MotorTek-Case Study

Assessor Guide

Introduction

This exercise is designed to provide a criteria based framework to enable the assessor to assess the participant.

The participants would include the following in the form of a presentation:

1. A clear recommendation of three products
2. Point of view on why he/she recommends these product in terms of technology/resources available, market consideration and competition
3. Point of view on disruptive trends noticed in terms of technology/resources available, market consideration and competition that stopped him/her from recommending the remaining four products

A brief description of the products under consideration is given below.

1. Anti-lock Braking System

Introduction

Antilock Braking System (ABS) is a safety system that prevents the wheels of your automobile from locking up. When the vehicle continues in the same relatively limited pneumatic zone, traction is lost. This implies that no matter which way the wheels are pointed, the automobile will slide. The anti-lock brakes (ABS) ensure that the wheels do not lock up. This ensures that you maintain vehicle control. Many automobiles have anti-lock brakes (ABS), which improve handling and lowers stopping distances in wet and slick situations. Despite the fact that vehicle control has increased, ABS may increase braking distance dramatically in challenging terrains such as gravel and snow-covered pavement.

Potential Drawbacks of an Anti-Lock Braking System

The anti-braking system, like every other component of a vehicle's mechanics, has its own set of problems and downsides. ABS is most effective on level, clean surfaces, such as a typical asphalt road. They are frequently less effective on terrain with loose gravel, dust, or snow. This is due to the ABS system's penchant for misinterpreting sensor information and underreacting. It is likely why the ABS is turned off when the road is sloppy or loose. A locked wheel is more likely to engage the road surface and securely attach itself when racing off-road.

The government has made it compulsory for all two-wheelers, which account for the highest share of accidents in the country, to either have the anti-lock braking system (ABS) or the combined braking system (CBS)

The cost of two-wheelers is likely to go up between Rs.4000 and Rs.6000 as a result.

The ABS helps riders maintain stability without skidding while applying the brake The CBS distributes the pressure, applied on the rear wheel, to the front wheel minimising the possibility of a road accident.

Two-wheelers are the most vulnerable among road users. According to official estimates, in 2014, 29.3 per cent, (or about 40,000 users), of 1.39 lakh people killed on roads were two-wheeler users

2. Slipper Clutch

Introduction

Often, taking a sharp turn at high speeds might not be the ideal way of making a turn in general. Hence, you would rather slow down and shift gears to a lower ratio and then take a turn. But many a times riders do not have the time to do this in a critical situation. Thus, to prevent such scenarios from occurring, the slipper clutch was introduced. Most often, the primary usage of a slipper clutch is to prevent the engine braking force from transmitting via the chain to the rear wheel. But having a slipper clutch comes with advantages and disadvantages.

Advantages of a Slipper Clutch

There are several advantages of a slipper clutch over a standard clutch.

- The main advantage is that it helps in reducing the overall momentum and sudden forces inside the transmission, such that there are minor wear and tear inside of the transmission.
- The overall performance of the bike improves. There are no jerks and abrupt interruptions that might disrupt the functioning of the engine upon sudden braking of the two wheeler.
- Another key advantage of having a slipper clutch is that it helps in the overall prevention of rear-wheel lock up, engine seizure, and transmission failure.
- An interesting advantage is that it takes in most of the shocks and vibrations while cornering. This results in a less bumpy ride and the suspension adds on for extra comfort making the rise smooth and effortless.
- The rider doesn't need to concentrate more on the clutch while cornering but can take care of more important things such as cornering posture, braking through ABS, and so on. It helps in effective braking of the two wheeler.

Disadvantages of a Slipper Clutch

- The overall construction and installation of slipper clutches are quite complex. Some might be so complex that many manufacturers tend not to deal with it and provide standard clutches for their bikes.

- In general, they are expensive in terms of manufacturing and construction of the slipper clutch. And the cost doesn't include the reduction in wear and tear of the transmission, less suspension movement, and rider safety.
- In case of a vehicle with a really powerful engine, weaker brakes are a disadvantage. It might be safer to rely on a standard clutch to slow down the bike. With slipper clutches, that might only be possible if you tweak the transmission to provide higher level of braking capabilities, which defeats the very purpose of it.

What needs to be considered is how effective a slipper clutch can be when coupled with an ABS.

3. Traction Control System (TCS)

Introduction

Traction control system, which was once preserved for Moto GP is now being equipped in low powered motorcycles as well as scooters. The world renowned motorcycle manufacturer Piaggio's Vespa offers traction control system in its scooters. Motorcycle traction control system is considered to be an add-on safety feature which complements the Anti-lock Braking Systems (ABS). Motorcycle traction control system adds to rider safety during acceleration and cornering.

Traction control system prevents slip of tire when power supplied to tires overcomes the friction provided by road. Traction control system uses the ABS sensors to determine the relative speed of front and rear wheel. It actuates when the system observes slip in rear tire and decreases the rear wheel speed by retarding ignition timing, electronically adjusting throttle or by shutting off the ignition in engine cylinder (in multi cylinder engine).

The method of decreasing power supply is chosen by their manufacturers depending on the motorcycles. The chosen method affects the system price radically. This system requires various sensors and actuators. These components elevate the system's cost to a considerable level. Most of the motorcycle OEMs manufacture their own systems whereas others outsource it. Traction control systems are still limited to performance bikes, use of these systems are increasing and gradually moving towards lower capacity motorcycles as well.

Motorcycle Traction Control Systems Market: Drivers & Trends

Modern society's passion for riding big capacity motorcycles is increasing day by day and this results in the propelling of traction control system market opportunities around the world. Motorcycle manufacturers are focusing on improving power delivery in low capacity engines, which can cause the slip of rear tire or lift of front tire.

These possibilities spur the need of systems which can control power delivery and provide it at the time of requirement. As many countries have started mandating ABS in motorcycles, it is not too far that motorcycle OEMs will start adding traction control system in the bikes to provide better safety.

Moreover competitiveness is forcing manufacturers to add new features in motorcycles. Two wheelers are more prone to accidents as compared to other vehicles on road, and therefore

two wheelers need to be equipped with more safety features to prevent accidents. This necessity promotes the growth of motorcycle traction control systems market all over the globe.

Motorcycle Traction Control Systems Market: Restraints

Tires can also be improvised to increase the friction between road and vehicle, especially in low power motorcycles. These alternatives limit the use of motorcycle traction control systems. Besides alternatives, traction control system adds extra cost to manufacturers which cannot be overcome in economic motorcycles. Economic motorcycles share a relatively larger share of motorcycle market, and traction control systems are not an absolute requirement in low capacity motor cycles.

Motorcycle Traction Control Systems Market: Segmentation

Motorcycle traction control system can be segmented on the basis of engine capacity-Low capacity motorcycle under (under 500 CC) and High capacity motor cycles (above 500 CC). High capacity motorcycles have major market share by value.

4. Augmented Reality Helmets

Introduction

Helmets are an important component of bike safety equipment and these are becoming more advanced with their new features. Multiple helmets have been launched in the market that can be connected to your phone through Bluetooth. This latest bike technology has been introduced to make the rider's biking experience more smooth and hassle-free. With the help of this helmet, you may answer your calls and listen to navigation directions without taking your eyes off the road. It also eliminates the need of putting earphones on while riding. This new AR helmet will let you ride your bike without any distractions. This product has the potential to have a beneficial influence on the two wheeler industry due to its outstanding qualities.

Some advantages

An augmented-reality helmet could give a bike rider a 360-degree view of the road could help prevent accidents. They could come with features like front and rear cameras and a drop-down visor that can overlay live-streaming footage from the rear camera onto a rider's field of view.

The visor can also display proximity warnings, such as if a vehicle is overtaking the rider, and alert them to potential collisions by combining data from the cameras and ultrasonic sensors on the front and back of the helmet.

In addition, helmets can overlay GPS navigation information and journey statistics for riders who want to track their performance.

Some dis-advantages

Overall the cost of manufacturing these helmets would be high thus limiting the market for them

Finding the exact method for projecting video onto the visor can be a complicated and expensive proposition

5. Ride-By-Wire

Introduction

In the era of severe emission requirements, this bike technology adds value to riding performance and reliability. It accelerates the bike using complex electronic technology. Because of the rapid, high flow of air in the combustion chamber when a rider twists the throttle for powerful propulsion, the bike temporarily jams, resulting in inadequate ignition and a rough ride. Ride-By-Wire technology is employed to give seamless acceleration in this situation.

Precision management of the air/fuel mixture, improved fuel efficiency, fewer tailpipe emissions, and the opportunity to add cruise control and several riding modes that allow variable throttle response are a few of the benefits of the RBW (Ride-By-Wire) system. And, these advantages may have a favourable impact on the automobile business.

Advantages

Smooth Acceleration

Better Fuel Economy

Cruise Control is possible

Traction Control is possible

Variable Power Modes can be incorporated

Unlike a cable, the sensor doesn't make the twist of the accelerator hard in the due course of time.

Less chances of the sensor giving up than a Cable snapping due to age.

All these not only help in reducing rider inputs thus causing less stress, in many cases it also saves lives.

Disadvantages

Ride by wire sensor is expensive for to manufacture and is also expensive to replace. The cable is relatively way cheaper.

Since there is no physical contact involved between the throttle control and the throttle butterflies, there is a lack of feel. Thus there is hardly any feedback you get from the system. This poses some serious trouble for those use the technology for the first time.

The reduction in the mechanical aspect of the process incurs more dependency on the trained mechanics and specialized machines to not only troubleshoot but also to rectify the problem as it comes. Replacing the cable is a simple process and can be replaced by the rider, with the right tools.

6. Two-wheelers with Internet of Things (IoT) technology

IoT-enabled scooters are already prevalent, thanks to rideshare trends. Currently, IoT allows commuters to book a scooter at any location using a mobile app and they get a key to ride the scooter. Customers can also park the scooter at the parking station and pay for the ride through the same app. Such automated systems will only become more commonplace in the future.

7. Vehicle-to-vehicle communication

Introduction

V2V (vehicle-to-vehicle) is a communication technique that aids in crash avoidance. It makes use of VANETs (vehicular ad hoc networks), which are wireless networks that allow vehicles to communicate and share information about their driving habits. The data comprises speed, geolocation, braking, stability, and travel direction. This technology is critical for improving road safety by sending out incident notifications before a driver notices them.

It uses some of the most modern wireless technologies that enable autonomous vehicles to stay connected, namely Satellite-Based Global Positioning System (GPS), Inertial Navigation System (INS) and Laser Illuminated Detection And Ranging (LIDAR)

Advantages

Reducing accidents on the road because of crash prevention pre-warning

Vehicles having the opportunity to monitor and change their position/route etc.

Drivers being warned if they drift out of their lane

Slowing down if the vehicle gets too near to the other vehicles around them

Disadvantages

Privacy Concerns - Automated License Plate Readers (ALPR) can monitor and collect data involving automobiles that communicate with one another via V2V. If this data is hacked, it may jeopardize personal privacy and raise other security problems.

Security Risks - There are security concerns if the systems were to get hacked. Vehicle control could be taken over to some extent by the hacker.

Liability Issues - If the V2V communication system prompts result in an accident, determining who was at fault in the first place would be difficult.

Before a connected-vehicle transportation system can be fully effective, a few obstacles must be resolved. All vehicles on the road must be fitted with the technology, legislation must be enacted at several levels, and the issue of liability for automated systems must be addressed. Government involvement in setting up infrastructure is also required for V2V to be fully successful.