

When is Color Correction a Necessity?

The term “color correction” inherently implies that it’s a post-production process to be relied upon only when something has gone wrong. Perhaps the raw footage has some negative attributes, and color correction must be brought in to rectify them. In truth, today’s color *correction* processes are far more about color *enhancement*, and provide a whole new set of tools that are useful throughout a film’s production life cycle.

There are three strategic points in the post-production process when color correction should occur. They are:

- During or immediately after image capture (before offline editing)
- Before or during online editing and compositing
- After editing in preparation for distribution

The decision to color correct might be logistical, creative or financial, but either way, it seems that everything from cameras to televisions now offers color tools.

Image capture

Color correction starts in camera. The director of photography (DP) combines set design and lighting with an understanding of cinematography to create an image. This is not considered color correction in the traditional sense, but this is where it starts. If a picture is worth a 1000 words, it is the cinematographer who chooses the words and the message they convey. But the perfect image is elusive.

While shooting, the sun might provide inconsistent light; the blue of the sky might shift in intensity over throughout the days; an actor might arrive late, changing the intended quality of light. Or he might catch the sun over days or weeks of shooting, causing a change of skin color. A lens that is right for depth of field and framing might be too revealing for an actor. The feature film *Cast Away*, starring Tom Hanks, included many night scenes on an island that could only be reached and filmed during daylight. All of these examples, and many more, complicate the quest for perfect images.



original



soft skin enhancement

Some of these challenges will be dealt with by lights, makeup and action, but schedules have to be met and the equipment available on set is not always sufficient for the challenges that arise. It is an industry irony that bigger budgets often shoot worse chroma-key shots. Chroma-key is the technique of putting a foreground against

a uniform blue or green screen that will later be replaced by another background. On a big budget movie with expensive talent, it is cheaper to sort out a bad matte in post-production than it is to have the talent standing around.

I recently directed a two-day shoot for which the model arrived two hours late. By the time she was in place the sun was reflecting brightly off the nearside of a swimming pool, casting a rapidly changing shadow on the far side. Since the shot involved a series of jump cuts, we had the choice of correcting the reflection at the color correction stage, or shooting earlier the next day. Since we had already used our weather day because of a thunderstorm, it was not much of a choice. In this and countless other scenarios faced during production, color correction may be the only feasible escape route to successful completion.

Post Production

Once shot, a negative goes for traditional lab processing. If it is going to be printed, it is color timed with red, green and blue printer lights. Color timing is needed to even out scenes and exposures, add effects and to compensate for the higher contrast of print stocks. However, it is much more usual today to telecine the neg. to an electronic or video format for non-linear editing. Telecine color correction is done on a real-time system such as the da Vinci 2K Plus, which has much more sophisticated toolsets than the RGB lab printer lights.

A 2K Plus colorist has the advantage of individual RGB and luminance controls for shadow, mid-tone and highlight parts of the picture; secondary corrections defined by hue, saturation and/or luminance; geographical isolations defined by “Power Windows” and effects including Gaussian blur. it is an elaborate creative tool that, fully optioned can manage up to 22 windows, 46 isolations and about 50 color corrections per scene in real time.

There is a myth that shooting video to begin with removes the necessity for color correction; scene matching and style are still needed. It is true that electronic capture has an inherent dynamic range that’s closer to video, but the downside is that this dynamic range is insufficient to capture exteriors and many available light situations.



original shot on hdcam



hdcam color enhanced

As a result the colorist must optimize clipped whites (or at least diminished white detail), crushed blacks and the flatter linear contrast of video originated material. This type of color correction is different from that required to address the technical concerns of film transfer, yet it is a similar and still necessary process.

Increasingly, movie production teams are handling much of the decision making at this stage, especially for longer projects that are still shooting. The first reason for this is the availability of the director of photography (DP), who is often involved in other jobs by the time a project reaches the final stages of conforming and compositing. Another reason is that the color style and effect very often requires a collaborative effort between the DP and colorist.

Some projects are shot straight and the decision on color is left for later, but often a DP will expose and light with color correction in mind. This entails good planning and communication, but almost always produces better results. An extreme example of such planning is the shooting of night-time shots during the day, and other favorite effects include bleach reduction and black and white on color stock. DPs will probably get the on set look management (color correction) tools they are asking for in the near future, and this will generate even more demanding color enhancement requirements during post production.



original scene



night grade

Good planning is essential, because if a scene is shot with a particularly unique process in mind, the color session must be booked on appropriate equipment. However, in the perfect world, art direction, cinematography and color correction are all coordinated and harmonious even on the simplest project, each building on the other.

Color correction is often more practical than just dealing with issues on set – it is also a process for introducing new lighting scenarios after filming is complete. Graduated filters are a classic case. Neutral density (ND) and polarizers usually are best applied on camera, but color graduated filters are best done in color correction. Why?

Well NDs are an important part of capturing the image, without them detail might be lost. However, aside from being inconvenient, color grads also filter out color information so that less, not more, of the image is captured. Camera grads require exposure changes, cannot be tracked on pan or zoom shots and are difficult – if not impossible – to remove later.

With on-camera filters, the production team is restricted to densities and colors that are physically available on set for the lenses in use. A colorist on the other hand can create any color, density or gradation and track it across a scene. The grad can be resized, reshaped or removed. It can even be keyed behind foreground elements for a more realistic look. It's easy to see how color correction is important not just in

“correcting” a mistake but also as an integral part of manufacturing a look not otherwise possible on set.



beach with camera polarizer



beach with graduated blue and other secondary enhancements

Further, color correction is essential before offline editing if there is a risk that takes will be rejected during editing because of questionable quality. This alone would only justify minimal color correction, however there is a business model to consider. Material is shot, offline edited and then presented for approval. Many companies go to great lengths to make the approval copy look as finished as possible, especially for clients who are not experienced in visualizing color enhancement.

Finishing and Distribution

Having said all that, the best time to do color correction is after, or sometimes during, the composite and conform stages. Unfortunately, by this stage either adequate correction has already been applied or the budget has been spent. The obvious advantages of color correction after conforming are that the scenes are now played in context against each other so corrections can be more seamlessly consistent, and only selected material is graded, protecting a facility’s most valuable resource: time.

Less obvious but equally relevant benefits are the efficiencies of grading a project from a single master (no wasted time rewinding or changing film rolls or tapes) and the safety of working on a media clone instead of the original camera material. The bottom line is that color correction after conforming and compositing is highly efficient and can achieve a degree of precision and attention to detail that would be difficult, time consuming and expensive earlier in the post-production process.

Another industry belief is that color correction should be done during compositing. This is a mixed truth. It is true that composite layers must be matched to each other before combining them. Ideally the colorist would have done this during the selected-takes transfer; however, in practice the compositor has the advantage of grading elements in context and often makes tweaks to improve the composite. What is less widely understood is that mood, style and color effects are best applied to the finished image, and indeed a global correction usually improves the credibility of the shot.

For example, imagine a simple two-element shot: foreground and background. To combine them, the lighting, contrast and color have to be matched. Change one and

you must change the other just to keep the combination realistic. Once the two elements are matched and combined, however, they can be modified with a single correction, and any added lighting effects assume the two elements were always seen together.

Episodic television has been graded after editing for decades. Nowadays DVD and now digital intermediate masters of feature films are always graded after editing and effects. Nevertheless, it is ironic that the stage at which color correction is most beneficial is also the stage at which it is least common. Colorists, facilities and, in consequence, manufacturers are now taking a long hard look at workflow.

Many colorists use a telecine editor such as the TLC to assemble projects in edit order as they grade the unedited selected takes. Newer software based look management systems, such as the Discreet Lustre and da Vinci Resolve, integrate conform and color tools. Even the industry mainstay hardware system, the da Vinci 2K Plus, has optional conform tools in its Nucleas package.

Once a color-enhanced master exists, it is often used to generate multiple versions in different formats, for different media and different markets around the world. Each version can be optimized for the color space, and local preferences of its target media and audience. A short color session at the least should avoid rejection by a foreign market, but when done well, it will greatly enhance the film's reception around the world.

In conclusion, color correction – like editing – could be done in camera, but it takes a lot of time and effort and still produces an inferior result. Ideally, it is refined continuously throughout post-production, with the finer and more elaborate tweaks happening after everything else.

When *is* color correction a necessity?

Always! Color correction is pure production value. In colorist terminology, this is pure gold.

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