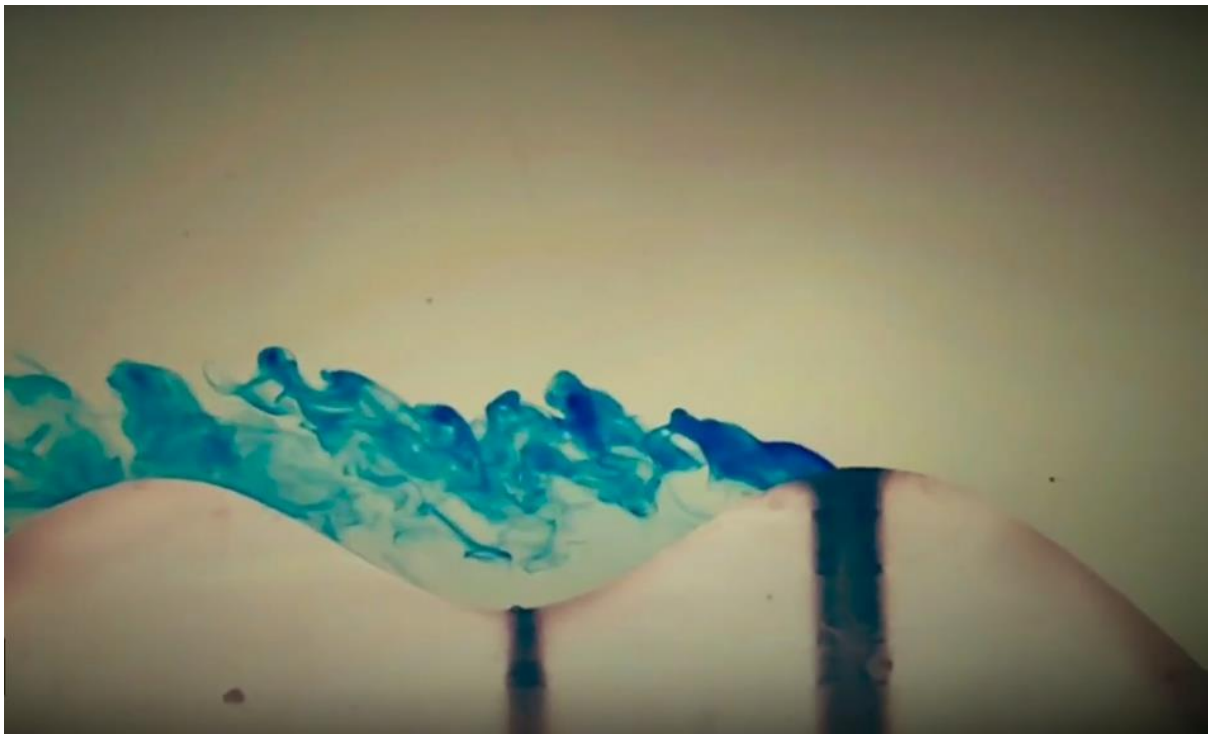
Flow over humps in a flume



Team Second
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MCEN-4151
Flow Visualization
A Course in the Physics and Art of Fluid Flow
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Projected with Gabriel Elbert, Cade Haley, Michael Sandoval, and Lucas Sorensen

Background

The objective of the Team second assignment was to develop an idea for a flow visualization experiment, to creatively gather materials and design the experiment, and to photograph the results. The video contains essence of the art of flow visualization with a balance between demonstrating the physics of the flow and showing any atheistic photograph.

Experimental Setup, Physics, and Chemistry

During the video, the flow was going 1 liter per second. The cross-sectional area of the flume was about 0.25 m by 0.125m, which is 0.03125 m^2. The water in the flume was going at 3.125*10^-5 m/s, which was not as fast. $Re = UD/\nu$ = (3.125×10^−5m/s)(0.254 m) 1.004×10^−6 m^2/s = 7.906, which is a laminar flow.

Visualization Technique

In this experiment, we have used a flume that we can put two humps in the flume. We have inserted the paint water by ejecting with syringe. As the water in the flume passes over the humps with paint water inserted, it created a beautiful flow visualization.

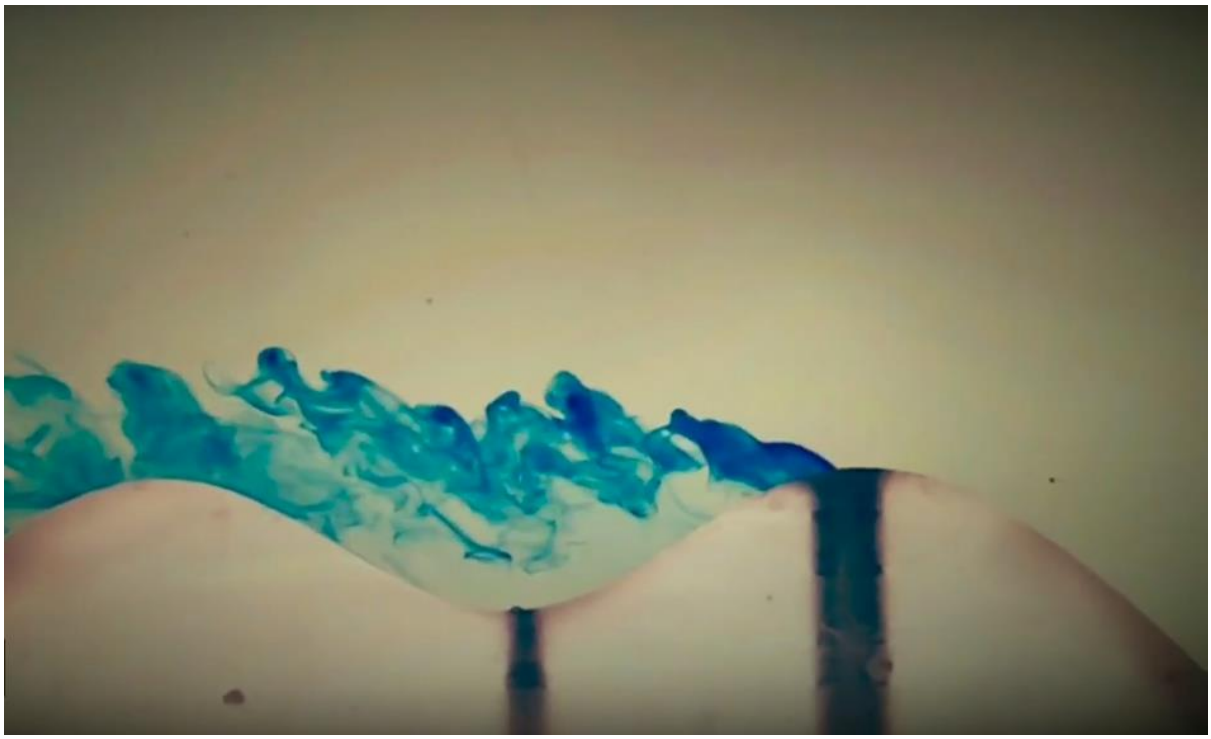

Figure 1. The image of the flow over humps

Equipment and photographic technique

The Samsung Galaxy S8 was used to take the photo shown in Figure 1. The camera on the Samsung Galaxy S8 is Samsung SM-G950U with a resolution of 1920 by 1080 and having 60 frames per seconds.

Conclusion

The paint water in a flume was a great idea to show both physics and aesthetic vision of the flow visualization. The flow was weak enough to show how the flow was moving. The watercolors were perfect for the image, where the artistic intent of the experiment was fully achieved.

Citation

- Airfoiltools.com. (2018). Reynolds number calculator. [online] Available at: http://airfoiltools.com/calculator/reynoldsnumber [Accessed 1 May 2018].