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# Evolution of Braking System

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***Abstract:*** ***Mechanical brakes all act by generating resistance forces, as 2 surfaces rub against one another. The stopping power or capacity of a brake depends more on the surface area of frictional surfaces as well as on the actual force applied. The friction and wear encountered by the operating surfaces square measure severe. Thus, the durability of a brake or service life between maintenance depends heavily on the type of material used to line the brake shoe or pads. They use levers or linkages to transmit force from one purpose to a different Most brakes unremarkably use friction between a pair of surfaces smooth on to convert the energy of the moving object into heat, though other methods of energy conversion may be employed***

## I. INTRODUCTION

Most of the brakes are use friction between 2 surfaces ironed along to convert the energy of the moving object into heat, though other methods of energy conversion may be employed.

For example the Eddy current brakes use magnetic fields to convert kinetic energy into electric current in the brake disc, fin, or rail, which is converted into heat. Still other braking methods even transform kinetic energy into different forms to stop a rotating flywheel.

## II. DRUMBRAKE

The hydraulic brakes contain a metal drum that encloses the brake assembly at every wheel. Two curved brake shoes expand outward to slow or stop the drum which rotates parts with the wheel. The term drum brake usually means a brake in which shoes press on the inner surface of the drum. When shoes maintain the skin of the drum, it's sometimes referred to as a clasp brake.

Where the drum is contact between the 2 shoes, similar to a conventional disc brake, it is sometimes called a pinch drum brake, though such brakes are relatively rare.

Figure (1)-Drum brake setup

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## III.DISC BRAKES

Disc brake, the fluid from the hydraulic brake cylinder is forced into a caliper wherever it presses against a piston. The piston successively squeezes 2 restraint against the disc rotor, that is hooked up to wheel, forcing it to slow down or stop.

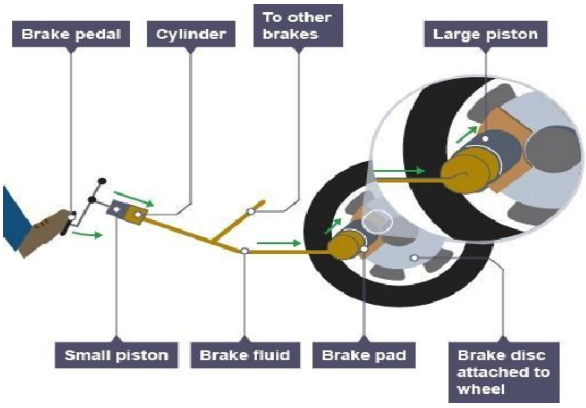


Figure (2)-Disc brake setup

### *A. Master Cylinder*

The master cylinder is hydraulic braking system is an intermediate component that work as an energy converter well as force multiplier mechanical energy is converted into hydraulic pressure The brake force needed before wheels is on top of that of real wheels to the shifting of mass from rear to front wheels throughout braking .This distribution of brake force between rear and front wheels is a function of master cylinder.

Figure (3) -Master cylinder

### *B. Brake DISC*

A hydraulic brake may well be a sort of brake that uses calipers to press the pairs of pads against a disc or rotor to create friction. This action is slow the rotation of a shaft, such as a vehicle axle, either to reduce its rotational speed or to hold it stationary

Figure(4)-Brake disc

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Materials considered for the brake disc

1) Carbon ceramics
2) Stainless steel 3213
3) Grey cast iron GG-204
4) Titanium alloys
5) Aluminium matrix composite

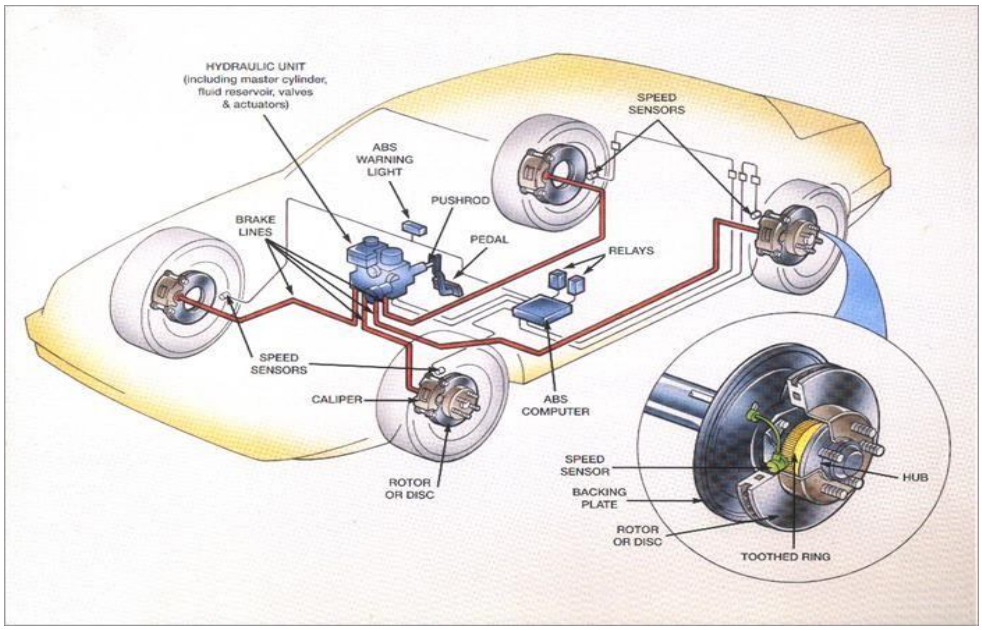
*C. Brake Caliper*

Brake calipers is a part of vehicle's braking system. Brake calipers squeeze the brake pads against the surface of the brake rotor to slow or stop the vehicle.The job of the caliper is to slow the car's wheels by creating friction.The brake caliper fits over the rotor like a clamp. Inside each caliper is a pair of metal plates bonded with friction material - these are called brake pads. The outboard brake pads are on the outside of the rotors (toward the curb) and the inboard brake pads on the inside

Figure(5)-Brake calliper

## IV. ANIT-LOCK BRAKING SYSTEM

An anti-lock braking system is also a security anti-skid braking system used on craft and on towards land vehicles, like cars, motorcycles, trucks, and buses. ABS operated by preventing the wheels from locking up during braking, thereby maintain tractive contact with the road surface.




Figure(6)-Anti locking braking system

*A. Components Used In ABS*

*1)* Speed sensor
*2)* Valve
*3)* Pump
*4)* Controller
*5)* Reluctor ring

## V. CALCULATIONS FOR WORKING OF BRAKES

Caliper and master cylinder which The are used from the TVS Apache RTR 180 bike. This is used due to our previous experience with the equipment and also its reliable performance at any given situation.

*A. Parameters*

γb=Rotational moment of inertia=1 to 1.05
W=weight
g=gravitational constant=9.81 fb =Braking force
fr =Rolling Resistance=0.0137 v=Initial velocity
ff =frictional force=μW μ=coefficient of friction=0.7 N=Newton
Mm =millimeters m/s =meter/seconds Kg=Kilograms
Master Cylinder diameter =13mm Caliper Piston diameter r=27mm Pedal Ratio=5:1
Maximum Force applied =50kg Force x g
=50 x 9.81 = 490.5N
Moment = Force x Pedal ratio
= 490.5 x 5 = 2452.5N
Pressure = Force / Area
= 2452.5/(π/4)x(13)2= 18.47N/mm2
Force applied by caliper = Pressure x Area
= 18.47 x (π /4) x (27)2 = 10579.127N
Braking Force = Force applied by caliper x 2x μ
= 10579.12 x 0.38 x 2 = 8040.13N

## VI. CONCLUSIONS

The anti-braking system has gone through a number of changes since its invention all the changes are aimed at improving its performance and safety. The advancement in technology has had a lot of contributions towards the improvement or implementation of the automobile braking system. For instance, the production of the anti-braking systems is a huge step towards improving safety of automobile braking systems. The opposed braking systems are created in such the way that they will sense associate degreed avoid associate degree at hand collision with an obstacle with none input from the driving force

## VII. ACKNOWLEDGMENT

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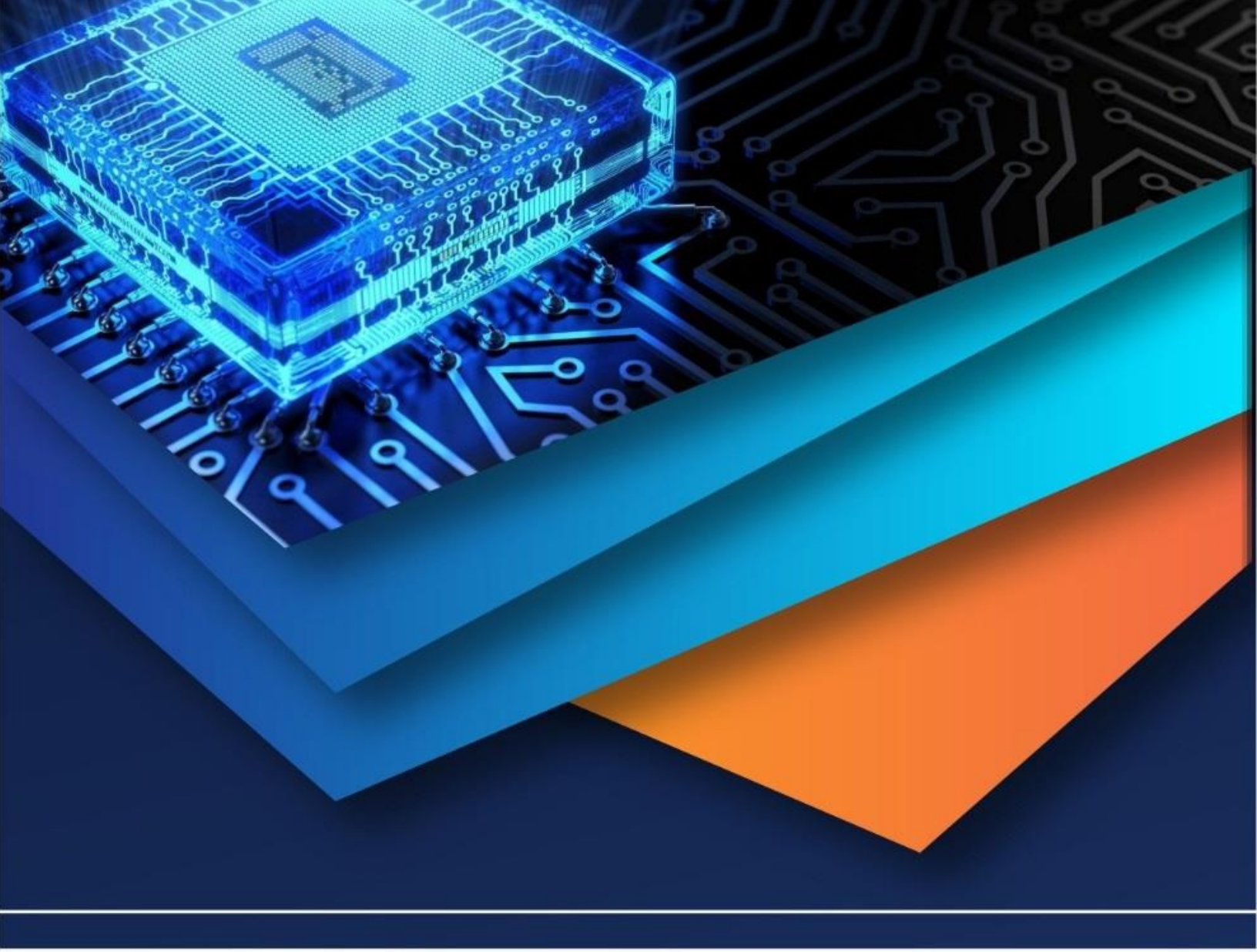
## REFERENCES

[1] Automobile Engineering R.B.Gupta. Brakes, classification andintroduction. Page no 9.1-9.6
[2] Kamaraju Ramakrishna. "Types of Braking system', Page no 190
[3] http://www.ignou.ac.in/upload/Unit-6-61.pdf Calculation of hydraulicforces
[4] http://tcachersites.schoolworld.com/webpages/M legacy brakes.pdf
[5] Joshua Pérez, Fernando Saco, Vicente MI lanes, Antonio Jiménez, Julio CDiaz and Teresa de Pedro, an RFID based (ABS) Vehicle speed controller



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