

FLUIDS/ARCHIMEDES

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Austin Com. College, 1212 Rio Grande St., Austin Tx. 78701 jpcise@austincc.edu & New York Times , October 15, 2016 by Choe Sang-Hun , Example of applying Physics in Politics.

A 'Balloon Warrior' Subverts North Korea, Thousands of Leaflets at a Time



INTRODUCTION: Archimedes Prin.: Object are buoyed up by the force of the fluid displaced. These balloons are 14.5 ft. in radius and 39 ft. tall....barrel-shaped.

QUESTIONS: (a) Find volume of balloon? (b) Find weight W_{GAS} (in lb.) of hydrogen in balloon? , (c) Find weight B of displaced air ?, (d) Find maximum weight W_{BAGS} balloon is capable of lifting ?

HINTS: $V_{CYLINDER} = \pi R^2 h$, $D = \text{weight density} = m g/V = \rho g$, $\rho = \text{mass density}$, $g = 32 \text{ ft./s.}^2$, $D V = \rho g V = W$, Mass density of air = $\rho_{AIR} = 0.002377 \text{ slugs/ ft.}^3$, Mass density of hydrogen = $\rho_H = 0.00016341 \text{ slugs/ ft.}^3$

ANSWERS: (a) $V = 25,760.3 \text{ ft.}^3$, (b) $W_{GAS} = 134.7 \text{ lb.}$ (c) $B = 1959.4 \text{ lb.}$, (d) $W_{BAGS} = B - W_{GAS} = 1,827.7 \text{ lb.}$

Lee Min-bok, a North Korean defector, getting ready to release balloons with bags of leaflets to North Korea near the Demilitarized Zone. Credit Jean Chung for The New York Times

POCHEON, South Korea — Lee Min-bok's house, fashioned out of two shipping containers, is monitored by 12 police surveillance cameras. Dogs woof at any stranger walking up the dirt path. Plainclothes detectives check his mailbox and tag along wherever he goes to protect him from possible assassins sent by North Korea, which openly threatens to kill him. But that has not stopped him. **On days when the wind blows to the north, Mr. Lee,**

59, ventures out with his secondhand five-ton truck, hauling a large hydrogen tank to the border with North Korea, an hour's drive away. There, he fills dozens of 23-foot and 39-foot barrel-shaped balloons with the gas and lets them drift away.

The balloons carry special payloads: radio sets, one-dollar bills, computer memory sticks and, above all, tens of thousands of leaflets bearing messages that Mr. Lee says will debunk the personality cult surrounding Kim Jong-un, the youthful leader of North Korea. "My leaflets are a poison for Kim Jong-un's regime, because they help North Koreans wake up to his lies," Mr. Lee said during an interview at his home.

Sailing 9,800 to 16,400 feet above sea level, Mr. Lee's balloons waft across the world's most heavily guarded border, high enough that North Korean soldiers have little chance of shooting them down. Then his patented "timer" devices click, unfastening vinyl bundles.

Leaflets fall out like snowflakes over the North, where Mr. Kim struggles to keep his people under a total information blackout, blocking the internet and prefixing all radio and TV sets to receive only his government's propaganda-filled broadcasts. In South Korea, there are 50 "balloon warriors," many of them defectors from the North like Mr. Lee, who seek to breach the wall with leaflets. Mr. Lee is their godfather. When he started floating large balloons in 2005, with others following suit, he received credit — and blame — for reigniting the leaflet battle the two Korean armies had waged until it petered out with the end of the Cold War. He now launches between 700 and 1,500 balloons a year, each carrying 30,000 to 60,000 leaflets.