LIGHTING FOR VIDEO

Contrast Ratio and Other Fun Terms

by Stephen Ellison

Churches are moving rapidly into the world of video. I am seeing it used to enhance the service in larger churches and also as a ministry to reach the community. If your church is thinking about becoming involved in video, (or you already are, but you're not happy with the results) than this article is for you.

The big mistake that is frequently made when entering the video world, is to get caught up in all of the fun gear associated with the video, such as cameras and switchers, and forget to evaluate your lighting system.

I know one church that decided to jump into the video world and start broadcasting on local access. They brought me in to look at their lighting after they had already bought some very fancy gear, in the way of cameras and a switcher. The most impressive piece of gear was a cube looking device that would allow them to perform live editing and add a whole array of fancy borders and graphics. When I asked how much they had left to spend on lighting, the answer was basically, nothing. All the money had gone to the video gear and no thought of improving the lighting was ever considered.

My answer at that point to them was that I could do very little to help in the allowable budget. Bringing the lighting levels up to what the cameras required was more than they could afford. I viewed a broadcast of their ministry on television. The switching and effects looked great but the overall picture was too dim and the colors all looked muddy.

Without enough light, the cameras don't have what they need to produce great images. Prior to adding video, the light levels in this particular church were adequate for regular church services. However, there was nowhere to go up in level to achieve what a camera requires without adding more fixtures and dimming.

So let me introduce you to the parts of the video world that make a difference to the lighting designer. First, the camera does not work as well as the human eye. A camera is limited in how much light it needs to work well. The new video camcorders report operating levels as low as 4 or 5 lux. Those levels are great for recording your child blowing out the birthday candles. The quality of picture is not very critical, at that moment, being able to capture the expression on the face of the child is paramount. The same light levels for broadcast are not acceptable; in order to produce broadcast quality pictures, you need to have your main focus in the picture at a level of about 100 lux.

There are two aspects of the picture that will be improved by a sufficient amount of light. The first is the **color rendering**. The camera is getting reflected color from objects, so the more information that is available, the better the picture. The camera cannot distinguish the rich variety of color that we can see, and with lower light levels, the colors all tend to look like shades of brown.

The second is the **depth of focus**, or how far back from the principle focus that objects in the background are in focus. Control over the depth of focus is with the *f* stop. The wider you have to open the *f* stop, the shorter the depth becomes. The *f* stop controls how much light is getting into the camera, so the lower the lighting level the more open the stop.

The deeper the depth the more three dimensional the image appears. Remember, a camera image is two dimensional, the third dimension, depth, is filled in by your mind. The more you can do to help the illusion of depth, the better the image. By providing sufficient lighting levels, the camera can be operated at its optimal *f* stop setting.

Another important concept to understand is **contrast ratio**, or the difference between the brightest object and the darkest object. Again, the eye has the ability to deal with a much higher ratio than even the best cameras. The eye can deal with as much as 1:1000 while the best ratio for a camera is 1:64. If we start with the level of light on the Pastor at 100 lux then if the background is at a level of 25 lux, the camera will see that area as being almost black. Your eye however, will perceive the area as being at a sufficient light level; a more appropriate level would be about 60 lux.

What does this mean to you in your church? You will be required to light the background and the congregation if you ever want to show them in your shot. If you don't light the background then the pastor will appear to be on a dark stage, and the audience will be in the dark. The other problem is that the illusion of three dimensions is lost. The amount of light doesn't have to match the amount of light on the pastor, because you want your main focus to be the brightest, but you need to have a level that the camera can use to produce a good picture.

I can hear the question now, how can I tell when I have enough light, if my eye is better than the camera? Such a good question. The answer is; don't depend on your eye, but rather depend on the camera. Whenever you are asked to light for video, then you need to ask for a video monitor. The only way to light for the camera is to look at what the camera is producing. Whenever I light for the camera I look at the monitor and not the platform. That way, I can adjust the light levels appropriately. Don't let them give you a black and white monitor. The other method is to use a light meter, measure the light levels and adjust them based on the readings from the meter. I have only used this method once in my career, when I had to set up and focus the lights the day before the cameras were set up and I was not going to be there for the actual show.

My preference is to not rely on my eye, but the camera as seen in the monitor, for two reasons. One, I feel this method is faster and always produces results that I can see in real time. The other reason has to do with the nature of data collection and relying on a device that is more sensitive than the

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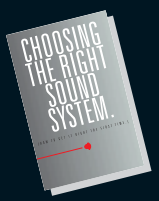

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camera. The one time I used a light meter I spent several hours trying to get a perfectly even light level over the entire audience. The meter, because it is a small point, was showing all the minor imperfections that I have since learned would not have been that critical, but that day I did not have a camera to see how the levels appeared, the cameras were set up the following day. In the end, the images did come out well, it was just a much longer process.

The next problem I often see in churches working with video today is the lack of backlighting. Remember that the camera produces a two dimensional image, and as a lighting designer it is our job to help create the illusion of three dimensions as much as we can. The amount of illumination is critical to help improve the depth of field; just as critical is the direction that the light appears to be coming from.

Every time he walked through a hot spot, the camera image went white hot on his forehead, or his forehead *bloomed*

During a typical Sunday morning service you are not trying to simulate a realistic lighting scenario, as compared to a dramatic production where the location of the sun makes a difference. Rather, you are trying to create an image that has good clarity and is interesting to look at.

I have seen some common mistakes made, such as using direct front light, which makes the person look flat, lacking any shadows. Or, a lighting angle that is too steep causes deep shadows under the eyes. No background lighting creates a two dimensional image and a boring picture. In order to create a pleasing image the person should be lit so that they have a proper amount of shadow and a well lit background with enough back there to be interesting, but not be a distraction.

The last problem created by not enough light is, *blooming*, or a portion of the picture that is so hot that it dominates the image. Just recently I visited a church that had just moved into a new building. They had installed a small lighting package and were videoing the service with a video camcorder. The image on the screen went back and forth from passable to the Pastor's forehead dominating the image because it was in the hotspot of a particular fixture. This was a pastor that liked to walk as he preached, so all the imperfections in the front wash were magnified on the big screen. Every time he walked through a hot spot, the camera image went white hot on his forehead, or his forehead *bloomed*. This washed out his face and the background, making it hard to see his face. One thing that is taught in lighting class is that if you can't see the person, you have trouble hearing them. When the image has a hot spot, you lose the focus on the face and therefore you lose the focus on the message.

In closing, I would urge all of you to take a closer look at all the aspects of creating a good image before spending any money on equipment. If your audience is distracted by a poor image, then they will not hear the message. Our goal *is* the message, not how fancy the image is. I believe that it would be better to produce a good image with fewer frills than a bad image at all. ◆

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