

Experimental race motorcycle uses igus plastic bearings

Introduced in 1999, the Yamaha YZF-R6 was the world's first 600cc production four-stroke motorcycle producing over 100 horsepower in stock form. Since then, Yamaha has incorporated a number of upgrades to improve speed and engine performance. The R6 engine has also been used in the nationwide Formula Student race series, where university students design and build single seat racing cars that are then raced at the iconic Silverstone circuit.

Aymen Alshawi is a 22-year old with a masters in mechanical engineering, now working as an inspection engineer for ExxonMobil. He previously participated in Formula Student, and wrote his degree dissertation on suspension systems for racing cars. From that, he designed a version of a virtual differential based on the slip angles of tyres. Aymen became interested in motorcycle racing and researched how others had developed significant modifications for their motorcycles, including British inventor Norman Hossack, whose "funny front-end" design was a significant deviation of the traditional front fork and suspension system.

In May 2015, Aymen purchased a 12-year old Yamaha R6 track-bike and embarked on an ambitious project to design and build a new front-end for it. His plan was to use a double wishbone that would move in a vertical plane, allowing the wheelbase and geometry to remain constant for better feedback and grip. Aymen did not let the fact that he only had a licence for 125cc bikes deter him!

Aided by the university's computer and engineering programs including CAD, Finite Element Analysis (FEA) and front end design software, Aymen worked evenings designing and performing test simulations. Parts were then created in thermoplastic to ensure they fitted together, before milling took place. A number of bearings were needed for both the fork wishbones and the bell crank pivots, but the traditional metal bearings in the rod end introduced unwanted axial play. He contacted igus and purchased plastic plain bearings from the iglidur series, as they are more resistant to edge type loads and axial play.

In all, three iglidur J type flange bearings were used. “In addition to lowering axial play, the other reasons I chose these bearings were for their light weight, being simpler to use and they came at a lower cost than the metal bearings used in the previous version,” said Aymen Alshawi.

The igus iglidur J plastic bearings combine high wear resistance and excellent coefficients of friction. They boast extreme dimensional stability, even in moisture-exposed applications. In addition, they are 100% self-lubricating, maintenance-free, corrosion-free and wear-resistant in dusty and dirty environments.

Aymen has ridden the motorcycle at speeds of 140mph on a test track, but the project is still in progress. The suspension system was mostly finished in December 2016, and he has an estimated date for final completion by the summer of 2017.

– Ends –

About igus:

Based in Northampton in the UK and with global headquarters in Cologne, Germany, igus is a leading international manufacturer of energy chain systems and polymer plain bearings. The family-run company is represented in 35 countries and employs approximately 3,000 people worldwide. In 2015, igus generated a turnover of 552 million euros with motion plastics, plastic components for moving applications.

With plastic bearing experience since 1964, cable carrier experience since 1971 and continuous-flex cable since 1989, igus provides the right solution based on 100,000 products available from stock with between 1,500 and 2,500 new product introductions each year. igus operates the largest test laboratories and factories in its sector to offer customers quick turnaround times on innovative products and solutions tailored to their needs.

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For further information, please contact

Megan Campbell, igus

Tel: 01604 677240

Email: mcampbell@igus.co.uk

Mark Gradwell, Technical Publicity

Tel: 01582 390980

Email: mgradwell@technical-group.com