JAY HOLBEN

ATMOSPHERIC CONDITIONS

Using Smoke and Fog for Your Shoot

When you mention smoke or fog, most people conjure up images of a misty, creepy cemetery at night, with fog crawling along the ground like the undead, or of black smoke billowing out the windows of a burning house. These are generally practical special effects. Fog can be your friend, however, as it adds atmosphere to photography and defines light in a unique way.

The first thing I need to note is the difference between smoke and fog.

Smoke is a chemical process, a changing of one form of matter into another, usually a byproduct of combustion. When you burn something, the chemical change happening to that object creates smoke. The particles released into the air from smoke are a mixture of gas, liquid and solid particulates. Smoke can have various colors—black, red, etc.—depending on the chemical composition of the material being burned. These particulates, however, are dangerous to humans. According to the United States Fire Administration and the Federal Emergency Management Agency, more than 79 percent of injuries sustained from indoor fires come from smoke inhalation. Smoke particulates are dangerous, and most items that produce special effects smoke (especially the really cool stuff like smoke cookies and burning tires) are generally illegal for use today or require a special permit and a licensed effects artist.

Enter *fog*. When you have liquid particulates in the air, light can refract and reflect off of them, which defines the shape of the light beam.

Fog, on the other hand, consists of liquid particulates that adhere to imperfections in oxygen molecules in the air. Artificial fog works the same as naturally occurring fog, with water particulates that are small enough to adhere to oxygen molecules. If the particulates get too big, then the fog becomes rain. Artificial fog is generally glycol-based and is relatively harmless to humans.

In standard foggers, water, glycerin or propylene glycol (fog juice) is passed through a superheated nozzle at high pressure and atomized into a fine mist. Fog will generally cover a large volume of space and will "hang" in the air. If you waft the fog (flap a large board or use a fan), you can create an even, featureless concentration of fog in an enclosed space.

Fog and mist can also be created with liquid nitrogen or solid carbon dioxide (CO_2 or "dry ice"—so named because when it "melts," it merely evaporates, or changes into a gaseous form, not a liquid form like regular ice). The extremely cold nature of CO_2 or liquid nitrogen causes the fog to be considerably denser and heavier than air (or glycol fog, for that matter), and as a result it hugs the ground and is more susceptible to the forces of gravity. (You can create a fog waterfall with liquid nitrogen but not with glycol fog.)

Cinematographer Ashley Barron focuses through the fog for a shot on *Black Tar Road*. She is shooting with a Canon EOS 5D Mk II with an ikan D7 onboard monitor.

Since CO_2 and liquid nitrogen are used more for visual effects or to create natural low-lying mist, I'd like to stick with glycol fog for the

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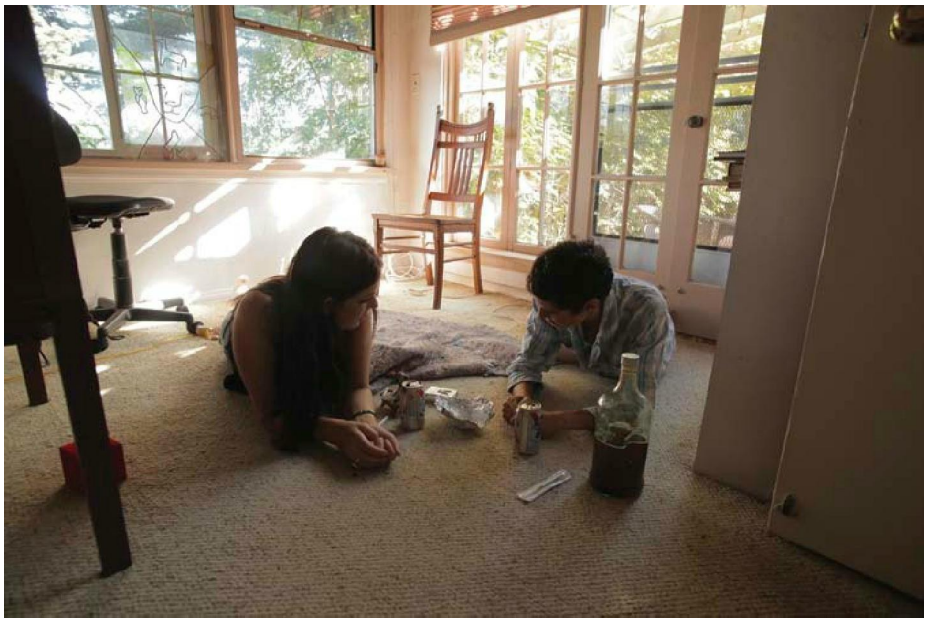

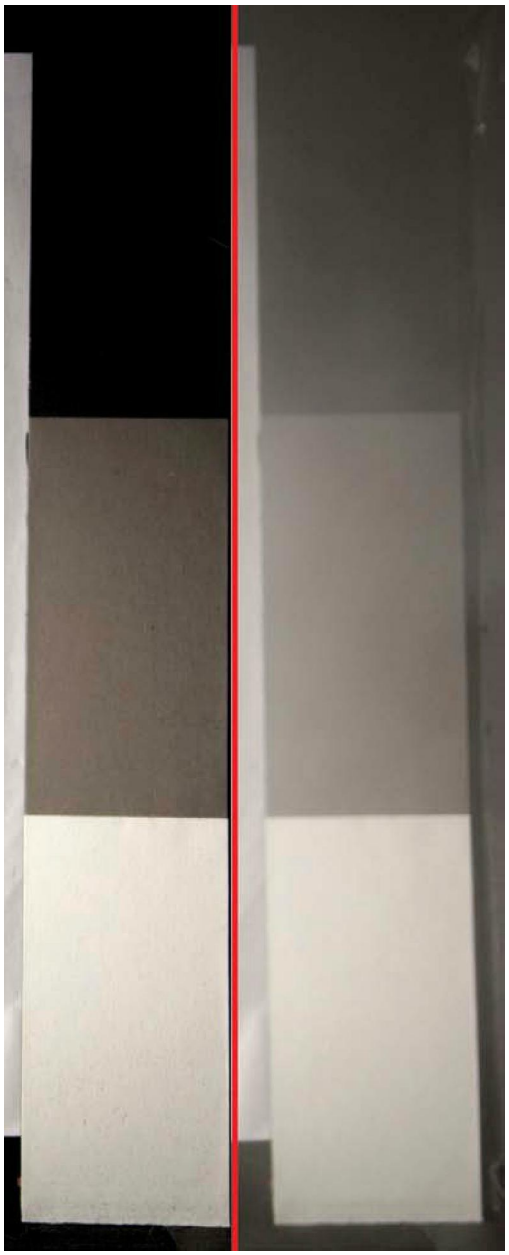

Top left: A shot without fog added. Charlie (Amber Dawn Lee, left) and Heather (Noelle Messier) scrounge the floor for fallen drug pieces in a narcotic haze in *Black Tar Road*.

Bottom left: The same shot, but with fog added into the room. This shot was taken before the fog had totally settled. It was too dense, lifting the highlights on the wall too high. When it settled a little further, it was perfect atmosphere to add to the shot.

Right: The left side shows a contrast strip of black, medium gray and white swatches without any fog added. The right side is the same contrast strip, under the same lighting, with fog added. The overall contrast level is reduced substantially, moving both white and black closer to medium gray.

purposes of this discussion. I'll address the use of fog less as a special effect and more for atmospheric effects.

We can't see light. Light itself is invisible to the human eye. What we see is the reflection and/or refraction of light. We see light bouncing off our skin, the floor, the computer keyboard. We can't see light in the air unless that light is reflecting or refracting off of something.

Enter *fog*. When you have liquid particulates in the air, light can refract and reflect off of them, which defines the shape of the light beam. When you see shafts of light in movies (and even in real life) it is because the light is interacting with particles in the air.

It's also important to understand that in order to see these shafts of light, we need to *backlight* the atmospheric material. The light needs to be directed toward the lens (not necessarily *into* the lens, which creates flare). For the shape of the light to be visible in the fog, we need that

light to refract from about 45° on either side of the lens. If it comes from behind the lens, the refraction of light on the particulates in the air will simply wash out the scene and massively reduce contrast, not show the shape of the light.

Reduction of contrast, however, is one of the primary reasons to use fog for a scene. The level and density of the fog will determine how much the contrast is reduced. Too much fog and you'll reduce your contrast down to almost nothing but a grey blob! Just enough can help take some of the "video curse" off digital images and impart depth and atmosphere into the scene. This isn't like additional depth of field—quite the opposite, in fact. It tends to create a "hazy" effect so that the background seems to be further away. It requires a light but consistent level of fog. Spray the fog into the room in small doses and waft it around until it dissipates into a single, consistent layer of haze without definition. The closer your subjects are to the camera, the less they will be affected by the fog. It creates a wonderful depth and feel.

Recently I was brought in as a director to help finish a feature film called *Black Tar Road*. Although a large portion of the film had already been completed, additional scenes were needed and the original director was no longer available. I brought in a young Russian cinematographer, Ashley Barron, who came to Los Angeles by way of Australia. We decided to incorporate fog for several of the scenes that we were shooting at a private residence in North Hollywood. We rented a Rosco fogger and used Rosco glycol-based fog juice to add atmosphere to several of the scenes we shot over two days last month.

As a final note, maintaining a consistent level of fog over the course of a day of shooting can be an incredible challenge. Over the years, I have developed a technique that works well for me. It requires a spot (reflected) light meter and a piece of black material. I generally use a large solid like a 4' x 4' and a hard light, usually a small tungsten Fresnel fixture. Off in a corner of the set—away from view of the camera and away from a lot of action or movement but still clearly visible to me at the camera—I'll place the black solid so that it is flat to my perspective. Then I'll put the small light low on the ground, pointing straight up in front of the black, with none of the light actually hitting the black. I want the light beam passing in front of the black (between the black and my position) but only lighting the air in front of the solid. When there is no fog in the air at all, I can take a spot meter reading of the black and get a zero reading (or close to it). When we add fog, the light beam will start to be visible and my spot meter reading of the black will increase. When I have the fog at the level that I like it, I take a reading of the black and make a note of that stop (usually saving it in the meter's memory). Then as the day goes on I can continually check that black, and if the stop is too low, I know I need more fog. If it's too high, then I know I need to let the fog settle a bit.

The light from this 300W Fresnel can be seen in a beam projecting out from the fixture because it is backlighting the fog in the air. Keeping it against a black background helps to accentuate the light beam.

There are some alternates to the glycol-based foggers, and some legal uses of smoke. Some companies make aerosol sprays that are the same kind of fog-like haze from a can. Both Diffusion Cloud in a Can and Fantasy FX Professional Haze use a medical grade ("white") mineral oil in an aerosol can to create a good haze in an enclosed space. They're generally available from film or theatrical expendable suppliers.

Burning incense or sage can create smoke that isn't too offensive to most people—although people with sensitivity to fragrances can be bothered. I once had a fogger stop working on me and had a number of people light up cigars to replace the atmosphere. Although I don't recommend this technique, it worked in a pinch. **dv**