

# Bicycle Blunders and Smarter Solutions

by Fred Oswald, PE, LCI #947

*The great obstacle to progress is not ignorance, but the illusion of knowledge.*  
--- Daniel Boorstin, historian, librarian of Congress

This illustrated article discusses common blunders (serious mistakes) related to bicycle use, education, advocacy, engineering, and traffic laws. The blunders make cycling more difficult and dangerous and they jeopardize our right to use the roads. The article then suggests Smarter Solutions to avoid these blunders.

Cycling expert John Forester estimates that thirty percent of car-bike collisions are caused by cyclists following defective "bike safety" teaching [1]. In addition, many crashes are caused by segregated (separate) bicycle facilities that make people think they can be safe without following the rules of the road.



We see the same bicycle blunders made over and over again. This article is intended to help people learn from past blunders so they stop repeating the blunders. *Those who do not learn from history are doomed to repeat it.*

---

## Footnote

[1] Forester's estimate is based on his analysis of Cross, Kenneth D., and Fisher, Gary, *A Study of Bicycle/Motor Vehicle Accidents: Identification of Problem Types and Countermeasure Approaches*, National Highway Traffic Safety Administration, 1977.

The "bike safety" errors that lead to crashes include (1) making a left turn from the right side of the road after signaling but not looking for traffic, (2) weaving between parked cars in order to ride as close as possible to the curb, and (3) stopping at intersections but not looking and yielding to traffic that has the right of way. Traditional bike safety often emphasizes less important requirements (like signaling and stopping) but ignores essential skills that actually prevent crashes (like yielding to traffic that has right of way.) Traditional bike safety teaches that the greatest duty is staying out of the way, even though this often compromises safety.

## 1. Fallacies that Underlie the Bicycle Blunders

1. Same-direction motor traffic is the greatest danger to cyclists.
2. Cyclists' most important duty is staying out of the way.
3. Obeying the rules of the road is unnecessary and too difficult to learn.
4. There is some method, other than obeying the rules of the road, by which roadways can be used safely.
5. Separate bikeways make cycling safe for people who do not know how to ride safely.

The public impression of bicycles is they are that they are toys to be used carelessly by children. Those adults who use bicycles are regarded as "playing in the road" and getting in the way of more important people who drive cars. The principle safety hazard to cyclists is thought to be traffic passing from behind (the "fear from the rear").

**Actual studies of cyclists' crashes show that almost all collisions occur at intersections** -- the same as for motor traffic. Hit from behind crashes are extremely rare, except at night when unlit cyclists and intoxicated drivers make these crashes more likely.

Bikeways are often promoted to encourage non-cyclists to use bicycles in the belief that separate facilities make cycling safe for people who ride dangerously. They are also promoted because they make people *feel* safer, even though they actually introduce new and unexpected hazards.

In subsequent sections of this article, we will examine blunders in teaching, use, promotion and accommodation of bicycles and the hazards these blunders create. Then we show Smarter Solutions to avoid the blunders by understanding the principles of cycling.

## 2. Blunders in Teaching

- Teaching by unqualified authority figures (parents, school teachers, police, etc)
- Message is based on fear of traffic
- Repeats advice that "sounds good" but is often wrong
- Confuses cyclists with pedestrians
- Failing to encourage following the standard rules of the road

"Bike Safety" is typically taught by a well-meaning but uninformed authority figures (parents, school teachers or "Officer Friendly"). The teaching generally consists of repeating advice that sounds good -- but it is often wrong. Some of this advice is intended to give children a "good scare" so they will stay out of the way of cars. Unfortunately, fear of traffic leads to dangerous mistakes on the road and it makes learning correct techniques much more difficult.

Almost everyone knows to operate motor vehicles according to a uniform set of rules of the road. We realize that drivers who operate according to conflicting rules are likely to drive into each other. But this knowledge does not extend to bicycle operation. Analysis of car-bike collisions demonstrates that over half of them are caused by the cyclist failing to obey the standard principles of traffic operation. [1]

Bad Advice	Why the Advice Is Wrong
"Stay out of the way of cars."	There are situations where it is safer to obviously be in the way. For example, if the travel lane is not wide enough to share with passing traffic, move LEFT so following drivers are not tempted to "squeeze by". At intersections and driveways, cyclists who try to stay out of the way by riding on sidewalks may "appear out of nowhere" and be hit. Experienced cyclists, who stay in the travel lane, are easily seen and avoided.
"You could be dead right."	You are more likely to be "dead-wrong". This is often part of a fear campaign. We don't teach swimming that way. When you have the right of way, use it. You are much better off riding predictably and acting like you know what you are doing. Of course, defensive driving is always wise -- plan an escape route, just in case.
"Ride as far right as possible"	This is misquoting the law that actually says ride <i>as near to the right side as practicable</i> (practice+able). There are several situations where "hugging the curb" is not safe. These include where the lane is not wide enough to share with a passing vehicle and if there are hazards at the edge of the road, or where other drivers can see you better if you move left. Maintain a safety zone to your right.
<b>Confusing Cyclists with Pedestrians</b>	
Many people think a person on a bike is some kind of pedestrian. Wrong! A bike can easily go 4 or 5 times as fast as a person walking. And even faster downhill. A bike cannot stop in a stride; it has brakes like other vehicles. It cannot turn in place or step sideways like a pedestrian either. These are a few of many reasons why riding on sidewalks is much more dangerous than <i>driving your bike</i> on the roadway. And why mixing cyclists and pedestrians is dangerous for both.	

Compare bike safety to swimming lessons given by a certified Red Cross instructor. An instructor candidate must be a proficient swimmer, passing both a written and swimming test to get into the 36 hour instructor class. The class includes several skills to be mastered, ending with another written and swimming test. Finally Red Cross instructors teach from a carefully prepared syllabus rather than making

up the advice as they go. In a swim class, children are taught to relax and **not to fear the water** [2] in order to swim effectively.

Another common blunder involves over-emphasizing a minor skill and then ignoring the really important information. Children are taught to signal turns as though it is a religious duty. But they are not taught to look for and yield to any traffic that has the right of way. You can see an example of this blunder in the otherwise rather good (but bizarre) 1963 'bicycle safety' video [One Got Fat](#). Notice in the first of several simulated "crashes", the message seems to be that giving a signal overrides traffic rules, or "It's OK to swerve in front of traffic so long as you signal first." While it is doubtful the producer intended to encourage swerving without looking, this is certainly a bicycle blunder.

You can read more about education blunders and how to avoid them in [Let's Stop Miseducating Society About Cycling](#).

## Footnotes

[1] John Forester presents an extensive analysis of bicycle crashes in his book [Bicycle Transportation](#), MIT Press, 1994.

[2] For another perspective on risk -- perception vs reality, see an article by Mighk Wilson: ["Freedom From Fear"](#). Mighk has a very good discussion of the excuse "I didn't see you" (about 2/3 down from top).

## 3. Blunders on the Road

1. Riding on sidewalks
2. Driving on wrong side of road
3. Riding too close to curb
4. Making left turn from right edge of road
5. Failing to yield when required
6. Violating traffic lights & stop signs
7. Not using lights at night

Most people have been taught to ride on sidewalks because they believe that the roads "belong to cars" and because they fear traffic passing from behind. They do not understand that sidewalk cyclists face collision risks at every intersection and even at driveways. They fail to realize that other drivers are not looking for conflicting traffic coming down the sidewalk.

Crash studies show that sidewalk cyclists face a risk of collisions with motor vehicles two to nine times as high, depending on factors such as intersection and driveway density, speed of the cyclists, etc. In the top photo at right, note the cyclist (mostly hidden by landscaping) on the curving sidewalk. This person chose the sidewalk even though the entire right lane was marked as a bike lane. This shows that paint on the road does not teach best practices. Only good teaching teaches best practices.

In the second photo, the sidewalk cyclists are traveling against traffic as they approach a busy intersection.

We often see people riding on the wrong side of the road so they can "see traffic coming". That is just what the wrong way rider at right told this author right after the photo was taken. Bicycle collision studies show that wrong way riding has a risk about 3 ½ times as high as riding on the right side of the road, yet some authority figures still teach riding this way.



Sidewalk cyclists [1]

Wrong-way sidewalk cyclists

Wrong-way on road

Pedestrians walk facing traffic so they can sidestep off the road when vehicles pass. But you cannot sidestep on a bike. Riding wrong way or on sidewalks places a cyclist outside the arc of vigilance of any driver on a collision course.

Many of the people who do ride on the right side of the road ride too close to the curb. This error is related to fear of traffic and the desire to "stay out of the way". The fear is developed by miseducation that makes people too much afraid of a remote hazard (being hit from behind) and too little afraid of much more likely risks from turning and crossing traffic. Another problem is bad traffic laws that encourage or even mandate this unsafe position on the road.

The novice cyclist at right was riding on the gutter pan seam. He was also veering back and forth erratically between the road and gutter rather than riding predictably in the travel lane.

Improperly trained cyclists sometimes make a left turn from the right edge of the road by swerving in front of traffic (the "shooting gallery" approach) rather than merging to the turn lane in advance of the intersection after yielding to any passing traffic.

Traffic laws in all 50 U.S. states require using headlights after dark. Yet most of nighttime cyclists have no lights. The major cause of this problem is a failure in education. Bicycle safety advocates like helmet giveaways. Why not a headlight giveaway?



A large part of the lightless rider problem is caused by the Consumer Products Safety Commission and its requirement of several reflectors but no active lights for all bicycles sold in interstate commerce. Most of these reflectors are nearly useless in preventing collisions, yet *they look like safety equipment*. Their presence encourages the dangerous practice of riding in the dark without lights.

Many cyclists are made to feel morally superior to motorists even as they are taught to be inferior as drivers. This makes them believe they need not and cannot follow traffic laws, such as stopping for traffic lights or making turns from the correct place on the road. A contributing factor is vehicle detectors at traffic lights that do not detect bicycles.

You can read more about crash causes in an article by Ken Kifer: [Cyclist Errors Which Cause Automobile-Bicycle Collisions, Illustrated](#).

#### 4. Blunders in Advocacy

**One cannot increase bicycle use by treating cyclists as second-class road users. Hence Vehicular Cycling rejects a symbolic priority of motorized over non-motorized road use but instead upholds the status and dignity of the cyclist as a fully equal road user.**  
--- John Finley Scott, Professor of Sociology, Emeritus, at U.C., Davis

"Bicycle advocates" (people who promote the bicycle to advance some other agenda, such as reducing auto use) stubbornly refuse to admit that there is any problem with separate bicycle facilities that direct cyclists to ride in dangerous places such as the door zone of parked cars. They would rather pretend this dangerous practice is OK and then blame the motorist when there is a crash. If the "bicycle advocates" would simply refuse to build facilities in the door zone and instead teach cyclists "ride outside the door zone", then the problem would largely vanish.

Blunders in advocacy include:

1. Promoting dangerous facilities
2. Giving only lip service to education
3. Undermining cyclists' rights to the road
4. Denying that facilities create hazards

Facilities advocates have an unwritten rule, sometimes called the 11th Commandment: *Thou shalt not criticize another facility advocate's work product*. The problem with this rule is that people who make safety-critical decisions need to be willing to have their work vigorously examined, and its weaknesses corrected. Doctors and engineers rip into each other's work during review sessions. It's considered a professional responsibility to let safety-critical work be exposed to careful review, free from any constraint to make nice or avoid hurting someone's feelings.

In bicycle facilities, bad designs that were shown to be dangerous 30 years ago are still used today because facility advocates don't want to spoil the party, even when doing so would prevent crashes.

There's another unwritten rule we call the 12th Commandment: *Thou shalt treat all bicycle users and all bicycle use as equally valuable*. The mere fact of using a bicycle is what counts, not whether it is used safely or competently.

This commandment is largely based on the assumption that one more bicycle equals one less car. That's because the facilities movement is more anti-car than it is pro-cyclist. Therefore, whatever attracts beginners is justified, even if the facility, the usage pattern or the rider is known to have safety problems.

By contrast, vehicular cyclists and vehicular advocacy have as their first priority breaking the causal chain of crashes. We encourage dangerous riders to learn more about safety, rather than praise them for riding dangerously. We insist that road designers and trail designers learn about accident causes and avoid building them into their designs. We also take a long range view of encouragement. People taught to do it properly will do it more.

Under the vehicular system, everyone has a stake in avoiding a crash. But under the "12th commandment," all cycling is created equal." With that as an imperative, you can't have standards for either cyclists or for facility designs.

The photo at right illustrates a blunder in advocacy. This is part of a pop-up advertisement featuring Lance Armstrong on the League of American Bicyclists website. The photo shows a warm and fuzzy suburban scene with a young girl riding her bike. The problem is the girl is riding on the sidewalk and in the wrong direction with respect to the adjacent street.



Studies of bicycle crashes show that riding on sidewalks creates a car-bike collision risk about two to nine times higher than riding on the street. The risk is especially high for riding against traffic. Studies that examine all crashes (not just car-bike collisions) found that the sidewalk is up to 25 times more dangerous than the street. The ad with the sidewalk cyclist remained more than two years after experienced cyclists objected to promoting a known dangerous practice that is completely contrary to principles taught in its BikeEd education program. It finally disappeared when the site was extensively revamped in 2006.

The LAB leadership seems incapable of understanding the problem. They regard all bicycle use as equally valid (the 12th Commandment), even if this exposes the cyclist to danger. Apparently cyclists are pawns to be sacrificed for some higher purpose, such as a "Bicycle Friendly America".

We believe that anyone who encourages other people to ride a bike has a moral responsibility to encourage those people to learn good cycling. The LAB leadership's failure to teach proper operation contributes to the high bicycle crash rate.

One of the worst examples of bicycle advocacy gone wrong is the [Bicycle Friendly Communities](#) program, which emphasizes facilities over education and fair treatment. The program refuses to support

cyclists' right to road access. Instead, they have given awards to cities that ban cyclists from important roads and that install dangerous separate bicycle facilities. The program is really "bicycle planner friendly" rather than friendly, or even fair, to cyclists.

Among the cities "honored" by the BFC program are Schaumburg, IL, which has a dangerous mandatory sidepath ordinance and mandatory registration ordinance with a steep \$100 to \$750 fine for violators. Also given the award was Fort Collins, Colorado, which bans bicycles from four miles of U.S. 287/College Ave. a stretch of road that has two of the city's bike shops! Perhaps worst is Ann Arbor, Michigan where the assistant city attorney argued *"The bike ordinance cannot be interpreted to allow for defendant's safety considerations. ... [It must] require operation at the shortest distance from the right side of the road that the rider is physically capable of effecting."*

Here are some of the questions asked on the BFC application: *What was your community's most significant investment for bicycling in the past year?* (In other words, how much did you spend?) *How many miles of bike lanes do you have?* and *How many miles of bike paths and trails do you have?* [3]



BFC Applicants are never asked whether these bike lanes and paths are appropriate facilities nor are they warned that facilities may be unsafe. Nothing encourages them to educate citizens about hazards of riding on the facilities or that the street is usually safer. The communities are not told that laws that unfairly restrict cyclists' access to the roads will disqualify their application. As a result, many BFC communities have unsafe facilities and some mandate using the unsafe facilities. Door zone bike lanes and dangerous sidepaths are considered "bicycle friendly". But they are certainly not cyclist friendly.

The "Safe Routes to School" program is based on the faulty premise that children can be made safe through installation of separate facilities. However, no route is safe for a person who rides dangerously. Conversely, almost any route is reasonably safe for the person who uses proper techniques.

Riding on the wrong side of the road is a serious blunder, with a collision risk higher by about 3 ½ times the rate for right-side operation. Yet right on the cover of the "Safe Routes to School" [4] booklet is a photo showing a child riding on the wrong side of the road.



Wrong Way in "Safe Routes"

### **Blunders of a Bicycle Advisory Committee**

Many cities appoint an advisory committee comprised of citizens interested in bicycling. Often, committee members' interest is primarily motivated by other considerations, such as reducing car use or promoting "healthy lifestyles". Rarely are they knowledgeable and experienced road cyclists. This is a serious deficiency since many issues facing bicycle advisory committees involve roadways.

This author knows a retired NASA engineer who organized and chairs such a committee. The chairman has a PhD, he is a very experienced recreational cyclist and he is very good at working with public officials. However, he never learned how to ride properly in traffic and he is not interested in learning. For example, the only way he will make a left turn on a busy street is by pedestrian methods that are appropriate for a young child.

The chairman once told his committee that he had four near crashes in the previous year. This was intended to show that the roads are "dangerous". In my answer, I told him that I ride two or three times as far as he does, on roads he is afraid to use, usually in rush hour traffic and in all weather. If he had four near crashes, then I should have had at least 20. But I had none -- because I follow the best practices of bicycle operation.

My offer to demonstrate how to ride in traffic was rejected by the chairman and his Bicycle Advisory

Committee. They were just not interested. Because of their ignorance, they have produced some serious bicycle blunders.

In other articles on the LAB Reform website, we show several other serious [blunders in advocacy](#). Including how ["America Bikes" promotes facilities by pandering to fear of traffic](#).

## Footnotes

[1] This photo is part of a pop-up advertisement and is also in a video on the [LAB Website](#). The girl appeared about 1/3 of the way through the ad.)

[2] Disclaimer: This is a composite picture. We do not know any city that puts a BFC sign on the same signpost as a no bikes sign. But there are cities that have both the BFC sign and no bikes signs. We think this is a disgrace.

[3] [BFC application, part 1](#) and [BFC application, part 2](#) (pdf files on BFC web site).

[4] National Highway Traffic Safety Administration, Safe Routes to School, DOT HS 809 497, Sep 2002.

## 5. Blunders in Planning & Engineering

How would you feel about driving a car on a road designed by an engineer who does not know how to drive and does not understand the rules of the road? Does this sound insane? This is the situation that faces people who drive bicycles. Such misunderstanding causes serious mistakes, including

- Contradicting safe practices
- Discouraging cyclists from following standard rules of the road
- Failing to understand bicycle operation in traffic
- Building bicycle sidepaths (multi-user paths beside roads) with dangerous intersections at cross-roads and driveways.
- Building bike lanes in the door zone of parked cars
- Placing bike lanes on steep hills
- Routing bike lanes to the right of right-turning traffic
- Encouraging left turns from the right edge of road
- Encouraging cyclists to pass slow traffic on the right

**There is an inherent fallacy in the practice of building separate bicycle facilities (sidepaths and bicycle lanes) alongside roadways. The fallacy is the assumption that such facilities make cycling safe for those who do not know how to do it properly. The fallacy is dangerously wrong for at least four reasons:**

- 1. All of the skills required for riding safely on the roadway are also needed for riding on the bikeways.**
- 2. Because the facilities complicate the roadway and create intrinsic hazards, more knowledge is needed for riding there safely than is needed on the roadway.**
- 3. The facilities often include explicit hazards due to defects in design, construction and maintenance.**
- 4. The presence of separate facilities makes people feel "comfortable" while riding dangerously. This makes them less willing to learn better methods.**

### Intrinsic Problems of Bikeways

Separate bicycle facilities treat cyclists as though they are rolling pedestrians, rather than drivers. This treatment makes them feel they are separate from traffic and **encourages them not to follow the rules of the road**. Violating the rules of the road often leads to crashes. As it is, too many cyclists on the road fail to stop for red traffic lights.

The problem is much worse for those who ride on sidewalks and sidepaths. In the photo we see two cyclists who were riding on a multiple-use path in the median strip of



a park roadway. The path has a pedestrian "Walk" signal, controlled by a push button. Like most path riders, they did not wait for the signal but rather crossed illegally, dodging turning traffic from the road.

The blue bike lane shown at right represents the best of a bad practice. The lane seems to be far enough from the curb, thus it avoids the door zone of parked cars. By running left of the right turn lane in the distance, it puts straight-through (but not turning) cyclists in the correct location. Finally, it has adequate room.



However, even this "best" bike lane encourages mistakes. The bike lane stripe encourages cyclists to stay to the right and motorists to stay left, even when the rules of the road require otherwise. If a fast cyclist (perhaps a tail wind or descending a hill) catches up to a slow car, there is a tempting clear channel for passing in the motorist's blind spot. This can lead to a collision if the motorist turns into a driveway or parking spot while the bicycle is passing.

Separate facilities attract beginners. (This is one of the reasons that "bicycle advocates push for the facilities.) Beginners often turn left directly from a bike lane (the "shooting gallery" approach) without first merging to the left turn lane. We have heard of beginners making a **right** turn from a bike lane by swerving across right-turning traffic,

Even experienced cyclists, who know enough to merge to the proper place on the road to make a turn or to avoid hazards, experience trouble from separate bicycle facilities because they encourage motorist resentment. Some motorists become vigilantes, harassing any cyclist not in "his place". The existence of a designated "bike route" on one road makes it very difficult to convince city officials to make improvements or repairs on a parallel route. Separate facilities make educating cyclists much more difficult.

### Explicit Bikeway Mistakes

Many separate bicycle facilities have explicit dangers, in addition to the intrinsic hazards discussed above. The photo at right shows a marked bike lane that routes cyclists across a "free-running right" at a highway entrance. Cyclists are expected to swerve across the path of traffic on the ramp. Motorists using the ramp are expected to yield to traffic crossing the ramp. This is intensely dangerous because both cyclists and motorists are directed to violate standard traffic rules.



The proper cyclist's route, staying in the through lane and avoiding the ramp, is shown by yellow dots in the figure. This avoids swerving across the path of motor vehicles. You can see more problems from blue bike lanes in ["Blue lane": really a lane, or a diagonal crosswalk?](#)

The City of Portland, Oregon has been experimented with painting bike lanes blue to warn travelers of "high-conflict areas". Although the blue paint may help alert some motorists to the non-standard intersection, it does not make bad engineering safe. It would be much better to simply follow sound practice and avoid creating the conflicts.

*Our goal is to investigate the effectiveness of colored pavement markings in reducing conflicts. To do this, we have selected ten conflict areas with a high level of cyclist and motorist interaction and about which area motorists and cyclists had complained. We then chose seven for initial testing, and painted them blue. ... The conflict area in all cases had already been defined with dashed lines, as well as, in most cases, signs indicating the need for motorists to yield to cyclists. The painted area and its accompanying sign are intended to remind motorists that they are crossing a bicycle lane and need to look first and yield to any through cyclists. They are also intended to caution cyclists to be careful in the conflict area. [1]*

Another frequent source of hazards is bikeways that are crammed into inadequate space. The photo at right shows a very narrow shoulder (varies from 1½ to 3 feet wide) that was made into a dangerous bicycle lane in a recently awarded [Bicycle Friendly Community](#), Carrboro, North Carolina.



The width of this bike lane shoulder is much less than the 4 feet minimum width for a bike lane as specified in the AASHTO Guide [3]. Ironically, the road itself was hardly hazardous to start with. It is a one-way, 16ft wide, rural section, residential street five blocks long with a 4-way stop sign at each block. The posted speed limit is 20 mph.



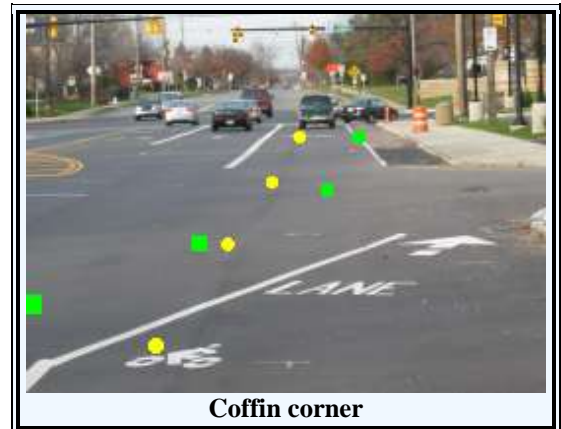
Unsafe bike lane [2]

There are other safety problems with this bike lane, including the adjacent ditch with no recovery area. The crown of the road and broken pavement increases the likelihood of riding into the ditch. Concrete culverts at driveway crossings create fixed object hazards.

This street is adjacent to an elementary school; presumably the dangerous bike lane was installed for children.

The Bicycle Friendly Community program promotes facilities like this without warning about or even acknowledging hazards introduced by poorly planned facilities. The only hazard considered is overtaking traffic (passing from behind). As we show in section 7, overtaking traffic is a very remote risk. Fortunately, Wayne Pein of the [North Carolina Coalition for Bicycle Driving](#) was able to convince the city to remove the bike lane signs.

Bikelanes often encourage mistakes by both cyclists and motorists – mistakes cause crashes. The photo at right shows a new bike lane in Berea, OH that passes to the right of a lane primarily for right turning traffic. Cyclists are directed to a route that makes them cross paths with turning vehicles. In the foreground is a sidestreet and a driveway to a drive-through pharmacy that will produce more conflicts with bicycle traffic.



Coffin corner

The bike lane stripes will discourage motorists from complying with Ohio traffic law § 4511.36(A), which says: *Approach for a right turn and a right turn shall be made as close as practicable to the right-hand curb or edge of the roadway.* The stripes are a traffic control device that encourages violation this law.

Notice in the photo both the car making a turn and the truck behind were turning improperly because drivers followed the lane markings. The green squares added to the photo show the correct path for turning traffic. The yellow dots indicate the proper route for a straight-through cyclist -- avoiding conflicts by staying near the center of the dual destination lane.

This intersection essentially violates recommendations in the *Manual on Uniform Traffic Control Devices* [4], which says (page 9C-4): *A through bicycle lane shall not be positioned to the right of a right turn only lane.* The MUTCD also says: *An optional through-right turn lane next to a right turn only lane should not be used where there is a through bicycle lane. If a capacity analysis indicates the need for an optional through-right turn lane, the bicycle lane should be discontinued at the intersection approach.*

An intersection with bike lanes striped right to the corner is referred to as a "coffin corner" because it is so dangerous. You can see more about this and several other mistakes including door zone bike lanes. See [Berea's Bicycle Blunders](#). All these blunders come in just 1/2 mile of roadway.

## The Door Zone

Bicycle facility design is serious business. Done wrong it kills. Some communities squeeze bike lanes into roads that do not have enough room. This creates serious safety compromises.

The city of Cambridge Mass. installed door zone bike lanes on several narrow and busy streets, including Massachusetts Avenue, [despite warnings that they were unsafe](#). The bike lane shown at right proved fatal for Tufts University graduate student Dana Laird in 2002. If you look carefully at the photo, you can see that the open car door blocks the entire bike lane. There is not room to avoid the door without encroaching into the motor lane. (Remember, a bike is about 2 feet wide. There is less than two feet between the open door and the left stripe.) You can see a [larger copy of this photo](#) from the photographer's website.

Unfortunately, many other cities also install bike lanes in the door zone (see bottom photo at right) and these cause also casualties to cyclists. You can read accounts of 16 recent door zone casualties (11 fatal) in an article called [The Door Zone Project](#).

One of the most inexcusable examples of carelessness in bike lane design is illustrated by this statement: *The City of Chicago installs bike lanes on streets as narrow as 44 feet wide with parking on both sides.* Chicago published a *Bike Lane Design Guide* [6] that includes plans showing how they achieve this claim. In their zeal to install bike lanes, despite inadequate space, they distorted the size of the cars and trucks depicted in the drawings.

John Forester [7] added dimensions for the vehicles depicted in [6] by scaling from the drawing. The vehicles are shown about 20 percent undersized. With the drawing falsified in this way, there seems to be almost enough room on this crowded street. This author believes the *Bikelane Design Guide* is a glaring example of engineering malpractice. (See illustration on next page.)

Installing striped bike lanes next to parked vehicles is, at best, a bad practice. If it is done anyway, the space required for parking space and bike lane combined is eighteen feet (see diagram on 2<sup>nd</sup> page below). The Chicago and Cambridge installations allow only about twelve feet, the minimum that meets AASHTO Guide standards. Other plans have been even worse. A proposed [bike lane in Austin Texas would allow only 10 feet](#) including the parking area.

Some cities combine a parking lane with a bike lane. This not only leads to riding in the door zone, it also encourages the dangerous practice of cyclists weaving in and out between parked cars. This "peek-a-boo" riding style can easily lead to collisions.

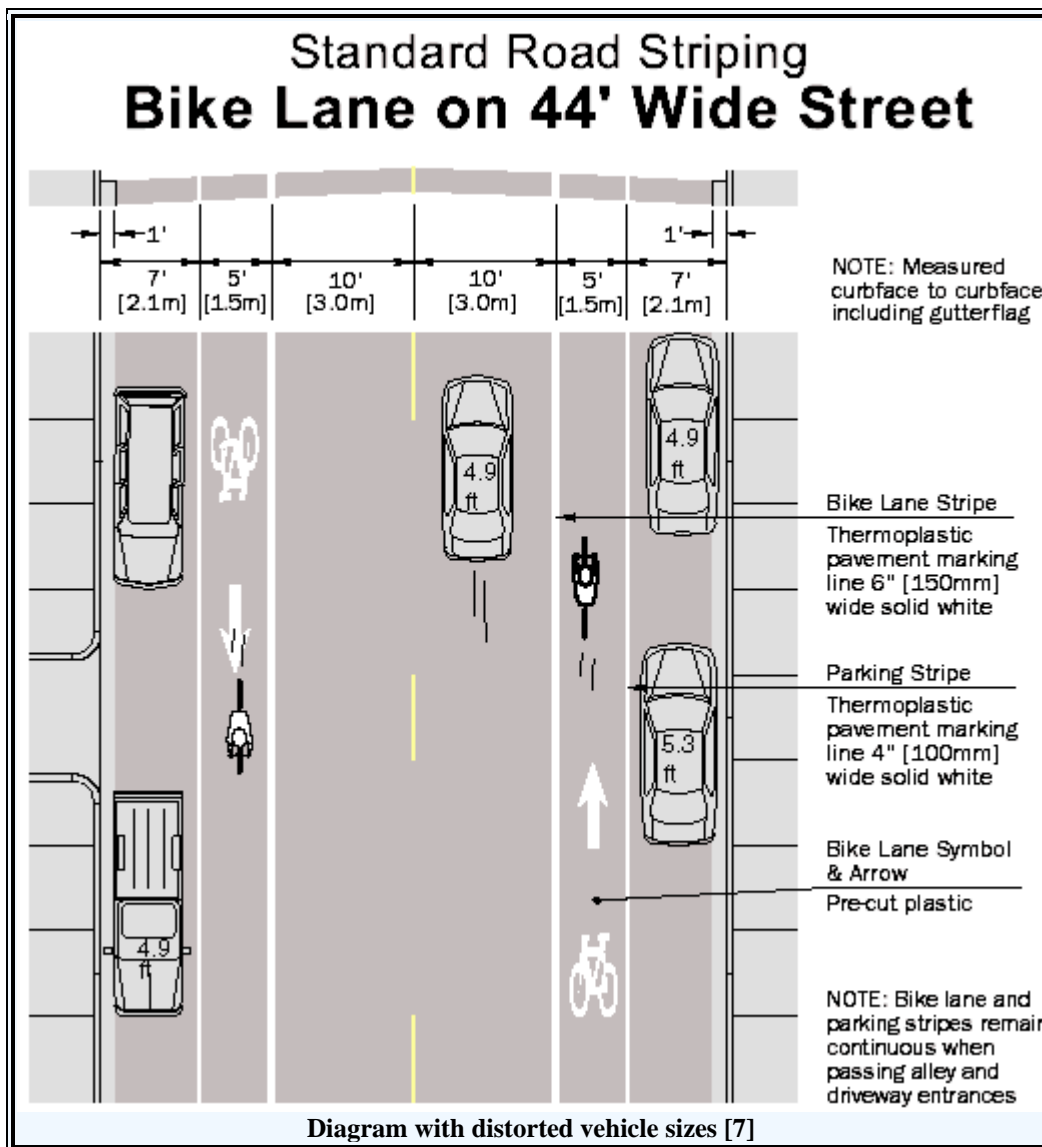
For more information about bicycle operation next to parked vehicles, including a unique idea of using "parking crosses" to mark a door zone buffer, see the article [Bicycling and On-Street Parallel Parking](#). The parking crosses (also shown in the diagram below) improve safety by discouraging door zone operation. They also encourage motorists to park within the parking lane. However, even if adequate space is provided, a bike lane stripe creates the intrinsic hazards described above. Better alternatives are described in part 9 of this series.

## The Most Dangerous Bicycle Facilities

Generally the most dangerous bicycle facility is a *sidepath* (a path beside the roadway). Such a path is essentially an asphalt sidewalk and it presents the user with the dangers of riding on sidewalks: a potential crash scene at every road crossing and at every driveway.

Note the sign in the photo at right that instructs the cyclist to walk his bike (across a driveway leading to a picnic area). There is no stop sign for traffic on the road in the background, nor are motorists asked to push their vehicles through the intersection. This author estimates that less than one cyclist in 1000 stops at the sign. Its purpose is apparently to deter lawsuits (blame the victims of crashes).



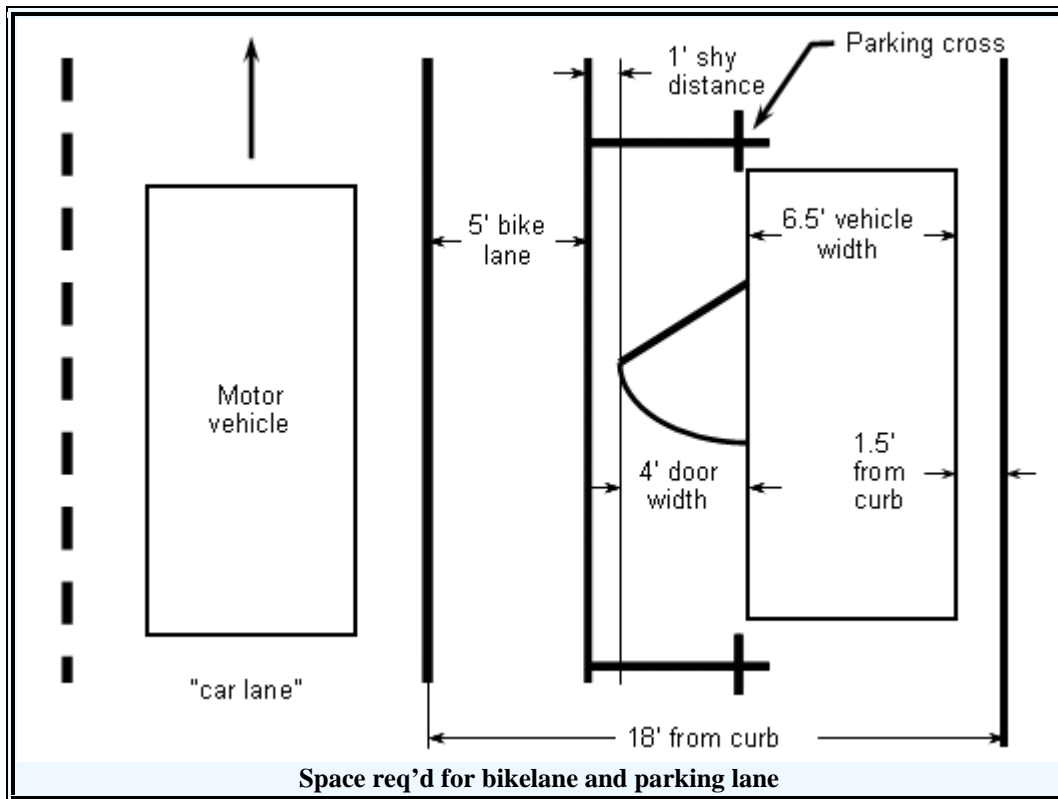


Riding on sidewalks and paths also introduces conflicts with pedestrians. Pedestrians are much more maneuverable than cyclists. They can stop or turn in a stride or even step sideways or backwards. Bicycles are vehicles; and they must maneuver accordingly. People walking on such a path do not expect high-speed traffic; they expect to be able to relax while taking a leisurely stroll.

Many bicycle facility designers introduce hazards because they simply do not understand bicycle operation. Often these designers are landscape architects, not trained in roadway design. They produce paths that twist and wind around and under trees, with sight lines obscured by foliage and other obstacles. These paths may look pretty, but they are unsafe except at walking speed.

In the photo at right, if the cyclist brushes his front wheel against the curbstone, his wheel will be diverted to his left. This would dump him into the roadway to his right, possibly under the wheels of a passing car. In addition, just around the curve in the background is a guard rail that has long bolts protruding towards the path. One of these could cause a nasty gash if brushed by a leg.





## Unfriendly Roads

In a later section of this article, we show how a well-designed road that is adequate for the traffic carried is an excellent bicycle facility. In other words, **every lane is a bike lane and every road is a bicycle facility**. Unfortunately, some roads are poorly designed, badly maintained, and overcrowded with traffic. Inadequate roads are less comfortable and less safe than they should be for all users, including bicycle drivers.

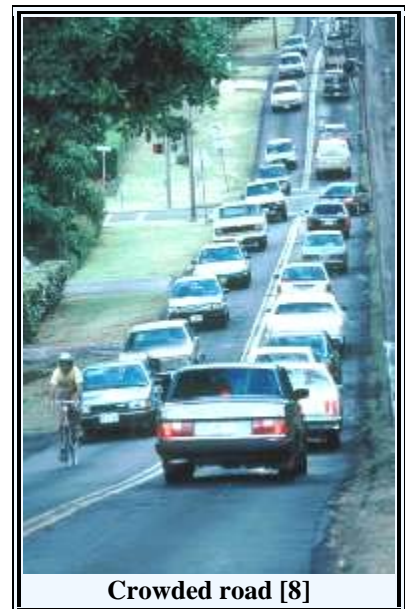
The most frequent road defects involve poor repair (potholes, cracks, etc.) Because bicycles are balanced vehicles, often with hard, narrow tires, surface defects affect cyclists more than other users. Other problems include confusing situations that induce mistakes, non-responsive vehicle detectors at demand actuated traffic signals and wide intersections with inadequate time for traffic to clear when the light changes.

In some developing areas, road improvements lag development. This causes extreme congestion as the roads are used beyond their capacity.

Heavy, high-speed traffic on what were once rural roads squeezes out cyclists and causes conflicts, particularly at intersections. You can read a discussion of this problem in the Triangle area of N Carolina in [Urban Traffic on Rural Roads](#) by Steve Goodridge.

## Hiding Behind Standards

Standards can not replace competence and knowledge by those who design bicycle facilities. This is especially critical when the standards have dangerous flaws such as the *Guide for the Development of Bicycle Facilities* [3]. Engineers are expected to do professional work as experts in their field [9]. However, we often see planners and engineers hide negligent bicycle facilities work behind weak standards.



Imagine if bridges were designed like bikelanes. Let's say a two-lane bridge is to have a load limit of 40 tons. The engineer, working according to official standards, would make the bridge strong enough to support one 40 ton truck, but not two trucks on the bridge at the same time or even one overloaded truck. After the bridge collapsed, everyone would blame the truck drivers for the accident. No professional engineering organizations would question this practice or correct the standards.

The bike lane that killed Dana Laird (see above) actually exceeded the minimum width of 12 feet for the combined width of bike lane and parking space (although not the "preferred" 14') specified in the *Guide*. Critical parts of the AASHTO bike lane standards are dangerously inadequate [10]. It may take a large legal judgment to make these standards safer.

Where there is not enough room to install bike lanes without adding explicit hazards (in addition to the intrinsic danger of separate facilities) then there is no excuse for installing bike lanes.

Professional Engineers are required to conform to a code of ethics: The National Society of Professional Engineers [NSPE Code of Ethics for Engineers](#) includes the following:

*Engineers, in the fulfillment of their professional duties, shall:*

[...]

2. *Perform services only in areas of their competence.*

Rigorous professional certification for bicycle planners and engineers is sorely lacking. Joining the Association of Pedestrian and Bicycle Professionals or taking a bicycle facilities design course from the Federal Highway Administration does not ensure competence about bicycling. We have suggestions for professional training in section 9 of this article.

If an engineer designed a bridge according to the methods often seen in bicycle facilities he would likely have his engineering license suspended or revoked for malpractice. At this time, we know of no engineer disciplined for designing dangerous facilities. The current state of public knowledge for bicycle matters is so poor that malpractice is normal and expected.

We should acknowledge that the AASHTO Guide, as badly flawed as it is about installing bike lanes next to parking and at intersection approaches, does at least specify minimums. Cyclists can and do cite the AASHTO Guide to block some of the worst proposals for substandard bike lanes.

## Bicycle Parking

The traditional schoolyard bike rack that holds a bike by its wheel was designed for children's bikes with cheap steel wheels. Most adult bicycles have lightweight aluminum wheels that can easily be damaged by these "wheel benders". Knowledgeable cyclists refuse to use them. The photo at right shows a concrete block with wheel slots. This is much worse than a schoolyard rack. The cyclist has instead hitched to a bench that supports his vehicle better.



## Recommended Reading About Bicycle Facilities

[Bike Lanes and Safety Research](#)

[Bike Lane Contrarian](#) slideshow

[Articles on Bicycle Facilities](#), (John Forester critiques)

[A Realistic Look at Bicycle Facilities, Laws and Programs](#)

[Lessons of the Vassar Street Sidepaths](#)

[Wide Outside Lanes are Superior to Bike Lanes](#), Why segregation is bad

[Bike Lane Stripes: Do they improve conditions for cycling?](#)

[Critique of FHWA Bike Lane Versus Wide Curb Lane Study--Faulty design and analysis plague this often-quoted study](#)

[Implications of Universal Access Principles for Bicycle-Specific Roadway Markings](#)

[Dilemmas of Bicycle Planning](#)

[Bikeway Activists in the Wrong Lane](#)

[Cycle path safety: A summary of research](#) (British article)

## Footnotes

- [1] "[Blue Bike Lanes for Greater Safety](#)", article on the Portland, Oregon web site.
- [2] Wayne Pein photo.
- [3] *Guide for the Development of Bicycle Facilities*, [American Association of State Highway and Transportation Officials](#), 1999
- [4] [Manual on Uniform Traffic Control Devices, Part 9 Traffic Controls for Bicycle Facilities](#).
- [5] [Robert Winters photo](#) from *Cambridge Civic Journal*.
- [6] The City of Chicago [Bike Lane Design Guide](#).
- [7] The illustration appears in a review by John Forester: [Bicycle Facility Selection: A Comparison of Approaches by Michael King, Architect Bikelane Design Guide by Chicago DOT](#)
- [8] [Dan Burden photograph](#), [www.pedbikeimages.org](http://www.pedbikeimages.org).
- [9] Each state defines requirements for a Professional Engineers license required for certain public safety functions, such as designing buildings, roads and bridges. Portions of the Code of Ethics have been incorporated into state law. For example, the Ohio Administrative Code §4733-35-03(B) states:  
*The Engineer or Surveyor shall undertake to perform assignments only when he and/or his consulting support are qualified by training and experience in the specific technical fields involved.*
- [10] For another critique of these standards, see [AASHTO and Door Zone Bike Lanes](#).

## 6. Blunders in Traffic Law and Enforcement

### What's Wrong With Bicycle Traffic Laws?

Motor vehicle traffic laws are generally uniform throughout the 50 states. A driver traveling from state to state need not learn a new set of laws with each border crossing. Likewise, within each state, local authorities have only limited powers to enact local ordinances. The basic set of the "rules of the road" is fairly consistent throughout the country.

Unfortunately, uniformity of rules is not the case for bicycle traffic laws. Part of the reason for confusion is the misguided attitude that bicycles are toys for children, rather than vehicles used by adults. Another significant reason is that the people who make the rules are not cyclists; they do not know how to operate a bicycle properly.

Many governments at the state and local level treat cyclists as incompetent children or third-class citizens. Some forbid cycling on roadways, but instead direct cyclists to use more dangerous facilities such as sidewalks and pathways beside the road. Other directives confine cyclists to the edge of the road, even where the road edge may not be safe. In many states, local ordinances form a crazy-quilt of dangerous and discriminatory rules that vary from community to community and that conflict with rules followed by other drivers [1].

The photos at right (Moore Rd. in Avon Lake, OH -- once a "Bicycle Friendly" city) shows a road closed to bicycles. Ironically, Moore Rd. has a short and narrow bicycle lane extending from Lake Rd to an elementary school about a block away. The bike lane is about three blocks from the NO BICYCLES ON PAVEMENT sign shown in the photo above. Apparently it is illegal to use this bike lane.

**Update:** Major state law reforms sponsored by the Ohio Bicycle Federation were passed into law in 2006. The most important of these reforms finally provides uniformity of Ohio bicycle traffic laws. The Avon Lake "bike ban" is now illegal [1].

The Uniform Vehicle Code forms a model for the traffic laws in most states. While the UVC is much better than most state codes, it still has much room for improvement [2].



"NO BICYCLES ON PAVEMENT"



Bike lane on road closed to bicycles

The safest way to operate a bicycle is as the lawful driver of a vehicle. This means riding on the roadway following the same traffic rules as other drivers. The general traffic laws support what we call "Vehicular Cycling". Cyclists who operate this way have one-fifth the crash rate of the average. Paradoxically, the best and safest practices are sometimes prohibited while dangerous mistakes of novices are encouraged by special bicycle-specific laws.

### **Why are traffic laws important to cyclists?**

**The safety and mobility of cyclists depends on equitable traffic law.**

**Traffic laws influence:**

- **How cyclists are taught to ride**
- **How the police treat cyclists**
- **What the motoring public expects from cyclists**
- **What happens in court or with insurance adjustor if a cyclist is involved in an collision**

### **Categories of Bicycle Traffic Law Defects**

1. Mandated dangerous practices
2. Non-uniform rules (unnecessary differences in driving rules)
3. Deny equal rights or equal protection under the law
4. Unnecessary regulation (gov't interference)

### **Examples of Serious Defects in Bicycle Traffic Law**

- Mandate riding wrong way (no current state laws but occasionally proposed)
- Mandate riding on sidewalk
- Prohibit bicycles from main streets ("stealth" sidewalk law)
- Mandate riding on sidepath, shoulder or bike lane
- Local "regulation of the operation of bicycles" (non-uniform laws)
- "Shall ride within 3 feet of right edge of road" (or keep to curb, etc.)
- "Shall ride as close as practicable to the right-hand curb"
- Cyclists not due "ordinary care" (Illinois case law)
- Mandatory helmet law (especially without "contributory negligence" exclusion)
- Prohibit normal vehicular left turn
- "Shall ride single file"
- Irresponsible brake requirements (skid the wheel)

### **Enforcement Problems and Behavior of Public Officials**

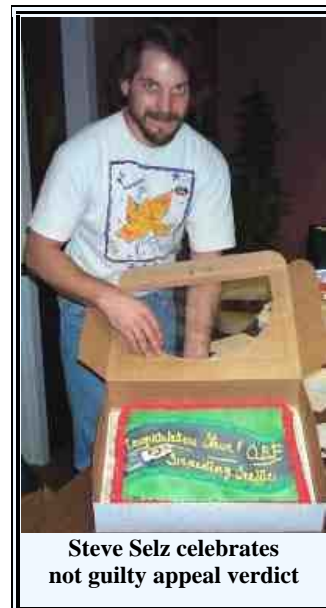
Correct enforcement of traffic law is as important as having good laws. This means the police must be properly trained in bicycle operation and they must understand bicycle traffic laws. Misinformed police often make errors of omission by ignoring illegal practices that lead to crashes. They occasionally make errors of commission by harassing lawful cyclists for riding in ways that they think are dangerous but that are actually safe and legal. Too often, police fail to take seriously road rage and other types of harassment directed at cyclists.

**A mistrained officer can spoil your day.**

All of society suffers when a cyclist is unjustly cited for riding lawfully. Police, prosecutors and judges have their attention diverted from what they should be doing. But the cyclist suffers most because, even if he beats the rap, he will not be made whole for either his legal expense or the aggravation suffered.

Below are excerpts from a few of the infamous cases where lawful cyclists were harassed by the American Legal System. All of these were caused by ignorance by police, prosecutors and sometimes judges. You can read more about these and other cases in the article [Bicycle "Right to the Road" Cases](#).

- The Illinois Supreme Court in *Boub versus Wayne Township* (1998) ruled in a 5:4 decision that cyclists are not "intended" users of roadways unless the roadway is signed as a bike route or marked with bike lanes. This means a person driving a bicycle is not due "ordinary care" from those who maintain the roadways.
- In the "impeding traffic" case, *Selz vs Trotwood* Montgomery County, District Court (case no. 99-TRD-4409, unreported), consider a statement by the city attorney that shows he considers bicycle drivers to be second class users of the road, not entitled to equal protection under the law. *Frankly, if it's 2:00 in the morning and there's no traffic around, there's no reason why he can't be on the roadway going eighteen or twenty miles an hour...* Selz was found guilty in the local court, overturned on appeal with the help of the Ohio Bicycle Federation.
- Cyclist Ken Clark was cited by an officer because he was riding about four feet from the edge of the right lane while rounding a curve on Plymouth Road in Ann Arbor. He had moved further left so following drivers could see him in time to avoid a crash. An officer illegally ordered him to ride on the sidewalk and then issued a citation. The city prosecutor claimed that Michigan's "as near as practicable" law requires staying within two feet of the edge of the road, under any circumstances, even if it is not safe to ride so close to the edge of the road. Fortunately, the judge did not agree.



## About Helmet Laws and Bicycle Registration

One of the most contentious issues cyclists face is the promotion of laws that would require persons operating bicycles to wear helmets. Helmet laws are promoted by well-meaning public health advocates who know little of cycling and by not-so-well-meaning insurance companies looking for an excuse to deny compensation to victims.

This author believes that a helmet can reduce injury from a crash and therefore, always wears one. Promoting helmet use as the primary (or the only) safety measure amounts to advocating *safe crashing*. Not crashing is much more important. We must teach people to ride safely.

Helmet laws are government interference in the private affairs of citizens. In most cases the government officials know little about cycling. The worst problem with helmet laws is they can actually make matters worse by creating a perception that the problem is solved - when it truly isn't.

Some communities offer a registration program to deter theft and aid recovery of stolen bicycles. **Any registration program must be voluntary.** If police make a serious effort to return stolen bicycles, then the program can be valuable. However, there have been cases where mandatory bicycle registration has become a "tool" for harassing lawful cyclists.

## Footnotes

[1] This author surveyed and rated the [local bicycle traffic ordinances for 62 NE Ohio Communities](#). About half of the communities included ordinances that mandate one or more dangerous practices (some corrected after being notified). A large part of this problem is due to an Ohio law that allows local authorities authority for *regulating the operation of bicycles*.

[2] This author started a small committee to study traffic laws of interest to cyclists, propose improvements based on the UVC as a "model", and then to rate the various state laws against the model. You can see the results to date at [Reforming Bicycle Traffic Laws](#).

## 7. Smarter Solutions -- Understanding the Real Issues

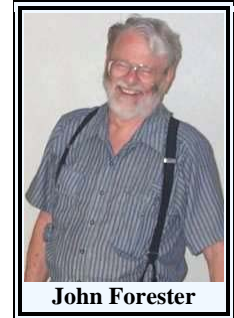
***Cyclists fare best when they act and are treated as drivers of vehicles.***  
**-- John Forester, author of *Effective Cycling* [1]**



***Cyclists should expect and demand safe accommodation on our public roads, just as does every other user. Nothing more is expected. Nothing less is acceptable.***  
**-- Jack Taylor of Pro Bicycle.**

All engineers, planners, public officials and advocates whose work affects cyclists simply **must** understand that bicycles are vehicles that should be operated on the same roads as other vehicles [1,2]. The training should include:

1. Bicycle driving classes
2. Experience of cycling *in traffic*, not just on quiet country roads
3. Appropriate seminars, workshops, conferences, etc. taught by *competent* cyclists [3]
4. Studying appropriate literature [1,2]



For generations, people in our society have been taught that riding in the roadway is dangerous because of traffic passing from behind. There never has been any evidence for the truth of this teaching (see below). But well-meaning authority figures accept it as a matter of fact and pass it along to the young. This perpetuates a "cycle of misinformation".

Another factor that makes cyclists reluctant to use busy roads is the notion that they are inferior to road users who have motors. We have been taught that our highest duty is to stay out of the way of cars. People who try to stay out of the way often ride on sidewalks. Then at intersections or driveway crossings, they appear "out of nowhere" and are hit.



It is often much safer to obviously be "in the way", by riding in the roadway and using the full lane where it is not safe to allow faster traffic to pass. Move to the right to let traffic past only when passing is safe. In the photo at right, the cyclist is deliberately deterring any unsafe attempt to pass at a blind curve.

Public officials must accept cyclists as legitimate road users entitled to whatever space they need for safety and reasonable convenience. However, cyclists must be taught to be cooperative and considerate of other road users and they should learn to find ways to allow traffic to pass safely with no more delay than is reasonable and necessary.

The experienced cyclist in the photo below is "asking permission" to get in someone's way briefly so he can merge to the left turn lane. He waits until a driver slows to allow him to make his merge. This is legal and quite safe so long as he does not try to force his way. "Negotiating" with traffic this way is an important skill taught in *Effective Cycling*.



Learning to cycle properly as the driver of a vehicle is not difficult except for "unlearning" the wrong information we have all picked up since childhood. This wrong information causes mistakes that prevent discovering better methods. It is much more efficient to learn through successful experience than failure. Experts estimate that learning to ride effectively in traffic takes:

1. About 10,000 - 20,000 miles to learn by yourself through trial and error
2. About 4,000 - 6,000 miles through a cycling club with a mentoring program
3. About 2,000 - 3,000 miles after a good class in bicycle driving

Note that the experience required above involves cycling in traffic by someone willing to learn. We know people who have ridden many tens of thousands of miles on low-traffic roads without learning how to drive a bicycle.

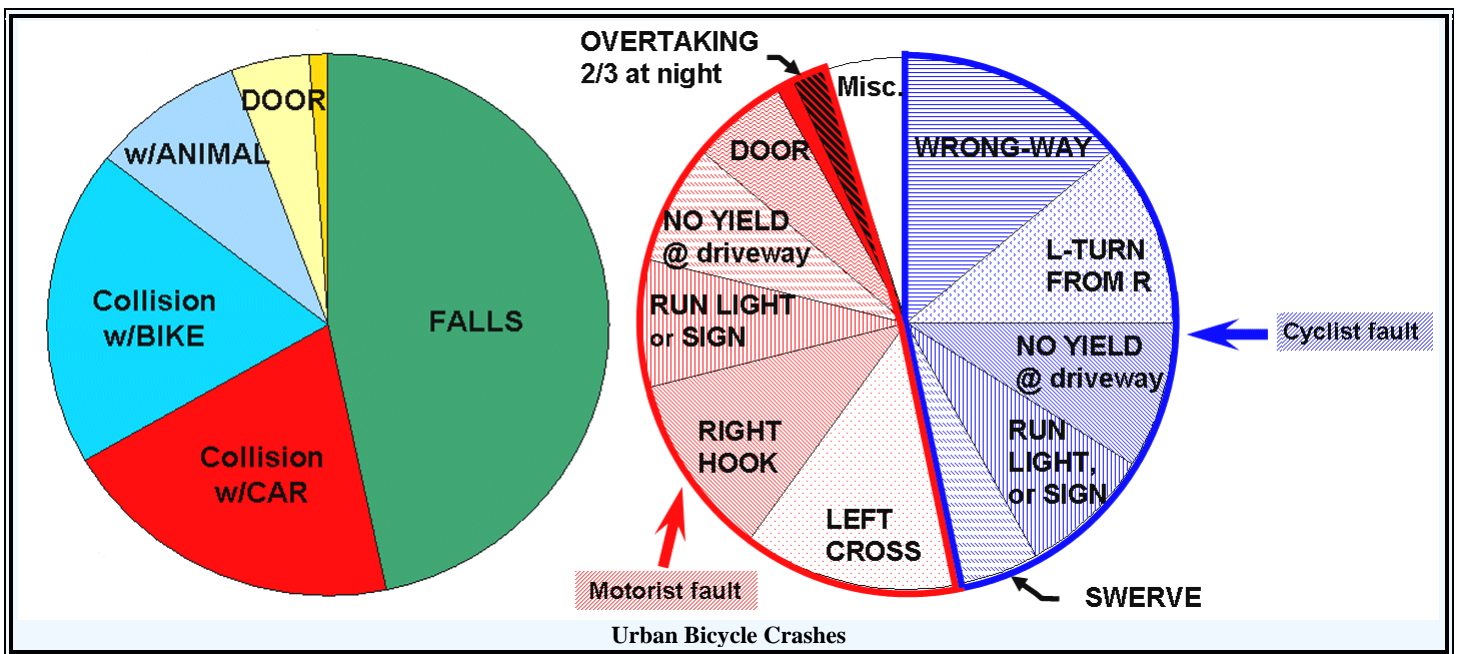
Note that the experience required above involves cycling in traffic by someone willing to learn. We know people who have ridden many tens of thousands of miles on low-traffic roads without learning how to drive a bicycle.

### Cycling Safety: Perception vs. Reality

Bicycle crash studies, first performed in the 1970's and continuing to the present show that the "fear from the rear" is not justified by fact. The chart at left below [4] shows that only one of six significant bicycle crashes involve cars. Nearly half are "single vehicle" crashes (mostly falls).

The right chart [5] below puts the "fear from the rear" in its place. Only about three percent of car-bike crashes are caused by an overtaking driver and 2/3 of those occur at night. Nighttime crashes primarily involve either impaired drivers or cyclists that lack adequate safety equipment (proper lights and reflectors). Under urban daylight conditions, overtaking collisions are *extremely rare*. The real hazard involves crossing and turning traffic, primarily encountered at intersections.

Safety studies have also shown that bicycle commuters have a much lower crash rate than the average population. This is despite the fact that they tend to ride on the busiest roads, in the heaviest traffic and sometimes after dark or in bad weather. **Experienced cyclists in difficult conditions are safer than inexperienced cyclists riding in easy conditions.**



### Delaying Traffic: Perception vs. Reality

Many non-cyclists believe that bicycles on the road "get in the way" and delay "real traffic". Much of this is due to the attitude that cyclists are just playing in the road and that they do not deserve to use roadway space. There is also the attitude that motorists have the right to drive at the speed limit, if not faster.

The reality is that ALL vehicles delay traffic. This is a consequence of the law of nature that two objects cannot occupy the same space at the same time. While bikes sometimes delay traffic, so do cars. Think about this next time you are waiting for a car to make a left turn ahead of you. If that were a bike, you would probably have room to be on your way. Likewise, as shown below, a courteous cyclist stopped at a traffic light will move up and to the left to allow following drivers to turn right on red, if it is safe and legal.

The actual delay to traffic from a bicycle is almost always trivial. Most traffic is able to pass with no impact other than slowing a bit and perhaps changing lanes. Occasionally, a passing driver must wait a few seconds in order to fit a gap for safe passing. Very rarely is the wait as much as 30 seconds.

Remember, the passing driver needs only to slow to the speed of the bicycle. Typically, the bicycle is traveling at half the speed limit, thus the delay is half what it seems. After passing, the motorist can go faster in the open space ahead of the bicycle. Most soon catch up to their earlier place in the traffic queue. This means the real delay is usually zero. The presence of a bicycle simply redistributes the delays already present due to other traffic [6].



**Be my guest**

## Footnotes

[1] All planners and designers of bicycle facilities must be familiar with the books of John Forester: [Effective Cycling](#), MIT Press, 1993 and [Bicycle Transportation](#), MIT Press, 1994. It takes some effort to get past the confrontational attitude of the author, but once you do, you can learn from the master.

[2] A good concise source of cycling information is [Bicycling Street Smarts](#). This booklet is the bicycle driver manual in PA, OH, FL, AZ, ID.

[3] Competent cyclists referred to above are able to *drive* a bicycle as a vehicle in traffic, according to the methods described in refs. [1] and [2] above. There is more to cycling than steering and balance.

[4] Data from Kaplan, "Characteristics of the Regular Adult Bicycle User"

[5] Data from Cross and Fischer, summarized in Forester, *Effective Cycling*

[6] For a through discussion of the delay issue, see chapter 8, "The Effect of Cyclists on Traffic" in the book *Bicycle Transportation* by John Forester, (Note [1] above.)

## 8. Smarter Solutions -- Education and Advocacy

We need to educate society at all levels to overcome the misinformation that has been dispensed for several generations. Educational measures include:

1. Public service messages
2. Posters & fliers
3. Newspaper articles
4. Web pages (like this one)
5. Bicycle driving classes
6. Public officials setting good example
7. School programs *with knowledgeable instructors*
8. Appropriate questions on driver license test



**Cyclists at night**

An extremely dangerous and very common mistake made by cyclists is riding at night without the proper lights -- often without **any** lights. It is for good reason that all states require a headlight on a bicycle used at night. Note in the top photo the bike headlights are plainly visible but otherwise, the two cyclists are inconspicuous despite several reflective items on their bikes and clothing. Unfortunately, most night-time cyclists do not know enough to use lights.

The Consumer Products Safety Commission is largely to blame for this problem because they mandate a set of reflectors for bikes but they do not mandate lights, a standard mounting system for lights or even a hang-tag to warn consumers that lights are needed at night. [Only one of the required reflectors provides a significant safety benefit](#) (the rear one) and that one is not nearly as bright as a standard SAE auto reflector. The other reflectors are nearly worthless.

Most states' bicycle laws mandate these nearly-useless reflectors. **Many Novices are misled by all the reflectors, which seem to serve as safety equipment.** Bicycle manufacturers lobbied for the reflector

requirements, rather than lights. Therefore the manufacturers are also culpable for the low usage of proper lighting.

Even in daytime most people who use bicycles do it badly. Earlier, we showed how nearly everyone has been exposed to misinformation about cycling. We have a huge problem to overcome.

People in our society must understand that bicycles are vehicles that should be operated on the same roads, by the same rules and with the same rights as other vehicles. Horsepower and speed do not confer superior rights. Using pedestrian methods (unless limited to pedestrian speeds) is extremely dangerous. The standard rules of the road were developed to allow safe and efficient travel for all.

Transportation engineers and planners whose work affects cyclists must understand the best methods of bicycle operation. Their designs must encourage -- and certainly not discourage -- these best practices.

## Teaching Children

One popular means for teaching children is at a bicycle rodeo as shown at right. If the community has a police bike patrol, the officers should be involved. Rodeos can be beneficial as small part of a larger program if the people teaching are knowledgeable. Perhaps the best benefit of a rodeo is it may offer an opportunity to reach the parents and distribute a [parents' guide](#).



A much better way to teach children [1] is to train several instructors in a certified program and then use them to teach groups of children through a school or youth organization. The instructors must be thoroughly trained in *bicycle driving* so they avoid the usual mistakes. We should emulate the Red Cross water safety program, which employs well-trained instructors who work from a carefully designed syllabus instead of untrained authority figures who make up advice as they go.

Cycling advocacy organizations must work to disseminate information widely to overcome dangerous myths about bicycle operation. One way to teach society is a series of well-written and frequently played public service announcements in the media (radio, television and newspapers). We must also reach authority figures, police, teachers and police so they stop spreading misinformation but instead begin to encourage the proper techniques.

Ultimately, parents must learn to appreciate correct cycling techniques so they do not miseducate their children or oppose efforts to provide proper lessons. This means society at large must have a basic understanding. As soon as a child learns to steer and balance a bicycle, parents should start teaching the basics of *bicycle driving*. With competent teaching, children of about age seven or eight can ride safely on residential streets.



The seven year old in the photo at right is demonstrating correct technique for a scan, yield and left merge. She is on a quiet street suitable for her age. By about age ten, she should be ready for four lane streets with moderate traffic and by twelve, for nearly any road.

This author has a PowerPoint Slideshow for parents that you can access on the [LAB Reform Cycling Education Pages](#). The show can help you teach your children the best and safest practices.

## Teaching Adults

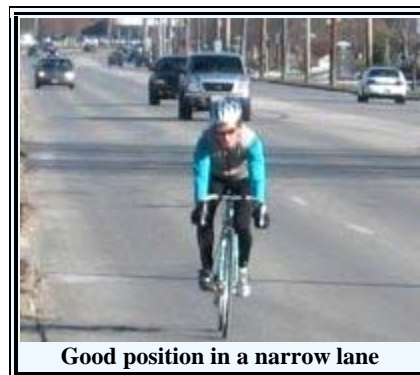
The most through bicycle driving program ever developed for either adults or children, is [Effective Cycling training](#). This was based on the book *Effective Cycling* [2]. Although these classes are not currently being offered, the shorter 9-10 hour *BikeEd "Road I"* course [3] was derived from the original 30 hour course. For less extensive training, there is an *Effective Cycling* video [4] and this author offers a "[Bicycle Driving Seminar](#)" PowerPoint presentation.

We need to reach **everyone** with the essential message that bicycles are vehicles that should be operated on the same roads, by the same rules and with the same rights and responsibilities and

other vehicles. If we can get this message broadly distributed, then there will be far fewer bicycle blunders and people will be more receptive to the idea of bicycle driving lessons.

## Beneficial Advocacy

Traditional "bike safety" teaches cyclists to stay out of the way of cars. This encourages bad lane position. When other drivers are passing too close, cyclists need to know to move *left* (further into the traffic lane) to show that the passing motorist must use the next lane to pass. If you "hug the curb" you invite them to "squeeze by". On a road with narrow lanes, the left tire track is often a good place to ride, as demonstrated in the photo at right.



Riding further left has other safety advantages as well: (1) The cyclist is where other drivers are looking for traffic, thus more likely to be seen. (2) Staying further left maintains a safety zone to the right. (3) The road surface is usually in better shape away from the edge of the road.

We have sharply criticized "bicycle advocates" for ulterior motives in promoting bicycling. Their misplaced advocacy makes cycling more dangerous and more difficult and it threatens our right to use the roads. Actually, bicycles need no advocates; they are only machines. Bicycles are not concerned whether communities are "bicycle friendly". However cyclists do need knowledgeable friends who will teach the best practices, reform bad traffic laws and protect their rights.

**If we are to get people to cycle effectively, we must teach them the "secret" of good road position.**

Helping cyclists report road hazards is a very useful project for a local advocacy organization. For a good example, see the Web page of [The Silicon Valley Bicycle Coalition](#). It is even better if the group collects reports, passes them along to appropriate government officials and maintain a list of reported hazards (in case a hazard is not fixed and someone gets hurt). See the Crankmail Web Site (Cleveland area bike clubs) for a [Road Hazard Report Form](#).

There are organizations that provide beneficial advocacy. We list a few below.

- [Ohio Bicycle Federation](#). (OBF developed a [Cyclist Friendly Community Program](#), including an extensive Toolkit.)
- [NC Coalition for Bicycle Driving](#)
- [PA Bicycle Access Council](#)
- [Bicycle Transportation Institute](#)
- [The Silicon Valley Bicycle Coalition](#)
- [Equal Rights for Cyclists Campaign](#)
- [Bicycling Life](#)
- [Bike Lakewood](#)

## Footnotes

[1] This author's [personal web pages](#) offer many ideas and materials for teaching both adults and children.

[2] [Effective Cycling](#), MIT Press, 1993

[3] See the list of [Certified League Cycling Instructors](#), to arrange a course or to learn how to become certified yourself.

[4] The [Effective Cycling Video](#), is available for \$25 from League of American Bicyclists, phone 202 822-1333 or email to [bikeleague@bikeleague.org](mailto:bikeleague@bikeleague.org).

## 9. Smarter Solutions -- Appropriate Facilities & Best Practices

1. Train engineers, planners, officials
2. Practice "benign neglect" -- often no special treatment is needed
3. Remove the worst facilities

4. Assuring cyclist access to roads and bridges
5. Try "better practice": "stripeless bikelanes"
6. Follow BEST practices:
  - o Well designed, built & maintained roads
  - o Curb lane has adequate width
  - o Cyclists encouraged to follow rules of road

## Training Engineers, Planners, Officials

Earlier, we asked rhetorically: "How would you like to drive a car on a road designed by an engineer who does not know how to drive and does not understand the rules of the road?" Those who plan and design bicycle facilities out of ignorance because they do not know how to operate a bicycle as a vehicle and thus create hazards are committing malpractice. To avoid the risk of malpractice, get some training [1]. (As an interim measure, at least employ consultants with significant and relevant experience.)

Simply attending a good seminar on vehicular cycling is not enough, although it certainly helps. The planner or engineer must thoroughly understand why bicycles must be operated as vehicles in order to resist pressure for ill-advised facilities from misinformed "bicycle advocates".

How can you tell if someone, including yourself, is a competent bicycle driver? A quick indicator is the ability to make a left turn in heavy traffic by "negotiating" with other drivers. (See photo "Left merge in traffic" in section 7 of this article.)

Every lane is a bike lane. This means those who plan or design bicycle facilities (including all non-freeway roads) must understand correct bicycle operation and design any facilities consistent with **best practices of bicycle driving**. The most comprehensive reference that should be familiar to transportation engineers is [Bicycle Transportation](#), by John Forester, MIT Press, 1994. A short article that should be read and understood by all bicycle planners is [The Dilemmas of Bicycle Planning](#) by Paul Schimek.

## Benign Neglect

"Bicycle Advocates" (people who promote the bicycle to advocate for other agendas, such as reducing car use) argue that roads are designed for automobiles, not bicycles. Actually, major roads are wider and stronger than they need be for automobiles because they are designed for trucks. Since automobiles are lighter and smaller, truck roads are also quite suitable for cars. Bicycles are still smaller and lighter, so well-designed roads are certainly adequate for bikes.

The picture at right shows a very good road for cycling. It has multiple lanes (5) that allow faster traffic to pass easily. The surface is in good condition and it is thoroughly salted in winter. Sewer drains are in the curb face, so they pose no hazard. The vehicle detectors at traffic lights are not marked but they work for any cyclist who knows where to stop. Most busses (but not the one pictured) carry bike racks, handy in case of bad weather or mechanical problems.



Good bike route

The cyclist in the photo was riding rather close to the curb. This position encourages passing drivers to squeeze past him. (The bus driver passed with adequate room as would be expected of a professional driver.) This author advises riding about one foot further left (in the right tire track) so drivers will realize that they must change lanes to pass. A cyclist who knows proper lane position will find this is an excellent route. The most valid complaint about the road (U.S. 42 near Cleveland, OH) is that it is not scenic.

This writer has no doubt that bicycle traffic was not considered when the road was built or recently repaved. Indeed, the city engineer did not know, until this author told him, that the vehicle detectors work for bicycles. This is a good example of benign neglect -- a well maintained road that is perfectly suited for bicycle transportation.

How might the road above be improved? Marking the vehicle detectors would help. If money were no object, another 2-3 feet of space in the right lane would be useful when traffic is heavy. But most of the

time, traffic is not heavy so extra width would be wasteful. The greatest room for improvement is in education: Teaching cyclists, motorists and police that bicycles are vehicles that should be operated on the same road, by the same rules and with the same rights as other vehicles. Be sure to teach cyclists the "[secret](#)" of [proper lane position](#) so they are safer and more comfortable on the road. And teach motorists that cyclists belong on the road, **not** on the sidewalk.

Where space permits and traffic volumes justify the expense, a wide curb lane, as is shown in the photo at right, benefits all users of the roads. A wide lane helps motorists pass safely without delay. The extra space also helps cyclists feel more at home on the road. Wide curb lanes should be the preferred means of "accommodating" bicycle traffic. Wide lanes do not cause the safety hazards that separate facilities do. Where the curb lane is not wide enough for sharing between a bicycle and a motor vehicle, the cyclist must be expected and encouraged to use the full lane.



Wide Curb Lane [3]

In the photo, notice how the passing motorist is allowing generous clearance, yet not encroaching in the oncoming traffic lane. Also note the marking for an obstruction: a paint stripe that warns a cyclist away from a drain grate in the roadway. This is good practice consistent with guidelines in the *Manual of Uniform Traffic Control Devices*.

### Not-So-Benign Neglect

Neglecting to fix road hazards exposes cyclists to danger. Public officials, highway engineers, road maintenance supervisors, and others concerned with building and maintaining roadways must understand that bicycles are balanced vehicles, often with hard, narrow tires and without a soft suspension. This makes cyclists highly vulnerable to road surface defects, such as bumps, holes, ridges and slots.

A bump produces an unpleasant jolt to the cyclist, can cause tire and/or rim damage, and can cause a crash if the cyclist swerves to avoid the bump or loses control. A hole produces a severe jolt and can cause a serious **stopping fall**, where the wheel is stopped and momentum carries the cyclist over handlebars. Ridges and slots nearly parallel to the line of travel can force the wheel to the side, producing a **diversion fall**.

The defect shown in the top photo at right is a deep slot at the joint between concrete of the roadway and a separate pour around a drain grate. Such defects are common on old concrete roads. This one may even be big enough to bring down a motorcycle. This author took a one-page [list of road hazards](#) with photos and explanations of the dangers involved to a city council meeting. By the next day, most of the defects had been temporarily patched.



Crack in road at drain grate seam -- a serious fall hazard

Safer seam around drain grate. Cracks developing here are less likely to trap a wheel.

When a city is informed of defects such as shown at right, it must promptly fix the problem or be liable for any injuries caused. If not informed, officials may claim ignorance of the defect as a legal defense. It is better if the city welcomes the reporting of defects by making it easy via a web site report form or a telephone "hotline". The best cities train their road maintenance supervisors and other officials so they recognize, understand and when possible prevent these problems.

### Roadway Shoulders

Shoulders are a popular place for touring cyclists riding in the country. Riding on the shoulder is appropriate for one who is cycling along a freeway. But on an urban road, the shoulder is often NOT a safe place to ride. A shoulder cyclist is much more likely to suffer a collision with turning traffic because other drivers do not look for conflicting traffic off the roadway. In addition, the shoulder is likely to accumulate glass, gravel and other debris because passing traffic does not "sweep" it clean. In some

states, operating a vehicle (including a bicycle) on the shoulder is technically illegal. This could cause a serious legal problem in the event of a crash. This is why experienced cyclists avoid shoulders on urban roads.

A small shoulder protects the edge of the pavement from being broken by keeping heavy wheels nearer the middle of the road where the road is better supported. A two foot shoulder is usually enough for this benefit.



In the photo at right, the travel lane is of marginal width to allow faster traffic to pass a bicycle. The four feet of pavement in the shoulder is largely wasted as far as cycling is concerned. If the fog line were moved over as indicated by the dashed line, then the lane would be wide enough to share with faster traffic. The remaining shoulder would still protect the edge of the pavement.

### Access to Bridges and Freeway Shoulders

In many U.S. states (particularly in the West) cyclists are permitted access to the shoulder of freeways in rural areas or where a reasonable alternate route is not available. In the photo at right (Highway 370 in MO, crossing Missouri River), the sign tells cyclists to ride on the shoulder. The safety record for such access is quite good because, except at interchanges, there is no turning or crossing traffic to produce a hazard.



Even in cities, there are places where cyclists should be allowed freeway shoulder access to cross an obstruction, such as a river, by entering just before the bridge and exiting just after. In some cases, a freeway replaced an older route that once provided cyclist access. Moreover, a new, cyclist-prohibited freeway bridge is likely to be safer than the old, cyclist-permitted bridge. In many states, the traffic laws must be corrected to permit freeway shoulder access.

### Where Separate Facilities May be Appropriate

Separate bicycle facilities are helpful in some situations: (1) As [shortcuts or supplements to the road system to improve connectivity](#). Examples include connecting "sprawl" neighborhoods, through parks or other places where cars are not welcome or to bypass a "traffic calming" barricade. The photo at right shows a cul-de-sac where a short path would be useful. (2) For recreational trails. (However be careful at road crossings.) (3) On long-narrow bridges where on-road access would otherwise not be allowed. (However, beware the approaches and avoid 2-way paths,)



In a very few places, bike lanes may actually improve conditions for cyclists. John Allen gives an example on the [Charles River Road near Boston](#). However, generally a bike lane provides more illusion of safety than reality.

### Alternatives to Separate Facilities

In previous sections, we have shown that separate bicycle facilities often introduce hazards because they discourage following of the rules of the road. In addition, many of these facilities have dangerous design defects. A correctly designed, properly constructed and well maintained road is almost always the best bicycle facility.

Where bicycle facilities **must** be installed because of political pressure from the uninformed consider ["stripeless" bike lanes](#) instead of traditional bike lanes. These consist of a bike stencil with arrow (sometimes called a "Sharrow") or similar marking, (another style is a "chevron") with no extra lane stripes. Be aware that a pair of bike lane stripes is a traffic control device that tells people where to ride. As we have seen in an earlier part of this series, bike lane stripes often tell cyclists to ride in an unsafe place.





**We should never install traffic control devices that people must disobey to be safe.**

Making bike lanes stripeless avoids most of the problems of a marked bike lane, so long as the stencils are placed correctly. This is likely to be a problem on streets where parking is allowed. The symbols must never be placed closer than five feet from parked cars (this means at least thirteen feet from the curb, 14-15 feet is better). The best place for these stencils is near the middle of the traffic lane (between the wheel tracks) where they also last longer.

In most cases, the best bicycle facilities are well-designed ordinary roads. Most important of all, we must understand that **facilities are never a substitute for education**. We must fund education first.

## Footnotes

[1] A good place to start is to seek advice (go for a training ride) from a [Certified League Cycling Instructor](#), if there is one from your area. Consider taking a *BikeEd* "Road I" course yourself. Unfortunately, due to a breakdown in the training program a few instructors are not fully qualified. Be sure any you deal with are consistent with the principles of *Effective Cycling*.

[2] Wayne Pein photo

[3] [John Allen photo](#)

## 10. Smarter Solutions -- Traffic Law Reform and Enlightening Public Officials

### Reforming Traffic Laws

Since spring 2002, a small committee has been working on improvements to bicycle traffic laws. The committee started by studying the current Uniform Vehicle Code to identify deficiencies from the standpoint of safe, efficient and equitable use of roadways for cycling. The committee developed a set of "Model Laws" starting with portions of the UVC. This model is used as the standard for rating the existing UVC and traffic laws of the various states.

The work of the [Law Reform Committee](#) is available on the Web. At present there is preliminary information for a few states and for the UVC. The article includes instructions for anyone who wishes to help.

At various times, state cycling organizations propose reforms for their state laws. [Reforms proposed by the Ohio Bicycle Federation](#) passed the Ohio General Assembly and signed into law in 2006. The reforms raised Ohio's rating from "D" to "A".

Occasionally, state cycling organizations must mobilize to defeat proposed laws that would harm cyclists' interests. Examples include an attempt to mandate wrong-way riding in Montana (2001) or an exorbitant bicycle license fee proposed in Vermont (2003). There is no national support for such efforts, except for the informal committee mentioned above.

At the local level, this author [evaluated bicycle ordinances for 65 communities in NE Ohio](#) assigning a rating (A-F scale) to each. Initially, about half of the communities mandated one or more dangerous practices, thus earning a rating of D or F. Since the project started four communities have improved their ordinances. Only one community (Brook Park, OH) currently earns an A rating.

The A rating is a result of the city completely revising their ordinances (originally rated F), and instead adopted [Model Municipal Ordinances](#). Reforms started after a resident sent a copy of the article to all members of council. The councilman who sponsored the reform legislation was quoted in the newspaper saying "I don't want to see Brook Park get an F in anything." The Ohio Bicycle Federation acknowledged the city's reforms by presenting a "Good Cycling Laws" award (photo below).



## Characteristics of the Ideal Law: [2]

- Simply stated; has clear meaning.
- Completely effective in solving the problem it addresses.
- Interacts synergistically with all other laws.
- Consumes minimal resources in its enforcement.
- Produces no adverse side-effects on human rights, living standards or quality of life.

## Enlightening Public Officials

Since public officials come from our society, they are taught the same information, right or wrong, as other citizens. Overcoming popular myths about bicycle operation will help educate lawmakers, police, judges and engineers. There is a need to work specifically to reach these officials.

Poor traffic laws confuse officials and law enforcement officers. Laws requiring riding *as near as practicable to the right-hand curb or edge of the roadway* are very often misinterpreted to mean *as close as possible* by those who do not understand correct lane position. Reforming traffic laws including this "far right rule" will help officials to avoid such mistakes.

A few states (Pennsylvania, Ohio, Florida Idaho and Arizona with more pending) have issued a state **Bicycle Drivers Manual**, based on the booklet [Bicycling Street Smarts](#). Such a manual, if issued by a state government agency, establishes the best practices are depicted in the booklet as regulations that define how to comply with traffic laws. The manual instructs: *On a road with two or more narrow lanes in your direction -- like many city streets -- you should ride in the middle of the right lane at all times.* This establishes the center of the lane to be *as close as practicable*.

Some states have similar instructions in the booklet given to applicants for a motor vehicle operator license. The [Texas Drivers License Handbook](#) has a particularly good section that tells motorists to watch for typical cyclists' mistakes and warns cyclists about motorist mistakes. Unfortunately, it is spoiled by misquoting the Texas "far right rule" to say "as far right in the lane as possible."

State transportation officials can help by adding appropriate [questions on state motor vehicle driver license exams](#). Such questions will lead to better coverage in driver training classes.

Earlier (in Section 8) we mentioned the new [Cyclist Friendly Community Program Toolkit](#). A very important feature of the program is that it strongly encourages government officials to understand the best cycling practices.

## Training Police

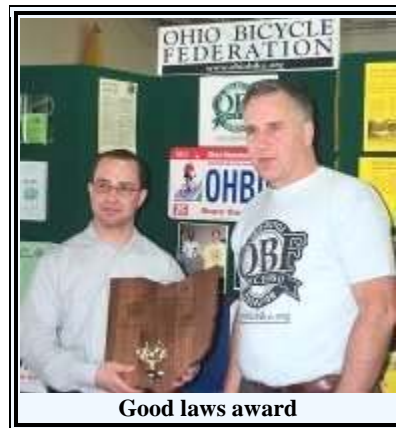
Cyclists need well-informed police to protect their safety and their rights under the law. Earlier in this series, we described problems due to poorly-trained police; including failing to enforce laws against the serious violations that cause collisions, occasional harassment of cyclists for what should be legal operation on the road and passing along misinformation in "safety tips", especially to children.

There are some good bike training programs for police.

Training for bicycle police is given by the [International Police Mountain Bike Assoc](#). For other officers, we recommend the new [National Police Bicycle Awareness Curriculum](#), developed through a grant from the National Highway Traffic Safety Administration. Police may also be able to arrange a seminar from a local [certified BikeEd instructor](#). At minimum, show the *Effective Cycling Video* [3] to officers.

## Government Help

Not all actions by government are harmful. The basic "rules of the road" provide for orderly and efficient traffic flow that is extremely beneficial to cyclists. Because bicycles predate motor vehicles, the right for



Good laws award

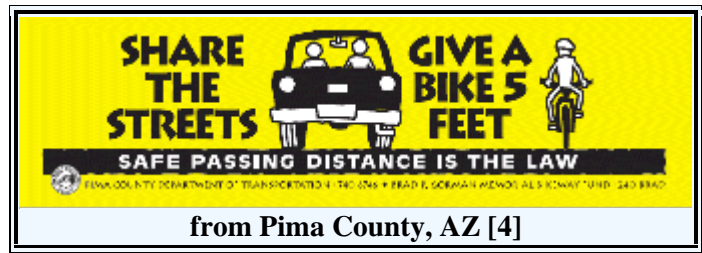


Police at work

bicycle operation on the roads is well established in law.

Sometimes government officials work with knowledgeable cyclists. Some officials are enlightened themselves. We earlier mentioned the booklet [Bicycling Street Smarts](#) that forms the bicycle driver manual in several states.

Some local authorities produce useful materials as well [4]. The Ohio Legislature and governor worked with the Ohio Bicycle Federation to pass significant reforms in 2006.



## Legal Representation for Cyclists

Whenever a cyclist needs legal help, whether to fight an unjust ticket, or to seek compensation from a collision caused by someone's negligence, the cyclist needs competent legal representation. This means an attorney and a good expert witness who understand cycling.

Unfortunately, cyclists may not get equal rights under the law. Often legal counsel is unaware of how common attitudes and prejudices conflict with principles of engineering, safety and law. Sometimes this is because defendants try to economize on legal expense. You can read accounts of past cases in an article by this author, [Bicycle "Right to the Road" Cases](#). More accounts of right to the road court cases are in the article [The Right to Travel by Human Power](#) and Alan Wachtel's essay, ["Bicycles and the Law: The Case of California"](#).

Some lawyers interested in cycling cases have their own web pages. You may be interested in the following.

- [Swanson, Thomas and Coon](#) of Portland, OR.
- [James Partridge](#) of Ann Arbor
- ["Bike Lawyer" Steve Magas](#) of Cincinnati
- ["Bike Attorney" Andrew Fischer](#) of Boston
- [Cycle Aid](#), a British law firm

## Footnotes

[1] Alan Forkosh photo.

[2] From the book *The Moon, Resources, Future Development and Colonization*, David G. Schrank, Burton L. Sharpe, Bonnie L. Cooper and Madhu Thangavelu, New York : Wiley, 1999.

[3] The video is available for \$25 from [bikeleague@bikeleague.org](mailto:bikeleague@bikeleague.org) or phone 202-822-1333. This author produced a short [Cycling Knowledge Test](#) for use with the video.

[4] Pima County, AZ ["Share the Road" booklet](#)

Some materials of others may have been reproduced with permission of the original author or under fair use guidelines. The author is a "League Cycling Instructor, certified by the League of American Bicyclists and a Professional Engineer in Ohio.

Last Revised 10/22/06. For the latest update of this article, see <http://www.labreform.org/blunders/>

© Copyright Fred Oswald 2004-2006. Non Commercial distribution authorized.