

Construction Meaning of *Bude Trieng* Toys (Rifles) in Physics: Traditional Toys

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Abstract. Physics is closely related to human life, without realizing we have implemented it in daily life such as when working, walking and other activities, not only adults but also children. When talking about physics we definitely think that physics was born from the west. Before the development of the west in the 9th Century AD, Physics was used in society, especially the people of Aceh. It is undeniable that technology has developed more rapidly now. Technology was created to facilitate human affairs. There are innumerable kinds of technologies. One example of a very popular technology is gadgets. Every person uses gadgets with modern technology such as smart phones, Children have now become active consumers in which many electronic products and gadgets make children the target market for their toys. Before the era of sophisticated technology one of the toys chosen by most children was the *Bude Trieng* (shotgun). *Bude Trieng* is marked by playing activities both by himself and other peer groups. i is one toy that quite safe and most popular with children. This type of toy is made from bamboo using paper bullets or *boh ram*. The method of application is insert *boh Ram's* bullet in the base of the *bude trieng*, the *ram* bullet fills the entire circle of the *trieng bude* hole, the air inside the *Bude trieng* will automatically be restrained and cannot come out. The air that is held in the middle of the *trieng bude* will produce pressure when one of the bullets is pushed and will make a sound from the *bude trieng*. The purpose of this research is to study the construction of the meaning of *bude trieng* culture in physics. The research method used was a descriptive qualitative research to describe the relationship between the *bude trieng* and physics.

Keywords: *Bude Trieng*. Pressure, Sound, Force.

INTRODUCTION

When talking about physics we definitely think that physics was born from the west. before the development of the west in the 9th Century AD, Physics was used in the community, especially the people of Aceh. Physics is the study of natural phenomena, without us knowing physics is very important in everyday life. It is undeniable that now technology has developed increasingly rapidly. Technology was created to facilitate human affairs. Various kinds of countless types of technology can be found in this modern era. One example of a very popular technology is gadgets. Every person uses gadgets with modern technology such as televisions, mobile phones, laptops, tablet computers, smart phones, and others. Children have now become active consumers in which many electronic products and gadgets make children the target market for their toys.

Childhood is still marked by activities both playing alone and playing with other peer groups. One of the toys they chose was like playing battles because Children really like playing battles. One of the tools used by children to play war, especially in the Kulam Baro village, Simpang Lhee, Sigli, namely *bude trieng* (bamboo rifles). The tools used to make *trieng bude* are bamboo, while the bullets used are *boh ram*.

The rifle (*bude trieng*) made of bamboo does not resemble the original rifle, called a rifle (*bude trieng*)

because it can fire bullets in the form of *boh ram*. when the bullet comes out of the bamboo snout (*bude trieng*) a gunshot will sound, so it's just like a real shotgun. *Bude trieng* (bamboo rifle) is a traditional toy measuring approximately 20-30 cm. this game is widely used in areas of remote area one of them baroque, Simpang Lhee, Sigli. The purpose of this study was to determine the relationship of the *bude trieng* (bamboo rifle) in physics. Of course this is the very unit of application of physics in children's toys long before the media, and sophisticated technology as it is today.

MATERIALS AND METHODS

Study area

The research approach is the whole way or activity carried out by research in carrying out noble research from the formulation of the problem to drawing conclusions. Researchers used a qualitative research approach with descriptive study types to be more focused and in line with the objectives of the study. The use of a qualitative research approach is based on the consideration that in the application of the *bude trieng* culture in daily life, it involves various aspects that must be explored more deeply.

RESULT AND DISCUSSION

There are several physical theories related to the trieng culture such as pressure, sound and force.

Pressure

Pressure is generally defined as the pressure divided by the area of the compressive field. Mathematically, the definition of pressure P of an object that is applied the force F on a surface whose area A is:

$$P = \frac{F}{A}$$

Where:

P = Pressure (pa)

F = compressive force (N)

A = area of press field (m²)

Because the force and area are measured in newtons (N) and square meters (m²) the unit of force is newtons per square meter (N m⁻²). In SI units 1 N m⁻² called 1 pascal (pa).

Boyle's law "the product of pressure and the volume of gas in a closed room always remains if the temperature of the gas does not change."

Mathematically can be written

$$P_1 V_1 = P_2 V_2$$

Where:

P_1 = initial gas pressure (pa)

V_1 = initial gas pressure (m³)

P_2 = final gas pressure (pa)

V_2 = final gas pressure (m³)

The effect of pressure and volume of gas in a confined space at a fixed temperature can be investigated with an instrument called a manometer. The amount of gas pressure in a confined space can be calculated by Boyle's law equation.

Sound

The sound we hear is a wave propagation. Sound waves propagate through the air medium. Sound waves in the air are longitudinal waves. Speaker vibrations produce variations in air pressure. Pulses resulting from the compression of air move away from the source of pressure after the compression of air passes, then the air molecules return to their original position, so when the waves propagate longitudinally the air molecules only vibrate and do not propagate.

Sound as a longitudinal wave can propagate through the three forms of matter, namely solid, liquid, and gas. However, sound waves cannot travel through a vacuum (vacuum). Sound propagates through a medium by transferring kinetic energy from one other chemolecular molecule in the medium. Sound propagation in solid media is faster when compared to propagation in liquid or gas. This is caused by intermolecular distances in

solids being shorter than in liquids and gases so that kinetic energy transfer occurs more quickly.

Dopper effect "if the sound source and the listener move closer to each other, then the frequency that occurs is greater than the sound frequency, whereas when the sound source and the listener move away from each other, then the frequency of the sound is smaller than the frequency of the sound source, which was first popularized by an Austrian named Christian johann doppler in 1803-1855.

In general, we can combine Doppler frequency equations into one of the following equations:

$$Fp = \frac{V \pm Vp}{V \pm Vs} Fs$$

The + sign for the listener approaches the sound source or the sound source moves away from the listener. Alert - for the listener to move away from the sound source or the sound source approaching the listener. Sound is a logitudinal wave produced by a vibrating object. The condition for the sound is

1. There is a sound source
2. The existence of solid, liquid, and gas propagation medium.
3. There is a receiver / listener within the range of the sound source.

In general, sound propagation in a solid medium is greater than in a liquid or gas medium:

a. Fast sound propagation in solids

Fast sound propagation in solids depends on young's modulus and density of solids

$$V = \sqrt{\frac{E}{\rho}}$$

Where:

v = fast sound propagation (m / s)

E = modulus young (N / m²)

ρ = density of liquid (kg / m³)

b. Quick sound propagation in liquid

Fast sound propagation in solids depends on bulk modulus and density of solids

$$V = \sqrt{\frac{B}{\rho}}$$

Where:

v = fast sound propagation (m / s)

E = Bulk modulus (N / m²)

ρ = density of liquid (kg / m³)

c. Fast sound propagation in gas

Quick sound propagation in a gas depends on the temperature and type of gas.

$$V = \sqrt{\gamma RT / M}$$

Where:

V = sound propagation speed (m / s)

γ = laplace constant

R = general gas constant (j / mol K)

T = gas temperature

M = the relative molecular mass of the gas

Force

Force is something that causes a change in an object, it can be in the form of pull and push. Newton's Law I "An object in a steady state or moving at constant speed, will remain stationary or will continue to move at a constant speed, unless there is an external force affecting it."

$$\Sigma F = 0$$

Newton's Law II "the acceleration of an object is directly proportional to the force acting on the object, and inversely proportional to the mass of the object". Mathematically can be written:

$$a = F / m$$

Where:

a = acceleration (m / s²)

F = force (N)

m = mass of body (kg)

How to make (*bude trieng*) is quite easy and simple, we only make bamboo rifles (*bude trieng*) and bamboo (*bude trieng*) bullet booster, bamboo (*bude trieng*) used to make the rifle parts are old bamboo (*trieng* that you know) but it is small and has a small diameter or diameter, the selected bamboo has a bamboo wall thick enough to withstand the pressure, this first bamboo is a bamboo rifle to place and fire aneuk Ram. After that the second bamboo is the bullet booster bamboo, the second bamboo (*bude trieng*) is made from a piece of bamboo (*bude trieng*) with a connection of a bamboo that is strong enough in the middle, the bamboo stems in the second bamboo must be about the size of the hole in the first bamboo (*bude trieng*), this bamboo stick serves to push the bullet to ram into the first bamboo. The length of the bamboo trunk (*bude trieng*) is reduced by approximately 2cm in length from the first bamboo, the goal is that the Ram's bullet that is pushed does not fall out of the muzzle of the rifle (*bude trieng*) and stops only at the end of the muzzle of the rifle (*bude trieng*). Picture 1. how to make (*bude trieng*):



Figure 1. how to make (*bude trieng*).

The way to play it is very simple, to be able to throw bullets first look for the Ram (bullet) in the fields or forests, the purpose is to use the ram as a bullet because

the ram is solid (hard) and small in shape can fill the entire circle of the bud hole (*bude trieng*) (rifles). The first Ram's bullet was pushed first by bamboo sticks (*bude trieng*) to the tip of the rifle (*bude trieng*) after that I just put the second Ram's bullet in the base of the *Bude trieng* (rifle), so before starting to shoot there were two bullets, one at the end and one was held by a rifle (*bude trieng*), because both Ram's bullets filled the entire circle of the rifle hole (*bude trieng*), then automatically the air inside the rifle (*bude trieng*) or in the middle of both bullets would be held and could not escape, the air held in the middle of the rifle (*bude trieng*) This will produce pressure when one of the Bullets is pushed.

After the tip and the base of the rifle are loaded with ram, push the bullet to the base of the rifle using a bamboo stick (*bude trieng*) then the bullet at the tip of the rifle (*bude trieng*) will immediately eject out and make a "tok" or "bletok" "as if a rifle (*bude trieng*) fired a bullet, After that, automatically the bullet that had existed at the base of the rifle (*bude trieng*) changed its position to the end of the rifle (*bude trieng*) then we just need to look for another ram bullet and enter at the base of the rifle (*bude trieng*) push until the bullet at the end of the shotgun comes out, and so on. The following Figure 2 of (*bude trieng*):



Figure 2. how to use *bude trieng*

The bullet at the tip of the rifle can be ejected and as if fired because in the gun or in the middle of both bullets there is air that is retained and cannot come out, and of course this will produce pressure when one bullet is pushed as mentioned above, in other words a quick push from bamboo sticks on Ram's bullet at the base of the rifle (*bude trieng*) result in the compression of space in the bamboo hole because on the other hand the other end of the bamboo is also blocked by *boh ram's* bullet, this causes the pressure inside the bamboo to rise while the space in the bamboo gets smaller, this pressure will force the bullet *boh ram's* was at the tip of the shotgun coming out quickly with a "bletok" sound. The longer the bamboo, the farther the *boh ram's* bullets can be ejected because the longer the bamboo, the greater the thrust that can be carried out by the hands of a *trieng* buddy player (rifle).

Relationship between Bude Trieng and Physics

When we put the second Ram's bullet in the head of the *bude trieng* (rifle), so before starting to shoot there are two bullets, one at the end and one from the shotgun (*bude trieng*), because the two Ram's bullets fill the entire circle of the shotgun hole (*bude trieng*), then automatically the air inside the rifle (*bude trieng*) or in the middle of the two bullets will be held and unable to come out, the air held in the middle of the rifle (*bude trieng*) will produce pressure when one of the bullets is pushed. Then according to the definition of pressure is the force divided by the area of the compressive field. Pressure is a physics term used to express the magnitude of the force per unit area. It should be noted that the force referred to here is the force which is perpendicular to the surface of an object. The effect of pressure and volume of gas in a confined space at a fixed temperature can be investigated with an instrument called a manometer. The amount of gas pressure in a confined space can be calculated.

Inside the trieng bude (bamboo rifle) has an air column so that when children play war there will be a "tock" or "blatok" sound because the definition of sound is a longitudinal wave produced by a vibrating object. The conditions for the sound are:

1. There is a sound source
2. The existence of a propagation medium (solid, liquid, and gas)
3. There is a receiver / listener within the range of the sound source.

A sound can be heard by humans because of its frequency which is between 20 Hz - 20,000 Hz (audiosonic). Not only humans, all living things can also hear a sound. Based on its frequency, sound waves are classified as follows.

1. Infrasound: sounds that have frequencies <20 Hz. This sound can be heard by animals such as crickets, spiders, elephants, dogs and dolphins.
2. Audiosonik: sounds that have a frequency of 20 Hz - 20,000 Hz. This sound can be heard by humans.
3. Ultrasonic: sounds that have frequencies > 20,000 Hz. This sound can be heard by animals such as bats and dolphins.

Sound waves include mechanical waves. Mechanical waves are waves that require a medium for propagation. The propagation medium can be liquid, solid, and air. Sound waves cannot travel in a vacuum. This is because the speed of sound wave propagation in solids is faster than in gas or air

When we force (push) a bullet, the position of *boh ram* will change which was at the base of the rifle (*bude trieng*) changes to the position of the rifle (*bude trieng*), such as Newton's Law I "An object is at rest or moving at a constant speed. will remain silent or will continue to

move at a constant speed, unless there is an external *Bude trieng* force affecting it.

Force is a force (pull or doronagan) that causes the object it engages will experience a change in position or position (move) and change shape. Force can also be interpreted as an attraction or impulse exerted by an object against another object. The pull has a direction that approaches the person or animal or object that is pulling it. Meanwhile, drive has a direction away from the person or animal or object that drives it. Besides having direction, force also has a value, then force is a vector quantity. Force can cause an object to change shape, change position, change speed, change length or volume, and also change direction. The size and strength of the force that we have to spend on an activity, depending on the type of activity.

The following types of styles:

1. Touch style

Understanding the style of touch is a style that is done must be done with touching or direct contact between objects that work on the force with objects subject to force.

Examples of touch styles are as follows:

- a. Muscle style is the force caused by the muscles of humans and animals.
- b. The spring force is the recovering force caused by an object experiencing compression or stretching.
- c. Friction forces are forces that arise due to friction between the surfaces of two or more objects.
- d. Engine force is the force caused by the combustion of fuel in the engine.

2. Style Not touch

Understanding the style does not touch the style that is done without any contact or a direct box between the objects that work on the force with objects that are subjected to force.

Examples of the style of no touch are as follows:

1. Magnetic force is the tensile or repulsive force caused by magnetic objects
2. Gravitational force is the force imposed by an object to pull another object towards the center of the object in question. For example the force of earth's gravity draws objects above the surface of the earth towards the center of the earth.
3. The electric force is the force exerted by an electric charge or electric current
4. Gravity or commonly called the weight of objects. The weight of an object is the gravitational force of the earth acting on that object.

CONCLUSIONS

Very related in physics, the proof is that when Bude trieng is applied there is a relationship between pressure, sound and force. Of course this must be symbolized in

the lives of children in developing creativity and innovation. And researchers hope that in the future Bude Trieng becomes a medium for physics education students not only learn theory but also simple practice of theory so students are able to understand how sound, pressure, and Force are said.

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