IMPROVING BICYCLISTS' TRAFFIC BEHAVIOR BY CHANGING NATIONAL ATTITUDES

A Paper Presented At The 1988 Annual Convention Of The Institute of Transportation Engineers

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The largest single cause of accidents to American bicyclists, both collisions between motor vehicles and bicycles (hereafter called car-bike collisions for simplicity) and other types of accidents, is the incompetence of the bicyclists involved. The reported car-bike collisions cause about 1,000 deaths and 50,000 injuries annually; the actual numbers may be several times greater for injuries and a small factor greater for deaths. The total number of deaths and injuries in bicycle accidents is probably about 500,000 annually. Over half of American car-bike collisions involve the cyclist suddenly getting in front of a motor vehicle by doing something that doesn't fit the traffic pattern: a dart-out, a swerve, riding in the wrong place, riding without a headlamp at night, etc. [2] The behaviors that cause the majority of American car-bike collisions can be observed and measured. According to the measurements that have been made, the large majority of American cyclists habitually act in the ways that cause many frequent types of car-bike collision. [3] Moreover, those accosted with criticism of their behavior tend to reply in two different ways. The majority say that they behave as they do to be safe, while the minority aggressively and vociferously defend themselves by arguing that the laws don't apply to them and aren't safe anyway. The investigator often finds that those who exhibit the worst behavior are those who are most concerned about safety.

In these ways the typical American bicyclist fits the classic model upon which American bicycle policies and safety programs have been based since the 1930s. In that model, the cyclist doesn't understand the traffic system, has poor judgement of traffic, and doesn't care to obey the laws. Therefore, the cyclist must be given the simplest possible safety training that uses the fear of motor traffic to persuade the cyclist to stay out of its way. Since the 1930s the emphasis has been on stopping at stop signs, signalling left turns and, above all, staying at the edge of the road. However, even this simplified safety program has had only limited effect, as shown by the prevalent types of car-bike collision. For these and other reasons, most American traffic engineers, safety specialists and highway administrators seem to believe that cyclists necessarily have these characteristics. To put it another way, they believe that these characteristics are natural for cyclists in any advanced, motorized society where cars are the best form of personal transportation.

This assumption is not correct. Other nations have produced cyclists with different characteristics and behaviors and, in all probability, different accident profiles. I'll discuss British cyclists in greatest detail because I have the most information about them. In five weeks and 1500 miles of cycling in England I saw no cyclist who acted as typical American cyclists do. British cyclists take their place in traffic and ride properly, and most think nothing about it. British people met in pubs and parks and hotels all

believe that everybody on the road has to act in the same manner in order to avoid collisions, and that the cyclist who acts accordingly has little to fear. The American theory that cyclists ought to act differently from motorists has them scratching their heads in confusion and they puzzle about how any rational society could get itself into such a self-evident mess. The British highway administrators and traffic engineers, as high up as I could reach them, have the same belief as the British public.

Cyclists of other European nations differ from both British and American cyclists. In general, those in northern Europe tend to be law-abiding and respectful of motor traffic and authority but they don't stand up for their rights. In particular, the Germans and the Dutch tend to look on cars as indicative of power, social standing and modern life, despite their very different political and economic histories. The Germans see the speed of fast cars as the reward of those who deserve it. The management of upper-class German hotels is perturbed when it discovers that the foreigners with reservations arrive by bicycle, but is relieved when they dress for dinner as ladies and gentlemen. With their approval of fast motor traffic, Germans see bikeways as the appropriate facilities to get cyclists out of its way. As in the U.S., there is some environmentalist opposition to this attitude. In more egalitarian Holland this approach would have been rejected, so Dutch bikeways were promoted as ways to protect cyclists from the growing danger of motor traffic as Holland caught up with the modern world. However, even in egalitarian Holland, cyclists operate on the rule that the faster traffic has the right of way. Therefore, Dutch bikeways are praised for an effect that doesn't matter in more enlightened nations. Traffic engineers have had to install speed berms to slow down motor traffic that crosses the bikeways. Otherwise, the Dutch cyclists would rarely get the right of way. Regardless of motive, nearly all Dutch bicycle traffic occurs in the older cities where automobile use is difficult and expensive, not on the rural bikeways that tourists praise.

Cyclists in southern Europe, France and Italy, have a still different character. Like British cyclists, they are competent and confident that they belong on the road. Like their motoring compatriots, they travel in a sporting manner. And they are welcomed; neither motorists nor hotel-keepers look down on them.

In those nations that were founded by British settlers and where British law and principles still have effect, cyclists are much more like British cyclists than like American cyclists. Cyclists in New Zealand, the most British of Commonwealth nations, are very similar to British cyclists. Those in Australia, a nation whose history and topography are much more like those of the American West than like other Commonwealth nations, are still law abiding and reasonably competent but are inclined to fierce argument against fast motor-vehicle driving and for bikeways. Their attitudes reflect the strains of the rapid motorization of the last thirty years, and the tendency of Australian highway authorities to copy American rather than British policies and techniques. One would think that Canadian cyclists, being in a nation so close to the U.S.A. whose highways, automobiles and topography are practically indistinguishable from those in the U.S.A., would be like American cyclists, but that is not so. Everywhere that I have been in Canada I have seen that the British legal and political heritage and the presence of former British club cyclists have had a leavening effect, making Canadian cyclists much more law-abiding and inclined to be competent than those in the U.S.A.

Americans often argue that the behavior typical of U.S. cyclists is the necessary adjustment to difficult modern traffic conditions. Comparison with British cyclists shows that this is not so. Traffic in Britain is both denser and faster than in the U.S. The typical class A road in Britain is physically similar to a farm-to-market road in the U.S., two narrow lanes without shoulders, twisting and turning around fields and over short, sharp rises with short sight distances. In Britain, such roads carry dense intercity traffic with a high proportion of trucks. The British also have controlled-access highways with the speed limit at 70mph, and no political consideration is being given to excluding cyclists from these. (Cyclists are excluded from British motorways, but that is because the motorways are part of the European motorway system.) British urban traffic is extremely dense and most cities have street patterns similar

to Boston in Massachusetts, radial streets laid out in pre-automotive times. Only the most careful layout of one-way streets and turning lanes enables traffic to move at all. Just getting around efficiently in Britain demands good driving, whether by car or by bicycle. However, some British practices are better than those in the U.S. I much prefer yield signs and traffic circles to stop signs and traffic signals, and British directional signs are much clearer than U.S. ones.

In five weeks and 1500 miles two of us had only two altercations with motorists, despite the seemingly difficult conditions. At one traffic circle a motorist loudly insisted that he had the right-of-way to change lanes into my position when I don't think that he did. At another traffic circle that was so large with trees growing in the middle that I didn't recognize that it was a traffic circle, I tried to turn in the wrong direction and was called a bloody fool by a truck driver. At another time I tried cycling slowly the wrong way on a one-way shopping street that was filled with pedestrians, behavior that is normal in the U.S.A. Everybody told me I mustn't ride when I went in that direction, so I got off and walked with them. The message is clear: if you act like a driver when cycling in Britain, you'll have no problem with anybody or anything. The contrast with the U.S. is dramatic.

The differences in behavior of cyclists are correlated with different formal social attitudes towards cyclists. In Britain, cycling is seen as a normal mode of transport that everybody has the ability to use. Even though Britain had no speed limit in rural areas until recently, the theory that speed gave right-of-way has never won acceptance. The traffic laws are considered to protect every road user and to be applied equally. The highways are intended and maintained for all road users, despite the crowding. These attitudes are appropriate for a nation where, as late as the 1950s, 25% of the vehicle miles in Britain were by bicycle. They are not the attitudes that are institutionalized in the U.S.

The attitudes that are institutionalized in the U.S. spring from informal national attitudes about cyclists. In the U.S., cyclists were seen as children or mental defectives because everybody else drove cars. Those adults who cycled were viewed as unimportant, low-income people of low social standing, again because everybody else could afford a car. There used to be just enough truth in these ideas to give them spurious credibility, but I can remember when university faculty formed a considerable portion of the cycling community in the years when faculty salaries were low. Not all the attitudes are based on economics. Cyclists are viewed as risk-taking fools, because nobody with any sense would ride a bike in traffic when they could be safe in a car. Cyclists are also viewed as illegitimate for several reasons, among them that they don't pay fuel taxes, that they are pleasure riders rather than useful workers, and, significantly, that they don't obey the traffic laws. While recent events are making some changes in the bases for these attitudes, such changes are not necessarily for the better. Economic facts have revealed that all Americans can't have a car to drive on their 16th birthday, but some people are saying that's just as well because young people haven't the judgement to drive safely. Many more Americans are cycling to work or as part of their work, but the most visible working cyclists, the urban messengers, are a disaster. The greater publicity given to bicycle racing reinforces the views of those who object that cycling delays legitimate traffic merely for entertainment. These views have lead to discrimination against cyclists in law, law enforcement and highway design and maintenance.

One can argue that these public attitudes are irrelevant because we administer our highway system according to laws, approved public policies and engineering knowledge. Unfortunately, in U.S. bicycle affairs that has not been true. For decades there has been close correspondence, each one reinforcing the other, between these public attitudes and highway policies and practices concerning bicycles. The results can only be described as disastrous: over ten thousand dead, over a million injured, in accidents that otherwise would not have occurred, to say nothing of the decay in respect for the laws and between people.

As near as I can ascertain, sometime in the late 1930s several assumptions appeared that determined the attitudes towards cyclists. These assumptions held that the road system was too dangerous for people to

cycle upon. The reasons given were that cars were bigger and faster than cyclists, cyclists could not judge the speed and distance of vehicles and could not look over their shoulders to see overtaking traffic. The part that's true is irrelevant and the parts that would be relevant aren't true; these assumptions are all utter nonsense without any scientific basis and the facts were available to disprove them when they were first promulgated, had anybody cared to do so. Nevertheless, the U.S. highway establishment made this foolishness the basis for its practices and policies regarding cyclists.

You may think that I am unjustly accusing you and your profession. I point out that in the 1950s ITE approved the change from traffic signal detectors that detected bicycles to ones that did not. That approval still existed in 1981, and so far as I know still does. [4] It is foolish to expect cyclists to obey the law and have respect for your profession when the equipment that you install won't allow them to obey the law and may kill them as well. I don't single out traffic engineers; all the professions involved in bicycle affairs got as badly confused. Paul Hill's book *Bicycle Law and Practice [5]* is a compendium of legal errors. In many important cases neither of the two attorneys nor the judge understood the legal or engineering issues raised by the accident, and neither did the author when he compiled the book. In law enforcement, just a few years ago the California Highway Patrol told the California Legislature that the increase in reported car-bike collisions was caused by those cyclists who acted like drivers of vehicles, an obvious falsehood.

By far the worst effect was in education, where bike-safety program specialists devised instructional programs that were based on the previously-described presumptions about roads, traffic and cyclists. Since these presumptions make a safe program impossible, the resulting programs violated the laws, contradicted traffic engineering principles, made no sense and couldn't be explained. Naturally, they caused casualties; thirty percent of America's car-bike collisions are caused by cyclists who are following the bike-safety precepts. [6] Yet none of the other highway professions made any objection that I can find, certainly none that had any effect. Rather, these other professions adopted American bike-safety foolishness as the proper policy in bicycling affairs. I don't know which party started this, but it is clearly evident that all participated. The motive is also obvious: get cyclists off the roads because they are presumed to slow down motorists.

Later on the traffic engineering profession was active in the effort to formalize this foolishness by designing bikeways that would force all cyclists, even those who knew better, to ride according to its precepts. The two most expensive, government funded sets of bikeway standards were California's *Bikeway Planning Criteria and Guidelines* of 1972 [7] and the Federal Highway Administration's *Safety and Location Criteria for Bicycle Facilities* of 1976-8. [8] Both of these were produced by recognized traffic-engineering experts, the former by a university institute, the latter by a large consulting firm. Both standards were vulnerable because they were based on the attitudes I have been criticizing rather than on recognized traffic engineering principles and knowledge, although their expert authors had no idea that that is what they were doing. The authors accepted the superstition on which they based their actions as engineering truth, even though it contradicted their professional training and they would never have done such things to motorists.

Both of these proposed standards were killed by the work of one man working without any resources other than his own brain. That demonstrated vulnerability ought to make you doubt the scientific accuracy of your own opinions about cyclists because these attitudes have crept into the traffic-engineering curriculum even though they are never, so far as I know, officially sanctioned or supported by any data that a professor might quote.

The AASHTO *Guide for Bicycle Facilities [9]* that is now commonly used is somewhat better than those two documents, but the reason is not better scientific support. The California committee that prepared the requirements that ended up in the AASHTO *Guide [10]* was instructed to prepare standards for bikeways that the politicians would order in any case. Therefore, the committee never

considered what program or which facility designs would best reduce accidents to cyclists. It merely produced designs for bikeways to get cyclists off the roads. This *Guide* is better than its predecessors only because we cyclists managed to discredit the most dangerous proposals. Whenever we cyclists (I did most of this work) made a prima facie case that organizations using a particular design would be liable for the accidents that it caused, that design was withdrawn. In most of these cases we applied standard traffic-engineering principles and reasoning to the proposed design, and we succeeded because the design obviously contradicted accepted principles. The *Guide* therefore contains only those proposals that we couldn't prove a priori to be dangerous.

American bike-safety training is a major reason why these attitudes have such a strong hold on Americans. The training is self-contradictory and absurd. For example, it teaches that cyclists must hug the curb because the primary danger to cyclists is that the cars coming from behind might not see the cyclist. Then it teaches the cyclist to turn left from the curb lane by extending his left arm before turning, in the forlorn hope that the cars that are presumed to be unable to see all of him will be deterred from hitting him by seeing his outstretched arm. That instruction contradicts traffic law, traffic-engineering principles and good driving practices. The logic is so ludicrous that the subject could be taught only by saying "Do what I tell you or you will be killed. The roads are a terribly dangerous place with all those fast cars."

This teaching through fear got the lesson across. The students learned that whenever they even thought about doing something different from what they had been told they were in imminent danger of being killed by a car. They also learned some other things. Officer Friendly came to school and told them that cars were very dangerous and how, even though the law gives cyclists rights to use the road, if they stick up for their rights in a confrontation with motorists they will be right, dead right, crushed beneath the car. They also learned to stop at stop signs, but never how to judge when it was safe to go. Cyclists aren't taught the skill of judging the speed of traffic because they are presumed to be incapable of learning how, and if they were taught they might have the presumption to get in front of a car. That instruction means that they get killed as they exit their own driveway because there's no stop sign there to tell them to stop and, in any case, stopping doesn't teach yielding.

Another effect of this instruction is to divide cyclists into two groups. The fearful and obedient majority follow the instructions exactly and attribute the dangers that they discover to the basic dangers of traffic rather than to their instruction. The aggressive minority deduces that the instructions are absurd and that following them prevents cyclists from getting around town effectively by bicycle. They also conclude that the laws that mess up their cycling are intended for motorists but, since they do not make cycling safe, can be justly disobeyed by cyclists. Both groups concur that traffic is extremely dangerous; they just disagree about the proper actions to take about it. One group hugs the curb in fear while the other dodges in and out wherever it sees a momentary opening that it can take advantage of. Both groups also believe that they have been subjected to the theoretical maximum of bicycle safety training, that there is no more to be learned. The obedient group has learned how little the cyclist can do to safeguard himself, the disobedient group has concluded that it's all foolishness. Neither group will take any more bicycle safety training and both groups, in slightly different ways, defend their riding style with the emotional ferocity of those who know that doing anything else will result in their death. What they have learned is what I call the cyclist-inferiority complex. This is the package of emotions that is best expressed as "The cyclist who rides in traffic must either delay the cars, or, if the cars don't choose to slow down, he will be crushed. The first is Sin, the second is Death, and the Wages of Sin is Death."

This instruction through fear of death has used the normal psychological processes that ensure that we never risk our lives through the dangers that our mentors fear. That's normally an advantage, but it has the disadvantage of inflexibility. The emotional power is so strong that people reject any knowledge to

the contrary, no matter how reasonably it is presented or in how much detail. That goes for many of you, too, my listeners and readers, learned though you may be. A phobia has been produced that must be treated by the standard methods for such psychological impediments. Basically, the patient must be exposed to emotional stimuli stronger than those initially instilled but without ill effect. In cycling, that means successful experience in heavy traffic. Of course, only those who are interested will bother to do that. And, equally, most Americans don't realize that this cyclist-inferiority complex is a psychological impediment; they think that their fear is a true reflection of the world. Their belief is reinforced because everybody that they know thinks the same way. When everybody except a few peculiar people has the same phobia, the phobia is invisible. That's why I started this discussion with illustrations of different beliefs and behaviors in other nations.

America is going to suffer from excessive casualties to cyclists, disrespect for the traffic laws and antagonism between cyclists and motorists as long we continue to inculcate our children with these false beliefs and dangerous practices. We must put a stop to that. Just as the highway establishment took the lead in starting this foolishness, so must it take responsibility for the results of that action and take the lead in stopping it. As traffic engineers you must examine what you think you know about cyclists and traffic and test what you think you know against scientifically-obtained knowledge. I will describe some of our present knowledge.

We know of only one way to operate safely and effectively on the road. That way is incorporated into our present driving practices. We know of no way to make driving safe for people who don't possess the skills to operate in that way. If we had, we would have adopted that system for motorists. Adult cyclists have the same physiological and mental abilities as motorists and, with appropriate training, can operate as well as motorists do. For child cyclists the question is not to discover which inadequate subset of driving skills they can learn. That's what's killing them today. The question is at what ages and with what training can they perform the normal driving maneuvers in each level of traffic. You will be surprised. With fifteen hours of group training eight-year-old children can operate properly on two-lane residential streets, ten-year-old children can operate on slower urban multi-lane streets and twelve-year-old children can operate on most multi-lane streets. [11], [12] Children with this training operate far better than do average adult cyclists. The program that provides this training is the Effective Cycling Program, with classes for both children and adults. [13] Delays to motor traffic have always been traffic engineers' major concern about bicycle traffic, but the fear has far outweighed the facts and is logically irrelevant. When motorists delay other motorists we don't try to kick them off the road; we widen the road instead. When moving people is the concern, as it is in most traffic problem areas, a person moved by bicycle is just as valuable a product as a person moved by car.

The places where cyclists really do delay motorists are on narrow, two-lane roads with lots of traffic in both directions or, when traffic is predominantly one-directional, with many turns that restrict sight distance. [14] The answer to this problem is simple. Adding a quarter-lane on each side lets the motorists overtake the cyclists without delay, while adding a full lane lets the faster motorists overtake both the cyclists and the slower motorists. The choice depends on the circumstances. However, if society says that this road must not be widened, for whatever reason it gives, then you have to consider justice. It is unjust to kick some people off the road just to give others a faster drive. The delays that society produces because it refuses to widen an overloaded road must be equitably distributed, and our standard method of doing this is first-come, first-served. No other method has met the criteria for justice.

Today's knowledge adequately demonstrates that cyclists can operate as drivers of vehicles, that this is how they must operate, that this technique causes neither car-bike collisions nor inequitable delays to motorists, and that such delays as are caused are concentrated on those roads that already require widening. Today's knowledge also demonstrates that normal, well-designed roads are generally better

for cyclists than are bikelanes or bikepaths. No more is required to discredit the superstitions that have determined American policies and practices in bicycle affairs.

U.S. officials don't like this vehicular-cycling principle. The official defense is that it has insufficient scientific evidence to challenge official policies. That's what the Federal Highway Administration wrote in the Federal Register when adopting the AASHTO Guide. However, science doesn't work that way. In science there is no minimum qualifying quantity of evidence; scientific questions are decided by which side has the better evidence. Officials don't like debating the issue, but when they have been forced to do so they have failed to advance any scientific studies that support their cyclist-inferiority views, while the existent evidence supports the vehicular-cycling principle. Logically, the official view of cyclists is based only on invented superstition and is maintained because it suits the powers that be.

This scientific evidence should give you courage to start a program of scientific reform. You first need to reform your own profession. Start by thinking of bicycles as normal traffic. You already have examples of this. Nowadays you don't have to order special drain grates or special traffic signal detectors to provide for cyclists. The special product is the one that you order for those special locations where there will never be bicycle traffic. Where you expect considerable bicycle traffic, the ITE design recommendations suggest two feet extra width in the outside lane. If somebody proposes something else for bicycles at any location, ask yourself whether you would like and approve that solution if it applied to motorists. If you wouldn't, it probably is not a solution at all. For a proposed facility that passes this first screen, determine whether there has been a scientific analysis and test of the design rated against the standard of competent cycling. If it makes good cycling better it may be acceptable, while if it is based on incompetent cycling almost for certain it will be worse than doing nothing. Then persuade your professional colleagues to do the same.

After that there are the other professions and the public. I've told you of the accidents caused by the bicycle safety teachers and the traffic police in cycling matters. Implicitly or explicitly, these people justify their actions as required or allowed by traffic-engineering knowledge. As I have just said, this is impossible because no traffic-engineering study had supported their assumptions and the modern studies disprove them. However, these people have been given so many plausible reasons for believing this false view of traffic-engineering knowledge (including statements by traffic engineers) that the traffic-engineering profession must make firm public denials of these false assumptions and public criticism of their results if the present errors are to be corrected.

Traffic engineers can also, indeed they should, apply their skills beyond the design of roads. They can examine the content of the various bike-safety and cycling curricula to see which teach cyclists to use the road system as it is intended to be used and which do not, or teach dangerous and conflicting techniques. They can examine the tests, or even better the students, to see which students have actually learned to drive properly. They should cooperate with other influential organizations to see that their communities have proper cycling training available to those who want it. More generally, they can influence public opinion in favor of cyclists acting like drivers of vehicle instead of they way they do.

They need to do these things because the only way that they will get well-behaved cyclists on the roads is to convert the training of dangerously-behaved cyclists into the training of properly-behaved cyclists. Only then will they be relieved of the pressure to produce unsafe and inefficient road designs to take care of what people think is the bicycle problem.

Endnotes

1 Cycling Transportation Engineer, Sunnyvale California

2 Forester, John: *Bicycle Transportation*; The M.I.T. Press; 1983; presents analyses of bicycle accident

studies.

3 Forester, John: *The Effect of Bikelane System Design on Cyclists' Traffic Errors*: Custom Cycle Fitments, 1982; discusses the method of observation and some data.

4 Institute of Transportation Engineers; *Standard for Vehicle Detectors*; 1981; Section B 15.

5 Hill, Paul; *Bicycle Law and Practice*; Bicycle Law Books, Falls Church VA; 1986

6 See the accident statistics tables in Forester, *Bicycle Transportation*, cited above.

7 Authored by the Institute of Transportation and Traffic Engineering of University of California at Los Angeles, April 1972

8 FHWA-RD-75-112, -113, -114. -112, the last volume issued, contains the scientific reports on which the other two volumes are based.

9 American Association of State Highway and Transportation Officials; *Guide For The Development of New Bicycle Facilities*; 1981; Washington DC.

10 The AASHTO *Guide* is largely California's *Planning and Design Criteria for Bikeways in California* with the propaganda taken out.

11 Forester, John & Diana Lewiston; *Intermediate-Level Cyclist Training Program: Objectives, Techniques and Results*; Custom Cycle Fitments, Sunnyvale CA; 1981

12 Forester, John; *Effective Cycling Instructor's Manual*; Custom Cycle Fitments, Sunnyvale CA; 4th Ed. 1986

13 Forester, John; *Effective Cycling*; 5th Ed., The M.I.T. Press, 1984

14 For the details of this analysis, see Forester, *Bicycle Transportation*, cited above.