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Identification and Development of Countermeasures for Bicyclist/ Motor-Vehicle Problem Types Volume III—Model Regulations

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16. Abstract

A detailed re-analysis of previously collected bicycle/motor-vehicle accident data (Cross and Fisher, 1977) was undertaken to define potential countermeasures. Countermeasure development was then undertaken in the areas of Training (see Volume I), Public Education (see Volume II) and Model Regulations (this Volume). Eight model state laws or municipal ordinances were developed and are reported herein. These are: Model Bicyclist Conspicuity Law, Model Law for Bicyclist Position on the Highway, Model Highway Entry Law, Model Minimum Age Law for Bicyclists, Model Driveway Parking Ordinance, Model Law to Remove Visual Obstructions, Model Regulation to Prohibit Riding Bicycles on Sidewalks, Model Bicycle Safety Patrol and Violation Disposition Ordinance. Recommendations for implementing and field testing the developed regulations are included.

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METRIC CONVERSION FACTORS

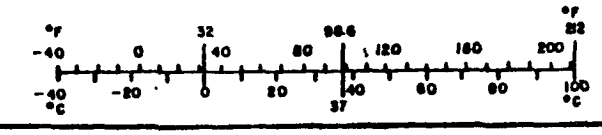
Approximate Conversions to Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
	LENGTH			
in	inches	*2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
	AREA			
in^2	square inches	6.5	square centimeters	cm^2
ft^2	square feet	0.09	square meters	m^2
yd^2	square yards	0.8	square meters	m^2
mi^2	square miles	2.6	square kilometers	km^2
	acres	0.4	hectares	ha
	MASS (weight)			
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	tonnes	t
	VOLUME			
tsp	teaspoons	5	milliliters	ml
Tbsp	tablespoons	15	milliliters	ml
fl oz	fluid ounces	30	milliliters	ml
c	cups	0.24	liters	l
pt	pints	0.47	liters	l
qt	quarts	0.95	liters	l
gal	gallons	3.8	liters	l
ft^3	cubic feet	0.03	cubic meters	m^3
yd^3	cubic yards	0.76	cubic meters	m^3
	TEMPERATURE (exact)			
°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

*1 in = 2.54 (exactly). For other exact conversions and more detailed tables, see NBS Misc. Publ. 286, Units of Weights and Measures, Price $2.25, SD Catalog No. C13.10:286.

Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
	LENGTH			
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi
	AREA			
cm^2	square centimeters	0.16	square inches	in^2
m^2	square meters	1.2	square yards	yd^2
km^2	square kilometers	0.4	square miles	mi^2
ha	hectares (10,000 m^2)	2.5	acres	
	MASS (weight)			
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	tonnes (1000 kg)	1.1	short tons	
	VOLUME			
ml	milliliters	0.03	fluid ounces	fl oz
l	liters	2.1	pints	pt
l	liters	1.06	quarts	qt
l	liters	0.26	gallons	gal
m^3	cubic meters	35	cubic feet	ft^3
m^3	cubic meters	1.3	cubic yards	yd^3
	TEMPERATURE (exact)			
°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F



MODEL REGULATION SUMMARY

Title:	Model Bicyclist Conspicuity Law
Target Problem:	Bicyclists, in general, present a poor "target" for motorists to see and avoid. Nighttime accidents with the motor-vehicle and bicycle on parallel paths are of particular interest because they result in a large percentage of fatalities.
Principal Features:	Provision requires the use of specified conspicuous equipment at the times and places prescribed. Detailed descriptions of both the equipment itself and its required use is deferred pending the outcome of on-going NHTSA research on bicyclist conspicuity (DTNH22-80-C-07052).
Recommended Level of Application:	State Law.

MODEL REGULATION SUMMARY

Title:	Model Law for Bicyclist Position on the Highway
Target Problem:	Bicyclists who ride the wrong way (facing traffic) or otherwise increase the chance of an accident through improper placement on the highway.
Principal Features:	Bicyclists shall generally keep to the right. Bicyclists may travel on any shoulder as long as they are driving with the traffic flow. If a suitable shoulder is available, a bicyclist must generally use it. Bicyclists may be prohibited from driving on sidewalks by erecting official traffic control devices. If allowed to drive on a sidewalk, a bicyclist must yield the right of way to a pedestrian and has all of the rights and duties applicable to a pedestrian.
Recommended Level of Application:	State Law.

MODEL REGULATION SUMMARY

Title:	Model Highway Entry Law
Target Problem:	Bicyclists who make sudden entires into the roadway, apparently without looking for motor vehicles, and motorists exiting driveways who do not observe bicyclists or pedestrians.
Principal Features:	Drivers of motor vehicles and bicycles exiting driveways, alleys, etc., must stop before moving onto a sidewalk and again before entering the roadway. After each stop, the driver must look for approaching traffic. Drivers shall yield to pedestrians on the sidewalk and approaching traffic on the roadway.
Recommended Level of Application:	State Law.

MODEL REGULATION SUMMARY

Title:	Model Minimum Age Law for Bicyclists
Target Problem:	Evaluation of accident data reveals that children under 12 are overmatched by the task of riding where motor vehicles may be encountered. The impulsive mistakes of these young bicyclists appear to be a problem of immaturity.
Principal Features:	Children under seven years of age may not drive a bicycle anywhere unless under the supervision of an adult. Seven and eight year olds may not drive a bicycle in the roadway unless supervised. Nine, 10 and 11 year olds may not ride unaccompanied in the roadway unless they have successfully completed an approved bicycle course.
Recommended Level of Application.	State Law.

MODEL REGULATION SUMMARY

Title:	Model Driveway Parking Ordinance
Tarege Problem:	Bicyclists, particularly the very young, who ride out of driveways into the roadway without stopping or looking.
Principal Features:	Allows parking across the driveway of a single family dwelling if, and only if, proper identification is displayed in plain view. (This effectively blocks the driveway preventing the rideout behavior.)
Recommended Level of Application:	Municipal Ordinance.

MODEL REGULATION SUMMARY

Title:	Model Law to Remove Visual Obstructions
Target Problem:	Many bicycle/motor-vehicle crashes are predisposed to occur because the view the bicyclist and motorist have of each other is blocked by vegetation, walls, fences or other permanent or semi-permanent obstructions.
Principal Features:	Property owners must remove hazardous visual obstructions within 10 days of notification by appropriate authorities. Periodic inspections by appropriate authorities to find hazards are required.
Recommended Level of Application:	State Law.

MODEL REGULATION SUMMARY

Title:	Model Regulation to Prohibit Riding Bicycles on Sidewalks
Target Problem:	Bicyclists riding on sidewalks are often struck by motor vehicles at the intersection of the sidewalk and a commercial driveway or alley because the motorist, who is busy looking for a gap in traffic, fails to see them.
Principal Features:	Appropriate authorities may ban sidewalk riding in an area deemed unsafe. Sidewalk riding prohibitions must be indicated by official traffic control devices. Bicyclist must comply with sign prohibitions.
Recommended Level of Application:	Municipal Ordinance.

MODEL REGULATION SUMMARY

Title:	Model Bicycle Safety Patrol and Violator Disposition Ordinance
Target Problem:	Accidents involving teenaged and younger bicyclists who precipitate the crash by a clear violation of existing traffic laws.
Principal Features:	Establishes a bicycle safety patrol responsible to the Chief of Police and provides that patrol members shall meet minimum standards and wear uniforms. Specifies the enforcement and bicycle safety duties of the patrol. Gives patrol members the authority to stop and warn or cite bicyclists who violate the law. Provides for trial or alternate adjudication and a range of punishments for violators.
Recommended Level of Application:	Municipal Ordinance.

FOREWORD

This report is the third volume of the final report of contract number DOT-HS-7-01726 between the U.S. Department of Transportation, National Highway Traffic Safety Administration (NHTSA) and Dunlap and Associates, Inc. The objective of the study was to develop countermeasures to bicycle/motor-vehicle accidents by utilizing the results of previous NHTSA-sponsored research which identified specific problem types and countermeasure approaches. An interim report on this project was previously published*.

This volume is devoted to regulatory approaches to the prevention of bicycle/motor-vehicle accidents. Volume I addresses study methods and the development of training countermeasures. Volume II is devoted to public education and information messages. A detailed curriculum for use at the fourth grade level and booklets for parents and law enforcement officers were also prepared and submitted separately.

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*Casey, S.M., Cross, K.D., Leaf, W.A., & Blomberg, R.D. Bicyclists' Inclination and Ability to Search Behind Before Turning Left. Interim Report, February 1980. DOT-HS-805-893. Available NTIS.

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Developmental efforts of this type rely heavily upon numerous agencies and individuals for information, guidance and review. This study was no exception. Throughout its life, it received valuable inputs from many sources to whom the authors are greatly indebted. Dr. Alfred J. Farina, Jr., who served as Contract Technical Manager for the National Highway Traffic Safety Administration (NHTSA), was helpful and supportive throughout the effort and contributed in both a creative and review capacity.

Edward F. Kearney, Executive Director of the National Committee on Uniform Traffic Laws and Ordinances (NCUTLO) and John W. English, formerly NCUTLO's Research Director, drafted the regulatory language and provided unique insights, both as experts in traffic law and as accomplished bicyclists. Messrs. Mitchell Laub, Joseph Saxe and Stanley Miller of Saxe Mitchell, Inc., provided the creative development for the public education messages and inputs on the publicity requirements for the Model Regulations.

Dr. Steven M. Casey of Anacapa Sciences was a major contributor to the study and was the principal author of one of its interim reports.

Many others contributed their talents to this effort in a variety of ways. In particular, the authors wish to thank:

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Mr. William C. Wilkinson, III (Bicycle Manufacturers Association)
Mr. John Williams (Editor, Bicycle Forum)
Mr. Curtis B. Yates (North Carolina State Bicycle Coordinator)

To all of the others we may have forgotten, we apologize and extend our sincerest appreciation for their contributions.

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I. INTRODUCTION

A. General Considerations

Of the three principal classes of highway safety countermeasures, i.e., training programs, safety messages, and model regulations, this volume addresses the last class. This is a logical and desirable sequence of consideration in development as well as presentation. Control of behavior through regulation involves the threat of sanction for non-compliance. Philosophically, therefore, a regulatory approach to the countermeasure development process should be the consequence of exhaustive attempts in the training and safety message areas.

Measures to encourage voluntary performance of accident avoidance behavior are generally preferable. However, accounting for human predispositions, clearly some traffic behaviors need to be "regulated" to ensure both fairness and safety (e.g., use of traffic control devices at most intersections). The model regulations for bicycle safety proposed herein have thus been developed as countermeasures for aspects of bicycle accident situations considered unlikely to be totally responsive to training or safety message approaches.

Traffic regulations are considered to be any written statement which prescribes or proscribes the appearance, function or performance of traffic units (pedestrian, vehicle and vehicle driver) and/or elements of the traffic environment (highway/street, traffic control devices). The most common forms of traffic regulations are traffic laws which compose a state's vehicle code and the ordinances making up a county's or city's traffic code. In a broader sense, regulations could also embrace various safety standards (e.g., Federal Motor Vehicle Safety Standards), specifications (e.g., Society of Automotive Engineers), or rules promulgated by an empowered administrative authority (e.g , state traffic or highway commissioner).

The emphasis in this volume has been on the development of traffic laws and ordinances. The laws and ordinances proposed are, in fact, pieces of model legislation which are recommended for enactment by a state or municipality. Whether the model regulation is termed a law or an ordinance depends on its degree of specification and applicability. A model regulation is termed a law when its desired impact is "universal" and its provisions should be controlling statewide. Where the applicability or utility of a regulation is likely dependent upon distinctly local conditions or needs, it is termed an ordinance.

The model regulations recommended for legislative enactment are, for the most part, complete packages, expressed in good traffic regulatory language and ready for enactment. While the model regulations are enactable in their present form, the National Highway Traffic Safety Administration (NHTSA) in the past has been interested in limited field testing of developed model regulations before formally promulgating them to the appropriate prospective jurisdictions (see Hale, Blomberg and Preusser, 1978). This, however, does not necessarily preclude enactment of any of these model regulations in a jurisdiction where there is a clear need for such legislation.

B. Overview of the Products

Eight model regulations for bicyclist safety are presented in succeeding chapters of this volume. The regulations are entitled:

- Model Bicyclist Conspicuity Law
- Model Law for Bicyclist Position on the Highway
- Model Highway Entry Law
- Model Minimum Age Law for Bicyclists
- Model Driveway Parking Ordinance
- Model Law to Remove Visual Obstructions
- Model Regulation to Prohibit Riding Bicycles on Sidewalks
- Model Bicycle Safety Patrol and Violator Disposition Ordinance

A ninth potential regulation was considered, but not fully developed. The accident problem concerned bicyclists being struck by parallel motor vehicles which turn right without adequate warning (Bicycle Accident Type No. 24). The countermeasure approach considered was an ammendment to Federal Motor Vehicle Standard No. 108 which would require side turn signal lamps on all motor vehicles to provide better warning of a vehicle's impending right turn to a bicyclist alongside the vehicle. The relevant SAE Recommended Practice for Side Turn Signal Lamps is SAE J914b (July 1978). Within the confines of this study, a thorough engineering evaluation of SAE J914b (July 1978) was not possible insofar as its applicability to warning bicyclists. Any further development of this countermeasure approach would also necessarily have to consider ways and means to increase motorist use of turn signals.

For each of the eight regulations a description of the underlying accident problem is presented. Next, the basic approach to the writing of the model regulation is articulated. The actual provisions of the model regulation are then presented coupled with an annotation of each major provision. The annotation describes the logical and/or empirical rationale supporting each major provision of the regulation. Considerations for implementing the regulation are discussed including those related to legislative enactment, enforcement, public education and cost factors. Finally, where appropriate, a discussion is presented of possible approaches to a full scale field test of the model regulation along with any risk-benefit consequences.

The terminology employed in the wording of the model regulations basically follows that in Chapter 1 "Words and Phrases Defined" of the Uniform Vehicle Code (NCUTLO, 1979). That chapter is reproduced in Appendix A for the benefit of the reader. In addition, no concepts offered in these model regulations are intended to conflict with any of the provisions of the latest version of Uniform Vehicle Code (NCUTLO, 1979). In fact, many of those provisions are subsumed or specifically referred to in the description of the model regulations to follow.

There are some terms which needed to be developed for the content of these model regulations which were not explicitly defined in Chapter 1 of the Uniform Vehicle Code. These terms as well as other frequently used terms from the Uniform Vehicle Code appear in Figure 1, Words and Phrases Defined. Any specific enactment of these regulations should include those definitions from Figure 1 which are not currently operative in the particular jurisdiction and should be sensitive to any conflicts between these definitions and those which may be prevailing as a result of legislative action or legal intrepretation.

Within the body of some of the model regulations, certain words or phrases appear in parentheses. The parenthetical material may refer to any or all of the following:

- A description of a jurisdictional agency whose official designation should be inserted by the local jurisdiction.
- Optional language (generally more than one parenthetical statement) with the decision as to which version is selected left up to the local jurisdiction.
- Description of a local statute which should be ultimately cited in the manner indicated.

The need for these regulations and the definition of their scope were an outgrowth of reference to and detailed additional analysis of the bicycle/motor-vehicle accident data collected by Cross and Fisher (1977). In their landmark research effort, they collected in-depth data on numerous accidents, examined causal elements and identified 36 different types of bicycle/motor-vehicle crashes in seven broad classes (A to G). This typology, including the relative incidence of the types and their typical severity, formed the design basis for the Model regulations contained herein.

In the remainder of this volume, the various accident types identified by Cross and Fisher (1977) will be referenced by name and/or number. Quantitative references are not differentiated between data published by Cross and Fisher (1977) and subsequent additional analyses of their information for this study. As an aid to the reader, a brief description of each of the types, often with a pictorial representation, is presented in Appendix B. Those who have had no previous exposure to the work of Cross and Fisher (1977) should consider, as a minimum, becoming familiar with the contents of Appendix B before proceeding through the remainder of this report. All readers may find this Appendix a useful reference as the content of each regulation is perused.

WORDS AND PHRASES DEFINED

***Bicycle**--Every (device) (vehicle) propelled solely by human power upon which any person may ride having two tandem wheels, except scooters and similar devices.*
Note: The term "vehicle" should be used if state law conforms with UVC § 1-184 which considers a bicycle as a vehicle.

***Bicyclist**--Any person who drives, operates, rides or who is in actual physical control of a bicycle.*

***Drive or Driving a bicycle**--Steering a bicycle, whether walking or riding it.*

***Highway, street**--The entire width between the boundary lines of every way publicly maintained when any part thereof is open to the use of the public for purposes of vehicular travel. (UVC § 1-122)*

***Ride or Riding a bicycle**--Being astride a bicycle whether or not in motion.*

***Roadway**--That portion of a highway improved, designed or ordinarily used for vehicular travel, exclusive of the sidewalk, berm or shoulder even though such sidewalk, berm or shoulder is used by persons riding bicycles or other human powered vehicles. (UVC § 1-158)*

***Shoulder**--That portion of the highway contiguous with the roadway for use by bicyclists, pedestrians where no sidewalks exist, stopped motor vehicles and for lateral support of the roadway structure. The line between the roadway and the shoulder may be a painted edge line or a change in surface color or material.*

***Sidewalk**--That portion of the highway which is contiguous with or near the roadway or shoulder, generally having a paved surface which is above the surface of the roadway and is intended principally for the use of pedestrians.*

Figure 1. Definitions of Important Words and Phrases.

II. GUIDELINES FOR REGULATION DEVELOPMENT

It is generally conceded that a program of traffic safety is dependent upon a foundation of sound traffic regulations made effective by appropriate levels of enforcement and public education. The development of these regulations is a multi-stage process which must begin with an enlightened understanding of the problem being attacked. Moreover, this understanding must not rest solely with any single group. It must be conveyed to both law makers, and the public to insure passage of an effective regulation and compliance with it by the public. Unfortunately, merely understanding the problem is not sufficient. Good laws must take into account such practical problems as enforcement, adjudication and public understanding if they are to achieve their desired goal of accident reduction.

Ideally, sound traffic regulations promote the safe, expeditious and equitable flow of all traffic units (motor vehicles, bicycles, pedestrians, etc.) upon the trafficway, accounting for the capacities and limitations in the capabilities of each unit. Therefore, traffic rules must be drafted so as to denote a "reasonable" regulation of traffic behavior while minimizing any attendant inconveniences. Since the penalties for traffic violations are less severe than those for criminal violations the "threat value" for traffic laws is overall lower than for criminal laws.

Traffic laws should have as much self-apparent merit as possible to promote voluntary compliance by the public. Self-apparent merit is manifest in a regulation whose intent and rationale are easily understood by the public without need for official "interpretation." However, the economy of expression demanded by traffic regulations does not always allow for a clear expression of the rationale. For this reason, and as an aid to legislative acceptance and enactment, it was necessary to "annotate" each provision of each model regulation contained within this report. The annotation succinctly describes the reasons for the regulatory provision and interconnection with the entire body of the regulation. Thus, the goal of "self-apparent merit" for model traffic regulations is quite important from the two principal standpoints of public acceptance, i.e., legislative enactment and public compliance. The importance of voluntary public compliance, engendered by a perception of reasonableness and value in the regulations, cannot be overemphasized. Police enforcement of all provisions of all traffic laws all of the time is obviously impossible.

Besides having self-apparent merit, traffic regulations must be behaviorally realistic. They must take account of human habits and inclinations in the traffic environment and existing traffic law. Where possible in accomplishing their purpose, traffic regulations should not conflict with population stereotypes or negatively transfer to provisions of existing, effective regulations.

The operational provisions of traffic regulations must be stated simply and clearly, without the need for interpretation of complex legal language, and employ as few qualifying clauses and exceptions as possible. The requirements (who or what is affected, what must be done or not done) and rationale (why's and wherefore's) for traffic regulations must be made apparent to the public preferably via the body of any regulation but certainly through supportive public information and education.

The need for clarity and simplicity also translates into the area of traffic law enforcement. Effective traffic regulations incorporate provisions which denote well defined elements of offenses which are amenable to objective and consistent law enforcement actions. Although certain necessary and difficult to enforce provisions may have "educational value" within the body of a regulation, inclusion of such items in model regulations should be the exception rather than the rule.

To promote compliance with and convenient enforcement of traffic regulations, consideration should be given to having the regulations specify "cues" to be installed in the traffic environment, whenever practicable, to evoke the driver and/or pedestrian behavior required by the regulation. Traffic control devices (i.e., signs, signals and pavement markings) are examples of methods for displaying cues for ensuring the performance of some required traffic behaviors. Traffic regulations whose provisions incorporate reasonable and acceptable traffic behavior cues will facilitate compliance and aid in enforcement by:

- Relieving drivers and pedestrians of the burden for total recall of the required or prohibited behaviors.

- Providing police with benchmarks and objective guidelines for taking enforcement action.

It has been the intent of the authors to adhere to the foregoing design criteria throughout the regulatory development process. The reader should keep this in mind when evaluating these products.

III. MODEL BICYCLIST CONSPICUITY LAW

A. Background of the Accident Problem

In the study of bicycle accidents by Cross and Fisher (1977), analysis of several specific accident types suggested that the visibility of the bicyclist to the striking motorists could very well be a source of contribution to the accidents. In particular, the following types of accidents were involved:

- Type 9 Motorist Turn-Merge/Drive Through: Intersection Controlled by Sign
- Type 10 Motorist Turn-Merge: Intersection Controlled by Signal
- Type 12 Motorist Driveout: Controlled Intersection
- Type 13 Motorist Overtaking: Bicyclist Not Observed
- Type 22 Motorist Unexpected Left Turn: Parallel Paths, Same Direction
- Type 23 Motorists Unexpected Left Turn: Parallel Paths, Facing Approach
- Type 24 Motorist Unexpected Right Turn: Parallel Paths
- Type 25 Vehicles Collide at Uncontrolled Intersection: Orthogonal Paths
- Type 26 Vehicles Collide Head-On, Wrong Way Bicyclist

Types 9, 10, 12 and 25 involve the motorist and bicyclist on orthogonal or right angle paths. Recurring throughout these accidents is the fact that the motorist did not expect to see the bicyclist riding across the intersection in the street (sometimes wrong way against tne flow of traffic) and failed to detect the bicyclist in time to avoid the collision. Most (70% or more) of these accidents occurred in daytime.

Types 13, 22, 23, 24 and 26 concern motorists and bicyclists on parallel paths before the collision occurred. With the exception of Type 13, most of these accidents occurred in the daytime. In the case of type 13 in which the motorists overtakes the bicyclist riding on the outside edge of the roadway (no rideable shoulder or sidewalk being available), 63% occurred during the nighttime.

As a group, these nine accident types account for 32.4% of the fatal injuries and 37.5% of the non-fatal injuries in the study sample.

B. The Model Regulation

1. Approach and Overview

In all the aforementioned accident types, the capacity for accident reduction via enhanced conspicuity for the bicyclist is clearly present. This is not the only potentially effective countermeasure approach. Optimized driver search patterns and bicyclist position and direction on the roadway are others. However, conspicuity-enhancement is a potentially powerful approach to improve the early detection of a relatively small visual target, such as a bicyclist, without the need to substantially modify the "normal" search behavior of the motorist. In many orientations the bicyclist's appearance is not distinguishable from that of a pedestrian. Yet a bicyclist travels at two times or more the speed of a pedestrian. An adult pedestrian averages about three miles per hour. Bicyclists frequently operate in the range of 7-15 miles per hour with a "dash" capacity of 20 mph or more. Bicyclists thus represent a significant and often unexpected collision threat for motor vehicles because of their low visual target value, higher speeds relative to pedestrians and frequent and sustained intermingling with motor vehicle traffic on streets and highways.

Conspicuity enhancement for the bicyclist, therefore, seems a productive approach to counter the situations where: 1) bicyclist positions and movements on the highway are not necessarily expected by the motorists, and 2) motorists and bicyclists are on parallel, same direction pathways in low ambient and nighttime conditions (Type 13).

Inherent to the successful implementation of bicyclist conspicuity countermeasures will be the creation of the need to acquire and appropriately use the conspicuous materials or devices. The required user motivation could theoretically be created through appropriate public education measures alone. The prospect of this approach being successful is not viewed as particularly likely, however. Past experience in gaining the maximum use of physical/mechanical traffic accident countermeasures (e.g., vehicle reflectors, vehicle hazard warning lights, school bus lighting systems) has been via the regulatory route.

2. Provisions of the Model Regulation

Figure 2 contains the provisions of the Model Bicyclist Conspicuity Law.

3. Annotation of the Model Regulation Provisions

§ 1--Bicyclists to use conspicuous equipment--Without regard at this time to the specific nature of conspicuous materials to be employed, the overall requirement to "have and display" such materials is stated in this section. It is acknowledged that while the likely locus of this regulation would be within the body of vehicle and traffic law of a state, initially in the early stages of acceptance, this regulation could be adopted as a municipal traffic ordinance. The requirement for use of conspicuous materials extends to use of the bicycle, either riding or walking it, upon or across a roadway or shoulder. If a bicycle were to be used exclusively on a sidewalk, bicycle path or other off-highway/street locations where the bicyclist could not readily intermingle with motor vehicle traffic,

MODEL BICYCLIST CONSPICUITY LAW

§ 1 - Bicyclists to use conspicuous equipment

In addition to other equipment required by the laws of this state (or ordinances of this city), every person riding (or walking) a bicycle upon or across a roadway or shoulder shall have and display the equipment described in section 2.

§ 2 - Conspicuous equipment for use by bicyclists

[Pending the results of NHTSA sponsored research underway to study and propose conspicuous materials or devices for bicyclists and pedestrians, this section will likely describe:

(a) Appearance and performance parameters for the required items or any controlling federal, state or local standard(s).

(b) Acceptable method(s) for displaying the conspicuous materials or devices.

(c) Required usable condition for the conspicuous materials or devices.

(d) Times of day for using various equipment, as appropriate.]

Figure 2. Model Bicyclist Conspicuity Law.

then the provisions of this section would not necessarily apply. Practically speaking, once the law were enacted, the countermeasure would not likely be deployed on a situational basis. The transition of the bicyclist between on-street and off-street locations would likely be frequent and it would be inconvenient to use and disuse the countermeasures situationally.

§ 2--Conspicuous equipment for use by bicyclists--The exact nature of the conspicuous materials or devices to be used by persons riding or walking bicycles on the roadway or shoulder cannot be specified at this time. Consequently the content of this section cannot now be written definitively but only outlined. As referenced in the text of the outline for this section, research which is currently underway for NHTSA will study and propose particular conspicuous materials or devices for pedestrians and bicyclists. The items specified may embrace retroreflective, fluorescent and light-emitting materials/devices or combinations thereof which would be worn by the bicyclist or affixed to the bicycle itself. Whatever conspicuous countermeasures are identified as instrumental and appropriate to enhancing the conspicuity of bicyclists will be described in this section ultimately in terms of the appearance, methods for display, required usable condition, and times of day for use, if appropriate.

Detailed specifications for the performance parameters of the conspicuous materials will not likely reside within this provision. More appropriately, only the official designation or reference (e.g., "retroreflective," "fluorescent," "lights") for the conspicuous materials will be mentioned along with a reference to any controlling governmental or technical society standard.

C. Implementation

1. Enactment

The Model Bicyclist Conspicuity Law is intended for enactment as a state law and to thus have its provisions controlling throughout the state. In its present form, however, the model law is not in a form which is conducive to immediate enactment as the conspicuous materials have not been defined. Assuming that the results of the research presently being conducted for NHTSA (Contract No. DTNH22-80-C-07052, Dunlap and Associates, Inc.) will identify a viable approach to enhancing the conspicuity of bicyclists, then much of the outlined content for this law can be converted to the necessary operational provisions and render the entire model law as enactable legislation.

The underlying conspicuity research must not only identify a perceptually effective means for enhancing the conspicuity of bicyclists on highways and streets, but equally important, identify a means which is readily accepted and used by the bicycling public. Given that the research is successful on both counts, then there should be the documentation available which can be converted into an effective lobbying tool. With the research data to show that the conspicuous materials to be required by law are both perceptually effective and acceptable to the public, an effective basis will be available for gaining legislative support for enactment of the Model Bicyclist Conspicuity Law.

In addition to the publishing of the aforementioned research data in the form of a fact sheet, information within the body of this report can be

converted into a potentially effective fact sheet for legislators to engender their support. Specifically, the material found in the following sections would constitute a good fact sheet or lobbying tool to promote the enactment of any model law within this report:

- Background of the Accident Problem
- Approach and Overview
- Provisions of the Model Regulation (the actual model regulation)
- Annotation of the Model Regulation Provisions

2. Enforcement

It is anticipated that enforcement of any of the basic operational provisions of this model law will present no major problems. The presence or absence of the required conspicuous materials, by definition, should be readily detectable by any enforcement officer for the use situations specified by the law. The required usable condition provisions of the model law, although yet to be defined, will likely be less objectively enforceable. Officer judgement and discretion, not to exceed that required to detect signal equipment/lighting violations in motor vehicles, will be likely required to detect damaged, worn, sub-standard or missing conspicuous materials/devices on bicycles.

3. Public Education

The major orientation of the public education program to support the Model Bicyclist Conspicuity Law should be towards the bicyclist via broadcast media. Television spots of 60 and 30 seconds duration should be developed which cover the following content:

- Show the differences in bicyclist conspicuity with and without the required or acceptable conspicuous materials which are clearly shown or described. The contexts could involve location shooting on various types of urban, suburban and rural roadways. Another possible direction for the production of television spots could involve different sports personalities from football, soccer and basketball with the message emphasizing that competing teams wear different color uniforms so they readily pick out and identify teammates as well as opposing players. "When on the field or on the road, I want everybody to notice me." So would say a sports star. The impact of the personality on younger people could heighten the motivation to use conspicuous materials and devices. It is conceivable that the conspicuous materials developed by the research now being conducted and likely to be required by the model law will be designed to be effective in the daytime (fluorescent materials) as well as the nighttime (retroreflective, light-emitting). Therefore, location shooting could cover both the daytime and nighttime conditions, where appropriate. The conspicuity study will also likely describe the traffic situations where daytime or nighttime conspicuity is of particular importance. From the accident data, daytime

bicyclist "inconspicuity" appears to be more of a problem where bicyclists mingle in motor vehicle traffic and bicyclists or motorists cross each other's pathways. Nighttime bicyclist inconspicuity appears to be more of a problem on open suburban and rural roadways where the motorist is overtaking the bicyclist who is to the right of the highway or street.

- Emphasize the need for bicyclists to attempt to be at least as visible as motor vehicles with which they mingle.

- Remind bicyclists to keep the conspicuous materials in the required operating condition, replacing worn, damaged or missing items as soon as possible.

A magazine presentation or poster could also be appropriate. A split photo layout (one color, if necessary) should show a bicyclist with and without the conspicuous materials under the conditions for which they were designed. The copy should focus on the need to display the required materials in the proper manner and condition.

4. Cost Factors

No unusual public costs are foreseen in connection with the enactment and enforcement of this model law. Adequate enforcement of the Model Bicyclist Conspicuity Law should be accomplished via routine police patrol and any existing bicycle patrols. There will be compliance costs, however. Accordingly, it should be a design goal for the conspicuous materials for bicyclists to be as low in cost as possible. This obviously will be an important factor affecting public acceptance and use of the materials or devices. A prediction of unit cost is impossible at this time without knowing the nature or design of the materials in question.

D. Field Testing and Risk Benefit Analysis

Two points presently bear on any plans to be developed for a field test of this model law:

- The model law does not exist in complete and final form.

- There is a requirement in the research contract to study and propose conspicuous materials for pedestrians and bicyclists (Contract No. DTNH22-80-C-07052) to develop a formal experimental field test plan to test the proposed pedestrian and bicyclist conspicuity measures in a naturalistic setting (e.g., state, municipality)

In view of the aforementioned considerations, it would seem prudent to defer the development of field test concepts until the previous research contract is completed. The field test plan, under that contract, probably should be written as a field test of this model law to be most cost-effective.

Any risks attendant to the field testing of this model law are seen to be minimal. Devices or materials designed to enhance the detection and recognition of bicyclists should only really improve the potential safety of bicyclists. A frequent cry from opponents of material safety countermeasures (safety belts, helmets, etc.) is that they will promote a "false sense of security" in the minds of those who use them. This false sense of security is said to encourage incautious behavior. This thesis is one which, while having some logical appeal, has yet to be demonstrated in the highway safety environment. Rational vehicle operators do not seem inclined to expose themselves to greater than necessary risks consciously on a regular basis.

IV. MODEL LAW FOR BICYCLIST POSITION ON THE HIGHWAY

A. Background of the Accident Problem

Examination of the data acquired and presented by Cross and Fisher (1977), reveals "wrong-way" bicycle riding (bicyclists riding along the left side of a two-way street or highway against traffic) to be a prominent precipitating factor in bicycle accidents. Wrong-way riding was a factor in at least 25% of all accidents studied. Specific accident types where wrong-way riding was a factor include:

- Type 5 Bicycle Rideout: Intersection Controlled by Sign (20%)*
- Type 7 Bicycle Rideout: Intersection Controlled by Signal, Multiple Threat (22%)*
- Type 8 Motorist Turn-Merge: Commercial Driveway / Alley (71%)*
- Type 9 Motorist Turn-Merge/Drive Through: Intersection Controlled by Sign (82%)*
- Type 10 Motorist Turn-Merge: Intersection Controlled by Signal (90%)*
- Type 21 Wrong-Way Bicyclist Turns Right: Parallel Paths (90%)*
- Type 22 Motorist Unexpected Left Turn: Parallel Paths, Same Direction (62%)*
- Type 24 Motorist Unexpected Right Turn: Parallel Paths (25%)*
- Type 25 Vehicles Collide at Uncontrolled Intersection: Orthogonal Paths (37%)*
- Type 26 Vehicles Collide Head-On Wrong-Way Bicyclist (77%)*

Wrong-way riding is a conspicuous example of a hazardous bicyclist position and direction on the street or hignway which is involved in numerous bicycle accidents. Other position-related behaviors which have been implicated by Cross and Fisher (1977) in bicycle accidents are "...path unnecessarily far from curb/shoulder--4.8% fatal accidents, 4.4% non-fatal accidents" and "...path unnecessarily close to parked motor vehicles--0.4% non-fatal accidents." Bicyclist position on the highway, therefore, appears to be a contributing factor in numerous bicycle accident types.

*Percent of all Cross and Fisher (1977) cases involving wrong-way bicycle riding.

B. The Model Regulation

1. Approach and Overview

With the exception of some special circumstances (e.g., one way streets, when turning left, overtaking slow or turning vehicles) the Model Law for Bicyclist Position on the Highway will require that all bicyclists move on the right side of the roadway. Moreover, other aspects of bicyclist position/direction that should reduce the likelihood of collisions with motor vehicles will be encoded in this model law as well.

2. Provisions of the Model Regulation

Figure 3 contains the provisions of the Model Law for Bicyclist Position on the Highway.

3. Annotation of the Model Regulation Provisions

§ 1--Bicyclist position on roadway

a) In essence, this subsection reaffirms the proper consideration of a bicycle as a vehicle (see UVC §1-184) by requiring a bicyclist to comply with the state law equivalent of UVC §11-301. UVC §11-301 requires all vehicles to be driven on the right half of all roadways "...of sufficient width" with some exceptions. Since bicycles are two-wheeled vehicles and bicyclists are vehicle operators or drivers, bicyclists should conform to all regulations governing the flow of vehicular traffic upon the streets and highways. Put another way, a bicyclist should have "...the rights and all of the duties applicable to the drivers of any other vehicle..." (UVC §11-1202). To do otherwise, especially driving a bicycle on the left side of a street or highway facing oncoming traffic is both illegal and dangerous. Fifty-two percent of Class C bicycle accidents (Types 8 - 12--Motorist Turn-Merge/Drive Through/Drive-Out), involved a bicyclist who was riding on the left side of a two way roadway facing oncoming traffic. Cross and Fisher (1977) estimate that countermeasures that would eliminate "wrong-way" bicycle riding would eliminate about half of all Class C bicycle accidents (half of 2.4% of fatal injuries and 18.7% of non-fatal injuries).

Why is wrong-way riding dangerous, besides being illegal? As mentioned earlier in this section, a bicyclist is not a particularly prominent visual target in many cases. It is understandable then that when a motorist is attempting to turn at an intersection, turn into a private road or driveway, or enter a street or highway, the motorist has a potentially demanding task of clearing vehicular and pedestrian traffic operating in normal, lawful, and expected pathways on the street or highway. A wrong-way bicyclist, therefore, is at heightened risk of being struck by a motor vehicle because of his poor conspicuity and unexpected position and direction on the highway. A wrong-way bicyclist, in addition, is at a serious disadvantage to observe and obey the traffic control devices governing the flow of traffic in his direction which are now located on the other side of the street. Finally, a wrong-way bicyclist who collides head-on to any degree with an opposing motorist at moderate to slow speeds runs the risk of greater injury than if the bicyclist and motor vehicle were on the same direction parallel pathways. A

MODEL LAW FOR BICYCLIST POSITION ON THE HIGHWAY

§ 1 - Bicyclist position on roadway

(a) A person driving a bicycle shall comply with _____ (state law comparable to UVC § 11-301) requiring all drivers to be on the right half of the roadway and shall not drive on the left facing traffic coming from the opposite direction except when authorized by that law.

(b) Except as provided in subsection (c), any person driving a bicycle upon a roadway at less than the normal speed of traffic at the time and place and under the conditions then existing shall travel as closely as practicable to the right-hand curb or edge of the roadway, or as closely as practicable to either curb or edge of the roadway when on a one-way street.

(c) Any person driving a bicycle may move away from the positions described in subsection (b) as necessary under any of the following situations:

(1) When overtaking and passing another bicycle or (other) vehicle.

(2) When preparing for a turn.

(3) When reasonably necessary to avoid conditions including, but not limited to, fixed or moving objects, parked or moving vehicles, vehicle doors that are or may open, bicycles, pedestrians, animals, surface hazards, or substandard width lanes, that make it unsafe to remain near the curb or edge of the roadway. For purposes of this section, a "substandard width lane" is a lane that is too narrow for a bicycle and an overtaking vehicle to travel safely side by side within the lane.

(4) When necessary to comply with lane use restrictions.

§ 2 - Bicyclist on shoulders

(a) A person driving a bicycle may travel on any shoulder except as provided in subsection (d).

(b) A person driving a bicycle (on a controlled-access highway) (or a highway with a speed limit in excess of 35 miles per hour) shall travel on the shoulder when the shoulder is:

Figure 3. Model Law for Bicyclist Position on the Highway.

(continued)

(1) At least six feet wide, and

(2) Paved with a surface that is as level and as smooth as the adjacent roadway, and

(3) The conditions in (1) and (2) exist for the next 300 feet to be traveled.

(c) Subsection (b) shall not apply:

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

(2) When preparing for a left turn.

(3) When reasonably necessary to avoid conditions including, but not limited to, fixed or moving objects, parked or moving vehicles, vehicle doors that are or may open, bicycles, pedestrians, animals or surface hazards, that make it unsafe to continue on the shoulder.

(d) A person driving a bicycle on a shoulder shall travel only in the same direction as traffic in the adjacent lane.

§ 3 - Bicyclist use of sidewalks

(a) A person driving a bicycle upon and along a sidewalk, or across a roadway upon and along a crosswalk, shall yield the right of way to any pedestrian and shall give audible signal before overtaking and passing such pedestrian.

(b) A person shall not drive a bicycle upon and along a sidewalk, or across a roadway upon and along a crosswalk, where such use of bicycles is prohibited by official traffic-control devices.

(c) A bicyclist traveling on a sidewalk or in a crosswalk shall have all the rights and duties applicable to a pedestrian under the same circumstances.

Figure 3 (continued). Model Law for Bicyclist Position on the Highway.

"brushing" or glancing collision between a motorist and a bicyclist on same direction parallel pathways is likely to result in less injury to the bicyclist than if the individuals were on opposite parallel courses. This applies to moderate to slow speeds (25 mph or less). When motor vehicle speeds exceed 35-40 mph, bicyclists who are struck by motor vehicles going in the same direction (e.g., Type 13, Motorist Overtaking: Bicyclist Not Observed) incur severe and often fatal injuries, i.e., Type 13, accounted for about 25% of all fatal injuries in the sample studied by Cross and Fisher (1977).

b) The requirement for a bicyclist to operate as closely to the right-hand curb or edge of a two-way roadway, or either curb or edge of a one-way roadway, is predicated upon two fundamental considerations. First, bicyclists are much less conspicuous visual targets than most motor vehicles. Second, bicyclists are not expected by most motorists to operate in the roadway. Given that a bicyclist is not always seen that well by motorists and is not expected to operate in motor vehicle pathways, it seems only logical that bicyclists and motorists should be as physically separated as possible on streets and highways in most cases. The contention by some bicycling enthusiasts that their conspicuity is enhanced by operating in traffic lanes as much as possible does not seem supportable when considering drivers expectation for what kind of vehicles are expected on roadways--namely, motor vehicles of considerably larger size than bicycles. When considering the active scan patterns of drivers, it should be understood that numerous detections of traffic information are made in a driver's visual periphery. The driver's expectation for large sized vehicles will tend to favor the detectability of these vehicles, particularly in the periphery.

A key factor modifying the requirement for a bicyclist to operate as closely as possible to the appropriate roadway edge or curb is the bicyclist's ability to keep pace with traffic. Assuming that a bicyclist is not able to operate at the "normal speed of traffic" then the opportunity for rapid closure upon a bicyclist's position on the roadway increases as the speed differential increases. Under these conditions the hazard is greatest for the bicyclists as the requirements for quick detection and appropriate avoidance of a bicyclist operating in the roadway increase for motorists. Should bicyclists be able to keep pace with the normal speed of traffic, then the risks of a collision are considerably reduced.

The provisions of this section are a close paraphrase of UVC §11-1205(a).

c) Of practical necessity, a bicyclist must have relief from the requirement to operate as far to one side of the street or highway as practicable under certain circumstances. It follows that once any of the exceptional situations to be discussed below is no longer operational, then the bicyclist will return to the otherwise required position on the roadway. The exceptions mentioned here are those contained within UVC §11-1205(a)(1-3) with some additions.

(1) Obviously, a bicyclist attempting to overtake and pass another bicyclist or vehicle proceeding in the same direction must move more into the highway or street to clear the vehicle being passed. A

bicyclist overtaking and passing another vehicle must do so on the left of that vehicle to be consistent with all other vehicular traffic requirements.

(2) Where a bicyclist wishes to make a left turn at an intersection, private road or driveway, there must be an allowance made for the bicyclist to ease to the far left portion of the roadway being traveled. A left turn from this position can be less hazardous as the bicyclist will not have to contend with same direction vehicular traffic going straight through his position as well as trying to clear opposite direction traffic before executing the left turn. This provision reflects the substance of UVC §11-601(b).

(3) Clearly there are many roadside physical hazards which can cause a bicyclist to leave the near curb or roadway edge position to avoid a collision or serious damage to the bicycle. This subsection attempts to enumerate these hazards. Besides the actual hazardous objects a bicyclist may encounter, the concept of a "substandard width" lane is introduced and defined. This concept of a lane too narrow for an overtaking vehicle and a bicycle to travel side by side is a necessary exception to the rule to stay as far to one side of the street as possible. In this case, the bicyclist may necessarily have to "take the lane" (move out towards the center of the traffic lane in question) for maximum protection. Since these restricted lane situations of any magnitude occur in city traffic situations or construction areas where speed limits are reduced, the bicyclist will be better able to achieve a speed which will be normal to that situation once having taken the lane. Thus, it is likely that the bicyclist will be able to maintain a reasonable speed and not slow following vehicles appreciably.

(4) The situation at an intersection where a right turn only lane exists presents a problem to the bicyclist under this regulation. If the bicyclist proceeds straight through an intersection with a right turn pocket and stays to the right, the bicyclist could be struck or interfered with by a motorist turning right. In this and similar situations, the bicyclist must be exempted from staying as far to the right as possible on a two-way street.

§ 2--Bicyclist on shoulders--It is desirable to make certain that all traffic laws apply to bicyclists even when they are riding on shoulders. This can be accomplished by enactment of a provision in substantial agreement with either UVC §11-1202 or UVC §1-184. Given this the following provisions promote prudent use of shoulders by bicyclists.

a) To foster the greatest possible separation of motor vehicles and bicycles on highways and streets, this subsection has been incorporated into this model law. It specifically encourages use of an appropriate shoulder by a bicyclist by giving explicit permission to drive on a shoulder.

b) This provision requires use of the shoulder by a bicyclist in either or both of two high risk situations. The first situation, a condition for optional enactment is where bicyclists are permitted to use limited access highways. Unquestionably, considering the substantial speed differentials between motor vehicles and any bicyclists on a limited access highway, bicyclists must operate as far to the edge of any suitable shoulder as possible to provide a necessary separation from the passing stream of motor vehicles. The other situation requiring bicyclist use of the shoulder is on a highway with a speed

limit in excess of 35 mph. The higher speed of motor vehicle traffic on these highways again necessitates mandatory use of qualifying shoulders by bicyclists.

Requiring a bicyclist to use an available shoulder reasonably demands that the shoulder be of a minimum, acceptable quality to be usable by a bicyclist. Thus, the requirements for mandatory use of a shoulder by a bicyclist are predicated upon three qualifying conditions:

(1) The shoulder must be at least six feet wide. This minimum width is based upon two recommendations made in the Transportation and Traffic Engineering Handbook (Baerwald, 1976). The first recommendation concerns the minimum effective width for bikeways. A minimum width of 6.4 feet is recommended for a two-lane bikeway based upon a comfortable maneuvering allowance at a 10 mph design speed (p. 667). This width should allow for comfortable overtaking and passing of one bicyclist by another without having to leave the boundary of the shoulder. In addition, six feet is recommended as a minimum shoulder width for four-lane freeways (p. 626). Thus a six foot minimum width shoulder is seen as a reasonable prerequisite for required use of a shoulder by a bicyclist.

(2) In addition to a minimum shoulder width, the surface of the shoulder must be of a satisfactory quality to render it usable by the bicyclist. As a minimum, the shoulder surface should be at least as level and smooth as the adjacent roadway. Thus, an unpaved or poorly maintained shoulder (relative to the adjoining roadway), even six feet or wider, would not have to be used by a bicyclist.

(3) The third and final condition to be met for requiring a bicyclist to travel on a shoulder under §2(b) is that the aforementioned two conditions exist for the next 300 feet to be traveled. Should the availability of a quality shoulder (minimum width and surface quality) be less than 300 feet ahead then the bicyclist will have a reasonable lead distance in which to plan and smoothly execute a course change to a suitable alternate position on the highway (e.g., roadway edge, sidewalk). At a constant speed of about ten mph, a bicyclist would have approximately 20 seconds to relocate within a 300 foot distance.

c) As in §1(c) above, the same three exceptions to having to ride as far to one side of the street or highway as possible apply to riding a shoulder for the reasons already discussed.

d) In §1(a) above a bicyclist is required to ride on the right side of the roadway with the flow of traffic. The "roadway" is defined as the "...portion of a highway improved, designed or ordinarily used for vehicular travel, exclusive of the sidewalk, berm or shoulder..." (UVC §1-158). It is, therefore, necessary to ensure (as this §2(d) does) that bicyclists riding on shoulders ride only in the same direction as traffic in the adjacent lane. No wrong-way bicycle riding can be tolerated on shoulders for all of the reasons cited for §1(a) above.

§ 3--Bicyclist use of sidewalks--There are locations within many jurisdictions where bicycling on sidewalks presents undue hazards. In one case,

the hazard is to the bicyclist due to high commercial vehicle activity in driveways and alleys which cross sidewalks. In the second case the hazard is to pedestrians where the pedestrian density is high. In these cases a jurisdiction may justifiably entertain a prohibition of bicycle riding upon sidewalks. In other cases, bicycle riding upon sidewalks presents little additional threat to pedestrians and affords a much greater degree of protection for the bicyclist due to the physical separation from motor vehicle traffic. To encourage greater appropriate use of sidewalks by bicyclists (particularly the younger bicyclists still developing riding skills necessary in the traffic environment) this section has been drafted which is a close paraphrasing of UVC §11-1209.

a) As the title of this subsection implies and the phrasing of this section denotes, a bicyclist is given permission to drive a bicycle upon a sidewalk with concomitant responsibilities for the well-being of the more vulnerable pedestrian. Principally the bicyclist is under the duty to always yield the right of way to any pedestrian on the sidewalk. Moreover, the sounding of an audible alarm by the bicyclist is also required prior to overtaking and passing a pedestrian. The mandated warning may be transmitted vocally or via any sufficiently audible mechanical or electrical sound source.

b) This subsection clearly recognizes the fact that, for the previously discussed reasons above, bicycle riding on sidewalks may be prohibited in certain locations. As a consequence of acknowledging the possibility of prohibited bicycle riding on some sidewalk areas, the bicyclist is explicitly obligated to obey such a restriction when such a restriction is indicated by an official control device (i.e., sign, signal or pavement marking).

c) For desirable consistency a bicyclist is assigned all the rights and duties of a pedestrian in addition to the other obligations of this section while driving on a sidewalk. These rights and duties are described in UVC Article V--Pedestrians Rights and Duties, which comprises UVC §11-501 through UVC §11-513 and covers such topics as obedience to traffic control devices and regulations, right of way in crosswalks, crossing outside crosswalks, drivers to exercise due care, use of right half of crosswalk, use of roadways, soliciting of rides or business, avoidance of driving through a safety zone, requirement to yield to emergency vehicles, drivers yielding to blind pedestrians, under the influence of alcohol and drugs and movement near bridges and railroad signals.

C. Implementation

1. Enactment

Many of the elements of this regulatory package presently exist in the vehicle and traffic laws of states. The substance of this model regulation is distilled from accepted practice within the long standing body of vehicle "rules of the road" (e.g., riding with the flow of traffic, riding toward the edge of the roadway or highway if not able to keep up with the pace of traffic). It is not likely that any of the provisions of this model law would conflict with existing local requirements. More likely the provisions of this law could and should be enacted where appropriate to fill voids in existing law. This model law or pertinent sections not already in force, should be enacted at

the state level and be controlling throughout the state. Municipalities may, with reasonable justification, wish to prohibit sidewalk bicycle riding in hazardous situations like the ones discussed in the annotation for §3. Municipalities would have the prerogative to take this exception under this model law prevailing at the state level.

No major impedance to enactment at the state level is foreseen as this model law attempts (with the exception of allowing sidewalk riding) to bring bicycles within the purview of rules of the road governing the flow of vehicles which, in fact, bicycles are.

2. Enforcement

The elements of offenses embodied by this law are all basically amenable to "on-view" enforcement by police officers. Since violations are easily observable (i.e., position and direction on the highway or street), no special police resources are envisioned to adequately enforce this law. Routine police patrols will be adequate.

Should a "bicycle safety patrol" be operating in a jurisdiction, similar to the one proposed in a later model ordinance in this volume, it would be an ideal adjunct to the levels of police enforcement available for this model law. Wrong-way riding, in particular, is a more common infraction by the younger bicyclist. This individual might well be more positively influenced by an encounter with a safety patrol member rather than a police officer. The safety patrol member would also have less competing demands for time and thus be able to make the enforcement encounter a more meaningful learning experience for the bicyclist.

3. Public Education

Broadcast media and printed media support for this model law are seen as particularly useful. Thirty and 60 second television spots aimed at the youthful bicyclist (9-15 years of age) should reinforce the principal behavior requirements of the model law, namely:

- "Being on the right side." The right side alludes to riding on the right side of a two-way street with traffic as well as the correct or lawful side of the street. This message element could also feature the "Right Rider" character described in Volume II, as a proponent for the message--"go with the flow" thus, coordinating and possibly potentiating the safety message and regulatory programs.

- Deference (yielding the right of way and warning before overtaking) to pedestrians when riding on the sidewalk. A 30 second TV spot could get excellent play as a PSA on childrens' programs. A copy message such as "Don't be greedy--sidewalks don't just belong to you" could be effective. Since the bicyclist must yield the right of

way to a pedestrian, the most difficult part of the message is making the pedestrian aware of the bicycle approaching from behind. Some type of voice signal like "fore" in golf and "track" in skiing, seems useful. A symbolic and repeated warning phrase such as "rolling," "wheels," "behind you" or some other catch phrase, could prove effective.

Posters which coordinate with the television spots are recommended for development and placement in schools and youthful gathering areas.

4. Cost Factors

Implementation and enforcement of the Model Law for Bicyclist Position on the Highway should involve no extraordinary expenditure of public funds. No special enforcement equipment, traffic control devices, or unusual personnel resources should be required.

D. Field Testing Considerations and Risk Benefit Analysis

In field testing regulatory countermeasures, three generally accepted techniques have been employed. These techniques have been termed "actual implementation," "existing situation" and "essential features." Actual implementation is the most realistic form of countermeasure assessment involving actual passage of the model legislation and assessment of its effectiveness on a before and after basis by measuring accident precipitating behaviors and/or the frequency of the accident type involved. The existing situation approach involves locating a jurisdiction where the regulatory countermeasure already exists. Comparisons on a before and after basis can be made for the accident type(s) involved by analyzing police accident reports. Observations can also be made of public compliance behavior on an "after" basis only. From a cost-effectiveness basis, it behooves one to ascertain the possibilities for an existing situation assessment prior to considering, at any length, the time and expense involved in an actual implementation approach. In an essential features method the "key" features of the reguation are implemented without legislative enactment, typically through the executive powers of a particular agency (e.g., Traffic Engineer for a parking regulation, Turnpike Authority for a rule of the road specific to the limited access highway controlled). Before and after accident and behavioral measures are possible via this method as well as recommended public education approaches and police enforcement levels.

For the Model Law for Bicyclist Position on the Highway it is recommended that the possibilities be investigated for an existing situation, and an actual implementation field test. The condition of a jurisdiction's vehicle and traffic law which would permit an existing situation is that verbatim (not likely) or substantially conforming provisions of the Model Law for Bicyclist Position on the Highway are enacted already.

Ideally the enactment should be recent (3-5 years) so that hardcopy accident reports are available. Generally speaking any "before" period of accident analysis should

span three years to provide a stable average and a measure of protection against a regression-to-the-mean phenomenon.

The ideal experimental design for all assessments would be a before and after (pre-test/post-test) measurement period in an "experimental" site or jurisdiction and a "comparison" site or jurisdiction. The experimental site should meet the requirements of already having or being able to have the elements of the model regulation in force. The comparison site should be as comparable as possible in the physical features of the traffic environment, bicyling activity, weather, mixture and movements of motor vehicles and types and design of streets and highway (particularly the availability of shoulder and sidewalk areas).

In considering the possibilities for an actual implementation test, the following factors should be taken into account:

- It is desirable that none of the features of the model law exist in the candidate jurisdiction prior to enactment.
- Rather than going the route of enactment via a state legislature (the proper route for provisions of this nature to be controlling throughout the state) which would involve considerable time and expense, it may be as efficient, on a test basis, to have the model law enacted as a model ordinance within a municipal jurisdiction. Sufficient bicycling activity (and associated bicycling accidents) would have to be present to satisfy the requirements for a valid before and after assessment of accident experience and/or reduction in hazardous behaviors.

With regard to an essential features approach, little opportunity for this method is seen in this setting. These bicycle rules of the road are not typically amenable to administrative implementation. They usually require enactment via a local or state legislative body. Regardless of the test method employed the following items are recommended for consideration as dependent variables in any before and after assessment of the model law:

- Bicycle accident frequency
  - Bicyclist being struck by a motor vehicle, noting "wrong-way" riding, specific location on highway or street (roadway, shoulder or sidewalk), availability and condition of a shoulder or sidewalk where the bicyclist was struck.
  - Bicyclist striking a pedestrian or another bicyclist while riding on the sidewalk.
- Bicyclist compliance behavior
  - Failure to travel as closely as possible to the appropriate roadway edge or curb
  - Failure to ride in the same direction as motor vehicle traffic

- Failure to use a shoulder when required
- Failure to yield to a pedestrian on a sidewalk
- Failure to warn a pedestrian before overtaking on a sidewalk
- Riding on a sidewalk where such riding is prohibited by an official traffic control device

During any pre-test or before period for an actual implementation field test, the recommended public education materials should be produced and available in sufficient quantities to be distributed to the broadcast stations and youthful gathering areas at the beginning of the recommended one year minimum post-test or "after" period of assessment for the model law. The pre-test accident and behavioral data (where appropriate) should be collected during the post-test period as well.

It must be emphasized that an assessment of any model law's effectiveness in reducing the targetted accident type and the precipitating hazardous behaviors, may in fact be more directly an assessment of the effectiveness of the supporting public education materials to properly inform the public as to the requirements of the law and motivate compliance. In essence, the public education materials are the principal a-priori means for the public to be advised of the existence and specific requirements of the new law. If the information transfer is inadequate, the assessment of the efficacy of the provisions of the law is compromised. In this regard, before and after surveys of public awareness and understanding of the law's provisions are very important to understanding the results of any field assessment. Not withstanding any prevailing restrictions on the development and use of public survey instruments, such a survey of public awareness and understanding is recommended and essential to evaluating the effectiveness of this or any model law as distinguished from the impact of the public education and enforcement programs supporting the regulation. The activity levels of these two programs should be carefully documented during the post-test assessment period.

In conclusion, the benefits of the Model Law for Bicyclist Position on the Highway far outweigh any possible side-effect risks. Positioning bicyclists to the edge of the roadway or near the curb, where possible, separates them from the faster moving vehicular flow. Riding in the same direction as the flow of other vehicular traffic reduces numerous risks to bicyclists. Allowing bicyclists on "qualifying" sidewalks does raise the risk of bicycle-pedestrian collisions, but not to an excessive degree. By providing for the prohibition of sidewalk riding in dangerous areas, specific types of accidents, particularly those involving motorists exiting commercial driveways (Type 8) can be reduced.

V. MODEL HIGHWAY ENTRY LAW

A. Background of the Accident Problem

Cross and Fisher (1977) described a class of bicycle accidents (Class A) termed "Bicycle Rideout: Driveway, Alley and Other Mid-Block." Types 1-4 in this class involve bicyclists being struck by motor vehicles after entering the roadway suddenly and typically without slowing, stopping or searching for oncoming traffic. The roadway entries are from residential driveways, alleys, commercial driveways and even over the curb. Together these four accident types account for 15.1% of the fatal accidents studied and 13.9% of the non-fatal accidents. Again the younger bicyclist (15 years and younger) predominates the accident populations.

In addition, Type 8, Motorist Turn-Merge: Commercial Driveway/Alley should be considered at this time as well. This involves a motorist exiting a commercial driveway or alleyway and striking a bicyclist travelling in either direction on a sidewalk, or on a roadway edge or shoulder (in some cases, wrong-way riding). Reasons cited for the motorist failing to observe the bicyclist were often the bicyclist's unexpected location--that is, the sidewalk or the wrong-side of the roadway.

B. The Model Regulation

1. Approach and Overview

While strong advice and public education aimed at encouraging bicyclists and drivers to stop and search before entering a sidewalk or roadway could be effective, more properly this behavior should be considered as a "rule of the road" and thus within the domain of vehicle and traffic law. Therefore, the orientation of the model law is to require the desired course and search behaviors on the part of all drivers (motor vehicle and bicycle) to minimize accident occurrence in this unsuspectedly hazardous traffic situation.

2. Provisions of the Model Regulation

Figure 4. contains the provisions of the Model Highway Entry Law.

3. Annotation of the Model Regulation Provisions

§ 1--Stop before emerging from alley, driveway or building --The thrust of this provision is to require a "double stop" by both bicycle and motor vehicle drivers before entering a roadway from an off-roadway location such as an alley, driveway or building. The reason for the two stops is that a sidewalk can carry one stream of pedestrian and bicycle traffic and the roadway a second stream of vehicular traffic. Before a vehicle (in this case a bicycle or motor vehicle) rightfully can enter either stream, that vehicle must be stopped (where the best view of oncoming traffic can be had) and the driver must look for oncoming traffic. While requiring a stop before looking may seem like an overly conservative behavior, accounting for human nature, if a stop is not

MODEL HIGHWAY ENTRY LAW

§ 1 - Stops before emerging from alley, driveway or building

The driver of a vehicle or bicycle emerging from an alley, building, private road or driveway shall stop immediately prior to moving onto a sidewalk or onto the sidewalk area extending across such alley, building entrance, road or driveway, and shall stop at the point nearest the roadway to be entered where the operator has a view of approaching traffic thereon. After each stop, the driver of a vehicle or bicycle shall look for any approaching traffic.

§ 2 - Yield to traffic on sidewalks

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

§ 3 - Yield to traffic on roadway or shoulder

The driver of a vehicle or bicycle about to enter or cross a roadway or shoulder from any place other than another roadway or shoulder shall yield the right of way to all traffic approaching on the roadway or shoulder to be entered or crossed.

Figure 4. Model Highway Entry Law.

achieved the speed at which the "look" is taken will be slower than if no stop were required. The behaviors of stopping and looking by either the bicyclist or motor vehicle operator are also considered to be reasonably perceivable and enforceable behaviors.

As the provision is worded the double stop is only required if a sidewalk is present. An entry into a roadway with no sidewalk requires a single stop just before entering the roadway. Thus, when emerging from an off-roadway location the presence of a sidewalk edge or roadway edge takes on the practical significance of a very familiar traffic control device, namely the stop sign, when §2 and §3 of this model law are considered.

This section is patterned after UVC §11-705 with the notable additions of a required look for approaching traffic at each stop, and the highlighting of bicycle from the group of all vehicles.

§ 2--Yield to traffic on sidewalks--As necessary and required by this section a bicyclist or motorist in addition to stopping and looking for any traffic which might be coming on a sidewalk, must yield the right of way to any such traffic before entering the sidewalk.

This section is nearly identical to UVC §11-509 except that bicycle is specifically mentioned in addition to all other vehicles.

§ 3--Yield to traffic on roadway or shoulder--Following the pattern or the prior section this section completes the necessary sequence of cautionary behaviors before a vehicle driver (bicyclist or motorist) may properly enter a roadway from an off-roadway location. Namely, the vehicle driver must yield the right of way to any approaching traffic in the roadway or adjoining shoulder before entering that roadway or shoulder.

This section closely follows UVC §11-404 with the added consideration of traffic on shoulders to be accounted for in yielding the right of way.

C. Implementation

1. Enactment

The Model Highway Entry Law should be codified into a state's traffic laws and its provisions thus be controlling throughout the state. Given the accident background data and the persuasive logical appeal of its provisions as intended accident countermeasures, acceptance and enactment of the model law are not seen to be major problems.

The structure of this law is in a finished form, without optional provisions to select or tailor to the particular jurisdiction. In summary, the model law is eminently ready for enactment.

2. Enforcement

The elements of traffic offenses embodied by this model law are relatively straight-forward and amenable to visual detection by motorized or foot patrol officers. The three principal behavioral elements for establishing

a legal entry into a sidewalk or roadway/shoulder are the stop, a search for any oncoming traffic, and a yield of the right of way, if necessary, to oncoming traffic (pedestrian, bicycle or other vehicles). The stop and yield aspects of the required behaviors are basically easy to visually confirm, given good visual access. Somewhat more problematic, from a strict enforcement standpoint, would be a determination of a "look for any approaching traffic" by a motorist. Tinted glass, windscreen reflections and sunglasses can do much to obscure a view of motorist search activities. Although the enforceability of the motorist component of required search prior to highway entry is adjudged potentially problematic, it does not substantially detract from the value of the provision as an incentive to perform the desired behavior.

3. Public Education

Television spots, radio spots and posters are recommended as the media channels for this model law. The targets for messages obviously are both bicyclists and motorists and the spots should reflect these points of view. The television spots should concentrate on younger bicyclists as media targets (15 years and younger) and the radio spots should focus on reaching motorists at the point of behavior (i.e., in their cars in the traffic environment). Bicyclist point of view posters could be developed and displayed in schools and other youthful gathering areas. A motorist point of view poster could be displayed in motor vehicle department offices as well.

In the bicyclist oriented presentations, "Right Rider" (see Volume II for a description of this animated character which serves as the message proponent) could again be employed to good advantage as an overall campaign symbol.

The message elements to be communicated or depicted in the public education materials are:

- The stop, look and yield behavioral requirements
- The traffic situations (i.e., off-roadway entry points for performing the behaviors

4. Cost Factors

No extraordinary public costs are foreseen during the enactment or enforcement of this model law. No special police equipment or deployment levels are really necessary for normal on-view enforcement of this model law. This law would, however, benefit from the presence of a bicycle safety patrol to enforce provisions of this law applicable to bicyclists.

D. Field Testing Considerations and Risk Benefit Analysis

Within the last ten years, several states have enacted laws patterned after UVC §11-705, UVC §11-509, and UVC §11-404 which are similar to §1, §2 and §3 of this model regulation (the double stop is not, however required). The possibilities for conducting an existing situation form of field test for this model regulation should, therefore, be investigated. Should suitable experimental and comparison jurisdictions be found, then the before and after pre-test/

post-test paradigm with a comparison site discussed in Section III.D. should be implemented. A three-year period of pre-test accident data should be collected to be followed by a minimum of one-year post-test period of data collection. Pre-test and post-test behavioral or compliance data should also be acquired.

The specific data to be collected on a before and after basis are:

- Accident frequency
  - Bicyclists on roadway, shoulders or sidewalks being struck by drivers emerging from off-roadway entry points
  - Pedestrians, bicyclists or other vehicles on roadways, shoulders or sidewalks being struck by or striking bicyclists emerging from off-roadway entry points
- Behavior

  Stop, search and yielding of right of way (if required) for bicyclists and motorists entering sidewalks and roadways/ shoulders from off-roadway locations
- Public awareness and understanding of the provisions of the model law

If an actual implementation form of field test were deemed appropriate, the public education materials should be produced in sufficient numbers to be available for distribution and transmission immediately prior to the program or after period for the enacted model law.

VI. MODEL MINIMUM AGE LAW FOR BICYCLISTS

A. Background of the Accident Problem

Examining the accident data of Cross and Fisher (1977), an undesirable conclusion regarding the bicyclist must be drawn. The conclusion is that the younger bicyclist (6-15 years of age) is overrepresented in both the fatal and non-fatal accident populations. The data of interest are:*

Bicyclist Age	Fatal Accidents	Non-Fatal Accidents
6 years	4.2%	2.0%
6-11	20.6%	27.5%
12-15	23.1%	37.1%
16-19	16.9%	13.9%
20-29	13.4%	12.2%
30-44	8.5%	3.8%
45-59	5.4%	1.8%
$\geq$ 60	7.9%	1.7%

Moreover, there is a cluster of accident types principally involving the younger bicyclist which account for 23.5% of the fatal accident sample and 26.9% of the non-fatal accident sample. These accident types are:

- Type 1 Bicycle Rideout: Residential Driveway/Alley, Pre-Crash Path Perpendicular to Roadway
- Type 2 Bicycle Rideout: Commercial Driveway/Alley, Pre-Crash Path Perpendicular to Roadway
- Type 3 Bicycle Rideout: Driveway/Alley Apron, Pre-Crash Path Parallel to Roadway
- Type 4 Bicycle Rideout: Entry Over Shoulder/Curb
- Type 5 Bicycle Rideout: Intersection Controlled by Sign
- Type 25 Vehicles Collide at Uncontrolled Intersection: Orthogonal Paths

Evaluations of the bicycle accident data reveal that young bicyclists are overmatched by the task of riding where motor vehicles may be encountered. Young bicyclists are involved in bicycle/motor vehicle accidents out of proportion to their numbers in the traffic environment. The accidents are almost always precipitated by gross errors. Frequently young bicyclists are

*Reprinted from Cross and Fisher (1977), Table 4 (p. 83) omitting the data on rates of bicycle use.

struck when they enter the right of way of a motorist suddenly, usually without adequate search and often with an abrupt turn or swerve which does not allow the motorist adequate evasion time.

B. The Model Regulation

1. Approach and Overview

The approach to this model law reflects a view of young bicyclists which stresses maturational and experiential factors in their development into skilled, capable cyclists. The approach taken considers two premises: 1) that very young children do not possess the capabilities to learn to ride safety in traffic, and 2) that slightly older children need to learn the psychomotor, perceptual and judgmental skills necessary for safe riding. These conclusions are consistent with those reached by experts in child pedestrian safety who feel that very young children are incapable of safely being independent pedestrians in traffic situations (Coote, 1976; Sandels, 1973; Schioldborg, 1978).

The general approach followed here, then, seeks to keep very young bicyclists (6 years old and younger) out of traffic completely and to provide for training bicyclists in the appropriate skills as they become old enough to learn and to cope with traffic. Based on analyses of accident data and on child development research, most children at or below the age of 8 seem incapable of riding safely alone in traffic; the regulatory provisions recommended seek to exclude them from traffic. Children aged 9 or older seem capable of riding safely in traffic with training, and the major educational countermeasure proposed (see Volume I) is aimed at teaching such children to cope with traffic successfully.

Bicyclists 12 years and older, seem capable of riding in traffic with low accident rates provided they have had the course of instruction recommended in Volume I. The errors which lead to their accidents are often course errors. Children often are in unusual traffic positions in which others do not expect them or which allow too little freedom for accident avoidance. Judgmental errors are frequently committed such as failing to anticipate dangerous vehicle movements. Many of these errors violate existing laws, while others might be avoided if bicyclists were aware of the potential danger. To some extent, also, driver ignorance and correctable environmental hazards contribute to these accidents.

2. Provisions of the Model Regulation

Figure 5. contains the provisions of the Model Minimum Age Law for Bicyclists.

3. Annotation of the Model Regulation Provisions

§ 1--Persons under nine years of age--Within the opening statements of this section, the parent or guardian of any child under nine years old is unequivocally designated as the responsible party for ensuring that his or her child or children comply with the provisions of this model law. Designating parents or guardians as an influential authority over the bicycling behavior of their respective children has precedence in UVC §11-1201 describing the effect of regulations concerning operation of bicycles and other human powered vehicles. As juvenile bicyclists, those under the age of 16 generally may not be held

MODEL MINIMUM AGE LAW

FOR BICYCLISTS

§ 1 - Persons under nine years of age

A parent or guardian having custody of a child under nine years of age shall exercise such supervision over that child and over any bicycles or tricycles owned or used by members of the family as necessary to assure that:

(a) A child under seven years of age shall not use a bicycle or tricycle upon any roadway, shoulder, sidewalk, parking area, private road or driveway, unless the child is under the continuous and immediate supervision of a person at least (18) years of age;

(b) A child who is seven or eight years of age shall not use a bicycle or tricycle upon any roadway or shoulder unless he or she is under the continuous and immediate supervision of a person at least (18) years of age.

Failure on the part of a parent or guardian to exercise such supervision shall constitute a misdemeanor.

§ 2 - Persons nine or more years of age

A person who is nine, ten or eleven years of age shall not drive a bicycle on a roadway or shoulder unless he or she:

(a) Is under the continuous and immediate supervision of a person at least (18) years of age; or

(b) Has successfully completed a course approved by the (appropriate state or local agency).

Figure 5. Model Minimum Age Law for Bicyclists.

legally responsible for their behavior. The logical substitutes for this legal responsibility must be the associated parents or guardians.

a) A child under seven years of age is conditionally prohibited from using (riding, driving, parking, etc.) a bicycle or tricycle (including the molded plastic toy tricycles called "big wheels" or "hot wheels") anywhere they may operate near traffic. These forbidden areas include the roadway (generally the domain of the motor vehicle), shoulder (shared by bicyclists, pedestrians, and motor vehicles), sidewalk (where pedestrians and some bicyclists may travel, but a convenient launching area for the young, unskilled bicyclist into the street), and private roads or driveways (another favorite launching place for bicyclists to ride out into the street). Operation of a bicycle or tricycle in a fenced-in yard, playground or similar sanctuary, where sudden entry into the street by a bicyclist is not really possible, is not prohibited. The only condition which could allow a bicyclist or tricyclist to operate in the explicitly forbidden area is while under the supervision of a person at least 18 years of age. While the minimum age of 18 is recommended for the supervisor, the parentheses indicate that a jurisdiction may have grounds for substitution of another minimum age. The essential degree of supervision required to ensure the safety of a less than seven year old bicyclist operating in the aforementioned areas is difficult to succintly define within the body of a traffic regulation. Thus the objectives of "continuous" and "immediate" have been chosen to denote the scope and degree of supervision required. Operationally, the minimum level of supervision would be such that the supervisor has nearly complete control over bicyclist/tricyclist movements such that a life-threatening maneuver by the child can be prevented or circumvented. This type of control would necessitate, in many cases. the supervisor riding with the fledgling bicyclist on roadways and shoulders. An important part of complying with this operational definition of supervision would be prudent selection by the supervisor of areas in which the child will be allowed to operate. Certainly a busy or high speed roadway, or shoulder adjacent to such a facility, would be a highly inappropriate location on which to supervise the activity of any bicyclist. However, a roadway/shoulder area of a quiet housing development may, in fact, be a relatively safe and highly appropriate area in which to start to develop some very basic traffic-coping skills of the very young bicyclist.

Review of the relevant literature confirms that children six years old or younger should not ride a bicycle in or near a street/highway unless under the direct supervision of an adult. Colburne (1971) contends that pre-school children's perceptual processes are not sufficiently developed to permit them to judge the speed of approaching vehicles, which would deleteriously affect street entries and crossings. Sandels (1970) found that children up to nine years of age were not reliable at distinguishing left from right, and that children up to ten years of age found difficulty in understanding traffic terms and the meaning of road signs. Sandels (1970) concludes that children do not have the ability to effectively cope with traffic until about 12 years of age. Shioldberg (1978) notes that pre-school children's conceptual understanding, spatial orientation and auditory localization are limited and they they should not be left alone in traffic. Clearly bicyclists under nine years of age are at substantial risk operating in or near areas where motor vehicles may operate, unless properly supervised.

b) The effect of this subsection is to remove some of the aforementioned prohibitions for the seven and eight year old bicyclist. The seven and eight year old bicyclist still may not operate on a roadway or shoulder without the required supervision. However, independent operation in previously forbidden locations such as sidewalks, parking areas, private roads or driveways is permitted. This reflects a philosophy of staged development and the assertion that limited independent bicycling in the above areas is the next stage in developing the essential battery of skills for totally independent bicycle riding.

The concluding text for §1 denotes failure on the part of a parent or supervisor to exercise the required supervision as a misdemeanor, thus, closing the necessary loop or accountability placed upon the parent or guardian by this model law and establishing the seriousness of the offense.

§ 2--Persons nine or more years or age--This provision precludes a nine, ten or eleven year old bicyclist from driving a bicycle on a roadway or shoulder unless that bicyclist has the required supervision or has successfully completed a course approved by the state or local agency to be named by the local jurisdiction.

The supervision requirement for seven and eight year old bicyclists riding on roadways or shoulders still applies to the nine, ten and eleven year old bicyclists unless and only unless the nine, ten or eleven year old bicyclist has completed an approved bicyclist safety course. If the nine, ten or eleven year old bicyclist has successfully completed the approved course, he or she may operate independently upon the highway or street (roadway plus shoulder). Implicit in this section is that the independent bicycle-riding privilege is automatically extended to the bicyclist who is 12 years of age or older and that children who complete an approved course will receive a "license" or other portable indication of their right to drive a bicycle.

The course of instruction highly recommended as the course to be approved by the appropriate state or local agency in §2(b) is, in fact, the one in Volume I of this report and entitled "A Course in Bicycle Driver Education." The course is recommended for introduction to the fourth grade level student or the nine year old. This is viewed to be an age level where the behavior modificational impact of this course can be significant and in sufficient time to thwart the otherwise heavy accident involvement of the 11-13 year old age bracket of the bicyclist later on.

Setting the cutoff age of 12 years or older for restrictions on bicyclist operations has, as mentioned previously, support from the developmental studies of child traffic behavior. Namely that the functional capabilities and proper motivation necessary for effective accident avoidance behavior are likely to be present in a 12 year old bicyclist through sheer experience acquired up to this point--regardless of whatever supervision or education is received. In other words, sufficient skills are presumed to be present by virtue of the fact that the individual has survived to this point. More importantly, within the context of this model law, the 12 year old bicyclist will have had sufficient supervision and/or instruction to be a competent bicyclist by the age of 12, having progressed through the stipulated stages of qualification.

There is precedent for the 12 year old cut-off in existing regulations, as well. For example, an ordinance of the City of Indianapolis makes it unlawful for a parent or legal guardian or custodian of any child under 12 years of age to allow that child "...to ride a bicycle on any public street in the city, in the roadway portion thereof, while open and used by vehicular traffic, except where and when designated by the city as a play street." Similarly, Warren, Michigan requires that "no child, until he or she has attained his or her 11th birthday, shall ride a bicycle in the streets of the city." Germany requires that a bicyclist be at least 12 years old for unsupervised bicycle riding.*

Generally speaking, the person of 12 years of age is adolescent and almost a teenager. The psychosocial reality is that it would be unrealistic and likely impractical to continue restrictions on bicycling behavior at and beyond this age.

C. Implementation

1. Enactment

In its present form, the Model Minimum Age Law for Bicyclists is amenable to immediate enactment and recommended for doing so at the state level. Fact sheets for legislators, prepared from this discussion and augmented by any pertinent local accident data are recommended to facilitate this process.

Given an articulate program of support and encouragement for legislative enactment that end should be realized without much difficulty. Thematic to the program of support for legislation enactment should be these points, as a minimum:

- A bicycle is a vehicle, not a toy, requiring a driver with proper knowledge, skills and attitudes to operate it safety on or near highways and streets.
- Acknowledging that the acquisition of the necessary vehicle control behaviors in human beings is age-linked (as is done with regard to a minimum age to obtain a motor vehicle operator's license or to purchase alcoholic beverages) then minimum ages to operate a bicycle in traffic contexts of various hazard levels with varying degrees of supervision is reasonable, as well as stipulating an approved course of instruction to properly qualify bicyclists.
- Developing a means to identify young bicyclists by age to aid enforcement.

2. Enforcement

If the model law were to be passed, strict enforcement would, in fact be problematic. Determination of youthful ages less than 7 years, 7 or

*Indianapolis §29-404; Warren §5-114; Germany paragraph 65.

8 years, 9, 10 or 11 years, 12 years or older visually can be a difficult though not impossible task. The under 7 year old category of age estimation, the 9 to 11 year old, and the 12 year old and older estimation may be sufficiently accurate to enable reasonably effective "enforcement" of this regulation.

However, the maximum impact of the regulation cannot realistically depend to a great degree on enforcement or it would be ill fated for enactment and unpopular for compliance. Acceptance of the intent of the regulation by the parents and guardian and their voluntary actions to insure compliance with its provisions will be key to its successful performance.

Any heightened or special enforcement of the provisions of this model law by police or bicycle patrols is not recommended as these activities could be construed as intrusion and harassment by the public.

3. Public Education

The effectiveness of this support to the model law is absolutely essential. The acquaintance of parents and guardians with the requirements of the model law is crucial as well as the reasons for the restrictions. The key requirement for definition will be "continuous" and "immediate" supervision. The notion of supervision sufficient to prevent a left-threatening action and the likelihood of parents having to ride with their children should be brought forward. The packaging of the "requirements and rationale" of the law could be through posters, pamphlets, hang tags, etc. at all points of purchase (bike shops, sporting goods stores). Public announcements backed by posters and pamphlets could be made at PTA meetings, and other civic events, and distributed through public buildings and motor vehicle department offices. A 30 second TV spot for parents and guardians could be quite effective in underscoring the existence and importance of the written materials describing the new law. A 10 second radio spot could do likewise.

Finally, simple message statements could be disseminated to K-4 grades reinforcing the notion of required parental or guardian supervision until the bicycle driver education course is taken and passed. The same message could be given to school administrators so they do not condone unsupervised riding in critical age ranges and to promote the availability of good training programs.

4. Cost Factors

No extraordinary local costs are anticipated for the enactment and enforcement of the model law, assuming the costs for the development, production and dissemination of the public education materials are borne elsewhere (e.g., bicycle manufacturers, Federal government).

D. Field Testing Considerations and Risk Benefit Analysis

This model law is not recommended for field testing as a single entity in isolation. In fact, this model law is a desirable setting to allow certain beneficial treatments (supervision, education and training) to be applied to the youthful bicycling population at certain key stages of human development; and, in the absence of those beneficial treatments, to preclude exposure of

the very young and vulnerable bicyclists to the hazardous situations (roadways, shoulders, etc.) with which they do not cope well. Therefore, this model law should be a companion to all other model regulations presented in this volume. Most naturally, it should be coupled with the field test or assessment of the Bicyclist Driver Education Training Program described in Volume I.

Given the longitudinal nature (span of years) of the structure of this law, an isolated field test of the impact of this law may be tenuous and its specific effects hard to delimit without considering its interaction with the treatments involved (supervision and education). Moreover, compliance behavior measures would be difficult to specify and obtain. The variation in exercise of effective supervision could be considerable and difficult to monitor covertly. A test of its legal impact in removing the 11 year old and younger bicyclist from hazard exposure is a possible pure test not involving other treatments and laws. The cost benefit of such a partial test is not viewed as very high.

Thus, a field test of this law, per se, is not recommended. Rather, this law should be coupled with field tests of other model bicyclist regulations in this volume as well as with the training and message packages. In essence, this model regulation is viewed as having its greatest impact as a supportive vehicle for other countermeasures. However, it must also be noted that compliance level is the only real experimental issue with respect to this law. Given that children in the critical age ranges do not ride unsupervised, the law will almost certainly be effective. To the extent it eliminates riding by young children altogether, accidents will decrease. Also, there is no tenable hypothesis which makes supervised riding more likely to result in a crash than unsupervised bicycle driving. Hence, a key focus of any immediate testing should be the determination of parental and child compliance and the development of educational materials for their maximization. In the interim, the extremely low likelihood of counterproductivity and the strong intuitive evidence for the efficacy of this approach suggest immediate promotion of widespread adoption of this law.

VII. MODEL DRIVEWAY PARKING ORDINANCE

A. Background of the Accident Problem

Residential driveways are frequently used as play areas by young children. Where these are paved driveways, the surface is ideal for youngsters to operate bicycles, tricycles and other play vehicles. Parents probably feel that the driveway is a safe area, by and large, for child play activities. The number of accidents involving backing vehicles in a residential driveway striking a child pedestrian and accidents involving child bicyclists or tricycles entering roadways from driveways being struck by motor vehicles are strong refutation to this view by parents. In the latter case, young bicyclists ride out of driveways into streets without adequate search and are struck by motorists proceeding normally.

The accident types involving a child bicyclist launching from a residential driveway into the roadway which were identified by Cross and Fisher (1977) were:

Type 1 - Bicycle Rideout: Residential Driveway/Alley Pre-Crash Path Perpendicular to Roadway

Type 3 - Bicycle Rideout: Driveway/Alley Apron Pre-Crash Path Parallel to Roadway

Collectively these two accident types account for 8.2% of the non-fatal accident sample and 9.1% of the fatal accident sample.

While the education of parents on the hazards of unsupervised child bicycling activities in residential driveways is necessary, an aid to parental supervision and control would be advantageous.

B. The Model Regulation

1. Approach and Overview

The objective of this model ordinance is to provide the legal authorization for residents to park a vehicle across the entrance to their own driveway. Such an act currently is typically illegal. The parked car could serve as a temporary barricade and obstruction to a sudden entry into the street by a child bicyclist. Thus, the opportunity for young bicyclists to use residential driveways as launching ramps into roadways should be thwarted to a considerable degree. It will be important that only sanctioned individuals be allowed to park in front of their own driveways to avoid creating a public nuisance. A permit displayed on the vehicle is a possible way of indicating this authorization to parking enforcement personnel.

2. Provisions of the Model Regulation

Figure 6. contains the provisions of the Model Driveway Parking Ordinance.

MODEL DRIVEWAY PARKING ORDINANCE

§ 1 - Parking across driveways permitted

Notwithstanding the provisions of _____ (insert citation to state law or local ordinance comparable to UVC § 11-1003 (a) (2) (a) (1968)), a person may park a vehicle in front of a driveway serving a single occupancy dwelling unit (as a means of discouraging bicyclists from riding down the driveway into the street) if that person displays identification meeting the requirements specified under § 2.*

§ 2 - Identification requirements

The (appropriate police agency) shall specify a format for an identification placard to be placed in plain view on any vehicle which is parked in front of a driveway in accordance with § 1. At a minimum, this identification placard shall include the address at which parking across a driveway is permitted and shall bear the signature and telephone number of the owner or current occupant of the dwelling unit served by the driveway.

§ 3 - When parking across driveways prohibited

A person shall not park a vehicle in front of a driveway without displaying the identification placard for that location nor in violation of other prohibitions, restrictions and limitations on stopping, standing or parking vehicles.

**This section forbids standing or parking a vehicle "in front of a public or private driveway."*

Figure 6. Model Driveway Parking Ordinance.

3. Annotation of the Model Regulation

§ 1--Parking across driveways permitted--Permission is formally granted the single occupancy dwelling resident to park a vehicle in front of that dwelling's driveway. Acknowledgement is made parenthetically to the likely existence of a provision in the state vehicle and traffic code comparable to UVC §11-003(a)2.a. forbidding parking across a public or private driveway. Section 1 of this model ordinance acknowledges that the municipal jurisdiction may be in conflict with a state statute concerning parking across driveways. However, to prevent a precipitous rejection of the concept of across-driveway parking, the rationale for the action is described in the body of this section succintly in parentheses. The requirement that any vehicle parking across a residential driveway must display the proper identification is also provided in this section.

Thus §1 empowers but does not require a single occupancy dwelling resident/owner to park his or her vehicle in front of the dwelling's driveway. This provision is restricted to single family dwellings to preclude the possible inconveniences thrust upon occupants of multiple family dwellings should a resident park a vehicle across the driveway entrance to the dwelling.

While no time of day is stated for the effectiveness of the parking empowerment, a jurisdiction may wish to restrict the privilege to the daytime hours when children are at play.

§ 2--Identification requirements--A procedure is suggested for authenticating that any vehicle parked across a driveway entrance is in fact duly authorized to do so. A placard is described generally for posting in or on the vehicle. Content items (i.e., address, resident signature/name and telephone number) are recommended for inclusion on the placard. The assumption is that the resident wishing to exercise this parking privilege would fashion his or her own parking placard meeting the design specifications. Alternatively, one might be directed to the appropriate jurisdictional parking authority to apply for the parking placard. Presentation of operator's license and vehicle registration would be a likely prerequisite. In addition, verification of the single occupancy status of the dwelling in question might have to be carried out by the police agency. The required payment of a fee to cover administrative costs associated with the issuance of the placard is a matter for the jurisdiction to consider. It would be an advantage to have little or no administrative or fee burden for applicants. Hence, the self-made placard approach is preferred as it provides the information needed for enforcement with a minimum of effort on the part of the citizen.

§ 3--When parking across driveways prohibited--This concluding section reaffirms that parking across residential driveways may only be done if the proper placard, described above, is displayed.

C. Implementation

1. Enactment

Due to the unusual nature of this regulation, its greatest chance for enactment and proving itself as a municipal ordinance, particularly in a city where residential driveway bicyclist accidents are a demonstrable problem. The voluntary aspect of this ordinance should be stressed to city legislators, namely, that empowerment is being given to certain residents to park their cars in such

a manner as to enhance the safety of their children at play in driveways (particularly when using bicycles/tricycles). To maximize the attraction for enactment, the jurisdiction may wish to include a "sunset clause." Such a clause would stipulate a limited period of effectiveness for the ordinance (at least one year), wherein its effectiveness in terms of associated accident reduction could be studied and reported to the city council or board of aldermen. Unless the sunset clause were stricken before the stipulated date the ordinance would be automatically repealed.

To maximize the enactability of the ordinance, the proponents of this ordinance should have the administrative details of the placard system (issuance, posting) discussed in §2 satisfactorily specified to meet local requirements.

2. Enforcement

Enforcement of the ordinance should be relatively straight-forward. Convenient visual inspection of any vehicle parked across a residential driveway should indicate its legality or illegality.

Initial selective enforcement of this ordinance in high density residential areas is a recommended consideration to publicize the existence of this ordinance and assure the public that proper enforcement will discourage abuse of the new parking privilege. Residents will also likely call in complaints to the police if strangers park across their driveway.

3. Public Education

The chances for the success or failure of this ordinance rest with the effectiveness of the supporting public education program. The program must not only inform the public of the existence of the model ordinance and the reason for its existence, but it must encourage the public to utilize the parking privilege being extended.

A description for parents and guardians of the accident problem involved and this dramatic change in parking regulations could require a major, multi-directed media package. Television spots (30 and 60 second) might be the prime channel followed by radio spots (10, 15, 30 and 60 second) to reach the driving public. Newspaper ads and posters displayed in public facilities and motor vehicle department offices should also be considered as a less expensive prime medium. It is also recommended that a pamphlet may also be used as a give-away in public buildings and supermarkets. All printed materials should include a blank placard to indicate the recommended form and promote a degree of uniformity.

As to the creative approach for the materials, a visual emphasis should be employed. Message elements should be the following:

- When properly identified a vehicle may be parked across one's driveway to prevent children from riding their bicycles or tricycles into the roadway.
- Parking a car across a driveway isn't necessarily illegal anymore.
- Children can be shown (or described) riding down a residential driveway with their passage to the roadway blocked by the properly identified parked vehicle (highlighted).

4. Cost Factors

The media program development and distribution costs could be a serious consideration in the appeal of the legislation, if they were to be borne by the local jurisdiction.

Other costs to consider are those associated with any administration of the placard identification system. The charging of fees would offset governmental costs, but lower the attractiveness of the new parking privilege to those who might wish to use it.

D. Field Testing Considerations and Risk Benefit Analysis

The only practical form of field testing for this ordinance would be an actual implementation via the standard pre-test/post-test experimental site with a comparison site paradigm. If properly conceived and effectively implemented this ordinance should yield a significant reduction of Type 1 and Type 3 accidents.

Knowledge and behavioral measures will be important for the field assessment. The public's knowledge and acceptance of the "value" of the law will be valuable information to obtain. It will be essential background information to interpret the two major forms of behavioral data which should be collected:

- Estimated frequency of individuals parking in front of their driveways at particular times of day and duration as related to times when children uses their bicycles.
- The level of compliance for those individuals exercising the privilege with the placard identification requirements.

The field test for the ordinance should be attuned to answer several operational questions before the ordinance might properly be recommended for widespread implementation. Considerations such as the following should be accounted for in this field test design:

- What are the energy implications of additional car starts and movements?
- What is the impact on overall public safety and convenience?
  - effects on household deliveries and pick-ups
  - access of emergency services (fire, medical, police)
  - possible increase of pedestrian dart-outs with increased on-street parking
  - unwitting blockage of close-by neighbor's driveway entrance
- Will bicyclists still be able to squeeze by or enter the roadway over the curb, using the parked car as a screen?
- Do any attendant cost burdens significantly diminish the public's desire to use the new parking privilege?

VIII. MODEL LAW TO REMOVE VISUAL OBSTRUCTIONS

A. Background of the Accident Problem

Close review of the data of Cross and Fisher (1977) reveals that certain intersections, curves, driveway/alley junctions and other highway sites appear to have been made unnecessarily dangerous by the presence of vegetation, walls, fences or other obstructions to the view which approaching drivers may have of one another. The obstructed lines of sight in such locations can unnecessarily congest traffic if such sites have heavy traffic flows and, more importantly, contribute to reduced "preview time" necessary for stopping, yielding or swerving to avoid collisions. Accident types which are influenced to varying degrees by this obstructed vision factor are:

Type 1 - Bicycle Rideout: Residential Driveway/Alley, Pre-Crash Path Perpendicular to Roadway

Type 2 - Bicycle Rideout: Commercial Driveway/Alley, Pre-Crash Path Perpendicular to Roadway

Type 3 - Bicycle Rideout: Driveway/Alley Apron, Pre-Crash Path Parallel to Roadway

Type 4 - Bicycle Rideout: Entry over Shoulder/Curb

Type 5 - Bicycle Rideout: Intersection Controlled by Sign

Type 8 - Motorist Turn-Merge: Commercial Driveway/Alley

Type 25 - Vehicles Collide at Uncontrolled Intersection: Orthogonal Paths

Type 29 - Parking Lot Other Open Area: Orthogonal Paths

As an aggregate, these accident types account for 22.8% of the non-fatal accidents and 16.3% of the fatal accidents studied by Cross and Fisher (1977).

B. The Model Regulation

1. Approach and Overview

The approach to the development of this model law has been to establish a requirement and mechanism whereby visual obstructions near traffic-way intersections, entrances and curves can be routinely detected and removed where it is reasonably possible to do so.

2. Provisions of the Model Regulation

Figure 7. contains the provisions of the Model Law to Remove Visual Obstructions.

MODEL LAW TO REMOVE VISUAL OBSTRUCTIONS

§ 1 - Duty to remove visual obstructions

(a) It shall be the duty of the owner of real property on which any tree, plant, shrub, or any moveable object unreasonably obstructs the view of any driver, pedestrian or bicyclist proceeding along a highway and thereby constitutes a potential traffic hazard to eliminate such a visual obstruction.

(b) When the (state highway commission) or any local authority determines upon the basis of an engineering and traffic investigation that such a potential traffic hazard exists, it shall notify the owner and order that the hazard be removed within 10 days.

(c) The failure of the owner to remove such traffic hazard within 10 days of the notice required in subsection (b) above, shall constitute an offense punishable by a penalty of _____ dollars and every day said owner shall fail to remove it shall be a separate and distinct offense.

(d) It shall be the duty of the (state highway commission) and the (city traffic engineer) to comply with subsection (a) above as to visual obstructions located on public property.

§ 2 - Inspection for visual obstructions

The (state highway commission, traffic engineer) shall inspect (quarterly, semi-annually, annually) the highways and bicycle paths of this (state, county, city) to identify obstructions which impair a driver's view of the official traffic control devices or pedestrian, bicycle or vehicular traffic.

Figure 7. Model Law to Remove Visual Obstructions.

3. Annotation of the Model Regulation

§ 1--Duty to remove visual obstructions--Subsections a) through c) below closely follow the content of UVC §15-113.

a) A frequent location of visual obstructions for highway traffic is private property. In this regard, this subsection confers the responsibility to the affected real property owner to "eliminate" any obstruction such as vegetation, a parked vehicle, a temporary edifice--whatever item may be located on the private property in question. The verb "eliminate" has been carefully chosen to denote any action up to and including total removal of the object. Actions intermediate to total removal could include "modification" (e.g., trimming back vegetation, lowering the height of a fence) or "relocation" within the bounds of the property so as to remove the hazard. Obviously, the obstruction targeted for elimination must be reasonably eliminatable and such an interpretation is intended for this provision. A portion of some permanent construction (building, stone wall) which has been in place for some number of years would likely represent an unjustifiable hardship for an owner to eliminate.

It should be emphasized that this process of eliminating visual obstructions which can cause potential traffic hazards has a benefit for the reduction of motor vehicle accidents and pedestrian accidents as well as bicycle accidents.

b) Following a survey by the jurisdictional traffic authority (e.g., state highway commissioner, municipal traffic engineer) and determination that a potentially hazardous visual obstruction exists, this subsection requires that the real property owner be given ten days notice in which to eliminate the visual hazard. Implicit in the notification, is that the property owner will be clearly apprised of the nature of the offending object (what it is and how it blocks vision), the recommended course of courses of action to eliminate the visual hazard and the date by which the hazard should be eliminated. While not specified, it is assumed that a real property owner could seek relief to the requirement to eliminate an entity and/or the date by which an entity must be eliminated through a jurisdictional appeals process. The mechanics of the appeals process should be articulated to the property owner in the original notification. The nature of the engineering and traffic survey which identifies the visual obstructions is not specified but assumed to be one employing generally held traffic engineering criteria for stopping sight distances and minimum sight distances for various forms of controlled intersections.

c) The framework for imposing a penalty upon a delinquent property owner is provided in this subsection. The exact level of fine to be imposed for a violation of the requirement to eliminate a visual hazard is not specified. This determination is best left to the enacting jurisdiction.

d) Concommittant to the responsibility of the property owner to eliminate visual obstructions on private property, a requirement has been made for the jurisdictional traffic authorities (both state and municipal) to do likewise in regard to public property. This provision contributes not only to the perception

of balancing responsibilities between the private and public sectors, but will materially contribute to the maximum effectiveness of the model law when implemented.

§ 2--Inspection for visual obstructions--In order to detect visual obstructions in any kind of rigorous manner, periodic inspections of the traffic environment must be made by the cognizant agency. Section 2 of the model law states that the jurisdictional traffic authority (to be identified by enacting jurisdiction) shall make periodic inspections of both highways and bicycle paths to detect any visual obstructions. The frequency of inspection should be as often as possible, being influenced to some extent by climate as it affects the growth of vegetation.

Operationally, the potential view obstructions of concern are mentioned and include the views that traffic units may have of one another (bicycle drivers, pedestrians, motor vehicle drivers) as well as the views that drivers and pedestrians may have of official traffic control devices.

C. Implementation

1. Enactment

Ideally this legislation should be enacted at the state level and be controlling throughout the state. It would also be suitable as a municipal or county ordinance. The model law is intended to supply the statutory authority for conducting periodic visual obstruction surveys, and requiring property owners (private, public) to arrange for the elimination of visual obstructions located on their property. Without provisions such as those of the Model Law to Remove Visual Obstructions, it is likely that not much in the way of visual obstruction detection and elimination would occur except on a critical incident basis. Without this model law, the elimination of visual obstruction before they become major traffic problems is not considered very likely.

Opposition from the property owners is not unlikely. Some will view the regulation as yet another potential form of public harassment and an unnecessary cost burden. An accounting and presentation of jurisdictional traffic accidents involving obstructed vision attributable to offending objects on private property would assist in characterizing the importance of the problem.

Despite public opposition, this measure should have inherent appeal to traffic oriented legislators, particularly when it is underscored that the model law may reduce all forms of traffic accidents involving motor vehicles, bicycles and pedestrians where desirable sight distances may have been reduced by obstructions.

2. Enforcement

Enforcement of this regulation is not difficult. Once the notice for corrective action has been delivered to the property owner and its requirements accepted, the ten day performance period is easily monitored with a follow-up visit to the site in question by the traffic authority personnel or police (depending on the judgments required, if any, to determine compliance). Compliance or noncompliance can likely be visually verified.

3. Public Education

As real property owners are the principal targets of public education messages for this model law, it is possible to provide relatively economical, "pin point" information transfer. A highly efficient media channel would be a direct mailing. Notification of the existence of this model law and it's provisions could be included with tax bills or property assessment statements. Local real estate sales offices could also serve as distribution points for pamphlets conveying the messages to property buyers.

The information to be communicated in these printed materials is basically as follows:

- The variety of items on private property which can be traffic related visual obstructions.
- Desirability of the property owner to voluntarily eliminate such items and the ways in which it can be done.
- The compliance requirements once the notice to eliminate a visual hazard is received; the associated appeals process.
- Fines and other penalties for non-compliance.

4. Cost Factors

There are costs to be borne in both the private and public sector associated with the implementation of this model law. The property owner costs have already been mentioned and can range from insignificant trimming of tree branches or cutting of weeds to modification of a fence or wall or removal of a small building.

Within the public sector, the jurisdictional traffic authority will incur labor costs to conduct the periodic inspections of the traffic environment, issue notices for obstruction elimination, and follow-up inspections to determine compliances with notices. It is also likely that the traffic authority would be the likely agency to oversee the initial round of any appeals process initiated by a notified property owner.

D. Field Testing Considerations and Risk Benefit Analysis

This model law is not recommended for isolated field testing against bicycle accidents. This is a general purpose regulation which should have a beneficial effect on all forms of traffic accidents where roadside objects obstruct the view that traffic units may have of one another. In addition, it would necessarily be difficult to predict the opportunities the law would have to render an impact in accident reduction. In fact if the law were effectively publicized during the early phases of enactment, voluntary removal of many hazards could occur obviating the invoking of the detection and enforcement provisions of the model law. The degree of hazard induced by various visual obstructions would also be difficult to assess. The availability of a pre-test incidence of visual obstructions would also be a difficult item on which to select a jurisdiction for a field assessment.

Should a large number of notices to eliminate detected visual obstructions in a field test site be contested through the appeals process, the timely measurement of any positive effect from this model law could be compromised. Moreover, the impact of this regulation is diffuse (many accident types) and moot insofar as a case can be made for the degree of contribution to a collision reduced sight distance can have at an intersection or highway entry point. In other words, there are not unique bicycle or pedestrian accident types to which this regulation is addressed. This by no means argues against its value or need for implementation. Quite to the contrary. However, instead of being individually implemented and assessed, this model law should be part of an aggregate of model regulations to be implemented and tested as a group--such as was recommended for the Model Minimum Age Law for Bicyclists. It's positive effect likely will be diffuse, crossing all traffic accidents and somewhat longitudinal in its occurrence.

There are no serious risks foreseen in the implementation of this model law. The intrinsic wisdom of its intent is unquestionable. The chance that improved sight distances achieved at formerly obstructed intersections and road entry points will encourage higher approach speeds and less caution is not seen as very likely. Compliance measurements as a test of compliance with this regulation are possible and could be undertaken through random samples of locations within the test jurisdiction.

IX. MODEL REGULATION TO PROHIBIT RIDING BICYCLES ON SIDEWALKS

A. Background of the Accident Problem

Bicycle accident Type 8--Motorist Turn-Merge: Commercial Driveway/ Alley accounted for 5.3% of the non-fatal accidents studied in the accident sample of Cross and Fisher (1977). The motorist emerging from the commercial driveway or alley, typically struck bicyclists moving in either direction on the immediate sidewalk or edge of the street. In every case of this type, Cross and Fisher (1977) found that the motorist searched "normally" but failed to observe the bicyclist largely due to the failure to expect a bicyclist (with a much higher approach speed than a pedestrian) to be a collision threat on a sidewalk. In many cases the views which bicyclists and motorists could have of one another and preview time were critically limited. In summary, the data show that bicycle operation in areas where there are concentrations of commercial driveways and alleys is extremely hazardous. Sight distances are often poor. High density roadway traffic and pedestrian activity compound the existing motorist's search task to an excessive degree. Bicyclists on sidewalks in these areas are particularly at high risk because of their proximity to the emerging motorist coping with reduced sight distances.

B. The Model Regulation

1. Approach and Overview

The intent of this regulation is to empower the jurisdictional traffic authority to identify areas where bicycle riding on sidewalks is particularly hazardous. Consequently, the traffic authority must have the power to exclude bicycle traffic on sidewalks in these dangerous areas. Complementing the Model Law for Bicyclist Position on the Highway, which acknowledged the rights and responsibilities of bicyclists riding on sidewalks, this model regulation will provide for the withdrawal of the sidewalk riding provilege where the accident risks for bicyclists are unacceptably high.

2. Provisions of the Model Regulation

Figure 8. contains the provisions of the Model Regulation to Prohibit Riding Bicycles on Sidewalks.

3. Annotation of the Model Regulation Provisions

§ 1--Authority to prohibit bicycle riding on sidewalks--Subsection a) empowers either a city traffic engineer or state traffic commissioner, whichever is appropriate, to prohibit bicycle riding on sidewalks. Explictly such a decision must follow from the appropriate "engineering and traffic investigation" which determined that such riding was unsafe. The investigation should consider that the degree of hazard is important to warranting the restriction. Blanket exclusion of bicycles from the sidewalks of some cities unduly penalizes bicyclists from operating in an usually safer environment than the street itself. Type 8 accident occurrence should be a prime indicator of the need for excluding bicyclists from sidewalks. While the principal intent of this provision is to make possible an identification of sidewalk areas which are hazardous for bicyclists,

MODEL REGULATION TO PROHIBIT RIDING BICYCLES ON SIDEWALKS

§ 1 - Authority to prohibit bicycle riding on sidewalks

(a) The (traffic engineer, traffic commissioner) may prohibit riding bicycles on any sidewalk when an engineering and traffic investigation determines such riding would be unsafe.

(b) Any prohibition against riding a bicycle on a sidewalk adopted under this section shall be effective only when indicated by official traffic control devices.

§ 2 - Bicyclist to comply with signs

A person driving a bicycle shall obey the instructions of any official traffic control device authorized by § 1.

Figure 8. Model Regulation to Prohibit Riding Bicycles on Sidewalks.

because of motor vehicle operations, the effect of this provision would also permit the exclusion of bicyclists from sidewalks where their presence would unduly endanger pedestrians as well.

The power granted the jurisdictional traffic authority to exclude bicycle riding from certain hazardous sidewalk locations dispels any uncertainty with regard to whether the traffic engineer's/commissioner's regulatory authority extends to the sidewalk environment.

Subsection b) necessarily requires that the locations where bicyclists are forbidden to ride on sidewalks be so indicated with appropriate official traffic control devices. Although pavement markings could convey the appropriate message, it is recommended that signs such as those recommended in the Manual on Uniform Traffic Control Devices for Streets and Highways (1978, pp. 20-21) be considered for use by the enacting jurisdiction.

The posting of restrictions is essential to obtaining the desired level of compliance. As these restrictions are likely to vary within a jurisdiction according to the degree and location of assessed hazard, fairness demands that bicyclists be apprised of the restrictions where and when they apply. Since these restricted areas are likely to occur in business districts with defined blocks, it is recommended that the appropriate regulatory sign be placed at each end of an affected block.

This subsection substantially follows UVC §11-1209(b).

§ 2--Bicyclists to comply with signs--As a measure of compliance insurance, bicyclists are explictly required to comply with the traffic control devices prohibiting their movements on sidewalks. This further reinforces the legitimacy of prohibiting bicycling on certain sidewalks (and the traffic authority's prerogative to do so) and the validity of using an "official traffic control device" (normally employed on highways or streets) on a sidewalk.

C. Implementation

1. Enactment

Though this regulation could be enacted and applied at the state level, it is recommended that it be promulgated as a model traffic ordinance. The primary targets for this legislation will be commercial districts of cities.

In general, this regulation should encounter little opposition. Some bicyclists may express concerns that the regulation will unduly restrict sidewalk bicycle riding. However, the serious bicyclists, who would be inclined to comment publicly, would probably prefer to operate on or at the side of the roadway in these areas.

2. Enforcement

Assuming a uniform implementation of the signing requirements for this regulation, police enforcement should present no problems or added burdens. Visual identification of the infraction (location and time of day, if a factor) should be readily accomplished.

3. Public Education

No elaborate primary public education should be required to facilitate compliance with this ordinance as the traffic control devices themselves should largely mediate the public's needs for information (i.e., that a prohibition exists--where and when it exists). Modest reinforcement for the prohibition could appear as press releases to local newspapers and broadcast media informing them of the prohibitions and showing the signs. Announcements in the school system would also serve the public interest.

4. Cost Factors

There will be costs associated with the installation of traffic control devices. About $100 per sign could be involved with posting restrictions if metal signs on posts are utilized. Painted signs on the sidewalk would be less expensive initially but would have to be refurbished more frequently.

D. Field Testing Considerations and Risk Benefit Analysis

An actual implementation form of field test is recommended for this regulation. Incidence accounting of the Type 8 bicycle accident before and after the enactment of the regulation would be required along with before and after behavioral data. Riding in the hazardous locations before the regulation would be compared to riding in the hazardous areas (now posted as such) after the regulation went into effect. This latter behavioral measure would in effect be a compliance measure. Police enforcement via written citations would be additional background data to gauge the level of enforcement in effect during the program period.

As a single, easily definable accident type (Type 8), is associated with the regulatory countermeasure, the implementation and field test could be expeditiously accomplished in a municipal jurisdiction.

No discernible public risk is foreseen as a consequence of enacting this model regulation.

X. MODEL BICYCLE SAFETY PATROL AND VIOLATOR DISPOSITION ORDINANCE

A. Background of the Accident Problem

Many bicycle accidents studied by Cross and Fisher (1977) involve clear violations of existing traffic laws which apply to bicycles. Typical violations include failure to obey traffic control devices (signal lights, stop signs, yield signs, etc.), riding on the left facing traffic, failing to signal prior to executing a turn and failure to yield when entering the roadway. Bicycles are human powered vehicles. Like other vehicles such as motor vehicles and animal powered vehicles, bicycles are subject to all the rules of the road with few exceptions. When bicyclists operate in traffic and fail to comply with applicable rules of the road, they significantly increase their risk of collision. Moreover, when bicyclists obviously ignore their duties in traffic, they run the risk that other vehicles will not respect the bicyclist's rights as a legitimate highway user.

Accident types where traffic law violation is a thematic component of the precipitating behaviors include:

Type 2 - Bicycle Rideout: Commercial Driveway/Alley, Pre-Crash Path Perpendicular to Roadway

Type 5 - Bicycle Rideout: Intersection Controlled by Sign

Type 6 - Bicycle Rideout: Intersection Controlled by Signal, Signal Phase Change

Type 7 - Bicycle Rideout: Intersection Controlled by Signal, Multiple Threat

Type 8 - Motorist Turn-Merge: Commercial Driveway/Alley

Type 9 - Motorist Turn-Merge/Drive Through: Intersection Controlled by Sign

Type 10 - Motorist Turn-Merge: Intersection Controlled by Signal

Type 18 - Bicyclist Unexpected Left Turn: Parallel Paths, Same Direction

Type 19 - Bicyclist Unexpected Left Turn: Parallel Paths, Facing Approach

Type 21 - Wrong-Way Bicyclist Turns Right: Parallel Paths

Type 25 - Vehicles Collide at Uncontrolled Intersection: Orthogonal Paths

Type 26 - Vehicles Collide Head-On: Wrong Way Bicyclist

Collectively, this group of accident types accounts for nearly one third (30%) of all fatal accidents sampled and over half (55%) of the non-fatal accidents studied. If one considers that traffic laws are safe driving practices put into words, then greater compliance with traffic laws by bicyclists can have a significant reduction in traffic accidents by reducing the occurrence of precipitating, hazardous bicyclist behaviors.

B. The Model Regulation

1. Approach and Overview

The development of this model ordinance acknowledges a prevailing view in traffic law enforcement. The view is that taking enforcement action against bicyclists, and pedestrians for that matter, who have committed traffic violations is secondary to enforcement action against motor vehicle operator violations.

It seems to many more important to detect and apprehend motor vehicle operator infractions as the motor vehicle driver is in control of so much more lethal force. In addition, sending bicyclists or pedestrians to traffic court may seem petty and harrassing especially in view of the overloaded court dockets. It is certainly unpopular.

Whatever the motives are, however, it is clear that for the most part, bicyclist and pedestrian traffic violations are not detected and prosecuted as rigorously as motor vehicle driver violations. This model ordinance, therefore provides legislative enablement for a jurisdiction to establish and maintain a cadre of dedicated bicyclist education and enforcement specialists. Assuming that a "safety patrol" is active in detecting bicyclist violators, then an alternate, optional pathway to the jurisdictional traffic court system should be established to mitigate court case loads.

The notion of a bicycle safety patrol is not new. Several states and local communities empower and utilize bicycle-mounted patrols during the summer months when bicycle riding is heaviest. Patrol members are often, but not exclusively, teenagers or college students in their early twenties. The viability and benefit of the bicycle safety patrol approach is attested to by the apparent success of the programs operating in the State of Minnesota. Several of these (Duluth, Hastings and Richfield) were examined as part of this study. This examination provided a motivation for drafting the Model Regulation to enable use of patrols in other communities. However, neither the Model nor the annotation herein is intended as an exhaustive treatise on the subject. Communities considering enactment of the Model Ordinance should conduct a thorough examination of all of the operating parameters of a bicycle safety patrol before fielding one.

In summary, the model ordinance will provide the statutory authority and mechanism for the formation of a team of field specialists to detect bicyclist violators, provide powers to stop and take the appropriate enforcement action, and establish an adjudicative mechanism as an alternate to the jurisdictional traffic court system. It should be emphasized that even though a bicycle safety patrol with enforcement powers is established by enactment of the model ordinance, it should not be construed that the mission of the bicycle safety patrol is exclusively enforcement. Equally as important as enforcing bicycling violations will be the "educational" value of younger bicyclists encountering

members of the bicycle safety patrol. For example, a patrol member may detect a technically enforceable traffic violation by a bicyclist or group of bicyclists. Judging from the manner in which the violation was committed, the patrol member may elect not to issue a citation but instead to stop, talk over the hazard(s) involved in what the bicyclist(s) did, and to finally only give an oral or written warning. For favorable public relations, only warnings should be issued initially to all offenders to allow the public to become accustomed to the manner of bicycle patrol operations. In some cases, with the very young bicyclists, a semi-formal warning is not necessary considering that the patrol member thoroughly describes the hazards involved and strongly advises against repeating the hazardous behavior. In summary, while an enhanced bicycle regulation enforcement capability is provided a jurisdiction by the formation of a bicycle safety patrol and associated adjudicative system, an equal emphasis should be given to deployment of the bicycle safety patrol as a field force of safety educators.

This model regulation seems most appropriately implemented as a municipal or county ordinance. This will allow a structuring of the patrol organization and functioning as well as the adjudicative procedures to meet local needs and demands for such services. Administration of all elements of the proposed system would also be more manageable at the city or county level.

A potentially effective means is hereby provided a municipal jurisdiction to enhance bicycle safety through education and enforcement. Because this mechanism is a field unit of bicycle specialists (the safety patrol) it is likely to detect more hazardous situations and be better accepted by the public as educators and enforcers.

2. Provisions of the Model Regulation

Figure 9. contains the provisions of the Model Bicycle Safety Patrol and Violator Disposition Ordinance.

3. Annotation of the Model Regulation Provisions

§ 1--Bicycle safety patrol established

a) Authorization is provided in this section for formation of the bicycle safety patrol under a designated responsible officer of the local police department who reports directly to the Chief of Police. Insofar as implementation and coordination of the patrol is concerned, the most cost-efficient agency structured to do this is the police department. Affiliation with the police department also provides patrol members with:

- A degree of authority and "presence" in the field that would be difficult to establish by other means.
- The actual authority to stop (detain) a bicyclist on the street and to take enforcement action if warranted.

b) The minimum qualifications for membership in the safety patrol have not been specified but are suggested for development and promulgation by the Chief of Police. It is suggested that 18 years of age may be a reasonable

MODEL BICYCLE SAFETY PATROL AND VIOLATOR DISPOSITION ORDINANCE

§ 1 - Bicycle safety patrol established

(a) There is hereby established in the (traffic division of the) police department of this city a bicycle safety patrol under the control and supervision of an officer appointed by and directly responsible to the chief of police.

(b) Members of the bicycle safety patrol shall meet minimum qualifications specified by the chief of police.

(c) Members of the bicycle safety patrol shall (wear uniforms and) carry badges of their office as may be specified by the chief of police.

§ 2 - Duties of bicycle safety patrol

It shall be the duty of the bicycle safety patrol to:

(a) Enforce the traffic laws of this state and city pertaining to the duties of persons using bicycles;

(b) Make arrests, issue citations or warnings for violations of laws pertaining to the duties of persons using bicycles;

(c) Assist in the investigation of accidents involving persons using bicycles;

(d) Implement ways and means to improve bicycle safety; and

(e) Carry out those duties specifically imposed upon the patrol by the ordinances of this city or by the chief of police.

§ 3 - Power to stop, warn, cite violators

(a) A member of the bicycle safety patrol is authorized to stop and warn or issue a citation to any person he or she has observed violating a law or ordinance pertaining to the duties of persons using bicycles. As to any violator who is less than 16 years of age, a copy of the citation or any warning shall be mailed or delivered to a parent or guardian of the violator.

Figure 9. Model Bicycle Safety Patrol and Violator Disposition Ordinance.

(continued)

(b) Any person stopped pursuant to this section shall, upon request by the patrol member, identify himself or herself by providing his or her full name, address, age and telephone number. If the person is less than 16 years of age, the person shall also provide the name and address of his or her parent or guardian.

§ 4 - Trial of violators

(a) The adjudication of any person receiving a citation from the bicycle safety patrol under this ordinance shall be conducted by:

(1) The traffic court if the violator is 16 or more years of age.

(2) The juvenile court if the violator is less than 16 years of age.

(b) In lieu of trial by a judge (magistrate), the court by its rules may authorize the trial of bicycle users by a (hearing officer, peer court, _____, _____, _____) provided that a person found guilty shall have the right to appeal to the court for a trial de novo.

(c) As to any violator who is less than 16 years of age, his or her parent or guardian shall be present at the trial or other proceeding. Any parent or guardian who fails to comply with an order of the court shall be guilty of a misdemeanor.

§ 5 - Punishment of violators using bicycles

Any person convicted of using a bicycle in violation of the laws of this state or the ordinances of this city shall be punished by a fine of not more than $ ____. In addition to, or in lieu of this penalty, the court may require attending and satisfactorily completing a bicycle safety education course, impound the bicycle for not more than ___ days, prohibit using a bicycle on the streets for not more than ___ months, or performing or refraining from performing such acts as may be ordered by the court.

Figure 9 (continued). Model Bicycle Safety Patrol and Violator Disposition Ordinance.

lower age limit (certainly no lower than 16 years of age). This seems to be an age level that would certainly command the respect of the 15 year old bicyclist and below (i.e., the younger bicyclists are principally involved in bicycle accidents). Since 18 years is the minimum voting age in most states, the minimum age for entry into the armed forces, 18 years or older bicycle patrol members should be accepted by the older bicyclists as well. Other factors to consider when developing a battery of minimum qualifications for patrol members include:

- Physical and mental conditioning
  - Are the applicants bicycling enthusiasts with a serious orientation to improving bicycle safety?
  - Are the applicants sufficiently skilled and "in-shape" to cope with the time and distance requirements of assigned patrol areas?
- Minimum qualification training

  A brief indoctrination course should be developed and administered to applicants before they are qualified to go out on patrol. The course should cover, as a minimum:
  - The elements of offenses within the bicycle laws to be enforced
  - Enforcement powers and options
  - Effective public relations
  - Safety factors concerned with a roadside "stop"
  - Principles of effective bicycle patrol; selective enforcement
  - Education versus enforcement
  - Coordination requirements with the regular police: when to call for assistance
  - Control and investigation of accident scenes
  - Basic first aid

c) To promote public acceptance and respect for bicycle patrol members a subsection has been provided requiring the patrol members to carry badges of identification as a minimum. There is a parenthetical suggestion that a "uniform" could also be required. A broad interpretation of a "uniform" is intended and could, in fact, be only a harness/belt arrangement for minimum inconvenience and maximum comfort. A special blouse/tee shirt or windbreaker could also be provided. Attire decisions should consider patrol member comfort, as the bicycle patrol will likely be employed in the spring, summer and fall months when bicycling activity is greatest.

In regard to other equipment, it is recommended that patrol members be issued police radios. Not only can this enhance the coordination and control amongst patrol members, but it provides ready access to regular police forces should enforcement or emergency assistance be required at a traffic scene.

It is also assumed that patrol members, because they are bicycling enthusiasts, will own state-of-the-art light frame, narrow tire, multi-speed bicycles. Since bicyclists generally have their bicycles "set-up" to meet their own personal comfort and needs, use of one's own bicycle for patrol activities may be most appropriate. However, many existing patrols provide bicycles for patrol members.

§ 2--Duties of bicycle safety patrol--Within this section, five broad duties are described.

a) The first duty concerns the enforcement of bicycle-related laws of the state and city within which the patrol operates. The ordinance has been specifically drafted to include only laws pertaining to the duties (not "rights and duties") of bicyclists to avoid the possibility of having a bicyclist mounted patrol member take enforcement action against a motor vehicle driver.

b) Specifically stated are the enforcement powers of the patrol to include the making of arrests, and the issuance of citations and warnings for observed infractions. The term "arrest," in this case, refers only to the authority to stop and detain another bicyclist who has been observed to commit a traffic violation. It is not intended to authorize a bicycle patrol member to take another bicyclist into physical custody for escort to a facility for booking or incarceration. Should this extreme form of arrest be required, it is recommended that the bicycle patrol member summon the assistance of a motorized patrol unit to more appropriately carry out this action.

The citations or summons to be used by the bicycle patrol may be the standard jurisdictional form, if the citation is to be processed through the normal traffic court system. Alternatively, a special summons form may be necessary for processing of an offender through administrative adjudication.

c) Authorization of patrol members to assist in bicycle accident investigations is efficacious. Besides frequently being in a position to witness an accident while on patrol, the bicycle patrol member has a "professional" perspective with regard to bicyclist capacities, limitations and habits/tendencies which can add greatly to an understanding of the factors contributing to a bicycle accident. Moreover, the patrol member may be the first person on the scene and in the best position to summon emergency services, as necessary, and to protect the accident scene and associated evidence. The patrol member should be prepared to act as the senior authority until a regular police officer responds to the scene.

d) This provision is rather general and intended to set a tone for discretionary action on the part of the bicyclist to promote bicycle safety. While no specific activities are prescribed the impression intended is that patrol members will do whatever is feasible and appropriate on and off the job to improve bicycle safety. Needless to say, all forms of educational en-

deavors are encouraged, including bicycle safety demonstrations in schools or in summer recreational programs.

e) This subsection clearly affirms the responsibility of the bicycle patrol to carry out the requirements not only of the municipal code under which they operate, but the directives of the Chief of Police as well.

§ 3--Power to stop, warn, cite violators

a) In support of the duty to "make arrests, issue citations or warnings, for violations of laws pertaining to the duties of persons using bicycles" in § 2(b) above, the express authority to do so is provided in this subsection. In the case where the patrol member decides to issue a citation or summons for an observed infraction, the matters of identification and accountability of the alleged offender become apparent. This subsection requires that a violator under 16 years of age provide the name and address of his or her parent or guardian so that the summons can be mailed or delivered to such an individual. It is presumed that not only will individuals under the age of 16 years be considered minors under the law, but will not likely be carrying valid pocket identification. Thus, proper identification of individuals under this system will be dependent upon the patrol members personal knowledge of the individual in question, and/or the honesty of that individual in identifying himself or herself and his or her parents. Violators over 16 years of age will generally be carrying some objective form of identification (driver's license or learner's permit, majority card, etc.) which the bicycle member can and should request for purposes of identification.

b) The responsibilities of an alleged bicyclist violator for identification to a patrol member are detailed within this subsection. For persons 16 years of age or older, that individual is required to provide:

- Full name
- Address
- Age
- Telephone number

The person less than 16 years of age is only required to provide the name and address of his or her parent or guardian.

§ 4--Trial of Violators--Adjudicative procedures are spelled out in this section.

a) The adjudicative routing through the existing court system is described. In one case, if the violator is 16 or more years in age, the individual would encounter the regular traffic court. In the case of the juvenile offender (less than 16 years of age) this individual would route through the juvenile court system. Contact with one form of the existing court system would technically be required in either case.

b) The alternative pathway to court contact in every case would be an administrative setting for adjudication overseen by a hearing officer or council of peers. The court through its system of rules could prescribe the ways in which violators would be processed by this administrative system. From the standpoint of having the greatest positive impact on the behavior of the

bicyclist violator, the following considerations are offered for the development rules for adjudicating routing of bicyclist offenders:

- First offenders regardless of age should be routed through the administrative system (hearing officer, peer court, etc.)
- Repeat offenders 12-15 years of age should go through juvenile court
- Repeat offenders 9-11 years of age should still remain within the administrative system, but be required to demonstrate satisfactory completion of the Course in Bicycle Driver Education presented in Volume I of this report or its local equivalent in as short a time as possible.
- Repeat offenders more than 16 years of age should go through the regular traffic court system.

This provision is so worded that the enacting jurisdiction has the responsibility to structure the type of authority (hearing officer, peer court, etc.) to govern the administrative adjudication system. Moreover, it is provided that any person convicted of a bicycle traffic violation within the purview of the administrative system expressly has the right to appeal to the court for a new trial.

c) In regard to the bicycle offender who is less than 16 years of age, it is specifically required that an associated parent or guardian accompany the alleged offender to any adjudicative proceeding. This provision creates a manifest level of accountability for the parent or guardian involved for it stipulates that any parent or guardian who fails to comply with an order of the court shall be guilty of a misdemeanor. These requirements should increase the chances that any juvenile violator will appear at the appropriate adjudicative proceeding along with their cognizant family authority.

§ 5--Punishment of violators using bicycles--While no specific sanctions are enumerated within the body of this regulation, a framework of possible punitive measures is provided in this section. Provision is made for a maximum fine (to be specified by the jurisdiction) to be levied upon any conviction. In addition to or in lieu of the fine, discretionary actions are suggested to include satisfactory completion of a safety course (such as the Course in Bicycle Driver Education--see Volume I of this report), impounding of the bicycle for a maximum period of time and prohibiting use of the bicycle on the streets for a maximum period of time. The maximum times are to be specified locally. Since the age and maturity of bicyclist offenders will range considerably, the court must have the ability to select meaningful "treatments" to engender lawful and safe bicyclist behavior. This section provides a reasonable range of alternatives along these lines.

C. Implementation

1. Enactment

As denoted by the title, Model Bicycle Safety Patrol and Violator Disposition Ordinance, this model regulation is considered most appropriately

enacted at the municipal level of government. In principle, the concept should be appealing to legislators who are convinced that the number of bicycle accidents can and should be reduced. To justify introduction of this model ordinance, the sponsoring agency should attempt to document the numbers and types of bicycle accidents occurring in the jurisdiction over the last several years. The age of the involved bicyclist should also be tabulated in meaningful class intervals (e.g., less than 6 years, 6-8 years, 9-11 years, 12-14 years, etc.).

In addition, it is essential that the proponents of this legislation know that there is a sufficient pool of bicyclists who are both capable and interested in joining the bicycle patrol during the time of year in which it would be operational.

The cost factors discussed in section D will also be a factor in determining the overall legislative appeal of the model legislation. However, given that a jurisdiction decides that it has what it considers a bicycle accident problem and the bicycling enthusiasts to form a bicycle safety patrol, the legislation should have public appeal.

2. Enforcement

As this is principally enabling legislation to permit a cadre of personnel to exist and enforce bicycling laws and ordinances, enforcement of the enabling provisions is not really a matter of concern for this report.

3. Public Education

To gain the maximum positive response from the public to the bicycle safety patrol, a substantial coordinated media campaign should be considered. Principal among the objectives for information transfer to the public are:

- Introduction and legitimization of the patrol (extension of the police department)
- Review of the patrol's missions, namely education and enforcement for both child and adult bicyclists
- Responsibilities of the public to stop and provide proper identification to a bona fide patrol member when asked
- Description of the due process afforded an individual who receives a summons or citation from a bicycle safety patrol member
- Range of possible outcomes following "conviction" of a bicycle traffic offense.

As to creative approaches, and media channels, many alternatives are worthy of further investigation and development. For the child/young teen oriented group, cinematic and 30 second and 60 second television materials are recommended for production. A 5-7 minute film should be considered for use in the classroom and by bicycling clubs. Excerpts or "lifts" from this basic film could be formatted into 30 and 60 second television spots for airing on children's programming. Useful adult exposure to these spots can be expected as well. It may be desirable to employ the "Right Rider" character (see

Volume II for a complete description of this character) as the proponent in the children's film and spots. An approach along the lines of ..."You'll see that Right Rider has some friends who are helping him now--these friends are the members of the bicycle safety patrol..." could be effective.

Multiple radio spots and live copy should also be considered for development and aimed at the adult population. Posters announcing the inauguration of the patrol and how its members can be identified should be produced for display in schools, post offices and various clubs and associations. Finally, a comprehensive pamphlet, outlining the entire set of information objectives heretofore discussed, should be produced for distribution to schools, motor vehicle department offices, community centers and bicycle riding clubs.

4. Cost Factors

There are public costs associated with the implementation of this model ordinance. Cost items which could be involved are:

- Salaries for the patrol members. As college students or other young adults are potentially good candidates for patrol membership, salary costs can be minimized. Moreover, the operation of the patrol will likely be seasonal (spring through fall) so that salary costs will be restricted somewhat as a result.

- Costs for training of patrol members

- Equipment Costs--Uniform (belts), badges, pocket identification, police radios, helmets, tee shirts, windbreakers.

- Printing costs for any special citation/summons forms--this would only be a factor if the decision were made that the bicycle patrol should not use the jurisdictional uniform traffic summons and complaint form.

- Administrative adjudication--Fees for the hearing officer or members of the peer court may be a consideration as well as the cost of facilities used.

While these are some "system" costs associated with the implementation of the model ordinance, it should be underscored that the returns in reduced bicycle accidents and fines collected could easily more than justify the costs in making this potentially valuable service available to the public.

D. Field Testing Considerations and Risk Benefit Analysis

An actual implementation form of field test (pre/post experimental and comparison site) is recommended for this model ordinance. Because this ordinance depends primarily upon a jurisdiction's set of bicycle traffic rules as a focus for enhanced enforcement, this test may be conducted independently. As previously suggested, accident data should be collected for a minimum of three years prior to implementation for at least one "program" year following enactment. Data recommended for collection on a before and after basis include:

- Bicycle accidents
  - By bicycle accident types
  - By any cited traffic law violations
- Cited traffic law violations, not involving an accident
  - Those written by the usual police patrol officer
  - Those written by the bicycle safety patrol
- Disposition of all cited offenses

It will be important to look at the number and type of bicycle accidents occurring pre and post enactment along with the sex and age of the involved bicyclist. In addition, the number and nature of traffic offenses committed should be tallied noting the degree of hazard involved. Ideally, a statistically significant drop in bicycle accidents should occur from pre test to post test at the experimental site and no significant differences pre to post should be found in the comparison site. In addition to or in lieu of a significant accident drop, fewer citations should be written by the patrol in the second half of the program period versus the first half, as an indication of developing public awareness and compliance. A significant drop in the degree of hazard involved in the bicycle traffic citation written pre to post and first half to second half of the program period would also be indicative of a favorable field test outcome.

However this model ordinance might be implemented for field test purposes, little public risk is foreseen as a consequence. The greatest potential for risk lies with the selection of bicycle safety patrol members themselves. Poorly qualified individuals by reasons of low motivation, or poor physical condition will compromise the potential effectiveness of the patrol to discourage bicyclist traffic violations. In addition, poorly motivated members will not have properly benefitted from their qualification training and be risks to themselves in several ways:

- Not knowing how to make safe roadside stops of suspected traffic offenders
- Not knowing when or how to summon police assistance for an unanticipated problem

While these risks are rated as relatively low in probability if proper selection and training of patrol members occur, they do need to be borne in mind.

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APPENDIX A

Glossary of Terms

The following definitions of vehicle and traffic terms have been reprinted from Chapter 1 of the Uniform Vehicle Code as ammended by all supplements up to and including the 1979 supplement thereto. These terms and definitions have been basically adhered to throughout this report.

NOTE: This act or any portion thereof should be prefaced by a descriptive title conforming to the requirements of the constitution or statutes of the state enacting it.

*Be it enacted, * * **

CHAPTER 1

Words and Phrases Defined

§ 1-101—Definition of words and phrases

The following words and phrases when used in this act shall, for the purpose of this act, have the meanings respectively ascribed to them in this chapter, except when the context otherwise requires.

§ 1-102—Alley.—A street or highway intended to provide access to the rear or side of lots or buildings in urban districts and not intended for the purpose of through vehicular traffic. (NEW, 1968.)

§ 1-103—Arterial street.—Any U.S. or State numbered route, controlled-access highway, or other major radial or circumferential street or highway designated by local authorities within their respective jurisdictions as part of a major arterial system of streets or highways. (NEW, 1954; RENUMBERED, 1968.)

§ 1-104—Authorized emergency vehicle.—Such fire department vehicles, police vehicles and ambulances as are publicly owned, and such other publicly or privately owned vehicles as are designated by the commissioner (or other appropriate state official) under § 15-111 of this act. (REVISED AND RENUMBERED, 1968.)

§ 1-105—Bicycle.—Every vehicle propelled solely by human power upon which any person may ride, having two tandem wheels, except such vehicles with a seat height of no more than 25 inches from the ground when the seat is adjusted to its highest position, and except scooters and similar devices. (REVISED, 1975 & 1979.)

§ 1-106—Bus.—Every motor vehicle designed for carrying more than 10 passengers and used for the transportation of persons; and every motor vehicle, other than a taxicab, designed and used for the transportation of persons for compensation. (RENUMBERED, 1968.)

§ 1-107—Business district.—The territory contiguous to and including a highway when within any 600 feet along such highway there are buildings in use for business or industrial purposes, including but not limited to hotels, banks, or office buildings, railroad stations and public buildings which occupy at least 300 feet of frontage on one side or 300 feet collectively on both sides of the highway. (RENUMBERED, 1968.)

§ 1-108—Cancellation of driver's license.—The annulment or termination by formal action of the department of a person's driver's license because of some error or defect in the license or because the licensee is no longer entitled to such license, but the cancellation of a license is without prejudice and application for a new license may be made at any time after such cancellation. (RENUMBERED, 1968.)

§ 1-109—Commissioner.[1]—The commissioner of motor vehicles of this State.

§ 1-110—Controlled-access highway.—Every highway, street or roadway in respect to which owners or occupants of abutting lands and other persons have no legal right of access to or from the same except at such points only and in such manner as may be determined by the public authority having jurisdiction over such highway, street or roadway.

§ 1-111—Crosswalk.—(a) 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 included within the extension of the lateral lines of the existing sidewalk at right angles to the centerline. (REVISED, 1975.)

(b) Any portion of a roadway at an intersection or elsewhere distinctly indicated for pedestrian crossing by lines or other markings on the surface.

§ 1-112—Dealer.—Every person in the business of buying, selling or exchanging vehicles. (REVISED, 1971.)

§ 1-113—Department.[2]—The department of motor vehicles of this State.

§ 1-113.1—Divided highway.—A highway divided into two or more roadways by leaving an intervening space or by a physical barrier or by a clearly indicated dividing section so constructed as to impede vehicular traffic. (NEW, 1971.)

§ 1-113.2—Driveaway-towaway operation.—Any operation in which any motor vehicle, trailer or semitrailer, singly or in combination, new or used, constitutes the commodity being transported, when one set or more of wheels of any such vehicle are on the roadway during the course of transportation, whether or not any such vehicle furnishes the motive power. (NEW, 1962; RENUMBERED, 1971.)

§ 1-114—Driver.—Every person who drives or is in actual physical control of a vehicle.

§ 1-114.1—Driver's license.—Any license to operate a motor vehicle issued under the laws of this State. (NEW, 1968.)

§ 1-115—Essential parts.—All integral and body parts of a vehicle of a type required to be registered hereunder, the removal, alteration or substitution of which would tend to conceal the identity of the vehicle or substantially alter its appearance, model, type or mode of operation.

§ 1-116—Established place of business.—The place actually occupied either continuously or at regular periods by a dealer or manufacturer where his books and records are kept and a large share of his business is transacted.

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[1]If the term "commissioner" is not appropriate in a particular state, then the appropriate term and definition should be substituted.

[2]If the administration of this act is not vested in the department of motor vehicles within a particular state, the above definition should be revised to designate the appropriate department or bureau of the state government to administer this act.

§ 1-117—Explosives.—Any chemical compound or mechanical mixture that is commonly used or intended for the purpose of producing an explosion and which contains any oxidizing and combustive units or other ingredients in such proportions, quantities or packing that an ignition by fire, by friction, by concussion, by percussion or by detonator of any part of the compound or mixture may cause such a sudden generation of highly heated gases that the resultant gaseous pressures are capable of producing destructive effects on contiguous objects or of destroying life or limb.

§ 1-118—Farm tractor.—Every motor vehicle designed and used primarily as a farm implement, for drawing plows, mowing machines and other implements of husbandry.

§ 1-119—Flammable liquid.—Any liquid which has a flash point of 70°F., or less, as determined by a tagliabue or equivalent closed-cup test device.

§ 1-120—Foreign vehicle.—Every vehicle of a type required to be registered hereunder brought into this State from another state, territory or country other than in the ordinary course of business by or through a manufacturer or dealer and not registered in this State.

§ 1-121—Gross weight.—The weight of a vehicle without load plus the weight of any load thereon.

§ 1-122—Highway.—The entire width between the boundary lines of every way publicly maintained when any part thereof is open to the use of the public for purposes of vehicular travel.[3]

§ 1-123—House trailer.—(a) A trailer or semitrailer which is designed, constructed and equipped as a dwelling place, living abode or sleeping place (either permanently or temporarily) and is equipped for use as a conveyance on streets and highways, or

(b) A trailer or a semitrailer whose chassis and exterior shell is designed and constructed for use as a house trailer, as defined in paragraph (a), but which is used instead permanently or temporarily for the advertising, sales, display or promotion of merchandise or services, or for any other commercial purpose except the transportation of property for hire or the transportation of property for distribution by a private carrier. (NEW SECTION, 1956.)

§ 1-123.1—Human powered vehicle.—Every vehicle designed to be moved solely by human power. (NEW, 1979.)

§ 1-124—Identifying number.—The vehicle number assigned by the manufacturer or by the department for the purpose of identifying the vehicle. The term shall include any numbers or letters assigned by the manufacturer for the purpose of identifying a part of a vehicle and any such number placed on a part in accordance with this act or regulations of the department for the purpose of identifying it. (REVISED, 1979.)

§ 1-125—Implement of husbandry.—Every vehicle designed or adapted and used exclusively for agricultural operations and only incidentally operated or moved upon the highways. (REVISED, 1971.)

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[3]By the above definition the terms "street" and "highway" are synonymous and interchangeable.

§ 1-126—Intersection.—(a) The area embraced within the prolongation or connection of the lateral curb lines, or, if none, then the lateral boundary lines of the roadways of two highways which joint one another at, or approximately at, right angles, or the area within which vehicles traveling upon different highways joining at any other angle may come in conflict.

(b) Where a highway includes two roadways (3) feet or more apart, then every crossing of each roadway of such divided highway by an intersecting highway shall be regarded as a separate intersection. In the event such intersecting highway also includes two roadways (30) feet or more apart, then every crossing of two roadways of such highways shall be regarded as a separate intersection.

(c) The junction of an alley with a street or highway shall not constitute an intersection. (NEW, 1968.)

§ 1-127—Laned roadway.—A roadway which is divided into two or more clearly marked lanes for vehicular traffic.

§ 1-128—License or license to operate a motor vehicle.—Any driver's license or any other license to permit to operate a motor vehicle issued under, or granted by, the laws of this State including: (REVISED, 1968.)

1. Any temporary license or instruction permit;
2. The privilege of any person to drive a motor vehicle whether or not such person holds a valid license;
3. Any nonresident's operating privilege as defined herein.

§ 1-129—Lienholder.—A person holding a security interest in a vehicle. (NEW, 1956.)

§ 1-130—Local authorities.—Every country, municipal and other local board or body having authority to enact laws relating to traffic under the constitution and laws of this State.

§ 1-131—Mail.—To deposit in the United States mail properly addressed and with postage prepaid. (NEW, 1956.)

§ 1-132—Manufacturer.—Every person engaged in the business of constructing or assembling vehicles of a type required to be registered hereunder at an established place of business in this State.

§ 1-133—Metal tire.—Every tire the surface of which in contact with the highway is wholly or partly of metal or other hard, nonresilient material.

§ 1-133.1—Moped.—A motor-driven cycle both with pedals to permit propulsion by human power and with a motor which produces not to exceed two brake horsepower and which is not capable of propelling the vehicle at a speed in excess of 30 mph on level ground. If an internal combustion engine is used, the displacement shall not exceed 50 cubic centimeters and the moped shall have a power drive system that functions directly or automatically without clutching or shifting by the operator after the drive system is engaged. (NEW, 1979.)

§ 1-133.2—Motor home.—Every motor vehicle designed, used or maintained primarily as a mobile dwelling, office or commercial space. (NEW, 1971; RENUMBERED, 1979.)

§ 1-134—Motor vehicle.—Every vehicle which is self-propelled, and every vehicle which is propelled by electric power obtained from overhead trolley wires but not operated upon rails, except vehicles moved solely by human power. (REVISED, 1975.)

§ 1-135—Motorcycle.—Every motor vehicle having a seat or saddle for the use of the rider and designed to travel on not more than three wheels in contact with the ground, but excluding a tractor.

§ 1-136—Motor-driven cycle.—Every motorcycle, motor scooter or motorized bicycle having an engine with less than 150 cubic centimeters displacement or with five brake horsepower or less. (REVISED, 1975.)

§ 1-137—Nonresident.—Every person who is not a resident of this State.

§ 1-138—Nonresident's operating privilege.—The privilege conferred upon a nonresident by the laws of this State pertaining to the operation by such person of a motor vehicle, or the use of a vehicle owned by such person, in this State.

§ 1-138.1—Odometer.—An instrument for measuring and recording the actual distance a motor vehicle travels while in operation, other than any auxiliary odometer designed to be reset by the operator of the motor vehicle for the purpose of recording mileage on trips. (NEW, 1979.)

§ 1-139—Official traffic-control devices.—All signs, signals, markings and devices not inconsistent with this act placed or erected by authority of a public body or official having jurisdiction, for the purpose of regulating, warning or guiding traffic.

§ 1-140—Owner.—A person, other than a lienholder, having the property in or title to a vehicle. The term includes a person entitled to the use and possession of a vehicle subject to security interest in another person, but excludes a lessee under a least not intended as security. (REVISED, 1956; RENUMBERED, 1968.)

§ 1-141—Park or parking.—Means the standing of a vehicle, whether occupied or not, otherwise than temporarily for the purpose of and while actually engaged in loading or unloading property or passengers. (REVISED, 1971.)

§ 1-142—Passenger car.—Every motor vehicle, except motorcycles and motor-driven cycles, designed for carrying 10 passengers or less and used for the transportation of persons. (NEW, 1962; RENUMBERED, 1968).

§ 1-143—Pedestrian.—Any person afoot.

§ 1-144—Person.—Every natural person, firm, copartnership, association or corporation.

§ 1-144.1—Personal identification card.—A document issued by the department for the sole purpose of identifying the bearer and not authorized for use as a driver's license. (NEW, 1979.)

§ 1-145—Pneumatic tire.—Every tire in which compressed air is designed to support the load.

§ 1-146—Pole trailer.—Every vehicle without motive power designed to be drawn by another vehicle and attached to the towing vehicle by means of a reach or pole, or by being boomed or otherwise secured to the towing vehicle, and ordinarily used for transporting long or irregularly shaped loads such as poles, pipes or structural members capable, generally, of sustaining themselves as beams between the supporting connections.

§ 1-147—Police officer.—Every officer authorized to direct or regulate traffic or to make arrests for violations of traffic regulations.

§ 1-148—Private road or driveway.—Every way or place in private ownership and used for vehicular travel by the owner and those having express or implied permission from the owner, but not by other persons.

§ 1-149—Railroad.—A Carrier of persons or property upon cars (, other than streetcars,) operated upon stationary rails. (REVISED, 1968.)

§ 1-150—Railroad sign or signal.—Any sign, signal or device erected by authority of a public body or official or by a railroad and intended to give notice of the presence of railroad tracks or the approach of a railroad train.

§ 1-151—Railroad train.—A steam engine, electric or other motor, with or without cars coupled thereto, operated upon rails (except streetcars). (REVISED, 1971.)

§ 1-152—Reconstructed vehicle.—Every vehicle of a type required to be registered hereunder materially altered from its original construction by the removal, addition or substitution of essential parts, new or used.

§ 1-153—Registration.—The registration certificate or certificates and registration plates issued under the laws of this State pertaining to the registration of vehicles.

§ 1-154—Residence district.—The territory contiguous to and including a highway not comprising a business district when the property on such highway for a distance of 300 feet or more is in the main improved with residences or residences and buildings in use for business.

§ 1-155—Revocation of driver's license.—The termination by formal action of the department of a person's license or privilege to operate a motor vehicle on the highways, which terminated license or privilege shall not be subject to renewal or restoration except that an applciation for a new license may be presented and acted by the department after the expiration of the applicable period of time prescribed in this act. (REVISED, 1975.)

§ 1-156—Right of way.—The right of one vehicle or pedestrian to proceed in a lawful manner in preference to another vehicle or pedestrian approaching under such circumstances of direction, speed and proximity as to give rise to danger of collision unless one grants precedence to the other. (REVISED, 1962.)

§ 1-157—Road tractor.—Section deleted in 1971.

§ 1-158—Roadway.—That portion of a highway improved, designed or ordinarily used for vehicular travel, exclusive of the sidewalk, berm or shoulder even though such sidewalk, berm or shoulder is used by persons riding bicycles or other human powered vehicles. In the event a highway includes two or more separate roadways the term "roadway" as used herein shall refer to any such roadway separately but not to all such roadways collectively. (REVISED, 1975.)

§ 1-159—Safety zone.—The area of space officially set apart within a roadway for the exclusive use of pedestrians and which is protected or is so marked or indicated by adequate signs as to be plainly visible at all times while set apart as a safety zone.

§ 1-159.1—Salvage vehicle.—A vehicle which is sold for the purpose of being scrapped, destroyed or salvaged for parts and any vehicle for which a total loss settlement of $1,000 or more has been made by an insurance company, other than an unrecovered, stolen vehicle. (NEW, 1979.)

§ 1-160—School bus.—Every motor vehicle that complies with the color and identification requirements set forth in the most recent edition of *Minimum Standards for School Buses*[4] and is used to transport children to or from school or in connection with school activities, but not including buses operated by common carriers in urban transportation of school children. (REVISED, 1962.)

§ 1-161—Security agreement.—A written agreement which reserves or creates a security interest. (NEW, 1956.)

§ 1-162—Security interest.—An interest in a vehicle reserved or created by agreement and which secures payment or performance of an obligation. The term includes the interest of a lessor under a lease intended as security. A security interest is "perfected" when it is valid against third parties generally, subject only to specific statutory exceptions. (NEW, 1956.)

§ 1-163—Semitrailer.—Every vehicle with or without motive power, other than a pole trailer, designed for carrying persons or property and for being drawn by a motor vehicle and so constructed that some part of its weight and that of its load rests upon or is carried by another vehicle.

§ 1-164—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.

§ 1-165—Solid rubber tire.—Every tire of rubber or other resilient material which does not depend upon compressed air for the support of the load. (REVISED, 1971.)

§ 1-166—Special mobile equipment.—Every vehicle not designed or used primarily for the transportation of persons or property and only incidentally operated or moved over a highway, including but not limited to: ditch digging apparatus, well boring apparatus and road construction and maintenance machinery such as

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[4]Produced and sponsored by the National Commission on Safety Education of the National Education Association, Washington, D.C. 20036.

asphalt spreaders, bituminous mixers, bucket loaders, tractors other than truck tractors, ditchers, levelling graders, finishing machines, motor graders, road rollers, scarifiers, earth moving carry-alls and scrapers, power shovels and drag lines, and self-propelled cranes and earth moving equipment. The term does not include house trailers, dump trucks, truck mounted transit mixers, cranes or shovels, or other vehicles designed for the transportation of persons or property to which machinery has been attached. (REVISED, 1956.)

§ 1-167—Specially constructed vehicle.—Every vehicle of a type required to be registered hereunder not originally constructed under a distinctive name, make, model or type by a generally recognized manufacturer of vehicles and not materially altered from its original construction.

§ 1-168—Stand or standing.—Means the halting of a vehicle, whether occupied or not, otherwise than temporarily for the purpose of and while actually engaged in receiving or discharging passengers. (NEW, 1956.)

§ 1-169—State.—A state, territory or possession of the United States, the District of Columbia, the Commonwealth of Puerto Rico or a province of Canada. (REVISED, 1968.)

§ 1-170—Stop.—When required means complete cessation from movement.

§ 1-171—Stop or stopping.—When prohibited means any halting even momentarily of a vehicle, whether occupied or not, except when necessary to avoid conflict with other traffic or in compliance with the directions of a police officer or traffic-control sign or signal. (REVISED, 1956.)

§ 1-172—Street.—The entire width between boundary lines of every way publicly maintained when any part thereof is open to the use of the public for purposes of vehicular travel.[5]

§ 1-173—Streetcar.—A car other than a railroad train for transporting persons or property and operated upon rails principally within a municipality.[6]

§ 1-174—Suspension of driver's license.—The temporary withdrawal by formal action of the department of a person's required or privilege to operate a motor vehicle on the public highways, which temporary withdrawal shall be for a period of specifically designated by the department. (REVISED, 1968.)

§ 1-175—Through highway.—Every highway or portion thereof on which vehicular traffic is given preferential right of way, and at the entrances to which vehicular traffic from intersecting highways is required by law to yield the right of way to vehicles on such through highway in obedience to a stop sign, yield sign, or other official traffic-control device, when such signs or devices are erected as provided in this act. (REVISED, 1968.)

§ 1-176—Trackless trolley coach.—Every motor vehicle which is propelled by electric power obtained from overhead trolley wires but not operated upon rails.

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[5]By the above definition the terms "street" and "highway" are synonymous and interchangeable.

[6]This definition should be omitted by states in which streetcars are not in operation.

§ 1-177—Traffic.—Pedestrians, ridden or herded animals, vehicles, streetcars and other conveyances either singly or together while using any highway for purposes of travel.

§ 1-178—Traffic-control signal.—Any device, whether manually, electrically or mechanically operated, by which traffic is alternately directed to stop and permitted to proceed. (REVISED, 1962.)

§ 1-179—Trailer.—Every vehicle with or without motive power, other than a pole trailer, designed for carrying persons or property and for being drawn by a motor vehicle and so constructed that no part of its weight rests upon the towing vehicle.

§ 1-180—Transporter.—Every person engaged in the business of delivering vehicles of a type required to be registered hereunder from a manufacturing, assembling or distributing plant to dealers or sales agents of a manufacturer.

§ 1-181—Truck.—Every motor vehicle designed, used or maintained primarily for the transportation of property.

§ 1-181.1—Truck camper.—Any structure designed, used or maintained primarily to be loaded on or affixed to a motor vehicle to provide a mobile dwelling, sleeping place, office or commercial space. (NEW, 1971.)

§ 1-182—Truck tractor.—Every motor vehicle designed and used primarily for drawing other vehicles and not so constructed as to carry a load other than a part of the weight of the vehicle and load so drawn.

§ 1-183—Urban district.—The territory contiguous to and including any street which is built up with structures devoted to business, industry or dwelling houses situated at intervals of less than 100 feet for a distance of a quarter of a mile or more. (NEW, 1954.)

§ 1-184—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. (REVISED, 1975.)

§ 1-185—Vehicle identification number.—The numbers and letters, if any, designated by the department for the purpose of identifying the vehicle or the unique identifier assigned to each vehicle by the manufacturer pursuant to regulations. (NEW, 1979.)