

Bicycle Commuter Guide --Tips & Techniques

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Revised November 2001



Many people realize that riding a bicycle instead of driving a car saves the noise, stinks, and congestion of the infernal combustion engine. How about the personal benefits of bicycle commuting? Cycling offers pleasure, companionship (ride with a buddy), cost savings (especially if you eliminate a motor vehicle), time-savings (combining workout with commuting), reduced stress, and cardiovascular fitness. A bicycle can be a "fitness club on two wheels." Riding is fun and makes you feel good if you do it right.



Do you know how to ride a bicycle? Almost everyone would say, "Of course, I learned as a kid." But watch people riding bicycles. Only a few show real proficiency by steering confidently, pedaling easily at a brisk cadence (80-100 rpm) and riding fast (15-25 mph). Many bicycle commuters have to go fast since they typically ride at least 2000 miles/year. Notice that competent cyclists use the road like vehicle operators and the wise wear helmets.

You can also see many novices who weave and wobble, as they grind their pedals slowly (less than 60 rpm) to ride sluggishly (6-12 mph). Many novices run traffic lights, ride on the sidewalk or the wrong side of the road, go too fast downhill, wear no helmet and ride without lights in the dark. Novices have about five times the crash rate of experienced riders even though they are much less likely to ride in rush-hour traffic, inclement weather or after dark. Obviously, there is more to cycling than balance. Now, ask yourself again, do you know how to ride a bicycle?

If you are willing to learn, consider the **Effective Cycling** program. Effective Cycling, developed by [John Forester](#)¹, is based on the "Vehicular Cycling" theory. The premise is "**Cyclists fare best when they act and are treated as operators of vehicles.**" This is the opposite of what Forester calls the "Cyclist Inferiority" phobia where people are terrified of being struck down from behind by automobiles. This fear begins in traditional "bike safety" programs that teach little more than "wear your helmet and stay away from cars." This miseducation prompts behavior that leads to many accidents.

Cars are fast, noise machines that come at us from behind where we cannot see them coming. The "fear from the rear" is obvious, intuitive and thus widely believed. But at one time, so was the idea that the stars revolve around a flat Earth. Accident statistics refute the inferiority superstition: Less than one percent of cycling causalities are caused by the struck-from-behind collisions feared by novice riders. Most cycling collisions are caused by turning and crossing traffic, the same as automobile collisions.

The dilemma is that novice cyclists fear the least likely accidents too much while they fear the greater hazards too little. Riding the wrong way in traffic or worse, riding the wrong way on the sidewalk, are the most common causes of car/bike collisions. Ironically, many novice cyclists think these are *safer* ways to ride. For more information, see the [bicycle accident study by Wachtel and Lewiston](#)² from ITE Journal, September 1994.

Vehicular Cycling involves "Five Rules for Traffic Cycling" (from the book *Effective Cycling* by John Forester, published by the M.I.T. Press.) Copyright John Forester. (There is also a video by the same name.)


1. Drive on the right side of the road, never on the left and never on the sidewalk.
2. When you reach a more important or larger road than the one you are on, yield to crossing traffic. Here, yielding means looking to each side and waiting until no traffic is coming.
3. When you intend to change lanes or to move laterally on the roadway, yield to traffic in the new lane or line of travel. Here, yielding means looking forward and backward until you see that no traffic is coming.

4. When approaching an intersection, position yourself with respect to your destination direction -- on the right near the curb if you want to turn right, on the left near the centerline if you want to turn left, and between those positions if you want to go straight.
5. Between intersections position yourself according to your speed relative to other traffic; slower traffic is nearer the curb and faster traffic is near the centerline.

I will add two more. (1) **Be visible:** Wear bright, conspicuous clothes, use lights at night and ride where other drivers are looking for traffic. (2) **Be predictable:** This means to ride a straight "line", signal turns and lane changes and generally look like you know what you are doing. If you act like the driver of a vehicle, then other drivers usually understand what you are doing.

Effective Cycling (also known as "Bike Ed") teaches vital skills: riding a straight line, the look-back, instant turn, and hard braking. Other skills include lane changing and being courteous on the road (sharing the lane) without being submissive. You can see these demonstrated in the video or described in the book, but to really learn them, take the course. You can find a list of instructors at the [League of American Bicyclists](#)³ web site. A Cleveland area instructor is [Karl Weisel](#)⁴.

The book *Effective Cycling* has tips and technical explanations for how a bike works -- for example, why some brakes feel softer as you apply them. But the most important part tells how to ride on the road. Once you get past the author's abrasive and confrontational tone you can learn from a real expert. The paperback edition costs less than \$20. It should be on your bookshelf. Read the section about cycling in traffic several times. The video version of *Effective Cycling* gives an excellent demonstration of Vehicular Cycling technique. Libraries should have both the video and the book. Another excellent resource is the [North Carolina Coalition for Bicycle Driving](#)⁵. The concise booklet, *Street Smarts* by John Allen, is available through [Rubel Bikemaps](#)⁶ and on the web and in print as part of the [Pennsylvania Bicycle Driver's Manual](#)⁷.

 **Sharing the road** works both ways. Overtaking motorists have the obligation to wait until they can pass safely and then to allow enough room. Cyclists have the obligation to make passing easy as long as passing is safe and reasonable. If the lane is wide enough, stay far enough right to allow cars to pass. If not, then you must **take the lane** for your own safety.

Beginners often "hug" the curb because they fear traffic. This encourages motorists to squeeze by even if there is not enough room to pass safely. If you find overtaking traffic is passing too close for safety, move *left* -- take a little more of the lane. This gives a clear signal to passing drivers that they must use part of the next lane to pass. The safety distance a passing motorist allows a cyclist is often about the same distance as the cyclist rides from the curb.

However, be considerate. If you collect a train of cars, pull over occasionally to let them by. If a motorist gives you the right of way, acknowledge with a friendly wave or nod. When you stop at a traffic light,



Share the Road: Going uphill at slow speed, you do not need much room and it is not reasonable to block traffic.



Take the Lane: If you ride too close to the edge of a narrow lane, some motorists will try to squeeze past.



Proper Lane Position: On a road with substandard width lanes, ride near the right tire track. Photo R.Woodward.


stay away from the curb or right-turning cars may cut around you. Instead, where there are right-turning motorists, scoot to your left and signal drivers to "be my guest" and pass on your right. Be careful about waving drivers around you on a curving, two-lane road. Some drivers take a long time to react. An oncoming car may appear ahead, just after you signal. An alternative "OK to pass" signal to pass is to move right to make more room and briefly stop pedaling.

At a traffic light with a long line of stopped cars, you will have a great temptation to pass on the right. Unless you are in a wide curb lane (such that motorists can easily pass you again), don't -- it is not "fair" and it causes much resentment. Rude and lawless riders hurt the reputation of all of us. If you ride a regular route, other drivers will learn how to operate around you.

Traffic lights controlled by induction loop "vehicle detectors" can be a problem. If the sensitivity is set high enough, most will detect a bicycle stopped directly over a loop wire. Unfortunately, some are not adjusted properly and if the wire cuts are covered by pavement, how can you know where they are unless the "hot spot" is marked? Older simple loop detector wires usually run about 1/4 of the distance from each side of the lane lines. Newer double loop detectors have another wire cut in the center of the lane. If you cannot make a detector work for you, it is *malfunctioning*. Please report it and insist it be repaired




Simple Loop Detector: Detector wires are under the cyclist's left foot and also near left side of lane. (He should be further left.)

 **Dealing with Barbarians:** A major aggravation for cyclists is Joe Six-Pack Motorist driving his "Suburban Assault Vehicle". Joe, along with the rest of society, has been miseducated about cycling and thinks bicycles should not be on the road. Joe may honk and point at the sidewalk to show where you "belong". Bikeways, especially in the absence of education, reinforce this attitude. Police may be ignorant too. If you are ordered off the road or in the gutter, explain why you belong on the road. I carry a listing of state bicycle traffic laws (laminated in plastic). You may need to write to the police chief suggesting that the department needs training in vehicular cycling. ([There is a special police course](#)⁸.) In communities with "sidewalk laws" you must choose between the hazards of riding on the sidewalk, or risk getting tickets for riding safely. For information on what to do if you are stopped for what should be lawful cycling, see John Forester's article [Legal Defense of Cyclists' Rights](#)¹, the [Crankmail advocacy section](#)⁹ and the companion article, "[Bicycle Commuter Issues, The Politics of Two Wheels](#)"¹⁰.

When you are on the road, remember that motorists are generally looking for cars, not for a much smaller bicycle. You must wear bright clothing (plus lights at night) and ride in or near the traffic lanes where drivers are looking. Learn to anticipate problems in order to avoid them. Some drivers will misjudge your speed and "hook" in front of you. For these occasions, you need the defensive driving skills taught in Effective Cycling -- hard braking and the instant turn.

For the few bozos that try to run you off the road, here are some tips from other cyclists. "Learning to be assertive is a good way to get rid of hate; they are trying to bring you down to their level; for your own good, you have to rise above them." "Carry a 'jerk book'. When an incident occurs, write down the license number and other details, trying to make it obvious what you are doing. The driver may watch in the mirror to see your reaction. He will get very nervous if he sees you writing." The notebook is also handy for turning in bad commercial drivers -- sometimes there is a "how's my driving" sign on a truck.


 **Equipment:** If you are planning to bicycle commute, obviously you need a bike. If you have a serviceable machine, start with that. Buy a better one after you get experience. Stay away from mass merchandisers -- See "[Bikes R Not Toys](#)"¹¹. Their bikes range from inadequate to dangerous (particularly the brakes). Visit several reputable local shops (ask around) and don't buy too cheap -- expect to spend at least \$400 (unless you find last year's model or a good used bike). The three most important concerns are fit, fit, and fit. A good bike shop will help fit you. Beware a store where stock on hand determines what "fits" the customer.

Common bike styles include the fashionable mountain bikes, road bikes, and hybrids. Avoid extremes. A heavy mountain bike with soft suspension and knobby tires will not roll well. A racing bike with thin sew-up tires gives a hard ride and gets too many flats. Some novice riders like the "cruiser" style bikes which allow a "sit up and beg" riding posture. These may be useful for those who must ride in dress clothing but the high wind resistance is bad for long distances or higher speeds.


When I bought a new bike, some friends advised a road bike with dropped handlebars for reduced wind resistance. Another friend said, "You can hybridize a mountain bike" (by getting harder tires) "but you can't mountainize a hybrid bike." I do not ride off road so I settled on a hybrid with high pressure (95 psi) tires. For an overview of bikes, see the buyer's guide in the April issue of *Bicycling Magazine*.

You need at least a few accessories for commuting. With a new bike, look for a discount or package deal. Consider a rear rack, pump, spare tubes and tires, patch kit, tire "irons", spare brake cable, chain lubricant, some basic tools and a good lock. You should also get either toe clips (to hold your feet in the proper position) or clipless pedals and matching shoes. For moderate distance commuting (20 miles/day), I use clips with my regular shoes. For the days when I gamble it won't rain (and lose), I keep a complete change of clothes at work, including shoes.

In addition to tools, you need rain gear and cycling gloves (to prevent "handlebar palsy"). To hold all this plus change of clothes and lunch, get panniers (packs) to hang on the front or rear racks and/or a handlebar bag. On my bike I use a handlebar bag designed for a road bike – with the wire frame bent to make it work on my hybrid. I also have a small tool bag, panniers and a "trunk", a bag that fits on top of the rear rack. (I sometimes carry lots of stuff.) Tip: Carry light things in a handlebar bag. Weight up front makes steering more difficult.

 **Safety equipment** starts with a helmet, which can reduce head injury risk significantly. Newer designs are lighter and protect better than those from years ago. To read an interesting testimonial, see [John Allen's](#)¹² web site. Other safety items include bright clothing, a rear view mirror (I prefer the type that clips on glasses) and a reflective safety flag that sticks out to the side, making your bike look wider and more visible. My flag is a "Flash Flag" from [Flashback](#)¹³. Traffic law in most states requires a headlight and taillight if you ride after dark. You should carry a small first aid kit as well.

A few cyclists have a strong prejudice against mirrors. Some feel a mirror is a "crutch" and cite a freak accident 30 or 40 years ago where a rider's eye was blinded by a shattered mirror. The real issue is the limitations of a mirror. A mirror provides only a narrow field of view, takes getting used to and needs proper adjustment. You should use a mirror to supplement the "look back", not replace it. When you are about to change lanes, the look back provides communication with a motorist and is a way for you to "ask permission" for your move. (When you change lanes, you **do not** have the right of way.) However, unless your neck is as flexible as an owl's, looking back to see straight behind is difficult. This is just where a properly adjusted mirror works best.

 **Night riding:** *Don't even think* of riding after dark without a headlight. Bright clothing is not enough. You need both lights and reflectors. A strobe (flashing light) on the back of the bike will help motorists notice you but is not so good at providing depth information to following drivers. Forester recommends replacing the standard small, red rear reflector with a 3" amber SAE auto reflector that is 8-10 times brighter. If you mount the reflector off to the side it is less likely to get caked with mud thrown up by the wheel. In the *Effective Cycling* video you can see John Forester riding with a large amber reflector. Reflectorized clothing and a "Flash Flag" (see above) are good attention getters.

Bicycle headlights cost from under \$20 to over \$200. If you ride off road in the dark, you may need an expensive, multi-beam, high-power system. For commuting on smooth, well-lit roads, 3 watts may be adequate. If a handlebar-mount light cannot not "see" over a handlebar bag, rig another mounting system. A small flashlight is handy for repairs in the dark and can serve as a backup headlight. If you are caught in the dark without lights, don't try to sneak down the sidewalk. **Walk your bike home!** To understand why, read John Schubert's interesting explanation "[Why reflectors sometimes don't work](#)."¹⁴

I have used a Union generator set (2.4W headlight, 0.6W taillight) for several years. The headlight mounts under the handlebar bag, where the front reflector used to be. Recently, I bought a second Union set, partly to have a spare generator but also to have a second independent light system. The extra headlight upgraded with a more powerful 6W bulb connects through a push-button switch to a rechargeable lead-acid battery that goes in my water bottle cage. The battery (6 volt, 4 amp-hour), built for emergency-building lights, came from a home supply store (\$11). It is rugged but heavy.



Tips: Most beginners pedal too slowly, under 60 rpm, straining their knees and getting tired quickly. It is better to spin easily at 80-100 rpm. However, if you find yourself bouncing on the seat, you are cranking too fast. To prevent injury, take it easy the first 10 minutes or so, until you warm up. If you use toe clips in traffic, don't tighten the straps. This makes it easier to get feet in and out when you stop but you still get the foot positioning benefit of the clips. Tuck the laces into your shoes so they don't get caught in the chain.

If you use a mountain bike, replace the soft, knobby tires with smooth, hard (80-100 psi) tires which have much less rolling resistance. Keep your tires properly inflated. Besides rolling easier, you will prevent pinch flats (also called snakebite). A soft bike seat comfortable on a 10 minute "test ride" may be excruciating halfway through an all day trip. You need a seat that supports your weight on the *ischial tuberosities* (sit bones) rather than the perineal area. Adjust the seat height by raising it until your hips start to rock when you ride. Then lower it slightly until the rocking stops.

Lube your chain every couple weeks, after a rain, and especially when it "sings". Learn simple repairs such as repairing flats, adjusting and cleaning bearings, etc. A good reference is *Bicycling Magazine's Complete Guide to Bicycle Maintenance and Repair*. There is much more cycling information online via Web pages and in Internet discussion groups. While most online information is reliable, be a little wary. You can find good cycling articles and links to more on web pages of [Sheldon Brown](#)¹⁴, [John Allen](#)¹², [Ken Kifer](#)¹⁵, [Bicycling Life](#)² and [MassBike MetroBoston](#)¹⁶.

Many people ask about needing a shower after riding to work. The need depends on the temperature (lower in the morning) and the level of effort and distance for the ride. On hot days, rather than shower at work, I take it a bit easy on the ride in, then soak my face in a cool, wet towel, and change my shirt (from the T-shirt used on the ride) after I've cooled, 30-60 minutes later. I have not worn a tie since I started riding regularly (but keep one in my desk for the rare occasion).

I wear shorts or running pants rather than dress pants to avoid a "chainring tattoo" on my pants leg. Cycling shorts usually have a "chamois" pad to prevent chafing on long rides. For this to work, however, the chamois should be next to your skin, which means no underwear. This can make for an interesting experience if you are caught changing behind the bookcase in the office. On a commute, you likely do not need chamois shorts anyway.

You need a safe place to park. Some of us enjoy ultra close-in parking right in the office. Why not try it? A local cycling club may find a mentor to give you tips on road positioning, routes, equipment and clothes. For Cleveland area clubs, see [Crankmail](#)⁹. You might also find a "riding buddy" at work. A buddy provides another set of eyes to watch for problems, deters troublemakers and can help with repairs.



Time cost: A bicycle is usually slower than an auto. Thus there is a "time cost" of cycling. Let me put this in personal terms: I live 9-12 miles from work (depending on route). It takes about 20 min. to drive or 40 to ride (shortest route). Therefore, my time "cost" for riding is 20 min. But I get 40 min. of healthful exercise in this time -- much more efficient than driving to a gym. For the ride home, I often choose a 12-mile scenic and shady route mostly through the park. The ride home takes about 50 min. Surveys of cycle commuters show that many consider up to 10 miles one way to be a reasonable distance for regular riding. Those living further may drive part way and ride the rest. Insist that public transportation in your community accommodates bicycles.

An ideal bike route is fast, convenient and direct. It will be free from dense, high-speed traffic and have a wide, smoothly paved outside (right) lane without hazards (like parallel bar sewer grates and chuck

holes). Many experienced commuters prefer fast but busy arterial roads to side streets that have more delays at intersections from stop signs or traffic lights.



Winter cycling: Winter brings new challenges -- keeping hands, ears and feet warm while not overheating elsewhere. One secret is wearing layers of clothing (ventilating zippers are a must). A breathable wind shell over a wicking fabric works well. Flannel lined nylon running pants with leg zippers keep legs warm. Elastic sewn on the right cuff keeps it away from the chainring. An ear band or balaclava under the helmet helps keep the head warm. Below freezing, wear liner gloves or even mitts. To protect both yourself and the bike from salt splash thrown up from wet roads, get fenders. If fenders do not extend low enough, add homemade flaps made from a plastic milk jug. Check the [Icebike Web Site](#)¹⁷ for useful winter tips.

A special winter hazard is black ice. My worst fall was in a place where the road looked clear except the blacktop was just a little "too black". Another problem is visibility. You are often riding in the dark. In the early morning or late afternoon you may be invisible to a motorist dazzled by low sun.



BUGs: Consider starting a **Bicycle User Group** where you work. For example, "GO-BIKE" at NASA/Glenn Research Center helps the Safety Office host events like an Effective Cycling class and "Ride to Work" days and works to improve the local cycling environment. NASA loans the *Effective Cycling* video and other materials (free) to employees.

My goal in this article is to help beginners get over initial hurdles and avoid common mistakes. You can find much more information in the sources mentioned above. You do not need to learn it all at once. It takes time to get used to riding in traffic, especially to get over The Superstition -- at least 10,000 miles to learn via trial and error by yourself; 5,000 miles with a good mentor or 500 miles after an Effective Cycling (Bike Ed) course. Find a buddy if you can and start riding. The best time to start is now.

A companion article, "[Bicycle Commuter Issues, The Politics of Two Wheels](#)¹⁰" discusses problems caused by our society and what we might do about them. If you have any questions or comments, please direct them to [Fred Oswald](#)¹⁸. The author is an NASA engineer, a Professional Engineer in Ohio and a 4000 miles/year bicycle commuter from Cleveland.

Summary of links from this article:

1. <http://www.johnforester.com/>
2. <http://www.bicyclinglife.com>
3. <http://www.bikeleague.org/educenter/education.htm>
4. <mailto:krweisel@msn.com>
5. <http://www.humantransport.org/bicycledriving/index.html>
6. <http://www.bikemaps.com/bss.htm>
7. <http://www.dot.state.pa.us/Internet/hwyIntHS.nsf/frmBikeManual>
8. <http://ipmba.org/>
9. <http://www.crankmail.com/cmtoc.htm>
10. <http://www.geocities.com/lakeeriewheelers/advocacy/issues.pdf>
11. <http://www.bikesrnottoys.com/>
12. <http://www.bikexpert.com/bicycle/>
13. <http://www.flashback.ca/>
14. <http://www.sheldonbrown.com/articles.html>
15. <http://www.kenkifer.com/bikepages/>
16. <http://www.massbikeboston.org/>
17. <http://www.enteract.com/~icebike/>
18. fredoswald@nccw.net