**American Motion Picture Society**

home of the world's longest-running non-commercial film festival

Home    Cinema    Student    Film Talk    Tech Talk    Club Talk    Tools/Links    Festivals    About Us

# AUDIO POST PRODUCTION

*John Cook reports on a workshop at
the Multicultural Cinema Club of Kitchener, Ontario,
which was led by Earl McCluskie.*

## The Speaker

**Earl McCluskie** is a recording producer and engineer based in the Waterloo region. In addition to CD recording and concert production, he has worked in audio post-production with the CBC for the *Nature of Things, Fifth Estate* and drama, as well as numerous independent video productions. He is currently producing a video documentary for the Wellington Winds, and as recording producer and engineer on an independent film project with Helmut Lipsky and Stefan Pleszczynski (CBC's *Da Vinci's Inquest, Intelligence*) in Montreal.

## Summary

**How professionals rescue bad audio situations encountered in on-site video recording:**

1. Earle demonstrated how to use the audio tools of editing suites to make speech more intelligible and background noise less objectionable.
2. He described the very time arduous task of ADR (Automated Dialogue Replacement).
3. Sound effects are added using sound effect clips and live recording of sound effects (Foley recording)
4. Music is very powerful when used to augment the emotional impact rather than used simply as background.
5. Everything is brought together in mixing.
6. Getting good audio on set is a lot easier than trying to doctor bad audio.

## Poor audio screams "amateur"

While in the past, the best audio was the hallmark of a few select TV programs and a few high budget Hollywood movies, the existence of over 40 million home theater audio systems has raised the bar in the ears of a significant portion of the public. These 40 million audio systems, that default to Dolby 5.1 surround sound, are raising audio quality expectations just as HD is raising video quality expectations. All the US TV networks, as well as CTV and CBC are gunning for high quality Dolby 5.1 surround sound, as opposed to its introductory use of isolated jet over-flights and explosions.

Now more than ever, poor audio screams AMATEUR!

Where dialogue is key, poor audio quality degrades the enjoyment of a video more than poor video quality. One cannot "get into" a video if one is straining to follow the dialogue and even totally missing key speech.

## On-set audio recording

It is very rare indeed for the ideal microphone position to be the same as the desired camera position. The optimum camera position wins every time. So by definition, an on camera microphone is at a decided disadvantage.

Because the microphone is typically too far from the subject, ambient noise will make itself very obvious, as a microphone does not have the abilities of the human ear/brain system to concentrate on the desired sound, while blocking out the background noise, as we regularly do in "cocktail conversation".

## On-site audio recording

Most amateur recording is not done anywhere that could be described as a movie set or sound recording studio. We often shoot outside, where we are plagued by wind noise.

Wind socks muffle the sound, reducing intelligibility. We try to use directional shotgun microphones to get the dialogue above the surrounding noise.  Unfortunately, the

Most movie and TV sets are not the resonating boxes of the typical room in a house. They rarely have any ceiling and typically have only a couple of short walls. This means that they are not plagued by the sound muddying reverb of a small room, exacerbated by distant miking.

Despite all the advantages that TV and Hollywood sets have, the majority of their on set audio recording still does not meet high standards and they very often revert to very expensive and time consuming post production audio track replacement.

more directional the microphone, the more it colours the sound, with its internal resonating pipes.

If we shoot in a room, wall reflections and room resonances reduce intelligibility. Furnace noise, traffic noise, refrigerator noise, PC fan noise, even a neighbour's TV or sound system vie for attention on our sound track.

Thank God, iPods have replaced most Ghetto Blasters. Our kids can now go deaf in our blessed silence.

# DOCTORING SOUND IN POST PRODUCTION

### Sample Clip in Car

Earle used a clip, shot in a car, to demonstrate doctoring the sound track in an editing suite. Shooting in a car with the microphone seeing the nearby hard reflective glass surfaces gives us highly coloured sound. Then we have to contend with vehicle noise, passing traffic noise, such as trucks, as well as the speaker raising her voice when noise becomes apparent. While it is desirable to use fixed audio gain settings to avoid the volume pumping of automatic audio gain in this situation, we revert to the automatic setting because of our lack of control of the actual sound levels. The volume pumping action makes post-production more difficult.

### Using Audio Filters

Using a high cut filter to remove high frequencies, removes significant amounts of high frequency noise. One must be careful when cutting below about 5 KHz as then one will be removing the sibilance frequencies critical to speech intelligibility. The high cut filter will remove the high frequencies that make up high fidelity, but this is the tradeoff for reducing objectionable noise.

Using a low cut filter will remove the low frequency rumble noises. This time we risk cutting the low frequencies that give the voice warmth, trading off audio quality for reduction of objectionable noise.

Notch filters can be used if a noise is of a very specific frequency. In our sample, the main frequency of a passing truck was effectively removed. Because the notch was very narrow, the effect on the voice was unnoticeable.

### Using the Audio Timeline

There are many ways to use the timeline features of your

### Editing Suite

Even though he is a seasoned professional, it is worth noting that Earle avoids the high cost of Final Cut Pro and MacIntosh computers and uses Sony's Vegas. It does the job, to the highest professional standards, in acceptable delivered format, for $600, without needing a herd of extra addons. So, you have no excuse to waste your money for meaningless status. Then there's your really cheap writer who's very happy with his $45 Magix Movie Edit Pro for HD.

### Monitoring

It is important to use a good quality speaker system when doctoring your sound track. This is especially important for very low frequencies which are inaudible in a cheap speaker system, but may be overwhelming when played on a good audio system with a powerful subwoofer. Similarly, high frequency noise may be very objectionable on a good sound system, and be absent on a cheap speaker.



While doing the doctoring, the particular flaw we are trying to reduce is played in a loop while settings are adjusted. After we are satisfied with our settings, a comparison to the original should give us great satisfaction. Another good practice is to play the clip on a cheap speaker system, to ensure that it still sounds good on this more typical sound system.

### Using the Noise Gate

Though frowned upon by many, the noise gate can be very

editing program to control the audio segments. Earle reverts to the time proven technique used before computers. One assigns each short part of the clip a separate channel, as in the days of mixing boards, where the parameters are adjusted until satisfactory. When these parameters are not satisfactory for another part of the clip, another copy of the clip is put on another timeline track, and adjusted to satisfaction.

The final mix is done by cross fading among the many doctored segments or mixer channels. The segments may need to be adjusted to ensure the cross fading is seamless. More segments will be required to compensate for the pumping of the camera's automatic volume control.

### Substituting Background Noise

If we have a noise throughout most of a clip, its sudden absence, in the middle of the clip, can stick out like a sore thumb. You should always record a segment of only background noise for each clip, to be used later to fix such a situation. It is only a matter of adding a piece of this background noise back into the segment to eliminate the interruption. One could also use the background to add a needed break in the dialogue, provided of course that you had also shot some footage of the scene where the speaker's lips were not on screen to switch the video to during the added audio "silence".

## Substituting Studio Sound

In practice well over 70% of the audio in high quality movies is generated in sound studios, rather than on set. All blue screen audio is done in post because of the risk of microphone shadows on the blue screen.

ADR (Automated Dialogue Replacement) replaces set recorded voice with voice recorded in a sound studio. Foley Recording and canned clips replaces the non-human sounds. And of course, music is written and recorded for the film. You could say that most high quality Hollywood movie sound is artificial sound.

### ADR

There's nothing automatic about Automated Dialogue Replacement, except that most studios automatically use it in their films.

The general principle is to repeat each phrase, recorded on set, in a loop. This loop is then played through the actor's headsets, while the actors repeat the dialogue in sync and with the proper accent, emphasis and feeling. When one phrase has finally been done to the satisfaction of the

effective for reducing noise.

What the noise gate does is eliminate sound that is below a set threshold. One can also adjust the attack and release time of the action to minimize its side effects.

Earle very effectively eliminated a buzz in a phrase, without audibly affecting the voice quality. The following phrase was badly affected by the settings, and was corrected on another timeline track.

### Results

I was very impressed with the improvement of the sound clip after the operation. Most of the objectionable noise was totally removed, and the voice was strikingly more intelligible. The dialogue could now be followed effortlessly. While a clip that was originally very hard to follow was rescued, the final result certainly could not be called high quality audio.



### Sound Effects

Non-human sounds recorded on set rarely sound realistic. You may have noticed that even AFV augments its amateur clips with sound effects. Fireworks and gun shots recorded on set never seem to sound right. The sounds of footsteps, doors, cars, birds, insects etc. are notoriously difficult to capture properly when they are central to the action.

Sound editors can spend a long time finding suitable sound effect clips to doctor until they sound right for the action

dialogue director, the operation moves on to the next phrase.

The voices are recorded in a sound studio. If an intimate sound is needed, the actor is in very close proximity to the microphone. If a more distant voice sound is needed, the voice is recorded at normal distance, for best quality, and the characteristic of further distance is artificially achieved by appropriate tone manipulation and reverb.

on screen. I've listened to whole CDs worth of sound effects and found only one or two that I've found of marginally acceptable sound quality. There are a lot of sub-par sound effects available out there. The good ones, that are up to Hollywood standards, are rather expensive. Unfortunately, Hollywood quality is what we're used to and expect.

## Foley Recording

The introduction of radio and the talkies also introduced us to the sound effects man. He's the guy who supplies all the non-human sounds using an array of devices to simulate creaky doors, footsteps on any surface, breaking glass, thunder, rain ... the works. The technique is named after Jack Foley, one of the original Hollywood sound effects men.



The best sound effects men can do a whole scene, in sync, on one take. Anyone remember Air Farce on CBC radio? The good sound effect man's hardware and microphone placement has been proven to sound right. The good sound man is far more efficient than trying to find a suitable pre-recorded sound, and doctoring it to sound right and then synching it with the action.

## Recording Your Own Sound Effects



Going out in the world to record a suitable sound can be a trying challenge. Look at all the lousy ones out there. George Lucas spent a long time finding the sound he wanted for the Star Wars light sabre. The classic sound of the light sabre is a recording of an impact on a set of old copper railway telegraph wires in their typical location on the tee bars of telegraph poles, struck under very specific high humidity conditions. You can hear the waves bouncing back and forth between the poles.

Getting suitable sound effects for surround sound Dolby 5.1 is another major hurdle for today's quality directors. The Holophone family of surround sound microphones are widely used for ambient surround sound at sports events. **The Holophone PortaMic 5.1** is intended for serious amateur use, with its ability to code Dolby 5.1 sound onto the standard stereo microphone inputs of camcorders. (Price in May 2010 under $600.)

## Music

Unless the film is about musicians playing, music is always added in post. Most amateur films use music simply as a background. In a good production, the music sets the mood and follows the emotions of the film. If you have a big budget, you hire a good composer to write the music for the film, and hire a good orchestra to record the score.



There are a few tricks that are used on lower budget productions. The first is to avoid classical music, as it's very difficult to edit without making the cut points apparent, because of long reverb times and continuously overlapping instruments. Pop music is much easier to edit, especially with the myriad of music programs out there, like Band in a Box and Garage Band. Many of these programs will actually compose for you, so you don't have to worry about copyright.

## Synching

Synchronizing all the audio and film clips was quite the challenge in the days of film and audio tape recorders, whose speed was not very consistent. **SMPTE** (Society of Motion Picture and Television Engineers) had a code that was generated in a

sync generator and recorded on every device - from tape recorders, to film cameras to video recorders. All this equipment then had the ability to lock on to the sync generator during playback so that everything stayed synchronized. Some studios still use this system. It makes for very complex setup on site, as all the equipment has to be plugged into the sync generator and working properly before you can record anything. In the latest systems, every setting of every device is logged. For example, the camera location, orientation, lighting etc. are required when the scene is being mixed with computer generated animation.

These days, with the accurate crystal clocks of digital recording technology, each recorder and playback device is locked on to its own very stable crystal and will automatically play at the correct speed to eliminate any drifting out of sync.

We amateurs can easily sync our individual camcorders and digital audio recorders in our edit suites. Synching on set is still required for real time TV.

## MIXING

In a Hollywood production, the final mixing is a big deal indeed. This is where the movie director, the dialogue director, the music director, the sound effects director and all the other directors fight it out and the professional mixer actually make the final product.

Film duration limits can wreak havoc with an edit. It is not uncommon for Toronto's mixer professional to earn $300,000 or more a year.

Having 96 tracks can be useful here. Because audio is often dealt with as an afterthought, with the picture quality the main concern of the director, it is common that audio is not up to the highest standards because of the time and budget crunch.

## BENCHMARK MOVIES

Movies with top notch audio quality are not all that common.

It is a good idea to view the few good ones to inspire one and see just what can be done. Listen carefully to the products of producers that are on the cutting edge, like George Lucas and James Cameron.

Academy Awards for best sound are always an indication of the latest in sound quality.

In addition, some stars, like Tom Cruise seem to demand good sound for all his movies.

*2000: Gladiator*
*2001: Black Hawk Down*
*2002: Chicago*
*2003: The Lord of the Rings: The Return of the King*
*2004: Ray*
*2005: King Kong -*
*2006: Dreamgirls*
*2007: The Bourne Ultimatum*
*2008: Slumdog Millionaire*
*2009: The Hurt Locker*

*- John Cook*

This article appeared in ***Panorama*** the Journal of the Society of Canadian Cine Amateurs and is reproduced here by kind permission of the editor and the author.