the level at foh was 106dB, the PA was then turned off and the level dropped to 105dB. Draw your own conclusions.

5. How receptive do you find artists to being asked to turn the backline down?

Honestly? They lie. The musicians will agree that the levels need to come down, they may even play a bit quieter during the soundcheck. It will be back up to normal volume for the show. They will all deny turning back up again. Keyboard players are the biggest liars of all.

6. How do you respond to the concept that 'the sound reinforcement system is an extension of the musician's instrument'?

Sounds like marketing ##### to me.

If you are mixing an acoustic act and the aim is to make them sound like an acoustic act then, yes the role of the speakers is "reinforcement". The expectation of audiences and management for the majority

of acts is that the foh mix should sound better than the racket being made on stage. As a foh engineer your role is more than just amplifying what is coming to you from the stage.

7. Have you ever used a split system, where certain sources use a separate speaker system to other sources? Why did you use it and did you feel it improved clarity, and spatial perception?

I assume you are referring to Dave Rat's Red Hot Chili Peppers system which is basically hanging 2 separate PA's next to each other. The concept of it is interesting and I would like to try it for myself. I have not heard it but several people whose opinions I respect have described the show as disappointing. I do not know if this is a reflection on the overall mix or the split concept. I have heard Dave mix on conventional left & right systems in the past (Rage Against the Machine) and he is unquestionably very, very good.

If you are not aware of Dave Rat's dual hang concept you can read all about it here, trek through the blog and he goes into detail about how it is setup and how he is using it. You will also gain some valuable insight into the role of a foh guy with a stadium level artist. It is a very honest and at times quite revealing blog.

<http://ratsound.com/cblog/archives/2006/05/C1.html>

8. Who should have ownership and responsibility for the mix? Is this usually the case?

The front of house engineer is responsible for the front of house mix. Yes. Management may offer opinions but responsibility must be taken by the engineer.

9. Do you normally speak with the artist before the soundcheck/show about what they want from the sound reinforcement? Is this something you would like to do, but don't get to do? What questions do you ask?

For FOH no. Obviously if the artist has an opinion they want to share they will probably share it with you. More often than not I am trusted to make it sound good. I usually get sent copies of the albums but unless there are lots of very specific effects (delays on certain phrases perhaps) I tend to mix the band my way and not the album way. As a general rule this means more guitars and drums, less keyboards and samples and track. I get good live reviews, I make the live experience exciting for the audience.

Monitors, yes. Mostly “are you OK”, “can you hear yourself”, “happy?” sort of stuff and completely irrelevant rubbish to distract them from how appalling the venue of the day sounds. As I said before, monitors is mostly about making musicians comfortable on stage. At least 70% psychology.

10. Please give any further comments and opinions on artistic control in a live music scenario.

No further comments.

Mark Gay – Music Technician for Live Sound at an FE College

1. Describe your work. Do you work within one genre more than others? If so, which? Do you work mainly with one artist or with a large amount of artists? What kind of venues do you work in? etc

I work at South Downs College – www.southdowns.ac.uk. There are over 400 music students. The courses we run are AS & A level in both Music & Music Technology, BTEC at First Diploma, National Award, National Diploma & Higher National Diploma in Music Performance and First Diploma & National Diploma in Music Technology. There are also a few groups doing some sort of music performance just for fun!

My job title is “Music Technician – Live Sound”. The bit of my job that interests you (I think) is that I am responsible for sound for the performances that our students do, and also for any bands we get in for things like Jazz Week. There are about 18 classes of students who usually divide into about 3 groups each. So I guess I work with a lot of bands & many genres are covered.

We do gigs at several locations within the college, ranging in size from vocal PA in the Recital Room & Coffee House, to full set up in the College Theatre. Most gigs outside the college are in the larger music pubs in the area which require more than just vocal reinforcement. However we do one Christmas & four end of year shows at The Wedgewood Rooms - <http://www.wedgewood-rooms.co.uk> (one of my former places of work) which has national tour spec PA – mostly. ;)

I also have my own “small but good” PA, though I’m not gigging it much at the moment. I use it mostly for Jazz, Big Band & Folk type events.

I’ve been based in the same area for 25 years so I’m quite well known around here. Most of the local PA companies have my phone number, so, while I don’t actively tout for work beyond the day job & my own little setup, I do sometimes help out by jumping on a desk occasionally.

In the past I've worked full time for a smallish hire company, and freelanced for some larger ones, and some touring bands. I've been the house engineer in a couple of live music venues – one for about 10 years.

2. Do you have any musical talent? If so do you play regularly and in what context?

Well, I learnt the oboe at school & can sing in tune. I don't perform in any way though. So that's no really.

3. Do you advocate the silent stage idea? Why and how far do you take it? (DI guitars? Electronic kit? Guitar cabinets offstage?)

I think it's a great idea, particularly in smaller venues where drum volume can be higher than I want to run the PA. I'm never happy if I'm being forced into pushing up faders, by over-loud guitars.

Most of what I do these days is one off stuff so although I do usually try to get the amps pointing at musicians' ears and that sort of thing when it's a small room, I can only make changes that the band are comfortable with.

We do encourage students to experiment with different ways of working to get stage volume down. DI bass, keys & guitars (emulated speaker output) are used at times, but usually not for gigs. It needs consistency of equipment & crew that we can't guarantee for the gigs we do.

In the past I've worked with a (reggae) band which had a silent stage except for the monitors. Electric drums, the guitarist used a pod, bass & keys just DIs – one microphone for the singer & one for the drummer's percussion "toys".

It's not something that can be forced on a band though. The transition can take some time to get used to for the band and engineer. The first time I did it, I thought it was as big a change to what I was familiar with as my first large outdoor gig was – all of a sudden tiny adjustments on the desk could be heard. Part of me likes the power, but remember, with power comes responsibility – it's much more important to get everything just right if all the sound is being controlled by me!

I think this can only work if you have the full trust of the band, both in you as an engineer and in the equipment that's being used. I found that it takes much longer to soundcheck & the band were only happy if they each had their own monitor mix. Not such a problem if the whole PA is in the truck, but a lot of our gigs used house PA systems of the size where 5 way monitor mixes are almost unheard of. Our

solution to this was that a small mixer, XLR splitter box & the keyboard players powered speakers soon got added to the van.

So, today it's something I'd like to do if I was working a lot with one band, but it has to be the band's decision.

4. Do you often feel you're working against, not with, the backline levels?

When working for college, I guess I'm usually seen as being in charge, so if discussion & asking does not work then I am in a position to tell the band what to do. Even so there are times when I defiantly feel that.

I would guess that it's only a small percentage of students who want to be too loud. Thinking about it, they are always male, and are usually among the less musically talented in a class.

Working with my own PA, I tend to only take work where this is unlikely to be a problem.

5. How receptive do you find artists to being asked to turn the backline down?

Inexperienced bands who know they are still learning usually listen to advice and act upon it. Those who have been around a long time will also usually listen, though may be less likely to act.

There are good & bad ways of asking, and having the people skills to know the right way to talk to each band is important. If they think I'm asking because I'm a grumpy old git it won't work, if they think I'm trying to get a better sound for them then we're in business.

6. How do you respond to the concept that 'the sound reinforcement system is an extension of the musician's instrument'?

That would be nice. Set it up, get the levels balanced & come back at the end of the show? It's not going to happen very often is it? I have done shows where I've not touched the desk for most of the show, but these usually have involved just one musician. Add more people and maintaining a balance becomes more difficult.

I think we are there to help the band sound the way they want to, and often what comes from the stage needs some sort of adjustment to achieve this.

During sound check, we initially focus on one instrument at a time, usually trying to get the best sound for that individual instrument. Once the whole band start playing together, we bring levels up to get the right balance. Through this process the system may well be an extension of each instrument. However, that is rarely the end of it. Changes then have to be made so that each instrument is heard clearly and in its correct place within the music.

An example may be that two guitars sound virtually the same, resulting in a muddled sound – panning may sort this, but sometimes, a large part of the audience may only be hearing one of the stacks. Cutting the higher end of one guitar & lower end of the other may clear this up better.

So, I think that a sound system is more than an extension of the instrument. This is one reason why the engineer needs to be good artistically, as well as technically.

7. Have you ever used a split system, where certain sources use a separate speaker system to other sources? Why did you use it and did you feel it improved clarity, and spatial perception?

What, like Dave Rat? Yes.

Like Dave, I stated doing this with monitors many years ago – vocals only through a pair of wedges, and guitar & drums through another between them or off to one side – that sort of thing. Ended up being something I'd always try to do if the equipment & space were available, as it made the bands happier

Then there were gigs on tours when I'd get part of the PA out of the truck to help out a poor house system, usually putting vocals in my system & everything else in the other.

I never set out to design a system this way though until I read Dave's blog. I've really only tried it out properly once, but have to say it was the best sound for that rig in that venue that I've ever got.

I used the same system as I normally put in the room, two subs & two tops per side. Subs were shared by each system, kick, snare & vocals went through one top (the inside one) & everything else went through the other.

The band were very good, which helps a lot (of course), but pretty loud for the room. I felt the vocal clarity was amazing, something I think I may have struggled with slightly with a conventional setup. I think it's as much to do with spatial difference as the speakers performing a simpler task. I had a particularly high number of positive comments from a mostly "muso" audience too.

It's something that's now on my wish list for my own PA. Just need a couple of grand for speakers & couple more for a more flexible desk.....

If flying were available I'd very much like to try just three stacks (LCR) separated in this way, but I don't seem to do gigs where that's possible these days.

8. Who should have ownership and responsibility for the mix? Is this usually the case?

It might be worth looking a classical music for this one. All but the smallest ensembles have a conductor controlling the levels (among other things).

Even a solo act can't really tell from the stage what it sounds like to the audience, and this gets worse as the band gets larger.

So the mix must be the responsibility of the person at the desk.

9. Do you normally speak with the artist before the soundcheck/show about what they want from the sound reinforcement? Is this something you would like to do, but don't get to do? What questions do you ask?

I try to, if it's not obvious, but lack of time often makes it a very short conversation. If possible, I like to have a set list with notes on it, such as "big spacey drums" or "keep volume down at start – kicks in big for the chorus".

For gigs with our students I tend to talk more to the staff who take the rehearsal classes (and are probably trying to do an assessment for each band member).

10. Please give any further comments and opinions on artistic control in a live music scenario.

No further comments.

'Paul Barnes' – Bass Guitarist for Sonic Boom Six

1. Describe your work. What kind of ensemble and genre do you play in? What kind of venues do you work in? etc

I'm in a 5 piece punk rock band that plays all different styles of music within the punk rock sphere. The ensemble includes drums, sampler, two guitars, three vocals, bass and trombone. Occasionally the

trombone will be augmented by a trumpet or sax for live shows. We play in every different kind of rock venue literally from bars to festival stages in front of thousands.

2. How often does your ensemble use sound reinforcement?

Always basically, and the only time we would use no monitors would be in small house and bar shows, We do not like playing without monitors. Always a PA and amps would be there. In all the hundreds of gigs we have done, I could count on one hand the number of acoustic sets we have done with no reinforcement at all. I could do that if I had just two fingers.

3. What scale of sound reinforcement is used? (Vocals only, full miced, FOH and monitor desk?)

It varies, but generally standard rock band reinforcement. Vocals, miced guitar amps, FOH. On bigger Academy style tours or festivals - usually if were supporting someone bigger - we would have an additional monitor engineer and desk.

4. Have you used/do you use your own sound engineer?

As of this interview, we are starting to use our own engineer in May. We generally use the front of house people in the UK but over in Europe we have had an engineer who has come around with us. It was a very good experience to have someone who understands how you should sound.

5. Who should have ownership and responsibility for the mix? Is this usually the case?

A trusted sound engineer should have responsibility for the mix. It is the bands job to secure a character that they can trust in not to be jumping offstage and around the venue during soundcheck barking orders about things that may or may not be the same when the venue has people in it. In terms of in house engineers, the best bet is to give them trust and hope for the best. Getting too confrontational will mean a surly engineer and an awkward working environment. The best thing that can happen is that you trust the engineer and he does a good job and you get on well, which happens reasonably often.

6. Have you played on a silent stage (with in ear monitoring and DId instruments/relocated guitar amps)? What did you think of it and would you do it again?

We have played on a stage where the engineer attempted to case the kit in a plastic cage and keep all the amps as quiet as possible so he could create a CD quality mix. It was horrific, he was straight out of music college and couldn't comprehend the trade-off required between his ability to control a mix and the natural energy of an onstage sound that is required at a rock show. You don't spend money on Marshall amps and cabs to turn them so low you can't hear them and then pump them through an average PA, it is absurd. I ended up climbing up the drum baffle thing. He ended up throwing his hands up and a friend of ours had to take over the desk. We wouldn't, and couldn't, do that again. Our style of music is about energy and instant feedback between the crowd and the band. To try and create a CD quality listening experience is totally, utterly and entirely missing the point. It should be the other way around.

7. How do you respond to the concept that the sound reinforcement system is an extension of the musician's instrument?

I would totally agree. Amplification is part and parcel of the electric guitar. Samplers need a good PA. Vocalists need a good reinforcement to create the effects that they can in the arrangements they have committed to record, and the whole band works and writes music in a way that takes the technology as a given.

8. Which do you more often feel, that you working with the engineer, or battling against them?

It is a close call but to be honest more often that we're working with them. The bad ones really stick in your head but more often than not the in-house engineers, especially in bigger venues and festivals, want you to sound as good as you want to sound. I certainly understand their limitations and job and have very, very rarely got shirty with them. Memories pop into the head of gigs entirely consisting of screeching feedback or the aforementioned idiot with the plastic box but you have to remember that the audience doesn't really care. If they do, they will blame him, not you. To start rowing and blaming the engineer has no productive purpose whatsoever.

9. Do you normally speak with the engineer before soundcheck about what kind of sound you want? Is this something you would like to do, but don't get to do?

Yes, we always do. We explain we have three main vocals, we have a sampler that needs to be loud throughout the set and give the signal for our entrance (which will have the sampler under it) and we tell him that at times we will swap instruments. We never specify what kind of sound we want though,

that is most certainly up to the engineer. If you have to ask, you'll never know I think! It is best to keep these things simple so that the few points you do have, he or she will remember. We always make a point of doing this, very rarely would we not get to do this.