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MCEN 4151
Image/Video 3 Report
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Beer-Viz

I. INTRODUCTION

The goal of this project was to capture the flow of beer coming from a keg tap into a pint glass. Inspiration for this project came while pouring beers from my roommate's kegerator. Special thanks to my roommate Alan Haugen for helping hold the beer glass while I took the photos.

II. PROCEDURES

The apparatus for this project consisted of a kegerator (keg fridge), a keg of budweiser, a Sony a6400 camera, a pint glass, and an HDX 1200-Watt Halogen Tripod Work Light. The camera was approximately 5 inches from the pint glass during the capture. I was seated on the ground holding the camera to take the photo and the lights were situated directly behind me and angled slightly upwards. The apparatus can be seen below in **Figure 1**.

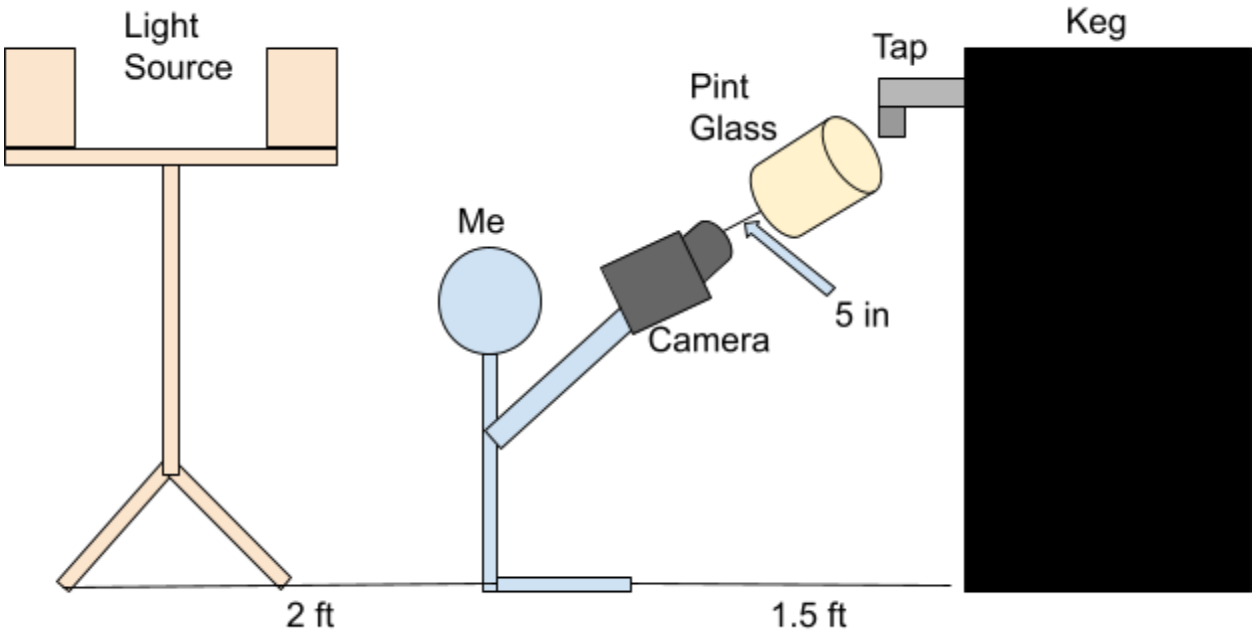

Figure 1. Diagram of apparatus for photo. All values have been approximated

The HDX work lights were an essential part of the apparatus. The kegerator is situated in the laundry area of our house and the only light source is one in the adjacent room. As such, these work lights were required in order to create the bright lighting that is seen in the final image. The light source and the overall setup of the room can be seen below in **Figure 2.**

Figure 2. Diagram of light source with the HDX lights (left) located in the laundry room (right)

As shown above, the room is painted white which helped improve the lighting. However, the differences in the white background in the final image is due to the fact that a white t-shirt had to be placed over the dryer to prevent sharp edges from appearing in the photo. Another aspect of the apparatus is the kegerator, which has two taps and has a nice wood backdrop surrounded by black refrigerator panels. The kegerator can be seen below in **Figure 3**.

Figure 3. Kegerator with silver taps and cherry wood mounting structure

III. RESULTS & ANALYSIS

From a fluid mechanics perspective, this was a great example of laminar flow. Inside of the keg fridge is a keg hooked up to a tank of carbon dioxide. The CO2 tank applies pressure on the beer in the keg causing it to flow up and out and then through the tap. A regulator is used to make sure that the CO2 pressure is maintained at roughly 12 psi which leads to a strong and consistent draft (Klosowski, para. 20). If the pressure is too low then the beer will end up being flat and will flow slowly. If the pressure is too high then it will result in too fast of a flow and lots of foam. After adjusting the regulator to the right pressure the beer gets a nice laminar flow out of the tap which can be seen in the final image. Additionally, the titling of the glass is the age old trick that also relates to the flow of the beer. If the glass were straight up and down, the beer would experience a great deal of turbulence from the impact as it reaches the bottom. The result is the creation of a large amount of foam, also referred to as ‘head’. By tilting the glass, the flow is able to uniformly travel down the side of the cup and reach the bottom at a lower velocity which reduces the amount of foam that is produced. The greater the angle of the glass the less

foam that is created. The foam content of a beer is also a property of how it was produced. Some beers are meant to have a large amount of head (i.e. pilsner) while others do not. In this case the budweiser only had a small amount of head due to the angle that my roommate held it at.

The camera specifications can be seen below:

Device: Sony a6400
Dimensions: 6000 x 3376
Focal length: 26mm
F number: f/4
Exposure: 1/160

Only minor post processing was done in order to increase the brightness of the photo and add some more contrast. The lighting as discussed earlier was perfect and shadows were not an issue. I feel the contrast with the beer and the sharpness of the image are really appealing. However, one of the biggest challenges was bringing the camera into focus. On the first take, photos taken of the beer glass ended up being blurry while the glass was being filled. This resulted in a full beer having to be consumed before the next take could be accomplished. On the second try I worked to bring everything into focus and tried to refrain from making any small movements. I also moved back slightly from the glass and as a result everything was in focus. Examples of the original image and a blurry one can be seen in the appendix.

IV. CONCLUSION

Overall, I really enjoyed this image video assignment and liked the set up process. In the future I would improve the overall apparatus. One issue was the contrasting white backgrounds in the final photo. Since this is in the laundry room, the dryer was in the shot and was covered with a white t-shirt. One solution could be to hang a white sheet from the ceiling and eliminate any sharp edges from the dryer and wall in the background. For a future assignment, I think it would be interesting to play around with doing a ‘bad’ pour and have the pint glass be straight up and down. I think it would help to capture more foam with the turbulent impact of the beer as it enters the glass. Overall, a favorite college pastime led to what I believe was a successful and appealing flow visualization of beer.

REFERENCES

Klosowski, Thorin. “How Kegerators Work.” *HowStuffWorks*, HowStuffWorks, 9 Feb. 2010, https://home.howstuffworks.com/kegerator.htm.

APPENDIX

Original final image (top) with no post processing. Poorly focused image (bottom) that exemplifies the problems in the first trial run.