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A Synthesis of Existing Bicyclist and Pedestrian Related Laws and Enforcement Programs

National Bicycling And Walking Study

U.S. Department of Transportation
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Foreword

This case study was prepared under contract for the Federal Highway Administration by Brian L. Bowman, Robert L. Vecellio, and David W. Haynes.

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A SYNTHESIS OF EXISTING BICYCLIST AND PEDESTRIAN RELATED LAWS AND ENFORCEMENT PROGRAMS

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CASE STUDY #13

FINAL REPORT

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EXECUTIVE SUMMARY

Bicycle-related fatalities are often considered to be a problem only among children, and pedestrian fatalities to be restricted primarily to the elderly and the very young. Statistics, however, show that the percentage of young adult and adult involvement in these types of accidents has been increasing steadily since 1960. This trend is likely to continue as more and more people use these transportation modes for environmental, health, monetary, and convenience reasons.

A great many of these deaths are caused by people who are either unaware of the numerous laws and ordinances regarding pedestrian and bicycle movement, or who simply choose to ignore them. This dangerous disregard of the law can be attributed to several reasons, including wide variations in regulations among jurisdictions, and the lack of enforcement. This project was conducted with the intent of compiling a comprehensive set of laws and ordinances which may be adapted as necessary and passed by individual governing bodies. This synthesis is a compilation of pedestrian and bicycle related regulations and enforcement programs that have been partially enacted by a number of agencies and does not constitute a recommended set of laws and ordinances. Agencies interested in establishing laws and ordinances are encouraged to read the discussion of each and determine if it is in accord with community goals. The law enforcement strategies and their results are presented to enable increased adherence to enacted regulations.

The first chapter presents background information on the nature of bicyclist and pedestrian accidents and the need for this synthesis. A discussion of the content and format of each of the following chapters is also presented.

The regulations concerning bicyclists and pedestrians are presented separately, with a chapter being devoted to each transportation mode. In some cases, particularly regarding the use of sidewalks, there is overlap between the content of the two chapters. Many of the regulations are adapted directly from existing sources such as the Uniform Vehicle Code and numerous State and city codes, since the intent is the same and the only differences lie in phrasing and the inclusion of certain exceptions or other details. A discussion accompanies each regulation presented and focuses on the different variations which exist and the concerns which led to the law's passage. Primary emphasis in these two chapters is devoted to those regulations that are not common, not uniformly accepted or that have come to the forefront

only recently, such as requiring the use of helmets, prohibiting the use of mountain bikes on hiking trails, and, bicycle courier registration. Agencies requiring one such regulation can use those presented in this synthesis as a starting point. Each chapter concludes with a discussion of issues related to bicycling and walking, adjacent property owner liability, and the linking of facilities with mass transit stops. These issues are important considerations, but do not lend themselves to the development of model regulations.

The passing of detailed legislation is not effective without enforcement. Enforcement, however, can be a complicated task if the public is unaware of the rights and responsibilities of bicyclists and pedestrians. The fourth chapter presents some of the aspects that contribute to a successful enforcement program. Because the attention given to enforcement in the past has been uneven, it is generally recognized that any agency wishing to implement an aggressive enforcement policy should begin the effort with an intensive public education and information campaign. Though police departments should not be responsible for developing and implementing the education portion of a total program, they should be involved, as should local civic, health, and safety organizations. Enlisting the aid of these groups not only helps offset the costs of the program, but fosters broader community support.

The information on enforcement is derived from a thorough review of available literature, along with comments obtained from a questionnaire sent to several agencies which were identified as having aggressive and innovative bicycling and walking programs. A copy of the questionnaire used is included as Appendix A.

Enforcement does not necessarily have to be negative in character, since it constitutes education, albeit in an ex post facto manner. A high visibility enforcement campaign, rather than targeting those who break the law, could focus on rewarding those who are observed exercising correct and courteous behavior through the use of coupons and raffles. The issuance of warning citations during the grace period which accompanies the passage of many laws and ordinances is a prime example of education through enforcement. The same can be said of peer courts, where children who are caught breaking the law are held accountable for their actions by a jury of high school students who hand down sentences such as writing an essay on why the violator's behavior was dangerous.

There are three ways in which a police department may distribute responsibility for enforcement among its officers. The first is to incorporate it into the daily routine and require officers to write a certain number of citations per day or per week. One agency which takes

this approach attempts to cite motorists who violate pedestrian and bicycle-related laws twice as frequently as pedestrians and bicyclists who do likewise. It is reported that the public perceives that enforcement effort as evenhanded. A second possibility is to utilize a spot enforcement campaign, which has higher visibility than the first option. Probably the most effective method, though, is to place some officers on bicycles and give them the primary responsibility for bicycle and pedestrian law enforcement. These officers usually assume this responsibility in addition to their other law enforcement duties, though there are some patrols which focus almost exclusively on bicycle and pedestrian infractions.

The use of bicycle patrols has the advantage of looking less menacing to youthful violators, even as older bicyclists are more willing to accept a ticket from these officers, since they can empathize better with the bicycling community's concerns. In addition, the bicycle offers a nice balance between speed and maneuverability, particularly in central business districts and on university campuses, where officers in motor vehicles may have difficulty apprehending people intent on escaping.

Auxiliary patrols composed of citizens who are properly trained and empowered to issue citations may be used instead of regular police personnel. Besides freeing the officers to do other work, these patrols, which attract a large number of college students, do not present a problem with motivation and may be able to relate better with young lawbreakers, thereby providing a positive law enforcement role model for the offenders. The drawbacks include the cost of organizing and sustaining the patrol, and the possibility that the patrols will not elicit the same respect within the community as police personnel.

Specific areas which should be targeted for enforcement include central business districts, universities, grade schools, parks and other locations where bicycling and walking activity, and, consequently, the likelihood for infractions or accidents are high. In addition, locations where concentrations of elderly or intoxicated pedestrians are present should be patrolled frequently because of the unique hazards that these groups pose.

A comprehensive bicycling and pedestrian program can only succeed if the elements of engineering, education, and enforcement are all present and working together. If the emphasis of enforcement is placed on education rather than punishment, public perceptions of bicycling and walking as valid modes of transportation will be strengthened.

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CHAPTER 1 - INTRODUCTION

In 1989, approximately 7,200 pedestrians and 1,000 bicyclists were struck and killed nationwide by motor vehicles. Together, these numbers comprised over 17% of the estimated 46,900 people who lost their lives in motor vehicle accidents [1]. Though the magnitude of these numbers may be surprising in itself, what may be more surprising is the age composition of the victims. Most people would consider bicycle-related deaths to be restricted primarily to children, but statistics indicate that only about one-third of such victims are under the age of 14, while half are between the ages of 15 and 44. Similarly, pedestrian fatalities are often assumed to be a problem only among young children and senior citizens, but the facts do not support this misconception. While it is true that those over age 65 are disproportionately represented, comprising over one-quarter of the total fatalities, well over one-half of the fatalities are between 15 and 44 years old [1].

The percentage of young adult and adult involvement in bicycle fatalities has been increasing steadily since 1960, and the trend is likely to continue as more people use bikes for environmental, health, monetary, and convenience reasons. The death of children in such accidents may usually be attributed to reckless behavior in which they intentionally or unintentionally expose themselves to life-threatening situations. The element of risk is a predominant theme in adolescent behavior and, although it does not make the resulting deaths any less painful or needless, the thrill of a near-miss often outweighs the risk in a child's mind.

There are a number of factors which place children on bicycles at greater risk than adults. A young child has only two-thirds of the peripheral vision of an adult, and his smaller size both limits his field of vision and conspicuousness to motorists. Children also have more difficulty in judging the speed and distance of an approaching vehicle than adults do [2]. While these factors help explain the accident frequency with children, they cannot rationalize the relatively high incidence of adult bicycle-related fatalities. The enhanced physical senses of adults and the mature unwillingness to expose themselves to undue risk should result in lower accident frequencies for adults. One possible reason may be that many people, bicyclists and motorists alike, are unaware of the rights and responsibilities of bicyclists on the roadways.

As the number of adults who use bicycles for various purposes has increased in recent years, there has also been a corresponding rise in the potential for conflicts and accidents. Many of these negative encounters are a result of an unfortunate adversarial relationship.

Motorists often perceive bicyclists as impediments to motor vehicles in the traffic stream. Some bicyclists, on the other hand, may view motorists as bullies who are unwilling to share the roadway with them, despite the fact that a bicycle is a legal vehicle in all 50 States. A former bicycle program coordinator for Boulder, Colorado, feels that "some people think of bicycles as inferior to [motor vehicles]. Some motorists, therefore, do not think they should have to slow down to share the road with bicyclists. But if all the bicyclists drove cars instead, they would have to slow down for the traffic jams" [3].

While neither viewpoint is entirely correct, both have some basis in fact. The problem arises because many bicyclists use that mode of transportation primarily for pleasure or for short trips to work, school, or a place of business. Because of the nature in which those bicycles are being used, there is a tendency for their operators to take to the road without considering fully the ramifications of their actions. An adult who is a careful motor vehicle driver may be a very nonchalant bicyclist because he or she views the bicycle as a relatively small lightweight vehicle. While driving a motorized vehicle, they are aware that the vehicle's size and weight restrict their allowable travel path and can result in dire consequences for themselves and others in the event of an accident. Once mounted on a bicycle, however, they often adopt a carefree attitude as a result of their greater mobility and sense of freedom. Passing a queue of vehicles by hugging the curb or riding on an adjacent sidewalk or shaving a few seconds off a trip by rolling through a red signal may seem natural maneuvers to the casual bicyclist. Such maneuvers, however, exhibit a sense of indifference which results in an attitude of intolerance by motorists.

This is not to imply that every bicyclist represents an accident waiting to happen. Dedicated bicyclists are probably more aware of the rules of the road than most of the people who sit behind a steering wheel. These bicyclists realize that in an accident involving a motor vehicle and a bicycle, they are the ones more likely to end up in a nearby emergency room. A study conducted by the League of American Wheelmen found that the bicycle accident rate among its members was only one-fifth that of the general population, most of whom are untrained or inexperienced [4].

A bicycle safety study conducted by Cross concluded that bicyclists are judged by the reporting officer to be at primary fault in approximately 50% of all accidents, both fatal and non-fatal [5]. Fully half of those accidents where the bicyclist was at fault occurred when a motor vehicle struck a bicyclist who had entered the roadway improperly. Similar accidents

where the motorist was deemed at fault accounted for only a small percentage of the total. Some 80% of the motorist-caused accidents involved a bicyclist being hit from behind by an overtaking vehicle. In almost half of these cases, the motor vehicle operator claimed that the bicyclist was not detected until it was too late. These results indicate that many motorists either may be unaware that a bicyclist has the same rights on the roadway as the driver of another motor vehicle, or they may refuse to extend such courtesies because of the bicycle's slow speed and small size. If this is true, then the number of avoidable accidents is probably much higher than the statistics indicate. Regardless, it would appear that both groups should become more familiar with the laws and ordinances governing bicycle operation and should exercise more caution and courtesy toward each other.

Many people are either unaware of the numerous laws and ordinances governing the use of bicycles on roadways or simply choose to ignore them. This may partially be due to the common perception of the bicycle as a child's toy, not meriting serious attention by law enforcement personnel on a day-to-day basis. For example, until 1986, the section covering bicycle traffic laws in Arizona's State Code was entitled "Operation of Bicycles and Play Vehicles" [6]. Deleting such language has been a major endeavor of many advocacy groups. There is documented evidence of the unwillingness of local police departments to issue citations to bicyclists, because it does not constitute "real police work" [7]. Perhaps more importantly, because of the lack of a comprehensive education and licensing program, most bicyclists are never provided the opportunity to learn the rules of the road. Many state agencies, as well as several local bodies, publish such information, but it is usually not widely distributed or made required reading in the classroom or as a prerequisite to becoming a licensed motor vehicle driver.

Because of the general inaccessibility of such literature, there has been little effort to consolidate the various codes into a uniform set of laws. As a result, there are some distinct differences in what is permitted between various jurisdictions. For example, the Georgia Uniform Rules of the Road states that "wherever a usable path or sidewalk adjacent to a roadway has been provided, bicycle riders shall use such path or sidewalk and shall not use the roadway" [8]. The City Code of Savannah, Georgia, however, states "it shall be unlawful for any person to ride a bicycle upon any sidewalk in the city, except when necessary to cross a sidewalk from the curb to the entrance of a lot, building, or enclosure" [8]. Such differences increase the potential for confusion.

To some extent, the same problems with regulations and enforcement also exist with pedestrians. Literature on correct pedestrian behavior is scarce and enforcement is almost non-existent, except in the central business districts of some cities. Unlike bicycle-related accidents, where ignorance of the law contributes substantially to the annual death toll, most pedestrian fatalities are the result of neglect or inattentiveness. Whereas a bicyclist may not be aware that running a stop sign is illegal, or a motorist may not realize he or she is required to treat a bicycle as any other vehicle on the roadway, a pedestrian who jaywalks is likely to know that such behavior is illegal. In New York City, where over half of the traffic-related deaths each year are pedestrians, a columnist writes "despite the constant and earnest entreatment of authorities for pedestrians to conform to rules, to fear for their lives, New Yorkers continue to behave as though they were sacred cows, free to roam the streets free of molestation" [9].

In addition to laws governing the manner in which bicyclists, pedestrians, and motorists are to interact, there are other laws and ordinances which contribute directly or indirectly to the casualty toll. For example, an agency which does not require the construction of sidewalks or paved shoulders may unknowingly contribute to accidental deaths when people are forced to use the traveled roadway because they were not provided with safer, separate facilities for their use.

Objectives and Scope of Synthesis

The primary objectives of this project were to document existing laws and ordinances relating to pedestrians and bicyclists and to examine various enforcement programs used throughout the country. A literature review including enacted codes and statutes, magazine and newspaper articles, and prior studies resulted in a comprehensive list of the major issues affecting pedestrians and bicyclists and a list of agencies with aggressive and often innovative bicycling and walking programs. A questionnaire survey was mailed to a representative group of State, county and city agencies to obtain current data on their experiences with regulations and enforcement programs. A copy of a representative survey form is included as Appendix A. Fourteen completed questionnaires were returned, representing a 52% response rate from the 27 agencies which were requested to participate. Of the 14, two were city agencies, five were county agencies, and 7 were State agencies.

This synthesis is a compilation of pedestrian and bicycle-related regulations and enforcement programs that have been partially enacted by a number of agencies and does not constitute a recommended set of laws and ordinances. Agencies interested in establishing laws and ordinances are encouraged to read the discussion of each and determine if it is in accord with community goals.

The majority of current regulations conforms to the Uniform Vehicle Code and Model Traffic Ordinance published by the National Committee on Uniform Traffic Laws and Ordinances (NCUTLO) [10]. For the purposes of this project, emphasis was placed on obtaining information on recent issues such as mandatory helmet laws, liability of landowners who own property adjacent to trails and paths, bike courier registration, and mountain bike restrictions. Based on the results of the literature review and the survey, a set of possible model laws and ordinances is presented in the following two chapters. Agencies wishing to adopt such regulations can use those presented in this synthesis merely as a starting point. Each of the laws and ordinances is accompanied by a discussion of the regulation variations that exist among jurisdictions, as well as other background information. For those laws which have become uniformly adopted across the country, the narrative is brief, with more attention being devoted to potentially controversial topics.

Chapter 2 is devoted to laws and ordinances which are applicable to bicycles. The model regulations are presented in four distinct categories, with a fifth section being reserved for a general discussion of related issues. The use of the term "model" should in no way construe that the wording of each regulation is legally correct. Where possible, the laws and ordinances are repeated directly from, or adapted from, jurisdictional codes, which do have legal connotations. However, many were developed without the input of a legal expert. The primary intent of this chapter is to present a set of regulations which is comprehensive, but without overly restrictive wording which may render some impractical under certain circumstances. A jurisdiction desiring to pass a bicycle ordinance may use this chapter as a general guide, but legal counsel is required to ensure that the exact phrasing is appropriate for that area.

The same general format is followed in Chapter 3, where model laws and ordinances for pedestrians are presented. Out of necessity, there is a considerable number of references to bicycles and human-powered vehicles in this chapter, particularly with regard to the use of sidewalks and crosswalks. In cities where bicycle use on sidewalks is prohibited, these references may be deleted. To avoid unnecessary duplication, these regulations are presented

only within this chapter, although including them in Chapter 2 would be justified. The same reservations regarding the use of the term "model" apply to the laws and ordinances of Chapter 3.

Chapter 4 discusses the various law enforcement efforts, both historical and current, in the United States, and explores the effects and public perception of these programs. Much of this information was obtained from the survey and is, therefore, subject to the opinions of the person(s) completing the questionnaire. However, this method provides the most reliable data possible within the constraints of this project.

CHAPTER 2 - MODEL BICYCLE LAWS AND ORDINANCES

This chapter is devoted to laws and ordinances which are specifically applicable to bicycles. Model regulations are presented in four distinct categories, with a fifth section being reserved for a general discussion of related issues. The use of the term "model" should in no way construe that the wording of each regulation is legally correct. Wherever possible, the laws and ordinances are repeated directly from, or adapted from, jurisdictional codes, which do have legal connotations. However, many were developed without the input of a legal expert. The primary intent of this chapter is to present a series of regulations which is comprehensive, but without overly restrictive wording which may render some impractical under certain circumstances. A jurisdiction desiring to pass a bicycle ordinance may use this chapter as a general guide, but legal counsel is required to ensure that the exact phrasing is appropriate.

WORDS AND PHRASES DEFINED

Bicycle - *Every vehicle propelled solely by human power upon which any person may ride, having two tandem wheels and except scooters and similar devices.*

This definition is taken directly from the 1987 revision of the Uniform Vehicle Code (UVC) [10], which is different from earlier versions in that any reference to a minimum seat height or minimum wheel diameter has been deleted. Until this revision, any such vehicle with a seat height of more than 25 inches from the ground when the seat was adjusted to its highest position was not legally defined as a bicycle [11]. In the State of Georgia, a bicycle is defined as having a minimum wheel diameter of 13 inches [12]. Under either of these definitions, many such vehicles being driven by children would not be legally defined as bicycles, and their operators would not be required to follow the guidelines set forth in the governing vehicular code. Omitting such verbiage prevents this possibility and requires that all persons operating a bicycle on public facilities adhere to all governing laws and ordinances.

Bicyclist - *Any person who drives, operates, rides or who is in actual physical control of a bicycle, except when said person is afoot and is pushing a bicycle.*

In the UVC, no definition of a bicyclist is provided. Rather, since the bicycle is considered a vehicle, the operator of a bicycle is considered a driver. A driver is defined as "every person who drives or is in actual physical control of a vehicle" [10]. The distinction is necessary primarily due to the existence of tandem bicycles, in which there are two or more people who are at least partly in control of the vehicle.

In a 1981 National Highway Traffic Safety Administration (NHTSA) report, a bicyclist was defined as above, but without the exception [13]. The distinction as to whether a person pushing a bicycle can be considered a bicyclist arises from a court case, the details of which were described in a 1989 article appearing in Bicycle USA, a publication of the League of American Wheelmen [14]. The case involved a motorist who struck and injured a child who was pushing a bicycle at an intersection crosswalk while under the protection of a traffic signal. The child was taking his bicycle, which was unlighted, to be repaired. The motorist's attorney argued that since state law required the use of a lighted front lamp and a red rear reflector, the child was guilty of contributory negligence and was not entitled to damages. In their decision, the justices determined that they boy was a pedestrian, not a bicyclist, stating that "... [he] was as much a pedestrian as if the bicycle had been strapped to his back, or carried on his shoulder ... [and he] would have been as much, and no more, entitled to the protection of the law of the road if his burden had been a sack of unlighted potatoes."

Bicycle Lane - *A portion of a roadway which has been designated by striping, signing and pavement markings for the exclusive use of bicycles.*

This definition, and the two which follow, are adapted from the Oregon Revised Statute - 1985 [15] and Guide for Development of Bicycle Facilities [34], published by the American Association of State Highway and Transportation Officials (AASHTO) in 1991. The UVC does not define a bicycle lane.

Bicycle Path - *A public way, physically separated from motorized vehicular traffic by an open space or barrier and either within the highway right of way or within an independent right of way.*

Again, the UVC does not set forth a definition. A bicycle path is a separate facility, thus the distinction between it and a bicycle lane.

Bicycle Route - *A segment of a system of bikeways designated by the jurisdiction having authority with appropriate directional and informational markers with or without specific bicycle route number.*

The only requirement for designation as a bicycle route is the consensus of the jurisdiction's governing body. The UVC does not define a bicycle route.

Human-Powered Vehicle - *Every vehicle designed to be moved solely by human power.*

The UVC includes this definition in order to differentiate between a bicycle and a moped or similar vehicle [10]. The definitions of bicycle lane, bicycle path, and bicycle route may be altered so that the only suitable vehicles for use on such facilities will be "human-powered vehicles," according to the desires of the governing body.

Vehicle - *Every device in, upon or by which any person or property is or may be transported or drawn upon a highway, excepting devices used exclusively upon stationary rails or tracks.*

This definition is taken directly from the UVC [10]. It was not until the spring of 1986, when Utah made it unanimous, that the bicycle was recognized as a vehicle in all 50 states [17]. Such designation is important because of the responsibilities and rights which are inherent in the operation of a vehicle on a highway. Not only are law enforcement officers given a clearer mandate to stop bicyclists who do not obey traffic laws, but they also become better empowered to cite motorists who do not yield certain rights and courtesies to bicyclists.

RULES OF THE ROAD

Paragraph 1 - *Restriction on Use of Roadways*

(a) The (State highway commission) by resolution or order entered in its minutes, and local authorities by ordinance, may regulate or prohibit the use of any roadway (or highway) within their respective jurisdictions by any class or kind of traffic which is found to be incompatible with the normal and safe movement of traffic.

(b) The (State highway commission) or the local authority adopting any such prohibition shall erect and maintain official traffic-control devices on the highway on which such prohibitions are applicable and when in place no person shall disobey the restrictions stated on such devices.

This section is repeated verbatim from the UVC, with the exception of the deletion of the term "controlled-access" before "roadway" or "highway" [10]. In jurisdictions where bicycles are allowed on controlled-access roadways, their use is restricted to the shoulders due to the high travel speed of motor vehicles. Policies on bicycle use of controlled-access roadways are the responsibility of State agencies and vary among States. For example, Colorado generally permits bicycle usage with their prohibition on specified segments while Washington permits bicycle usage except in urban areas. Arizona and California also permit bicycle usage on limited access roadways after such use has been requested and approved by an engineering study. New Jersey issues bicycling permits for the use of limited access roadways. In general, western States tend to be more permissive in allowing bicycle use on limited access roadways than eastern States. Possible reasons for the more permissive attitude can be attributed to the lower traffic volumes in many areas of western States, as well as the lack of a suitable alternative road network. In mountainous areas, it may be safer to allow bicyclists on controlled-access highways, where grades and curves are less severe, than to restrict them to other roadways, though no data were found to back this assumption. A notable exception to the western policy of allowable use is the State of New Mexico, where legislation to overturn this prohibition was defeated in 1988 [18].

The Federal government allows States to upgrade the classification of controlled-access highways which were constructed to meet the standards of the Interstate Highway System. In Tennessee, where bicycles are permitted on controlled-access U.S. routes but not on Interstate routes, the upgrading of a stretch of highway from one designation to the other made bicycle travel on one highway illegal, literally overnight [19]. This prohibition occurred with no alterations to the highway itself, the only changes being in the route marker signs. In situations like this, it may be wise for transportation agencies to review their policy on bicycles before such changes are made.

The term "controlled-access" was omitted because agencies can, and frequently do, prohibit the use of bicycles on certain roadways within their jurisdiction. Several States responding to the questionnaire report that bicycles are banned on long causeways because many of the older ones were not constructed with shoulders and are so heavily traveled as to render bicycles extremely dangerous. Another State reported that a stretch of one highway passing through a military base is closed to bicyclists for security reasons. Three roads outside Albuquerque, New Mexico, were closed due to design deficiencies, but a local advocacy group succeeded in persuading the State to modify the restriction to where it is in effect only during rush hours [18].

Such restrictions are commonplace around the country, but in recent years as the power of bicycle advocacy groups has expanded, policy changes have become increasingly difficult to implement. When Mayor Ed Koch of New York City announced in 1987 that bicyclists would be banned from three streets in midtown Manhattan on weekdays for a 90-day trial period, he met up with such fierce opposition that he was forced to drop the plan [20, 21]. The plan was targeted at couriers who frequently broke traffic laws in an effort to make better time, but bicycle advocacy groups across the nation took offense to the ban. The official reason given for abandoning the plan was an increase in the number of traffic violation citations issued, coupled with a corresponding reduction in the number of accidents. Actually, a State Supreme Court justice ruled that the ban could not be enforced because the City had not provided adequate public notice of the closure plan and had not allowed for public comment. This ruling, and the immense amount of public outcry over the plan, led to its abandonment.

The experience of New York City can serve as an example for other governing bodies. Before any changes are made in policies regarding bicycle use on any roadways within the agency's jurisdiction, the concerns of the public should be addressed in order to avoid the lengthy and costly court process experienced by New York City.

Paragraph 2 - *Restriction on Use in Other Areas*

(a) The (State highway commission) by resolution or order entered in its minutes, and local authorities by ordinance, may regulate or prohibit the use of any off-road area within their respective jurisdictions by any class or kind of traffic which is found to be threatening to personal safety or damaging to the environment.

(b) The (State highway commission) or the local authority adopting any such prohibition shall erect and maintain signage in areas where such prohibitions are applicable and when in place no person shall disobey the restrictions stated on such devices.

There is no strict definition as to what differentiates a mountain bicycle from other types of bicycles, but they are characterized by wider, knobbier tires, sturdier frames and fewer gears. Mountain bicycles are designed primarily for punishing off-road use and their use has been a popular recreational activity in many parts of the country. This section, which is similar in form to that which empowers agencies to restrict bicycle traffic on highways, is intended primarily to give those agencies the ability to prohibit mountain bicycles in areas where studies have shown it would be beneficial to do so. In many situations, though, highway agencies have no jurisdiction over the areas where mountain bicycles are used, such as in city or state parks, so more generalized wording may be appropriate to ensure that the proper agencies are empowered. During the course of this project, no agency was identified which had a provision similar to this one, although several have attempted to implement bans. The wording of this regulation is that of the authors of this synthesis.

Attempting to prohibit mountain bicycles from public trails has become an explosive issue and often meets with fierce opposition wherever such action is proposed. A ban in Central Park in New York City, with violators facing up to three months in jail or a fine up to $500 or both, met with such opposition [22]. The League of American Wheelmen, in 1991, published guidelines on how bicyclists can organize

and reverse such restrictions and has, in effect, made this issue its rallying cry for the 90's [23].

The arguments for and against mountain bicycle restrictions are both passionate and logical. Mountain bicyclists claim that they have as much right to rural trails as any other user, and that environmental awareness is the responsibility of the individual bicyclist [24]. Those in favor of bans claim that the sanctity of the forest is violated by mountain bicyclists who are more interested in going as fast as possible than in enjoying the scenery. Skidding down hills, sliding around corners, and grinding up inclines cause rutting which can lead to severe erosion [25]. On one side is a group of people who feel that they, as taxpaying citizens, have as much right to be there as anyone else. Taking the opposing view are those who feel that the environment is being harmed.

While attempting to ban mountain bicycle use in recreational areas may create opposition for the responsible agency, it is necessary that such restrictions be made possible if the safety and environmental conditions warrant such action. Each area in question will have to be evaluated on an individual basis and input will need to be allowed from both factions to decrease the possibility of the agency being involved in costly court battles.

Paragraph 3 - *Drivers to Exercise Due Caution*

Notwithstanding other provisions or other ordinances, every driver of a vehicle shall exercise due care to avoid colliding with any person propelling a human-powered vehicle and shall give an audible signal when necessary.

This rather non-specific section is adapted from a similar provision in the UVC [10]. It is intended to ensure that a driver make every effort reasonable to avoid an accident, even if the bicyclist is clearly in violation of one or more traffic laws.

Paragraph 4 - *Pedestrians' Right of Way on Sidewalks*

The driver of a vehicle crossing a sidewalk shall yield the right of way to any pedestrian and all other traffic on the sidewalk.

Taken directly from the UVC, this section establishes that all vehicle operators, including bicyclists, must yield to pedestrian and bicycle traffic on sidewalks when entering or exiting a roadway [10].

Paragraph 5 - *Driving Upon Sidewalk*

(a) No person shall drive any vehicle other than by human power upon a sidewalk or sidewalk area except upon a permanent or duly authorized temporary driveway.

(b) Local authorities, by ordinance, may regulate or prohibit the use of any sidewalk within their respective jurisdictions by human-powered vehicles which are found to be incompatible with the normal and safe movement of pedestrian traffic.

(c) In areas where human-powered vehicles have been prohibited, the city traffic engineer is authorized to erect or place signs prohibiting the riding of human-powered vehicles thereon by any person and when such signs are in place, no person shall disobey the same.

(d) Whenever any person is operating a human-powered vehicle upon a sidewalk, such person shall yield the right of way to any pedestrian and shall give an audible warning before overtaking and passing such pedestrian.

Ordinances regarding the use of bicycles on sidewalks are so varied among jurisdictions that few citizens are aware of the legality of such actions in their community. The literature and the questionnaire responses indicate that most cities allow bicyclists to operate on sidewalks in residential areas, but not in commercial areas, particularly in central business districts. Over half of the States responding to the questionnaire indicated that the practice of limited allowance is common among their cities. Heavier pedestrian volumes in these areas are the most often cited reason. Other communities may stipulate that only children be allowed to ride bicycles on sidewalks, while those over a certain age (usually 16) may not. Whatever alterations a governing body may make to these provisions must be based on a thorough study of local conditions.

Subparagraph (a) is taken directly from the UVC and prohibits the operation of motor vehicles on sidewalks, but does allow the operation of bicycles [10]. The UVC does not make any recommendations as to whether or not bicycles or other human-

powered vehicles should be allowed on sidewalks. Subparagraph (b) is added to allow the governing body to make whatever revisions to this blanket passage it deems necessary, be they based on development type, age, or other criteria. The final two subparagraphs are adapted from the city code of Davis, California, and are similar to passages which are duplicated in one form or another in many local codes [26].

Whatever policy is adopted in a particular jurisdiction, making this information well known to the bicycling public should be a priority, due to the confusion which exists in many cities.

Paragraph 6 - *Opening and Closing Vehicle Doors*

No person shall open any door on a motor vehicle unless and until it is reasonably safe to do so and can be done without interfering with the movement of other traffic, nor shall any person leave a door open on a side of a vehicle available to moving traffic for a period of time longer than necessary to load or unload passengers.

Taken directly from the UVC, the intent of this section is to deter people from entering or exiting a motor vehicle and causing an accident by such action [10]. When regulations similar to this were passed, they were focused primarily on preventing people in motor vehicles from opening doors into the path of other motor vehicles. Streets in several commercial areas have been restriped or reconstructed to include wide outside lanes in one or more direction. In these lanes, parallel parking is permitted along the right side while the left side is reserved for bicycle use. Because bicycles are more difficult to discern among urban clutter, a person may accidentally open a door directly in the path of a bicyclist. The law is concerned with increasing safety to all roadway users, but the impact on bicyclist safety can be especially pronounced.

Paragraph 7 - *Operation of Vehicles on Bicycle Lane*

(a) A person operating a motor vehicle shall yield the right-of-way to a person operating a bicycle or moped upon a bicycle lane.

(b) This section does not require persons operating mopeds to yield the right-of-way to bicycles if the mopeds are operated on bicycle lanes under human power.

(c) A person may operate a motor vehicle upon a bicycle lane when making a turn, when entering or leaving the roadway, or when required in the course of official duty.
(d) An implement of husbandry may momentarily cross into a bicycle lane to permit other vehicles to overtake and pass the implement of husbandry.

Adapted from the Oregon Revised Statute, this section establishes that a bicycle which is being legally operated in a bicycle lane has the right-of-way over other vehicles turning across the lane [15]. The three most common errors which threaten cyclists all involve the failure to yield the right-of-way when required by law. These actions are turning left in front of an oncoming cyclist who is going straight through an intersection, failing to obey a stop sign and pulling in front of a rider, and passing a cyclist and immediately turning right into his or her path [27]. Most bicycle accidents and conflicts which occur on roadways do not involve a marked bicycle lane, possibly because the percentage of total roadway mileage with these special lanes is small. Since this provision deals specifically with vehicles turning across bicycle lanes, these accident statistics do not have specific applicability in this situation, but they do reflect the danger posed by motorists turning into the paths of bicyclists. The last two subparagraphs establish exceptions to the prohibition of the operation of motor vehicles in a bicycle lane.

Paragraph 8 - *Operation of a Vehicle on Sidewalk*

(a) The driver of a motor vehicle shall yield the right-of-way to a bicyclist on a sidewalk.
(b) The driver of a motor vehicle is not in violation of this section when a bicyclist is not operating the vehicle in a legal manner. This does not relieve the driver of a motor vehicle from the duty to exercise due caution, however.
(c) A person may operate a motor vehicle upon a sidewalk when making a turn, when entering or leaving the roadway, or when required in the course of official duty.

This section is adapted from the Oregon Revised Statute, and establishes that a bicycle which is being legally operated on a sidewalk has the right-of-way over motor vehicles turning across the sidewalk [15]. The third subparagraph details exceptions to the prohibition of the operation of a motor vehicle on a sidewalk. While included here

for completeness and consistency, these exceptions will most likely appear in other sections of the governing body's code.

Paragraph 9 - *Operation of a Motor Vehicle on a Bicycle Path*

(a) A person shall not operate a motor vehicle upon a bicycle path, except when specifically allowed by law.

(b) This section does not apply to the operator of a moped if the moped is being operated solely by human power.

(c) A person may operate a motor vehicle on a bicycle path when making a turn, when entering or exiting the roadway, or when required in the course of official duty.

Adapted from the Oregon Revised Statute, this section prohibits the operation of a motor vehicle upon a bicycle path and details exceptions [15]. The governing body will need to elaborate on the penalty for committing such an offense.

OPERATION OF BICYCLES

Paragraph 10 - *Effect of Regulations*

(a) It is a misdemeanor for any person to do any act forbidden or fail to perform any act required in this section.

(b) The parent of any child and the guardian of any ward shall not authorize or knowingly permit any such child or ward to violate any of the provisions of this act.

This section is repeated verbatim from the UVC and establishes that breaking any of the laws in this article is a misdemeanor, though no monetary or other penalties are detailed [10]. The governing body will need to elaborate on the penalties for the offenses in this article and, although no recommendations are made, this subject is discussed in Chapter 4.

Subparagraph (b) is a boilerplate clause which makes no attempt to completely define the legal responsibility which parents or guardians have for the actions of their children. It is included to make it clear that liability can be placed on parents or guardians when a bicycling minor causes an injury. In a Bicycle USA article, two court

case rulings are detailed where parents were held responsible for their child's action on a bicycle [28]. In one, a boy who was delivering groceries for his father, who owned a grocery store, struck and injured a girl on her way to school. In another, a five-year-old girl, who had used training wheels for a month and then was given a larger bike and allowed to ride without the wheels and without parental supervision, injured a 79-year-old woman.

Paragraph 11 - ***Traffic Laws Apply to Persons on Bicycles***

A person propelling a vehicle by human power or riding a bicycle shall have all the rights and all of the duties applicable to the driver of any other vehicle, except as to special regulations in this article and except as to those provisions which by their nature can have no application.

This section establishes the bicycle as an equal to motor vehicles when it is being operated upon a roadway or other bicycle way. It holds bicycle riders responsible for following all traffic laws which are applicable, as well as to the special provisions which are detailed in the following sections. This section also requires that all motor vehicle operators afford the same rights to bicycle riders that they would afford to the drivers of other motor vehicles. This section is taken directly from the UVC [10].

Although not specifically stated, one of the more important implications of this section is the requirement that bicyclists travel on the right side of the roadway, in the same direction as motor vehicles. Many children are taught by their parents to ride facing traffic, and this habit manifests itself into adulthood. There are two reasons for this teaching of improper behavior. Either the parents fear for the child's safety and feel that the child can better avoid collisions if he or she is facing traffic, or the parents do not know the law. Over one-third of bicycle-motor vehicle accidents occur when the motor vehicle overtakes the bicyclist with nearly 80% of these accidents occurring at night [5]. Wrong-way riding is a major factor in nearly 30% of all accidents, according to one study [5]. This statistic underscores the importance of bicyclist's recognizing and understanding their responsibilities in the traffic stream. A bicyclist who rides in the wrong direction and is involved in an accident may be found guilty of contributory negligence and may be unable to recover damages for injury [29].

Paragraph 12 - *Riding on Bicycles*

(a) No bicycle shall be used to carry more persons at one time than the number for which it is designed or equipped, except that an adult rider may carry a child securely attached to his or her person in a backpack or sling.

(b) No person operating a bicycle shall ride other than upon or astride a permanent and regular seat attached thereto.

(c) No operator shall allow a person riding as a passenger, and no person shall ride as a passenger, on a bicycle other than upon or astride a separate seat attached thereto. If the passenger is a minor weighing 40 pounds or less, the seat shall have adequate provision for retaining the minor in place and for protecting the minor from the moving parts of the bicycle.

Subparagraph (a) is adapted from the UVC and establishes that the only way in which it is legal for a bicycle to be operated with more people on it than the bicycle is designed or equipped for is for a small child to be carried on the back of the operator [10]. This subparagraph makes no effort to set age or weight restrictions for the child, nor does it define what age constitutes being an adult. A reasonable definition of "adult" would be that age at which a person may obtain a driver's license, which is 16 in most places.

The final two subparagraphs are adapted from the California Vehicle Code and require all persons riding a bicycle to do so on a permanently attached seat [30]. For children under a certain weight, the seat must be equipped to protect the child from getting his or her feet and hands caught in the spokes and gears of the bicycle.

Paragraph 13 - *Position in Lane*

(a) Any person operating a bicycle or a moped upon a roadway at less than the normal speed of traffic at the time and place and under the conditions then existing shall ride as close as practicable to the right-hand curb or edge of the roadway except under any of the following situations:

(1) When overtaking and passing another vehicle proceeding in the same direction.

(2) When preparing to execute a left turn.

(3) When reasonably necessary to avoid hazardous conditions including, but not limited to, fixed or moving objects, parked or moving vehicles, pedestrians, animals, surface hazards, or other conditions that make continued operation along the right curb or edge unsafe or to avoid unsafe operation in a lane on the roadway that is too narrow for a bicycle and a vehicle to travel safely side by side.

(4) When operating within an incorporated area as near as practicable to the left curb or edge of a roadway that is designated as one-way. A bicyclist is subject to the same requirements and exceptions of this section when operating along the left curb or edge as are applicable when operating along the right curb or edge.

(5) When operating alongside other bicycles as long as the bicycles are both being operated within a single lane and in a manner which does not impede the normal and reasonable movement of traffic.

(6) When establishing control of the lane in advance of a left turn maneuver.

(b) Any person operating a bicycle or moped upon a bicycle way is not required to operate as close as practicable to the right edge of the way except when necessary to allow the passage of other vehicles and pedestrians.

The bulk of subparagraph (a) is adapted from the UVC and specifies that bicyclists must operate as close as possible to the right edge of the traveled roadway except under certain conditions [10]. What defines a reasonable distance is open to debate, with the most common interpretation being approximately one to two feet. The statute for the City of Boulder, Colorado, stipulates that a bicyclist is entitled to use the right four feet of the lane under normal conditions, and all of the lane when necessary [31]. The amount of the lane that a bicyclist chooses to use may cause a change in motorist behavior. In one limited study a bicyclist who normally rides two feet from the curb concludes that passing motorists tend to pass him by utilizing at least part of the adjacent lane. When the distance is reduced to one foot, motorists will attempt to squeeze by in the same lane rather than waiting for a safe passing opportunity [32].

The fifth provision in subparagraph (a) was adapted from the Oregon Revised Statute, as was subparagraph (b) [15]. The sixth provision is explained under the section entitled "Left Turns."

Paragraph 14 - *Riding on Shoulder*

(a) A person driving a bicycle may travel on a shoulder, if one is provided, in the same direction as motor vehicle traffic.

(b) A person driving a bicycle on a highway with a speed limit in excess of 35 miles per hour and which has a paved shoulder that is at least six feet wide and has a surface quality comparable to the adjacent roadway shall use said shoulder.

(c) Subparagraph (b) shall not apply:

(1) When overtaking and passing another vehicle on the shoulder.

(2) When preparing for a left turn.

(3) When it is reasonably necessary to avoid conditions including, but not limited to, fixed or moving objects, parked or moving vehicles, bicycles, pedestrians, animals, surface hazards or other conditions which make it unsafe to continue on the shoulder.

This provision is adapted from an NHTSA report and specifies when a bicyclist is required to use the shoulder instead of lanes which are used by motor vehicles [13]. Exceptions similar to those in the section entitled "Position in Lane" are detailed. This provision also gives the bicyclist the option to use the other roadway lanes if the shoulder is not of high design standards.

Paragraph 15 - *Riding Two or More Abreast*

Persons riding bicycles upon a roadway shall not ride more than two abreast except on paths or parts of roadways set aside for the exclusive use of bicycles. Persons riding two or more abreast shall not impede the normal and reasonable movement of traffic.

This section is adapted from the UVC, which allows bicyclists to ride two abreast on all roadways and more than two abreast where it is practical and safe to do so. Of the 14 agencies responding to the survey, only two indicated that their laws contradict

this provision. Several of the respondents, however, voiced personal opinions that blanket authority to allow riding two abreast was dangerous and should be banned. In their opinion, single-file riding is much safer and more conducive to the efficient movement of traffic. With this provision, the governing body is still empowered to designate, mark, and sign routes where riding two abreast is considered dangerous. It is unlikely that any agencies will have to resort to these tactics since experienced riders should recognize the potential threat and ride single file, while novice riders probably would opt for single file out of concern for their own safety.

It is feasible to prohibit bicyclists riding two or more abreast except on routes selected by the agency. This would create the need for the agency to assess each roadway individually and would require new signing and marking. Another drawback to such a restriction is that riding two or more abreast would be prohibited on many roadways, such as in residential areas where volumes and speeds are low, where such activity is relatively safe.

No studies on this subject were identified during the preparation of this synthesis, but that does not mean such literature does not exist. The relative safety of riding single file and riding two or more abreast should definitely be studied thoroughly before any restrictions are implemented.

Paragraph 16 - *Clinging to Vehicles*

(a) No person riding upon a bicycle shall attach the same or himself to any other vehicle or streetcar for the purpose of quicker conveyance.

(b) This section shall not prohibit attaching a bicycle trailer or bicycle semitrailer to a bicycle if that trailer has been designed for such attachment.

(c) This section does not absolve the operator of the vehicle onto which the bicyclist is attached from exercising due caution.

This section is adapted from the UVC and is aimed primarily at people who grab hold of the tailgate, side mirror, or other part of a moving motor vehicle in order to be towed along [10]. There have been numerous court cases in which people engaging in such acts have been found guilty of contributory negligence and were thus not eligible to collect damages for injury. In a Washington court case in which a 13-year-old boy

was injured while holding onto a pickup truck, the court ruled that "[while] the moving truck was a temptation to the boy . . . it did amount to an invitation to him to take hold of it. The driver was pursuing his business in an orderly way, and the extent of his duty to the boy was not to injure him wantonly or recklessly. But apart from such considerations, it is clear that the boy was guilty of negligence that prevents a recovery" [33].

Paragraph 17 - *Use of Bicycle Paths*

Wherever a safe and easily accessed path for bicycles has been provided adjacent to a roadway, bicycle riders shall use such path and shall not use the roadway.

The UVC stipulates that bicycle riders must use an adjacent path if one is provided [10]. Bicycle advocacy groups have attempted to have this section entirely deleted, which would allow bicyclists to choose whether to use the bicycle path or the roadway. The reason, they cite, is that many older paths are so poorly designed or maintained that using them constitutes an undue hazard for bicyclists. This paragraph may soon be deleted from the UVC, as it was nearly overturned at the last meeting of the NCUTLO. There are safety benefits, however, to separating transportation modes where a well-designed and maintained alternate facility exists. What constitutes a "safe and easily accessed" bike path is open to interpretation. One possible solution is to mark and sign those paths which meet the design criteria recently established by AASHTO [34]. Where a path does not meet these criteria, the bicyclist would be free to choose whether or not to use it.

This possibility, however, would require the agency to extensively evaluate each bicycle path for conformity. At present, it is unlikely that many existing paths would meet the stringent criteria advanced by AASHTO, so there would be little effective difference between implementing this regulation and the deletion of this section entirely. In the short term, this would favor those who oppose being restricted to the unsafe paths and would create a higher volume of bicycle traffic on the adjacent roadway. It seems unlikely, though, that the novice bicyclist would opt for the roadway over the path, regardless of how ill-designed the facility is. The primary effect would be that only the more experienced bicyclists would exercise the freedom of choice, and the resulting

potential for conflicts and accidents may not be as high as is commonly believed. The advantage of this regulation over deletion of the section entirely is that as more trails are constructed or redesigned to meet AASHTO standards, the agency will be empowered to cite bicyclists who do not use these facilities where available.

Without appropriate wording to indicate how the agency intends to determine and mark which paths are "safe and easily accessed," the decision whether or not to use a path has effectively been left up to the individual bicyclist. Such a vague provision will invite confrontation with bicyclists who feel that they were unfairly cited for not using an adjacent path. In time, the definition of "safe and easily accessed" would be decided by court decisions rather than by engineering judgment. Since this is not a desirable method for any agency to follow, it is suggested that the agency wishing to deviate from the UVC in this respect make significant additions to the boilerplate clause presented here. At best, the regulation is a small effort to recognize and address the rights and needs of bicyclists who have been restricted to unsafe paths for years. Additional research in this area is needed to ensure that the best interests and safety of both motor vehicle operators and bicyclists are preserved.

Paragraph 18 - *Carrying Articles*

No person operating a bicycle shall carry any package, bundle, or article which prevents the use of both hands in the control and operation of the bicycle. A person operating a bicycle shall keep at least one hand on the handlebars at all times.

In many jurisdictions, it is legal to operate a bicycle with only one hand. Whether or not this is safe is questionable. In urban environments, for example, where frequent quick maneuvers may be required of the bicyclist, doing so effectively with only one hand is more difficult. Another danger is that the temptation to shift the load from one hand to the other can cause temporary imbalance, resulting in loss of control. This section is taken directly from the UVC [10].

Paragraph 19 - *Left Turns*

(a) Where it may be accomplished safely and without disrupting the normal flow of traffic, a bicyclist attempting a left turn shall do so in a manner in accord with the laws

governing left-turning motor vehicles. The bicyclist shall establish control of the lane by safely moving to the left within the lane at least 100 feet in advance of the turn. Once the lane is controlled, the bicyclist may make the turn, using the appropriate signal, or maneuver into a turn lane should one exist. Where one or more through lanes must be crossed between the lane in which the bicyclist is originally riding and the lane from which the turn will be made, the procedure in subparagraph (b) must be followed.
(b) When a normal left turn maneuver may not be made, a bicyclist intending to turn left shall approach the turn as close as practicable to the right curb or edge of the roadway. After proceeding across the intersecting roadway, the turn shall be made as close as practicable to the curb or edge of the roadway on the far side of the intersection. After turning, the bicyclist shall comply with any official traffic control device or police officer regulating traffic on the highway along which he or she intends to proceed.
(c) Notwithstanding the foregoing provisions, the state highway commission and local authorities may cause official traffic control devices to be placed and thereby require and direct that a specific course be traveled by turning bicycles, and when such devices are so placed, no person shall turn a bicycle other than as directed and required by such devices.

Subparagraphs (b) and (c) are stipulated in the UVC as the only appropriate methods in which a bicyclist may make a left turn maneuver [10]. Many jurisdictions omit this section altogether, as evidenced by both the survey and the code sections which were available for this study. In these areas, no special provisions are set forth as to how a bicyclist is to make a left turn, with the result that bicyclists must rely on their wits and skill to determine the most appropriate turning method.

On low volume and/or low speed roadways, a maneuver similar to that which motor vehicles use may be appropriate and pose little risk to the bicyclist while simultaneously eliminating unnecessary delay caused by the procedure in subparagraph (b). Where there are several lanes which must be crossed, or where the volumes or speeds are high, the safest method is that set forth in the UVC. A skilled bicyclist may be able to safely cross several lanes of traffic and make a "normal" left turn, but if volumes and speeds are high, it is safer to perform the maneuver as stipulated in the

UVC. Even the most skilled bicyclist may have difficulty judging the speed and location of several vehicles approaching from the rear simultaneously. If there are three or more lanes on the roadway, the bicyclist will experience difficulty in moving from the curb lane to the turn lane in one fluid motion. In this instance bicyclists will need to start their lane transition well in advance of the intersection. The potential for accidents and conflicts will increase since motorists do not expect bicyclists on the inside lanes. For this reason, two possible left turn procedures are detailed.

Locations with actuated signals must be analyzed to ensure that the loop detectors are sufficiently sensitive to be activated by bicycles prior to permitting left turns by bicyclists in a manner similar to motor vehicles. In Palo Alto, California, one community which has made extraordinary efforts to accommodate its biking constituency, the detection loops were altered to the diagonal diamond loop configuration, which was designed with bicycles in mind [35].

Paragraph 20 - *Turn Signals*

A signal of intention to turn right or left or to stop when required shall be given continuously during not less than the last 100 feet traveled by the bicycle before turning. The turn signal shall be given while the bicycle is stopped waiting to turn. A signal by hand and arm need not be given continuously if the hand is needed in the control or operation of the bicycle. Appropriate hand signals are as follows:

(a) To indicate a left turn, the left hand and arm shall be extended horizontally.

(b) To indicate a right turn, the left arm shall be extended horizontally, with the portion below the elbow extended upward, or the right hand and arm shall be extended horizontally.

(c) To indicate a stop or a sudden reduction in speed, either arm shall be extended horizontally, with the portion below the elbow extended downward.

This section is adapted from the UVC and the California Vehicle Code [10, 30]. While the UVC stipulates that a bicyclist must signal his or her intention to turn at least 100 feet in advance, appropriate hand signals, which are contained in a different article, are not referenced directly. The signals which are given were written with motor vehicle operators in mind, while the California provisions are specifically for bicyclists and are

more appropriate and flexible.

Paragraph 21 - ***Passing***

(a) The operator of a motor vehicle overtaking a bicycle proceeding in the same direction shall exercise due care, leaving a safe distance, but in no case less than 3 feet clearance when passing the bicycle and shall maintain clearance until safely past the overtaken bicycle.

(b) The operator of a bicycle passing a parked motor vehicle or a standing bus shall exercise due care, leaving a safe distance, but in no case less than 3 feet clearance when passing the vehicle and shall maintain clearance until safely past the overtaken vehicle.

The problem of motorists who attempt to squeeze past bicyclists is addressed in the section entitled "Lane Position." Subparagraph (a) is taken directly from the Wisconsin Statutes and makes this dangerous maneuver illegal, requiring passing motorist to leave what has been determined to be a minimum safe distance between them and the bicyclist [36]. Subparagraph (b) was adapted from numerous codes which have this provision to help prevent bicyclists from running into car doors which are opened unexpectedly or people being discharged from a bus.

Paragraph 22 - ***Bicycle Parking***

(a) No person shall park any bicycle against windows or on the main traveled portion of the sidewalk, nor in such manner as to constitute a hazard to pedestrians, traffic, or property. If there are no bicycle racks, bicycles may be attached in an upright parallel position to any public pole such as a light post or parking meter, as long as said pole is within twenty-four inches (24) of the curb.

(b) A bicycle may be parked on the roadway at any angle to the curb or edge of the roadway at any location where parking is allowed.

(c) A bicycle may be parked on the roadway abreast of another bicycle or bicycles near the side of the roadway at any location where parking is allowed.

(d) No person shall park a bicycle on a roadway in such a manner as to obstruct the movement of a legally parked motor vehicle.

(e) In all other respects, bicycles parked anywhere on a highway shall conform with the provisions regulating the parking of vehicles.

A low-cost alternative to the installation of racks or lockers is to allow bicycles to be chained to parking meters. In most cases, meters are installed very close to the curb edge, out of the way of pedestrian traffic. Because meters are well installed and the head is securely attached in most instances, a bicycle which is attached to the post with a high security lock, such as the U-shaped Kryptonite, should be safe from theft. In the Center City portion of Philadelphia, thousands of bicyclists secure their vehicle in this way every day and it has caused little problem [37]. Subparagraph (a) is adapted from the Wisconsin Statutes [36]. Subparagraphs (b) through (e) are adapted from the UVC and are boilerplate clauses regarding the parking of bicycles. Specific provisions may be adopted by local governing bodies as warranted. A discussion of some of the possible ordinances is included in the section entitled "Other Considerations" at the end of this chapter.

Paragraph 23 - *Bicycle Racing*

(a) Bicycle racing on the highways is prohibited except as authorized in this section.
(b) Bicycle racing on a highway shall not be unlawful when a racing event has been approved by state or local authorities on any highway under their respective jurisdictions. Approval of bicycle highway racing events shall be granted only under conditions which assure reasonable safety for all race participants, spectators, and other highway users, and which prevent unreasonable interference with traffic flow which would seriously inconvenience other highway users.
(c) By agreement with the approving authority, participants in an approved bicycle highway racing event may be exempted from compliance with any traffic laws otherwise applicable thereto, provided that traffic control is adequate to assure the safety of all highway users.

This section is taken directly from the UVC and prohibits bicycle racing on public roadways unless specifically authorized by the jurisdiction's governing body [10]. Though this generic passage is a bit lengthier than most actual city ordinances, the

content is the same.

Paragraph 24 - *Speed Limit*

(a) No person shall operate a bicycle at a speed greater than is reasonable and prudent under existing conditions.

(b) No person shall operate a bicycle in excess of any posted speed limit.

This section is taken from the Wisconsin Statutes [36]. In a Washington Post editorial on the dangers of reckless bicyclists on recreational trails, it was suggested that "... bicycle cowboys who weave in and out of pedestrians, flicking them like slalom poles, should be thrown off the paths - if not into the river" [38]. This same editorial recommends that on paths where there is a high volume of pedestrian traffic, cities should set bicycle speed limits of not more than two or three times an average walking pace, or about 10 miles per hour. Though it does not seem likely that these limits will be actively enforced, implementing speed limits on bicycle and pedestrian paths gives some degree of legal authority for people to lodge complaints against reckless bicyclists. Such a policy will work best if there is a registration program in effect which requires a license plate or some other identification device to be attached to the bicycle. While it may not be practical to enforce speed limits on these paths, posting signs to this effect will remind bicyclists that they have an obligation to ride slower and exercise more caution when pedestrians are present.

Paragraph 25 - *Signalling When Overtaking*

When overtaking and passing another vehicle or pedestrian, the driver of a bicycle shall give a warning audible at a distance of not less than twenty-five feet. This warning may be by voice or by a mechanical or electrical signalling device.

The wording of this provision is that of the authors, and represents a compilation of the practice of several agencies. The UVC does not require that a bicyclist give an audible warning when overtaking and passing another vehicle or a pedestrian, nor does it require that the bicycle be equipped with any signalling device [10]. There is a provision which prohibits the use of any siren or whistle. The primary emphasis of this

regulation is to encourage proper etiquette when a bicycle is being operated on a sidewalk or another facility where pedestrians may be present. Because pedestrians can, and often do, make quick changes in direction, it is in the best interest of the bicyclist to warn the person being overtaken. The verbal warning should indicate to the pedestrian on which side the bicyclist intends to pass, and a mechanical or electrical warning should be accompanied by a verbal message to the effect of "on your right or on your left."

REQUIRED EQUIPMENT

Paragraph 26 - *Application of Chapter to Bicycles*

No provision in this chapter shall apply to bicycles nor to equipment for use on bicycles except as to provisions in this article or unless a provision has been made specifically applicable to bicycles or their equipment.

Paragraph 27 - *Reflectors and Lamps*

Every bicycle upon a highway or bicycle way at any time from a half-hour after sunset to a half-hour before sunrise and at any other time when, due to insufficient light or unfavorable atmospheric conditions, persons and vehicles on the highway or bicycle way are not clearly discernible at a distance of 1,000 feet, shall be equipped with:

(a) A lamp securely attached to the front of the bicycle which emits a white light visible from a distance of at least 500 feet to the front.

(b) A red reflector of sufficient size and reflectivity securely attached to the rear of the bicycle or beneath the seat which is visible from 50 to 600 feet to the rear when directly in front of lawful lower beams of a motor vehicle. A lamp emitting red light visible from 600 feet to the rear may be used in addition to, but not in lieu of, the required reflector.

(c) White or yellow reflectors of sufficient size and reflectivity mounted on each side forward of center and rear of center of the bicycle to be visible from both sides for 600 feet when directly in front of lawful lower beams of a motor vehicle. Bicycles which are equipped with reflectorized tires on the front and the rear need not be equipped with side reflectors.

(d) A white or yellow reflector on each pedal visible from the front and rear or the bicycle from a distance of 200 feet when directly in front of lawful lower beams of a motor vehicle.

(e) A bicycle or its rider may be equipped with lights or reflectors in addition to those required by the foregoing subparagraphs.

Paragraph 28 - *Brake*

Every bicycle operated on a highway or bicycle way shall be equipped with a brake or brakes which will enable its driver to stop the bicycle within 25 feet from a speed of 10 miles per hour on dry, clean, level pavement.

Paragraph 29 - *Handlebars*

No person shall operate a bicycle on a highway or bicycle way equipped with handlebars so raised that the operator must elevate his or her hands above shoulder level in order to grasp the normal steering grip area. Every bicycle that is equipped with handlebar grips must have said grips securely glued to the handlebars.

Paragraph 30 - *Seat*

(a) No person operating a bicycle on a highway or bicycle way shall ride other than upon or astride a permanent and regular seat attached thereto.

(b) No operator shall allow a person riding as a passenger, and no person shall ride as a passenger, on a bicycle on a highway or bicycle way other than upon or astride a separate seat attached thereto. If the passenger is a minor weighing 40 pounds or less, the seat shall have adequate provision for retaining the minor in place and for protecting the minor from the moving parts of the bicycle.

Paragraph 31 - *Height*

No person shall operate a bicycle on a highway or bicycle way which is of such a size as to prevent the operator from safely stopping, supporting it in an upright position with at least one foot on the ground, and restarting it in a safe manner.

Paragraph 32 - *Bicycle Identifying Number*

A person engaged in the business of selling bicycles at retail shall not sell any bicycle unless the bicycle has an identifying number permanently stamped or cast on its frame.

Paragraph 33 - *General Bicycle Condition*

No person shall operate a bicycle on a highway or bicycle way where its mechanical condition shall impair the safe operation of the bicycle.

Paragraph 34 - Helmet[1]

(a) Every person operating a bicycle on a highway or bicycle way shall wear a helmet of good fit, fastened securely, and meeting ANSI Z90.4 or subsequent bicycle helmet standards, or the Snell Memorial Foundation's 1984 Standard for Protective Headgear for Use in Bicycling or subsequent standards.

(b) No person operating a bicycle on a highway or bicycle way shall allow anyone to ride as a passenger unless the passenger is wearing a helmet as defined in (a) or else is in an enclosed trailer or other device which meets or exceeds current nationally recognized standards of design and manufacture for the protection of the passenger's head from impacts in an accident without the need for a helmet.

(c) The first violation of (a) or (b) shall be dismissed if the person charged submits proof that equipment meeting the standards in (a) and (b) has been acquired for use by the operator or passenger.

Paragraph 35 - *Inspecting Bicycles*

A uniformed police officer may, at any time, upon reasonable cause to believe that a bicycle is unsafe or not equipped as required by law, or that its equipment is not in proper adjustment or repair, require the person riding the bicycle to stop and submit the bicycle to an inspection and such test with reference thereto as may be appropriate.

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1. The provisions of this paragraph are included to provide an example for those agencies which desire to make helmet usage mandatory and should not be construed as a recommendation for such laws.

The provisions in this article are adapted from numerous sources, including the UVC, the California Vehicle Code, the Wisconsin Statutes, the Des Plaines, Illinois City Code, the Concord, California City Code, and an article in Bicycle USA [10, 30, 36, 39, 40, 41]. The provision dealing with lamps and reflectors is more stringent than the UVC, specifying the placement of the front lamp and rear reflectors and also requiring reflectors to be placed on the front and rear of the pedals. Other requirements which are not included in the UVC are the requirement of a signalling device, requirement of a permanently attached seat, specifications for the handlebars and bicycle height, a generic clause regarding the general condition of the bicycle, and the requirement for operators and passengers to use a helmet or other safety equipment. A bicycle which meets all the criteria of this article will probably be legal in every jurisdiction in the country. Most jurisdictions do not require the use of a signalling device or helmet, nor do they set standards for handlebars or overall bicycle height. Their inclusion is the result of a desire to be as complete as possible.

Of all these requirements, the only one which has generated national debate has been the mandatory helmet ordinance. The States of California and New York, among others, already have laws which require the use of helmets for young children riding in bike carriers, but in 1990, Howard County, Maryland, passed legislation requiring any bicyclist 16 years of age or under to wear a helmet, becoming the first jurisdiction in the country to set such a broad standard [42]. A study by the Harborview Injury Prevention and Research Center revealed that bicycle-related head injuries can be reduced by 85% through the use of helmets, yet fewer than 5% of America's cyclists, and less than 1% of those under age 15, currently use helmets [42].

Howard County's mandatory helmet law, which originally was aimed at bicyclists of all ages, met with stiff opposition when introduced. Surprisingly, much of it came from ardent bicyclists, approximately half of whom oppose mandatory laws, as revealed in a survey conducted at the 1990 National Conference of Bicyclists [41]. A referendum was sought by enthusiasts in Howard County who felt that their personal freedom was being violated and who did not want to be forced to wear a helmet in the middle of summer, the same arguments used by opponents of mandatory motorcycle helmet laws [43]. In addition, it was felt that such provisions would discourage people from taking up bicycling and would be frequently violated because an acceptable helmet costs a

minimum of $25. For families who are unable to afford the cost of a helmet, school programs whereby needy children are allowed to borrow helmets may be necessary. A model program has been established in Boulder, Colorado, which keeps 100 bikes and 50 helmets on hand for the free daily use of tourists and residents [44]. People wishing to give bicycling a try without any expense can simply borrow the necessary equipment from the city by leaving a credit card number and a security deposit.

Agencies wishing to implement a mandatory helmet law should expect considerable public outcry and may want to reconsider such actions if enacting such a provision will curtail usage. At this point, the best alternative for bicycle-friendly jurisdictions is public education programs which encourage helmet use, but do not actually require them. If the education program works and helmet use becomes widespread, mandatory usage laws can then be more easily enacted. As stated in the introduction, the controversial nature of this issue and the lack of data regarding the effects of mandatory helmet usage make the suggestion of a generalized model ordinance difficult. The provision presented here should be viewed as an alternative, not as a mandate for helmet use.

LICENSING AND REGISTRATION

This entire section is adapted from a Bicycle Manufacturers Association of America Model Bicycle Ordinance, with consideration being given to the other sources available [44]. Though the wording of actual provisions varies widely, and not all jurisdictions have such detailed regulations, it was felt that this Model Ordinance was thorough and clear enough to be adopted in this report directly. Portions dealing with the legal definition of a bicycle and rules of the road were deleted to prevent repetition of provisions in other sections. Two regulations concerned with legal penalties and the procedures for impounding were omitted since these issues will be discussed in Chapter 4 and such policies will be highly dependent on the legal and political climate of each community.

The primary revision which an agency may wish to consider before adopting this section would be to exclude children from Paragraph 44, which requires the applicant to have detailed knowledge of the rules of the road. Every bicycle within a city should

be registered, but it is unreasonable to expect young children to know all the traffic laws of the jurisdiction. Some basic knowledge, such as the proper side of the road on which to ride, how to signal a turn, and when to yield to other vehicles can and should be taught either in school or by the parents or guardian.

These regulations may be adopted by either a State or local agency. For conformity and ease of implementation, States would be better suited to assume this responsibility, as the registration process could be incorporated into the duties of the Department of Motor Vehicles or equivalent agency. No information was found to indicate that any State has such a program, but several local agencies were identified.

Paragraph 36 - *Registration of Bicycles*

(a) It shall be unlawful for any person to drive a bicycle on any highway or bicycle way without first obtaining from the (licensing authority) a license therefore as prescribed in Paragraph 37.

(b) No person, firm, partnership, or corporation shall maintain, operate, or conduct a business of buying or selling new or secondhand bicycles without first obtaining a license from the (licensing authority) as prescribed in Paragraph 43, Subparagraph (b).

(c) From and after the passage of this ordinance, it shall be unlawful for any person, firm, partnership, or corporation to maintain, operate, or conduct a bicycle-renting agency without first obtaining a license from the (licensing authority) as herein prescribed in Paragraph 43.

Paragraph 37 - *Issuance of License*

The police department is hereby authorized and directed to issue upon written application, bicycle licenses that shall be effective for one year, and all licenses shall be dated of the year of issue. This license when issued, shall entitle the licensee to operate such bicycle or bicycles for which said license shall have been issued upon all public streets, highways, and bicycle ways.

Paragraph 38 - *License Plates*

The police department shall provide each year a license plate (or tag or decal), together with registration certificate cards stamped in numerical order beginning with the number

one; and shall indicate the year for which they were issued and letters indicating by whom they were issued. The license shall be suitable for attachment to the bicycle at a location where it will always be plainly visible, and it shall also be the duty of the police department to attach the license to the bicycle, or supervise its attachment in such manner as will prevent removal. The police department shall also provide and issue a registration card with numbers corresponding with the numbers on the license. The issuance of the registration card and license to the licensee shall be after the collection of the registration fee for the license as provided in Paragraph 44, Subparagraph (c). Funds collected by the police department for the licenses provided for in this ordinance shall be returned by the police department as collected and under conditions to be determined by the treasurer of the registration fund. The license shall remain attached to the bicycle during the valid term of such license. The police department shall keep a record of the date of issue of each license.

Paragraph 39 - *Dealers and Rental Agencies*

All persons, firms, partnerships, or corporations engaged in the business of buying or selling new or secondhand bicycles are hereby required to make regular reports to the police department, giving a list of all purchases and sales made by said dealer, as well as the name and address of all persons, firms, partnerships, and corporations from whom said bicycles are purchased and to whom sold, a description of each bicycle purchased or sold and the serial number thereof, and in the case of a secondhand bicycle bought from an individual or taken in trade from a person buying a new bicycle, or a secondhand bicycle taken from a dealer's stock, the number of the license thereon, if any.

Paragraph 40 - *Transfer of License*

It shall be the duty of any person who sells or transfers ownership of any bicycle to report such sale or transfer by returning to the police department the registration card issued to such person as license thereof, together with the name of the person and his or her address to whom the bicycle was sold or transferred, and such report shall be made within two days of the date of sale or transfer thereof. It shall be the duty of the person who made the purchase or the transferee of said bicycle to apply to the police

department for registration thereof within two days of the date of said sale or transfer.

Paragraph 41 - ***Altering License***

It shall be unlawful for any person, firm, partnership, or corporation to willfully and maliciously remove, destroy, mutilate, or alter the number of any bicycle frame licensed pursuant to this ordinance. It shall also be unlawful for any person, firm, partnership, or corporation to remove, destroy, mutilate, or alter any license plate, seal, or registration card during the time in which said license plate, seal, or registration card is operative, provided, however, that nothing in this ordinance shall prohibit the police department from stamping on the frame of bicycles on which no serial number can be found or on which said number is illegible for identification purposes. The police department may also stamp upon the frame of any bicycle registered a number which shall be the secret number of the police department, if so required, in the administration of this ordinance to prevent bicycle larceny and recover stolen bikes.

Paragraph 42 - ***Rental Practices***

No person, firm, partnership, or corporation engaged in the business of renting bicycles for hire shall rent a bicycle to a minor unless the written consent of the parents or guardian is provided. The renting agency must keep the written consent on file for police inspection.

Paragraph 43 - ***License Fees***

The following fees shall be collected by the police department for the various types of licenses provided under this ordinance:

(a) The license fee to be paid for each bicycle shall be $_____ for the first year or any part of the first year for which such license shall be issued, it being understood that all licenses issued under this ordinance expire on the last day of the month of _____, unless that date shall happen on a Sunday in which event the license shall be dated on the first following legal date. In the case where the transfer of bicycle ownership is made in the manner prescribed in this ordinance, the fee for the transfer of said license shall be $_____. Upon the loss of a license, and upon evidence satisfactory of said loss, a new license shall be issued upon payment of $_____.

(b) Each person, firm, partnership or corporation engaged in the business of buying and selling new and secondhand bicycles shall be required to have a license issued by the police department. Said license shall be effective for one year. Any person, firm, partnership, or corporation engaged in the business of renting bicycles for public hire shall procure a license for their bicycle rental agency.

(c) Each person, firm, partnership, or corporation engaged in the business of renting bicycles for public hire, in addition to the license fee prescribed for each bicycle, as provided for in Subparagraph (a) of this ordinance, shall be required to have a license to operate a bicycle rental agency. All bicycles owned by said agency offered for public hire shall be registered in the name of said agency, but a record of the name, address and age of such person hiring a bicycle shall be kept on file for the inspection of the police department. License plates and registration cards issued to a bicycle rental agency shall contain the letters "RA" indicating they are issued to a bicycle rental agency.

Paragraph 44 - *Inspection*

The chief of police, or his designated representatives, shall inspect each bicycle offered for registration and shall also examine the driving qualifications of the applicant as to his or her knowledge of the vehicle traffic laws of the state applying to bicycles, traffic signs and signals, as set forth in other articles, and if the applicant's riding qualifications, knowledge of the vehicle laws of the state applying to bicycles, and the bicycle safe driving rules and regulations and the official police instructions for the safe operation of a bicycle are not satisfactory, or the bicycle is not in good driveable condition and properly equipped as provided for in this ordinance, registration of the applicant's bicycle must not be issued until all requirements are fulfilled.

Paragraph 45 - *Qualifications of Dealers*

In the matter of the issuance of business licenses for the dealers in secondhand bicycles and the conduct and operation of a bicycle rental agency, the chief of police must be satisfied that applicants for such licenses are of good character and financially responsible.

OTHER CONSIDERATIONS

Compiling a comprehensive synthesis of bicycle laws and ordinances is a difficult task, due to the variety in codes and the different attitudes taken by agencies towards stimulating bicycle use. At best, a set of laws which have applicability in any jurisdiction can be proposed, with suggestions made as to how they should be altered. Similarly, ordinances can be enacted that have a direct or indirect impact on bicyclists and bicycle use. Providing model ordinances in this report would not be appropriate since they are specific to the facilities, needs and goals of the municipality. Some of these issues, however, can be discussed, and agencies may take it upon themselves to consider the issues in developing laws and ordinances which best suit their needs.

Providing Facilities for Bicyclists

The City of Palo Alto, California requires that employers provide one bicycle locker for every ten motor vehicle parking spaces, as well as one shower for every 10,000 square feet in the building [44]. A city responding to the questionnaire requires that developers provide one space per dwelling unit in residential areas, and one space for every ten car spaces in commercial areas. After the first 50 spaces are provided, the requirement is cut in half, and each space must be at least two feet by six feet, with a six foot vertical clearance. Any racks used must accommodate U-shaped locks and the bicycle parking location must be clearly designated, safe and convenient. In Los Angeles, companies with more than 100 employees must provide incentives for workers who carpool, use mass transit, or commute by bike, with rewards ranging from prize drawings to stipends of as much as $85 a month [45]. Many other cities have similar detailed ordinances or are considering them. The specifics of such provisions must be established by the governing body because local biking characteristics must be taken into account.

In jurisdictions where bicycle use is not currently high, the passage of such provisions may increase usage levels. In a poll conducted for Bicycling magazine, it was discovered that less than 2% of America's workers currently commute to work by bicycle. If employers provided secure storage areas for bicycles and showers for employee use, some 17% claim they would sometimes ride bikes to work [45].

Linking Bicycling and Walking with Mass Transit

Besides providing parking at residences and businesses, cities may also consider passing ordinances which will facilitate linking bicycle ridership with mass transit. Many people who use mass transit for commuting arrive at the transit station each morning in automobiles. A study conducted in New Jersey in 1981 revealed that although 70% of rail riders lived within 4 miles of the station, over 75% arrived each morning by automobile, with only 18% making the trip by bike [46]. Approximately one-third of those who did not use a bicycle cited the lack of secure parking facilities as the primary reason. For the mass transit rider who wishes to use a bicycle at both ends of the rail trip, many systems prohibit carrying a bike onto the train. In cities which have rail transit systems, establishing provisions for such mode connections should be a priority in a bicycle program. Some of the possibilities include restricting bicyclists to either the first or last car of the train, limiting the maximum number of bicycles per car, and prohibiting bikes during certain periods such as the morning and evening rushes [46].

By cooperating with transit authorities, it is possible to develop a coordinated policy whereby commuters can ride their bicycles to the station or transit center in the morning, park them at secure locations, and then catch trains or buses to take them to their destination. The highway agency would be responsible for establishing safe bicycle ways connecting the stations with nearby residential areas, while the transit authority would need to provide safe parking areas. The combined efforts of the two would be necessary to educate the public and encourage them to use the two transportation modes in tandem. In addition to targeting mass transit stations, the governing body should also pass zoning ordinances which require bicycle parking facilities at high-density residential developments and major destination points such as shopping centers and schools. At these points, as well as along the entire length of the bicycle route network, support facilities such as drinking fountains and comfort stations should be constructed.

Eliminating Roadway Hazards

To prevent bicycle accidents, one of the simplest measures a governing body may take is to ensure that drainage grates are oriented so that the bars are perpendicular to the direction of travel. If the bars are oriented parallel with the roadway, bicycle tires may slip through and cause the rider to be thrown off the vehicle. Another possible accident scenario involves a bicyclist who is wary enough to see the hazard and swerves to avoid. Such quick movements

may send the bicyclist directly into the path of an overtaking motor vehicle. Though the correction of such hazards seems to be more operationally oriented than legislative, the State of Oregon sets a good example for other agencies by including the following passage in their statutes [15]:

> Street drains, sewer drains, storm drains and other similar openings in a roadbed over which traffic must pass that are in any portion of a public way, highway, road, street, footpath or bicycle trail that is available for use by bicycle traffic shall be designed and installed, including any modification of existing drains, with grates or covers so that bicycle traffic may pass over the drains safely and without obstruction or interference.

Although the concerns of bicyclists are probably not the reason many jurisdictions have bottle return bottles, such legislation does have a significant impact on this constituency. Requiring a refundable deposit on glass bottles encourages consumers to return beer and soda bottles to the store, rather than disposing of them alongside the road. While making the roadside much more pleasant, it creates a safer bicycling environment by reducing the amount of broken glass. After New York State passed a bottle return bill, the state's Returnable Container Law Commission estimated that litter was reduced 70 to 80 percent, while a bicycle club estimated that a similar reduction occurred in the number of punctured bicycle tires [47].

Prohibiting Headphones and Other Hearing Impediments

Another countermeasure which may prevent bicycle accidents would be the passage of legislation against the use of devices which restrict the hearing of a bicyclist. Those in favor of such a law feel that bicyclists, being slower than other traffic, must depend on their ears for vital information. Wearing headphones hampers a bicyclist's ability to hear traffic sounds. There have been incidents in several states where cyclists wearing headphones were struck and killed by trains, tragedies which may have been easily avoided [48]. The arguments against such a law are also persuasive, however. Instructors in bicycle safety courses often use two-way headphone radios to communicate with students. Bicycle tour groups use them to maintain contact, warn about road hazards, and give route directions. A further consideration is that drivers of motor vehicles are not required to have unimpaired hearing to operate their vehicle. Motor vehicle operators are permitted to identify exterior traffic clues with vehicle windows closed and over the extraneous sounds of radios, conversations and engine noise.

In addition, bicyclists and motorcyclists often use earmuffs for protection against frostbite in northern States [49]. The State of Florida is the only agency identified which specifically prohibits the use of headsets, headphones and other listening devices other than hearing aids when operating a bicycle.

Operating a Bicycle While Under the Influence of Drugs or Alcohol

As more emphasis is placed on reducing drunk driving and more and more offenders are losing their driver's license, they are switching to other transportation modes, such as bicycling and walking. Many of the agencies responding to the survey indicated that the laws against operating a motor vehicle while under the influence of drugs or alcohol were not applicable to bicycle riders. The reasons for this are obvious, since no license is required to operate a bicycle and usually the only individual physically injured in an accident is the bicyclist. While these considerations may explain the lack of inebriated biking laws, it does not justify this oversight. It is not necessary for the punitive penalties for violating these laws to be as severe as those imposed on motor vehicle operators. Laws should be established prohibiting operating a bicycle while under the influence of drugs or alcohol, but no agencies were identified as having such ordinances.

Regulating Bicycle Couriers

Another group of bicyclists who may pose a hazard to other roadway users are bicycle couriers. Bike couriers are common in larger cities where better travel time may be made on a bicycle rather than in a motor vehicle. Speed is important to bike couriers since they are paid by the number of deliveries they make. Crowded sidewalks become a convenient way to bypass a queue of vehicles at a signal. Red lights may be ignored and it is not uncommon for couriers to travel well in excess of what is a safe speed. The latest trend, however, may be the most dangerous. Couriers have traded in the traditional 10-speed bike in favor of faster and lighter track bikes, which are made for racing. The danger is that these bikes are not equipped with conventional brakes, rather, the rider must stop pedaling and apply backward pressure to the pedals until the back wheel stops spinning and skips up slightly [50]. In an attempt to ensure that couriers or their companies can be held liable for any accidents caused by such dangerous behavior, many cities such as New York, Chicago and Washington have passed laws which require couriers to be licensed and insured. These regulations also establish procedures

in which frequent violators can lose their license or access to some public streets [51, 52, 53, 54]. The effectiveness of these programs has not been formally evaluated or reported in the literature.

Reducing Queues Behind Bicyclists

An additional concern is requiring bicyclists to temporarily leave the roadway if they hold up vehicular traffic behind them. This is more of an issue in mountainous States where narrow roads and restricted sight distances can create long queues behind bicyclists. In Colorado, a bill was introduced, originally aimed solely at automobile drivers but revised to include bicyclists, which required drivers to pull off the road if they held up five or more vehicles. Bicyclists failing to do so would have points assessed against their driver's license and would receive a stiff fine [55, 56]. The Colorado Bicycling Advisory Board and the League of American Wheelmen teamed up to prevent the passage of this legislation, instead having it amended to follow the wording of the UVC section dealing with lane position.

Zoning

There are many legal issues which must be addressed that do not deal specifically with the operation of bicycles. When constructing a bicycle facility, it may be necessary for the agency to exercise its right of eminent domain to obtain land for its construction. The question of whether an agency may utilize this power to create a facility to be used only for recreational purposes by a small percentage of people living in the area has created controversy. When the Forest Preserve District in Illinois attempted to condemn and take possession of a strip of riverfront from 26 property owners, the land owners and legislators alike balked, claiming a gross abuse of the right of eminent domain [57]. The FPD changed plans for the bikeway so that the route followed the right of way of the highway along the front of the properties. Court cases have ruled that eminent domain may be exercised for the construction of a bicycle path, even though it may be established only for pleasure purposes and may not be used by a significant percentage of the citizens within the agency's jurisdiction [58].

There are many reasons why landowners may object to having a bicycle path run along or through their property, besides the fact that they may lose a significant parcel of land. Noise created by trail users may be a concern, but rarely will excessive noise levels be generated. Litter may also be cited as a reason for opposing the construction of a trail, but this potential

problem can be alleviated if the agency responsible for construction installs trash cans at regular intervals and makes arrangements to have litter patrols make periodic sweeps down the trail. Concerns over loss of privacy can be eliminated if a fence or hedgerow is erected by the agency. Some landowners will even claim that the construction of a bike trail will lower their property values. While general conclusions cannot be drawn from only one study, it was determined that the Burke-Gilman Trail in Seattle, Washington, was actually an amenity that helps sell homes and increase property values, while having little if any effect on crime and vandalism, another concern of property owners [59].

In addition to these concerns, property owners frequently raise the issue of liability. They worry that bicyclists or pedestrians may have accidents on the portion of the trail for which they donated an easement, and that they will find themselves as a defendant in a court case. Most of these fears are ungrounded, as many agencies specifically exempt property owners from liability on these easements. For trespassers who may stray off this easement, common law holds that the landowner "owes no duty of care." An important exception to this is the doctrine of "attractive nuisance" which may hold landowners responsible for injuries to children who trespass onto a property because of a particular attraction, such as a swimming pool. In rural areas, children will most likely be under adult supervision when on a trail. In urban areas, the construction of a fence or hedgerow which effectively blocks the view of the landowner's property from the trail will eliminate this possibility. And, of course, should a trespassing adult cause damage to the property, the general rules of tort liability are applicable. This holds little consolation for property owners, since many perpetrators of this sort are never caught. Their fear is that the installation of a trail provides would-be wrongdoers with a back door to their property. So far, little effort has been made to determine if such fears are justified, and this lack of data is an impediment to the construction of new facilities.

CHAPTER 3 - MODEL PEDESTRIAN LAWS AND ORDINANCES

This chapter is devoted to laws and ordinances which are specifically applicable to pedestrians. Model regulations are presented in two distinct categories, with a third section being reserved for a general discussion of related issues. The use of the term "model" should in no way construe that the wording of each regulation is legally correct. Where possible, the laws and ordinances are repeated directly from, or adapted from, jurisdictional codes, which do have legal connotations. However, many were developed without the input of a legal expert. The primary intent of this chapter is to present a set of regulations which is comprehensive, but without overly restrictive wording which may render some impractical under certain circumstances. A jurisdiction desiring to pass a pedestrian ordinance may use this chapter as a general guide, but legal counsel is required to ensure that the exact phrasing is appropriate for that area.

WORDS AND PHRASES DEFINED

Crosswalk - *That part of a roadway at an intersection included within the connections of the lateral lines of the sidewalks on opposite sides of the highway measured from the curbs or, in the absence of curbs, from the edges of the traversable roadway; and in the absence of a sidewalk on one side of the roadway, that part of a roadway included within the extension of the lateral lines of the existing sidewalk at right angles to the centerline. Any portion of a roadway at an intersection or elsewhere distinctly indicated for pedestrian crossing by lines or other markings on the surface is also considered a crosswalk.*

This definition is adapted from the UVC [10]. Perhaps the only omission is the location of a crosswalk at an intersection where there are no sidewalks on either side of the roadway. For legal purposes, a crosswalk at a location like this could be defined with reference to the distance from the curb or edge of the intersecting roadway, but practical considerations prevent this. Where there are no sidewalks, pedestrians will make their own footpaths, and the crosswalk centerline should follow the endpoints of these paths. Also, there may be physical obstructions such as fences, bushes, holes,

and the like which would make such a definition unwise. It is probably concerns like these which led to this omission.

Motorized Wheelchair - *Any self-propelled vehicle designed for, and used by, a handicapped person that is incapable of a speed in excess of eight miles per hour. Any person using a motorized wheelchair on any public street, highway, or bicycle way shall be considered a pedestrian.*

The basic definition of a motorized wheelchair is taken directly from the UVC, but the inclusion of the clause defining an operator of such a vehicle as a pedestrian was the result of practical considerations [10]. Although a motorized wheelchair is defined as a vehicle, one cannot expect it to be operated in the same manner and for the operator to have the same rights and responsibilities as a motor vehicle or a bicycle. A person in a wheelchair will behave much more like a pedestrian than a driver.

Pedestrian - *Any person on a public street, highway or bicycle way who is traveling without benefit of a vehicle, with the exception that any person in a wheelchair or similar device, is considered a pedestrian.*

The Uniform Vehicle Code's definition of a pedestrian as "any person afoot" is inadequate when it is considered that many handicapped people use manually operated wheelchairs or their motorized counterparts, which are legally defined as vehicles [10]. The legal definition should be structured so that persons in wheelchairs or a similar device are classified as pedestrians in accord with the definition for motorized wheelchairs.

Safety Zone - *The area or space officially set apart within a roadway for the exclusive use of pedestrians and which is protected or is so marked or indicated by official traffic control devices as to be plainly visible at all times while set apart as a safety zone.*

The use of safety zones is gaining in popularity as the concerns of elderly and handicapped pedestrians, who may not travel as fast as other pedestrians, become more

of an issue. These persons often find themselves stranded in the middle of the roadway when pedestrian crossing signals change, resulting either in unnecessary delay for drivers or the need for the crosser to wait in the roadway until there is a sufficient gap or until the next protected signal. On roadways with high volumes and/or high speeds, this is an extremely dangerous situation which can be averted by the installation of a protected refuge area in the median of the roadway. A pedestrian may easily cross one direction of the roadway while under the protection of a signal, then wait in the safety zone until the next crossing opportunity. Not only does the provision of a safety zone reduce pedestrian exposure to hazard, but it may considerably reduce the delay to vehicular traffic. If the roadway is exceptionally wide and there is a high volume of traffic, the volume of the cross street may not be high enough to warrant a green signal which is sufficiently long to allow pedestrians to cross the entire width of the primary road.

Individual agencies should set standards for the installation of safety zones and make every effort to construct them where warranted. Numerous publications exist to aid agencies in drafting such policies. This definition is from the UVC [10].

Sidewalk - *That portion of a street between the curb lines, or the lateral lines of a roadway, and the adjacent property lines, intended for use by pedestrians and by bicyclists and other users where permitted.*

In the UVC, the definition of a sidewalk notes that such facilities are intended for use by pedestrians, with no mention of bicyclists [10]. Though sidewalks are built primarily with pedestrians in mind, their use by bicyclists in jurisdictions where such activity is legal requires the inclusion of the clause at the end of this definition.

PEDESTRIAN RIGHTS AND RESPONSIBILITIES

Paragraph 1 - ***Obedience to Traffic Control Devices and Traffic Regulations***

(a) A pedestrian shall obey the instructions of any official traffic control device specifically applicable to him or her, unless otherwise directed by a police officer.

(b) Pedestrians shall be subject to traffic and pedestrian control signals as provided in Sections 2 and 3 of this article.

(c) At all other locations, pedestrians shall be accorded the privileges and shall be subject to the restrictions stated in this article.

Adapted from the UVC, this section establishes that pedestrians are bound to follow any official signals or the instructions of any police officer [10]. Agencies will need to add subparagraphs to this provision detailing the penalties for violating any of the laws and ordinances in this article.

Paragraph 2 - *Drivers to Exercise Due Care*

Notwithstanding other provisions of this article or provisions of any local ordinance, every driver of a vehicle shall exercise due care to avoid colliding with any pedestrian and shall give an audible warning when necessary and shall exercise proper precaution upon observing any child or any obviously confused, incapacitated, or intoxicated person.

This rather non-specific section is taken from the UVC [10]. It is intended to ensure that a driver make every effort reasonable to avoid an accident, even if the pedestrian is clearly in violation of one or more traffic laws.

Paragraph 3 - *Traffic Control Signal Legend*

Whenever traffic is controlled by traffic control signals exhibiting different colored lights successively, or with arrows, the following colors shall be used and shall indicate and apply to operators of vehicles and pedestrians as follows below. In the event an official traffic signal is erected and maintained at a place other than an intersection, the provisions of this section are applicable except as to those provisions which by their nature can have no application.

(a) Green Go Light - Vehicular traffic facing a green signal may proceed straight through or turn right or left unless at such place prohibits either such turn, but vehicular traffic shall yield the right of way to other vehicles and to pedestrians lawfully within the intersection or an adjacent crosswalk at the time such signal is exhibited. Pedestrians,

and persons who are riding bicycles in a manner which is consistent with the safe use of the crosswalk by pedestrians, facing the signal may proceed across the roadway within any marked or unmarked crosswalk.

(b) Yellow - When shown with or following the green, traffic facing a yellow signal shall stop before entering the intersection unless so close to it that a stop may not be made in safety.

(c) Red - Vehicular traffic facing a red signal shall stop before entering the crosswalk on the near side of an intersection, or if none, then before entering the intersection or at such point as may be indicated by a clearly visible sign or marking and shall remain standing until green or other signal permitting movement is shown. No pedestrian or bicyclist facing such signal shall enter the roadway unless he or she can do so safely and without interfering with any vehicular traffic. Vehicular traffic facing a red signal at an intersection may, after stopping as required, cautiously enter the intersection to make a right turn into the nearest lawfully available lane for traffic moving to the right or to turn left from a one-way highway into the nearest lawfully available lane of a one-way highway on which vehicular traffic travels to the left. No turn may be made on a red signal if lanes of moving traffic are crossed or if a sign at the intersection prohibits a turn. In making a turn on a red signal, vehicular traffic shall yield the right-of-way to pedestrians and bicyclists lawfully within a crosswalk and to other traffic lawfully using the intersection.

(d) Green Arrow - Vehicular traffic facing a green arrow signal may enter the intersection only to make the movement indicated by the arrow but shall yield the right-of-way to pedestrians and bicyclists lawfully within a crosswalk and to other traffic lawfully using the intersection. When the green arrow signal indicates a right or left turn traffic shall cautiously enter the intersection. No pedestrian or bicyclist facing such signal shall enter the roadway unless he or she can do so safely and without interfering with any vehicular traffic.

This section is adapted from the Wisconsin Statutes and details the requirements of motorists and pedestrians at intersections and other locations controlled by traffic signals, but where no pedestrian signals are provided [36]. Basically, a pedestrian is required to emulate the actions of vehicles on the road which parallels the direction in

which the pedestrian is traveling. Pedestrians may cross the intersecting roadway when facing a green signal intended for the parallel roadway, and motorists are required to yield to them. When facing a signal with a red indication, meaning that vehicular traffic is moving on the cross street, the pedestrian may cross only after making sure that it is safe to do so. In jurisdictions where a right turn on red is lawful, motorists must yield to pedestrians in a crosswalk. The portion of subparagraph (c) concerned with such a maneuver is enclosed in parentheses so that it may be deleted by agencies where right turn on red is not permitted. When facing a green arrow, the pedestrian must act in the same way as when facing a red signal, since it is assumed that vehicles approaching from the other direction will also have a green arrow and will be turning onto the cross street which the pedestrian is crossing.

Paragraph 4 - *Pedestrian Control Signals*

Whenever special pedestrian control signals are in place, such signals indicate as follows:

(a) Steady Walk or Steady White or Green Symbol - A pedestrian, or a person riding a bicycle in a manner which is consistent with the safe use of the crossing by pedestrians, facing such a signal may proceed across the roadway or other vehicular crossing in the direction of the signal and the operators of all vehicles shall yield the right-of-way to the pedestrian or bicyclist.

(b) Flashing Walk or Flashing White or Green Symbol - A pedestrian, or a person riding a bicycle in a manner which is consistent with the safe use of the crossing by pedestrians, facing such a signal may proceed across the roadway or other vehicular crossing in the direction of the signal, exercising caution due to vehicles potentially turning across their path, and the operators of all vehicles shall yield the right-of-way to the pedestrian or bicyclist.

(c) Flashing Don't Walk or Flashing Red Symbol - No pedestrian or bicyclist may start to cross the roadway or other vehicular crossing in the direction of such a signal, but any pedestrian or bicyclist who has partially completed crossing on the "Walk" or similar signal may continue ahead to the far side of the crossing or to a safety zone. Operators of all vehicles shall yield the right-of-way to the pedestrian or bicyclist who is in the process of crossing.

(d) Steady Don't Walk or Steady Red Symbol - No pedestrian or bicyclist may start to cross the roadway or other vehicular crossing in the direction of such a signal, and any pedestrian or bicyclist who has partially completed crossing on the "Walk" and flashing "Don't Walk," signals, or on other similar signals, must immediately leave the roadway by proceeding to the nearest curb, edge, or safety zone, regardless of direction. Nothing in this provision relieves operators of motor vehicles from the requirement to exercise due caution.

One frequently cited problem with regard to pedestrian signals is the lack of uniformity and understanding of the pedestrian signal phases. Some agencies use the current standard of white walk and orange don't walk illumination, while other agencies have not upgraded the old green and red signals. In many cases, a flashing walk phase is not used and, when used, pedestrians are confused as to the meaning. For this reason, this regulation was adopted from the UVC, and includes a description of the meaning of the flashing walk phase, since it is still in fairly common usage and often creates confusion [10].

Many countermeasures have been proposed to alleviate this problem, including the development of new signs and pavement markings. Perhaps one of the better alternatives is a sign which depicts each of the pedestrian signal phases, accompanied by an explanation of what each signal means. The sign is mounted at eye level on poles at intersections and has become popular, with several agencies currently using this device or others similar to it [60]. Another alternative is to adopt a provision such as the one above which is much more explicit than the UVC and details the four major phases used in pedestrian signals. No effort was made to develop regulations for innovative signals due to the wide variety of designs and the lack of available information on exactly how they operate. Jurisdictions which use such devices should conform their signals and regulations to accepted standards.

The installation of a pedestrian signal should reduce the number of conflicts and accidents occurring at an intersection. This may not be the case, however, if the experiences of Lowell, Massachusetts are indicative [61]. Ten pedestrians were injured in two years at a location with a pedestrian signal. Because the overwhelming majority of crossers disobeyed the signal due to the lengthy time required to receive a permissive

phase, the signal was removed. In the 16 months following removal, no accidents were reported. Although no statistically valid conclusions can be drawn from this example, other studies have shown that the installation of pedestrian signals may not yield the desired or anticipated safety benefits. A study of 5,100 accidents in 20 different urban areas by Robertson and Carter concluded that ".... pedestrian indications appear to contribute to the reduction of accidents or accident potential at some intersections, have little or no effect at others, and even increase accidents at still others" [62]. Zegeer, Opiela and Cynecki drew a similar conclusion, indicating the effectiveness of pedestrian signals depended significantly on the different strategies for timing [63]. The two primary reasons for this apparent lack of consistent effectiveness is that pedestrian signals either give people a false sense of security or are used with such a long cycle that pedestrians get frustrated and cross illegally.

Paragraph 5 - *Right of Way in Crosswalks*

(a) At an intersection or crosswalk where traffic is not controlled by traffic control signals or by a police officer, the operator of a vehicle shall yield the right-of-way, slowing down or stopping if need be to so yield, to a pedestrian, or person riding a bicycle in a manner which is consistent with the safe use of the crosswalk by pedestrians, who is crossing the roadway within a crosswalk when the pedestrian or bicyclist is upon the half of the roadway upon which the vehicle is traveling, or when the pedestrian or bicyclist is approaching so closely from the opposite half of the roadway as to be in danger.

(b) No pedestrian or bicyclist shall suddenly leave a curb or other place of safety and walk, run or ride into the path of a vehicle which is so close that it is difficult for the operator of the vehicle to yield.

(c) Whenever any vehicle is stopped at an intersection or crosswalk to permit a pedestrian or bicyclist to cross the roadway, the operator of any vehicle approaching from the rear shall not overtake and pass the stopped vehicle.

This article is a combination of provisions stipulated in the UVC and the Wisconsin Statutes [10, 36]. Basically, the wording is the only difference, with the exception that Wisconsin includes bicyclists. This provision establishes that a

pedestrian always has the right-of-way over motor vehicles, providing the pedestrian is legally crossing the roadway and is exercising due caution while doing so.

Paragraph 6 - *Crossing at a Location Other Than a Crosswalk*

(a) Every pedestrian crossing a roadway at any point other than within a marked crosswalk or within an unmarked crosswalk at an intersection shall yield the right of way to all vehicles upon the roadway.

(b) Any pedestrian crossing a roadway at a point where a pedestrian tunnel or overhead pedestrian crossing has been provided shall yield the right-of-way to all vehicles upon the roadway.

(c) Between adjacent intersections at which traffic control signals are in operation, pedestrians shall not cross at any place except in a marked crosswalk.

(d) No pedestrian shall cross a roadway intersection diagonally unless authorized by official traffic control devices; and when authorized to cross diagonally, pedestrians shall cross only in accordance with the official traffic control devices pertaining to such crossing movements.

This section, adapted from the UVC, sets guidelines for how and when a pedestrian may cross a roadway outside of a crosswalk [10]. Violating subparagraphs (c) or (d) constitutes jaywalking, as does violating a pedestrian crossing signal provision as established in Paragraph 4 of this section. In some jurisdictions, a pedestrian who crosses at street level when a tunnel or overhead crossing has been provided for his or her use would also be considered a jaywalker, but many such facilities are not accessible to handicapped people and requiring their use by everyone cannot be enforced effectively in such cases.

Paragraph 7 - *Pedestrians to Use the Right Half of Crosswalks*

Pedestrians and bicyclists shall move, whenever practicable, upon the right half of crosswalks.

Paragraph 8 - ***Use of Sidewalks***

(a) Where a sidewalk is provided and its use is practicable, it shall be unlawful for any pedestrian to walk along and upon an adjacent roadway.

(b) Where a sidewalk is not available, any pedestrian walking along and upon a highway shall walk only on a shoulder, as far as practicable from the edge of the roadway.

(c) Where neither a sidewalk nor a shoulder is available, any pedestrian walking along and upon a highway shall walk as near as practicable to an outside edge of the roadway, and, if on a two-way roadway, shall walk only on the left side of the roadway.

(d) Except as otherwise provided in this article, any pedestrian upon a roadway shall yield the right-of-way to all vehicles upon the roadway.

Paragraph 9 - ***Driving Through a Safety Zone Prohibited***

No vehicle shall at any time be driven through or within a safety zone.

Paragraph 10 - ***Right-of-Way on Sidewalks***

The driver of a vehicle crossing a sidewalk shall yield the right-of-way to any pedestrian and all other traffic on the sidewalk.

Paragraph 11 - ***Yielding to Authorized Emergency Vehicles***

(a) Upon the immediate approach of an authorized emergency vehicle making use of audible and visual signals meeting the requirements set forth in other articles, or of a police vehicle properly and lawfully making use of an audible signal only, every pedestrian shall yield the right-of-way to the authorized emergency vehicle.

(b) This section shall not relieve the driver of an authorized emergency vehicle from the duty to drive with due caution for the safety of all persons using the highway nor from the duty to exercise due caution to avoid colliding with any pedestrian.

Paragraph 12 - ***Blind Pedestrian Right-of-Way***

The driver of a vehicle shall yield the right-of-way to any blind pedestrian carrying a clearly visible white cane or accompanied by a guide dog.

Paragraph 13 - *Bridge and Railroad Signals*

(a) No pedestrian shall enter or remain upon any bridge or approach thereto beyond the bridge signal, gate, or barrier after a bridge operation signal indication has been given.

(b) No pedestrian shall pass through, around, over, or under any crossing gate or barrier at a railroad crossing or bridge while such gate or barrier is closed or is being opened or closed.

Sections 7 through 13 were adapted from the UVC, with only minor revisions which did not affect the intended meaning and possible interpretations [10].

Paragraph 14 - *Soliciting Rides or Business*

(a) No person shall stand in a roadway for the purpose of soliciting a ride.

(b) No person shall stand on a highway for the purpose of soliciting employment or business, or contributions from the occupants of any vehicle.

(c) No person shall stand on or in proximity to a street or highway for the purpose of soliciting the watching or guarding of any vehicle while parked or about to be parked on a street or highway.

This section is repeated directly from the UVC, but merits some discussion [10]. The provisions of subparagraph (b) are often disobeyed, with the knowledge and consent of police departments, in jurisdictions which have a similar law on the books. One group of people, panhandlers and people offering their services for food or money, are almost impossible to regulate. When caught, these people are most often simply told to move along, but the offender will only wait until the policeman is out of sight or will move to a different corner. A second group includes people who are legitimately selling items such as newspapers or flowers, usually with no pressure being used on the motorists to purchase these items. A third category of solicitors are those who are collecting donations for any number of causes.

Prohibiting the activities of the latter two groups may cause bad publicity for an agency and would hurt those who depend on such methods for their livelihood, as well as many charitable organizations. The potential hazard to persons engaging in such acts cannot be disputed, though. Any agency which wishes to allow the continuance of

soliciting in this manner should strictly regulate the persons involved. Applications should be made to the police department and permits issued by the same with the requirement that the solicitors use safety vests to increase their conspicuity. Any person soliciting at an intersection, when asked to do so by a police officer, should produce a permit with his or her name on it, as well as some form of identification. In addition, the highway agency should be freed of any liability in instances where people engaged in these activities are injured in an accident.

Paragraph 15 - *Pedestrians Under the Influence of Alcohol or Drugs*

A person who is under the influence of alcohol or any drug to a degree which renders himself or herself a hazard shall not walk or be upon a highway except on a sidewalk or in a legal crosswalk.

This section was taken from the UVC [10]. Drunk pedestrians are usually dealt with under the regulations against public intoxication or drunk and disorderly conduct. No agencies were identified which have specific laws or ordinances concerning drunk pedestrians, and to have such laws may not be necessary since the existing provisions under which they are penalized may be adequate. Bicycling and walking have become popular alternatives for people who lose their driver's license for conviction of driving while under the influence. Of the 7,000 pedestrian fatalities which occur each year in the United States, approximately one-third of them are intoxicated, with an average blood alcohol level nearly double that of drunk drivers who are killed in automobile accidents. In about 12% of these accidents, the victim was laying in the road prior to impact due to stumbling, passing out, or trying to absorb heat from the roadway [64]. The solution to this problem lies in enforcement, not legislation.

Paragraph 16 - Use of Reflective Material

Any pedestrian walking or running on or upon a roadway between the period of one-half hour after sunset to one-half hour before sunrise, or in other conditions of limited visibility, should wear reflective material which is clearly visible from 300 feet under the lawful lower beams of motor vehicles.

This section is provided in response to the growing number of people who jog or walk early in the morning or during the evening along roadways. Usually such activity takes place in residential areas where speeds and volumes are low, but some safety standard is necessary. Many people engaging in these activities take it upon themselves to wear reflective material out of concern for their personal safety, but the adoption of a provision similar to this one would give some legal authority for police officers to enforce it against those who do not.

PEDESTRIAN-RELATED ORDINANCES

Paragraph 17 - *Stopping Before Passing an Ice Cream Truck*

Any operator of a vehicle approaching a standing ice cream truck must come to a complete stop before proceeding cautiously around or past the truck. The ice cream truck must be equipped with a stop signal arm and flashing lights in the front and rear which must be used when in the process of stopping with the intent to vend, or while standing and in the process of vending.

Paragraph 18 - *Disabled Vehicle on a Freeway*

When any vehicle becomes disabled on a limited-access roadway, the driver of said vehicle must move the vehicle as far off the traveled roadway as reasonably possible and place approved warning devices behind the vehicle in position to suitably warn approaching drivers of the hazard. Any person who leaves a disabled vehicle between the period of one-half hour after sunset to one-half hour before sunrise, or in other conditions of limited visibility, in order to obtain help must wear reflective material which makes him or her clearly discernible under direct lawful lower beams of an approaching motor vehicle at a distance of 300 feet. This is the only situation where it shall be legal to walk upon a limited-access highway, except for the execution of official duties.

Both of these provisions are adapted from a 1980 report of the Transportation Task Force of the Urban Consortium for Technology Initiatives [65]. The intent of the first ordinance is to make motorists more aware of the dangers of children crossing the

street in the vicinity of an ice cream truck. It requires the truck to be equipped with a signal arm and flashing lights, similar to a school bus. Similarly, it stipulates that any vehicle approaching the ice cream truck while the warning devices are in operation, must come to a complete stop. The difference lies in the fact that after stopping, the driver may proceed cautiously about his or her way. This is warranted since ice cream trucks may stay in one position for lengthy periods of time. In Detroit, Michigan, a field test of a similar ordinance produced a 77% decrease in the number of accidents involving ice cream trucks [66]. The ordinance was first used by Indianapolis, Indiana, in 1971, and that city considered its experience a success.

The second provision requires that drivers of disabled vehicles on a limited-access highway ensure that their vehicles are moved as far out of the way of other vehicles as possible. When walking along the highway at night to summon help, reflective material visible from 300 feet is required. It is felt that this distance is sufficient to provide motorists with adequate warning of the presence of a pedestrian and allow them to take any necessary countermeasures. Such countermeasures should not be needed since the pedestrian would be required by Paragraph 8 to walk on the shoulder, as far to the right as practicable. No information was available on whether this provision has been implemented anywhere or what its success has been.

OTHER CONSIDERATIONS

Linking Bicycling and Walking With Mass Transit

To encourage use of transit in a community, highway agencies and transit authorities should cooperate to ensure that modal transitions can be easily accomplished. The installation of paths linking rail stations and transit centers to nearby residential areas, aside from facilitating bicycle use, encourages people to bicycle or walk to and from home, rather than making the trip by automobile. When considering bus stop modal transitions, pedestrian facilities should be of more concern than bicycle facilities. Since bus stops are more numerous and the network more comprehensive, walking is a practical way to reach them. In addition it is often unwise to leave a bicycle chained up at a bus stop for any substantial length of time. Agencies should make every effort to ensure that sidewalks are provided which connect bus stops to nearby apartment complexes, shopping centers, and office buildings. Transit

authorities should adopt policies which make using a bus system a more attractive alternative. Many people refuse to use a public bus because the popular perception holds that buses are only for the very young or for the poor. Anyone seeing another person standing alongside the roadway in a cold, driving rain with their shoes buried two inches in mud certainly would not consider a bus ride as preferable to the use of a private automobile. Providing a paved area on which to stand, as well as benches and protective shelters, will help erode this perception and may increase bus usage in a community.

Another bus stop standard which should be adopted involves the location of stops at intersections. Where a bus stop is to be provided at an intersection, it should be placed just beyond the intersection and space, when possible, should be provided for buses to pull off the roadway so that other traffic may pass. People exiting from the bus should be prohibited from crossing in front of the bus, rather they should walk back to the intersection and cross there.

Removing Sidewalk Obstacles

Cities with congested sidewalks should consider ordinances which remove some of the clutter and thereby increase pedestrian flows. In New York City, street vendors present a major obstacle on some sidewalks, and efforts have been made to remove unlicensed vendors thereby providing additional space for pedestrians [67]. Other objects which can be regulated or prohibited altogether include benches, newsstands, telephone booths and bus shelters. Street entertainers often generate large crowds, but attempting to remove them from their positions may prove to be extremely unpopular.

Often, it is not such semi-permanent obstacles which present the major hazard to bicyclists and pedestrians, but rather those which are transitory or correctable. Garbage and trash collection is a particular problem, since many homeowners will take advantage of clean, level surfaces such as the sidewalk to pile rubbish. Snow and ice removal presents another dilemma, particularly since many people are wary of being sued by someone who may slip and fall on the sidewalk in front of their home. In their view, it may be more advantageous not to clear the sidewalk at all, rather than to risk missing a small ice path and becoming a defendant in a civil suit. Many cities have attempted to correct this by passing ordinances which prohibit the temporary blocking of any sidewalk or the failure to remove snow within a certain time period. Enforcing a ban on placing garbage and trash on the sidewalk is considerably easier than ensuring that snow is removed in a timely and correct manner. In northern climates,

attempting to keep sidewalks open and free of ice in residential areas would be a monumental effort on the part of the city. For this reason, individual homeowners should be responsible for clearing walks in front of their home. A reasonable time period for compliance may be within 24 hours of when the snowfall ended. In commercial areas, because of the large sidewalk areas and the prevalence of street furniture, the city should assume at least partial responsibility. Individual agencies must develop ordinances which are reasonable and enforceable for their particular areas.

A model ordinance for the removal of visual obstructions has been developed. This ordinance holds individual property owners responsible for removing any tree, plant, shrub or other moveable object which unreasonably obstructs the line of sight of any driver, bicyclist or pedestrian. After notification by the State highway commission or the local authority, the owner is given 10 days to remove the hazard or be fined [68]. The ordinance also details that public agencies are required to inspect highways, sidewalks, bicycle paths and the like on a periodic basis for visual obstructions, and to remove any found.

Maintaining Pedestrian Facilities Through Construction Zones

The poor maintenance of pedestrian facilities in and around construction zones represents a high degree of risk for a transportation agency. Though there are standards for rerouting pedestrian traffic around such areas, these guides are often not followed, leaving the pedestrian "... to fight through construction areas full of debris, mud and other obstructions" [69]. Chadda and Brisbin studied pedestrian movement through construction zones and recommended that further guidelines be developed at the Federal level and incorporated into the Manual of Uniform Traffic Control Devices (MUTCD) [69]. Such provisions, by their nature, would also apply to bicyclists in areas where their use on sidewalks is permitted.

CHAPTER 4 - LAW ENFORCEMENT STRATEGIES

Any comprehensive program which is established to improve pedestrian and bicycle safety must comprise the elements of engineering, education and enforcement in order to be completely successful. Much progress has been made in setting engineering standards to ensure that new facilities are constructed where needed and that they are safe for the intended users. Education programs have been established, with mixed results, in countless jurisdictions. The area which has received the least attention of the three has been enforcement, for a number of reasons. The public is generally unaware of the laws and ordinances regulating pedestrians and bicyclists and there is the perception that violating these laws will not result in a citation. This attitude is reinforced by police officers who indirectly encourage such illegal behavior by not ticketing violators. In addition, funding for enforcement programs is often limited and in many instances, such "nonessential" programs which deal with bicyclists and pedestrians are often the first cut from a police department's budget when money becomes tight.

In the previous two chapters, an analysis was made of various regulations governing these two modes of transportation, and sets of model laws and ordinances were developed. But the passing of detailed legislation does little good if there is no enforcement, and enforcement can be complicated if the public is generally unaware of the rights and responsibilities of bikers and pedestrians. Because relatively little attention has been paid to enforcement in the past, it is generally recognized that any agency wishing to implement an aggressive enforcement policy should precede the effort with an intensive public education and information campaign. Because education and enforcement are so inextricably linked, it will not be possible to deal exclusively with enforcement programs without a brief discussion of applicable education components.

Coordinating Education with an Enforcement Program

Grade schools are the best starting point for educating the public about the laws governing bicyclists and pedestrians. It is easier to teach young children proper behavior than it is to break adults of bad lifelong habits. The National Highway Traffic Safety Administration (NHTSA) has developed a fourth-grade level bicycle education course, which has been or is being used by schools across the country [70]. In conjunction with the material presented in

this course, instruction on pedestrian rights and responsibilities is often provided. Where no formal courses have been established on this subject, police officers are frequently invited into the classroom to make short presentations on proper behavior and to answer questions the children may have on what is right and what is wrong. The "Officer Friendly" program is one name frequently applied to this effort, which tries to educate through the use of an enforcement officer, thus lending an air of credibility and importance to the material in the eyes of children. Ideally, each child would have direct contact with the officer, but practical considerations may make this impossible. An effective alternative is to have officers instruct groups of teachers or day-care providers, who may then pass on the information to their classes.

Education and enforcement cannot focus on children alone since a large number of the pedestrian and bicycle-related fatalities which occur involve adults. Before launching an enforcement campaign, police departments should prepare a media packet, with important statistics and information on dangerous behavior, to be released at a news conference. By enlisting the cooperation of the news media, the public can be made aware of the dangers and importance of being a bicyclist or pedestrian, while being informed that the police intend to "crack down" on lawbreakers in the near future. The period during which the media blitz occurs can be designated as Pedestrian and Bicycle Safety Week (Month) by the mayor or other governing official in the jurisdiction. Similar educational campaigns have been successfully employed by Seattle, Washington, D.C., Palo Alto, Albuquerque and Los Angeles [72].

The primary emphasis of education campaigns directed at children should be the basic responsibilities they have while operating in traffic, such as which side of the road is to be used, where bicycle riding is prohibited and the like. It is motor vehicle traffic, after all, which poses the greatest danger to bicyclists and pedestrians, so education and enforcement programs cannot be directed at these two groups only. Public service announcements on television and radio are one popular way to inform motorists of their responsibilities. Another possibility is to attach brochures on the topic to every moving violation citation issued to motorists. At a more basic level, States may revise their driver's license written examinations to include more detailed sections on how to interact with bicyclists and pedestrians.

Any education and enforcement campaign must have the support of the community in order to succeed. Though police departments should not be responsible for developing and implementing the education portion of a total program, they should be involved, as should local

civic, health and safety organizations. Seattle's program enlisted the support of the Harborview Injury Prevention Center to help inform the public. Among other activities, the facility, which is affiliated with a local hospital, developed posters to display on buses which emphasized motorists' responsibilities, the vulnerability of children, and the penalties for committing infractions. Seattle's commitment to pedestrian and bicycle safety, education and enforcement is widely recognized as one of the more innovative in the nation, receiving numerous accolades from safety groups, engineers, educators, bicycle advocacy groups and the like. In a Bicycle USA article, Yuri Samer writes, " [after riding around Seattle] ... cyclists may wonder if they have ridden through a passage into the Twilight Zone or perhaps have died and gone to Holland" [71]. The second possibility raised by the author is a reference to the Netherlands, where bicycle riding is enormously popular and is a vital component of the overall transportation system.

After a comprehensive education program has been established, enforcement efforts will be easier to implement and will be better received by the public. At first, enforcement campaigns should be highly publicized, so that the public is aware of a new "get tough" attitude adopted by their local police department. The engineering aspect comes into play at this point, as the placement of signs and pavement markings can reinforce the perception that this is an important issue which is being taken seriously in the community. The installation of such devices will also prevent violators from hiding behind the excuse that they were unaware of the law, thereby making fines or other penalties more difficult to overturn in the adjudication process.

Enforcement, in itself, constitutes education, albeit in an after the fact manner. Though knowledge of the law may come a little late for some, the enforcement process does not have to be negative in character. It is commonly recognized that positive reinforcement usually prompts the desired behavior better than punishment will. This is the idea behind a suggestion made at the Pedestrian Law Enforcement Strategies Workshop, conducted by NHTSA in November, 1990 [72]. Rather than target those who break the law, why not stop those who are observed exercising correct and courteous behavior? Pedestrians, bicyclists and motorists could be given coupons redeemable at local merchants, or could have their names entered into a pool, from which periodic, well-publicized, drawings could be made for prizes donated by local merchants. Even if this does not have the desired effect of increasing compliance with the law, a program like this would be a public relations coup for the police department.

The Need for Innovative Enforcement Efforts

As part of the survey conducted during the course of this project, agencies were asked to rate various aspects of their enforcement programs. The results were rather surprising, since the questionnaire was primarily mailed to those agencies identified in the literature review as having innovative or well-established bicycle and pedestrian programs. On a scale of 1 to 10, with 10 being defined as "excellent," the agencies reported that, on average, the public perception of and support for intensive enforcement campaigns rated only between a 3 or 4. Three other aspects, the degree of police enforcement, the perceived effectiveness of the enforcement campaign, and the importance which police officers placed on enforcing bicycle and pedestrian laws, all received average scores between 2 and 3. There were notable exceptions, but the overall picture appears dismal for communities who have not yet developed programs of their own.

Such results indicate that changes need to be made in the way enforcement is accomplished. Making the public more aware of the potential danger of ignoring the laws regarding bicyclists and pedestrians, while incorporating positive reinforcement into a program which emphasizes education over punishment, will help increase community support for tougher enforcement. Monitoring the enforcement to ensure that it is consistent and fair, accompanied by periodic reports to the community on the benefits and progress of the program, will result in a more positive public perception.

Targeting Colleges and Universities

College and university campuses are one area of enforcement that have not been highly publicized or well-coordinated, but which may yield the best long-term results. A great many students either live on campus or in nearby apartments and depend on walking and bicycling as the primary modes of campus mobility. Since students are usually in a hurry to get to and from classes, there is a tendency for frequent violations to occur. Yet enforcement is almost non-existent, except at a few notable campuses such as the University of California at Davis and the University of Wisconsin. Enforcing these laws against college students may be unpopular, since many of them do not have a great deal of extra money, so the education aspect should be strongly emphasized. Fines should be low, but enough that violators do not simply shrug off the penalty. It is in the area of ensuring that fines are paid that campus police have distinct advantages over their urban counterparts. Many universities have clearly

understood policies which prohibit students from registering for classes or receiving a diploma until all outstanding fees have been cleared. Where identification cards are used by students for a variety of purposes on campus, such as checking out books from the library, purchasing meals in the cafeteria, and paying for textbooks, the cards can be temporarily disabled until overdue fines are paid. Relating this possibility to the majority of the public, driver's licenses and automobile tags should not be renewable until all outstanding fines have been paid.

Alternatives for Police Departments

An aggressive enforcement program should be accompanied by implementing procedures and policies within the police department well before the first citation is issued. One of the first issues pertains to the individual responsibilities of the officers, which will be partially determined by funding availability. Where funds are tight, most departments will simply add the responsibility of enforcing pedestrian and bicyclist laws to the overall list of each officer's duties. Pedestrians and bicyclists may applaud when an officer stops a motorist who failed to yield the right-of-way when required to do so, but often adopt an entirely different posture when they themselves are cited for violating the rights of motorists. The Seattle Police Department Traffic Division seems to have hit upon the proper ratio, with a policy which requires each officer to issue one citation daily to motorists who fail to yield the right-of-way to a pedestrian, with tickets for jaywalking being issued half as frequently, or one every other day [72]. The public perceives this enforcement policy as even-handed. A similar policy could be adopted for violating bicycle related laws.

Instead of incorporating this responsibility into the daily routine of each officer, a more visible alternative is a spot enforcement campaign. On a rotating basis, officers spent significant portions of their shift watching for violations at certain high-incident locations. At locations where pedestrian and bicycle activity is low, the police may consider making use of a "plant." In this procedure, a person periodically crosses the street on foot, or rides through an intersection on a bicycle, or performs any other movement which the police can easily monitor from a nearby position. Conflicts are intentionally created with the knowledge and consent of the police, and the violators are subsequently cited. This may constitute a form of entrapment, but when used in Seattle the policy received overwhelming public support [72]. Calls placed to the police department regarding the program were mostly favorable, with several people volunteering their services as the "plant." The person acting as the typical

pedestrian or bicyclist is exposed to increased risk. Though the amount of risk posed to this person will be no greater, and probably actually less, than that which faces any other walker or bicyclist, some degree of liability on the part of the city or the police department seems inherent should the person be involved in an accident. Legal considerations should be carefully evaluated before any agency tries this method of enforcement.

Bicycle Patrols

If funding can be obtained, a preferable permanent alternative to either of the programs mentioned above is the establishment of a bicycle patrol. The scope of this patrol can vary from a single uniformed officer, whose primarily responsibility is the enforcement of bicycle and pedestrian laws, to a squad of officers with the normal range of duties, to a seasonal force manned by paid volunteers from the community.

The use of bicycle officers in the enforcement of these laws has many advantages. Since many of the violators will be children, the experience of being stopped and either warned or cited by an officer in a patrol car may be more of a traumatic experience rather than a learning one. An officer on a bicycle is much less intimidating and provides the opportunity for more direct contact, since it enables casual conversation with other bicyclists without the tension of watching a police officer emerge from a motor vehicle. Not only does it make the execution of official duties easier, but it holds unique possibilities in the realm of public relations. A writer and avid bicyclist took to the bicycle beat with an officer in Boston for five days in 1990, and recounts an experience deep in the heart of a drug-infested, crime-ridden ghetto area:

> "Yo, five-oh on bikes," says a black girl in pigtails, who can't be more than 6.
> "Yeah? What do you think about that?" I reply.
> The ice broken, she steps forward, her gaze locked on the sunbleached fur covering my tanned forearm. She reaches out, tentatively at first, then smooths the soft down with her tiny hand.
> "Can you ride me on your handlebars?" she asks.
> I may not be able to change her world, but when this girl touched my arm, I felt the walls of fear and ignorance tumbling around us. It wasn't much, but I felt a definite *something*. By being there on my mountain bike, I gave that little girl the opportunity to come in contact - to actually touch - a policeman (or what she believed was a policeman). I felt I was making a difference. I only hope she realizes we're the good guys [73].

For older bicyclists and pedestrians, the advantage of a less threatening presence is still significant, but another element enters into the encounter between the officer and the violator. When a bicyclist is stopped by an officer in a motor vehicle, there may be some measure of resentment on the part of the bicyclist. Avid bicyclists are a well-organized and vocal group who have strong feelings about their rights and duties on the road. Being stopped by an officer on a bicycle shows the offender that the community and the department are sensitive to their concerns. An officer who performs his or her duties on a bicycle can relate better to the violator, and the fact that the officer has to endure the same conditions gives him or her the "right" to cite another bicyclist, at least in the mind in the offender.

An advantage to placing officers on bicycles is the speed and maneuverability available with bicycles. An officer in a motor vehicle who attempts to stop a bicyclist or pedestrian can be easily thwarted because the violators have access to escape routes through which an automobile cannot pass. The officer may, of course, leave his vehicle in order to take pursuit, but seldom will he or she be able to overtake a bicyclist intent on getting away. In most cases, chasing fleeing offenders will not be worth the time and effort and the person will go unpunished. A police officer who is an experienced bicyclist can often engage pursuit of these people with success. It is a different story when it comes to stopping motorists, but in most instances motor vehicle operators will stop out of respect for the uniform. Bicycle officers are most effective in central business districts and on university campuses, where sidewalks, pedestrian malls and narrow passages between buildings can present major obstacles for regular patrol officers. Officers on bicycles, however, can patrol effectively just about everywhere. Because of congestion, there are documented instances where an officer on a bicycle has traveled substantial distances in response to a call, often beating their counterparts in automobiles to the scene.

There are other advantages an officer on a bicycle has over one in a patrol car. Because a bicycle makes very little noise, surveillance is facilitated in situations which require the officer to remain undetected while moving in as close as possible. Finally, an officer who patrols on bicycle in Boston says that bicycles are the optimum height to allow him to see into parked vehicles. The primary thing he checks for while doing this is a popped ignition, which is a reliable indication that the vehicle has been stolen.

Officers on bikes are at a disadvantage in stopping motor vehicle drivers, but it is always possible for the bicycle officer to call for backup or to make note of the license tag number.

The reason most people would refuse to stop for a police officer on a bicycle is that the offender may not believe that the officer is "for real." For this reason, it is recommended that the uniform not be altered in any way, aside from the use of a protective helmet instead of a hat. In Washington, D.C., a female pedestrian was ordered to stop by a plainclothes police officer after she had illegally crossed a street. He did not identify himself as a policeman, and she kept on walking. After again telling her to stop and being ignored, he ran up from behind and forcefully stopped her [74]. This indicates that only regularly uniformed officers should be allowed to issue citations to pedestrians and bicyclists.

One major drawback of placing officers on bicycles with the specific responsibility of enforcing bicycle and pedestrian laws is that it diverts staff from other important responsibilities. Catching drug dealers is a higher enforcement priority than punishing jaywalkers. Selling the public the idea that their tax dollars should be spent on pedestrian and bicycle enforcement rather than on other enforcement areas is a difficult task. For this reason, many jurisdictions utilize citizen patrols instead of regular officers. Often, these patrols are composed of paid volunteers who are trained in various aspects of law enforcement, including the rules of the road, when to cite offenders, and how to deal with a multitude of potentially dangerous situations. Participants frequently take part in "Effective Cycling" courses so that they will be better able to fulfill their duties. The patrol members are issued official-looking uniforms and in most jurisdictions are empowered to stop and cite violators. In some areas, however, only duly sworn police officers may fine a motorist, bicyclist or pedestrian, so the citizen patrol simply serves as an education tool. They are only able to instruct people on proper behavior and to issue warnings, but even with such limited capabilities, these forces serve a vital function. Once the public is given time to accept and understand the function of these patrols, enforcement can be implemented while regular police officers are free to pursue other matters.

Since many of these patrols are in operation only during the summer months, when bicycle use is highest, many of the people forming the patrol are college students who are out on break. College students are still young enough to relate effectively with small children, and they serve as excellent role models. Motivation is not a problem, as it may be with regular policemen who feel that to issue tickets for jaywalking is a waste of their time. A major drawback is the additional funding required to pay, train, and outfit the members of citizen patrols.

Law Enforcement Personnel Motivation and Concerns

The issue of officer motivation is a major obstacle to an effective enforcement effort. This may be a serious problem when an officer is required to patrol on a bicycle against his or her wishes. To some officers this duty appears demeaning and can result in low morale. Only those officers who have a positive attitude towards bicycling and are not opposed to performing their duties on a bicycle rather than in a motor vehicle should be charged with these duties. Many officers volunteer for such positions for a number of reasons. Health benefits are one reason. Another reason is that patrolling on a bicycle allows an officer to better relate with citizens and makes the officer less threatening to those who commit minor offenses. The responsibility of ensuring that every officer charged with the added duty of enforcing bicycle and pedestrian laws takes this duty seriously resides with the police chief and the precinct commanders. Without their enthusiasm and effort, an effective program will be virtually impossible. The importance of enforcement of these laws should be stressed and officers should take part in training courses.

When it is required to stop a minor who has done something unsafe, many policemen are worried that they will be perceived as "picking on" the child. If the parents are nearby and they become antagonistic, the officer should explain that he stopped the child not to punish him or her, but to prevent possible injury in the future resulting from illegal behavior.

The possibility that a major crime or accident will occur while he or she is issuing a citation to a bicyclist or pedestrian is of concern to police officers. To be involved in such trivial enforcement efforts, in the opinion of some officers, does not constitute "real" police work. What these officers fail to realize is that by taking the time to stop and cite a pedestrian who has jaywalked, the officer may prevent the violator from repeating that behavior and stepping into the path of a speeding vehicle the next day.

Funding Alternatives

As with any program, the primary ingredient which must be available before any real effort can begin is funding. By enlisting the support of schools, hospitals and community organizations, the costs of education programs can be shared equitably, but the burden of enforcement will reside with the police department. Participants in the Pedestrian Law Enforcement Strategies workshop suggested that the private sector become involved in sharing the burden of enforcement [72]. In areas where pedestrian and bicycling activity is high, police

departments may request that area merchants help offset the cost of providing a safer environment for their customers. Neighborhood groups can contribute funds which would allow police to patrol more frequently near parks and schools. Another avenue which may be easier to implement would involve adding a fee to moving violation tickets, with the funds being earmarked for special enforcement projects and other programs. The Albuquerque Crash Reduction Effort (ACRE) program is funded through the State Highway Department's Traffic Safety Education and Enforcement Fund, which is financed in large part from a $3 fee added to citations [72]. The ACRE program finances engineering, education and enforcement efforts and is considered very successful.

High-Risk Populations

After funding has been established and the type of enforcement effort has been determined, it will be necessary for departments to target specific areas where enforcement can be most effective. Areas with high pedestrian and bicycle volumes or with high accident rates will be at the top of the priority list. Accident records will help to some degree, but many computerized systems do not include off-highway pedestrian fatalities, such as those which occur in shopping center parking lots, so some discretion must be used. Knowledge of the community and its traffic patterns is an important determinant in pinpointing specific sites or areas for enforcement. Many cities do not keep detailed records on bicycle and pedestrian volumes, but shopping centers, central business districts, parks and schools are typically high generators for these transportation modes. Other locations which warrant consideration are the vicinity of senior citizen centers, hospitals and streets with a high concentration of bars and night clubs.

The reason for targeting senior citizen centers and night clubs is that pedestrians in these areas are at a higher risk. Elderly pedestrians, because they are prone to physical impairments such as decreased peripheral vision, depth perception, and hearing, and may have difficulty walking, are at greater risk [72]. One particular characteristic of the elderly, which places them in danger, is the tendency for them to cross at midblock locations rather than walking to a signalized intersection [72]. Education and enforcement will probably not discourage such behavior since crossing the street may tax the energy of a senior citizen to the point where additional physical exertion may not be possible. Violators would rather take the risk of crossing illegally than walking the additional distance to a crosswalk. Police officers who

attempt to cite elderly violators often encounter strong resentment and are frustrated in their efforts to explain why such behavior is dangerous since the senior citizen often feels that their age entitles them special privileges.

In areas with bars, the emphasis is on preventing intoxicated pedestrians from placing themselves or others in danger. Usually, police exercise a high profile presence in these areas to prevent minors from entering the clubs, to break up occasional fights, and to watch for impaired drivers. Many States have decriminalized public intoxication, and with the general unavailability of detoxification centers, police officers are often forced to look the other way and hope that impaired pedestrians stay out of harm's way. In situations where an intoxicated person does not have a sober driver to take him or her home, the offense of being a pedestrian while under the influence needs to be legally defined and procedures established so that police officers may take appropriate action to prevent a possible accident.

Another group of pedestrians which pose a high risk are people who walk along the shoulders of limited-access or other high-speed roadways. On rural freeways, the bulk of pedestrian fatalities occur within three groups: construction workers, hitchhikers and motorists with disabled vehicles. Speed limits through construction zones are usually set at least 10 miles per hour lower than the normal limit, but motorists often do not reduce their speeds. This may stem from the perception that speed limits through construction zones are not enforceable because of the frequent use of changeable message signs. These signs do not carry the same importance in the minds of motorists that standard regulatory signs do. As part of the Michigan State Police's Construction Zone Accident Reduction (CZAR) project, a construction zone with a posted speed limit of 45 miles per hour was targeted for enforcement [72]. Prior to this effort, in which motorists were cited only while construction workers were actually present, the average speed was approximately 56 miles per hour. After the campaign, the average speed had been reduced to 48 miles per hour. In Pennsylvania, the penalty for a speeding violation is automatically doubled if the offense occurred in a construction zone, and signs are posted intermittently to inform motorists of this and the incremental fine schedule [61].

There is little that can be done to reduce the number of people attempting to hitchhike, aside from increasing the level of patrol along primary highways. The problem of disabled motorists, however, is one which can be addressed in other ways. A model ordinance was presented in Chapter 3 which requires pedestrians on limited-access roadways to wear reflective material during nighttime or at other times when visibility is restricted. Aside from

the safety implications, the primary problem which stranded motorists pose for law enforcement personnel is that they tie up manpower which could be better used. As part of the education process, the duty of aiding these motorists needs to be shifted to the public or to other non-enforcement government personnel. The growing use of cellular telephones and existing high usage of citizen's band radios makes it possible for passing motorists to notify roadside service associations of other motorists who are in need of assistance. Many radio stations, and even a few State transportation agencies, sponsor "Mercy Wagons," which can provide basic repair services, gasoline, or a tow to a nearby repair shop.

In urban areas, two other groups also pose a high risk on high-speed roadways: people crossing to and from shopping centers, work, home and the like and people who are waiting to be picked up by a carpool. Normal education and enforcement activities can be used to discourage such behavior, but engineering can play a much more important role in these cases. Identifying corridors where these actions occur can lead to the construction of crossovers for people attempting to cross roadways and turnouts for vehicles being used in carpools.

Children also comprise a high risk population, but enforcement is usually not the best route to be taken with this group. Negative public reaction and the potential trauma for children necessitate that education be the primary focus of any program directed toward the young. With adult violators, an effective enforcement effort will require the support of the court system. Many contested citations which were issued to bicyclists or pedestrians are overturned because it is felt that the legal system should not be tied up by such trivial matters. The use of a legal system can also be used for child offenders, and numerous peer courts have been established across the country for the purpose of encouraging proper bicycling and walking behavior among the young. The principle behind the program is to hold children accountable for their actions in a non-threatening environment, while reinforcing that the violation should not be taken lightly. They present a better alternative to the issuance of warnings, which often fail to elicit the desired response, or the use of actual citations, which are paid for by parents who may simply dismiss the incident as childhood antics.

Peer Courts

The idea of peer courts has been around for a long time, with the City of Dallas, Texas using such a program since 1942 [72]. These courts operate in much the same way the regular courts do, with evidence being presented on both sides if desired. A panel of justices,

composed of high school students who are selected on the strength of their grades and level of community involvement, listen to the arguments and then render a verdict, with an appropriate penalty. The list of potential punishments is limited only by the imagination, but some of the more popular ones used included advising the parents to withhold bicycle privileges from the child for a specified period of time, requiring the violator to hand-copy sections of the city code which deal with the offense of which he or she was "convicted," making the child write an essay on why their behavior was dangerous, and requiring the offender's attendance at a safety school. This latter option is available only if the community has a well-established education program.

Warning Versus Citing Violators

A firm education program will make enforcement easier, and the enforcement effort should focus more on education than punishment. A key component in making this possible is requiring the registration of bicycles in a community. The applicant can be required to demonstrate a basic knowledge of his or her rights and responsibilities while on the roadways and bikeways before the bicycle is registered, and the registration process makes the job of the police officers less difficult. Recovered stolen bikes can be more readily identified and returned to their owners, and keeping track of habitual offenders is facilitated.

As with any new law, the passage should be followed by a grace period to allow the public to become accustomed to it. Since many people hold to the belief that first-time offenders should merely be given written warnings, the grace period would be the ideal time for law enforcement personnel to begin the enforcement effort. For the public to take a law seriously, though, the threat of punishment should be a definite possibility and the issuance of only warnings should not be mandatory. The officer should be allowed to use discretion as to whether or not a violator should be cited or merely warned, but first-time offenders must face the risk of a penalty for the program to be credible. In the case of children, however, a first offense should not be punishable. Rather, a written warning should be given to the child and a copy of it mailed to the parents or guardian, along with a letter of explanation encouraging them to teach the proper behavior. A third copy should be kept on file by the police department so repeat offenders can be identified. Subsequent violations by a child should result in suitable punishment, such as being brought up before a peer court.

Monetary Fines

Recommending monetary fines would be inappropriate because the magnitude of the amount should be determined by a consideration of several variables which cannot be adequately addressed. Some basic guidelines can be suggested, however, based on the results of the survey conducted for this project. Since the bicycle is legally defined as a vehicle in every State, penalties for a moving violation on a bicycle could be set equivalent to those committed behind the wheel of a motor vehicle. Bicyclists strive to be considered as equals among motor vehicles, and they should be willing to accept the responsibilities which accompany that designation. To impose lesser penalties would be unfair to motorists. Using the level of existing fines as a guide, punishments for moving violations which are applicable only to bicyclists, such as riding on a sidewalk where not allowed, can easily be established. Based on the survey results a $40 to $60 fine appears to be a popular range for these "unique" offenses. The lack of appropriate safety gear can also be correlated to motor vehicle penalties. As an example of how fines for motor vehicle offenses can be correlated to bicycle operation offenses, the fine for not having a head lamp on a bicycle can be set equivalent to that for operating a motor vehicle with a broken headlight. Likewise, if an agency passes a mandatory bicycle helmet law, the penalty for not using a helmet can be the same as that imposed on motorcycle riders who fail to wear protective head gear, assuming motorcycle riders are also required to wear helmets in that jurisdiction. For other infractions of this nature, including the failure to register a bike, $25 to $50 is in line with most agencies.

The fines imposed for jaywalking, coupled with the usual lack of enforcement, are one of the primary reasons few display proper street crossing behavior. In most jurisdictions, the fine runs from $10 to $20, which is not a sufficient penalty to act as a deterrent. A few areas impose fines up to around $50, which probably is much more effective in preventing jaywalking. Pedestrian-related fines in the neighborhood of $30 to $40 would appear to be a compromise between these two extremes.

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APPENDIX A

SAMPLE QUESTIONNAIRE

A Synthesis of Existing Bicyclist and Pedestrian Related Laws and Enforcement Programs
DTFH61-91-Q-00044

Questionnaire

Part 1 - General Information

Agency Name _____

Agency Address _____

_____

Contact _____

Phone Number (_____) _____

Part 2 - Bicycle and Pedestrian Paths Information

01. Approximately how many miles of off-road bicycle and walking trails are within your agency's boundaries? _____

02. Approximately how many miles of marked bicycle lanes, or wide outside curb lanes intended for bicycle use, are on the roadways within your agency's boundaries?

    Marked bicycle lanes _____

    Wide outside curb lanes _____

03. For the off-road facilities, please estimate the following percentages:

    _____ People using the facility who are on bicycles

    _____ Bicyclists using the facility who are under the legal driving age

Part 3 - Bicycle-Related Laws, Ordinances, and Regulations

04. Listed on the following page are several general "rules of the road" for bicyclists. Please indicate whether or not each is applicable in your jurisdiction by marking YES or NO in the space provided.

    _____ Permitted to use sidewalk. If this varies by the area's development characteristics (eg., residential vs. CBD) or by the age of the bicyclist (eg., children under 16 allowed to ride on sidewalks), please detail in the space at the end of this question.

    _____ Must have an audible warning device such as a bell.

_____ Must have reflectors and headlamp for use in low visibility conditions.

_____ Permitted to carry a passenger, even if the bicycle is not designed for more than one person.

_____ Must use a protective helmet. If yes, please detail below.

_____ If a parallel off-road facility is available, the bicyclist must use it rather than riding on the roadway.

_____ Must ride single file on roadways.

_____ Must use pedestrian paths to make left turns at roadway intersections.

_____ Must yield to pedestrians.

_____ Must ride in same direction as vehicular traffic.

Provided below is space to supply additional information related to Question #04, if necessary. If your agency has other "rules of the road" which are applicable only to off-road bicycle trails, please describe briefly below or attach additional sheets.

_____

_____

_____

_____

_____

_____

05. Are the laws regarding the operation of a motor vehicle while under the influence of alcohol or drugs applicable to bicyclists as well?_____

_____

06. Does your jurisdiction require any licensing procedure for bicycle use or provide any public education programs? If yes, please explain briefly.

_____

_____

_____

_____

07. Does your jurisdiction have any innovative development ordinances related to bicycling? Examples would include requiring developers to provide bike paths or to dedicate easements for bicycle use and requiring businesses to provide bike racks, showers, and lockers for its employees. If yes, please describe briefly or attach copies of the ordinances.

_____

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08. Are there any roadways (aside from freeways) within your jurisdiction where bicycle use is prohibited? If yes, explain. _____

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_____

Part 4 - Bicycling Enforcement Programs

09. Please rate the following on an individual basis on a scale of 1 to 10, with 10 being excellent.

_____ Degree of police enforcement of bicycle-related laws.

_____ Effectiveness of police enforcement in curbing unsafe behavior.

_____ Attitude of police officers of the importance in enforcing bicycle laws.

_____ Public support for and perception of enforcement programs.

Provided below is space to supply additional information related to Question #09, if necessary.

_____

_____

_____

10. Please rank the following violations in order of the estimated number of citations issued during the previous year, with 1 indicating the most citations. Also provide the typical penalty or fine.

RANK	FINE	
_____	_____	Motorist failing to yield right-of-way to bicyclist when necessary
_____	_____	Bicyclist riding on sidewalk or in other restricted area
_____	_____	Bicyclist running a stop sign or ignoring a traffic signal
_____	_____	Riding without proper equipment (bell, headlamp, helmet, etc.)
_____	_____	Operating while intoxicated
_____	_____	Reckless behavior (hanging onto motor vehicle, weaving, etc.)
_____	_____	Other _____

How are disputed tickets resolved? _____

Are points assessed against the bicyclist's driver's license? _____

_____

What happens if the bicyclist does not pay? _____

_____

_____

11. Does your jurisdiction employ any innovative methods to enforce bicycle related laws (placing policemen on bicycles, for bike trails, etc.)? If yes, please explain and comment briefly on the effectiveness and public perception of the program. _____

_____

_____

_____

_____

Part 5 - Pedestrian-Related Laws, Ordinances, and Regulations

12. If a sidewalk is not present, is a pedestrian required to walk on the left side of the roadway, facing traffic? If so, is this law enforced? _____

13. What are the laws related to walking while under the influence of drugs or alcohol in your jurisdiction? _____

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14. Does your jurisdiction have any innovative ordinances related to pedestrians? For example, requirements for new developments to provide sidewalks, the use of median refuge islands on divided roadways, etc. If yes, please describe briefly.

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_____

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_____

15. Is a pedestrian required to wear reflective clothing or material at night? _____

Part 6 - Pedestrian Enforcement Programs

16. Please rate the following on a scale of 1 to 10, with 10 being excellent.

_____ Degree of police enforcement of pedestrian related laws.

_____ Effectiveness of police enforcement in curbing unsafe behavior.

_____ Attitude of police officers in enforcing the laws.

_____ Public support for and perception of enforcement programs.

Provided below is space to supply additional information related to Question #16 above, if necessary. _____

_____

_____

17. Does your jurisdiction employ any unique methods to enforce pedestrian related laws? If yes, please explain and comment briefly on the effectiveness and public perception of the program.

_____

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_____

18. Please rank the following violations in order of the estimated number of citations issued during the previous year, with 1 indicating the most citations. Also provide the typical penalty or fine.

RANK	FINE	
_____	_____	Motorist failing to yield right-of-way to pedestrian in crosswalk
_____	_____	Pedestrian not wearing reflective clothing or material at night
_____	_____	Jaywalking (pedestrian crossing outside of a marked crosswalk when one is available nearby)
_____	_____	Hitchhiking
_____	_____	Walking while under the influence of drugs or alcohol
_____	_____	Other _____

How are disputed tickets resolved? _____

_____

_____

Are points assessed against the pedestrian's driver's license? _____

_____

What happens if the pedestrian does not pay?

_____

_____

Part 7 - Additional Information

19. Who, by law, is responsible for maintenance of the sidewalks and bike paths within your agency's jurisdiction?_____

_____

_____

_____

_____

20. If you have any additional comments related to bicycle and pedestrian laws and their enforcement which you feel were not adequately covered by this questionnaire, please use the space provided below. _____

_____

_____

_____

_____

_____

* U.S. G.P.O.:1993-343-273:80099