Softly Speaking

By Peter Monahan, June 1, 2004,

One might think that a fabric company has little to do with lighting. After all, while scenery and lighting design are inexorably linked, how important can fabric be to either? Yet the choices a designer makes in fabric, as with all the other elements, will directly affect the final look of the production. This series of articles discusses common types of fabric, why they are used, and challenges they may present to a lighting designer.

ANGLE, ANGLE, ANGLE

Lighting vis-à-vis fabric is nowhere more critical than when dealing with a sharkstooth scrim. Lit correctly, a sharkstooth scrim provides one of the most magical effects: the bleed-through. If the scrim is lit correctly, it can appear completely opaque; as the lighting is changed, the scrim will “dissolve,” allowing the scene behind it to “bleed through” the scrim or the scenery painted on the scrim. Continue the change, and the scrim will disappear completely, as if by magic. But what is the “correct” way to make this happen?

In real estate, the three most important factors are “location, location, location.” To create this effect with sharks-tooth scrim, the most important things to remember are angle, angle, angle. Combined with a stringent control of the lighting, the correct angle will make the task easy. Knowing the correct angle is simple: just think oblique or, if you prefer, steep, and you're well on your way.

We often get calls from less experienced users telling us that our sharkstooth scrim “doesn't work.” When pressed, the caller usually says that the scrim will not provide an opaque surface and that the scene behind the scrim is visible when the scrim is lit. Invariably, we find that one of two things is going wrong. First, prior to the bleed-through, the space behind the scrim must be completely dark. The key word here is “completely.” Any light behind the scrim reflects on the scene that the scrim is trying to hide, allowing the audience to see it, albeit dimly. Already, the magic is beginning to weaken. For a scrim to be most effective, the area behind it must be totally unlit; ideally, even running and exit lights should be masked from casting illumination. Of course, the brighter the lighting on the scrim itself, the less likely it is that anyone will see a glimmer or gleam shining from behind the scrim, but every effort should be made to keep the area behind the scrim completely dark until the “reveal” cue is running.

Now the area is as dark as possible (our caller assures us), but it still “doesn't work.” The scene is still visible through the lit scrim. Here's where the angle of the lighting is critical. Ideally, the lighting on the scrim is at such a steep angle that it cannot possibly illuminate the scene behind — so steep that any spill “buries” within a foot or so of the scrim. You must create a “trough” of space between the scrim and nearby scenery so that any light that spills through the scrim hits nothing and won't show to the audience.

The most common way to achieve this is to have some type of strip lighting at the top and directly in front of the scrim. The majority of the light from the strips washes the front of the scrim (with some spill downstage), and any excess light shines through into the empty space between the scrim and the scenery and is not visible. If you have extra line sets and a spare blackout drape, you can ensure this by hanging the drape about a foot behind your scrim at the upstage edge of your “trough” and flying it out moments before the bleed-through. You still need to control the spill upstage or the blackout drop will be visible, most particularly as it flies just before the bleed-through begins.

LOCATION, LOCATION, LOCATION

While the most common placement of lighting instruments for a scrim is above and directly in front of the scrim, that isn't the only position that will be effective. Remember: angle angle, angle! As long as your lighting is oblique and can wash the scrim, it doesn't have to be from above. If your scrim is in an extreme downstage position, for example, it can be lit with footlights; many think of these as anachronisms, but they're very effective for scrim washes. (In this case, the “spill” light is lost up in the flies, behind the proscenium and/or masking borders.)

In a “wing and drop” set, the strips can be mounted vertically on each side of the scrim; the spill, in this case, will wash off-stage between the wings downstage and upstage of the scrim. In all of these cases, a blackout drop is helpful but not necessary.

Having said that, it should follow what lighting positions will not work for a scrim. Sharkstooth scrim is, essentially, a series of holes tied together that will let lighting through. Lighting from the front of house will certainly light the scrim. Unfortunately, it will also light everything behind it. Moving to the box booms will only help if they create an angle so severe that the spill disappears offstage. Balcony rail is probably the worst position. Since “the angle of incidence equals the angle of return,” the rail will provide the maximum visibility of the scrim and the scenery behind it.

Equally important in making the scrim work its magic is properly lighting the scene behind it. If you want the scrim to disappear when the dissolve is complete, the lighting for the scene to be revealed must come from behind the scrim. Any lighting from in front may well reveal the upstage scene but will also continue to illuminate the scrim itself, and any scenery that may be painted on it. While this may be the effect you want to achieve, if you want the scrim to disappear, it cannot be lit. Your scene lighting should come from an electric upstage (and blackout drop) or from side positions upstage of the scrim.

All in all, lighting a scrim is fairly basic but very easy to get very wrong. When done correctly, it can be a magical effect; when the lighting isn't controlled, it can be a painful mess. Sharkstooth scrim presents the most common challenge to lighting designers. In our next article, we'll discuss other fabrics common to production and the challenges they may present to lighting.

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Scrim FAQs

Does it matter in which direction the “tooth,” or opening in the scrim, is oriented? The tooth is about twice as high as it is wide, and this is the common orientation when sewing the scrim. The properties, however, are not affected if the tooth is rotated. Another common reason for rotating a scrim is to combat the moiré effect: this is caused when holes of the same size are lined up with one another, causing a wavy, blurring look to whatever is seen through. As this can cause discomfort to audiences, it should be avoided; rotating one of the scrims will ensure that the “teeth” do not line up. Trying to maintain at least 6' between scrims will also minimize this effect.

What side of the scrim should face the audience? When you feel a sharkstooth scrim, one side is fairly smooth, while the other has more texture, where the threads pass over one another. While it does not appreciably affect the use of the scrim, more texture gives the light more surface area to hit and is slightly more visible to the audience. We generally place the textured side towards the audience.

Can you project onto sharkstooth scrim? Short answer: yes, but you may not want to do so. Since scrim is a series of holes tied together, it wants to be lit at an extreme angle. If you are projecting images onto it, you will probably want to use a fairly direct, flat angle, which means much of the image will continue through the scrim and strike whatever is behind. The image on the scrim itself will be degraded, both by the secondary reflection from behind the scrim and by the low quality of the surface. The image will be recognizable but not of high quality. That said, projecting patterns or abstractions onto a scrim is often very effective, especially as the secondary reflection may provide additional depth and dimension.

Softly Speaking Part 2

By Peter Monahan, August 1, 2004

If scrim can cause the greatest headaches in lighting fabric, then most other fabrics are far easier to light. Now that our primary interest is illumination, rather than creating a reveal with sharkstooth scrim as discussed in Part One (June 2004), lighting fabric becomes much like lighting anything else. Rather than cover old ground that most of you probably remember from Lighting 101, let's look at some of the problems and pitfalls that one may encounter lighting other fabrics.

LENO-FILLED SCRIM AND MUSLIN

Sometimes, I like to describe leno-filled scrim as “sharkstooth scrim with the holes filled in,” which always begs the question, “Why did anyone bother?” Lighting may well be the answer: the leno-filled scrim has a lovely soft, textured surface that reflects light beautifully, thus making it ideal for a cyclorama or a bounce drop. Like the sharkstooth scrim, it has one surface that is more textured and one that is smoother; in general, we recommend having the textured side facing the audience to take advantage of the extra surface dimension. Generally, this should be lit as any cyc would be: strip lights from above or below. The added texture on the surface of the fabric will help smooth the edges of the lighting and remove some of the scalloping of the light that can occur at the very top or bottom of the cyclorama, where it is closest to the lighting instruments.

Leno-filled scrim is also ideal for projecting abstract shapes and patterns, due to its highly reflective surface. The texture, however, will mitigate high resolutions, and so leno is not the best surface for video projection. Leno is also a thicker fabric than muslin or other fabrics, so backlighting a leno cyclorama may not produce the best results; muslin is a better choice for this.

Muslin is perhaps the most ubiquitous fabric in theatre. Ignoring its use in costumes, muslin is used widely for scenery, drops, and cycloramas — in short, any surface that may be painted or that is being used to reflect light. Pretty simple stuff, really, so what could go wrong lighting muslin?

Well, you might mix weights on muslins and then sew them together and paint them. And, most likely, the different weights will not take paint in the same way. Why is this a lighting problem? True, it's mostly a painting problem, but it may not show up until the stage lighting hits the painted surface: then, it's a lighting problem. This will become most apparent when you have different weight muslin — medium and heavy, for example on a similar hard surface. The medium has less thread in it; the surface beneath will show through more than the heavier muslin. If the surface is especially light or dark, it may shift the color more under the medium weight muslin than under the heavy weight muslin. If possible, offer your advice and be consistent on weights before it becomes your lighting problem.

Seams are another area of question and concern. Traditionally, a seamed muslin drop in the theatre has horizontal seams to allow it to hang straight. Alternatively, in video, the seams will often be vertical, on the assumption that a shot can be centered between two seams and will never show on camera. From a lighting standpoint, seams raise only a few concerns. If sewn properly, and front-lit from the top with strip lights, the seams should barely register to a live audience. Of course, if you are backlighting the drop or cyclorama, then seams become a major issue: they will become black lines across the scene. As a lighting designer, you can't do much about this: move your lights to the front, if the design and space allow.

Once again, lending your advice prior to the production may help. If you have a backlit scene, and the producing organization cannot afford a seamless drop, remind them to carefully consider where the seam(s) will land. If the drop features a cityscape, then a seam right along the edge of the sky may not be as visible to the audience, even if the drop is backlit; the color change from city to sky may help hide the seam itself. Or, if you are again doing a cityscape, but only buildings, then you may want to ask for vertical seams on the drop-all of the lines in the architecture of the city are vertical and may well hide the seams themselves.

Lastly, the color of the muslin itself should be considered. Most often, painters will request natural muslin, that “cream of wheat” color that seems white until compared to the next most popular muslin, bleached white. Often, for cycloramas, designers request bleached white muslin, reasoning that it has a more reflective surface than does the natural and, thus, will be brighter. And their reasoning is correct: the bleached white muslin is certainly more reflective than natural muslin. In fact, I often suggest that it is too much more reflective, while actually only reflecting an additional 7-10% more light, and it has two potential pitfalls. First, as it is bleached white, it will clearly show any dirt, stain, or smudge, and theatres are notoriously dusty spaces. Grime that will barely register on a natural muslin drop will clearly show on bleached white muslin. Second, the extra reflectivity means that any light, anywhere, is likely to create some glow on the cyclorama, which may distract an audience during a blackout: exit lights, aisle lights, backstage running lights, and glowing lighting instruments may all cast light onto the bleached white cyclorama, causing it to glow slightly and destroying the dark void the designer had hoped to create.

Finally, the question often arises: what about sky blue, dark blue, or gray muslin? Each of these can be fine, depending on the application. If the use of the muslin is primarily to create a day sky, then using the sky blue muslin can save you a good deal of paint and time. Similarly, if you're primary effect is a night sky, using the dark blue muslin may save you time and effort. Each, however, also has limitations: the muslins are no longer color-neutral, as the natural or bleached white muslins are, and so limit the lighting designer's ability to create a full range of colors on the cyclorama.

With the sky blue muslin, very little actual color is present, so this effect will be less apparent, although it will certainly be easier to move the colors in the blue range. With a dark blue, however, trying to get unsaturated reds or oranges to be a dominant color through the use of lighting instruments will be extremely difficult. The muslin will primarily reflect dark blue (and probably some dark red) light and very little else. Gray muslins were developed primarily for television use, to control the amount of reflected light behind the primary subject. Most light gray muslins will reflect all colors pretty equally at a lower percentage than bleached white or natural muslin.

GAUZE & EFFECT

Like sharkstooth scrim, most gauzes will provide a degree of opacity-to-transparency shift, or bleed-through effect. If you're using gauze to create this effect, light it in the same way that you would a sharkstooth scrim, and remember: angle, angle, angle! Otherwise, you may be using the gauze to soften the look on the stage or to add a feeling of depth to the space in which you are working. If it's the latter, you may not want to light the gauze at all but just light the elements behind the gauze, or you may want to splash some light on the gauze itself — this will help create a “haze” from the gauze and soften and slightly obscure anything behind it.

Finally, a gauze on an upstage window may allow you to change time of day — bright daylight into sunset colors — by lighting a small piece of gauze over the window, rather than a full cyclorama behind the window. Remember, however, that even more than with sharkstooth scrim, gauzes are mostly holes with little surface and so will be limited in how much they reflect.

MASKING FABRICS

Masking fabrics should be the easiest to light. For the most part, they are hung to hide something and are designed to absorb light, which is not to say that they won't cause problems if given the chance. The most common issues that arise are differing weights, changing nap directions, and re-dyed fabric. Lets look at each of these.

Without filling another whole issue on weaving technique, let's just accept that different masking fabrics have different weights (thickness) and finishes (surface appearances). As a general rule of thumb, the heavier the fabric, the less likely it is that light behind the fabric can be seen. Use heavier velour, for instance, for a border in front of a light pipe. Cover a dark wall, and you may be fine with a lightweight velour or other masking fabric.

The primary types of surfaces finished for masking fabrics are napped fab rics, such as velours and velvets; calendared fabrics, such as serge; and brushed surfaces, such as Commando Cloth or Duvetyn. The napped surface of velour is perhaps the most common masking fabric in the US. The depth of the nap will vary and will cause the amount of light absorbed to vary with that depth, but overall, this is a highly light-absorbent fabric that will soften the edge or top of a stage and keep from pulling the audience's attention away from the primary scene, while framing that scene and hiding the backstage of the theatre. As the weight (and nap length) varies, however, so will the fabric's ability to absorb light. Mixing weights, then, may cause the velour to absorb light differently. While this may not cause a huge difference, it may be enough to slightly distract the audience, and so should be avoided, if possible.

Of far greater concern with a napped fabric is the direction of the nap. Run your hand along a napped fabric, and you will feel the pile; run your hand with the nap, and it will all lie down under your hand; run against the nap, and it will stand up and darken the color of the fabric. Light hitting the fabric has a similar effect. If the nap direction is not consistent in your masking, the color will appear to vary, even if the goods are all from the same dye lot. Simple solution: make sure that the nap direction is consistent. The standard in the US is to run the nap “down,” or toward the bottom of the drape. For pure practicality, it will collect less dust and keep your drapes cleaner longer. You may decide to have the nap direction “up,” if for no other reason than you feel that the color is slightly richer this way. Again, as long as all of the nap runs in the same direction, you'll have consistency.

While brushed surfaces don't have a nap, they do appear to have a direction to them. The effect of turning the brushed surface in one direction or the other is much less than when using velour, but you still must be consistent. Mixing the direction will cause the fabric to reflect light differently and create a potential distraction to the audience.

The final note on fabrics is completely out of the lighting designer's control. I mention it just to help solve a mystery that may have cropped up on one occasion or another. Usually, black velour is black velour. The dye lots vary widely, but if your soft goods are all of one dye lot, they will all look the same. If light spills on them, they may take on a diffuse, subtle glow of that color light but, for the most part, they stay black, unless the goods have been re-dyed. Sometimes, a batch of velour just isn't the right color, and sometimes, it has been re-dyed, so as not to be thrown away. It is easiest, in fabric, to take a color to black; the black will override any other colors and so, to the naked eye, will appear black, until colored light hits it. Then, it may turn into completely unexpected colors. Did you ever hit your black masking with a lavender gel and have it suddenly pop red on you? Most likely, the goods were dyed red to begin with and then re-dyed black. When the lavender (a mix of red and blue) light hit the velour, the red dye under the black reflected back more of the red in the gel, turning your masking red. The good news is that not all that much velour is re-dyed.

Fabric is just one aspect of an overall scenic design but an important one that a lighting designer must take care to light. It can cause real problems, eating up time better spent on other aspects of design. Hopefully, with a little smart planning, you can prevent these problems from arising at all.