



Last week I discussed some very general points when going shopping for a new bike. This week I will go in-depth on drivetrain options. Completely customizable, the drivetrain includes brake/shifters (Briifters), cables, front and rear derailleurs, crankset and chainrings, and cassettes.

Internally Geared Hubs

While many members will choose conventional or electrically shifted derailleur-based drivetrains, IGH has several advantages – especially for year-round commuters.

IGH uses planetary gear-sets very similar to the automatic transmission in your car. The gears in IGH are always in mesh and power is routed through the gear-set by holding or releasing different parts of the planetary gear-sets.

These hubs commonly have from 3 to as many as 18 speeds – all without using a derailleur.

Advantages

1. Gears can be selected anytime – even when stopped.
2. The gears are contained and remain clean and lubricated – perfect for winter commuting
3. Since there aren't any derailleurs involved, dropping a chain is almost impossible.
4. Adjustment is handled by cable tension. Viewing an indicator in a small window and using a barrel adjuster – which can be handled by the rider – tool free.
5. Service life is extended because dust, mud, snow, and water are kept out of the gears. Typical service intervals are – first oil change inspection and adjustment at 2000 km and then every 5000 km.



Disadvantages

1. IGH systems tend to be heavier than a typical derailleur system.
2. Customized gear ratio choices can only be made by either changing the chainring and/or hub sprocket. This means that all the gear ratios move up or down in unison.
3. Gear ratios are limited and may not suit the riding conditions you normally ride in, as well as your strength and conditioning.
4. Lubricant may need changing for winter riding. Higher viscosity “summer” oil may be too thick for winter temperatures.
5. NEVER clean an IGH with high pressure water. Water can be forced past seals and corrode internal parts. Since the rider cannot see the internal components, the water continuously circulates throughout the parts. This situation commonly results in almost complete failure of the hub – VERY EXPENSIVE.



Derailleur Systems

This system has been with us since 1937 and works quite well. A big change came in 1949 when Campagnolo introduced their cable actuated Gran Sport. Cassettes are commonly available in 7 to 13 speeds, in combination with a 1, 2, or 3 chainring crankset, provides all the ratios a cyclist is likely to need and can be customized to suit almost any cyclist.

Advantages

1. A clean well lubricated system is about 98% efficient in transferring power from the pedals to the road.
2. They are a much simpler system with a wide range of options as far as gear ratios are concerned. By changing chainrings and cassettes a huge number of gear ratios are possible, however it almost guarantees that there will be a few ratios that are duplicated.
3. Changing out parts to get a series of ratios is comparatively inexpensive.
4. Parts are commonly available in most bike shops.
5. Electric Shift systems have made missed shifts or dropped chains a thing of the past.

Disadvantages

1. All components are open to contamination by dust, water, snow, and mud - accelerating wear.
2. Maintaining a derailleur system is required more often. For Mountain Bike riders and Winter Commuters the almost continuous bath of water, mud, and slush, that may contain corrosive Calcium Chloride and Sodium Chloride, means a great deal of chain cleaning and relubrication. Ignoring service means extreme wear will result in a complete replacement of drivetrain components.
3. Adjusting the system is best handled by a service technician. However, if a cyclist has a good knowledge of how the system works, it is possible for the cyclist to do adjustments themselves.

Conventional 53/39 crankset

These cranksets are becoming increasingly rare in the recreational cycling community. While they do offer very fine cadence adjustment, perfect for road racing, their generally higher gear ratios demand a strong pair of legs to make good use of the entire range of gears.

Semi-Compact 52/36 (38) crankset

The spider on which the chainrings are mounted is smaller to accommodate the smaller chainrings. In some cases, a different front derailleur is required to lift the chain from the small chainring onto the large chainring. The advantage of semi-compact cranksets is that they give a lower set of gear ratios for climbing hills.

Compact 50/34 crankset

These cranksets offer almost the same range of gear ratios as a triple crankset, without the weight of a triple crankset. Triple cranksets also increase the chances of dropping a chain. The disadvantage of the Compact crankset is that the jump in gear ratios from one cassette cog to the next is greater. For a recreational rider these jumps likely will not be a problem. However, for road racing these jumps are too coarse and a rider can't find the right ratio to maintain their most effective pedaling cadence. One gear is too high while the next is too low.

Triple 50/39/30 Cranksets

Not as popular as they once were, the Triple Crankset offers the widest range of gear ratios and are perfect for loaded touring in hilly terrain. Some bike manufacturers have adopted Mountain Bike groupsets to get the lowest gears needed for a touring bike. These are heavier and more complex in terms of shifting and dropped chains are more common.

One-By Cranksets (1 x 10, 1x11, 1x12 and 1x13)

The One-By drivetrain eliminates the front derailleur entirely and the one chainring is usually smaller. Modern rear derailleurs, chains and gear profiles with pins and ramps, make it possible to shift these systems, even though the chainline is excessive. The full range of gears requires a very wide range cassette and derailleur that can take up the longer chain.

Electric Shift

Electric shift has been with us since 2009, however SunTour produced an electric shift groupo (Browning Electronic AccuShift) in 1990! These systems are really aimed at competitive cycling, but some of their features make them very attractive to recreational cyclists as well.

Some key features are:

1. Stepper Motors provides shifts that are very crisp and flawless.
2. Although we have grown used to letting up pedal pressure when shifting mechanical systems, these electric shift systems will shift even under extremely heavy loads
3. Shift buttons can be added to aero handlebars for Triathletes and on the hoods for Sprinters. Buttons can also be assigned and reassigned to suit the rider's preferences.
4. The system can relearn the position of the cassette – very handy for racing when neutral service offers a wheel that has a slightly different dish.
5. The front derailleur tracks the position of the chain on the cassette, so no more annoying chain rub on the front derailleur.
6. Systems offer a limp-in mode (a mid-range ratio) should the system fail.
7. Self-diagnosis will warn the rider if there is a fault in the system and technicians can troubleshoot the system via laptop and appropriate software.

Belt Drive

Belt drives have come into use and faded away several times in modern history. This system has been seen most often on single gear/fixed-gear bikes. They are attractive because they eliminate the cleaning and lubrication that a chain drive requires. They are also very quiet in operation.

However, they require an Internally Geared Hub (IGH) to achieve multiple gears and proper belt tensioning/alignment can be a bit fiddly.

What can the future bring to cycling drivelines?

Although the current drivelines are about 98% efficient, there are prototype systems on the horizon such as [Ceramic Speed's DrivEn.™](#) The problem with these systems is that drive torque must change direction (90 degrees) and higher friction is the result.

Bottom Line

Perhaps the biggest take-away from this is that there are a multitude of options available to the bicycle shopper and no one should feel that they need to compromise on their new bike. Work with your bike retailer to get just the right driveline that best suits your needs.

As you age your needs in terms of a driveline change as well. In your twenties riding up hills with a 53/39 crankset and a "dime-roll" (blitzkrieg/corn-cob cluster) wasn't a problem. Now, you may find that you are using all of your lowest cogs in combination with your 39 tooth "granny gear" and even that isn't entirely comfortable on some of the steepest ramps. Time for a change – don't fight it.

