

# Cycling Gear

# Contents

<b>Cycling Gear</b>	<b>4</b>
Helmets . . . . .	4
Gloves . . . . .	4
Glasses . . . . .	4
Mirrors . . . . .	5
Fenders . . . . .	5
Toe Clips and Clipless Shoes . . . . .	5
Shorts . . . . .	5
<b>Lighting</b>	<b>7</b>
Super LED Lamps . . . . .	7
Sound Signals . . . . .	8
<b>Weather Protection</b>	<b>9</b>
Safety Equipment . . . . .	9
Rain Suits . . . . .	9
Rain Capes . . . . .	9
Umbrella . . . . .	10
Handlebar Covers . . . . .	10
Tire Studs . . . . .	10
<b>Carrying cargo</b>	<b>11</b>
Panniers . . . . .	11
Handlebar Bags . . . . .	12
Saddle Wedge Bag . . . . .	13
Baskets . . . . .	13
<b>Trailers</b>	<b>14</b>
Bucket Panniers . . . . .	14
Pizza Delivery . . . . .	14
Cargo Mule . . . . .	15
<b>Anti-Theft</b>	<b>16</b>
Types of Locks . . . . .	16
<b>Tent Trailer</b>	<b>17</b>
<b>Generators and Dynamos</b>	<b>18</b>
Communications . . . . .	18
MP3 and FM Radio . . . . .	19
<b>Motor Assist</b>	<b>20</b>
Installation . . . . .	20
Bike types . . . . .	20

Magneto Electricity . . . . . 20  
Legal Motors . . . . . 21

# Cycling Gear

Cycling is such an expansive topic that even the equipment you can build or get to enhance your cycling experience deserve their own mention. You get what you pay for is true as always, just do enough research that you are not paying for expensive advertising and no company budget left over to make a good product. Don't be afraid to DIY or buy used. Used means someone else has already tested the gear for factory defects and durability.

If you are just short distance commuting or taking a ride through the neighborhood park all you need is a bicycle and a helmet. Beyond the easy rides on warm days you need to think about lighting for safety and illuminating your path in the dark, keeping comfortable on long rides, and carrying supplies and camping gear for extended tours or self supported cross country travel.

## Helmets

The most likely cause of fatalities and debilitating brain injury while cycling is head impact. New helmets, on average, reduce risk of brain damage by a factor of nine to one when compared to no safety equipment. Also, they can be purchased nearly anywhere bikes are sold. Make sure your helmet is adjusted correctly for it to be most effective. Helmets have a one crash expiry, so do not accept a used helmet for anything more than free, and replace it as soon as possible.

One of our editors was in a serious accident where she was struck by a car. The helmet cracked badly, but protected her skull. Although she still suffers a limited field of vision in one eye due to brain concussion, her helmet was the difference between collecting thousands of dollars in damages and occupying a coffin.

## Gloves

Padded gloves are primarily to ease the pressure point stress of a long ride and may add several hours riding to your day. We have had great \$5 gloves and miserable \$60 gloves try them on in the store and lean hard onto a demo bicycle or tricycle handlebars to see if the pads line up with potential sore spots on the heels of your hands, also inspect the stitching. Gloves can also protect your palms in case of a fall. Grazed palms are not life threatening, but sensitive and will annoy until they heal.

If your gloves have Velcro closures on their backs, you can slide a compass made to fit onto a wrist watch band over one of the closure tabs. This is a great location for the compass, away from metal but easy to refer to, and it will assist you when traveling on winding roads.

## Glasses

When on a long trip cycling glasses keep you from getting blinded when hit by bugs. For both prescription or riding glasses, "rain-x" type window treatment is useful as it will shed the rain from

them in all but the worst storms. Alternately, wood shop safety glasses have also proved effective, even in heavy rainstorms.

Cycling glasses typically come in wrap around lens type, and up to three sets of lenses - dark, yellow, and clear. Dark is obviously for sun protection but if you ride into a shady area can degrade your depth perception, clear is for speeding along at night or low light where you are worried about clouds of bugs or road pebbles, and yellow is for improved contrast on cloudy overcast days.

## **Mirrors**

Increasingly common for touring and commuter cyclists is using mirrors to view into your large rear blind spot. Mirrors mostly attach to glasses or helmets and are near to the eye requiring a quick side glance to see if a car is coming from behind. There are also mirrors which attach to the bicycle but bags and equipment may block these or they require regular adjustment from the bumps and grinds of normal cycling life.

## **Fenders**

Fenders are absolutely indispensable if you're going to be biking off-road, on mixed terrain, or even on roads in the rain. Getting yourself and all your gear wet and covered in mud isn't pleasant. Cold, wet you very likely means sick you, which is not something you can afford while cycling long distances. Mud kicked into the drive train isn't good for it either.

A set of fenders will set you back about \$20, or can be improvised from coroplast campaign signs and zip ties.

## **Toe Clips and Clipless Shoes**

Keeping your foot centered on the pedal will give you more power. Toe clips use a regular shoe and hold your foot in. Clips extend the length of your potential leg stroke and allow an upward stroke. However, they may also cause distress to your ankles over a prolonged duration of use.

Clipless pedal shoes (snap in) amplify the benefits of toe clips, giving a very firm lock to your pedals, and do not wear their soles when pedaling. But clip shoes often do not grip cement well when used for walking, so bring walking shoes or sandals. The steel locking lug right under the ball of your foot becomes uncomfortable with some shoe designs after a few hours on your feet. Get tough quality synthetic laces because cotton rots quickly when exposed to weather. Of course at least two pairs of laces is standard spare.

The difficulties with these pedals are small once you adapt. You may fall getting used to having your feet stuck down and getting out of both clips and shoe pedals requires a twist motion that will become very natural after a few days of use.

## **Shorts**

Some people like to show off their bodies by wearing only spandex and bike shoes leaving nothing to the imagination. While there is a minor wind drag bonus the main reason for the spandex is to prevent

chafing, draw away sweat which can cause rash, and to pad the seat contact areas. You can wear the bike stuff under shorts if you like, synthetic outerwear will leverage the ability of the underwear/cycle skin-tights to wick away sweat instead of storing it against the skin like cotton does where it can leave you raw. Shorts are available in several designs of varying conformal shape and with or without seat padding, the idea is that an 8 piece pair of shorts will fit more comfortably than a 2 or 4 piecer. Shorts have a waistband so choosing a one piece body with top or suspender straps eliminates the waistband which can dig in especially during long days of riding.

# Lighting

Attempt to always ride during daylight hours and rest once the sun goes down. But if you are going to be riding at night, it is very important that you work to make yourself visible. Reflectors, reflective tape, and lights are all helpful. Even with the best loud colors and lighting travel at twilight and sunset are fraught with danger for the cyclist, if you are going to ride into the night take a break during the hour or two where the sun is low on the horizon until dark.

A good, flashing LED tail light will help car drivers notice your bicycle when approaching. LED flashers cost very little and they will run a long time on a single set of alkaline batteries. Zip-tie them to your seat, seat post, backpack, or spend a little more for a proper mount.

To avoid theft or vandalized flashers, attach a red LED light to the rear of a helmet and a white LED flasher to the front. This places the light well within view, and where you can take it inside. If your tire blows out the light will help you work at night, and in case of an accident you will be easier more visible. But remember that large packs may block your rear flasher.

More powerful lighting for road illumination is needed at times, especially on unlit stretches of road. Most of these systems use rechargeable batteries charged with generator system or solar cell, Be careful, some generators output too much power when moving fast and could damage the cells.

A high power LED lighting system will illuminate the road for low speed riding, allowing you to save the high power light big downhills. The best high visibility cycling lights as of 2010 are the HID light system, which can last upwards of four or more hours on a charge with incredible intensity. However, these can end up costing \$400, so you can try making your own with the plans below.

Conventional incandescent lighting systems will not last as long on a battery charge. But you can rebuild a used standard cycling light system by replacing the rechargeable batteries. If you have access to a high power LED flashlight (this technology is ever-improving, common hardware stores now carry focusing zoom-to-spot 220 lumen lights) it could be affixed parallel to your steering using a plastic pieces meant for holding reflectors, which are then screwed together in the middle.

Even if your batteries die reflectors help keep you safer in the dark, Reflective tape, stickers, and reflectors should be in place on your bicycle spokes and white front and red rear on your bicycle.

In the last ten years reflective tape has become cheap and durable, so look for bicycle bags and riding wear with this reflective stuff sewn in. You can also get free reflective tape by finding out who makes road signs in your area, since the tape they use on signs comes in large sheets, there's always left-overs which can usually be obtained by asking or dumpster diving.

## Super LED Lamps

In the past the ultimate light for cycling was either an overvolted halogen or a high intensity discharge(HID) halide headlight. Both of these had issues, the halogen route required frequent bulb changes and large batteries, the HID required about 30 seconds warm up even if the shutdown was because of hitting a bump, there was no way to adjust the brightness, they are fragile, and they cost at least \$300. The systems could flood the street with light and there was no alternative until...

Now in the future we finally have the long promised option of high output LED emitters for our lighting systemsx. Cree, Luxon, and several other LED makers now produce LED's that rival HID systems for brightness and beat them on battery power savings and are in use by dozens of flashlight

and headlight makers. They are instant on and unless the heat sink system breaks free of the emitter they should last for 50,000 hours or more, they also can be set to sever brightness levels. If you are interested in making your own systems currently it is possible to find deals from Hong Kong and China for emitters, power supply systems, lenses, and heat sinks where it should be possible to retrofit existing systems or build your own. The biggest issue with store or DIY solutions is heat, the most powerful systems produce enough light to intimidate car drivers but they also create heat which must be eliminated through the heat sink into the light housing otherwise it will literally melt the solder on the circuit board. Currently the best systems are over \$300 but we expect that the price will drop as the profit margins drop on this inexpensive tech and we get back to paying for a durable mount and good battery pack.

Our advice is to get a good wide flood pattern beam for your handlebars so you can see the shadow of stuff in the road. A second powerful system should be helmet mounted but with a tight beam for illuminating into tight turns and zapping drivers who wont dim their lights.

LED systems also work well when you have a good dynamo system but you need to include over-voltage protection or fast downhill runs might damage your system. Many dynamo specific lighting systems also include a large capacitor to keep your lights lit for a minute or so when you are stopped in traffic. With a hub dynamo and LED system you will have a long life low drag super green always available lighting system that can also be tapped for things like charging your phone, GPS, or rechargeable batteries.

## Sound Signals

Invest in a loud horn or whistle in addition to your bell. Your bell is the best general signal for most situations since it is associated with bicycles, but when it comes down to it a second extra loud signal is needed when the polite bell just is not enough. There are several very loud bike horns readily available which use compressed air or canned gas, but survival or police type whistles are better if you need to signal constantly in an urban area, use only plastic if you live in an area where the temperature drops below freezing since metal might freeze to your lips.

In highly populated urban areas barking like a dog or even just yelling at jaywalking pedestrians works. Most people freeze when they hear you, giving you time to take evasive action, many people really assume you have a faster breaking range than a car so they need some warning.



# Weather Protection

It seems that some of the places with the best bicycle culture also tend to be quite rainy, especially in the winter, in any case if you do enough cross country travel you will get stuck in bad weather without anywhere to hide. The first rain after a long dry spell can mean danger for you as collected oils and dust mix with the moisture often making the roads very slick both for you and the two ton beasts traveling at upwards of 80mph around you, be extremely careful. Be watchful when stepping off the road during a storm especially when it is built on a raised road grade or has dry ditches and canals all of which are at risk for flash floods. Heavy rain can also loosen stones on cliffs and hillsides in mountainous areas or where the road has been cut into a hillside, be watchful for mud and stone avalanches. Sheltering under a tree is a risk for lightning and falling limbs during heavy wind, use common sense. If you see or hear a tornado, which are actually common only in the US central time zone region in summer, lie down in a ditch or depression if possible and wait it out.

## Safety Equipment

When it rains continue to wear your helmet and deploy your safety lights and flashers, rain will often render tire friction generators ineffective so have alternatives with fresh batteries. You can stay a bit drier by using a safety colored helmet cover or by putting your helmet over your jacket or cape hood, do not impair your side visibility though.

## Rain Suits

In North America the solution to weather protection is almost universally to wear a rain suit made from goretex or other expensive semi-permeable fabric and just deal with with the heat and sweat, adequate ventilation zippers especially in the armpit can help quite a bit with this problem.

## Rain Capes

The English have a cuter solution although by working like a sail it can really make it difficult to cycle on a windy day. The rain cape is essentially a small poncho which acts like a combination umbrella and tent when you are on your bicycle, the front corners attach to wrist straps or handlebar attachments and the back is connected by straps to the riders legs. You are effectively in a bottomless mini tent and you tend to stay cooler since your perspiration is not trapped inside a suit. This cover could be sewn from a normal coated fabric poncho keeping in mind bright colors since rainy days are already more dangerous. To stay dry with a rain cape you also need to have fenders installed and some sort of boot/gaiter to protect your lower legs, this should be easy enough to sew especially if you are using snap in cliplless pedals and shoes.

If you don't want to modify your tarp tent poncho or buy a special rain cape do what one of our engineering staff did, he rolled up the front to a comfortable length and attached the corners to to his

handlebar ends with rubber bands made from recycled innertube, then he rolled up the back, secured the corners with more tube-bands and after sitting on his seat to check length tucked them upwards through his belt. He reports that a light pack keeps the poncho off of his back which kept the sweat in his shirt to a reasonable level, his next test will be attaching a strip of furnace filter one inch thick and three inches wide to his upper spine and another across his shoulders to get better stand off and ventilation without wearing a pack. Another planned modification is to make a special quick release waist belt with straps to gather the excess tarp neatly, he also intends to use larger straps to gather the nearly foot long rolls which droop from where they are attached to the handlebars.

## **Umbrella**

In summer many areas are subject to short but heavy storms often including large hail, when traveling in areas like this it is safer to pull over and pop open a good wind resistant umbrella than try to bike in a powerful storm, big storms also tend to distract car drivers and reduce visibility so even the emergency lane may not be safe. Almost all of the cheaper umbrellas found in discount stores and Asian markets will tear apart or blow inside-out in a strong wind gust or thunderstorm. As a bonus you can use the umbrella as a sun parasol during a rest stop.

## **Handlebar Covers**

We have seen bicycle cops in winter with fleece lined hand covers installed on the handlebars, these keep the hands dry and warm up to the forearm while not interfering with dexterity should you need your hands quickly.

## **Tire Studs**

If you must cycle in packed snow or ice you will need studded tires. Commercial studded tire treads are rare and expensive, but they are very easy to make! Get a set of new or used 'fat' smooth road tread tires and a heavy duty tube. Every two centimeters carefully insert two wide head roofing tacks in to the tread. You will need to file the sharp edges on most tack heads, and it may help to run a strip of tape over them once they are installed, even after smoothing them off. Replace the tire and tube, inflate once, release pressure, and inflate again to get the tube properly aligned. This is important since even the smoothed off tacks will cause tube wear. Once the tire is properly inflated cut the tacks 1-2mm from the tread and then mount the wheel. But remember, even if you are under control in slick winter conditions, never assume SUV drivers are!

# Carrying cargo

For daily use a courier bag, backpack, or fanny pack will work better to transport cargo, as you can carry them when you lock up your bike outside. But for longer rides you can increase the usefulness of your bike by equipping it to carry loads. Front and back racks can be added and bags, called panniers, can be attached to the sides of these racks. These will allow you to carry more by using the bike's frame to shoulder the whole load, without encumbering your hands or straining your shoulders.

## Panniers

Pannier, or saddle, bags which attach to touring or cargo racks found on the rear and sometimes front of many bicycles. They are the way many cyclists carry gear on long trips although they can also be used for daily errands like bringing home groceries.

A bag similar in purpose to a pannier is called a soft trunk, it sits atop your rear rack, its advantage lies mostly in that it does not increase the frontal cross-section of your bicycle should you need to negotiate crowded streets or narrow areas, unfortunately most can only hold the volume of one regular pannier. Most rear racks can mount two panniers and a trunk bag.

It is advised by some to use a loading ratio with 60% of the weight on the rear panniers and the rest in front. Larger riders may prefer to put the 60% on the front wheel in order to save the rear spokes from additional stress, but loading the front forks will make the steering more sluggish.

Always balance the left and right panniers, as uneven panniers can cause stress on your spokes and bearings. Fitting of panniers is important as your panniers must not touch the ground in even the tightest turn, as they may tear or cause you to wreck. Rear panniers must be sized and located so as not to interfere with your heel when you pedal.

For 20" wheel folding bikes normal panniers may not even be an option on the rear wheel due to heel interference when pedaling. Mounting a rack and panniers on front will nicely dampen the natural sensitive turning of these small wheel folders but the racks we have used have a lower maximum weight rating than rear racks. A moderately sized soft-trunk type bag which attaches to the top of the rear rack can be used instead, some will require attachment to the saddle or seat-post with a strap or bungee cord for added stability.

When carrying heavy panniers regularly inspect the mounting screws and the attachment hardware for damage and wear. A rack failure could cause you to wreck on a steep downhill. Failure of attachment hardware could leave you going back and retrieving your gear while hoping it has not been run over by cars or picked up by strangers. We know of a case where a whole loaded tour pannier was lost negotiating a large curb without the cyclist noticing the loss until miles later.

Large items like tents and sleeping bags are often bungee corded down to panniers to save space inside. Be sure to leave room inside panniers for food and items you find along your trip, never leave home with fully loaded panniers. There is a temptation to overload your bicycle with stuff when you have big bags. But although riding loaded on level highway requires little extra effort, going up hills can become a monumental task with 20-40 extra Kg.

When buying think about water resistance, try to ride when it is dry, but remember that thunderstorms and rain can sneak up. Some bags are water-tight, other have optional rain covers. You can always use heavy trash sacks as bag liners and large freezer bags to line outside pockets.

Cheap luggage locks are surprisingly effective in preventing looting during quick trips into a store. On tour we often found one or two zippers opened and maybe a shirt or something hanging out or some small bit of gear stolen. After using the locks we had little trouble as it adds a slight difficulty. Try to keep your bicycle where you and the public can see it. Cable ties can also be used to securely attach panniers for extra security and as a failsafe for the attachment system. We kept our most valuable items in our handlebar bag and took that inside with us.

Before any trip especially with new bags or racks load up fully and take the bicycle out for a spin. Loaded bags attached to your bike can radically affect handling. Practice making emergency stops, hard turns, and avoiding obstacles. See if your lights and reflectors are blocked by your bags. Inspect the racks and bike frame mounting points for bad welds, cracks or wiggle, tighten the mounting screws, and inspect the bag mounting hardware every day but especially well after a long ride or a recent installation.

## Handlebar Bags

Handlebar bags can compliment your panniers on long trips or be used alone around town. In most cases you will want to carry high value objects or items you want to quickly access when taking a short pause. When you stop in town or take a break from touring and stop into a store your handlebar bag should detach easily and go in with you so it is not stolen or looted. As with your panniers you should think about water resistance should you get caught in the rain. Here are some items you might consider packing in your handlebar bag:

- Passport or ID cards
- Cyclist, travel, and health insurance cards(some auto policies cover cyclist caused accidents and injuries)
- Cash and credit/debit cards
- Pay phone calling cards
- Mobile phone (paired to a Bluetooth headset)
- Keys, including bike lock keys
- Maps (in clear map holder)
- Snacks
- Energy gel
- Radio or large MP3 player
- Water bottles(on sides)
- GPS
- Flat kit and small repair tools
- Pocket knife or multitool
- First aid kit
- Camera

- Notebook or journal and pen

Many people like to get a clear plastic map holder which attaches to the handlebar bag making navigating much easier, the top of your handlebar bag seems like a great place to put a compass or GPS as well.

One writer essentially uses her handlebar bag as her purse when biking. Along with bike tour stuff she carries a scrunchy, compact, comb, lipstick, and mascara in her handlebar bag. The makeup takes up no room and no matter where she stops when she walks in we quote "looking all fit and sexy in that tight biking outfit guys fall all over to give me great service" always a useful ability but even more useful for getting freebies on the road. For fun she also throws sandals and a short spaghetti strap summer dress in her panniers so she can go out somewhere nice at night.

## Saddle Wedge Bag

Some people only carry a pump, some water, and whatever fits inside the seat bag or seat wedge which attaches under your bicycle saddle. We once met a well off wage slave who had everything he needed for a 14 day cycle tour in his seat wedge; his tire repair kit, a bike multitool, a CO2 quick inflater, a cell phone to call a cab to take him to the nearest bike shop for bigger breakdowns, and his credit card so he could eat at restaurants, sleep in motels, and buy his way out of most problems. For emergencies we think an extra key for your bike lock and some emergency cash is a good idea even if you don't live a revolving credit lifestyle. If you leave the seat wedge on you bike expect to see it looted by kleptos, most are quick release so take it inside with you. If you keep a folded plastic shopping bag or stuffable ultralight backpack in there you even have a comfortable way to carry the seat wedge around as you shop or you can use the plastic sack to protect your bike saddle in the rain. Most seat wedges have a spot for a rear red LED flasher, use it!

## Baskets

Baskets are also effective for carrying stuff. You can get baskets that attach to the front or back of the bike and fold flat when not in use. Milk carton crates make some of the best heavy duty baskets when cable tied to your handlebars or tail rack.

# Trailers

For carrying larger stuff (like children and furniture), you might want to consider a trailer. These can be expensive, but you can also make one yourself. A trailer can be pieced together with plastic piping or electrical conduit, a pair of spare wheels, and a basket or plastic tote. For a trailer hitch, go to your local hardware store and get a quickrelease garden hose or air hose connection and a bit of hose. Rig up the connections to be used as a trailer hitch. For added safety, paint the trailer a bright color and put LOTS of reflective tape and a small red flashing light on the back.

Instructables.com has a number of plans for bicycle trailers and trailer hitches.

One company in Eugene, Oregon makes a hard shell suitcase for transporting folding bicycles that when unloaded and the wheels are attached becomes a bicycle trailer, they use standard hardware store parts and it is easily copied using a suitcase from the thrift store.

A two wheel stand-up shopping cart of the type used by retirees to take their groceries home is perfect for the cycle commuter. An extra handle is clamped or welded to the frame, this handle will end in a pneumatic hose fitting, the counterpart will be mounted to the frame of your bicycle for trailering. It will extend the life of your wheels to add greased brass or copper tube bushings to the plastic wheels or ball bearings, even unmodified wheels need lube or they will heat up and maybe even melt at bicycle speeds. When you get to the store lock up your bike, unsnap your cart and take it in for shopping. When you get home your trailer/cart comes inside with you. It's easier than car shopping!

A different type of bicycle trailer becoming very popular with cycle tour types relies on a different type of mount which attaches to your frame and only has one wheel. It is sometimes known commercially as a BOB trailer, but it can be welded almost entirely out of a recycled BMX type bicycle and a bit of steel tubing. These single wheel trailers are much more agile and do not greatly add to the width of your bicycle meaning that almost anywhere your bicycle can go the trailer can follow.

## Bucket Panniers

You can also make large panniers from square food buckets and attaching hooks to grab your tail rack, properly caulked these will survive even the worst rain storms dry. Check where your feet will rotate during pedaling when placing the buckets so they will not block your heels.

## Pizza Delivery

If you just scored some cash or have an understanding buddy at the pizza shop there is a way to get that pizza back to your guerrilla cell without using a car or letting the undercover FBI agents deliver it to your squat. If you have a cargo rack on front or back tie or bungee down a cross board as wide as the pizza box (remember your added width if traveling in pedestrian areas) when you get the pizza use string, clean recycled nylon stockings, or industrial cling plastic wrap to carefully attach the pizza box. If you can get a few extra of those "doll house table" anti cheese smash things they give in the delivery pizza box you can spread them out on your pizza, now you can wrap the box a little tighter or stack several boxes without ending up with all the cheese stuck to the lid. The more stacked pizza boxes you

get the better this works to about five boxes, smaller diameter pies work better with this system. Don't stack anything on top of the pizza boxes, hang drinks from the handlebars or stick them in a basket.

## **Cargo Mule**

The Viet Cong made using a bicycle for cargo transport famous by traversing the Ho Chi Minh trail transporting their war supplies south at times almost exclusively with heavy laden bicycles.

Your bicycle becomes a push wagon and you have to walk. Try to balance the load as best as possible since it will be difficult if a very heavily laden bicycle were to fall over. Watch for bags or containers that might rub against your tires or spokes destroying your wheel and cargo.. Several hundred pounds could potentially be carried, nearly every adult bicycle is designed at a minimum to support over three hundred pounds of human rider. Attach a pole tightly across the handle bars to help steer, keep the brake handles reachable if you are in hilly terrain. Two pushers are better than one for balance. With loads over two hundred pounds be careful when using a bicycle with shock absorbers so they don't overload, be sure to have the tires at full inflation to prevent damage, and that the spokes are tight and aligned.

# Anti-Theft

## Types of Locks

A good lock is an important investment. 3' of hardened steel chain and high security lock gives options when securing your bike, and they're more affordable than a D lock (aka U-lock). If at all possible, get a lock that uses a disc tumbler lock. Tubular locks are more easily bypassed and will generally be used in poorer quality bike locks. The best place to carry a chain lock is in a pannier or basket. If you need to 'wear' the lock, then wear it around your waist. Wearing the chain across your chest may look 'cool' but in a crash can easily break your ribs and possibly puncture a lung.

Wearing a u-lock is easy; mini u-locks can fit into a back pocket. Another popular option is to place the lock in the space between your belt and pants waist band. We have seen a u-lock belt holster that is pretty easily replicated if you can sew, it is made from recycled seat belt strap with two loops to slide a belt through and then strap parallel to the belt to stick the lock into. Wearing the lock is not always comfortable for long rides, many rear cargo racks have space for a U lock to slip into otherwise most locks come with a clip and strap system to attach to the frame.



# Tent Trailer

This trailer system is not as lightweight as a hammock and tarp system for cycle campers but it provides a trailer and shelter for those who must carry all of their possessions with them as they move and also want a quick comfortable shelter without needing to find trees, or level ground to make camp. The tent-cot-trailer was originally designed as a temporary measure to house the urban homeless. It should also serve as an outwardly aesthetic alternative to stealth camping for cross country travelers.

An excellent platform to use a base for your DIY trailer is a lightweight folding cot. You will need to attach a trailer tongue to connect to your bicycle. Many people like to use an air hose connector so it is easy to quick release. You will also need to properly attach an axle and wheels in a way that they can easily be removed to convert back to a cot. Perhaps the best source for an axle is from a discarded jogging stroller. Often these bicycle type wheels even have a push button release. When attaching the wheels you will need to reinforce the light aluminum frame with some steel electrical conduit where it will be attached to the axle so the aluminum is not deformed when heavily loaded, reinforcing the trailer tongue attachment point would be advisable as well. Be careful if using U-bolts not to over-tighten them. Folded down this trailer is easily loaded with food, fuel, and camping supplies. Secure everything using straps and a tarp, a large tied down duffle bag, or camping backpack, unload and unfold at nightfall and you have a comfortable sleeping cot anywhere.

An inexpensive dome tent can be modified to fit the cot trailer. Try to find a tent with a footprint as close to but if not exact then slightly larger than your unfolded cot/trailer so you can hem it smaller. Measure and pin the tent to be sure your estimates were right, then mark and take in the excess fabric by sewing a pleat with a sewing machine and good thread reducing the wall size to fit the cot, using seam seal on the new seam to prevent leaks. You might need to remove or reduce the size of the tent floor. The pole length might also need to be changed. Secure the corners of the tent to edges of the cot.

If in an open area where strong winds are possible, leave the trailer hitch attached to your laid down bicycle so it will act as an anchor to prevent the tent-cot from blowing away. Heavier winds will require stakes to be pounded into the ground as anchors.

To get some ideas for your design, check out these links:

- <http://freeyourbike.blogspot.com/2006/09/bicycle-trailer-camp-bed-many-folk.html>
- <http://www.tonystrailers.com/mobileshelter/>
- <http://www.carryfreedom.com/bamboo.html>
- <http://www.flickr.com/photos/saholm/816119809/>
  
- <http://www.flickr.com/photos/therollinrev/2111022319/>

# Generators and Dynamos

^Jmage:BikeCharger.png

A bicycle generator or hub dynamo can be used to charge most gadgets needing less than 6 volts. Hubs are almost always of better quality, last longer, don't eat your tire tread, and have less drag while in use; the downside is you have to have the spokes removed and new shorter ones installed to add a hub dynamo. Output is almost always AC power so you need to make a bridge rectifier with diodes to get the power flowing in one direction then a large capacitor if you need to smooth out the voltage, lastly a zener diode or power regulator circuit for the appropriate voltage needs to be included because high speeds can generate 10-12 volts from a normally 6 volt generator which will fry most electronics without built in protection circuits. You can probably find most of this circuit inside a wall wart power block. If you don't want the added drag of generating when going uphill add a thumb switch on your electrical system and only activate it only on flat and downhill runs.

Friction dynamos/generators will rub a groove onto the side of your tire and eventually cause it to fail if used regularly, a rubber dynamo pickup wheel and cleaning dirt from the rubber contact surfaces will prolong the life of your tire. Some older friction dynamos rode directly on the tread but this would require a smooth tire instead of a mountain knobby, most of the time a smooth tread makes more sense unless you ride exclusively in mud and never on roads or packed surfaces.

If you still have a car but no fuel pull out the alternator and battery and put your bike onto a stationary bicycle exercise stand conversion system, you can always reinstall the parts in the car later. Remove the friction belt and attach the alternator with a short V-belt, this may require cutting a groove into the exercise stand flywheel. You will be able to keep your battery charged to power whatever 12 volt gadgets you need. We have seen experiments where laptops and small TV's are powered by the operator pedaling with such a system. An automobile alternator requires some input voltage so a 12 volt battery is required in the system.

## Communications

Cyclists use their senses to stay safe, a phone or radio by interfering with your concentration and hearing will increase your risk especially in chaotic urban cycling situations. We acknowledge the risk but there are times where you need communications gear to keep your cycle group together or to take a call during a long commute. These are several ways we have known people to stay in touch while cycling.

A mobile phone stashed inside a pack or pocket is dangerous to grab for while cycling, a Bluetooth headset makes answering as easy as pushing a button on your earpiece or headset, some phones can also be set to auto answer or take voice dialing from the headset. Find a headset compatible with your helmet and winter ear coverings, a bit of elastic cord attached to the earpiece can be used to loop through the chin strap to prevent loss if it falls out while on the road.

FRS radios due to their low cost, small size good range, low power consumption and great urban penetration usually make for a win in the license free radio competition. A headset and voice operation or VOX means every time you talk it activates the transmit, useful when keeping a bicycle group or tour together.

## **MP3 and FM Radio**

There are very small MP3 players and FM radios which can be attached to your helmet and are at much less risk of a torn wire or being dropped than a hard disk or pocket computer type music player in a pocket or pouch. There are few weatherproof MP3's out there but we have used a simple tiny FM radio made for swimmers to good effect in bad weather. The FM helmet radio is a way to cheaply wireless a larger MP3 player while it stays safe in your pack by using a cheap plug-in FM transmitter module.

# Motor Assist

If you want the portability and freedom of a bike with some of the ease of a motorcycle, no worries. Almost any bicycle can be converted to an electric power-assisted type (basically a moped) for a few hundred dollars. Various people have added old or new purpose bought weed-eater type engines to power-assisted bikes with positive results, but keep in mind that two stroke engines which burn an oil gasoline mix do pollute the environment significantly although Honda and Subaru four-stroke motors are much cleaner and consume normal gasoline. US rules now ban the import of most new two cycle engines but they are still available in Canada.

The two main methods for power transfer are a friction roller which is directly against the tire necessitating a smooth tread, or chain drive to the wheel, some kits have a sprocket which somehow connects directly to the wheel. These are often DIY jobs as the kits can be quite expensive, but be sure to get good instruction and guidance before doing this on your own. If the purists turn up their nose point out the idea of NEVER needing to use a car even in steep mountainous terrain where most would not even consider a loaded bicycle for everyday travel.

The Bicycle Motor Forum at <http://motorbicycling.com/> is a good place for tips and information on the various motors and systems, from kits to homebuilts.

## Installation

Installing a motor puts stress onto your frame and rear wheel, expect much shorter life from your spokes if you are attaching a sprocket to them, if you have to use the clamshell and spoke connection see about drilling out your wheel and hub for 8-9 gauge motorcycle spokes in the rear. . Designs which have a special rear wheel with normal and motor sprockets on opposite sides will last far longer. Pedaling is more difficult against a chain drive system even when the clutch is out. Friction drive systems quickly take the tread off of your rear tire and often stop working in wet weather.

## Bike types

While the majority of kits found online are for upright bikes, consider the luxury of a nearly self propelled recumbent, or just how much power and speed you could get out of a nicely modified cargo bike...

## Magneto Electricity

Look for a motor with a electrical output from the magnetos to run a light or charge batteries, this electrical output is AC power often only six volts and needs a rectifier circuit to be used by most things other than a regular headlight.

## Legal Motors

If you are desiring to be a legal eagle, many jurisdictions allow a one speed motor under 50 cc to be attached to a bicycle drive train without further regulation. Furthermore, any person operating two-wheeled vehicle with a motor greater than 50 cc must have a motor vehicle license of some sort. Some states require a motorcycle license regardless of the engine size, while others require only a passenger vehicle license. Most two-stroke engines are generally less than 50 cc, and most electric motors would be considered in the same category. Since laws differ with each jurisdiction, contact your state or province's Department of Motor Vehicles about their regulations on mopeds and "motor-driven cycles". If your engine comes unmarked a professional 49cc sticker or etching might throw off nosy cops. If you use an electric motor, a set of saddlebags over the wheel covering the motor can hide things a bit.



Cycling Gear

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