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The Development of Ducati Panigale 1299 Superleggera: lightweight design in the motorbike sector

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ABSTRACT

The purpose of the presentation is to show the development of Ducati 1299 Panigale Superleggera, an exclusive limited edition motorcycle that is the first production bike in the world to feature carbon fibre frame, rear seat frame, single sided swing arm and wheels.

First of all it will be introduced the Panigale product brief in order to understand the target of the original project launched back in 2012. Then there will be a brief explanation of the so called monocoque frame, one of the most effective new design concepts that allowed a consistent weight saving on the bike.

Moreover, it will be shown the 1199 Panigale Superleggera launched in 2014, the first limited edition motorcycle based on Panigale project. The challenging target on kerb weight was reached using magnesium alloys on frame and wheels and carbon fibre for the rear seat frame. The latest limited edition motorcycle, the 1299 Panigale Superleggera, is even lighter than its precursor thanks to the widespread use of composite materials on structural parts.

The development of those parts was done completely in house, sharing specific knowledge with Ducati Corse that has a long time expertise on composite materials. Dealing with composite materials, the design of the parts is strictly related to their manufacturing process so it was necessary to work together with the suppliers. Structural optimization, bonding design, temperature monitoring and heat insulation where also important to achieve reliability and stiffness targets, fulfilling a significant weight saving.

Keywords: Lightweight, Design, Aluminum, Magnesium, Carbon Fiber, Composite, Structure

Biographical Sketch



Leonardo Bagnoli has been in charge of Vehicle Simulation Dept. of Ducati Motor Holding s.p.a. since 2012. He joined Ducati Motor Holding s.p.a. back in 2007 and started his career as a structural analyst. He has gained particular expertise in the field of structural design, reliability assessment and innovative materials usage for structural applications. Now his team deals with most of the structural, dynamics, fluid-dynamics, NVH and optimization issues that are peculiar of motorcycles and cooperates with the other R&D Depts. in the development of production bikes.