

Jake Gigliotti
Flow Visualization
Group Project Report

For our first group project we set out with the goal of capturing images that involved Von Karman Vortex Streets in flowing water. To create this phenomenon we used the flume and different dyes flowing over a small cylinder. Some dyes worked better than others to show the phenomenon but our main dye was just water with thick blue food coloring in it.

For our apparatus we used the flume and about 5 inches of water flowing through at a given rate. We used a quarter inch piece of PVC pipe logged horizontally to the flume apparatus so that the water was flowing over the cross section of the tube. We injected dye approximately 2 inches above the pipe into the flow, making sure the pipe split the dye into two flowing sections. We injected the dye at a fairly constant rate as to where it would not become too turbulent before it hit the cross section of pipe.

The dye we used to visualize this flow was a fairly good indicator of the phenomenon. We also tried using food coloring and milk to show the flow but the milk was too murky and made the physics too hard to visualize. If we could use a more viscous fluid such as paint, we could have possibly visualized the flow better but it would have caused major problems in the flumes pump.

To photograph this phenomenon we used a Canon 40D digital SLR camera shot in RAW form. To contrast the flows dye vs. the clear water, we used 2 500-watt lights with a diffusion panel in front of them to backlight the flume. As well we added another 250 W light on top of the flume to toplight the flow. Our field of view was relatively small being approximately 6 inches across and 4 inches from top to bottom to show the physics of the flow while also exposing the beauty and detail of the dye flowing over the cylinder. The flow distance to the lens was about 3 inches, which created a very small area to show the flow and also a small depth of field. To focus the image was a bit of a challenge but we ended up focusing on the center of the cylinder, which rendered the flow in focus on almost every shot. The focal length was approximately 50mm and was shot with full manual focus. We shot the image at 1/1000 of a second to capture the fast flow with no blur and the aperture was an F 5. Our ISO was 800.

Overall I think the image is satisfactory. I decided black and white really reveals this flow well and helps see the physics even more than the color. Also I have always liked black and white film and I felt it fit well with this image.