Capturing A Popping Balloon

Or … Learning How to Manage Frustration

Jay-Dee Purdie - February 7, 2025

The Physics

- A fully inflated balloon pops in less than 1/1000 of a second

- Stored potential energy from the stretched latex is suddenly released

- Rupture travels across the surface at speeds of up to 1,500 metres/sec

- A miniature shockwave is created by rapid release of tension and air

- The shockwave is what generates the sound

My First Attempts

- Without A Flash

  - Time the shutter release to the 1/1000 second that balloon pops

  - Using a shutter speed of 1/8000 second

  - Finding enough light

- With A Flash & Camera on Bulb Mode

  - Time the firing of the flash to the 1/1000 second that balloon pops

  - Use various flash speeds with and without strobe lighting

- Maintain an inexpensive balloon supply

My Second Attempts

- Take <u>many</u> short (a few seconds) movies with my Nikon camera

- Setting — 4K resolution at 60fps

  - Wanted 120fps at 4K but not available with my camera lenses

  - Could have tried iPhone at 240fps at a 1080p resolution … wanted 4K

- Basic editing of movie in Lightroom *(not Lightroom Classic)*

- Load Lightroom edited movie into Photoshop and export individual frames

- Clean up the ***<u>one</u>*** frame that caught the balloon popping

Future Attempts … *maybe*

- Fire the flash in a dark room with a Pluto Trigger (https://plutotrigger.com)

  - Set the camera on bulb mode

  - Connect the flash to a Pluto Trigger and set flash speed to 1/1000 second or higher

  - Aim a ruby laser beam at the Pluto Trigger

  - Drop the dart on the balloon such that it breaks the laser beam which then tells the Pluto Trigger to fire the flash

  - Adjust the delay by 1ms increments until I get it right *(someday)*

  - Stop when the frustration feels overwhelming or I'm successful

The Slow-Mo Guys

- Phantom Flex4K — 1,000fps

- Phantom T4040 — 9,300 fps

- Phantom v1610 — 27,450fps

- Phantom TMX7510 — 800,000fps

- Starting price … easily $100,000 & more

https://www.phantomhighspeed.com