

Team Project # 3:
Image Report

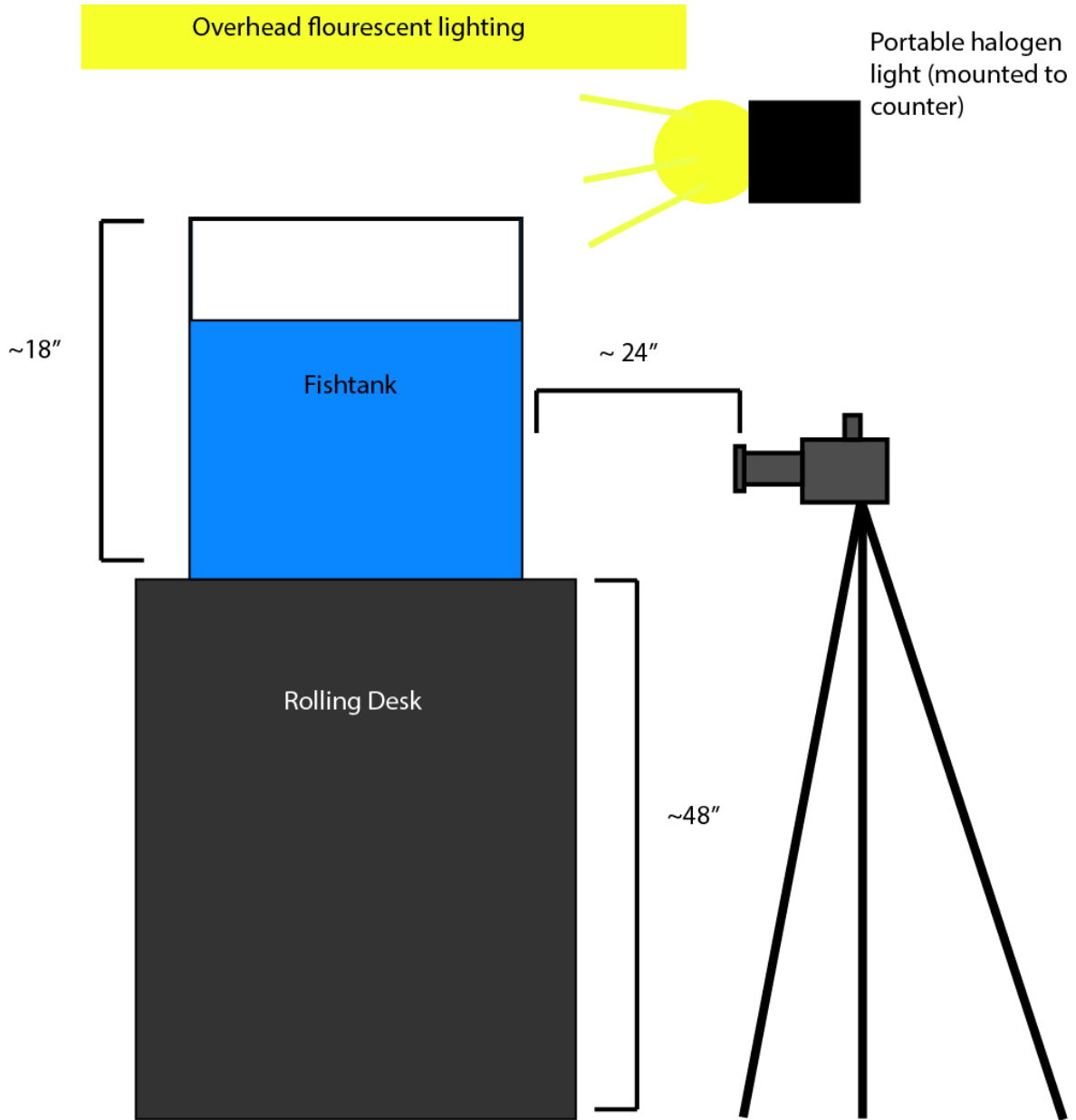


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Flow Visualization
CU Boulder, Spring 2014

I. Project Goal and Description

The goal of this project is to demonstrate the cavitation that occurs when objects are dropped into a low-viscosity liquid, in this case, water.

II. Project Setup



III. Camera Setup

The camera is a Micro 4/3 model, specifically a Panasonic G5. All controls are set to manual and I used a Pentax 1:4 Macro lens, adapted from a film SLR. The lens has a focal length of 50mm and was located about 24" from the side of the fish tank. The aperture range on the lens is f/4-f/32. I shot at f/11 and ISO1600, and 1/800s to maximize sharpness given the lighting situation. The field of view is about 6".

IV. Project Methods

The premise of the project is to catch the cavitation effect as objects are dropped into water. For a scientific experiment, a controlled drop would be necessary. Since the goal of this project is simply to visually capture the cavitation effect, the precision of a controlled drop is unnecessary. That said, all the objects were handheld and dropped from a height of 6-12" above the surface of the water.

Much of the cavitation capturing process relies on luck. I would set the camera to burst mode (max 20 frames/sec) and start shooting ~.5 seconds before the object was dropped. This was repeated dozens of times until we had about 300 total shots. Each object drop took 10-20 images; of which only 2-3 were interesting or usable.

In post-processing I inverted the image and adjusted lighting via the levels tool and the brightness and contrast tool. Many of the droplets on the bottom half of the image were removed via the spot healing tool to give an overall cleaner look (see original image for changes)

V. Conclusion

This image cleanly captures the cavitation effect caused by a tripod head and a Ping-Pong ball being dropped into a body of water from ~8". In class it was discussed the distortion of the Ping-Pong ball was caused by a lensing effect. However upon researching the term it seems it is most experienced in space, or in distances far greater than what we were dealing it.

I am satisfied with the outcome of the image, but would have liked the Ping-Pong to be sharper.

VI. Original Image



Self -Assessment

Assignment:

Date:

Scale: +, ! = excellent √ = meets expectations; good. ~ = Ok, could be better. X = needs work. NA = not applicable

Art	Your assessment	Comments
Intent was realized	√	
Effective	√	
Impact	√	
Interesting	√	
Beautiful	√	
Dramatic	√	
Feel/texture	√	
No distracting elements	√	
Framing/cropping enhances image	√	

Flow	Your assessment	Comments
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Clearly illustrates phenomena	~	
Flow is understandable	√	
Physics revealed	√	
Details visible	~	
Flow is reproducible	√	It's difficult to reproduce nature
Flow is controlled	√	
Creative flow or technique	√	
Publishable quality	√	

Photographic/video technique	Your assessment	Comments
Exposure: highlights detailed	√	
Exposure: shadows detailed	√	
Full contrast range	√	
Focus	√	Image is in focus
Depth of field	√	Very little DOF with infinite focus
Time resolved	√	
Spatially resolved	√	
Photoshop/ post-processing enhances intent	√	
Photoshop/ post-processing does not decrease important information	√	

Report		Your assessment	Comments
Collaborators acknowledged		√	No collaborators
Describes intent	Artistic		
	Scientific		
Describes fluid phenomena			
Estimates appropriate scales	Reynolds number etc.		
Calculation of time resolution etc.	How far did flow move during exposure?		
References:	Web level		
	Refereed journal level		
Clearly written		√	
Information is organized		√	
Good spelling and grammar		√	
Professional language (publishable)			
Provides information needed for reproducing flow	Fluid data, flow rates		
	geometry		
	timing		
Provides information needed for reproducing vis technique	Method		
	dilution		
	injection speed settings		
lighting type	(strobe/tungsten, watts, number)		
	light position, distance		
Provides information for reproducing image	Camera type and model	√	
	Camera-subject distance	√	
	Field of view	√	
	Focal length	√	
	aperture	√	
	shutter speed	√	
	Frame rate, playback rate	√	
	ISO setting	√	
	# pixels (width X ht)	√	
	Photoshop and post-processing techniques	√	
	"before" Photoshop image	√	

