

DOGMA 60.1



The Pinarello Dogma

The Idea

The behavior of a bicycle frame is strongly asymmetric. While the forces applied to the pedals are approximately equal, the offset of the chain to the right side means that the forces acting on the frame are asymmetric.

The Evidence

This phenomenon is simple to verify. At Cicli Pinarello this was tested with finite-element analysis and verified in laboratory testing. In both cases the flexural behavior of the frame was observed to be different laterally. Subjected to extreme loads representing a cyclist applying 1500 watts to the pedals, the frame shows a distortion of 2-3 mm on one side and only 1-2 mm on the other.

The Solution

This means that either the frame is too rigid on one side, in which case it can be made lighter, or too flexible on the other side, in which case it can be made stronger. Working with carbon fiber makes it relatively easy to modulate the stiffness by changing the type of fiber used, its orientation and shape. Frame designers know that the resistance of a section is much more dependant on its shape than on wall thickness. This concept is at the heart of the oversized tubes used on bicycle frames in recent years. In order to optimize frame behavior we must focus on the asymmetry of the structure's parts rather than on their thickness.

The Effect of the Chain

The forces acting on the pedals are roughly equal for the right and left pedals. The forces acting on the chain are therefore roughly equal from each pedal, but

are always applied to the right side of the frame. The result is that the overall deflection produced by these forces is not symmetric. This is because the pull of the chain is added to the right pedal force, but subtracted from the left pedal force. This is the reasoning for the creation of the Dogma 60.1, the first asymmetric racing bike!

Asymmetry

The asymmetry of the Dogma 60.1 begins with the chainstays, but progresses through the remainder of the frame as well as the fork. The right chainstay is smaller at the front end (near the bottom bracket) and grows larger towards the rear (dropout). Conversely, the left chainstay is reinforced on its front end, which is a very high-stress area, and grows thinner toward the rear. The right seatstay is larger and stronger than the left to counteract the forces acting on the bottom bracket area. The lower left of the top tube is reinforced as well and the right fork blade is noticeably larger and more angular in shape than the left. These are the regions that were determined to undergo the most stress from the asymmetrical pedaling forces and have therefore been strengthened, while other areas have been lightened. This creates a bicycle that is more "balanced" than possible with conventional techniques.

Carbon Fiber

The Dogma 60.1 is revolutionary in more than its asymmetry. It uses a new carbon fiber from Toray called 60HM1K with Nanoalloy. The 60HM represents a strength of 60 tons per square centimeter and 1K means each crossing is 1000 fibers. This carbon fiber is not presently used by any other manufacturer of road racing bicycles. Nanoalloy is Toray's answer to the dangers of carbon fiber fracturing from violent impacts such as crashes. The extraordinary Torayca Nanoalloy technology consists of self-repairing nano-particles embedded in the carbon fiber mesh that will expand on impact to prevent the fiber from fracturing. The impact performance of the 50HM1K carbon fiber as used in the Pinarello Prince is already 29% stronger than the most commonly used high modulus carbon fiber used in bicycle frames. The new 60HM1K carbon with Nanoalloy technology adds 23% to that advantage, giving a 59% improvement in resistance to traditional carbon fiber.

Construction

Pinarello has introduced the new Expanded Polystyrene System (EPS) into its production cycle to further increase the rigidity and tolerance of the critical parts of the frame. The EPS process is especially beneficial during manufacturing as it eliminates the imperfections that can form in critical areas when molding the frame. With the EPS method the carbon is laminated onto smooth polystyrene models, which are left inside the structure throughout the forming process. The EPS models melt from the high temperature required for the casting process and are removed afterwards. The result is a frame with smooth inside walls, free of flaws and with more consistent wall thickness.

The Dogma 60.1

The Dogma 60.1 is the beginning of a new generation of frames that will revolutionize the concept of racing bicycles. It is the first completely asymmetric

racing frame which represents the point of no return for fans of extreme performance. The asymmetry helps create a frame that is smoother yet stiffer, stronger and safer yet lighter and quieter on the road than any previous carbon fiber frames. The Dogma 60.1 in a 54 cm size weighs under 900 grams, nearly 90 grams lighter than the same size Prince. To top it off Pinarello introduces their finest paint work ever - Diamond Finish. The Dogma 60.1 is available as a frameset in 10 sizes as well as a complete bike with Di2 seamlessly integrated into the frame.

LIMITED EDITION BIKE
AVAILABLE AUGUST 14
\$TBD

FRAME SET
AVAILABLE OCTOBER 1