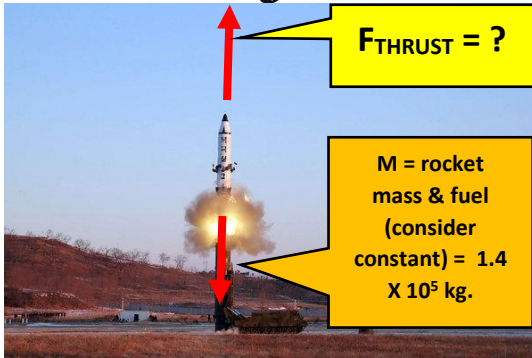


NEWTON'S 2ND LAW, $F_{NET} = ma$ Unit6 & 7, Dr. John P. Cise, Professor of Physics, Austin Com. College, Austin, Texas, USA jpcise@austincc.edu & New York Times , June 8,2018 by Choe Sang-Hun

North Korea Razes Missile Test Facility Ahead of Meeting With Trump



$F_{THRUST} = ?$

$M =$ rocket mass & fuel (consider constant) = 1.4×10^5 kg.

INTRODUCTION: These solid fuel rockets are faster to launch since their is no time needed to fuel as with liquid fueled rockets.Consider this Pukguksong rocket to take 10 s. to go from 0 to 100 m./s..

QUESTIONS: (a) Find launch acceleration? (b) Set up the working equation with Newton's second law. (c) Find $F_{THRUST} = ?$ needed to accomplish acceleration in (a)?

HINTS: $v^2 = v_o^2 + 2 a x$, weight = mg , $g = 9.8$ m./s.²

ANSWERS: (a) $a = 10$ m./s.², (b) _____, (c) $F_{THRUST} = \sim 1.512 \times 10^6$ N.

A photograph released by North Korea's state news agency purporting to show the launch of a **Pukguksong-2 missile** at an undisclosed location on Feb. 12, 2017. North Korea used the now-razed Kusong site to launch such missiles. SEOUL, South Korea — **Satellite imagery indicates that North Korea is razing some facilities used for testing one of its most dangerous missiles after its leader, Kim Jong-un, announced a moratorium** on nuclear and long-range missile tests, according to an analysis released this week. A "key missile test stand" that was used for testing missile ejections from canisters was demolished at a test site near Kusong in North Korea's northwest, Joseph S. Bermudez Jr., an expert on the country's weapons systems, said in a [report](#) published Wednesday on the website 38 North. The Kusong test site was being closely monitored by missile experts because North Korea **launched its first solid-fuel midrange ballistic missile, known as Pukguksong-2**, from there in February last year. Besides its intercontinental ballistic missiles, **solid-fuel missiles have been among the most worrisome additions to North Korea's growing arsenal of ballistic missiles. They can be launched faster and are easier to transport and hide, making them more suitable for surprise attacks.** Work to raze the missile test stand and nearby support structures began in the second week of May and appeared nearly complete in satellite imagery taken on May 19, Mr. Bermudez said. He said the stand was the only known facility in North Korea used for land-based, **canister-launched ballistic missile ejection tests**, which are critical for developing the solid-propellant Pukguksong-2 or longer-range systems. **Militaries use canisters to "cold launch" missiles, ejecting them high into the air before their fuel ignites. The North's Pukguksong series are cold launch missiles.If North Korea had indeed perfected cold launch technology, it would help the nation better protect its mobile missiles from environmental damage** while being driven around, and from fiery exhaust during launch. The **cold launch method** can also make missiles harder to **detect once fired. During a military parade in April last year, North Korea also showed off very large, apparently intercontinental, ballistic missiles encased in tubes or canisters, indicating that the North was also developing cold launch long-range missiles.** The significance of the removal of the test stand was unclear. Mr. Bermudez said it could not be determined whether North Korea was suspending missile ejection tests or was planning to build similar facilities in the future. Jeffrey Lewis, a North Korea specialist at the Middlebury Institute of International Studies at Monterey, Calif., [tweeted](#) that the test stand was used to test missile cold ejections, not for flight tests. He said he would strongly dispute the characterization of the facility as "key." Mr. Kim, North Korea's leader, announced on April 20 that he would **discontinue nuclear and intercontinental ballistic missile tests**, doing so as his government negotiated with Washington on holding a summit meeting with President Trump. North Korea invited outside journalists to watch the [shutting down](#) of its only known nuclear test site on May 24. The summit meeting is now scheduled to take place in Singapore next Tuesday. After a series of tests, North Korea declared late last year that it had mastered the ability to launch a nuclear missile capable of reaching the mainland United States. But its Hwasong-series intercontinental ballistic missiles use liquid fuel. Unlike solid-fuel missiles, liquid-fuel rockets have to be loaded with fuel just before launching, a process that can take up to an hour and make the missile vulnerable to a pre-emptive strike. "There is no rule of law in the country," he added. North Korea has been denounced as one of the worst human rights violators in the world, accused of extrajudicial killings, torture, chronic food insecurity, lack of freedom of expression and running a network of prison camps. Human rights groups are demanding Mr. Trump put human rights on his agenda when he meets with Mr. Kim