2011 FELT EDICT

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The goal was simple. Create the fastest full-suspension XC bike in the world.

Ambitious, sure. But what exactly does this mean? For Felt engineers, it meant throwing away all preconceived notions and starting from scratch. It meant designing an entirely new suspension system and frame that, together, would yield a specific set of performance characteristics determined by a team of athletes, engineers and product managers.

So what, specifically, were those desired performance traits? Generally speaking, speed, efficiency and agility. The Edict would have to be light and quick-handling to offer the competitive advantages that Felt’s pro XC racers demand. It would also require the stable, neutral feel of a trail bike that inspires confidence in the midnight lap of a 24-hour race.

In short, the Edict was created to make you a better rider. And to make every ride more enjoyable.

FAST is about efficiency. It’s about soaking up the terrain and keeping your tires on the ground for improved traction and handling. FAST suspension gives you confidence and control, and reduces fatigue over the long haul.

True, Felt already has an award-winning suspension system called Equilink. But just as we dedicate countless hours of research and design to creating different types of road racing bikes targeted at different types of riders and racing conditions, we believe every off-road performance bike deserves a higher level of analysis and engineering.

Other brands would have you believe one suspension system can work for all types of trail or riding conditions. But you wouldn’t use flat pedals and a full-face helmet for a long, grueling cross-country race, right? Or narrow tires and flat handlebars in the gravity park?

To meet the precise performance standards established for the Edict, Felt created an entirely new suspension system specifically for this bike, and this bike alone. It’s called Felt Active Stay Technology. Offering 100 millimeters of smooth, predictable travel, FAST delivers unmatched suspension performance in a lightweight, race-ready package.
The genius behind FAST is its simplicity. By creating a frame and suspension system that work in unison to achieve specific goals—namely, unparalleled XC speed, control and efficiency—Felt engineers were able to pinpoint their efforts. FAST makes the most of Felt's considerable experience working with cutting-edge materials and construction techniques, and utilizes the design of the frame to optimize the bike's overall suspension performance.

"FAST suspension technology embodies a light, stiff carbon fiber rear triangle assembly that doubles as a secondary spring assist to the rear suspension," says Felt suspension engineer Mike Ducharme. "This design not only eliminates the need for an additional pivot in the assembly, but also acts to hold the suspension at the optimal ride/race geometry. We were able to decrease the weight and increase efficiency by designing out unnecessary hardware and reducing unwanted suspension bob without sacrificing small bump compliance."

As Ducharme points out, one of the keys to FAST suspension technology is the innovative rear stays. The carbon fiber seatstay and chainstay work together like a leaf spring, offering just enough flex to optimize rear suspension activity. The whole rear end is custom shaped and engineered to provide both a stable pedaling platform and a smooth trail feel. It helps keep your tires on the ground when climbing or pedaling through smaller stutter bumps—situations where suspension affects traction—and adds just enough compliance to reduce fatigue over long efforts such as marathon or 24-hour races.

FAST takes cues from the single-pivot suspension design that performance-minded XC riders favor because of its light weight and reliability, and optimizes this tried-and-true system with a few new twists. It utilizes a set of carbon fiber stays that flex evenly throughout the suspension travel, providing performance characteristics that mimic the much more complicated four-bar suspension systems—but without the extra weight and complexity.

The stays are designed to be neutral (in their natural shape) at the "sag point" because that's where the bike typically rests under rider weight. The shock spring is supplemented by the design and material of the rear stay, which acts as a leaf spring, stiffening the latter part of the suspension travel. The slight additional spring provided by the carbon stay helps keep the suspension sitting at the proper sag point, which reduces small inputs from the rider that would cause unwanted bobbing from the suspension.

This design eliminates the need for a mechanical lockout or an overly damped shock that requires extra force to be "opened." The end result of all this: minimized bob without any harshness. Exactly what the XC racer, be it a short-track sprint fiend or an all-day marathon racer, demands in a bike.

The construction and mechanical aspects of the FAST system reveal an obsessive eye for detail. Every last fitting has been scrutinized and selected for durability and weight reduction. The links are aluminum, rather than carbon fiber, because Felt engineers felt the current available carbon link technology could be more susceptible to failure than aluminum.

The two main pivots feature sealed cartridge bearings for smooth performance, and there's a unique "link axle" system for the shock links that reduces weight by using less steel hardware and a hard anodized axle for the shock links' bearings to roll on. A "DU" bearing (similar to what is found in shock eyelets) and titanium axle are used for the less-stressed seat stay pivot. Besides shedding precious grams, this pivot construction proved its durability in testing.
MATERIALS: JUST THE RIGHT BLEND

You could call it an obsession. Felt engineers are constantly seeking the best raw materials for the job. Every application, every set of performance demands, requires a certain recipe. It starts with the best ingredients. No shortcuts.

But with a bike like the Edict, it’s not as simple as selecting a premium grade carbon fiber, machining a mold, and cooking up framesets. The athletes and engineers behind the creation of the Edict had very specific performance demands. One type of carbon fiber, even expensive premium grade carbon fiber, could never meet all those demands.

Instead, the Edict features a proprietary blend of carbon fiber materials—precisely layered and positioned in different areas of the frame to optimize the various properties of the different types of materials. It’s called UHC Ultimate+Nano.

Determining the perfect blend of materials to construct the Edict frame was a process two years in the making. Once the engineers settled on the optimal frame angles and tube shapes—criteria that would play a major role in how the bike would perform on the trail—the prototype phase began.

A series of test models was put into circulation to gather data and feedback in real-world riding conditions, each one featuring a slightly different blend of carbon fiber (see “Prototyping”).

The UHC Ultimate+Nano material used to construct the Edict’s frame features a high tensile modulus that makes it stiffer than the carbon fiber used in many mountain bikes on the market. This is a good thing. But this high-grade carbon fiber presented a challenge to Felt’s engineers because stiffness only represents one aspect of the Edict’s desired ride characteristics.

As with every Felt performance bike, a precise balance between stiffness, strength and durability was the goal. In addition, the Edict’s unique suspension system demanded a certain amount of compliance without sacrificing any of the bike’s “liveliness”. So a frame that was simply stiffer, or lighter, wouldn’t cut it. The goal was to nail all the characteristics that make this bike perform best when it hits the trail.
The frame material starts with sheets of unidirectional fiber (picture long, straight, black hair). These sheets, or plies, are made with proprietary blends of modulus (60T, 40T and 30T) and precisely positioned in the frame to take maximum advantage of each of the different material’s specific properties. For example, stiffer fiber plies are used in areas of peak stress such as the bottom bracket shell and down tube while higher-strength fiber plies are used in areas particularly susceptible to impact.

The sheets of carbon fiber are already “pre-impregnated” with an epoxy resin, and then plies are cut to the shapes needed to construct the frame. These plies are strategically laid onto specially shaped urethane mandrels. Once the lay-up is complete, it is placed into a symmetrically split CNC-machined mold (think of a waffle iron). An internal bladder is inserted, and the mold halves are closed and locked. The bladder is then inflated, pushing the carbon fiber firmly against the mold with a precise amount of pressure and heat.

The above process is pretty standard with most high-performance carbon fiber bikes, but Felt takes it a few steps further with the Edict. One of the key advantages of the new frame is a proprietary “Internally Optimized” molding process called InsideOut. By placing specially designed molds inside the frames during this process, Felt is able to eliminate any excess material inside the carbon fiber tubing (see below).

The next step of the process is Dynamic Monocoque Construction. This is the special technique Felt uses to join the individually molded sections of the Edict frame. Dynamic Monocoque Construction allows Felt engineers to optimize every section of the frame. By utilizing perfectly sized internal molds for different tubing sizes and shapes, they are able to maximize the effectiveness of the InsideOut process.

Finally, the frame sections are joined using a special co-molding technique. The individual sections are bonded together and then co-wrapped. Dynamic Monocoque Construction is considerably more complicated and expensive than other methods. But the ride quality and unparalleled strength make it worthwhile.

InsideOut technology with polyurethane inserts helps eliminate excess material build-up inside the frame and reduces overall weight.

Without InsideOut technology there is excess material build-up inside the frame.
All those hours spent on 3-D computer modeling, egghead engineering and industrial design were critical to the Edict’s creation—but it doesn’t end there. Even the most watertight designs require tinkering in order to perfect the way the bike performs in the gritty, unpredictable environment of off-road riding and racing. So as soon as Felt engineers got a chance, they took the Edict to the dirt.

This is the final and perhaps most critical phase: prototyping. A series of frames, like the one pictured above, was produced, assembled and ridden hard under real-world conditions. The new suspension design first hit the dirt in early 2008. From day one, the bike was meant to be suitable for World Cup-level XC competition, and that was the driving force behind its evolution.

Prototyping is always enlightening. It’s one thing to produce that mold from which the Edict frames will emerge, but it’s quite another to dial in the exact process by which the carbon is laid up. The production of each frame requires a huge amount of handwork that affects the way the bike rides. Adding or removing material from different areas of the frame goes a long way toward determining the bike’s weight, stiffness and strength.

This process allows Felt to walk the fringes of those hard-earned engineering theories. It provides a platform to experiment and test the extremes. Some frames are built to withstand more energy and abuse than any rider could possible produce. Others are built radically light.

Feedback from engineers and Felt athletes leads to adjustments in the lay-up schedule; each change affects the “feel” of the bike. Small changes in the lay-up schedule have major impacts on performance. Too much material, and the bike can feel “dead.” Too little, and it’s susceptible to flexing or cracking under extreme loads. Somewhere in the middle is that sweet spot that becomes the blueprint for Edicts that land on showroom floor—and, ultimately, on podiums of cross-country races around the world.
2011 FELT EDICT
TECHNICAL DETAILS

Frame weight:
1800 grams (w/o shock)

Frame material:
UHC Ultimate+Nano

Sizes:
S, M, L, XL

Rear suspension travel:
100mm

Front suspension travel:
100mm Sealed suspension pivot cartridge bearings and DU bearing combo

Steerer tube:
ControlTaper (1-1/8” top; 1-1/2” bottom)

Tire clearance:
26 x 2.2”

Seat post diameter:
30.9mm

Bottom bracket:
73mm

Rear axle:
135mm O.L.D. standard

Brakes:
International standard disc mount
Disc brake compatible drop-outs, seat stays and cable guides
Replaceable rear derailleur hanger

THE BOTTOM LINE
## GEOMETRY

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