Screaming at the Greenscreen
an industry op-ed by Steve Wright

How to shoot a good keyable greenscreen

During my 20+ years of compositing visual effects I have worked on plenty of "A" films. The disturbing truth seemed to be that the bigger the budget the badder the bluescreen. Truly, some of the worst greenscreen and bluescreen shots I have had to salvage were on $100+ million movies. It is infuriating to know that the hideous problem you are working all night to solve was easily avoided simply by shooting it properly in the first place. I therefore offer these tips on photographing them so you do not end up like me - screaming at the greenscreen.

Lighting the Backing

This is undoubtedly the most vexing aspect of trying to key a greenscreen. The keyer desperately needs the backing region to be lit uniformly – like within a ½ stop of uniformity all over. Uneven lighting causes you to either crank hard on the key which destroys edge detail or cut and paste multiple keys together, each optimized for different parts of the screen. A time consuming process. Of course we are going to garbage matte the dark, poorly lit edges of the greenscreen – unless, of course, the character wanders through them.

The reason this is so often ignored is because it is expensive. It is very difficult to uniformly light a 20 by 60 foot area evenly with a bunch of lights that fall off in brightness with the inverse square law. They tend to light one spot brightly and fall off in all directions. It takes time to set things up properly, and time is money, so they save time on the set by skimping on the lighting. "They can fix it in post" is the mantra. They save a buck and we take the hit.

The other issue is the purity of the backing. It needs to be really green. Not cyan or yellow, but a very pure green to appease the color difference algorithms in the various keyers. Using colored gels over the lights improves the purity of the backing color. Just make sure to keep it off the talent.

To be sure, each brand of keyer has different tolerances to different defects so it behooves the ardent keyer to have several brands of keyers available. This is why Nuke actually comes with four world-class keyers right out of the box – Keylight, Primatte, Ultimatte, and Digital Domain's own IBK keyer.

Lighting the Talent

The key issue (no pun intended) to lighting the talent is to make sure they are far enough away from the greenscreen so they are not flooded with green spill light. This needs to be at least 6 feet, 10 being better. However, the further away they stand the larger the greenscreen has to be, and the harder it is to light evenly (see "Lighting the Backing" above).

Also, make sure the talent has no green objects on their person (yes, this is done all the time) as well as no shiny objects. Shiny objects reflect the green backing which punches holes in the talent at keying time.

The talent should also be lit with some thought to the environment into which they are to be composited into so the quality of the lighting at least roughly matches. The lighting of a flatly lit character composited into a high contrast outdoor afternoon daylight shot will not match very well. Of course, we can fix it in post, but that's again more time and money.

Another often ignored issue is rim lighting. The lights tend to be placed out in front of the talent in roughly a 100 – 120 degree arc. While they look fine from the camera's point of view, their edges are under-lit. If the character were really on the set or location where they are to be composited

then they would be receiving light from all directions, not just the front quadrant. Add some lights at 180 degrees on either side so their rims don't go dark in the composite.

There is an archaic and discredited practice of counter-lighting the edges of the talent with a color complimentary to the backing – magenta for greenscreen and yellow for bluescreen. This is devil worship and must never ever be done. Not only is it photographically incorrect, it contaminates the edges in a way that is very difficult to fix. Modern keyers cope with spill suppression very well.

Green vs. Blue

Of course, the dominant consideration on whether to use a blue or green screen is the color of the object being keyed. Don't photograph green plants in front of a greenscreen. However, there are other subtler considerations that might tip the scales one way or another when the choice of color is a toss-up.

The blue color of both film and video has the most grain and noise by a wide margin. Since the key is made mostly from this color it means that the key will have lots of noise and sizzling edges. However, blue backings throw off less spill, so that factors in the other direction. Also, large outdoor bluescreens lit by sunlight work much better than greenscreens. However, it is much easier to light a greenscreen on set because it takes much less light to achieve the required brightness level of one stop under the key light.

Shooting Video

As the video cameras have evolved to HD resolution some features and most television projects are shot on video. There are two deep traps here. First is the savage data compression coming out of the camera to tape. The resulting picture looks fine to the eye on the monitor, but the computer needs all the picture and color information to pull a good key. Some of these compression schemes eliminate as much as 95% of the picture information. Yikes!

The final video offense is in-camera sharpening. Going under the rubrics of "sharpness", "detail", or "enhanced" they introduce edge ringing artifacts into the greenscreen shot that flummoxes all keyers. On the set the video camera's sharpening circuits must be turned OFF! If it needs sharpening, we can sharpen it in post after pulling the key.

Conclusion

It is astonishing how many DP's do not know these basic facts about shooting greenscreens. While they may have mastered lenses and film stocks, your DP may have virtually no experience shooting your greenscreens. It is up to you, the compositor or the VFX supervisor to convince him to shoot your footage correctly so you don't wind up screaming at the greenscreen.

Steve Wright