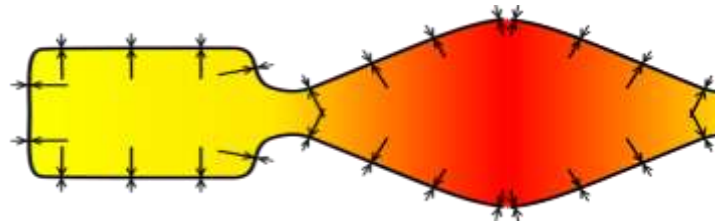


The intent of this image is a quick captured view from the naked eye perspective of our rocket demonstration. A rocket was set off and placed under sandbags, so it will be stationary and display the thrust at a single position. While the high speed camera was able to capture the time history, my image displays the shape of the flame at a single moment.

Propulsion of the rocket in this image is before it is dying down. The shape is created from the pressures of the rocket escaping from the chamber and reacting from the shape of the nozzle. Pressure will escape horizontal but the flow will have pressure at different directions vertically. The shape created is the reaction of the pressures against the atmospheric pressure. The atmosphere pressure is overpowered by the thrust allow the shape of the backdraft to expand to a point where the pressures will equal and then shorten the shape at the end because this was the end of the rocket propulsion.



The net thrust of a rocket can be determined by this equation: $F = \dot{m}V_r + A_r(P_r + P_{atm})$ (Barbarika). This equation is the mass flow of the gas exhaust times by the actual jet velocity of the exit with the flow area of the nozzle times by the different of the thrust pressure and the atmospheric pressure.

The image was taken behind the setup of the rocket. One of the group members who knows rockets was able to set up the rocket and insert the fuel into the chamber. The chamber was then secured on a stool with clamps and sandbags.

The camera settings included a full field of view that the lens provided. This was because the thrust distance was unknown by the photographer and the entire thrust needed to be captured. The

distance was about a couple yards for safety of the participants but close enough to capture a near image. A Cannon T1i rebel was set at 3200 ISO with 1/2000 shutter speed and 5.6 fstop. Even at this high shutter speed, there was still motion blur of the thrust because of the supersonic speeds of the rocket. This was the image captured with no cropping of Photoshop editing.

Reason for not editing this image because the entire image of the darkness and the view of the set up show the amount of light of the rocket and the magnitude of power this rocket is propelling. This image could have been cropped to only show the thrust but the cropped lost the impact of the sand bags. The entire setup shown gives the feel of a gas tank bursting. The only change I would have made if there was a chance to do two rocket set ups, so the camera could have been adjusted for more images to be taken and possibly a faster shutter speed.

Works Cited:

Barbarika, Henry . "Design criteria for rocket exhaust scrubbers." Research Triangle Park, N.C. :

Environmental Protection Agency, . (1978): p. 180-183. Print.