Activity C-3. A Photographic Challenge: Capturing Splashes

Goal: Take technically excellent and creative photos of milk drop splashes.

Prelab:

1. Read this article completely.
2. Submit your answer to the prelab problem online.

Prelab Problem:

The aperture that you select for a photograph affects two things: 1) the exposure of the film and 2) the *depth-of-field*. Depth-of-field refers to the range of distances in front of and behind the subject that will be in acceptable focus in the photograph. There are three ways to increase depth-of-field:

a. Use a larger f-stop or smaller aperture.
b. Move the camera further from the subject.
c. Use a shorter focal length lens. If using a zoom lens, zoom to a smaller focal length.

As an example of a situation where a large depth-of-field may be desirable, suppose that you're photographing a balloon burst and you want the balloon to be in focus from front-to-back. You may not want to move very far from the balloon, because you want it to appear large in the photograph. Or, if you're zooming in with the lens to make the balloon appear large, you may not want to change the zoom. That means you would need to use a smaller aperture (that is, larger f/#).

A situation that is a challenging one for obtaining good depth-of-field is photographing the splash of a milk drop. (Note that this is a relatively low-speed event compared to the burst of a balloon.) You need to keep the camera close to the subject, since it's so small. This, however, limits your depth-of-field (see item b above). The calculator dial on the flash indicates that you must use an aperture of f/5.6 for correct exposure with the auto-sensor set on yellow. In order to increase the depth-of-field, what can you do? Describe 2 methods that do not involve changing the camera-to-splash distance, the focal length of the lens, or the film exposure. You may do this by giving two different ways to complete the following.

"Since I'm not allowed to change the camera-to-splash distance and the focal length of the lens, the only way I can increase depth-of-field is to increase the f-stop. If this is the only thing I do, then the subject will be underexposed. I will compensate for the larger f-stop and maintain correct exposure of the subject by _____."

Equipment:

- Vivitar 283 flash unit
- SB-4 AC adapter for flash power
- Modified PC cord

- Flash clamp
- Time control box (includes photogate trigger circuit and delay circuit)
- Splashlight box (including separation funnel, interrupter photogate with cable to time control box, bowl, slash pillar)
- Digital camera and related equipment (batteries and/or AC adapter, memory card, A/V cable to connect to TV monitor, card reader)
- Tripod
- Milk or other non-corrosive liquid
- Background cloth or paper

Introduction: In this activity, you'll be using a photogate as the trigger for the flash unit. A drop of liquid passing through the photogate will start an electronic timer. After a preset time interval, the timer will discharge the flash unit. The time delay before discharged is determined by trial and error in order that the drop is splashing on a surface or in a pool of liquid when the flash goes off. You can experiment with different surfaces to get the effect you want. This is a challenging photographic situation because the drops are small, and you must get the camera in close in order to fill as much as the frame as possible. At such close distances, the depth-of-field will be shallow. You'll need to use a large f-stop (small aperture), but that may severely limit the exposure. In that case, you'll have to find a way to increase the exposure without decreasing the f-stop, getting motion blur, and setting the ISO too high.
Technically excellent photographs will…

1. …be sharply focused, front to back.
2. …have no motion blur.
3. …be correctly exposed (highlight areas should show density rather than being chalky white).
4. …have minimal thermal noise.
5. …have the splash image as large as possible in the field of view.

In addition, try to make your photos creative and different from splash photos you've seen before. For examples of splash photos taken by previous students, see the splash galleries at http://courses.ncssm.edu/hsi/.

You'll need two photo shoots in order to get the best photos. The first shoot will allow you to determine the conditions for the best photos. After you evaluate your results from that shoot, you'll do a second shoot.

The first photo shoot

Experiment with the apparatus to produce the effect(s) you want. Then set up the camera. Take a series of photos. Upload and rename the photos. List the filenames on your data page and email the data page to the instructor and all group members. Also provide the photo files to the instructor for back up. Then discuss with your partners what changes you can make in order to improve your photos in a second picture-taking session.

Preparation for the second photo shoot

1. Select a representative photo from the first photo shoot. Each person in the group must select a different photo. Complete the "Evaluation of C-3 Shoot 1" online.
2. If you'll need any props for your second photo shoot, bring them with you on the day of the shoot.

The second photo shoot

For your second photo shoot, implement the improvements that you identified in your evaluation of the photos from the first shoot. Use the maximum image quality and resolution available from your camera, as some of your photos will be printed. In addition, add a creative component if you didn't already do that in the first shoot. However, don't be so ambitious that you can't complete your photography in the allotted time.

As always, upload and rename photos, etc. You should know the routine by now.

Editing and Printing

After shooting enough photos to satisfy you, upload, rename, and backup as usual. Then select your best photos for printing. You'll probably need to do some minimal editing first using a photo editing program. This shouldn't entail anything more than cropping, small color balance and density shifts, and cleaning up noticeable noise. After editing your photo, save it with a new name. You could, for example, append the suffix 'edited' to the original name. If the photo is in the jpg format, save it at the highest quality (least compression) setting. When your photos are ready, you can provide them to the instructor (don't email large files, though!) for printing.