DOMANE

THE SMOOTH ADVANTAGE

THE ALL-NEW DOMANE

A MONUMENTAL ADVANTAGE

In the realm of our sport, battles are won and lost each year in northern Europe on the historic cobblestones of Paris-Roubaix and Tour of Flanders. For more than a hundred years, this bitter landscape has annihilated road-weary heroes, who have charged like warriors into the fierce winds, blinding dust storms, and bone-jarring pavé for a chance at victory on the world's stage.

THE SMOOTH ADVANTAGE

Cobblestones are the great distinguisher in bicycle racing. They separate the craven from the heroic, exposing weaknesses in bicycle design and cyclists alike while rewarding extraordinary strength and engineering prowess. Whereas mountain ranges are the kingdom of climbers, cobbles are the territory of the peloton's strongmen. In 2013, the world watched as Fabian Cancellara raced Domane to twin victories in Flanders and Roubaix, cementing his place in history among the sport's greatest victors.

The first generation Domane, which featured Trek's proprietary IsoSpeed decoupler, was heralded as the smoothest race bike ever created. Now, to further honor the timelessness of these reverential cobbles and the extraordinary athletes who race them, we have created something entirely new.

The all-new Domane is born of these historic roads and built to respectfully challenge them with three groundbreaking technologies that will irrevocably alter the time-honored battleground of the cobbled Classics: Front IsoSpeed, adjustable rear IsoSpeed, and IsoCore handlebar.

With these three innovations, Domane delivers a new convention of race comfort and compliance. And the proof lies in performance. We developed and tested the new Domane with the Trek-Segafredo Pro Cycling Team at the source—on the fabled cobbles of the Arenberg Forest and the climbs of Flanders—then reproduced a 100-meter-long replica of this terrain in our Waterloo headquarters for further validation and testing.

The result of these efforts is a trifecta of astounding technology that dissipates vibrational energy better than any other race bike, providing a 14% increase in rear compliance at the lowest adjustment, 10% additional compliance at the front, and a 20% increase in vibration dampening over a stock carbon bar. Together, these technologies deliver a ride quality that until now was only a distant dream of the world's finest racers. No bike in the past or present is better suited for cycling's greatest demands, because no bike has ever equaled Domane's technology and capability.

The cobblestones of our sport's greatest races are the proving ground of the world's best equipment and racers. These roads have conquered all. Until now. The all-new Domane is a revelation in technology in performance, bringing a new standard of race comfort and ride quality to even the world's roughest roads.

DOMANE SLR 6 DISC Matte Trek Black/Gloss Trek Black

FRAME 600 Series OCLV Carbon, Front IsoSpeed, Adjustable Rear IsoSpeed

FORK Domane Full Carbon Disc **REAR DERAILLEUR** Shimano Ultegra

CRANK Shimano Ultegra **WHEELS** Bontrager Paradigm Comp Tubeless Ready Disc

FRONT ISOSPEED DECOUPLER

The innovative front IsoSpeed decoupler delivers the perfect smooth and balanced ride, so you can ride faster, longer, and stronger. By allowing the steerer tube to rotate independently from the head tube, front IsoSpeed provides an additional 10% of front-end compliance over a traditional road bike. Front IsoSpeed reduces hard hits and vibration without sacrificing efficiency or control.

ADJUSTABLE REAR ISOSPEED

Trek's IsoSpeed technology smoothes even the roughest roads, delivering an efficient and comfortable ride for increased performance and speed. Adjustable rear IsoSpeed allows you to fine-tune your compliance level to suit your ride style and terrain, providing both a stiffer and more compliant ride than the current Domane and a 14% increase in overall compliance when the slider is in the lowest setting.

ISOSPEED TECHNOLOGY

Trek's IsoSpeed decoupler, the keystone of the current Domane's race comfort technology, was the result of an 18-month study of how a racing bike performs over rough roads. IsoSpeed was proven to increase compliance and comfort while inspiring confidence in handling.

Trek never stops developing. The methods of improving upon existing and/or new technology are rider-proven and numerically validated.

Starting in January of 2014, Trek commenced an intensive 16-month study to address market reviews and rider feedback that communicated concerns that IsoSpeed technology is imbalanced as a bike system. Likewise, IsoSpeed does not account for various rider bike fits and diverse body masses to fully experience the technological intent. Trek's problem statement was thorough. "Devise a system solution or component solutions that produces customizable comfort which accounts for various human body types, a broader range of bike fits, and will allow a rider to achieve a greater comfort-inspired experience compared to the first generation Domane. Front and/or rear comfort customization will minimize the perception that the rear is comfortable and the front is harsh and shall be executed in either a visual or non-visual manner with test lab and test riding data to support the solution(s) for the rider. The solution(s), however, shall require no compromise(s) to the performance characteristics of the first generation Domane, other than system or component mass. These solutions will be developed separately and can function together or separately."

In a seven-month period, 33 ideas were brainstormed and three frames, two forks, and two handlebars were fabricated for proof of concept before the production project launched. These concepts went through rider evaluations, structural testing, and computer simulations to pare down to the best solutions. The end result of our efforts is a trifecta of ride smoothing technologies that changes the standard for race comfort. Introducing adjustable compliance technology, front IsoSpeed technology, and IsoCore technology.

"When I ride the Classics , you have a stiff frame, the comfort of the IsoSpeed, the handling and all the things that make me a better rider. The new Domane gives me everything I need for racing, performance, and to get the best out of it. And to be part of it, to build up the Domane, is so amazing and so special."

FABIAN CANCELLARA, Trek-Segafredo

Fabian, testing the new Domane prototype on the cobbles in West Flanders, Belgium. December 5th, 2014.

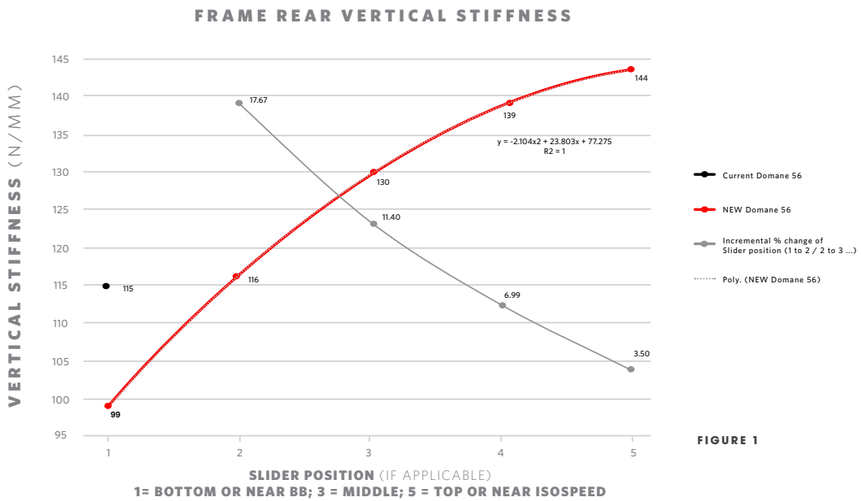

FIGURE 1

ADJUSTABLE COMPLIANCE TECHNOLOGY

Trek's adjustable compliance technology builds upon the renowned IsoSpeed decoupler that we all know and love. It is comprised of a pair of seat tubes, one integrated into the other to create a functional, beautiful form.

The two tubes are connected via the IsoSpeed decoupler (see Figure 2, location 2) and the bolted joint (location 6). In-between these two locations is a slider (location 4). The seat mast tube (location 1) utilizes the IsoSpeed decoupler to transfer the aft (or rearward) deflection of the upper seat mast to a fore (or forward) deflection of the lower seat mast. The vacant space (location 3) allows the lower seat mast to deflect in the fore direction while the main frame seat tube (location 5) remains independent from the lower seat mast. The slider contacts both the lower seat mast tube and main frame tube to limit the fore deflection of the lower seat mast per the user's preference. If the slider is towards the bottom (near the bottom bracket), a user will experience greater compliance because of the greater vacant space that allows the lower seat mast to deflect more. If the slider is near the top (towards the IsoSpeed decoupler), a user will experience less compliance because the slider is inhibiting deflection in the vacant space below it.

Test riding, instrumented test riding, and lab testing were among the validation procedures to inform Trek that adjustable compliance technology was performing as expected and allowing a user to adjust the compliance at the saddle.

Subjective test riding of the frame was overwhelmingly positive, and a noticeable compliance change was apparent when the slider was moved throughout its adjustment range. However, data collection was needed to further prove that the quantitative aspects were telling the same story.

In the test lab, vertical stiffness testing at the saddle shows that for a 56cm frame, the compliance ranges from approximately 99N/mm to 144N/mm throughout the slider's adjustment range. Figure 1 illustrates that the current Domane had a stiffness of approximately 115N/mm. This means that the new Domane is capable of more compliance and less compliance than its predecessor. Figure 1 also displays the incremental percent change as the slider is moved to the next relevant position. Movements in slider position from the bottom to middle positions have a greater effect on changes in compliance and movements of the slider

from the middle to top have a lesser effect on compliance. The compliance changes can be readily summarized as a quadratic relationship within the scope of Figure 1.

Trek also performed instrumented testing at Arenberg Forest that encompassed 43 tests at differing speeds and setups to further validate subjective test riding and lab testing. The figure below shows average peak-to-peak deflection between the rear axle and saddle gathered by strategically placed extensometer and accelerometers. Test lab results are in agreement with instrumented testing. The data show that the deflection captured on the first generation Domane is between the bottom and middle slider positions on the new Domane. Instrumented testing shows that about a 16% average change is experienced between the two positions. The test lab compliance numbers come in at a higher value of 23% between bottom and middle slider positions and overall change of 31% from bottom to top slider positions.

Figure 2:
1 – Seat mast tube;
2 – IsoSpeed decoupler;
3 – Vacant space;
4 – Slider;
5 – Main frame seat tube;
6 – Bolted Joint

FIGURE 2

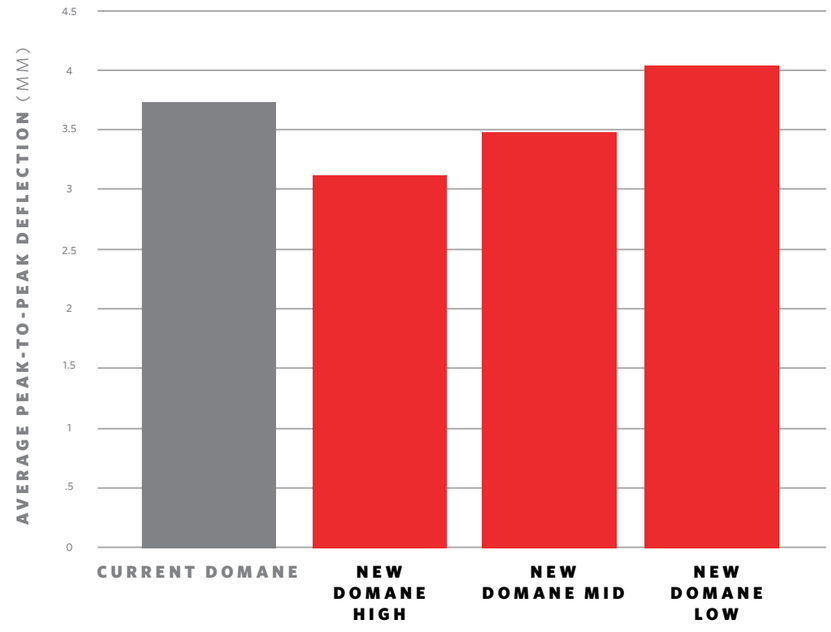

FIGURE 3

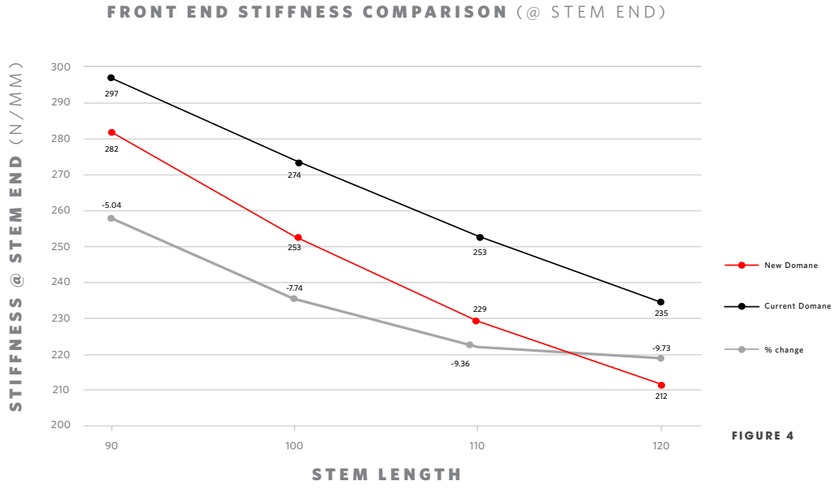

FIGURE 4

FRONT ISOSPEED TECHNOLOGY

The aim of front IsoSpeed technology was to utilize the frame's rear technology and apply it to the front end of the bike by isolating the steer tube of the fork to allow a rotational degree of freedom in the fore and aft direction. To help increase damping characteristics of the front end, a specially design upper head tube system was designed to allow this fore and aft degree of freedom for the steer tube to properly flex.

Again, Trek utilized the same methods from the adjustable compliance technology validation to confirm the Front IsoSpeed Technology. Figure 4 above shows stiffness at the stem faceplate of various stem lengths. It is quickly noticeable that stem length certainly has an effect on stiffness, but also that the IsoSpeed system provides a less stiff cockpit than the current Domane—anywhere from 5-10% depending on stem length. These results were leading Trek to believe that front IsoSpeed technology would be key to improved damping characteristics. The next step in proving this theory would be to run an instrumented bike over cobbles. Testing took place during the winter months in Wisconsin. Rather than traveling to gnarly cobbles, Trek fabricated an indoor 100-meter cobble track modeled after the cobbles of Arenberg. This allows Trek to easily test year-round in Wisconsin, take away any variation in the tire path over real cobbles, and quickly iterate and fine-tune designs.

The data collected in the 43 test runs on the replicated cobbles in our Waterloo headquarters prove Front IsoSpeed Technology offers an approximate 10% overall benefit over the current Domane.

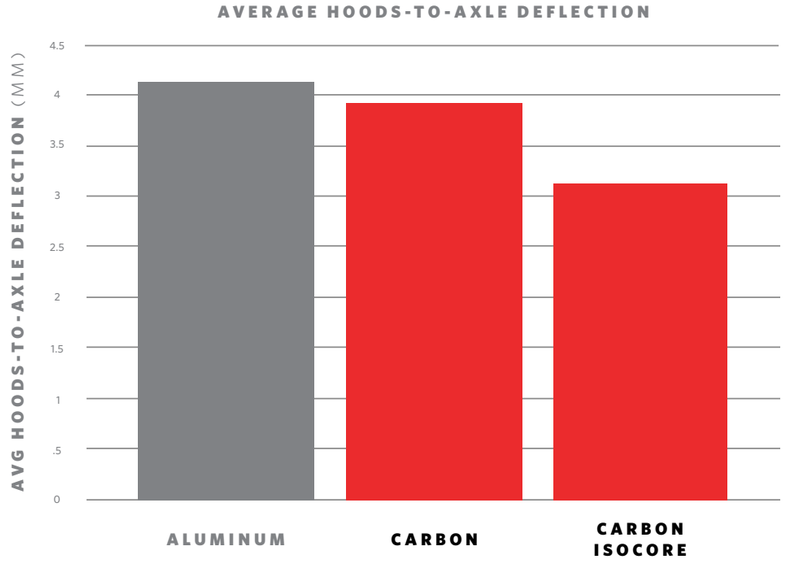

FIGURE 5

ISOCORE TECHNOLOGY

Working off of previous knowledge with the IsoZone Handlebar and a series of new test rides, Trek developed an IsoCore handlebar that combines sufficient compliance and established IsoZone pad comfort with a new vibration-damping system. A rubber compound specifically used for vibration-damping is included in the carbon layup at specific locations to optimize performance, creating a constrained layer damping system. This allows for the vibrational energy from the road to be efficiently dissipated before having a significant impact on the rider.

Figure 5 shows the vertical deflection of how various bars behaved while riding over cobbles. These tests, 38 in total, were conducted on a less severe cobbles texture. The data display that there is an obvious damping benefit in the IsoCore bar by comparing peak-to-peak accelerations that were numerically integrated twice to obtain deflection values. The tests proved the new IsoCore handlebar delivers a remarkable advantage over standard aluminum and carbon bars, showing an approximate 24% benefit over an aluminum bar and an approximate 20% benefit over a standard carbon bar.

BONTRAGER ISOCORE BAR

Bontrager's IsoCore handlebar improves damping of high-frequency vibrations. A continuous inner layer encased in OCLV Carbon reduces vibrations by 20% over standard carbon handlebars.

TREK
TREK
TREK

ADDITIONAL TIRE CLEARANCE

Additional tire clearance allows Domane to go where no road bike has gone before. Race, ride, explore. Domane SLR is available in caliper and disc brake options, which both have additional tire clearance. Adding to the platform's versatility, riders can now run 28c tires on Domane SLR and 32c tires on Domane SLR Disc, while still meeting CPSC and ISO clearance standards. Both bikes include hidden fender mounts. The caliper version features lightweight direct mount brakes, and the disc-equipped bike is furnished with 12mm thru axles.

FLAT MOUNT DISC BRAKES

All-new flat mount disc brakes are more elegant, lighter, smaller, and cleaner than traditional disc brakes, providing superior performance and stopping power under harsh conditions.

DOMANE SLR
8 SPEED

TREK
Shimano
TREK

DOMANE CONTROL CENTER

At the heart of the new Domane is an integrated control center that houses the battery port for electronic drivetrains. The control center is tucked into the downtube for accessibility, aerodynamics, and ease of use.

ISOSPEED FULL CARBON FORK

Lightweight full carbon fork with ride-tuned sweep and unique dropout placement provides 7% more compliance than a traditional road fork.

12MM THRU AXLE

12mm thru axles make steering more precise for more control, and the quick release feature makes wheel removal easy.

POWER TRANSFER CONSTRUCTION

Get the most out of every pedal stroke with Power Transfer Construction. This Trek innovation connects our exclusive E2 head tube and BB90 bottom bracket with a wide, ultra-stiff down tube that transfers more of your pedaling power to the road, for more speed out of every pedal turn.

OCLV

THE WORLD'S BEST CARBON

Nobody does carbon better than Trek. More carbon experience, more carbon engineers, and more in-house manufacturing capability make our OCLV Carbon the best in the world. Trek OCLV Carbon frames are the best in the world because we hold ourselves to the highest standards in the three key aspects of carbon manufacturing: quality, precision, and repeatability. Our passion for perfection means every carbon bike we make, no matter where or when it's built, is the best in its class.

IT ALL STARTS HERE

Two dozen years ago, Trek made the pivotal decision to engineer and manufacture carbon frames in-house, giving us complete control over the process. It was a huge gamble, with huge payoffs. Our homegrown, hands-on, control-freak approach has made us the industry leader in carbon frame advancements ever since.

QUALITY MATERIALS

The best frames start with the best raw materials, and Trek uses the finest carbon composites available. In fact, our US facility has industry-exclusive access to some highly advanced, strictly regulated strategic materials. We draw on our in-house advanced composite expertise to choose the best material for every application at every price point.

PROCESS CONTROL

Trek can do things with carbon no one else would even attempt, because we control every aspect of the design and manufacturing process in our US facility. We then control and drive these same factors in every facility where our carbon product is made, so we can be certain every Trek carbon frame meets our uncompromising standards.

INTEGRATION

Seamless integration of cables, electronics, and bearing interfaces requires intricate frame-shaping and incredibly tight tolerances that just aren't possible without an in-house carbon facility. It's why no one does integration better than Trek.

INNOVATION

We've perfected a long list of Trek-exclusive carbon innovations, all of which require the extraordinary process control and consistency afforded by our in-house manufacturing capabilities. When we transfer those innovations to our facilities worldwide, we bring unprecedented levels of technology to our entire line.

TESTING

Nobody tests like Trek. We install our own verification labs at each of our facilities worldwide and run our own frame tests for safety, durability, ride quality, and performance. We test as many times as it takes, often creating hundreds of iterations of a frame before we are satisfied.

THE RIGHT FIT IS EVERYTHING

The right fit dramatically increases your comfort, stability, efficiency, power — all the things that take a ride from great to perfect. Trek offers the largest range of sizes and fit choices on the market, so you'll find the right fit for your perfect ride.

ENDURANCE GEOMETRY

Stable but still racy, with a higher head tube for better control, handling, and responsiveness. Endurance Geometry is perfectly tuned for most riders looking to put in the long miles.

PRO ENDURANCE GEOMETRY

A longer wheelbase, lower bottom bracket, and shorter head tube length unite in the Pro Endurance Geometry to maximize stability and handling without sacrificing speed and responsiveness. Perfectly tuned to meet the demands of riders who prefer an aggressive out-front posture and require predictable handling over rough roads.

PROJECT ONE
BUILD YOUR VERY OWN DOMANE SLR
THROUGH PROJECT ONE,
TREK'S CUSTOM BIKE PROGRAM
trekbikes.com/projectone

TREK