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DOCUMENT RESUME

ED 107 803 CE 003 897

TITLE	Highway Safety Program Manual: Volume 14: Pedestrian Safety.
INSTITUTION	National Highway Traffic Safety Administration (DOT), Washington, D. C.
PUB DATE	Nov 74
NOTE	88p.; For related documents, see CE 003 883-901
AVAILABLE FROM	Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402 (Stock Number 5003-00204, $1.90)
EDRS PRICE	MF-$0.76 HC-$4.43 PLUS POSTAGE
DESCRIPTORS	Evaluation Criteria; Evaluation Methods; Federal Legislation; *Federal Programs; *Guidelines; Local Government; Objectives; *Pedestrian Traffic; Policy; Program Evaluation; Reports; State Government; State Programs; *Traffic Safety
IDENTIFIERS	*Highway Safety

ABSTRACT

Volume 14 of the 19-volume Highway Safety Program Manual (which provides guidance to State and local governments on preferred highway safety practices) concentrates on pedestrian safety. The purpose and objectives of a pedestrian safety program are outlined. Federal authority in the area of pedestrian safety and policies regarding a safety program are described. Program development and operations (an inventory of vehicle-pedestrian crash experience, improvement of pedestrian protection, driver familiarization with pedestrian problems, pedestrian training and education, protection of child pedestrians, and enforcement) are presented. Criteria and procedures for program evaluation and different types of reports (pedestrian safety program reports and reports to the National Highway Traffic Safety Administration and to the Federal Highway Administration) are explained. Local government participation is outlined. Appendixes contain the Highway Safety Program Standard 14, Pedestrian Safety; a glossary of definitions; references; a list of representative projects; and a list of resource organizations. (NH)

Highway Safety Program Manual NO. 14

Pedestrian Safety

NOVEMBER 1974

U.S. DEPARTMENT OF TRANSPORTATION

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

FEDERAL HIGHWAY ADMINISTRATION

HIGHWAY SAFETY PROGRAM MANUAL

VOLUME 14

PEDESTRIAN SAFETY

This manual is designed as a guide for States and their political subdivisions to use in developing highway safety program policies and procedures. It does not supersede the requirements of Highway Safety Program Standard No. 14.

For sale by the Superintendent of Documents, U.S. Government Printing Office
Washington, D.C. 20402 - Price $1.90
Stock Number 5003-00204

FOREWORD

As part of the Highway Safety Program Manual, this volume is designed to provide guidance to State and local governments on preferred highway safety practices. Volumes comprising the Manual are:

0. Planning and Administration
1. Periodic Motor Vehicle Inspection
2. Motor Vehicle Registration
3. Motorcycle Safety
4. Driver Education
5. Driver Licensing
6. Codes and Laws
7. Traffic Courts
8. Alcohol in Relation to Highway Safety
9. Identification and Surveillance of Accident Locations
10. Traffic Records
11. Emergency Medical Services
12. Highway Design, Construction, and Maintenance
13. Traffic Engineering Services
14. Pedestrian Safety
15. Police Traffic Services
16. Debris Hazard Control and Cleanup
17. Pupil Transportation Safety
18. Accident Investigation and Reporting

The volumes of the Manual supplement the Highway Safety Program Standards and present additional information to assist State and local agencies in implementing their highway safety programs.

The content of the volumes is based on the best knowledge currently available. As research and operating experience provide new insights and information, the Manual will be updated.

The volumes of the Highway Safety Program Manual deal with preferred highway safety practice and in no way commit the Department of Transportation to funding any particular program or project.

Many expert organizations and individuals at all levels of government and in the private sector contributed heavily in the preparation of the volumes of the Manual. The Department appreciates greatly this help in furthering the national program for improving highway safety for all Americans.

The Highway Safety Act of 1970 established the National Highway Traffic Safety Administration. Subsequent reorganization and identification of responsibilities resulted in shared responsibilities in administering Standard 14. The National Highway Traffic Safety Administration administers Sections I, III, IV, VI, and VII while the Federal Highway Administration administers Sections II and V.

U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

HIGHWAY SAFETY PROGRAM MANUAL

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U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

HIGHWAY SAFETY PROGRAM MANUAL

Volume	14 PEDESTRIAN SAFETY	Transmittal 51
Chapter	I. PURPOSE	November 1974

Par. I. Introduction
II. Purpose
III. Specific Objectives

I. INTRODUCTION

A. The vehicle-pedestrian injury problem, which affects all age groups of our society, is of serious proportions. This is particularly true as it relates to children, to persons who have been drinking alcohol immoderately, and to older persons whose mental and physical responses are less acute than those of the general public. While the problem is both rural and urban in scope, it is more acute in urban areas where approximately 60 percent of the nationwide pedestrian fatalities take place.

B. The need for a Pedestrian Safety Program has been emphasized by Congress.

The House of Representatives report stated:

> "No safety program will be adequate that does not include requirements with respect to pedestrian education beginning at the elementary school level, as well as signs and traffic signals specifically designed for pedestrian protection, construction of sidewalks as part of residential street construction, continuing enforcement of pedestrian traffic laws, and any other program that can be devised to keep both drivers and pedestrians aware that all the fatalities are not inside the cars . . . We can require the construction of sidewalks whenever we construct streets, and

we can require that when residential housing development permits are granted, they require that the development be planned to include sidewalks and to eliminate steep grades and sharp curves . . . We can require that pedestrian protection features be incorporated in our roads and streets."*

The Senate report stated:

"Accident prevention investigations will include . . . the behavior of pedestrians."**

II. PURPOSE

The purpose of the Program is to reduce the incidence of vehicle-pedestrian collisions and of the injuries in which they result and to emphasize and stimulate recognition of pedestrian safety as an integral, constant, and important element of community planning and of all aspects of highway transportation.

III. SPECIFIC OBJECTIVES

The specific objectives of the Pedestrian Safety Program are to:

A. Inventory vehicle-pedestrian crashes to determine the magnitude of the problem in each jurisdiction, the extent to which resources should be devoted to it, and the extent to which specific countermeasures are associated with changes in the frequency and severity of pedestrian injuries and deaths.

B. Identify the specific nature and relative importance of the characteristics of the pedestrians, drivers, vehicles, times, and places associated with pedestrian injuries and deaths and the extent to which these vary with the application of countermeasures directed specifically at them.

C. Improve pedestrian protection through reduction of vehicle-pedestrian conflicts.

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*H. Rept. 1700, 89th Congress, 2d Session, pp. 10 and 15.
**S. Rept. 1302, 89th Congress, 2d Session, p. 15.

D. Define special pedestrian safety problems associated with both preschool and school age children.

E. Define special problems associated with elderly pedestrians.

F. Develop vehicle and pedestrian safety measures that ensure reduction of vehicle-pedestrian conflicts.

G. Familiarize drivers with pedestrian problems, attitudes, responses, and characteristics, as well as with the problems posed by pedestrians, difficult vehicular traffic patterns, and inappropriate vehicle operation.

H. Familiarize pedestrians with driver problems, attitudes, responses, and characteristics, as well as with the problems posed by drivers, difficult pedestrian traffic patterns, and inappropriate pedestrian movement.

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Chapter	II. AUTHORITY	November 1974

Basic authority for the issuance of Standard 14, Pedestrian Safety, is Chapter 4 of Title 23, U.S.C. (hereinafter referred to as the Highway Safety Act of 1966).

Section 402(a) reads in part:

> "Each State shall have a highway safety program approved by the Secretary, designed to reduce traffic accidents and deaths, injuries, and property damage resulting therefrom. Such programs shall be in accordance with uniform standards promulgated by the Secretary . . . so as to improve . . . pedestrian performance."

The Pedestrian Safety Standard is presented as Appendix A.

U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

HIGHWAY SAFETY PROGRAM MANUAL

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Chapter	III. GENERAL POLICY	November 1974

Par. I. Introduction
II. Implementation Policy
III. Procedure Policy

I. INTRODUCTION

Pedestrians are a part of the highway transportation safety complex. The overall highway safety effort should recognize pedestrian safety requirements and implement actions that are specifically oriented to meeting them.

II. IMPLEMENTATION POLICY

A successful pedestrian safety program is based on policies that:

A. Accomplish:

1. The continuing measurement of the specific magnitude of the pedestrian injury problem in each jurisdiction and the determination of the extent to which specific countermeasures are associated with changes in pedestrian injuries and deaths.

2. The continuing identification of the characteristics of the pedestrians, drivers, vehicles, times, and places associated with pedestrian injuries and deaths and of the extent to which these vary with the application of countermeasures directed specifically at them.

B. Emphasize:

1. The utilization of the best state-of-the-art methods and techniques for pedestrian protection both at present and in the environments of the future now being planned.

2. The conduct of appropriately specific driver and pedestrian education and information programs.

3. The compliance with established pedestrian and driver rights and responsibilities.

C. Utilize uniform, pedestrian-oriented traffic engineering procedures when planning, constructing, and operating control devices to reduce vehicle-pedestrian conflicts.

D. Provide safety education for drivers and pedestrians which includes a description of the rights, duties, responsibilities, and limitations of each and their relationships with respect to each other.

E. Promote attendance at improvement schools by habitual violators of pedestrian protection regulations.

F. Expose the special problems and develop program elements for the protection of the child pedestrian during school or while at play and of the elderly in their daily activities.

G. Develop, enact, and uniformly enforce pedestrian protection ordinances dealing with both driver and pedestrian responsibilities.

H. Promote pedestrian protection by providing offstreet play areas, by spacially separating vehicular and pedestrian traffic to the maximum feasible extent, and, where this cannot be achieved, by separating the two streams in time, i.e., by ensuring that they are out of phase at the locations where their paths intersect.

I. Emphasize pedestrian protection in the environments of the future by incorporating the relevant considerations in the master planning process in public and private planning organizations at State and local levels. This should include the involvement and cooperation of persons involved with transportation or land use planning, together with those responsible for planning the

locations of all types of schools, institutions for the handicapped, homes for the elderly, hospitals, playground and other recreational facilities, and other land uses that generate major pedestrian movements.

III. PROCEDURE POLICY

Procedures to support such pedestrian safety policies should:

A. Determine pede[illegible]ety program requirements from the data inventory a[illegible]sis and needs studies.

B. Establish methods of cost-benefit analysis for the formulation of program element priorities.

C. Maintain programs which will be responsive to changing needs as identified through the use of the collected data, and inventory needs and cost-benefit analysis.

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Chapter	IV.-PROGRAM DEVELOPMENT AND OPERATIONS	November 1974

Par. II. Introduction
II. Inventory of Vehicle-Pedestrian Crash Experience
III. Improvement of Pedestrian Protection
IV. Driver Familiarization With Pedestrian Problems
V. Pedestrian Training and Education
VI. Protection of Child Pedestrians
VII. Enforcement

I. INTRODUCTION

A. Because of the magnitude of the pedestrian accident problem, each State should develop and implement a comprehensive program designed to ensure the safety of pedestrians. While it should be responsibe in general to each element of the Standard, the program should give special emphasis to the most critical of these - the young, certain older persons, involvement of alcohol, and the disproportionate incidence of urban accidents.

B. A comprehensive Statewide program designed to ensure the safety of pedestrians should include:

1. Inventory of vehicle-pedestrian crashes.

2. Identification of the factors involved.

3. Improvement of pedestrian protection through reduction of vehicle-pedestrian conflict.

4. Driver familiarization with pedestrian problems.

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5. Pedestrian familiarization with driver problems.

6. Protection of child pedestrians, including school children.

7. Protection of elderly pedestrians.

8. Enforcement of regulations to ensure reduction of vehicle-pedestrian conflicts.

9. Incorporation in master plans of land use for the future considerations related to providing for safe pedestrian movements.

C. To be fully effective, a comprehensive program of pedestrian safety requires the active participation of every agency involved in highway development operation in every jurisdiction; for example, engineering, enforcement, public health, public works planning, land use planning. Coordination of the relevant activities of these groups is mandatory:

1. At State level.

2. At local levels.

3. Among local jurisdictions in the same region.

D. To plan and implement the necessary coordination of multi-agency contributions to pedestrian safety, one agency or operating official should be designated as having primary responsibility for the pedestrian safety program:

1. At State level.

2. In every local jurisdiction.

II. INVENTORY OF VEHICLE-PEDESTRIAN CRASH EXPERIENCE

A. A complete and accurate inventory of vehicle-pedestrian crash data coupled with its thorough appraisal is required to provide a basis on which to plan, develop and implement practices and policies for the enhancement of pedestrian safety. This general program for appraisal of vehicle-pedestrian crash experience includes:

1. Investigation of crashes.

2. Acquisition of relevant data.

3. Analysis of relevant data.

4. Identification of crash- and injury-producing factors.

5. Corrective measures suggested by the analysis.

B. Investigation of crashes.

1. Systematic investigations of all vehicle-pedestrian crashes are required to develop a useful understanding of the primary and contributory causes of the crashes and resulting injuries, and to identify meaningful remedial measures. Such investigations should be initiated as soon as possible after occurrence of the accident in order to:

   a. Acquire information from witnesses before they become confused or leave the accident site.

   b. Assess temporary environmental conditions which may be subject to rapid change.

   c. Record the evidence of apparent primary and secondary causative factors of the accident event sequence, such as tire marks or other transient conditions which may become altered by subsequent traffic activity.

   d. Attempt to establish contributory accident causes.

   e. Identify relevant safety countermeasures that will lessen the likelihood, if not eliminate completely, the occurrence of similar vehicle-pedestrian crashes and consequences.

2. On-the-scene investigation of accidents is the primary responsibility of the police. Cooperative or other follow-up investigations can also be conducted by several types of individuals acting independently or as a team. Although each investigator is motivated by different, but complementary, objectives, each should attempt to acquire all facts about the accident. The principal classes of investigators include:

a. Police investigators.*

Police investigators should attempt to establish the sequence of events which led to the accident, questioning witnesses carefully and recording descriptions of environmental factors and any other evidence pertaining to the event.

b. Medical personnel.

While not directly investigating the sequence of events leading up to the crash, medical personnel should investigate the degree to which health factors (such as intoxication, vision or hearing deficiencies, or other deficiencies usually associated with older people) may have contributed to the accident. Medical reports should then be prepared on any deficiencies so identified either in the driver or the pedestrian.

c. Specialists for team investigations.**

Other investigators in a team format can include traffic and mechanical engineers, medical and social scientists, and other specialists to aid in determining the extent to which defective traffic control devices, vehicle failure, driver-pedestrian behavior, highway environmental factors, and health factors may have contributed to the accident. Such teams should also attempt to identify any design or external styling features such as exterior ornamentation of the vehicle that may have aggravated the injury resulting from the vehicle impacting the body of the pedestrian.

d. Other groups.

Investigators for private safety support organizations and insurance companies should be assisted as appropriate in the conduct of followup investigations of an accident in an attempt to acquire data and draw their own conclusions relating to matters within their responsibility and concern.

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*See Volume 15, Police Traffic Services.
**See Volume 9, Identification and Surveillance of Accident Locations.

3. The agency or official with overall responsibility for pedestrian safety should coordinate all crash investigation policies and programs involving any of the investigators listed in paragraph (2) above.

4. Vehicle-pedestrian crash classification.

   To promote the comparative and continuing analysis of data from several jurisdictions, States and their political subdivisions should use a uniform definition of data items and a common system for the classification of pedestrian accidents.

C. Relevant data.

Factors related to the driver, the vehicle, the pedestrian, and the roadway, as well as a myriad of other conditions which may be of consequence for a single incident, can all be factors in pedestrian accidents. It is essential, therefore, to record and make available data pertaining to all factors associated with an accident.

1. Accident classification.

   The pedestrian accident classification system should coincide or be consistent with that in use for all motor vehicle accidents.*

2. Time of occurrence.

   General data in the pedestrian accident data inventory should include:

   a. Time of day, to reflect light conditions present at the time of the accident.

   b. Day of week, to reflect traffic flow (light, medium, heavy) on the day of the accident.

   c. Month of year, to reflect:

*American National Standards Institute, Manual on Classification of Motor Vehicle Traffic Accidents (ANSI Manual D16.1-1970).

(1) Weather conditions.

(2) Seasonal traffic volume variations.

d. Year, to consolidate data base and to provide a time frame for statistics resulting from data analysis.

3. Location of accident site.

Fixing and recording the location of the accident accurately is extremely important, as discussed further in Volume 9, Identification and Surveillance of Accident Locations, to develop reliable indications of locations and conditions where there are concentrations of vehicle-pedestrian crashes.

4. Weather, lighting, and other environmental conditions.

The environmental conditions prevailing at the accident site at the time of the accident should be recorded. These include:

a. Weather factors, such as wind, precipitation, reduced visibility, and temperature.

b. Daylight, dusk, darkness, or other visibility limitations caused by overcast conditions.

c. Glare, parked cars, or other factors which may obscure pedestrians or traffic control devices from drivers.

d. Roadway conditions affected by weather, including rain, ice, snow, or other surface conditions that might affect vehicle stability and control or safe pedestrian movement.

5. Physical features of the accident site which may be significant contributory factors. Such physical features to be recorded include:

a. The locale of the accident site, including whether it is in predominantly:

(1) An urban or rural area.

(2) A residential, commercial, or industrial area.

(3) At or between intersections or interchanges.

b. Street-highway design characteristics, including:

(1) The width of the street or highway.

(2) The number of traffic lanes.

(3) The presence of underpasses and overpasses.

(4) Pedestrian islands or refuges.

c. Contributory deficiencies, including:

(1) Poor sight distance.

(2) Absent or otherwise deficient traffic signs, markings, or other control devices.

(3) Maintenance deficiencies in the road or traffic control devices.

(4) Maintenance deficiencies in the shoulders, such as improperly trimmed trees and bushes.

6. Vehicle data.

Vehicle data are important for determining causation of both the crash and the resulting injuries to pedestrians. Data to be collected should include vehicle:

a. Age.

b. Make and model.

c. Exterior features which may have been a crash or injury contributing factor.

d. Speed, direction, braking or acceleration, and other descriptions of the path of travel.

(1) Up to the instant of impact.

(2) After impact.

e. Precrash condition of brakes, lights, and other safety systems.

f. Damage, specifying the area of the vehicle in which impact occurred and the extent of such damage.

7. Pedestrian and driver data.

Pedestrian and vehicle operator data should include:

a. Name, age, sex, and address.

b. Nature of the injuries.

c. Previous health history including comments relative to any mental or physical impairments due to illness, injury, advanced age, or other reasons.

d. Blood-alcohol level of the driver and/or the pedestrian, and any other indication of the possible influence of alcohol.*

e. Any indication that either the driver or pedestrian was affected by prescription or patent medicines, drugs, or narcotics of any type.

f. Type and color of pedestrian clothing.

D. Analysis of accident data.

1. Procedures to assure that all relevant data that are collected are thoroughly analyzed should be part of the inventory. To be included are procedures that are appropriate for:

a. Individual accident analysis.

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*See Volume 8, Alcohol in Relation to Highway Safety.

b. Analyses based on combining data from several accidents.

2. All analyses should be oriented around the fundamental goal of learning all that is possible from a given event or group of events to aid in planning countermeasures to lessen the likelihood of future similar events or to reduce the severity of injuries in similar vehicle-pedestrian impacts. The assignment of blame for fault for purposes of civil or criminal litigation is of less importance.

3. Wherever possible, "control" data should be utilized to aid in assessing the significance of the factors associated with crashes in relation to the total pattern of "crash" and "noncrash" events under comparable conditions.

   a. Characteristics of drivers involved in crashes compared to those of crash-free drivers.

   b. Injured pedestrians compared to those who are not involved in accidents.

   c. Crash-involved vehicles versus crash-free vehicles.

   d. Locations where crashes occur compared to locations where there are no crashes or few crashes.

4. The various classes of countermeasures to improve pedestrian safety are generally well known. Systematic analysis of vehicle-pedestrian crash data should be directed toward identifying:

   a. Particular countermeasures that will be most appropriate to correct specific conditions.

   b. Program plans or policy-setting countermeasures that are applied in general.

   c. Alternatives for correcting some aspect of the pedestrian safety problem, either at a specific location or in general. Each alternative should be evaluated to determine what it can accomplish within a realistic economic framework. The merit of all corrective alternatives (devices or policies) should be compared and evaluated technically and economically.

III. IMPROVEMENT OF PEDESTRIAN PROTECTION

To promote better pedestrian compliance with regulations and increase pedestrian safety, uniformity in traffic control devices* and procedures is highly desirable and should be encouraged. Lack of uniformity in procedures and devices for the control of traffic creates confusion between pedestrians and motorists, causes errors in decision making, and contributes to accidents. Many traffic engineering measures have proven to be effective in providing protection for pedestrians. However, no single method or procedure of control and/or protection is universal because there are wide variations in geometrics, environmental features, and other conditions from one intersection to the next or on other sections of highways and streets.

A. Reduction of the potential for vehicle-pedestrian conflicts.

The measures and techniques presently available for the reduction of the potential vehicle-pedestrian conflict and subsequent enhancement of pedestrian safety may be categorized in general as protection at grade, including that provided by traffic control devices and other elements of traffic engineering practice, and provisions for full grade separation of pedestrian and vehicle movements with pedestrian overpasses or underpasses. Both classes of practice should be utilized wherever appropriate and within the limits of available resources. Such improvements should be planned on a needs basis for installation at locations where pedestrian protection facilities, devices, and techniques are warranted but do not exist or are substandard.

1. Protection at grade and other traffic engineering techniques.

    a. The use of traffic control devices or traffic engineering techniques should be based on a complete investigation and analysis of the pedestrian hazards at a specific problem site.

    b. All forms of pedestrian protection should be designed and operated to ensure adequate protection of older pedestrians, children, and other populations that are

*See Volume 13, Traffic Engineering Services

particularly likely to be struck by vehicles. All should take into consideration the slower perceptive and responsive capabilities of older pedestrians. For example, signal timing cycles should take into account walking speeds appropriate to older pedestrians and the habits and tendencies of children.

c. Traffic engineering techniques and traffic control devices which have proven successful when properly used include:

(1) Pedestrian signs, signals, and markings.

(a) The very few traffic control devices designed exclusively for and directed toward pedestrians include guide and regulatory signs.*

(11) At crosswalks.

(22) At pedestrian-actuated traffic control signals.

(33) At overpasses and underpasses.

(44) Along streets and highways having no sidewalks.

(b) Where appropriate, pedestrian signals should be incorporated into traffic signal control plans. Representative systems include:

(11) The pedestrian-actuated signal which will provide an interval for the pedestrian to cross on a demand basis.

(22) A semi-exclusive system in which the pedestrian shares the "green" interval with turning vehicles.

*See National Advisory Committee on Uniform Traffic Control Devices, Manual on Uniform Traffic Control Devices for Streets and Highways.

(33) An exclusive pedestrian system in which all vehicular movement is stopped.

(2) Channelization.

Although usually designed for vehicular traffic control, channelization can be an effective technique for pedestrian protection because it reduces the pavement area that would otherwise permit erratic driver actions. To encourage proper use of crosswalks by pedestrians, the channelization should not require extensive excursions from a direct path at areas of high pedestrian and/or vehicular traffic volume. When highways are exceptionally wide and no other controls or safeguards are available, channelization design should not require pedestrians to cross more than three lanes of traffic before reaching a refuge area.*

(3) Pedestrian islands.

Where a roadway has been widened for the improvement of vehicular traffic, pedestrians should be provided a means for safely crossing that roadway. Pedestrian islands are used to minimize pedestrian exposure to vehicular traffic and enable the pedestrian to cross safely in stages.

(4) Loading islands.

Loading islands which have been used for passenger loading of streetcars are not common today since the greater use of buses enables loading and unloading of passengers at the curb. Where still required, however, the islands should be designed for peak population usage.

*See American Association of State Highway Officials, A Policy on Geometric Design for Rural Highways, and Highway Research Board, Special Report No. 5, Channelization.

(5) Pedestrian crosswalks.

Judicious use of pavement markings has proven very effective for the control and safety of pedestrian traffic when their location is selected on the basis of need determined by analysis. Marked crosswalks reduce violation of the pedestrians' right-of-way by drivers and are more readily used by pedestrians, reducing jaywalking violations.*

(6) Pedestrian barriers.

(a) Studies of barriers limiting pedestrian access to roadways indicate that:

(11) When installing overpasses or underpasses, barriers for possible unsafe alternate routes should be provided.

(22) Continuous fencing of express right-of-way is desirable in high density population areas.

(33) Multilevel intersections of major roads or highways often require special pedestrian safety barriers.

(b) Stanchion and cable or chain barriers are most commonly used to prevent mid-block crossings. At school sites and along major highways, chain fencing is particularly useful to prevent mid-block crossings. Barriers should be high enough to prevent persons from stepping over them. They should be clearly designated and have appropriate guide signs. Barrier chains, fences, or rails on the curb side of loading islands have been effective in

*See National Advisory Committee on Uniform Traffic Control Devices, Manual on Uniform Traffic Control Devices for Streets and Highways, and Institute of Transportation and Traffic Engineering, University of California, The Influence of Painted Crosswalks on the Behavior of Pedestrians and Automobile Drivers.

preventing passengers from stepping unexpectedly into the path of vehicle traffic. A more detailed discussion of methods for protecting against vehicle encroachment is available in standard technical manuals.*

2. Full grade separation of pedestrian and vehicle movements.

The complete physical separation of pedestrians and vehicles is the most positive approach to reducing pedestrian traffic hazards. Some techniques or devices used to achieve this separation include:

a. Overpasses/underpasses.

Overpasses and underpasses have been successfully used to accomplish physical separation of pedestrians and vehicles. To avoid physical direction of pedestrians into traffic, the design of such structures should provide for the proper orientation of the approach and exit ramps. Proper lighting for protection against nuisance activities such as defacement, vandalism, and other undesirable activities should also be provided.** Whenever pedestrian overpasses and underpasses are used to separate pedestrians and vehicles, they should in general:

(1) Be well lighted and enclosed to prevent objects from being thrown into the path of vehicles.

(2) Direct pedestrian traffic in a safe manner by having exits and entrances which restrain pedestrians from direct entry into the path of vehicular traffic.

(3) Emphasize pedestrian convenience in design to assure pedestrian utilization.

*See National Advisory Committee on Uniform Traffic Control Devices, Manual on Uniform Traffic Control Devices for Streets and Highways.
**Institute of Traffic Engineers, Traffic Engineering Handbook.

b. Bridges and walkways.

The "second story" concept, which has been suggested for central business districts, provides for bridges and walkways at the second story level of downtown buildings. This concept should be considered in connection with the rehabilitation and renewal of central business district areas, as it has many advantages relating to pedestrian safety.

c. Pedestrian paths (not sidewalks).

There is frequently a need for some sort of pathway for pedestrians which separates pedestrians from vehicle traffic flow. This is particularly true in recreational reserves and in rural and suburban areas. The character of such areas precludes the use of conventional sidewalk construction on an economic basis. The use of simply-kept, graded, or improved paths provides safe pedestrian-vehicle separation in such areas.

d. Pedestrian tunnels.

Many cities have constructed or have permitted private construction of tunnels between downtown underground parking facilities and nearby buildings. This means of separating pedestrians from vehicular traffic should be considered when plans for such parking facilities are being developed.

B. Street and highway lighting systems.

More pedestrians are killed during nighttime hours than during daylight hours, indicating the need to provide drivers with better illumination and thereby with more advance warning of the presence of pedestrians.

1. Hazard aggravating factors.

Some factors which aggravate the seriousness of existing hazards and contribute to a higher nighttime accident experience are:

a. Type and color of clothing worn by pedestrians.

b. Dark pavement surfaces.

c. Reduced visual perception of both drivers and pedestrians.

2. Lighting systems.

Lighting at roadway intersections, or on sections of roadway having a high ratio of night/day accidents, should be provided or improved on a scheduled basis according to need.*

a. Environmental lighting should be designed and installed at critical and potentially hazardous locations to illuminate the pedestrian or to warn the driver that he is in an area where heavy and frequent pedestrian traffic can be expected.**

b. While lighting systems can be used to give drivers advance warning of pedestrian crossing locations at night, judicious use of pavement markings perform the same working function during daylight hours.

C. Land use planning and regulation.

1. Subdivision and redevelopment planning.

The practices recommended by the Institute of Traffic Engineers for pedestrian traffic control and safety are an excellent guide for the planning of new subdivisions and redevelopment areas.

a. Traffic considerations and subdivision design should be classified in two general categories.***

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*Illuminating Engineering Society, American Standard Practice for Street and Highway Lighting.

**Further information relating to street and highway lighting is presented in Volume 12, Highway Design, Construction, and Maintenance.

***Institute of Traffic Engineers, Recommended Practices for Subdivision Streets.

(1) The physical layout of the street and pedestrian system as related to land use.

(2) The engineering standards for vehicular and pedestrian facilities.

b. Planning aspects to be considered should include, but not necessarily be limited to:

(1) Provisions requiring the construction of sidewalks or pathways.

(2) Installation of adequate street lighting.

(3) The design of street patterns to insulate residential area activities from exposure to through traffic.

2. School site selection and usage.

a. Site selection.

Pedestrian safety should be given careful consideration in the selection of a site for a new school. School administrators should be assisted in the selection and planning of school sites by community planners, highway and traffic engineers, and police, fire, and other local officials who may be involved. Selection of a site and planning for its safe use must take into consideration such needs as special loading and unloading facilities in areas free from conflict with pedestrian traffic, parking for regular and special activities, and facilities for fire trucks or other emergency service vehicles and equipment.

b. Site usage.

(1) Proper pedestrian protective measures should also be instituted in the case of an existing school. In addition to pedestrian traffic, schools generate sizeable volumes of vehicular traffic in the course of their regular and special activities.

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(2) In any modernization, expansion, or improvement planning for existing schools, a major consideration should be to provide as much protection as possible for pedestrians and assistance to drivers through facilities that enable them to avoid pedestrians.

(3) The design of new facilities should emphasize the safe access and circulation of pedestrians in areas separated from vehicular traffic flow.

3. Off-street parking.

Many jurisdictions now require that plans for new major construction include off-street parking areas for employees, customers, and other visitors. The design of these parking areas should be carefully reviewed to ensure that hazards are eliminated and that protection for pedestrians is provided in the design.

4. Regulation of land use.

Regulation of land use should include enforcement of zoning ordinances to prohibit nonconforming uses that would generate hazardous pedestrian movements. A logical application of land use regulation should include:

a. Control over placement of entrances and exits of generators of pedestrian traffic such as:

(1) Playgrounds.

(2) Places of amusement.

(3) Sports events.

(4) Public and private buildings.

b. Procedures for regulation of installation of pedestrian-traffic generating amenities such as:

(1) Outdoor telephones.

(2) Newsstands.

(3) Drinking fountains.

(4) Bus stops.

D. Inventory of pedestrian protection.

The pedestrian safety program should include provisions for identifying and inventorying existing pedestrian-oriented traffic control devices and other facilities provided for pedestrian protection. Such inventories are to be in accordance with and an integral part of the inventories described in Volumes 12 and 13 of this Manual.*/** Provisions should also be made for keeping the inventory current on a scheduled basis.

IV. DRIVER FAMILIARIZATION WITH PEDESTRIAN PROBLEMS

A program to inform and educate drivers about pedestrian problems should be initiated to assist drivers in recognizing and avoiding situations which could result in a pedestrian accident. The development of such a plan should include such topics as reduced pedestrian capabilities, environmental factors, pedestrian rights and duties, and vehicle limitations.

A. Reduced pedestrian capabilities.

Pedestrians most frequently involved in accidents are young people up to 14 years of age, elderly people 65 years of age or older, and pedestrians who are under the influence of alcohol. The seriousness of the accident problems in these three groups is confirmed by the following facts.

1. Approximately 30 percent of the population of the United States is 14 years of age or younger. This same age group reflects about 52 percent of all pedestrian casualties. Young people usually have acute mental abilities but suffer from lack of fully developed physical coordination, experience, or sense of judgment. Very young children

*See Volume 12, Highway Design, Construction, and Maintenance.
**See Volume 13, Traffic Engineering Services.

of preschool age do not have the ability to change direction quickly.

2. Persons 65 years of age or over represent about 9 percent of our population but account for about 25 percent of all pedestrian fatalities. Elderly people are debilitated by decreased mental and physical coordination. Reduced vision and hearing, which is common for this age group, decrease pedestrian safety even in well-designed locations.

3. During past years, several States have conducted studies that indicated that of all the fatally injured pedestrians 15 to 64 years of age who were subjected to blood alcohol tests, 33 to 69 percent had blood alcohol concentration levels of 0.15 or more. It has been generally presumed that blood-alcohol concentration levels of 0.10 percent or more constitutes a condition of "under the influence of alcohol."* Persons under the influence of alcohol lose both mental awareness and physical coordination.

B. Environmental factors.

There are characteristics of time and environment which are related to certain types of pedestrian accident involvement.

1. Many young children involved in accidents are injured on residential streets while playing during daylight hours. This would suggest that drivers require additional training to improve their recognition of such areas as ones which require greater attention and caution.

2. The elderly person is more often involved in accidents at intersections and during hours of darkness. Drivers must be assisted in improving their pedestrian detection abilities by means of:

   a. Better crosswalk lighting.

   b. Advance warning techniques such as distinctive lighting or other devices at potentially high accident crossings.

*See Volume 8, Alcohol in Relation to Highway Safety.

c. Better training in recognizing pedestrian hazards.

d. Pedestrian use of visibility-enhancement devices, such as lights and retro-reflective materials in or on clothing.

C. Pedestrian rights and duties.*

1. Education programs.

The subject of pedestrian rights should be included in all driver education courses. Training in pedestrian attitudes regarding rights-of-way, refuges, etc., will better prepare drivers to anticipate pedestrian actions. The student who is learning to drive should be made aware of the limitations of pedestrians, particularly those of the very young and the elderly. Training should develop driving habits which emphasize recognition of these attitudes and limitations and their importance to improvement of pedestrian safety. A program to inform previously licensed drivers of pedestrian rights, attitudes, and limitations should be initiated.

2. Driver improvement school.

Local governments should require those drivers who have seriously violated pedestrian safety or driving regulations to attend a driver improvement school. The material presented at these sessions, in addition to general traffic regulations, should contain specific reference to pedestrian safety problems based on local data and conditions as well as the policies and practices drivers should use to enhance pedestrian safety.

D. Vehicle limitations.

Driver education and driver improvement curricula should include material pertaining to vehicle limitations and their

*See National Committee on Uniform Traffic Laws and Ordinances, Uniform Vehicle Code, Chapter 11, Rules of the Road, Article V, Pedestrians' Rights and Duties.

effect on pedestrian safety. A comparison of these limitations in relation to the limitations of pedestrians should be emphasized. Specifically, course material regarding speeds, stopping distances, and other vehicle characteristics relating to vehicle control should be related to pedestrian safety.

V. PEDESTRIAN TRAINING AND EDUCATION

A. Introduction.

Effective training and education programs should be designed and implemented for pedestrians in all age groups to make each aware of general pedestrian hazards, specifically those related to their respective groups. These programs should emphasize the special problem of each high risk category, especially those presented in paragraph IV of this chapter.

B. General training for all pedestrians.

1. Each State should encourage and assist in the development of cooperation and coordination among traffic safety agencies and school district safety supervisors to educate all pedestrian groups and to distribute information relative to:

   a. Pedestrian and driver rights and responsibilities.

   b. Duties and limitations of drivers and pedestrians.

   c. Vehicle-pedestrian accident statistics for State and local jurisdictions.

   d. Identified local hazards.

2. This educational process should be carried out both at State and local levels through:

   a. Programs to develop and disseminate pedestrian safety information and training materials through the public media and private publications.

   b. Public and private organizations in the States and political subdivisions that are working in the field of safety.

c. Parent education programs which cover pedestrian safety relating to both adult and child safety problems.

d. Special pedestrian safety schools established by local jurisdictions.

3. As part of the overall pedestrian training and education program, a syllabus should be prepared with inclusion of information on:

a. Pedestrian rights and duties.

These rights and duties are the guidelines by which both drivers and pedestrians can act in harmony to avoid vehicle-pedestrian conflicts. Since the pedestrian generally can respond more quickly than a vehicle, instruction of pedestrians should focus more on pedestrian "duties" than "rights." The vehicle operator, however, has a responsibility to consider those pedestrians not included in this "general" class, such as children, elderly persons, and alcohol users. To have an effective pedestrian safety program uniform enforcement of pedestrian and vehicle regulations or rights and duties is necessary.

(1) Rights of pedestrians include:

(a) Right-of-way in crosswalks.

(b) Right-of-refuge in safety zones.

(c) Right to expect driver courtesy and caution.

(d) Priority of right in use of sidewalks.

(2) Duties of pedestrians include:

(a) Obeying traffic regulations.

(b) Yielding to vehicles outside pedestrian crosswalk.

(c) Using sidewalks when available.

(d) Walking facing oncoming traffic where no sidewalks exist.

(e) Not hitchhiking.

(f) Anticipating unsafe driver actions.

(g) Wearing or carrying retro-reflective material, or a flashlight, during hours of darkness.

b. Traffic control devices.

The pedestrian should understand how traffic control devices work and how they are used. He should be taught to anticipate driver response actions to traffic control devices as well as what action he should take in response to the same stimulus.

c. Vehicle-pedestrian crash statistics and local hazards inventory.

General pedestrian accident statistics should be publicized at State and local levels. Local hazards, which in spite of all remedial efforts continue to be causative factors in frequent and severe pedestrian accidents, should be publicized.

C. Education for children.

Practice in the recognized duties and responsibilities of a pedestrian should become an automatic response. Because young people are often traffic casualties, this response should be developed by beginning the process of education at the earliest possible age, i.e., during nursery school, kindergarten, or elementary school.

1. Nursery school.

The nursery school or special preschool center provides the first opportunity to present instruction in pedestrian safety in an organized manner. The State should promote such programs by compiling and providing to all licensed nursery schools, child care centers, or other approved

training groups teaching guides and course materials designed for this age group.

2. Kindergarten.

   In many instances, the first opportunity to reach children with trained instructors is kindergarten. Guides and materials designed to educate these young children in pedestrian safety should also be compiled and supplied by the State.

3. Elementary schools.

   In those communities and school districts where nursery schools and/or kindergartens do not exist, training in traffic and pedestrian safety should begin in the first grade. In those communities that do have the nursery school and/or kindergarten facilities, this program should be continued in the elementary school. The guides and materials developed and provided by the State may be different in format than those provided for nursery school and kindergarten children, but emphasis on safety should be stronger because of the later start.

4. Safety supervisor.

   To assure proper development and presentation of traffic safety instructions, not only in the elementary grades, but in the intermediate and secondary schools as well, school administrators should assign a qualified school district safety supervisor to coordinate safety education with the State pedestrian safety supervisor.

VI. PROTECTION OF CHILD PEDESTRIANS

A. Introduction.

1. More extensive protection is required for child pedestrians because of their lack of coordination, undeveloped sense of judgment, and innate sense of curiosity and daring.

2. In developing protective measures for child pedestrians, it is necessary to define the changing environmental

hazards which a child may encounter as he walks from the residential to the school location. Child pedestrian activities to be considered include children at residential play and children in transit to and from school.

B. Children at play.

1. Introduction.

The majority of child pedestrian accidents occur at mid-block locations on residential streets. Children will frequently run into the roadway with little regard to hazards, because of the excitement of their activities.

2. Hazards.

Hazards facing children include:

a. Driveways.

b. Alleys.

c. Driver's inability to see small children behind his car in driveway.

d. Shrubbery hiding pedestrians approaching driveways or crosswalks.

e. Parked cars blocking driver's view of children playing.

f. Obstacles blocking child's view of approaching vehicle.

g. Inadequate sight distances at intersections.

3. Corrective measures.

The unique conditions and problems associated with each location must be considered and remedial measures developed specifically for those problems and those conditions. Corrective measures to overcome these hazards may include, but are not necessarily limited to:

a. Establishment of separated, off-street play facilities.

b. Prohibition of street play.

c. Provision for adequate sight distances:

(1) Use of wide medians and areas between curbs and sidewalks where possible.

(2) Trimming of shrubbery or removal of other obstacles at driveway entrances and intersections.

(3) Prohibition of street parking.

d. Regulation of vehicle speed.

e. Use of approved signing methods to warn drivers of children activity.

f. Emphasis on these hazards in driver education courses.

C. School children's safety.

1. Introduction.

The safety of school child pedestrians requires protection not only to and from school but also at the school site. Each student traffic safety program should, therefore, have as a minimum three basic objectives:

a. Intensive, continuing education of school children in proper safety practices.

b. Proper application, installation, and utilization of traffic control devices designed for school children.

c. Promotion of public understanding and acceptance of the total school pedestrian safety program.

2. Hazards.

The hazards faced by school children are those associated with crossing streets en route to and from school and those associated with activities required in school functions, including:

a. Numbers of street crossings required.

b. Inadequate traffic controls.

c. Lack of sidewalks.

d. Lack of visibility at street crossings.

e. Traffic over sidewalks from driveways and alleys.

f. Traffic and parking problems at the school site.

g. Inadequately protected playgrounds.

h. Exposure to traffic flow when approaching or leaving school buses or school bus loading points.

3. Corrective measures.

There are many measures presently available to eliminate or reduce the severity of such hazards.* These measures provide child warning, protection, or separation from a hazard. These corrective measures include:

a. General corrective measures.

(1) Traffic control devices and policies relating to school crossing signs and signals.

(2) Student safety patrols.

(3) Adult school crossing guards.

(4) Traffic officers at school crossings.

(5) School route plan.

(6) Installation of sidewalks or pedestrian pathways.

*Highway Users Federation for Safety and Mobility, A Guide to a School Pedestrian Safety Program.

(7) Fenced playground area.

(8) Use of underpasses/overpasses.

(9) Supervised school bus loading and unloading.

b. Specific corrective measures.

(1) School crossing control programs.

To achieve optimum protection and control of student pedestrians, school crossing control programs should make full use of the school route plan technique.* Discussion of the school route technique and other safety practices should be a part of the regular course of classroom instruction.

(a) Recognized warrants should be established and consistently used in determining whether school crossings along the school route should be protected by school safety patrols, adult crossing guards, police supervision, traffic signals, or a combination of these measures.

(b) Extensive use should be made of corner clearance parking prohibitions in order to assure maximum visibility for student pedestrian protection at intersections along the school route.

(c) Since the school is the focal point of the entire school route network, the school site, is therefore, the area of greatest concentrated exposure in terms of numbers of school child pedestrians. For maximum protection, maximum visibility for this critical area of exposure should be assured by prohibiting parking on the school side of any street adjacent to the school area during school hours.

*Institute of Traffic Engineers, A Program for School Crossing Protection, and National Commission on Safety Education (NCSE), Policies and Practices for School Safety Patrols.

(d) Parents and parent-teacher groups should be encouraged to promote the safety of school children. They should, through personal example, emphasize the importance of full compliance with traffic regulations. Unsafe and inconsiderate practices by parents in the pickup of small children at school sites often create serious, hazardous situations which should be discouraged or prohibited.

(2) School bus route and loading point plans.

Many school districts provide transportation with their own bus fleets for school children. The provision of transportation carries with it a responsibility for the safe operation of the system and should be coordinated with police and traffic engineering officials having jurisdiction in the area concerned. The two facets of the transportation system which must be considered to assure safe operation are:

(a) Proper route planning.

Routes for school buses should be planned to reduce to a minimum the need for children to cross major streets on their way to or from a pickup point. Effort should be made to eliminate the need for any school child to cross a major street at an unsignalized intersection.

(b) Safe pickup locations.

The location of pickup and discharge points on the selected bus routes should be determined with the cooperative assistance of the local police and traffic engineer or other responsible local official. If possible, pickup and discharge locations should be located off major streets to reduce the possibility of accidents which result from failure of drivers to stop for a school bus loading or discharging children.

(11) Where sidewalks are installed, pickup and discharge points should be selected so that several groups of students would be picked up at one point.

(22) Where heavy traffic is a problem, pick-up points should be constructed so a bus can park off the main artery to load passengers safely.

(33) The point of pickup should be protected to prevent children from stepping into the vehicle traffic path.

(44) Advance warning of the site location and associated pedestrian traffic should be provided to drivers by the installation of proper traffic signs.

(55) It is desirable that these areas be supervised by adults.

VII. ENFORCEMENT

A. Introduction.

1. The basic purposes of traffic law enforcement are to:

   a. Obtain safe and efficient use of streets and highways.

   b. Protect life, limb, and property.

   c. Encourage maximum voluntary compliance with regulations.

2. Enactment and enforcement of uniform regulations for pedestrian safety can help achieve these purposes. Enforcement ranges from suggested changes in habitual procedures (warnings) to court action.

B. Enactment of pedestrian safety legislation.

1. A major step toward solution of the problem of pedestrian accidents is the elimination of the conflict between the

pedestrian and the driver. To minimize this conflict, most States and many cities have enacted legislation to define equitably the rights and duties of both drivers and pedestrians and to curb careless practices. The existence of such legislation and its enforcement should encourage a greater regard by drivers and pedestrians for the need to observe safe practices and thus lead to a decrease in pedestrian accidents.

2. States should enact legislation which includes at least the provisions of the Uniform Vehicle Code, Article V, Pedestrians' Rights and Duties, Chapter 11, and those other sections of Rules of the Road which also contain significant pedestrian provisions. Further, to aid in the elimination of pedestrian ordinances which are inconsistent with each other and the State traffic laws, each State should consider developing and maintaining a model traffic ordinance that political subdivisions may adopt by reference.*

C. Enforcing legislation.

Once legislation is enacted, procedures for its uniform enforcement should be established. These pertain to police and adult school crossing guards.

1. Traffic police.

   a. Every police officer should receive both recruit and refresher in-service training in his responsibility for pedestrian safety. This training should include courses in pedestrian rights and responsibilities and the uniform enforcement of pedestrian-vehicle regulations.**

   b. Police officers should provide a high level of enforcement of pedestrian regulations at high hazard locations, and pedestrian violators should be cited for traffic violations.

   c. Police officers should be selectively assigned on a temporary basis to control duty at locations with high pedestrian-vehicular volumes and accident incidence.

*See Volume 6, Codes and Laws.
**See Volume 15, Police Traffic Services.

d. It is also desirable to have the police participate actively in the organization, training, and supervision of school safety patrols and adult crossing guards.

2. Adult school crossing guard.

The adult school crossing guard should be empowered to direct and control traffic. His presence provides maturity of judgment and experience.

a. Such judgment can then be used to identify pedestrian safety violators, and through educational rather than punitive processes, achieve higher degrees of voluntary compliance.

b. The guard should have procedures to identify and bring such violators to the attention of the police and the courts.

D. Traffic court processes.

1. Enactment of pedestrian "rights and duties" legislation, information about such legislation, education of the public to the need for enforcement of these laws, and enforcement by police at all levels will result in improved pedestrian safety. However, the program can fail if the courts do not carry out their responsibility in the pedestrian safety program. The courts in which traffic law violators are judged are the final link in the process of establishing driver and pedestrian rights and responsibilities. *

2. The regulation-enforcement-adjudication process should be developed and administered as part of the total highway safety program, including pedestrian safety.

3. Flagrant and frequent pedestrian traffic law violators should be required to attend schools to improve their safety habits. These schools should be designed to educate these violators in the responsibility of pedestrians and in driver and vehicle limitations.

*See Volume 7, Traffic Courts.

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U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

HIGHWAY SAFETY PROGRAM MANUAL

VOLUME 14 PEDESTRIAN SAFETY	TRANSMITTAL 51
CHAPTER V. PROGRAM EVALUATION	November 1974

Par. I. Introduction
II. Evaluation Factors
III. Cost Effectiveness
IV. Techniques of Measurement
V. Recommended Evaluation Procedure
VI. Pedestrian Safety Program Inventory

I. INTRODUCTION

A. Evaluation of the pedestrian safety program is required by the Standard. The program should be monitored periodically to determine program status against established program objectives and to establish what progress has been made since the last review.

B. Such evaluation not only provides a basis to optimize the allocation of limited resources but also provides an information base useful for considering program adjustments required by legal, demographic, economic, sociological, and technological change.

C. Pedestrian safety program effectiveness is usually measured in terms of reduced frequency and severity of vehicle-pedestrian crashes and injuries. While these factors are the ultimate measure, an appraisal of a program can be made by considering its content, depth, and overall scope. For such an evaluation a performance reference base is necessary. Two techniques which should be used to evaluate the State and local programs are:

1. Reference to fixed standards.

   The fixed standard technique compares present level of performance to the minimum levels of performance as set by recognized authorities in the field. Such comparison with a standard can indicate improvement still required. The economic feasibility of achieving fixed standard levels should be considered.

2. Reference to relative standards.

   The relative standard technique compares present level of performance to performance at a previous date to indicate whether there has been improvement or deterioration of performance.

D. Both techniques should be used to appraise programs at State and local levels. The relative technique indicates improvement while fixed standards indicate the improvement still required. This should only serve to schedule progress, however, not to avoid it.

II. EVALUATION FACTORS

A. Evaluation factors are of two types:

1. Quantitative factors, including:

   a. Percent of total traffic fatalities involving pedestrians.

   b. Percent of total traffic injuries involving pedestrians.

   c. Trends in pedestrian fatalities and injuries.

   d. Pedestrian accident victims by age groups.

   e. Pedestrian accident victims by sex.

   f. Pedestrian violations involving pedestrian accidents.

   g. Driver violations involving pedestrian accidents.

   h. Trends in accident data factors.

i. Total program costs incurred by State and local government.

j. Percent of accidents in which alcohol users (drivers or pedestrians) are involved.

k. Percent of accidents in which environmental factors, e.g., lighting, roadway condition, etc., have been a contributing cause.

2. Qualitative factors, including:

a. Completeness and accuracy of the inventory of vehicle-pedestrian crash data.

b. Adequacy of the inventory of pedestrian control devices.

c. Adequacy of pedestrian safety training program for:

(1) Preschool children.

(2) School children.

(3) Adults.

d. Adequacy of pedestrian safety information programs.

e. Adequacy of driver education in pedestrian safety including:

(1) Student driver education.

(2) Violator and/or driver improvement school.

f. Adequacy of school crossing supervision program.

B. Factors indicative of program penetration expressed as either degree of compliance with fixed standards or degree of improvement over a time base include, but are not necessarily limited to:

1. Percent of school route crossing points supervised by trained personnel.

2. Percent of school children population instructed in pedestrian safety.

3. Percent of pedestrian protection ordinance violation repeaters.

4. Percent of general population instructed in pedestrian safety.

5. Percent of pedestrian control device requirements satisfied.

6. Requests for pedestrian safety speaker.

7. Records of enforcement by police and courts.

III. COST EFFECTIVENESS

A. Performance of existing programs and the planning of program alternatives should be based on a formal comparison of program effectiveness with program costs. Program alternatives should be evaulated on the basis of which alternative can achieve the specified objective for the least cost. However, it is recognized that local conditions may require the allocation of funds on other than a strict cost-effectiveness rationale.

B. Some limited success has been achieved with cost-benefit evaluation by calculating benefits in terms of lives saved, injuries reduced, and property damage avoided. In essence, these analyses relate the reduction in accidents in terms of cost savings balanced against the cost of the safety improvement.

1. It is extremely difficult to perform such an analysis precisely because of the problem of isolating the impact of a single program improvement from other factors affecting highway safety.

2. It is suggested that the State and local governments perform cost-benefit studies only for those program changes where the effect of other factors remains relatively constant during the study period. Such analysis should be made for comparable time periods before and after the improvements have been effected.

IV. TECHNIQUES OF MEASUREMENT

Evaluation should be an intrinsic part of the development of any pedestrian safety program. Evaluation must be recognized as an essential

activity which can be accomplished far more effectively when it is planned in advance, rather than attempted by review of records on a post facto basis. Program evaluation can rarely be accomplished without planned, deliberate data gathering and analysis.

A. Dependent upon the availability and accuracy of existing data, techniques employed to obtain and analyze information should include planned attempts to determine the impact of the program changes through a process of before-and-after measurement of conditions. Extensive use of established data systems as well as sampling techniques should be included in the analysis.

B. The need for consolidating evaluation information on Statewide and local bases should be recognized. Accordingly, it is recommended that the criteria and units suggested be standardized and reflect the data collected by Statewide or nationally-recognized safety organizations.

V. RECOMMENDED EVALUATION PROCEDURE

A. Program inventory.

Program evaluation should be initiated through a comparison of current program activity with the program inventory included as paragraph VI of this chapter.

B. Evaluation criteria.

Achievement goals or criteria for both quantitative and qualitative program evaluation should be developed for a period of years. The achievement trends would specify levels of performance to be satisfied within specific time frames. Comparison of program activity trends and status to these criteria and program periods should indicate program effectiveness.

C. Cost effectiveness.

Analysis of costs incurred to establish and conduct a pedestrian safety program should be made. As these procedures are conducted, program costs must be weighed against the primary effectiveness criterium, which is: How much of a reduction in pedestrian accidents or injuries has been achieved?

1. Those control devices or procedures which improve pedestrian safety at minimum cost should be implemented, reported, and publicized.

2. The procedures or physical characteristics of the plans should be modified to obtain maximum cost-effectiveness payoff.

VI. PEDESTRIAN SAFETY PROGRAM INVENTORY

A. Introduction.

The inventory is preliminary and may be modified as experience warrants. This Statewide pedestrian safety inventory is presented to provide guidance to a State in assessing its program. In the inventory "local jurisdiction" is defined as a political subdivision of a State that has responsibility for and authority to pass and enforce its own ordinances. This should include at least all counties and incorporated municipalities. If another meaning or definiation is used, it should be stated and used as the basis for applicable responses. "School district" is defined as a political subdivision that has responsibility and authority to administer and operate an independent school system.

1. How many "local jurisdictions" are there in the State?

2. How many "school districts" are there in the State?

B. Accident records system.

1. Are data relating to pedestrian-vehicular accidents identified in the data storage system? Yes____ No____

2. Are (complete) pedestrian-vehicular accident summaries and tabulations prepared which provide data on:

   a. Time and location of all pedestrian accidents?

      Yes____ No____

   b. Ages of pedestrian casualties? Yes____ No____

3. The extent to which alcohol is present in blood of fatally injured pedestrians 16 years of age or older is determined in what percentage of cases? (Circle proper answer)

   a. 0%.

   b. Less than 10%.

   c. 10 to 25%.

   d. 25 to 50%.

   e. 50 to 75%.

   f. 75 to 100%.

   g. 100%.

4. The extent to which pedestrians involved in accidents have physical or mental disabilities is determined in what percentage of cases?

   a. 0%.

   b. Less than 10%.

   c. 10 to 25%.

   d. 25 to 50%.

   e. 50 to 75%.

   f. 75 to 100%.

   g. 100%.

5. To what extent were environmental factors, e.g., lighting, visibility, roadway conditions, dark clothing of pedestrians, etc., contributing factors? _____

C. Reduction of pedestrian-vehicle conflict.

1. How many local jurisdictions perform their own traffic engineering functions?____. Who performs this service for the remainder? (number)?____; county road agencies (for municipalities)?____; State highway agency?____; consultants?____; no one?____; others?____.

2. Is the Manual on Uniform Traffic Control Devices used as a guide to the application of pedestrian traffic control devices by the: State highway agency? Yes____ No ____; local agencies? Yes____ No____. If "Yes," number using Manual ____.

3. Has the State conducted an inventory of pedestrian-oriented traffic control devices within the past year? Yes____ No____

4. Has the State conducted a pedestrian control needs study during the past year? Yes____ No____

5. How many local jurisdictions have conducted an inventory of pedestrian-oriented traffic control devices within the past year?____

6. How many local jurisdictions have made a pedestrian control needs study in the past year?_____

7. How many local jurisdictions require approval by a board or committee which includes urban planners and/or traffic engineers for:

   a. New subdivision design?_____

   b. Renewal area design?_____

8. How many local jurisdictions require sidewalks in new subdivisions?_____

9. How many local jurisdictions require review by the agency having traffic engineering responsibility of new building and parking lot plans?_____

10. Are pedestrian underpasses/overpasses used for other than freeway or expressway pedestrian crossings? Yes____ No____

11. Are there any studies in progress at either the State or local level relating to the development of means to reduce or eliminate pedestrian-vehicle conflict? Yes____No____. If "Yes," specify.

12. Is there a continuing State policy to require separation of pedestrian from vehicular traffic by:

    a. Installation of sidewalks along arterial streets and highways? Yes____ No_____

    b. Separation of pedestrian traffic at intersections of arterial streets and highways by:

        (1) Structures? Yes____ No_____

        (2) Pedestrian traffic signals? Yes____ No_____

        (3) Other means? (Specify) _____

D. Accident avoidance.

1. Are new lighting improvements being developed to protect pedestrians:

    a. By State agencies? Yes____ No_____

    b. By local agencies? Yes____ No_____

2. What new methods of advance warning for drivers of the location of pedestrian crossings have been developed:

    a. By State agencies? _____

    b. By local agencies? _____

3. How many school districts include pedestrian safety in driver education courses in high school? _____

4. How many local jurisdictions have driver-pedestrian improvement (or violator) schools with trained instructors?

_____

5. How many of these schools are conducted by the police department?_____; the traffic courts?_____; or others?_____.

6. What innovative methods are being studied for special protection of elderly pedestrians? _____

_____

7. Have any been developed? Yes___ No___. If "Yes," specify._____

_____

E. Public education.

1. How many school districts include traffic safety courses, including pedestrian safety, in their curricula in:

   a. Kindergarten and elementary schools?_____

   b. Junior high schools?_____

   c. Senior high schools?_____

2. Are there requirements for licensed nursery schools to include safety education in their programs? Yes___ No___

3. Is there a State program to promote public information activities related to pedestrian safety on a regular basis through the news media? Yes___ No___

F. Child pedestrian protection.

1. Do the State and local pedestrian safety programs include provisions for the protection of preschool and elementary school children while in neighborhood play? Yes___ No___. If "Yes," provide brief supplemental description of the major measures._____

_____

2. How many school districts require an urban planner and/or traffic engineer on site selection and building planning committees? _____

3. How many school districts have a program of cooperation with other involved local agencies to develop a system of school routes for student pedestrian use?

4. How many use:

   a. School safety patrols only? _____

   b. Civilian crossing guards only? _____

   c. A combination? _____

5. How many school districts have a program of cooperation with local police and traffic engineers or other responsible local officials to develop school bus routes? _____

6. In how many school districts is the policy of establishing school bus stops off major streets in force? _____

7. In how many school districts are there no school bus routes and loading points which require a student to cross a major street at an unsignalized intersection (major street is one for which cross-street traffic is required to stop)? _____

G. Vehicular-pedestrian rights and duties.

1. Are there State laws in effect which:

   a. Define pedestrian rights and duties? Yes____ No____

   b. Define driver rights and duties with respect to pedestrians? Yes____ No____

   c. Enable local jurisdictions to adopt these laws by reference, as part of the State model traffic ordinance legislation? Yes____ No____

2. If not, is such legislation in preparation? Yes____ No____

3. If such State legislation is in effect, are the provisions comparable to those in the Uniform Vehicle Code? Yes ____ No____

4. If enabling legislation for adoption by reference of a State model traffic ordinance is in effect, how many local jurisdictions have adopted it?_____

5. If local ordinances exist, how many are comparable to the model traffic ordinance?_____

6. How many local jurisdictions have local police departments?
_____

7. How many police agencies have recruit and in-service training courses in pedestrian rights and duties, or make such training available to their officers?_____

8. How many local police departments use the "selective enforcement" technique based on accident data and traffic information for pedestrian enforcement?_____

9. How many local jurisdictions have a separate traffic court with judges assigned exclusively to traffic violation cases?
_____

U.S. DEPARTMENT OF TRANSPORTATION
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IV. Reports to NHTSA and FHWA

I. INTRODUCTION

A comprehensive reporting system is necessary for program management and evaluation. Periodic report requirements should assist in achieving the purpose of the Standard as well as provide an exchange of information which will result in improved pedestrian safety. Reports should be circulated within and between local and State agencies and to appropriate Federal agencies.

II. REPORT REQUIREMENTS

A. Any coordinator for pedestrian safety requires reports from other agencies in order to define program progress. Reports required to assess the effectiveness of the pedestrian safety program should contain data about accidents, environment, and training which may permit the determination and correction of pedestrian accident causative factors.

B. Such reports should be available from local agencies or from summaries compiled at the State government level. These reports should include:

1. Accident reports.

2. Enforcement reports.

3. Education reports.

4. Traffic engineering reports.

5. Physical condition reports.

III. PEDESTRIAN SAFETY PROGRAM REPORTS

The local pedestrian safety coordinators should submit to the Governor's Representative/program manager reports which reflect the planning, operation, and effectiveness of the local pedestrian safety program.

A. Planning reports.

The planning reports should indicate those activities local governments intend to initiate for improved pedestrian safety and include:

1. Details of the method of implementation.

2. A description of anticipated benefit.

3. An estimate of program costs.

4. Background and justification for the program.

5. Priorities assigned to programs on a cost-benefit basis, when feasible, to indicate the development and implementation sequence.

6. The interrelationship of pedestrian safety projects.

B. Operation reports.

1. The operation reports should:

   a. Indicate the functions and techniques of implementing the pedestrian safety program.

   b. Be distributed to functional departments and their responsible agents for use in daily operations.

   c. Emphasize program features which have been demonstrated to enhance pedestrian safety and their method of implementation.

2. The subject matter of typical operating reports should include:

   a. Vehicle-pedestrian crash investigation reports which expose common causes of pedestrian accidents as summarized from other agency reports. These reports should include information on the physical condition of both the pedestrian and the driver involved in accidents.

   b. Reports on the education of drivers and pedestrians in pedestrian safety, including, in summary form, special training of safety patrols or adult school crossing guards.

   c. Reports on enforcement activities (including the use of driver-pedestrian improvement schools) and summaries of daily citations for pedestrian safety violators.

   d. Inventory reports summarizing the availability and utilization of pedestrian safety devices such as:

      (1) Special traffic signals, sign, and markings.

      (2) Legislation affecting pedestrian safety (such as prohibitive parking ordinances to improve sight distances).

C. Effectiveness reports.

Periodic review of pedestrian safety programs to compare achievement with planned objectives provides a measure of the effectiveness of the program.

1. While a program may be qualitatively evaluated for its scope of activity, a quantitative measure of effectiveness is more difficult to assess. However, effectiveness would be demonstrated if the number of infractions per individual habitual violator was significantly reduced following attendance at a violator improvement school, or, even more significantly, if pedestrian accidents were significantly reduced after initiation of a pedestrian safety program.

2. The effectiveness of each of the various functional elements within a program is frequently difficult to isolate. The

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effectiveness reports developed and distributed by the State pedestrian safety coordinator to interested local, State, and national agencies should attempt to identify significant program activities.

3. Included in these reports should be a summary of:

   a. Pedestrian accident trends.

   b. Number of warnings or arrests of pedestrian violators.

   c. Safety patrol training programs.

   d. Violator improvement school repeaters.

   e. Adult school crossing guard program.

   f. Preschooler safety training program.

   g. Pedestrian safety speaker requests.

   h. Public-initiated control device requests.

   i. Reduction in pedestrian and driver alcohol involvement.

   j. Before-and-after studies.

IV. REPORTS TO NHTSA AND FHWA

A. The NHTSA and FHWA intends to request program summary and evaluation reports from each of the States to permit:

   1. Correlation of pedestrian accident data on a national basis.

   2. Evaluation of the State's pedestrian safety program.

   3. Assessment of the State's achievement of the Standard's legal requirements.

B. The reports submitted by local jurisdictions to the State should be correlated and compiled along with State data into a coordinated State report. These reports should contain summary information similar to that described in the evaluation checklist and paragraph III of this chapter.

U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

HIGHWAY SAFETY PROGRAM MANUAL

VOLUME 14 PEDESTRIAN SAFETY	TRANSMITTAL 51
CHAPTER VII. - LOCAL GOVERNMENT PARTICIPATION	November 1974

I. INTRODUCTION

The participation of political subdivisions and public and private organizations in pedestrian safety planning and programming involves interactions among numerous groups which generate, use, and/or implement pedestrian safety measures. Such interaction takes place on a horizontal basis among local governmental units and on a vertical basis between local governments and the State.

II. PARTICIPATION INTERACTION

To illustrate interaction in participation in pedestrian safety the following tabular formats are discussed and presented as exhibits at the conclusion of this chapter.

A. State government participation in pedestrian safety.

A number of State governmental agencies are concerned with various facets of pedestrian safety, usually with differing responsibilities. For example, accident record data on the physical/mental condition of pedestrians are generated by the enforcement agencies but they are utilized by State health and medical agencies. Specifically, other State agencies having functions related to the problem of alcohol and traffic safety, such as the courts and education departments, would be interested in utilizing such data. The interrelationship of these government agencies is shown in Exhibit I.

B. Local government participation in pedestrian safety.

Because the pedestrian problem is more severe in the urban than the rural areas of the State, pedestrian safety should be given a high priority in local government safety program planning. For example, accident record data showing a high incidence of accidents at a particular intersection should be of major interest to local enforcement, highway and traffic engineering, education, and community planning agencies. The pattern of local government participation is outlined in Exhibit II.

C. Public authority participation.

In addition to local general purpose governments, there are other special purpose units of government such as public transportation and parking and port authorities which are concerned with pedestrian safety. The interrelationship of special purpose governments in pedestrian safety programming is shown in Exhibit III.

D. Nonofficial group participation.

Because pedestrian safety involves all age levels of the population, a number of nonofficial groups are actively concerned with pedestrian safety. These include such groups as parent-teacher associations, civic clubs, and safety councils or associations. The interaction of such groups in various facets of pedestrian safety is illustrated in Exhibit IV.

EXHIBIT I

INTERACTION OF STATE GOVERNMENT AGENCY PARTICIPATION IN PEDESTRIAN SAFETY

	Court Action	Education	Enforcement	Health & Medical Services	Highway & Tr. Eng.	Legislative	Motor Vehicle Driver Admin.	Planning Groups	Public Works	Recreation
Pedestrian Safety Areas										
1. Accident Records										
a. Pedestrian Age	X	X	X	X	X	X		X		X
b. Pedestrian Physical & Mental Condition (including Alcohol and Drugs)	X	X	X	X	X	X	X	X		X
c. Location/Time of Accident		X	X		X					X
d. Environment Analysis			X		X				X	
e. Vehicle Condition		X	X				X			
f. Accident Contributing Factors	X	X	X	X	X	X	X	X	X	X
2. Conflict Reduction										
a. Traffic Engineering Practices		X	X		X	X	X		X	
b. Land Use Planning	X				X	X		X	X	X
c. Ped./Veh. Separation					X			X	X	X
d. Environmental Illumination					X			X	X	X
3. Driver Familiarization										
a. Pedestrian Behavior		X	X	X	X	X	X	X		X
b. Driver Behavior		X	X	X	X	X	X	X		X
c. Accident Avoidance Techniques		X	X				X	X		
d. Driver Education & Training	X	X	X	X		X	X			
e. Driver Improvement Courses	X	X	X			X	X			
f. Driver License Examinations		X		X		X	X			

EXHIBIT I
(Continued)

	Court Action	Education	Enforcement	Health Medical Services	Highway & Tr. Eng.	Legislative	Motor Vehicle Driver Admin.	Planning Groups	Public Works	Recreation
4. Public Education & Training										
a. School Programs		X					X			
b. General Public Programs	X	X	X	X	X	X	X	X		X
5. School Child Protection										
a. To/From School Routes		X	X		X	X		X	X	X
b. School Bus Loading/Unloading	X	X	X		X	X	X	X		X
c. Safe Play		X	X		X	X	X	X	X	X
6. Enforcement										
a. Legislation	X	X	X	X	X	X	X	X	X	X
b. Enforcement	X	X	X		X	X	X			
c. Adjudication	X	X	X				X			
7. Evaluation and Information Reports	X	X	X	X	X	X	X	X	X	X

EXHIBIT II

INTERACTION OF LOCAL GOVERNMENT AGENCY PARTICIPATION IN PEDESTRIAN SAFETY

Pedestrian Safety Areas	Planning	Court Action	Education	Enforcement	Admin. Action	Health & Medical Services	Highway & Tr. Eng.	Legislative	Public Works	Recreation
1. Accident Records										
a. Pedestrian Age	X	X	X	X	X	X	X	X		X
b. Pedestrian Physical & Mental Condition (including Alcohol & Drugs)	X	X	X	X	X	X	X	X	X	X
c. Location/Time of Accident			X	X	X		X			X
d. Environment Analysis	X			X			X		X	
e. Vehicle Condition		X		X				X		
f. Accident Contributing Factors	X	X	X	X	X	X	X	X	X	X
2. Conflict Reduction										
a. Traffic Engineering Practices	X		X	X	X		X	X	X	
b. Land Use Planning	X	X		X	X	X	X	X		X
c. Ped./Veh. Separation	X				X		X		X	X
d. Environmental Illumination	X				X		X		X	X
3. Driver Familiarization										
a. Pedestrian Behavior			X	X	X	X	X	X		X
b. Driver Behavior			X	X	X	X	X	X		X
c. Accident Avoidance Techniques			X	X		X	X	X		X
d. Driver Education & Training			X		X	X		X		
e. Driver Improvement Courses		X	X	X	X	X		X		
f. Driver Licenses Examinations		X	X	X	X	X		X		

EXHIBIT II
(Continued)

	Planning	Courts Action	Educa-tion	Enforce-ment	Admin. Action	Health & Medical Services	Highway & Tr. Eng.	Legis-lative	Public Works	Recrea-tion
4. Public Education & Training										
a. School Programs			X		X	X	X	X		X
b. General Public Programs		X	X	X	X	X	X	X		X
5. School Child Protection										
a. To/From School Routes	X		X	X	X		X	X	X	X
b. School Bus Loading/Unloading	X	X	X	X	X		X	X	X	X
c. Safe Play	X				X		X	X	X	X
6. Enforcement										
a. Legislation	X	X	X	X	X	X	X	X		
b. Enforcement		X	X	X	X			X		
c. Adjudication		X	X	X	X			X		
7. Evaluation and Information Reports	X	X	X	X	X	X	X	X	X	X

EXHIBIT III

PUBLIC AUTHORITY PARTICIPATION IN PEDESTRIAN SAFETY

Pedestrian Safety Areas	Education (Privately owned)	Parking Authority	Public Transportation Authority	Port Authority
1. Accident Records				
a. Pedestrian Age	x			
b. Pedestrian Physical & Mental Condition (including Alcohol & Drugs)				
c. Location Time of Accident	x	x	x	x
d. Environment Analysis		x	x	x
e. Vehicle Condition	x		x	
f. Accident Contributing Factors	x	x	x	x
2. Conflict Reduction				
a. Traffic Engineering Practices		x	x	x
b. Land Use Planning	x	x	x	x
c. Ped. Veh. Separation		x	x	x
d. Environmental Illumination	x	x	x	x
3. Driver Familiarization				
a. Pedestrian Behavior	x	x	x	x
b. Driver Behavior	x	x	x	x
c. Accident Avoidance Techniques	x	x	x	x
d. Driver Education & Training	x		x	x
e. Driver Improvement Courses				
f. Driver License Examinations	x		x	x

EXHIBIT III
(Continued)

	Education (Privately owned)	Parking Authority	Public Transportation Authority	Port Authority
4. Public Education & Training				
a. School Programs	X			
b. General Public Programs	X	X	X	X
5. School Child Protection				
a. To/From School Routes	X		X	
b. School Bus Loading Unloading	X		X	
c. Safe Play	X			
6. Enforcement				
a. Legislation	X			
b. Enforcement				
c. Adjudication				
7. Evaluation and Information Reports	X	X	X	X

EXHIBIT IV

NONOFFICIAL GROUP PARTICIPATION IN PEDESTRIAN SAFETY

Pedestrian Safety Areas	Safety Associations	PTA	Service Clubs	Civic Groups
1. Accident Records	X	X	X	X
a. Pedestrian Age				
b. Pedestrian Physical & Mental Condition (including Alcohol & Drugs)				
c. Location Time of Accident				
d. Environment Analysis				
e. Vehicle Condition				
f. Accident Contributing Factors				
2. Conflict Reduction	X	X	X	X
a. Traffic Engineering Practices				
b. Land Use Planning				
c. Ped./Veh. Separation				
d. Environmental Illumination				
3. Driver Familiarization	X	X	X	X
a. Pedestrian Behavior				
b. Driver Behavior				
c. Accident Avoidance Techniques				
d. Driver Education & Training				
e. Driver Improvement Courses				
f. Driver License Examinations				

APPENDIX A

HIGHWAY SAFETY PROGRAM STANDARD 14

PEDESTRIAN SAFETY

PURPOSE

To emphasize the need to recognize pedestrian safety as an integral, constant and important element in community planning and all aspects of highway transportation, and to ensure a continuing program to improve such safety by each State and its political subdivisions.

STANDARD

Every State in cooperation with its political subdivisions shall develop and implement a program to ensure the safety of pedestrians of all ages. The program shall provide as a minimum, that:

I. There is a continuing Statewide inventory of pedestrian-motor vehicle accidents, identifying specifically:

   A. The locations and times of all such accidents.

   B. The age of all of the pedestrians injured or killed.

   C. Where feasible to determine, whether the exterior features of the vehicle produced or aggravated an injury.

   D. The color and shade of clothing worn by pedestrians when injured or killed, and the visibility conditions which prevailed at the time.

   E. The extent to which alcohol is present in the blood of fatally injured pedestrians 16 years of age and older.

   F. Where possible to determine, the extent to which pedestrians involved in accidents have physical or mental disabilities.

II. There are established Statewide operational procedures for improving the protection of pedestrians through reduction of potential conflicts with vehicles:

A. By application of traffic engineering practices including pedestrian signals, signs, markings, parking regulations and other pedestrian and vehicle traffic control devices.

B. By land use planning in new and redevelopment areas for safe pedestrian movement.

C. By provision of pedestrian bridges, barriers, sidewalks and other means of physically separating pedestrian and vehicle pathways.

D. By provision of environmental illumination at high pedestrian volume and/or potentially hazardous pedestrian crossings.

III. There is established a Statewide program for familiarizing drivers with the pedestrian problem and with ways to avoid pedestrian collisions.

A. The program content shall include emphasis on:

1. Behavior characteristics of the three types of pedestrians most commonly involved in accidents with vehicles: 1) children; 2) persons under the influence of alcohol; and 3) the elderly.

2. Accident avoidance techniques that take into account the hazardous conditions and behavior characteristics displayed by each of the three high risk pedestrian groups listed in subparagraph 1.

B. Emphasis on this program content shall be included in:

1. All driver education and training courses.

2. Driver improvement courses.

3. Driver license examinations.

IV. There are Statewide programs for training and educating all members of the public as to safe pedestrian behavior on or near streets and highways.

A. For children, youths, and adults enrolled in schools, beginning at the earliest possible age.

B. For the general population via the public media.

V. There is a Statewide program for the protection of children walking to and from school, entering and leaving schoolbuses, and in neighborhood play.

VI. There is a Statewide program for establishment and enforcement of traffic regulations designed to achieve orderly pedestrian and vehicle movement and to reduce vehicle-pedestrian conflicts.

VII. This program shall be periodically evaluated by the States, and the National Highway Traffic Safety Administration and Federal Highway Administration shall be provided with an evaluation summary.

APPENDIX B

GLOSSARY OF DEFINITIONS

This glossary defines those terms whose meanings may be unclear in the context in which they are used. These definitions are meant to apply only to the usage of these terms in this volume.

Barricade - A portable or fixed barrier having object markings, used to close all or a portion of the right-of-way to vehicular or pedestrian traffic.

Barrier - A device used to direct pedestrian traffic.

Channelizing Line - A line which directs traffic and indicates that traffic should not cross but may proceed on either side.

Crosswalks - (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 whether marked or unmarked; (b) Any portion of a roadway distinctly indicated for pedestrian crossing by lines or other markings on the surface.

Highway (or 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.

Intersection - 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 join 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.

Island - An area within a roadway from which vehicular traffic is intended to be excluded, together with any area at the approach thereto occupied by protective deflecting or warning devices.

Island, Channelizing - A traffic island located in a roadway area to confine specific movements of traffic to definite channels.

Island, Divisional - A traffic island, usually elongated and narrow, following the course of the roadway to separate traffic moving in the same or opposite directions and sometimes used as a pedestrian refuge.

Island, Loading - A pedestrian island especially provided for the protection of transit vehicle users.

Island, Pedestrian Refuge - A pedestrian island designed for the use and protection of pedestrians. A pedestrian island includes the safety zone together with the area at the approach occupied or outlined by protective deflecting or warning devices. This includes loading islands.

Island, Traffic - An island designed to separate or direct streams of vehicle traffic. Included are both divisional and channelizing islands.

Median Lane - A speed change and storage lane within the median to accommodate left-turning vehicles and sometimes used as a pedestrian refuge.

Median - The portion of a divided highway separating traveled ways for traffic in opposite directions and sometimes used as a pedestrian refuge.

Official Traffic Control Devices - All signs, signals, markings, and devices . . . placed or erected by authority of a public body or official having jurisdiction for the purpose of regulating, warning, or guiding traffic.

Pathway - Simply-kept graded or improved pedestrian-vehicle separation.

Pavement - That part of a roadway having a constructed surface for the facilitation of vehicular traffic.

Pedestrian - A person in, or adjacent to a trafficway, not in or on any vehicle or other device used for transportation, sport, or recreation.

Pedestrian Clearance Interval - The time of display of the DONT WALK indication following the WALK interval before opposing vehicles receive a green indication.

Pedestrian Detector - A detector, usually of the push-button type, installed near the roadway capable of being operated by hand.

Pedestrian Phase (Pedestrian Movement) - A traffic phase allocated to pedestrian traffic.

A. Combined Pedestrian-Vehicle Phase - A traffic phase wherein pedestrians are directed to move on certain crosswalks parallel to the through vehicular movement and wherein vehicles are permitted to turn across the said crosswalks.

B. Semi-Exclusive Pedestrian-Vehicle Phase - A traffic phase wherein pedestrians are directed to move on certain crosswalks with parallel or other vehicular movements, but vehicles are not permitted to turn across the said crosswalks during the pedestrian movement.

C. Leading Pedestrian Phase - Signal phasing wherein an exclusive pedestrian phase, in advance of the minor-street vehicular green phase, is provided for pedestrians crossing the main street only.

D. Exclusive Pedestrian Phase - A traffic phase wherein pedestrians are directed to move on any crosswalk or cross the intersection diagonally during an exclusive phase while all vehicles are stopped.

Pedestrian Signal - A traffic control signal which is erected for the exclusive purpose of directing pedestrian traffic at signalized locations.

Pretimed Signal - A type of traffic control signal which directs traffic to stop and permits it to proceed in accordance with predetermined time schedules.

Public Parking Area (or Facility) - A parking facility available for use by the general public, with or without payment of a fee.

Right-Of-Way - The privilege of the immediate use of the roadway.

Roadway - That portion of a highway improved, designed, or ordinarily used for vehicular travel, exclusive of the berm or shoulder. In the event a highway includes two or more separate roadways, the term "roadway," as used herein, refers to any such roadway separately but not to all such roadways collectively.

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

Sidewalk - That portion of a street between the curb line, or the lateral line of a roadway, and the adjacent property lines intended for the use of pedestrians.

Signal Installation - All of the equipment and material involved in the signal control of traffic at one intersection.

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

Traffic-Actuated Signal - A type of traffic control signal in which the intervals are varied in accordance with the demands of traffic as registered by the actuation of detectors.

A. Semitraffic-Actuated Signal - A type of traffic-actuated signal in which means are provided for traffic actuation on one or more but not all approaches to the intersection.

B. Full Traffic-Actuated Signal - A type of traffic-actuated signal in which means are provided for traffic actuation on all approaches to the intersection.

Traffic Control Signal - Any device whether manually, electrically, or mechanically operated by which traffic is alternately directed to stop and permitted to proceed.

Traffic Markings - All lines, patterns, words, colors, or other devices, except signs, set into the surface of, applied upon, or attached to the pavement or curbing or to objects within or adjacent to the roadway officially placed for the purpose of regulating, warning, or guiding traffic.

Traffic Sign - A traffic control device mounted on a fixed or portable support whereby a specific message is conveyed by means of words or symbols, officially erected for the purpose of regulating, warning, or guiding traffic.

Warrants - The minimum conditions which would justify the establishment of a particular traffic control regulation or device, usually including such items as traffic volumes, geometrics, traffic characteristics, accident experience, etc.

APPENDIX C

REFERENCES

The following is a selected list of recognized authoritative references which may be helpful in implementing the programs specified in this volume. This list is not meant to be a bibliography of all documents available in the field.

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APPENDIX D

REPRESENTATIVE PROJECTS

The pedestrian accident problem affects all age groups of our society; therefore, there is a great need for the continuing development of new, innovative pedestrian safety projects and programs. There is no fixed master safety plan which can be designed to meet all local pedestrian problems, for every community has unique characteristics which require variations in old, tested programs as well as implementation of new safety projects.

Sample pedestrian safety projects and problem areas which could be investigated on a local level are described below.

I. Pedestrian Safety Projects.

The following pedestrian safety activities are presented as representative projects which have been or are being employed in pedestrian protection programs.

A. Preschool and kindergarten pedestrian safety training school. Equipment includes use of films and other visual aids to instruct children in traffic safety.

B. Development and printing of a teacher's guide for pedestrian, bicycle, and school bus safety in elementary grades.

C. In-service safety education programs for elementary school teachers, which will train them to incorporate safety into regular daily education programs.

D. Development of course material, course content, supplies, equipment, and "play towns" to teach pedestrian safety to mentally retarded children.

E. A study of the physical and traffic characteristics of a high pedestrian volume intersection to determine the extent and nature of the pedestrian problem and to obtain guidelines to solutions.

F. A demonstration of imaginative use of newly developed lighting techniques and traffic control to improve crosswalk lighting and pedestrian and vehicle traffic control.

G. Development of course outline, teaching techniques, and equipment for use in special pedestrian improvement schools where pedestrian traffic violators are referred.

H. Safety orientation programs or courses for older adults to provide on-the-spot pedestrian safety training, including actual demonstrations of effective use of pedestrian safety measures such as "Walk-Don't Walk" signals, zebra crosswalks, etc. These programs utilize films and other visual means to help older citizens develop greater self-responsibility in safety when using the roadways.

I. Preschool parent education programs designed to give parents constructive suggestions on how to begin traffic training for youngsters beginning when children first learn to walk. These projects could be an important part of such programs as "Head Start" where parents and preschoolers are brought together for training.

J. Development of training programs for police safety officers, community safety coordinators, and school safety supervisors who will be working in the area of child pedestrian safety.

K. Operation of a community "safety town," a miniature, simulated traffic area or village where children can learn safe pedestrian practices away from the dangers of actual traffic.

L. A study of the effectiveness of specially designed pedestrian safety signals and signs, including visual and audio pedestrian information signals used at hazardous pedestrian crossings.

M. A special study of school crossings to determine pedestrian protection needs and measures to be taken to provide maximum safety for children en route to and from school. This includes a program for training adult crossing guards or safety patrols in effective ways of safeguarding school children as they travel to and from school; and a program for the development of a school district or area plan for safe routes to school, which could be implemented by individual schools.

II. General Pedestrian Safety Problem Areas.

There is still much to be learned about pedestrian safety and ways to achieve greater pedestrian protection. Research investigations

of problem areas such as those described below can lead to the development of effective safety programs.

A. Develop and apply measures for the protection of older pedestrians.

The pedestrian 65 and older is underrepresented in the totals of pedestrian injuries and overrepresented in the fatality figures, indicating that his survivability rate is very poor. Thus, a potential for substantial payoff in terms of lives saved exists in this group. Means of protecting older pedestrians against the consequences of their slowing reflexes and failing abilities must be found.

B. Measure the benefits of a school safety program by a comprehensive demonstration study in two junior high school districts of a medium-to-large city.

Children 5-14 years of age represent 20.4 percent of the population of the United States and were involved in 87.6 percent of all pedestrian accidents which occurred during 1966.

Children of this age group should be amenable to a school-based program to reduce their contribution to the pedestrian accident toll. A study which would provide a documented evaluation of such a program would define the benefits to be obtained. Statistical comparisons between the before-and-after periods of both school districts would indicate the improvement that such a program could provide.

C. The effects of enforcement of pedestrian regulations on the frequency and severity of pedestrian accidents.

At present there is no firm evidence to indicate the degree to which enforcement contributes to the reduction of pedestrian accidents. There is need for studies which will collect and organize all available data on pedestrian legislation and its enforcement. The data will be used to evaluate and document the relationship of pedestrian regulation enforcement to the reduction of pedestrian accidents. The findings will then be used to develop standards for the uniform enforcement of pedestrian regulations and programs to aid their application and implementation.

D. Environmental light level control.

There is need for a study to determine the optimum level of light from all sources so that a pedestrian would be illuminated, not obliterated. A University of Indiana study revealed that a combination of good lighting and headlights "may obliterate a pedestrian." Arthur D. Little Inc., in its report, The State of the Art of Traffic Safety, lists only two research papers dealing with the effect of lighting improvements and pedestrian accidents. Pedestrian accidents were not the primary subject in either study. One referred to reduction of greater than 30 percent in pedestrian accidents by introduction of better lighting. The other, which studied accidents occurring during hours which are sometimes light and sometimes dark, indicated the effect of darkness is to multiply adult pedestrian casualties by approximately three times. This paucity of study about illumination and safety indicates the need for research in this area.

E. Methods for improving speed judgment of older pedestrians.

Elderly pedestrians experience great difficulty in correctly judging the speed of approaching vehicles and thus often endanger themselves in traffic. A study could be made of the cues used by older pedestrians in judging speed of oncoming vehicles in relation to decisions to cross the roadway and ways in which older pedestrians could develop methods for improving their speed judgments. These could then be used in training elderly people to be more self-reliant in traffic.

F. Effectiveness of information programs in affecting pedestrian walking habits.

Special publicity-information programs are often used for pedestrian safety generally and in relation to specific education, enforcement, or engineering programs. Various public information media are used in such a program. These could be studied to determine which types of information efforts effect most significant changes in pedestrian behavior. The results of this program would indicate those problem areas in which expenditure of future funds could be most effectively utilized.

G. Physically disabled pedestrian "play town."

The problems encountered by the physically disabled pedestrian could be the subject of study in a "play town" situation. The effect of conflict-reducing and traffic control devices on pedestrian performance of the physically disabled could be investigated to provide guidance in design planning near hospital and rehabilitation centers as well as in normal traffic areas.

APPENDIX E

RESOURCE ORGANIZATIONS

Organizations vitally interested in highway safety and which have done much work on pedestrian safety problems are listed below. This list should not be considered complete, but representative of the types of groups concerned with various aspects of the pedestrian safety problem.

American Association of Motor Vehicle Administrators (AAMVA)
404 Madison Building
Washington, D.C. 20004

American Association of State Highway Officials (AASHO)
341 National Press Building
Washington, D.C. 20004

American Automobile Association and Affiliated Clubs (AAA)
8111 Gatehouse Road
Falls Church, Virginia 22042

American Bar Association (ABA)
1155 East 60th Street
Chicago, Illinois 60637

American Driver and Traffic Safety Education Association
1201 16th Street, N.W.
Washington, D.C. 20036

Highway Users Federation for Safety and Mobility
1776 Massachusetts Avenue, N.W.
Washington, D.C. 20036

Bureau of Highway Traffic
University Park
Pennsylvania 16802

Federal Highway Administration
400 7th Street, S.W.
Washington, D.C. 20590

Council of State Governments
Iron Works Pike
Lexington, Kentucky 40505

Highway Research Board (HRB)
2101 Constitution Avenue
Washington, D.C. 20418

Highway Users Federation for Safety and Mobility
1776 Massachusetts Avenue, N.W.
Washington, D.C. 20036

Illuminating Engineering Society (IES)
345 East 47th Street
New York, New York 10017

Institute of Traffic Engineers (ITE)
1815 North Fort Myer Drive
Arlington, Virginia 22209

Insurance Institute for Highway Safety
Watergate Office Building
2600 Virginia Avenue, N.W.
Washington, D.C. 20037

National Association of Counties
1001 Connecticut Avenue, N.W.
Washington, D.C. 20036

National Highway Traffic Safety Administration
400 7th Street, S.W.
Washington, D.C. 20590

National League of Cities
1612 K Street, N.W.
Washington, D.C. 20006

National Safety Council (NSC)
425 North Michigan Avenue
Chicago, Illinois 60611

Traffic Institute
Northwestern University
1804 Hinman Avenue
Evanston, Illinois 60204

American National Standards Institute
10 East 40th Street
New York, New York 10016

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