

Second Team Image Report

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This video was produced for the second team image. With it we were able gain experience with high speed cameras. To utilize this new tool we need a subject so we pick the classic water balloon pop. By using a balloon, water, some dye and a sharp implement we were able to get some amazing shot. This also showed us the limitations of highspeed cameras that we had available. Pointily the image quality.

The setup was simple It was a water balloon filled to varies levels with about 10 drops of dye. Then I would hold the balloon while Duncan Lowery or Brent Eckles focused and aligned the camera. When all was ready, the person holding the balloon would pop it with a knife will the person on the camera would start the capture. To keep the amount of data down the video was truncated to a few dozen frames before and after the action. This allowed for effective file handling. This process was repeated several times with different fill levels and dyes.

The flow analysis seems to be strait forward. Looking at the balloon with a force diagram we can see that the balloon is Applying an equal normal force to the surface of the water. With the greatest force at the bottom. After popped the water falls do to gravity like expected.

Now looking at the action onto the water at the time the balloon is popped is more interesting as we can see that the balloon pulls off the surface of the water much faster then the water can fall giving us a view of the surface interaction of the water and balloon. We see the affects of no slip on the water, and the effect it gives is it accelerates the water at the same velocity as the balloon near the surface. What wee see is a spray of water being thrown by the balloon.

To capture this video, we barrowed a phantom high speed camera for the ITLL. The video captured was at 2500fps. At 256*256 px. The light source was the sun and we used a 50mm lens.

The second team project was a great opportunity to learn and understand what is need to take a high speed video. If I did it again knowing what I know now about the camera limitations. I would do a high speed of a slower moving object, so I could have higher resolution. I think the resolution detracted the most from this project.

