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Project 3

Flow Visualization  
Spring 2010

For project three I was interested in seeing if it would be possible to make a Von Karman Vortex Street with flame flowing over around obstacle. Although this effect was not seen during my shoot I was able to capture some cool images.

My set up was simple using a can of hair spray for the fluid and a girl lighter to light it just before it would pass around the dowel. Figure 1 shoes the set up and the observation area that I was looking for the Von Karman Vortex Street.

QuickTime™ and a  
decompressor  
are needed to see this picture.

figure 1

The lighter had to be held close enough to the spray can so that the entire flow would light but far enough away so the force of the spray would not blow the flame out.

I believe it was because of the high pressure in the spray that caused me not to see the Von Karman Vortex Street I was looking for. The pressure would blow the flame out if the lighter was not there to keep it light. The hair spray was also very wet which also caused the flame to go out. This made the experiment safer but the effect was not being able to see the vortexes.

To capture my image I used a Canon 5D mark ii, which is a professional camera that does great in low light. With a ISO setting of 6400 allowed me to use a high shutter speed of 1/1,250 of a second. The f/stop was at 4.5. This allowed me to capture the flame in the moment and still have a decent depth of field. The camera was about 2.5 feet away from the dowel making field of view around a foot squared, with a focal length of 105mm. The only thing done in post was cropping of the photo and turning it on its side. This brought more focus to the interesting shape of the flame.

I am very happy with this image for the shape that it made looks a lot like a ghost. Because of the randomness of burning fire reproducing my image would be hard. I would like to try again to get the Von Karman Vortex Streets with flame in the future. I believe using a more combustible spray would help show this the effect. I believe that the air around the spray also need to be flowing over the dowel, this way the flame would act like a dye does in water. My thinking is that with the properties of the Von Karman Vortex Streets combined with flame, balls of fire could be made.

