Water Shot on Glass

Da Zhou

Team 3rd Image
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Flow Visualization
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Background

The purpose of this assignment is to observe the phenomenon of water when a water gun shot on a glass board. A water gun usually weighs 2.5 to 3 pounds and it can send water to 25 feet away. Before the 1980s, water guns had fairly limited capabilities. Handheld pistols could only shoot water a short distance. They shot a weak, narrow stream and you had to run to a spigot to refill them after every shoot-out. These guns are still terrific toys, of course, and they're a wonderful demonstration of basic plumbing principles.

Since the pump is activated by a turning motor rather than a trigger, the design can have a slightly expanded cylinder size without making it more difficult to shoot. This extends the blast range somewhat. But the real advantage of this design is that the shooter doesn't have to keep pumping the trigger to continually shoot water. If you hold down the trigger, the motor keeps pumping, emitting a rapid series of bursts, like the continual fire of a machine gun.

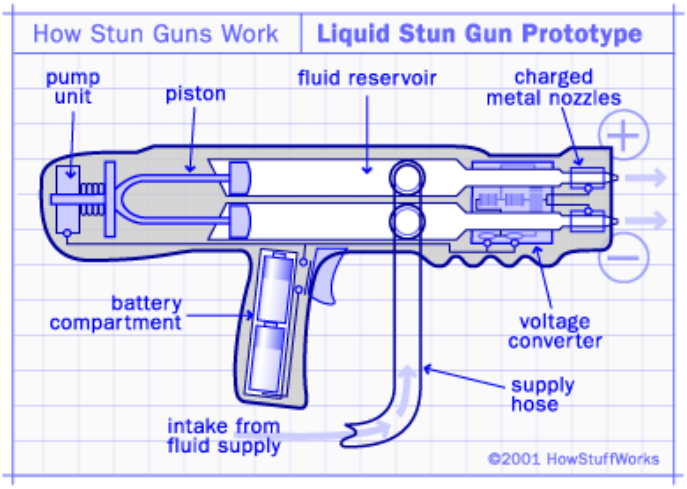

Figure 1 Explanation on how a water gun works

Figure 2 A water gun

Procedure

This experiment is conducted on a washing platform at Durning lab. The process of the experiment according to the following steps:

1. Prepare a water gun filled with water, pump it several times so that it can shot at its maximum distance
2. Set up the glass board in nearly 3 meter away from water gun.
3. Two lights were placed, one is on the side of glass and on is behind the place where the water gun shot.
4. One member was holding the glass board during the experiment, one member shot water on the glass board and the other one shot film or took pictures.

We tried different velocity of water by adjusting the pressure on pushing trigger. So the size and shape of the water on the glass was varying.

Figure 3 Experiment set-up

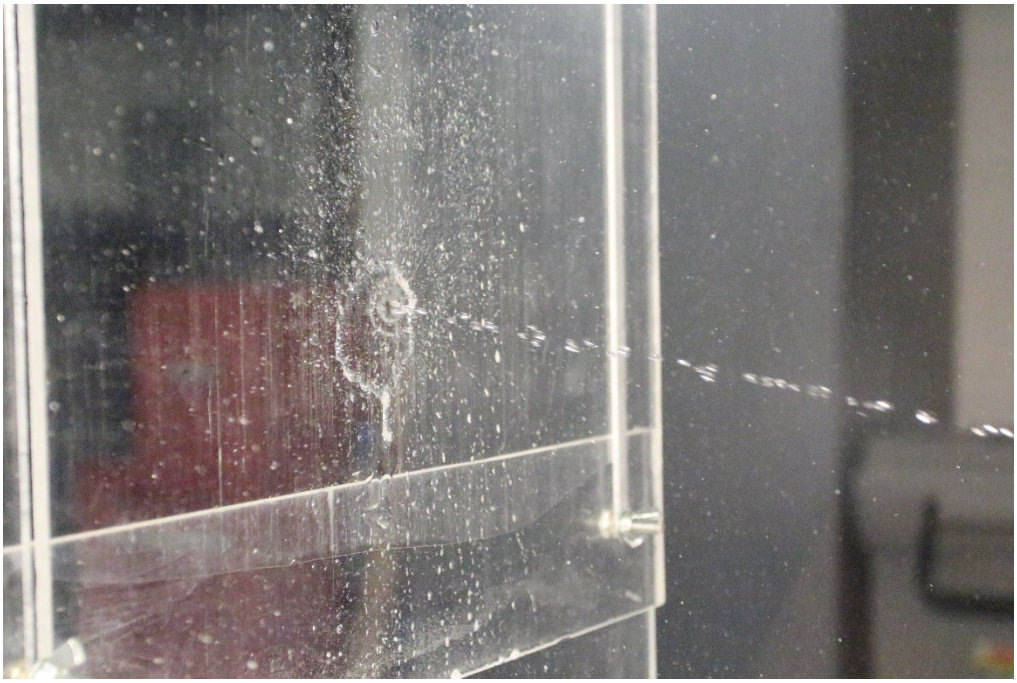

Figure 4 Team 3rd image (unedited)

Photographic Technique

The original picture was taken by Canon EOS REBEL T5i camera with exposure time of 1/4000 seconds, ISO speed of 12800 and focal length of 40 mm. Because the original image involves the whole set-up if experiment including glass board, screws and even trash bin on the right side. I use Photoshop to crop those unnecessary objects. I also increase the color of yellow because water is colorless and hard to see from the original image.

Reference

[1]: http://entertainment.howstuffworks.com/water-blaster.htm

[2]: http://electronics.howstuffworks.com/gadgets/other-gadgets/stun-gun6.htm

[3]: http://en.wikipedia.org/wiki/Color_of_water