IJMTST is UGC Approved Journal with Journal Id: 43137

International Journal for Modern Trends in Science and Technology, 8(S05):23-26, 2022

ISSN: 2455-3778 online
DOI: https://doi.org/10.46501/IJMTST08S0605
Available online at: https://www.ijmtst.com/vol8si06.html

Converting a Non-ABS Vehicle to an ABS Vehicle

Prudhvi Gudiseva, Shanmukha Srinivas Gupta Nulu, Chaitanya Sri Venkata Sairam Kalvakolanu, YN Shyam Sai Peela, Venkata Raghavendra Rao Mullapudi

Department of Automobile Engineering, Godavari Institute of Engineering and Technology(A), JNTUK, Kakinada.

To Cite this Article
Prudhvi Gudiseva, Shanmukha Srinivas Gupta Nulu, Chaitanya Sri Venkata Sairam Kalvakolanu, YN Shyam Sai Peela and Venkata Raghavendra Rao Mullapudi. Converting a Non-ABS Vehicle to an ABS Vehicle. International Journal for Modern Trends in Science and Technology 2022, 8(S05), pp. 23-26. https://doi.org/10.46501/IJMTST08S0605

Article Info
Received: 26 April 2022; Accepted: 24 May 2022; Published: 30 May 2022.

ABSTRACT

This paper organizes of a conversion of a non-ABS vehicle to an ABS vehicle by changing the whole braking system including all the sensors with specifications of a new vehicle of the same vehicle but a different variant.We need to understand the mechanics of ABS. ABS stands for Anti-Lock Braking system. It is good when you are travelling in loose gravel roads or wet and slippery roads. It basically stops from locking your wheels when you press your break hard. The brakes do not jam the wheels, instead apply intermittent brakes say around 15–20 times braking/sec. Now because of this, the stopping distance on dry roads is much larger using ABS compared to Normal braking.Due to older version bikes doesn't have the latest gen of abs inbuild in it, we can upgrade it to abs so that the safety components of the new version bikes can also be equipped in the older version of the vehicles or low variant bikes.

1. INTRODUCTION

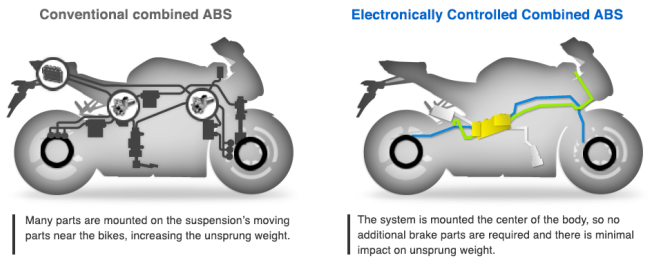
The concept for ABS predates the current structures that had been introduced in the 1950s. In 1908, for example, J.E. Francis brought his 'Slip Prevention Regulator for Rail Vehicles

The first right reputation of the ABS gadget came later with the German engineer Karl Wässel, whose system for modulating braking power became officially patented in 1928. Wässel, but by no means evolved a operating product and neither did Robert Bosch who produced a comparable patent 8 years later

By the early Nineteen Fifties, the Dunlop Maxaret anti-skid device changed into in sizeable aviation use inside the UK, with aircraft such as the Avro Vulcan and Handley Page Victor, Vickers Viscount and so forth.,. And later plane, together with the Vickers VC10, Hawker Siddeley Trident, Hawker Siddeley 125, Hawker Siddeley HS 748 and derived British Aerospace ATP, and BAC One-Eleven, and the Dutch Fokker F27 Friendship (which surprisingly had a Dunlop excessive pressure (two hundred Bar) pneumatic machine in lieu of hydraulics for braking, nostril wheel guidance and landing tools retraction), being geared up with Maxaretas widespread. Maxaret, whilst decreasing braking distances by way of as much as 30% in icy or moist conditions, additionally multiplied tire life, and had the additional gain of permitting take-offs and landings in situations that would preclude flying in any respect in non-Maxaret prepared plane.

In 1958, a Royal Enfield Super Meteor motorbike was used by the Road Research Laboratory to test the Maxaret anti-lock brake. The experiments confirmed that anti-lock brakes can be of top-notch price to bikes, for which skidding is worried in an excessive share of accidents. Stopping distances had been decreased in maximum of the tests in comparison with locked wheel braking, specially on slippery surfaces, wherein the development can be as an awful lot as 30%. Enfield's

technical director at the time, Tony Wilson-Jones, saw little future inside the system, but, and it changed into no longer placed into manufacturing with the aid of the agency.



2. Material and Methodology

Components

There are 4 predominant components of ABS: wheel pace sensors, valves, a pump, and a controller.

ABS pace sensors

Speed sensors (Encoders)

A speed sensor is used to decide the acceleration or deceleration of the wheel. These sensors use a magnet and a Hall impact sensor, or a toothed wheel and an electromagnetic coil to generate a sign. The rotation of the wheel or differential induces a magnetic discipline across the sensor. The fluctuations of this magnetic discipline generate a voltage within the sensor. Since the voltage induced within the sensor is a end result of the rotating wheel, this sensor can turn out to be inaccurate at slow speeds. The slower rotation of the wheel can purpose misguided fluctuations in the magnetic field and thus purpose misguided readings to the controller.

Valves

There is a valve in the brake line of every brake managed through the ABS. On some systems, the valve has 3 positions:

In role one, the valve is open; pressure from the grasp cylinder is surpassed right through to the brake.

In role, the valve blocks the road, setting apart that brake from the grasp cylinder. This prevents the stress from growing similarly need to the driving force push the brake pedal harder.

In function 3, the valve releases some of the pressure from the brake.

Partially disassembled four-channel hydraulic control unit containing motor, pump and valves

The majority of troubles with the valve device occur because of clogged valves. When a valve is clogged it's miles unable to open, near, or exchange role. An inoperable valve will save you the gadget from modulating the valves and controlling strain provided to the brakes.

Electronic control module

Pump

The pump inside the ABS is used to restore the strain to the hydraulic brakes after the valves have released it. A signal from the controller will launch the valve on the detection of wheel slip. After a valve releases the strain furnished from the person, the pump is used to restore the desired quantity of strain to the braking gadget. The controller will modulate the pump's repute on the way to provide the desired amount of strain and decrease slipping.

Controller

The controller is an ECU kind unit within the vehicle which gets information from each character wheel pace

sensor. If a wheel loses traction, the signal is sent to the controller. The controller will then restriction the brake pressure (EBD) and set off the ABS modulator which actuates the braking valves on and rancid.

In motors not geared up with ABS, the driving force has to manually pump the brakes to prevent wheel lockup. In automobiles geared up with ABS, your foot needs to continue to be firmly planted at the brake pedal, at the same time as ABS pumps the brakes for you so you can deal with guidance to protection.

You'll need to be travelling at more than 30kph because many ABS systems shut off as the vehicle gets below around 10-20kph and you'll need enough speed to feel it working. 40-50kph is enough. Drive in a straight line. Give yourself some margin on the left, then brake as hard as you can.

3. PROPOSED WORK

We replaced the non-ABS unit with an ABS characteristics unit in this experiment.

First, we determined the stopping distance of the vehicle without the ABS unit, then we replaced the entire ABS unit and began experimenting on it.

As part of the project, we obtained the measurements of an ABS unit and made an exact copy of its components.

Starting with the bike's disc and rim, and even the reluctor disc, the reluctor sensor is identical.

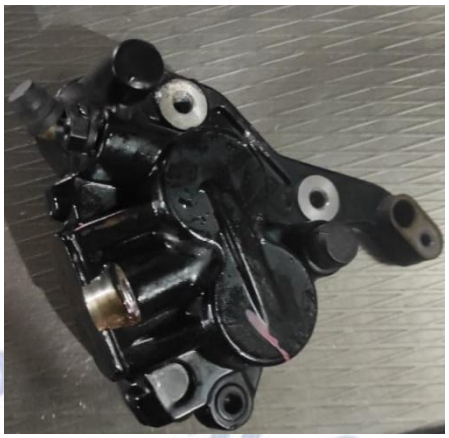
We make certain to achieve the same level of efficiency as the ABS unit.

As we can see, the stopping distance of the car increases as the braking effectiveness decreases.

We can deliver the same ABS effectiveness to vehicles with lower spec and older models and provide safety to them through this approach.

We used the entire equipment of a different variant of the identical vehicle for this.

We can only put one ABS unit for the front wheel on the old and low-spec vehicles.



4. RESULTS

In this project we installed the ABS unit to the vehicle and increased its breaking efficiency and also increase safety standards while braking.

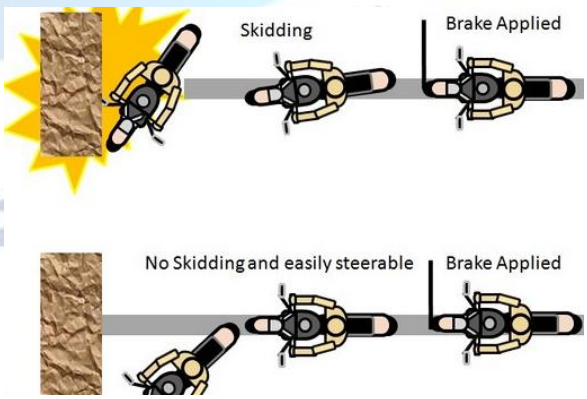
It's a life saver, ABS can save you many crashes. A nicely designed and calibrated ABS machine can brake higher than maximum drivers/riders.

In panic braking situations, even skilled and skilled riders might also squeeze the brake lever too difficult and slide, ABS prevents this and you may brake as tough as you want, ABS will reduce in before you lose traction.

You are capable to persuade the vehicle without dropping manipulate whilst braking.

You don't have the concern of dropping manipulate of vehicle. We all understand that 'Anti-lock Braking System' was delivered entirely, on motorcycles, to avoid dropping manage and crash by using skidding off at the asphalt so that it will stop-up in loss of life.

Allows the vehicle to haul some additional payload, because the momentum of the car can be justified with the aid of the intermittent pulses.



5. CONCLUSION

With development in a era in cars the braking gadget is getting increasingly superior.Antilock brakes assist drivers to have better manipulate of a vehicle in a few street conditions in which difficult braking may be necessary.In cars without abs,drivers who stumble upon slippery situations need to pump their brakes to make sure they do no longer spin out of manage because of locked up wheels.Antilock braking gadget coordinates wheel activity with a sensor on every wheel that modify brake pressure as essential,so that every one wheels are running in a comparable pace range.

Conflict of interest statement

Authors declare that they do not have any conflict of interest.

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