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Ride By Wire Technical Report

Academic skills

ACHA4005

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1 Introduction

The purpose of this report is to understand when and why Ride By Wire technology was implemented, how Ride by Wire technology works with modern day motorcycles and the pros and cons that come with it. It discusses advantages and disadvantages by also clarifying its use. It also expands on the background of ride by wire technology by discussing its history more in depth. It will also expand on fuel economy, price and traction control, and its dangers.

1.1 Justification

This report is needed to demonstrate an understanding of the subject matter and in turn ensuring that information written is being conveyed correctly.

1.2 Aims

The aim of this report is to better understand the place ride by wire technology holds in the market and to display the ability to execute a well written report which can be understood by the reader. It is there to provide better comprehension of why it may be needed or why people may prefer to use or not use it and the reasoning behind doing so.

1.3 Objectives

To show and prove development and understanding of the subject. To explain why ride by wire was implemented. To discuss advantages and disadvantages.

2 Background

2.1 The History Of Ride By Wire Technology

Yamaha first came out with the YCC-T Ride By Wire throttle on the 2006 YZF-R6 as a part of an upgrade, featuring a new engine management control (Rajkamal, 2016)

This was because of the new class of World Super Bikes 600 4 cylinders and 750 2 cylinders. Before the focus on the class, the bikes had around 90 brake horsepower (BHP) and weighed over 400 pounds dry. Factory teams started focusing on making race-specked road bikes as the class only allowed for minor changes from factory spec. Yamaha then remodelled its 1998 600cc bike (the YZF-R6) in 2006 making 25 more BHP and losing 42 pounds in weight while introducing the YCC-T Ride By Wire technology. (Hanlon, 2005).

The benefit of the Ride By Wire technology today is that it precisely delivers the air/ fuel ratio to the engine. This means it can bring down emissions, it can allow for better fuel economy, allow for cruise control, and the addition of rider modes (meaning traction control, wheelie control, power increase, extra) (Sadanand, 2019).

2.2 How Ride By Wire Technology Works

Ride By Wire Technology works by replacing the throttle cable with electrical signals, meaning that the mechanical motion of the grip throttle needs to turn into an electrical signal this is done with a potentiometer sensor. Sending a change in resistance to the electronic control unit (ECU). The resistance change can be either positive or negative depending on the bike. The change in resistance is usually between 1 and 5 Ohms. The signal is then sent to the ECU in order for it to process through traction control and any other system before sending the signal to the throttle body and the fuel injectors. This will allow for the butterfly valve in the throttle body to open to the correct amount and in turn for the right amount of fuel to be injected into the cylinders. The throttle position center attached to the throttle body again uses resistance to determine the position of the butterfly valve and feeding a signal back to the ECU ensuring there are no faults in the system.

3 Discussion

3.1 The Advantages Of Ride By Wire Technology

3.1.1 Smooth Acceleration

Smooth acceleration helps keep the rider comfortable and safe as being surprised by a sudden powerband mid-corner or anywhere can be dangerous, especially on high-power bikes.

3.1.2 Better Fuel Economy

As fuel prices increase riders want to be more and more fuel efficient, even though bikes use a lot less fuel than cars they still use a significant amount of fuel, there is always a way to save more money (RESEARCH, 2022), and Ride By Wire technology decreases the amount of fuel you need while keeping the power levels as high as possible.

3.1.3 Traction Control

Without traction control on higher power motorcycles heavy acceleration runs the risk of the bike may have the rear wheel slide out mid-corner, having the front wheel lift off the ground from a stationary position, mid-corner, or even in a straight line due to high torque or spin the rear wheel from a stationary position. (Lee, 2021)

3.1.4 Power Modes

Power modes can include Street/ Road Mode this mode is normally optimised for dry road conditions optimizing traction control, fuel economy for a smooth powerband, and a more fuel-efficient ride.

Rain Mode prioritizes grip over BHP and power this mode usually has the most amount of traction control and is best practice to be used in wet and slippery conditions.

Sport/ Dynamic Mode allows for the full BHP potential of the bike, this mode decreases the traction control and gives a more direct/ aggressive and connected throttle feel. This power mode is best used for more aggressive riding styles such as track riding.

Offroad/ Enduro Mode This mode found on mostly adventure bikes and Dulle-sport's, the throttle is more sensitive and direct. Traction control and bas are at a minimum and is meant to be used on off-road trails and less grippy roads. (Team, 2019).

3.2 The Disadvantages Of Ride By Wire Technology

3.2.1 Price

The sensors required for Ride By Wire Technology to operate are expensive also fixing any issues with the system has to be handled by a highly qualified mechanic meaning you cannot work on the system yourself and the price of maintenance goes up. (Sadanand, 2019)

3.2.2 Feel

some riders who enjoy the raw feeling a motorcycle gives them dislike the lack of feel/ feedback they get from the throttle. Because of there being no mechanical connection between the twist bar grip and the throttle bodies, there can be a feeling of disconnect.

3.2.3 Fake Confidence

It could be argued that many riders fail to remember (especially new riders) is that traction control will not prevent crashes. Traction control can make riders feel safer and add fake confidence to their riding thinking the traction control will be there to save them all the time. This results in riders being careless with the throttle and crashes accruing at higher speeds than if the bike did not have traction control. (Hinchliffe, 2019).

4 Conclusion

The justifications were to assess ride by wire technology and convey a fully written report discussing various topics in the subject chosen and to demonstrate an in depth comprehension of the background as well as discussing how it works and all that comes with it. In the background, the history of ride by wire was discussed by touching on the topic of how Yamaha first came out with the technology in 2006 for racing and also how the technology itself works regarding the sensors and the ECU. In the discussion, the advantages were discussed, for example, traction control, smooth acceleration, power modes and better fuel economy. Then the disadvantages were discussed, for example, price, feel and the fake confidence that comes with traction control. The summary of the findings was that ride by wire is liked and disliked almost equally by the community which leads us to believe there is no argument in the performance advantages but some riders would prefer to not compromise the feel for the power and efficiency that ride by wire technology brings. In conclusion, there are no results to say for certain that it is either bad or good it is simply down to the preference of the rider.

5 Reference List

Hanlon, M., 2005. *New Atlas*. [Online]

Available at: <https://newatlas.com/yamaha-introduces-ride-by-wire-motorcycle/4798/#:~:text=October%2031%2C%202005%20Yamaha%20recently,its%202006%20R6%20Supersport%20motorcycle.>

[Accessed 26 11 2023].

Hanlon, M., 2005. Yamaha introduced the ride-by-wire motorcycle. *new atlas*.

Hinchliffe, M., 2019. *Web Bike World*. [Online]

Available at: <https://www.webbikeworld.com/traction-control-key-safety/#:~:text=You%20can%20still%20crash%20with,riders%20careless%20with%20throttle%20use.>

[Accessed 26 11 2023].

<https://www.drivespark.com/off-beat/ride-by-wire-technology-explained-in-detail-019300.html>, 2019. *Web Bike World*. [Online]

Available at: <https://www.webbikeworld.com/traction-control-key-safety/#:~:text=You%20can%20still%20crash%20with,riders%20careless%20with%20throttle%20use.>

[Accessed 26 11 2023].

Lee, E., 2021. *motodeal*. [Online]

Available at: <https://www.motodeal.com.ph/articles/motorcycle-features/how-does-traction-control-work-and-why-do-you-need-it-your-motorcycle>

[Accessed 26 11 2023].

Rajkamal, 2016. *Drive Spark*. [Online]

Available at: <https://www.drivespark.com/off-beat/ride-by-wire-technology-explained-in-detail-019300.html>

[Accessed 26 11 2023].

Rajkamal, 2016. Ride-By-Wire Technology Explained In Detail. *Drive Spark*.

RESEARCH, D., 2022. *DYNOJET*. [Online]

Available at: <https://www.dynojet.com/blog/ways-to-make-your-motorcycle-more-fuel-efficient/>

[Accessed 26 11 2023].

Sadanand, G., 2019. *Bike Dekho*. [Online]

Available at: <https://www.bikedekho.com/news/what-is-ride-by-wire-throttle#:~:text=Benefits%20of%20ride%20by%20wire,which%20allow%20changing%20throttle%20resp>

onse.

[Accessed 26 11 2023].

Sadanand, G., 2019. What is Ride-By-Wire Throttle?. *BikeDekho*.

Team, C., 2019. *CarBikeTech*. [Online]

Available at: <https://carbiketech.com/riding-modes/>

[Accessed 26 11 2023].