



U.S. Department
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National Highway
Traffic Safety
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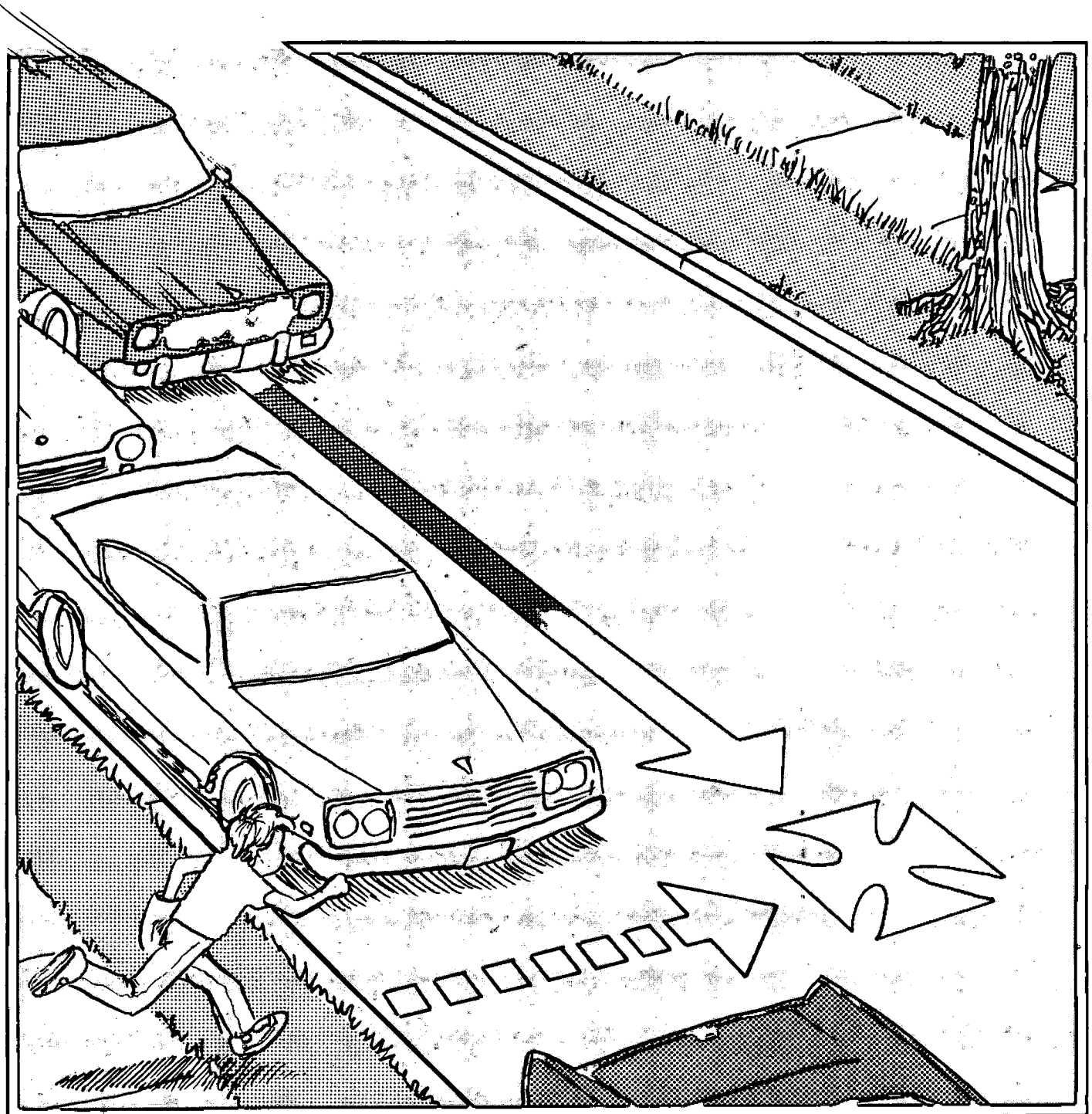
Pedestrian Accident Reduction Guide

Guidelines for a Successful Program

Why the Approach Works

Accident Types

Countermeasures



Pedestrian Accident Reduction (PAR) Guide

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Audiovisual Aid Is Now Available

A recorded 35-mm color slide show, "Everyone Is a Pedestrian Sometime," provides an excellent introduction to the need for a systematic approach to pedestrian safety.

Its 79 slides summarize this publication, telling of the annual toll of deaths and injuries, of the types of accidents responsible for the majority of these injuries, and some of the countermeasures that have been developed.

This slide show is particularly recommended for use by the States' highway safety coordinators and for regional offices of NHTSA. Local pedestrian safety coordinators will also find it a useful way to introduce their own presentations on a local or regional level.

Copies of "Everyone Is a Pedestrian Sometime," produced by NHTSA, have been furnished to the highway safety agency in each State, and are available through NHTSA headquarters and regional offices.

Introduction

Under their mandate to improve pedestrian safety, the National Highway Traffic Safety Administration and the Federal Highway Administration have thoroughly analyzed 12,000 pedestrian accidents.

This analysis has revealed that there is a serious problem indeed with pedestrian safety, even though the public at large is not aware of it for various reasons. Pedestrian deaths have numbered approximately 8,000 annually for the last decade, accounting for 17 to 19 percent of all motor vehicle deaths. Additionally, more than 100,000 pedestrians are injured each year.

The facts are that a pedestrian is injured fatally about once every hour in our country, and about 11 others are injured less seriously.

In some major metropolitan areas, pedestrian deaths account for 40 to 50 percent of all traffic fatalities. We find, in fact, that 85 percent of all pedestrian accidents and 66 percent of the pedestrian fatalities occur in urban areas.

A jurisdiction with a population of 50,000 can expect between 15 and 90 pedestrian injuries annually; communities of 100,000 will experience between 40 and 150, and others with populations of 250,000 will have from 100 to 400 pedestrians injured each year. From 2 to 5 percent of the victims will die as a direct result of the accidents; the rest of the victims are likely to be injured seriously.

Further, this analysis has revealed that those accidents were not random, unrelated incidents. Rather, they fall into 31 identifiable types that result from specific failures in the "Safety Sequence," that series of steps taken by pedestrians and motorists many times each day as they avoid accidents.

This systematization has enabled the development of countermeasures aimed at particular Safety Sequence failures of identifiable segments of the population who were involved in specific types of accidents.

Some countermeasures are now available to apply against the accident types that account for more than half of all pedestrian injuries. Other countermeasures are being developed and tested.

That is half of the pedestrian safety picture. The other half is successful implementation of the countermeasures at the local level, where ultimate responsibility for pedestrian safety lies, under a coherent, coordinated statewide program.

At both State and local levels, success depends upon pedestrian safety coordinators who have the necessary time, interest, authority, and responsibility to pursue their efforts vigorously.

The PAR Guide provides guidelines for such effective and successful programs as well as information about the accident types and the countermeasures now available. A companion document, the Federal Highway Administration's *Model Pedestrian Safety Program Users' Manual*, addresses the role of engineering countermeasures as part of this comprehensive approach to pedestrian problems. Persons desiring this manual or additional information on pedestrian safety programs and contacts should refer to the "HOW TO OBTAIN ADDITIONAL INFORMATION" section of this Guide.

I. Guidelines for a Successful Pedestrian Safety Program

The Local Level

Ultimately, the responsibility for a vigorous and effective pedestrian safety program falls upon the locality—city, town, or county.

Research and development of safety aids is being done at the national level for the benefit of all citizens. Statewide coordination is highly desirable if not essential. It is in the locality, however, that the effort comes to a focus in the removal of hazards and the education of pedestrian and driver alike.

Many localities already have programs that take diverse forms, and it is certainly true that each community must decide upon its own approach to pedestrian safety.

Still, a national overview discloses that there are three essential aspects which must be incorporated to the extent possible in every successful effort to bring pedestrian accidents to an irreducible minimum.

These essential aspects are the three C's: Coordination, Cooperation, and Continuity.

Coordination

One single agency or individual should be designated as the coordinator who will plan and carry out the community's program.

Here is the keystone of the entire effort. The coordinator analyzes the record of accidents, identifies the steps to be taken to counter specific dangers, makes an inventory of the community's current safety activities, promotes teamwork and cooperation, puts safety programs into operation, and monitors their execution and effectiveness.

The coordinator establishes and works with a coordinating committee. This brings together the various participants, including the media, thereby avoiding duplication of, or infringement upon, functions already being performed by existing organizations.

Hence the coordinator should have sufficient personal interest and available time to perform the tasks. Automatically assigning this responsibility as a general additional task to the chief of police or city traffic engineer will result, except in the most unusual cases, in that official's having to deemphasize another ongoing program or to assign a low priority to the new function.

Whether the coordination is provided by an individual or an agency, the coordinator must be officially designated and given specific authorities and responsibilities. This is best expressed in a formal charter for pedestrian safety activities or by policy statements and directives to each of the city or local agencies involved.

Cooperation

In order to succeed, the coordinator must have the broadest possible cooperation among various agencies and departments of the local government and throughout the private sector.

Key government participants include the following:

- Police department, primarily responsible for collecting data on traffic accidents, enforcing vehicle and pedestrian regulations, controlling traffic, and, in many cases, providing safety programs to schools and citizens' organizations.
- Traffic engineering staff, responsible for determining the need for traffic control devices, maintaining accident surveillance programs, reviewing plans that involve the public right-of-way, and working with such groups as the blind, the disabled, and school children to seek ways to improve pedestrian safety and mobility.
- School systems, both public and private, and their associated parent-teacher-pupil groups. Of particular concern are the elementary schools because of their role in training the young child in pedestrian safety.
- The legal system—city attorney, prosecutors, and courts.

- Such municipal departments as zoning, human resources, and public works.
- Transit authorities and port or airport authorities.

The support and cooperation of citizens and their organizations are essential. Their organizations include civic groups; service clubs; organizations already active in pedestrian safety work, such as local affiliates of the American Automobile Association and the National Safety Council; and businesses.

Among local businesses, the media are crucial both for their general public information role and in transmitting safety messages to the public. As will be seen, many of the specific steps to be taken to combat certain types of accidents rely upon publication by the media; a close working relationship is necessary.

The media includes not only daily newspapers of general circulation, radio, and television, but also weekly and semiweekly newspapers, giveaway newspapers, in-house newsletters, and billboards.

Others to be involved are community action groups, associations of residents, neighborhood associations, and organizations representing special constituencies, such as the non-English speaking, schoolchildren, the elderly, and the handicapped.

Continuity

A successful pedestrian safety program must have the strong support of elected and appointed officials in order to exist as a continuing, long-term effort.

Specifically, the program should be supported by the mayor, members of the city council, and city manager, and key members of the manager's staff. Elected officials are responsible for funding the pedestrian safety program and for enacting ordinances. The city manager must ensure that the ordinances are enforced. Together all of these officials must make and agree with difficult choices, such as whether or not to remove some onstreet parking that masks the movements of pedestrians.

In turn, these officials and heads of agencies must be kept advised by the coordinator of the progress of the program, and they must be told of any new ideas or developments to be proposed.

Regional Coordination

Coordination within a region or a metropolitan area can yield two major benefits.

The first benefit is cost-sharing, as in purchasing materials for use in school safety training programs. Each political entity in a region may be able to participate at a cost lower than if each went its separate way.

Second, public understanding is best achieved by a coordinated, rather than a fragmented, effort. This is important because many people live in one jurisdiction and work in another. Also, none of the mass communications media stops at the boundaries of its "home" community, and pedestrian safety efforts will be ill-served if the media are approached by many individual groups with their own individual messages.

The State Level

It is strongly recommended that each State designate a single agency to have primary administrative authority and responsibility for pedestrian safety.

The key responsibility at this level is fitting each community's pedestrian safety program into a coherent portion of the State's overall highway safety plan.

With vigorous local efforts under way, the State's coordinator must establish the pedestrian programs' share of available Federal and State funds and priorities among the competing localities and their programs.

Here, then, as is true at the local level, the coordinator is the focal point and so must have time and interest in order to ensure an optimum effort.

II. Why the PAR Approach Works

Motorists and pedestrians coexist and interact successfully most of the time. However, when this coexistence breaks down, the result is often an accident.

Therefore, in seeking a systematic and effective approach to pedestrian safety, NHTSA began by ascertaining that accidents resulted from identifiable changes in successful patterns of behavior.

At the risk of seeming obvious, a pedestrian and a moving vehicle are put on a "collision course" by decisions made earlier. As they approach the potential collision, there is a sequence of factors that determines the outcome, as follows:

1. **Search:** both driver and pedestrian scan their environment for potential hazards.
2. **Detection:** each perceives the other.
3. **Evaluation:** each recognizes the threat of a collision and the need for action to avoid it.
4. **Decision:** each determines what action to take in order to avoid a collision.
5. **Action:** successful performance of the appropriate action by either pedestrian or driver, or both.
6. **Vehicle Response:** a factor for the driver is the response of his vehicle to the action taken.

We call this the Safety Sequence.

A failure at any step in the Safety Sequence will make an accident much more likely because the pedestrian or driver will not perform each of the succeeding steps. Preoccupied or intoxicated, he will not search adequately. Failing in that function, he will not take further steps in the sequence—detection, evaluation, decision, and action.

The Safety Sequence is a way to understand clearly the causes of accidents. It is not a guide for assigning blame. If a child darts out from between parked cars and suddenly appears immediately in front of a moving vehicle, the driver may be blameless in the resulting collision. From the pedestrian safety viewpoint, however, the driver failed at the second step in the Safety Sequence and the pedestrian at the first. The presence of parked cars would be a "predisposing factor," i.e., one which doesn't cause the accident directly, but "sets it up," making the failures much more likely.

Applying the Safety Sequence to some 12,000 accident reports from 13 cities and from rural areas in six States, and conducting interviews with drivers, pedestrians, and witnesses, showed that the majority fitted into 31 specific accident types. Of these 31, there are seven which account for more than half of the total. It was toward these seven that NHTSA directed its initial research and development of countermeasures.

They are:

Dart-Out—The pedestrian appears suddenly, usually from between parked cars (33 percent).

Intersection Dash—A person runs across the intersection, is seen too late by a driver, and is struck (8 percent).

Vehicle Turn-Merge—The driver, concentrating upon turning into or merging with traffic, fails to see the pedestrian (6 percent):

Multiple Threat—A vehicle stops for a pedestrian who is crossing and the halted vehicle blocks the pedestrian from the view of the driver of an overtaking vehicle (3 percent).

Bus Stop Related—A pedestrian crosses in front of a stopped bus, which screens him from the view of the driver of an overtaking vehicle (3 percent).

Ice Cream Vendor Related—A pedestrian, usually a young child, is struck by a passing vehicle as he approaches or leaves the truck (2 percent).

Backing Up—A pedestrian is struck by a backing vehicle (2 percent).

The use of accident types provides a very powerful tool. Since each accident type is a specific problem, often involving a specific segment of the population, equally specific countermeasures can be developed. The countermeasures operate by:

- Reducing or eliminating the predisposing factors; for example, removing the parked cars which screen pedestrians as they enter a street.
- Reducing or eliminating failures in the Safety Sequence. An example of this would be teaching the proper manner in which pedestrians should search for oncoming vehicles.

The testing and evaluating of countermeasures is carried out under NHTSA's objective of providing fully developed, tested, feasible, and cost-effective countermeasures to localities along with techniques and procedures for applying them.

The first group of tested countermeasures is included in this publication.

Each report on a countermeasure describes its status. On some, testing has been completed. For example, the city of Detroit, Michigan, adopted a version of the Model Ice Cream Truck Ordinance in 1976 as part of a field test sponsored by NHTSA. In the first full vending season, accidents among children dropped by 77 percent, from a 3-year average of 48.7 to 11 in 1977.

A variety of countermeasures are now being tested in the Miami-Dade County, Florida, Urban Pedestrian Safety Demonstration Project. One part of the test is employing the Safe Street Crossing Training for Young Children, a countermeasure against dart-outs, for children in grades from kindergarten through third, in about 100 schools, for 3 years. A broad-based public information and education program is also part of the safety effort. Concurrently, the same training countermeasure for elementary schoolchildren is being tested in Tampa, Florida, as a control site.

A number of additional promising countermeasures are being tested in a few locations to see how well they work.

The following table shows accident types arranged by groups. Within a group, the types of accidents are ranked in descending order according to their approximate frequency.

Accident Types

Types are ranked by frequency, in descending order, within each group.

Group 1—Accident Types for Which Countermeasures Are Available

Type

Dart-Out
Vehicle Turn/Merge
Multiple Threat
Commercial Bus Related
Vendor-Ice Cream Truck

Group 2—Accident Types for Which Countermeasures Are Under Development*

Type

Intersection Dash
Disabled Vehicle Related
Walking Along Roadway
Schoolbus

*The countermeasures under development and testing will be furnished as they become available.

Group 2 (cont'd)

Type

**Working on Road
Backing Up
Hitchhiking
Mailbox Related**

Group 3—Countermeasure Development Not Yet Started

Type

**Pedestrian Not in Roadway
Pedestrian Walks Into Vehicle
Exiting/Entering Parked Vehicle
Driverless Vehicle
Expressway Crossing
Playing in Roadway
Play Vehicle Related
Driver Violation
Hot Pursuit
Trapped
Emergency/Police Vehicle Related**

III. Accident Typing

The key to success in a pedestrian safety program is to break accidents down into types, such as “dart-out” and “multiple threat.”

This serves three useful purposes.

The first is to focus everyone’s attention on the fact that the pedestrian accident problem is not an unmanageable hodgepodge of random events, but rather the repeated occurrence of similar and potentially preventable accident types.

The second is to obtain an accurate picture of the accident types that are occurring in one’s own community. There may be significant variations from place to place. For example, the multiple threat situation is responsible for a much larger percentage of the pedestrian deaths and injuries in California than in the United States as a whole. In California, motorists comply to a high degree with laws requiring them to stop for pedestrians, thus “setting up” the situation.

The third is because research developed and tested countermeasures are related to specific accident types described herein.

To assist local communities in classifying, or “typing,” their accidents, NHTSA has developed two pedestrian accident typing approaches. Either approach will yield similar profiles of frequency of occurrence for the various accident types when applied to police accident reports. Which approach is better for a given community will depend on its available facilities and what it plans to do with the data. The two approaches are:

- **Computer Accident Typing (CAT).** This approach employs coders who use police accident reports to complete a data form for each accident. The data on the forms are fed into a computer, programed with software furnished by NHTSA. The computer assigns an accident type expressed as a three-digit code to each case and then compiles a listing that shows the number of occurrences of each type and its percentage of the whole. This listing is used to prepare an accident-type profile.

The CAT approach is best where the local pedestrian safety program has a computer facility available to it.

Once this standardized CAT system is in use, the pedestrian safety coordinator may analyze specific accident types for such significant factors as age, sex, location, or site characteristics. However, the CAT program does not provide for these additional analyses. The local programming staff can provide the necessary additional software.

- **Manual Accident Typing (MAT).** The MAT approach is recommended for jurisdictions that do not have easy access to computer facilities. With this approach, coders review each accident report, following a step-by-step procedure contained in a coder’s manual. The procedure leads the coder to a determination of the accident type. The accident profile is then produced by summarizing the number of accident cases assigned to each type and calculating each percentage.

A locality’s pedestrian safety coordinator can obtain from NHTSA an accident typing materials package for the approach selected—CAT or MAT.

Each package contains:

- **The Administrator’s Guide.** The Guide details the typing process, including selecting the accident sample, determining the adequacy of the accident report data, training the coders, supervising the typing, and assuring typing accuracy.
- **Training materials.** These include a slide/tape presentation and practice cases. The course is designed to be self-taught; a trained instructor is not required. This approach allows individuals or small groups of coders and supervisors to learn at their own pace.

- Coder materials. These include all manuals and forms required by the coders to accomplish accident typing from police traffic accident reports.

For those communities choosing the CAT procedure, the materials package will also include a Data Processing Manual. This contains the CAT accident typing program, supporting information for making the program operational on the user's computer, and test data.

Accident typing involves four basic tasks—obtaining the accident reports, selecting and training the coders, assigning accident types to the reports, and evaluating the results.

In most communities, the initial accident typing effort will involve obtaining all police reports of pedestrian accidents for 1 to 3 prior years. In general, the more reports that the community can use for accident typing, the more accurate will be the analysis of their pedestrian accident problems. For smaller communities, a minimum of 3 to a maximum of 5 full years of accident reports should be categorized by types. Communities with more than 250 pedestrian accidents per year will find that coding 800 to 1,000 reports will be sufficient to develop a stable and representative accident type profile. However, complete years of reports should be used in order to adequately represent seasonal variations. Detailed guidelines for selecting the sample of reports to be typed are contained in the CAT and MAT Administrator's Guides.

Accident typing requires that coders be individuals who are able to follow directions carefully, who will exercise care in extracting information from accident reports, and who appreciate the need for accuracy in their work. Familiarity beforehand with the accident report form and with the rules and definitions that officers follow in filling out the reports may be helpful in coding, but is not essential. However, accident typing is not a lengthy process. Experienced coders usually need only about 5 minutes per report.

Clearly, the coding process is highly dependent on the quality of the report forms and the care taken by police officers in filling out the reports.

The actual process of assigning accident types and the job of the coders differs between the CAT and MAT approaches. With MAT, the coder both extracts information from the accident report and assigns the type. With CAT, the coder only extracts the information; assignment of type is done by the computer. However, CAT involves the additional steps of programming the computer, testing the program, and feeding data from the coders' forms into the computer.

Not all jurisdictions will have sufficiently detailed accident report data to permit reliable accident typing. The Administrator's Guide explains how a jurisdiction may measure the completeness of its available reports and the ability of these reports to support reliable accident typing. The Guide also suggests steps which can be taken to remedy deficiencies in reports.

Too, there may be an insufficient number of reports. About 100 are required in order to obtain a reasonably accurate profile of the more frequent accident types.

Once established, either CAT or MAT will yield a profile of the frequency of occurrence for each of the accident types. An example of such a profile is shown below. It may be used by a community which lacks its own profile as a rough guide for initial pedestrian safety efforts.

The final step in the accident typing process is to evaluate the profile and determine which accident types are to be addressed through the selection and implementation of countermeasures.

The accident typing process, while probably the most accurate way of identifying pedestrian accidents, may not always be the most feasible. For this reason, State and local pedestrian program personnel need to be aware of the capabilities of the ANSI D 20 Model Motorist Data Base as it applies to their State or local data systems. The ANSI Model Motorist Data Base, when fully implemented, can identify certain pedestrian accident types through the use of prescribed data elements. In this way, many accident types can still be identified when the MAT or CAT Systems are impractical to use. This PAR Guide will contain a chapter on the use of the ANSI Model Motorist Data Base for identifying pedestrian accident types. This chapter will be provided as an addendum to this Guide in the near future.

PEDESTRIAN ACCIDENT ANALYSIS SUMMARY AND PROFILE

Jurisdiction _____ Date Prepared _____

Prepared By _____

Covering Period _____ 19 ____ to ____ 19 ____

Total Accident Cases Analyzed 208*

ACCIDENT TYPE	COUNT	PERCENT	PERCENTAGE DISTRIBUTION			
			5%	10%	20%	30%
Dart-Outs	64	30.8				
Intersection Dash	34	16.3				
Vehicle Turn/Merge	15	7.2				
Multiple Threat	2	1				
Commercial Bus Related	5	2.4				
Disabled Vehicle Related	14	6.7				
Vendor-Ice Cream Truck	3	1.4				
Walking Along Roadway	31	14.9				
School Bus Related	2	1				
Working on Road	4	1.9				
Backing Up	3	1.4				
Hitchhiking	2	1				
Mailbox Related	3	1.4				

*To simplify the illustration, only 13 accident types are shown; consequently, a number of additional accidents which occur infrequently are not included.

IV. Applying Countermeasures

A community's own accident-type frequency table or that of NHTSA can provide an indication of program direction, but choices must still be made among accident types to be addressed, and countermeasures to be applied.

The ultimate goal in program planning is to obtain the greatest reduction in pedestrian accidents within the resources available. In striving to attain that goal, the coordinator will want to take the following factors into consideration:

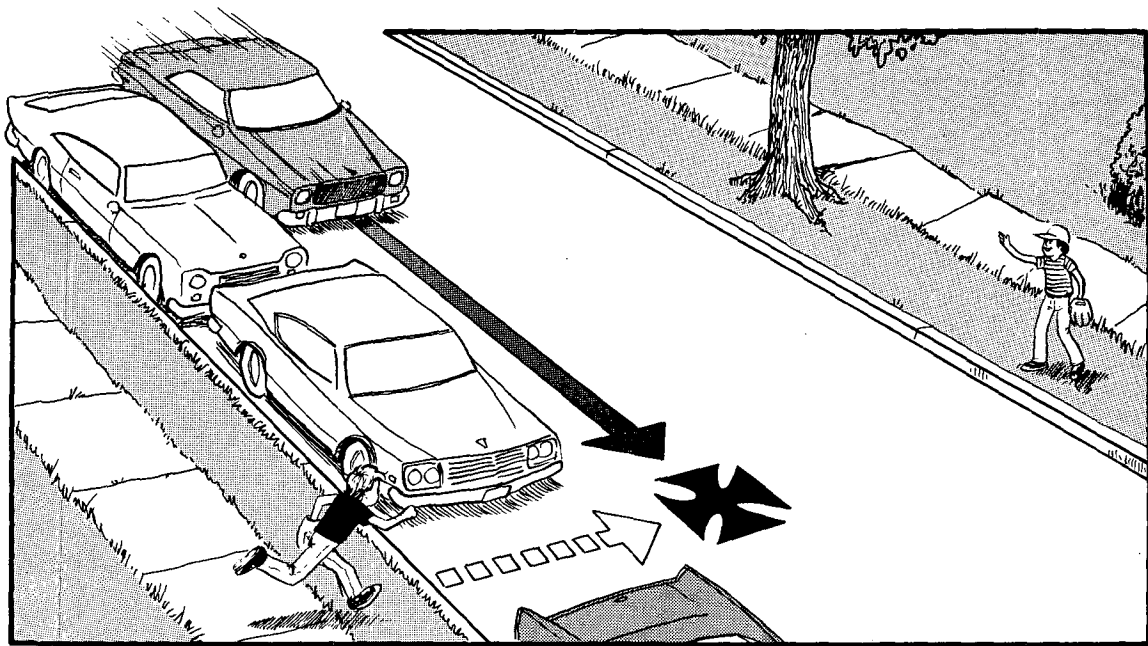
- Funds available for implementing the program.
- Personnel and other resources available.
- Type and degree of cooperation obtainable from various participants within the community.
- Cost and problems associated with implementing each countermeasure directed at specific segments of the population.
- Program visibility—how best to catch the eye of the public and gain support. A countermeasure such as the ice cream vendor ordinance may be selected for its high visibility and rapid impact in reducing the toll of an accident type that, while relatively uncommon, is frequent and devastating enough to worry parents of youngsters.
- Coverage of the countermeasure—an ordinance can cover a State or city; parking relocation covers specific streets, school-based training covers a certain group of children, and media messages may reach many individuals in an entire metropolitan area or region.

Yet another factor must be considered. This is the incremental results of a long-term program. Assume that a city has a high frequency of dart-out accidents involving children and it is decided to implement the school-based countermeasure. After the program has been in effect for a year or so, a substantial drop in accident frequency is noted. The program is continued; another reduction occurs during the second year. The third year shows no significant reduction. We seem to have reached our goal: the irreducible minimum.

In light of this, should funds now be allocated to a different program or countermeasure? Switching funds from the school-based program to one aimed at adults who also dart out into traffic seems to be an appealing choice; yet the probable result of ending a countermeasure of demonstrable worth must be considered. One solution could be to continue funding of effective programs through other funding sources, e.g., private organizations, while pedestrian safety moneys are used to address other identified problems.

Clearly, the coordinator's choices are nebulous at best; the frequency table is a guide, but good judgment is also required.

V. Accident Types and Countermeasures—Group 1



Accident type: DART-OUT

The pedestrian enters the street midblock and is struck by, or walks or runs into, a moving vehicle. This type of accident occurs typically in residential neighborhoods.

The Pedestrian

Children of preschool and elementary school age are the most frequent victims. However, all age groups are involved, even those over 65. Pedestrians hit in the first half of the attempted crossing are mostly children. The ages of those struck in the second half are spread more evenly over the age groups, although children still predominate.

Significant Factors

Common factors are that the vehicle is moving at a typical midblock speed, the driver little expecting that a pedestrian will appear in the roadway, and that the driver often does not see the pedestrian early enough because of parked cars or other obstructions to his vision.

The pedestrian often is running. His most frequent errors are failure to search adequately for approaching vehicles and/or appearing suddenly in front of the vehicle. Typically, the pedestrian's attention is directed forward, across the street, instead of toward oncoming traffic. Many of the entries into the roadway are not made with the intention of crossing the street, that is, the child pedestrian is often absorbed in play and may be following a ball or being chased.

Countermeasure: DART-OUT

School-Based Training for Young Children

Objective:

To teach children to stop at the traffic lane and to search correctly before entering the roadway.

Approach:

This is a program that provides tested materials for use in kindergarten through third grade. The duration is eight sessions, five in the classroom and three outside. Film, discussions, car mockups, and games are employed. Various options are included.

The following items are available: a teacher's guide, written materials, films, and design specifications for a car mockup.

Status:

Testing has been completed. It has demonstrated significant improvement in children's behavior when crossing streets. There have been positive but not conclusive results in reducing the frequency of these accidents.

Considerations:

- Several schools or school districts can share the materials, which fit into a station wagon for transport.

Implementation:

- Schools or school systems acquire or make equipment.
- Schools perform training.

How to obtain:

Write to NHTSA, NTS-14; 400 Seventh Street, SW; Washington, D.C. 20590, and request "K-3 Safe Street Crossing Curriculum."

Median Barrier

Objective:

To prevent or severely discourage pedestrians from attempting to cross a street except at preferred crossing points.

Approach:

Selected streets are equipped with a 6-foot high chain-link fence running along the median. The fence is continuous for the length of the block or from one pedestrian crossing place to another. Suitable locations are selected along busy, wide streets where pedestrians frequently cross hastily or at random.

Status:

Observations of behavior showed that this countermeasure produced a significant decrease in both pedestrians crossing elsewhere than at designated crossings and pedestrians entering the roadway in front of parked vehicles. The effectiveness in reducing accidents has not yet been determined.

Considerations:

- Cost of fencing and installation of same.
- Effects of vandalism and damage caused by vehicles must be repaired, and windblown trash must be removed.

Implementation:

- Traffic Engineering/ Streets to select locations, install barriers.

Notes:

- Refer to the Federal Highway Administration's *Model Pedestrian Safety Program Users' Manual*, IP 78-6, June 1978, Gerald R. Vallette and Judith A. McDivitt, available from the Superintendent of Documents; U.S. Government Printing Office; Washington, D.C. 20402. Stock Number 050-03-00335-2.

Parking Relocation (Low Angle Parking)**Objectives:**

1. To increase the likelihood that a driver, and a pedestrian who is entering the roadway from between parked cars, will see each other.
2. To slow the pedestrian down and direct his attention toward oncoming traffic rather than across the street.

Approach:

Selected streets are designated as one-way and are converted from parallel to low-angle diagonal parking on one or both sides, depending upon the street's width. Parking spaces are marked and signs are installed to prohibit vehicles' standing or parking except in marked spaces. Suitable locations are selected residential streets in high density housing areas where pedestrian accidents are frequent, traffic density is low, and little offstreet play area is available.

Status:

Observations showed that this countermeasure produced a significant increase in the percentage of pedestrians searching for traffic. Its effect on reducing accidents has not yet been determined.

Considerations:

- Some loss of parking may occur. A change from parking on both sides to parking on one side will reduce parking by about half. Also, the lower flexibility of low-angle diagonal parking and the geometric problems caused by driveways are likely to reduce parking still more.
- Conversion to one-way traffic will inconvenience some.
- Intensive education efforts directed toward residents, elected representatives, and appropriate local officials will be required in order to build support for this countermeasure.
- Costs will be incurred for signs and for marking spaces.
- Careful repainting of parking lines will be required periodically to retain their identity.

Implementation:

- Municipal government and residents' associations, if any, must agree to changes. (House-to-house visiting may be necessary to obtain residents' approval.)
- Traffic Engineering/ Streets to select streets, lay out and mark parking spaces, and install signs.

Notes:

- Refer to the Federal Highway Administration's *Model Pedestrian Safety Program Users' Manual*, IP 78-6, June, 1978, Gerald R. Vallette and Judith A. McDivitt, available from the Superintendent of Documents, U.S. Government Printing Office; Washington, D.C. 20402. Stock No. 050-003-00335-2.

Safety Messages**Objective:**

To teach children to stop and search correctly before entering a traffic lane.

Approach:

A 6-minute film embodying the messages and directed toward preschool and elementary school children has been produced. It is entitled "Willy Whistle," and it is available in 16-mm format for use in the classroom or on television, and as a 35-mm film for use in movie theaters. The film has an urban setting.

Three 60-second and three 30-second TV public service announcements (PSA's), or spots, and a poster showing "Willy Whistle" are also available.

Status:

Field tests of these messages indicate they have reduced unsafe behaviors and dart-out accidents by a significant amount.

Considerations:

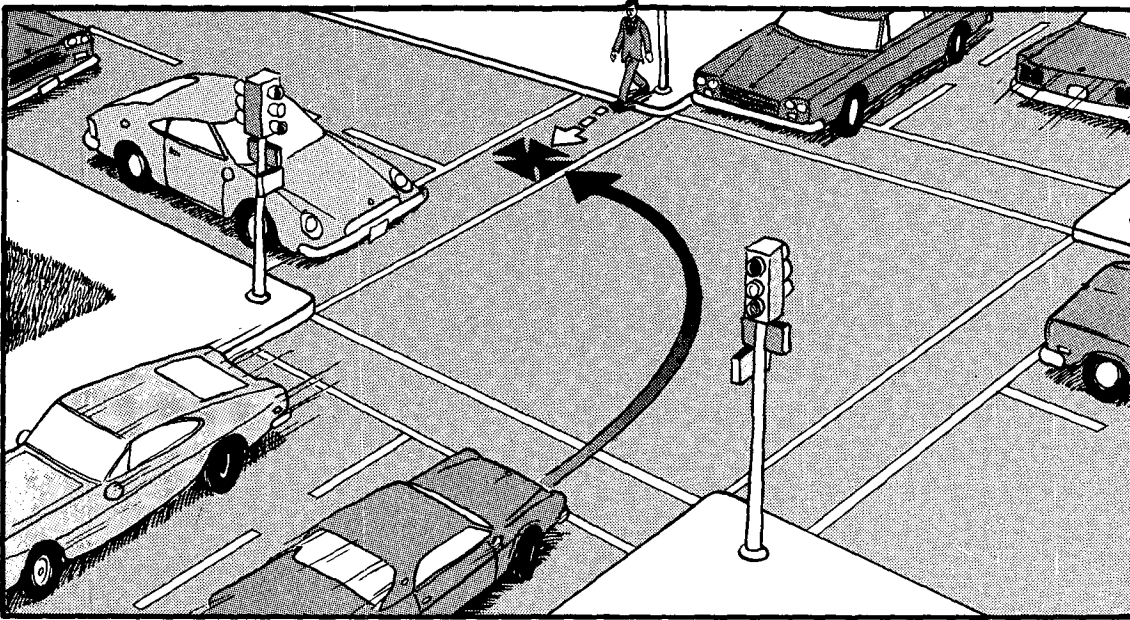
- Film, 16-mm print for television must be purchased.

Implementation:

- Pedestrian Safety Coordinator to arrange for showings on television and in theaters.
- Schools, media, and theaters to show the film and spots.

How to Obtain:

Write to NHTSA, NTS-14; 400 Seventh Street, SW; Washington, D.C. 20590, and request information on how to obtain "Willy Whistle" media materials.



Accident Type: VEHICLE TURN/MERGE

The driver is turning into and merging with traffic, and his vehicle strikes a pedestrian who is generally headed in a direction different from the driver's focus of attention. This type of accident occurs almost always at intersections in nonresidential areas.

The Pedestrian

Almost half of the pedestrians involved are aged 45 or older, although all age groups are involved.

Significant Factors

The key driver error is failure to search adequately for potential conflict with pedestrians. The driver's attention is directed toward traffic and merging successfully with it. The key pedestrian errors are inattention to traffic, making an inadequate search, or failing to anticipate the course of the vehicle. Typically the pedestrian walks normally, looks straight ahead, and is unaware of the need for evasive action until it is too late.

Attention conflict is built into this situation. The conflict is between the demands of the driving task during a turning maneuver, and a pedestrian crossing at a location from which the driver's attention is distracted. The situation is deceptive: When the pedestrian searches for threats, all that is seen is a motionless car. However, this car is not motionless; the driver is looking for a gap and the vehicle will move off when a gap appears.

Countermeasure: VEHICLE TURN/MERGE

Safety Messages—TV and Radio Spots

Objective:

To make both drivers and pedestrians aware of the magnitude of the danger in dividing their attention in this situation and to instill proper search behavior.

Approach:

Two TV public service announcements (PSA's), or spots, have been prepared in 60- and 30- second versions. These are directed to both drivers and pedestrians.

One radio spot for drivers has also been prepared in 60- and 30-second versions. This is intended to supplement the TV spots, but it can stand alone.

All spots are available in Spanish as well as in English. Print ads, bumper stickers, posters, and a pamphlet are also available.

Status:

Positive results were observed in pedestrian behavior changes, and a significant reduction in accidents was obtained for one subgroup (Spanish speaking), due possibly to a high level of message exposure.

Considerations:

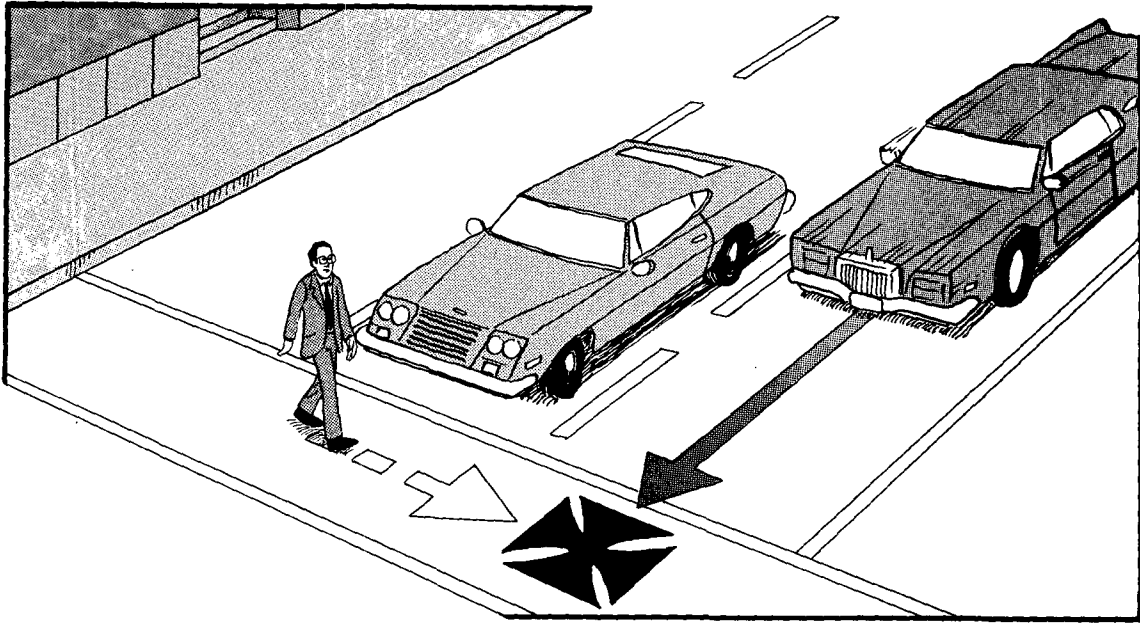
- Moderate charges are made for multiple copies of the TV prints and radio tapes.
- Effectiveness depends upon the spots' being aired at times when there is an adequate and appropriate audience.

Implementation:

- Pedestrian safety coordinator to arrange for public service time with the media.
- Media to show or play the spots.

How to obtain:

Write to NHTSA, NTS-14; 400 Seventh Street, SW; Washington, D.C. 20590, and request Vehicle Turn-Merge Media materials.



Accident Type: MULTIPLE THREAT

The pedestrian, crossing a multilane street, is permitted to cross by one or more vehicles that stop or slow down in order to yield. The pedestrian is then hit by another vehicle which passes the yielding vehicle(s), traveling in the same direction. The yielding vehicle(s) forms a visual screen between the pedestrian and the striking vehicle. This accident occurs mainly at intersections and in marked crosswalks.

The Pedestrian

All age groups are represented in the accident statistics.

Significant Factors

The key element is that the yielding vehicle prevents the driver of the collision vehicle and the pedestrian from seeing each other in time.

The most significant driver error is a failure to detect the pedestrian or to realize that a pedestrian might be crossing in front of the yielding vehicle.

The most significant pedestrian error is a failure to search for an additional vehicle passing the yielding vehicle. Most of the pedestrians are watching traffic but not the collision vehicle.

Countermeasure: MULTIPLE THREAT

Safety Messages—TV and Radio

Objective:

To make both drivers and pedestrians aware of this type of accident and to help them improve their search techniques and choices of actions in order to minimize their risks.

Approach:

Two TV public service announcements (PSA's), or spots, have been prepared in 60- and 30-second versions. These are directed to both drivers and pedestrians.

One radio spot for drivers has also been prepared in 60- and 30-second versions. This is intended to supplement the TV spots, but it can stand alone.

Status:

This countermeasure is still being tested, but it has already produced some positive effects upon behavior.

Considerations:

- Moderate charges are made for multiple copies of the 16-mm prints for TV and tapes for radio.
- Effectiveness depends on media running spots at times when there is an adequate and appropriate audience.

Implementation:

- Pedestrian safety coordinator to arrange for public service time with radio and TV stations.
- Media show or play the spots.

How to Obtain:

Write to NHTSA, NTS-14; 400 Seventh Street, SW; Washington, D.C. 20590, and request Multiple Threat Media materials.

Model Vehicle Overtaking Ordinance

Objective:

To deter drivers of overtaking cars from passing a vehicle that has stopped at a crosswalk without first stopping and determining that it is safe to proceed.

Approach:

A model ordinance has been prepared, suitable for adoption at the State level, which:

- a. Requires that a driver must yield to a pedestrian in a crosswalk by stopping short of the crosswalk.
- b. Requires that a driver may not pass a vehicle stopped at a crosswalk without first bringing his vehicle to a stop and determining that it is safe to proceed.

- c. Requires specified signing, painting, or geometry of crosswalks such that vehicles stopping to yield to pedestrians do so at least 20 feet from farthest crosswalk line.
- d. Forbids pedestrians suddenly to enter a crosswalk into the path of a vehicle, which constitutes an immediate hazard.
- e. Requires pedestrians to move, whenever practicable, on the right half of the crosswalks.

The model ordinance remedies a defect in existing laws.

Status:

Not yet tested; currently under study.

Considerations:

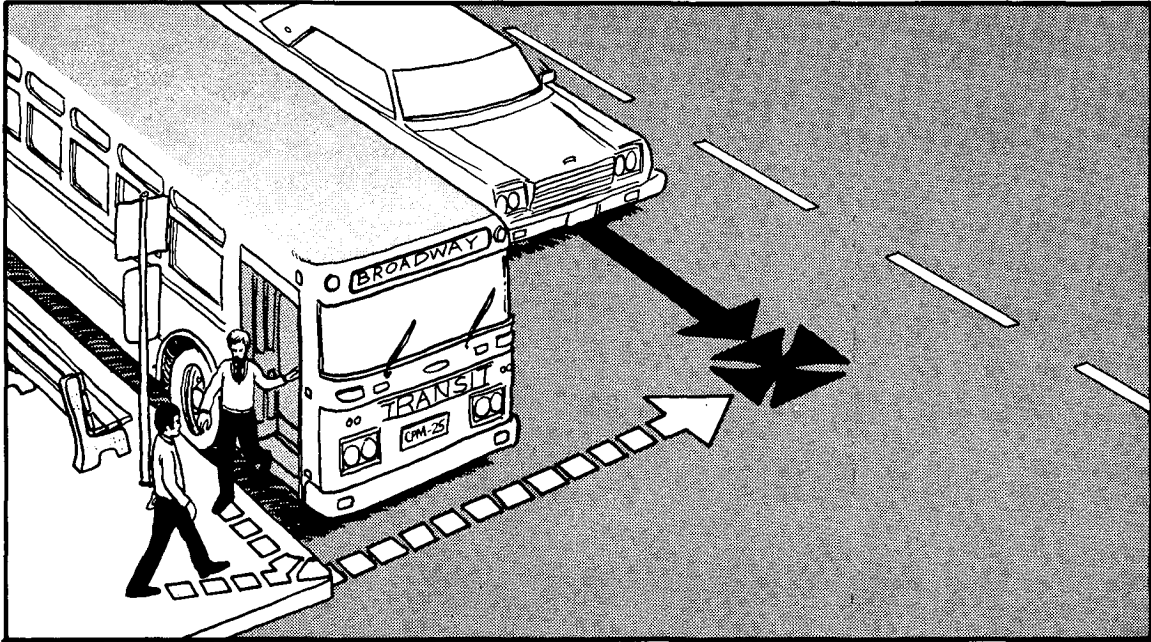
- Portions of the model ordinance are minor variations on existing laws in the Uniform Vehicle Code at Sections 11-502(d).
- Some costs may be incurred for new signs, signals, or markings and their maintenance.
- Enforcement by police is required.

Implementation:

- State government to enact the law.
- Police training.
- Police to enforce conspicuously, concentrating upon driver behavior at intersections without traffic signals, at the beginning of the law's being in force.
- Traffic Engineering/ Streets to place signs, signals, and markings.
- Media educate the public on the new law.

How to obtain:

Write to NHTSA, NTS-14; 400 Seventh Street, SW; Washington, D.C. 20590, and request Model Vehicle Overtaking Ordinance materials.



Accident Type: COMMERCIAL BUS STOP RELATED

The pedestrian is struck by a vehicle while crossing in front of a bus that is stopped at a bus stop. This almost always happens at intersections and usually in nonresidential areas.

The Pedestrian

All age groups are involved. The victim may or may not have been a passenger on the bus.

Significant Factors

Usually the bus stop location encourages pedestrians to cross in front of the bus, which blocks both the pedestrian's view of oncoming traffic and the collision vehicle driver's view of the pedestrian. Most pedestrian victims are not attending to traffic or have their attention focused on the bus. Some are running. Their critical errors are choosing a course with restricted visibility and the failure to stop and search adequately.

The critical error on the part of the driver is a failure to detect the pedestrian or a failure to recognize that a pedestrian may be crossing in front of the stopped bus.

Countermeasure: BUS STOP RELATED

Bus Stop Location Ordinance

Objective:

To reduce accidents to persons crossing streets served by bus lines by decreasing the number of pedestrians crossing in front of buses stopped at bus stops.

Approach:

A model ordinance has been developed, suitable for municipal enactment, which:

- a. Requires bus stops to be moved to far side of intersections unless it is unsafe or unreasonable to do so.
- b. Requires pedestrians not to cross in front of the bus unless allowed by traffic control device or police officer.
- c. Retains driver's duty to yield right-of-way to pedestrian in a crosswalk.
- d. Authorizes traffic engineer to establish bus stops and requires him to document reasons for not moving bus stop to far side.

Status:

Cities with far-side bus stops have experienced a major reduction in bus stop related pedestrian accidents.

Considerations:

- Many cities have already moved some or all of their bus stops to the far side because this results in increased bus mobility, fewer bus-vehicle accidents, and less use of curb space except for stops immediately before the bus must turn a corner.
- For city-owned transit authorities, or where other means of control of bus stop location already exist, the ordinance may be replaced by interagency negotiations leading to the same result.
- In many cities the traffic engineer already has the authority to move bus stops if he chooses to use it.
- Costs may be incurred in moving and installing boarding and alighting zones.
- Time will be required for surveys and for meetings with merchants who will be affected.

Implementation:

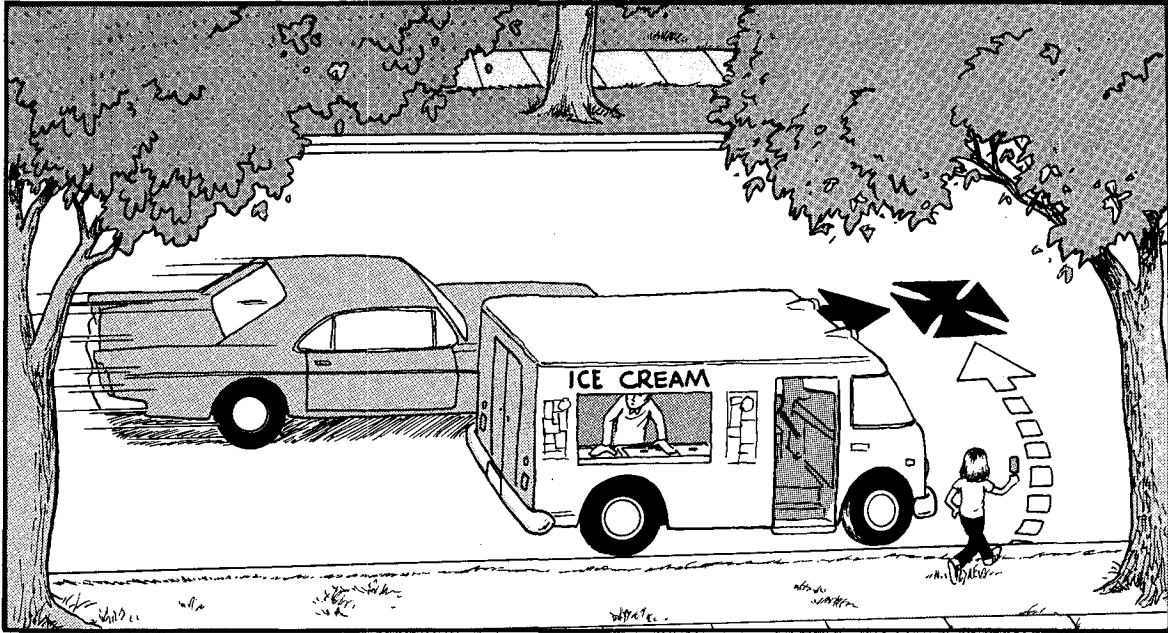
- Municipality to enact ordinance if traffic engineer does not already have this authority or the same results cannot be obtained through interagency negotiations.
- Bus company must examine the feasibility in terms of sources of passengers and must consult with drivers.
- Police to enforce provisions relating to passenger crossings.
- Traffic Engineering must relocate stops, determine the effects of relocation on traffic and upon passengers having to cross the street to the far side in order to board buses.

Notes:

See Recommended Practices of the Institute of Transportation Engineers.

How to obtain ordinance:

Write NHTSA, Technical Reference Division (NAD-44); U.S. Department of Transportation; Washington, D.C. 20590, and request "Bus Stop Ordinance (Attention: NTS-14)." There is no charge for a single copy.



Accident Type: VENDOR-ICE CREAM TRUCK

The pedestrian is struck going to or from an ice cream vending vehicle. This accident occurs almost exclusively in residential areas and away from intersections. Most occur as the pedestrian is leaving the truck.

The Pedestrian

This type of accident almost always involves children under 14 years of age.

Significant Factors

The pedestrian's attention is directed toward the vehicle or his purchase rather than toward traffic. The vending truck usually prevents the driver of the collision car from seeing the pedestrian in time. This accident is actually a unique type of a dart-out accident.

Countermeasure: VENDOR-ICE CREAM TRUCK

Model Ice Cream Truck Ordinance

Objective:

To require a reduction in speed of vehicles passing ice cream trucks and to increase their drivers' awareness, thereby enhancing the safety of pedestrians in this environment.

Approach:

A model ordinance has been prepared, suitable for enactment by municipalities and States, which requires:

- a. Driver from either direction to come to a full stop when meeting an ice cream truck that is vending, and then to pass at a prudent speed, yielding right-of-way to pedestrians.
- b. Ice cream truck to vend only when lawfully parked and not on designated types of streets. When vending, the truck driver must extend a stop signal arm with flashing lights and the truck must display two red flashing lights, facing to the front and rear, the lights to be mounted as high and as far apart as possible. Lights must not flash and the arm must not be extended except when vending. Truck must also be equipped with a convex mirror so that the driver can see the area in front of the truck that is obscured by the hood. Driver may not back the truck to make or attempt a sale.

Status:

Testing program completed. This countermeasure produced a 77-percent reduction in this type of accident.

NHTSA is seeking endorsement of this regulation by the National Committee on Uniform Traffic Laws and Ordinances. New Jersey has enacted the model as a State Law, effective February, 1981. Several other States and communities have reviewed its effectiveness and are considering its adoption.

Considerations:

- This ordinance is generally well accepted by vendors because of improved safety and for its public relations value.
- The model ordinance, particularly its requirements for equipment, may conflict with State law. If so, State law must be changed to permit a locality to adopt this measure.
- Costs will be incurred by vending companies.
- Installations on trucks must be inspected initially and then reinspected annually by the cognizant agency.
- Police enforcement is required.

Implementation:

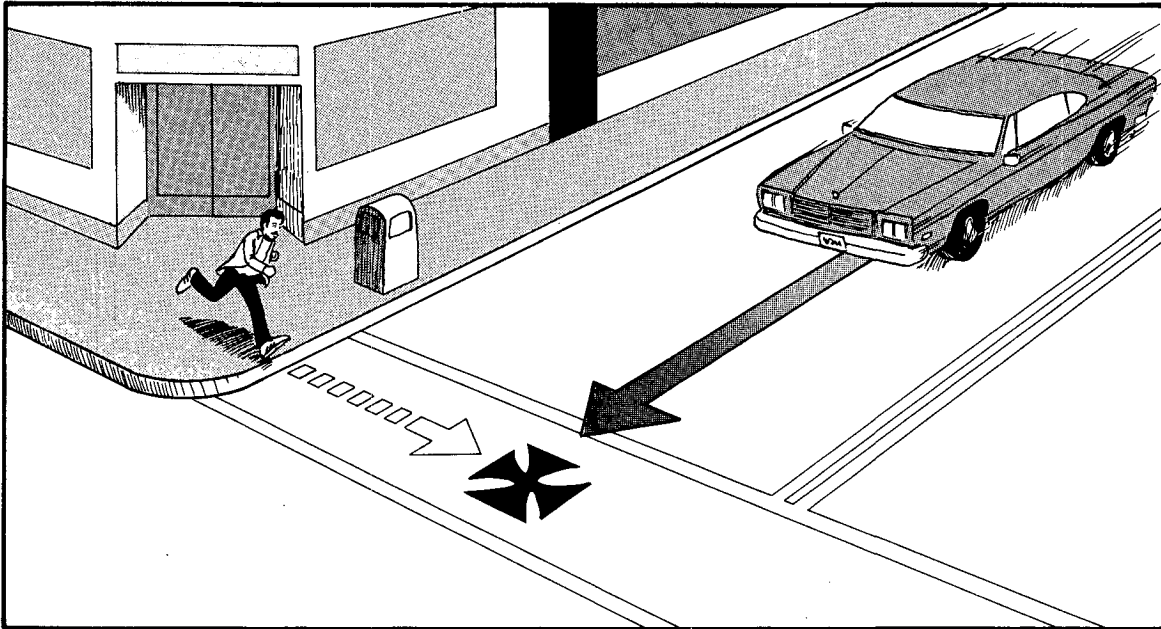
- State, municipal, or county government to enact ordinance.
- Vending companies to install equipment, train vendors.
- Police must be briefed.

- Appropriate agency must establish and operate an inspection system.
- Media report on new ordinance.
- TV stations show "spot" announcement below.

How to obtain ordinance and TV spot:

Write to NHTSA, Technical Reference Division (NAD-44); U.S. Department of Transportation; Washington, D.C. 20590, and request "MICTO Pamphlet (Attention: NTS-14)." No charge is made for single copies.

**VI. Accident Types for Which Countermeasures Are Being Developed —
Group 2**



Accident Type: INTERSECTION DASH

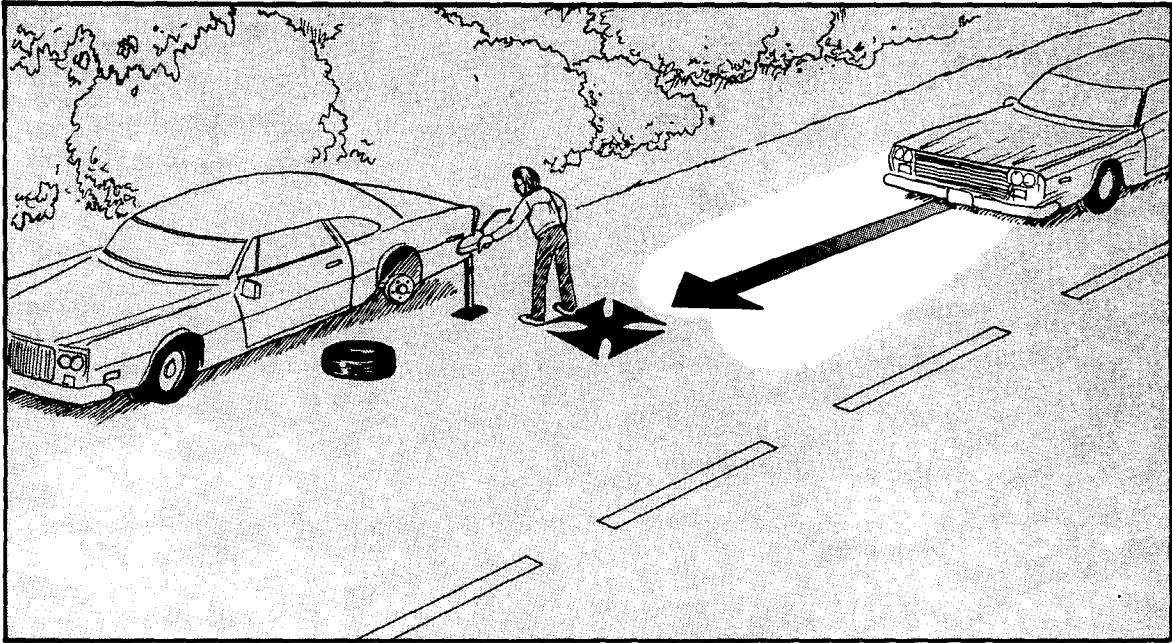
The pedestrian, who may be running, is crossing at an intersection and is struck by, or hits, a moving vehicle. There may or may not be a marked crosswalk. This type of accident usually occurs in nonresidential areas.

The Pedestrian

All age groups are involved, although those from 5 through 9 predominate.

Significant Factors

The key element is that the time during which the driver can detect the pedestrian is too short. The most frequent errors by pedestrians are failure to search adequately and/or appearing suddenly in front of the vehicle.



Accident Type: DISABLED VEHICLE RELATED

The pedestrian is struck while working on, standing next to, or walking to or from a disabled vehicle that is stopped where parking would not be allowed or would be injudicious. This type of accident occurs typically on a major highway after dark. The vehicle usually has been disabled by mechanical problems or an accident, rather than because of running out of fuel. Wet, snow-covered, and icy roads are often involved. In many accidents after dark, the disabled vehicle is not displaying lights or flashers.

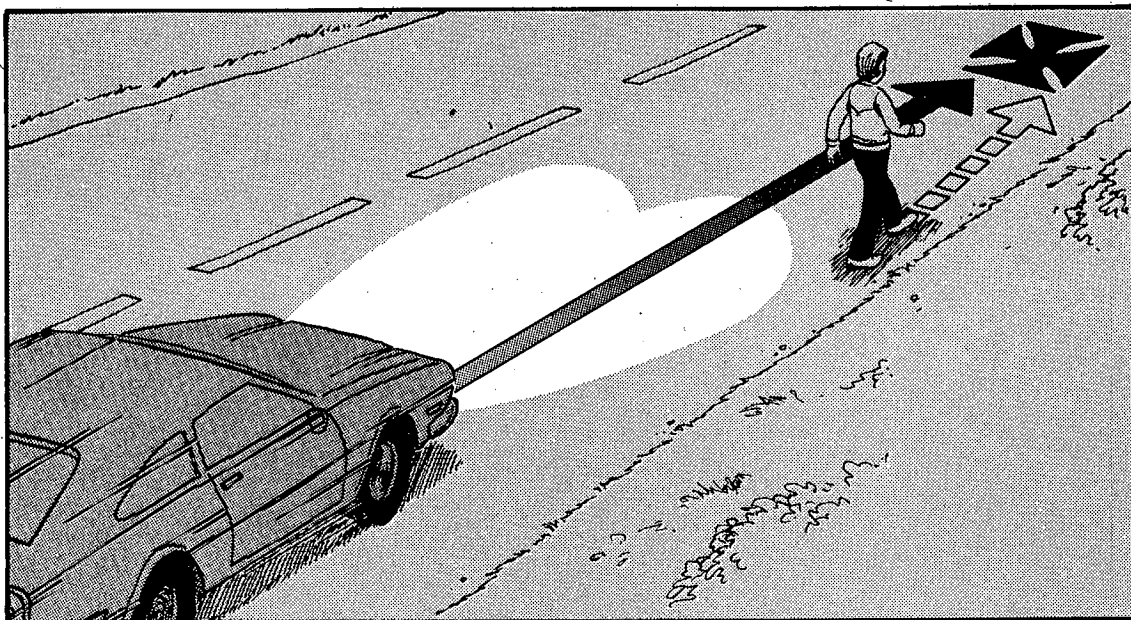
Most pedestrians who are not near the disabled vehicle are struck while attempting to cross a roadway.

The Pedestrian

Most victims are young males.

Significant Factors

The key pedestrian errors are being in an unexpected location and failing to search for and detect the collision vehicle. Often they are distracted by other traffic and most are unaware of the need for evasive action until it is too late. The driver may be partly or fully intoxicated or temporarily blinded by oncoming headlights, or he may lose control of his vehicle because of a slippery road surface.



Accident Type: WALKING ALONG ROADWAY

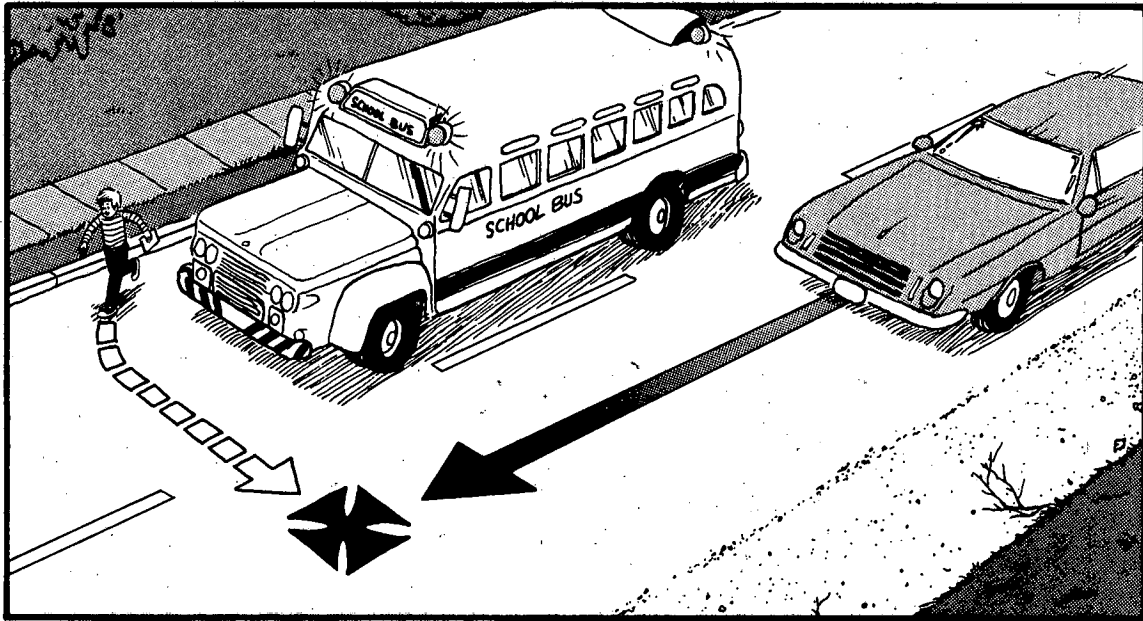
The pedestrian is struck while walking along a roadway, either on the edge or the shoulder. Most of these accidents occur on country roads after dark, and most occur on the roadway. Only a few occur where there is no shoulder or where the shoulder is inadequate.

The Pedestrian

Most are between 10 and 24 years of age; and most are wearing dark clothing and are therefore hard to see.

Significant Factors

Most of the pedestrians are walking with traffic and their focus of attention is away from the collision vehicles; consequently, they fail to search for and detect the threats. Most of the victims are unaware of the need to take evasive action. Most of the drivers become aware of the need for evasive action but are unable to perform the action successfully.



Accident Type: SCHOOLBUS

The pedestrian is struck while going to or from a schoolbus or a schoolbus stop. Most are struck while attempting to cross the road; only a few are hit while walking along the road. Some are struck by their own buses, but most are hit by other vehicles. Most accidents of this type occur on two-lane secondary highways.

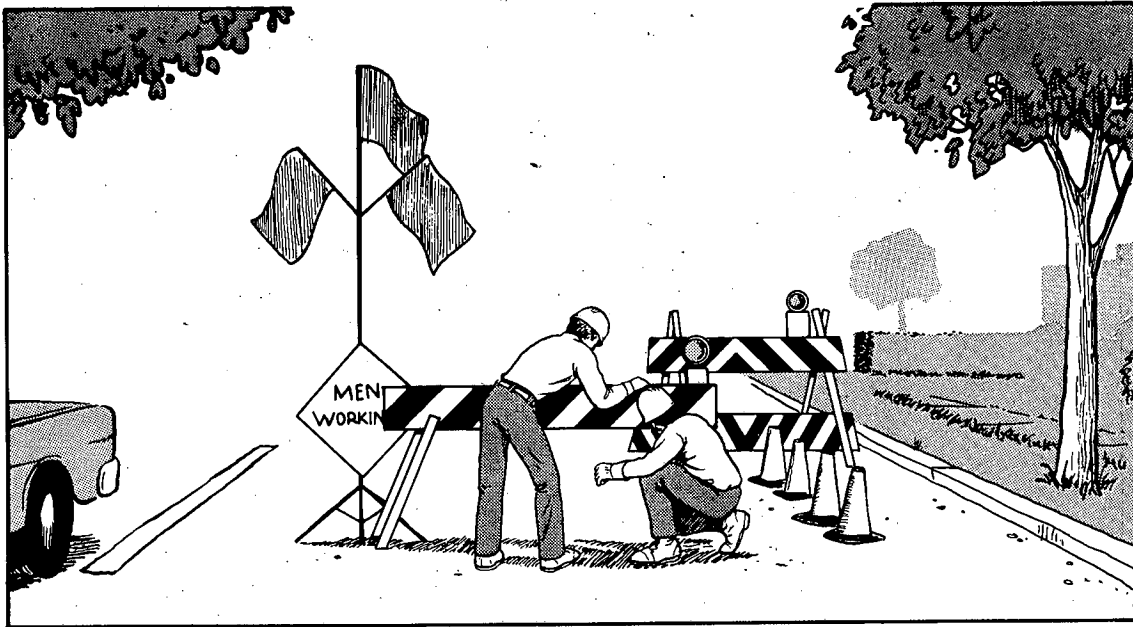
The Pedestrian

The pedestrians involved are of school age, with those aged 5 to 9 years predominating; a few older persons may be involved.

Significant Factors

Often the stopped bus screens the pedestrian and driver of the collision car from each other until it is too late for successful evasive action. Most drivers become aware of the pedestrian just before the accident but they are unable to avoid the collision.

The key pedestrian error is failure to search adequately because of distraction by other pedestrians. The key driver errors include failure to recognize the significance of the stopped schoolbus, inadequate search for pedestrians, and inadequate control of the vehicle.



Accident Type: WORKING ON ROAD

A person working on the roadway is struck by a vehicle in, or on the edge of, the roadway. Most accidents of this type occur in daylight; most of the victims are standing or walking, and very few are attempting to cross the road when struck.

The Pedestrian

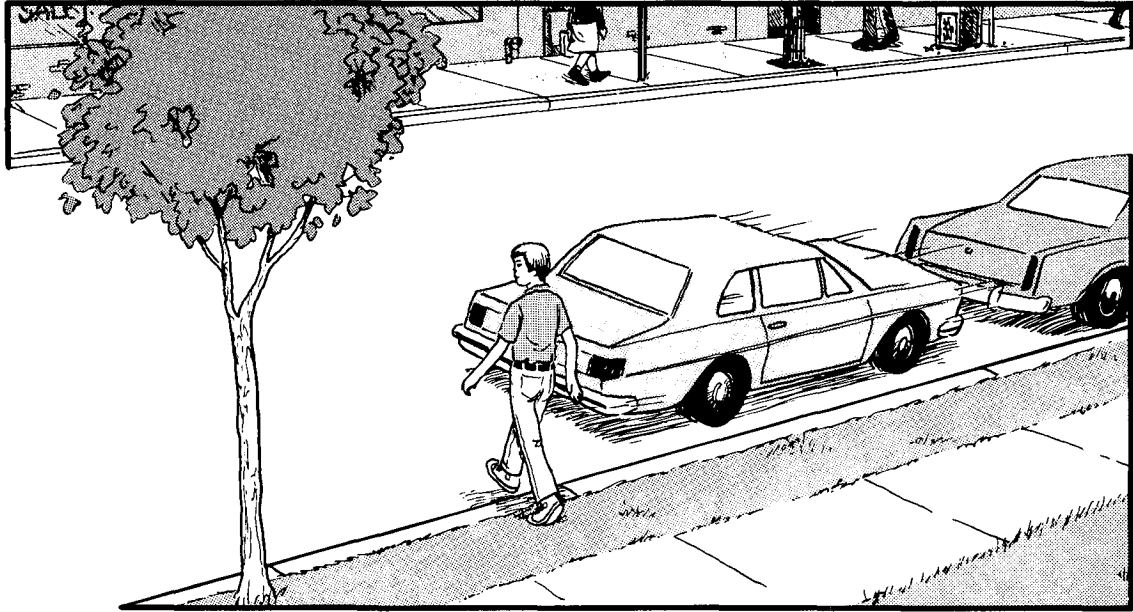
Victims are construction workers, flagmen, or others engaged in road work.

Significant Factors

Many of the workers are not wearing orange upper clothing, however, visibility of the work site or worker is not often a controlling factor. Neither driver nor pedestrian is aware of the need for evasive action.

The key pedestrian error is failure to search for and detect the collision vehicle.

Key driver errors are inattention and failure to predict or control the path of the vehicle.



Accident Type: BACKING UP

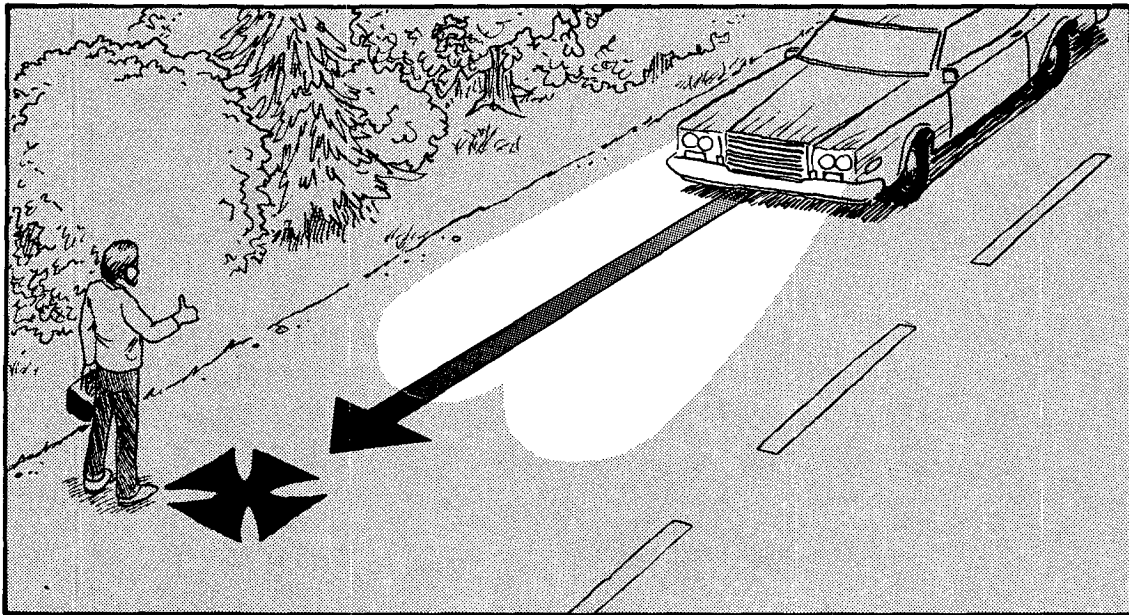
The pedestrian, who is likely to be walking normally at the time, is struck by a vehicle that is backing up. This type of accident occurs mainly in commercial or commercial-residential areas, at or near intersections, and at any time during the day.

The Pedestrian

Backing up accidents occur to all age groups, with a slight emphasis on those who are older than 50.

Significant Factors

Most pedestrians are directing their attention toward other moving traffic, and, failing to search adequately, they are not clearly aware of the movement of the vehicle that will strike them. Three out of every four involved in this type of accident never recognized a need for evasive action until struck. Although most of the drivers were directing their attention to the rear of their vehicles, few recognized the need for evasive action. About half either failed to search for pedestrians behind them or performed an inadequate search.



Accident Type: HITCHHIKING

The pedestrian is struck while hitchhiking, either while walking or stationary at the side of the road. Most of these accidents occur on major roadways in open areas of the country or in suburbs, and nearly all of the accidents occur at night.

The Pedestrian

Most of the pedestrian victims are young males.

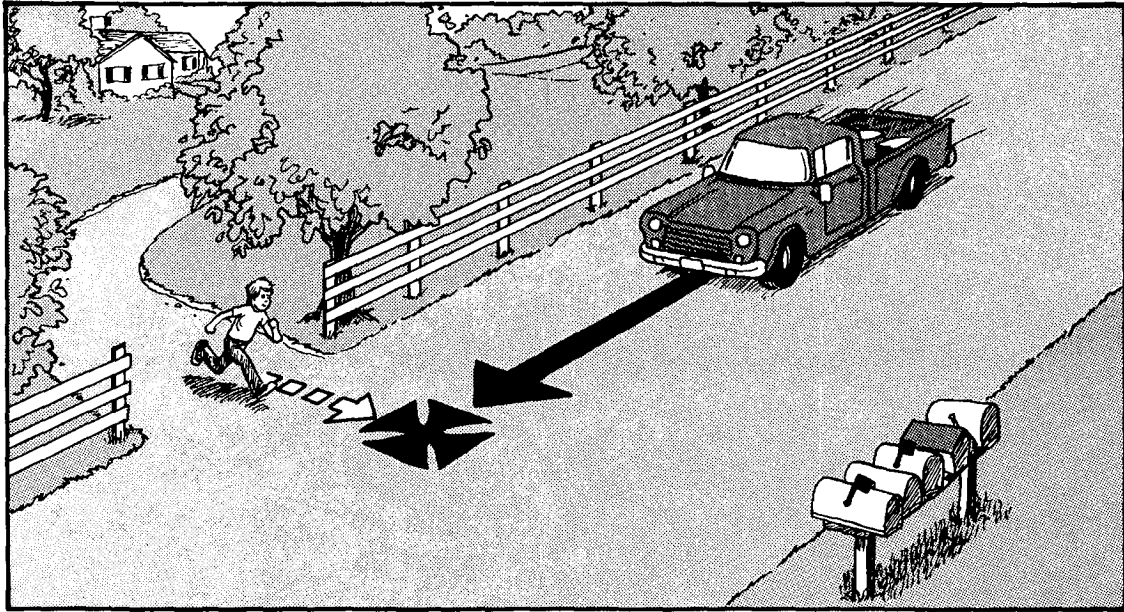
Significant Factors

Alcohol is a factor in the behavior of the pedestrian in a significant number of accidents. Inadequate or no roadway lighting is the most significant environmental factor.

More than is true of other accident types, these tend to occur when the roadway is wet.

The pedestrian may choose an unusual or unexpected place to stand or walk; most are not attending to the collision vehicle and therefore are aware of the need for evasive action.

The key driver error is an inadequate search, and many drivers are unaware of the need for corrective action.



Accident Type: MAILBOX RELATED

The pedestrian is struck going to or from a mailbox or newspaper box, often located on the other side of the road. Most of these accidents occur on high-speed, two-lane roads in country locations. Nearly all occur during daylight. Obstruction of vision by trees, brush, or other roadside items is a factor in only a few cases. The collision vehicle is moving at a typical highway speed.

The Pedestrian

Most victims are children under 9, and nearly all are attempting to cross the roadway alone.

Significant Factors

The pedestrian fails to search adequately and frequently runs into the roadway.

The driver of the collision vehicle has little expectation that a pedestrian will appear. Almost invariably the driver sees the pedestrian, but his attempts to stop or swerve to avoid the collision are unsuccessful.

**VII. Accident Types for Which Countermeasures Have Not Yet Been
Developed—Group 3**

Brief descriptions of Group 3 accident types follow:

Pedestrian Not in Roadway—The pedestrian was struck when not on a roadway. He may have been in a parking lot, driveway, private road, gas station, yard, or ballfield. This type includes pedestrians who were standing on the curb, waiting to cross a roadway.

Pedestrian Walks Into Vehicle—The pedestrian did not appear suddenly in the path of the vehicle, but walked into the side, front, or rear of it. This type includes accidents which occurred both at and away from intersections.

Exiting From/Entering Parked Vehicle—The pedestrian was in the traffic lane next to a stopped vehicle, either entering or leaving it.

Driverless Vehicle—The pedestrian was struck by a vehicle that was moving without a driver at the controls. A child may have set the vehicle in motion.

Expressway Crossing—The pedestrian was struck while attempting to cross a limited access expressway or expressway ramp.

Playing in Roadway—The pedestrian was struck while playing on foot in the roadway.

Play Vehicle Related—The pedestrian was riding a play vehicle, such as a wagon, sled, or skateboard, but not a bicycle, tricycle, or a "Big Wheel" toy, when struck.

Driver Violation—The only identifiable failure was that the driver seemed to have committed one or more of the following violations: Careless driving, failure to yield right-of-way, failure to obey a traffic signal or sign, speeding, driving while intoxicated, or driving under the influence of alcohol.

Hot Pursuit—The pedestrian was struck by a vehicle on an emergency or police mission, or by a vehicle being pursued by the police.

Trapped—The pedestrian was caught in an intersection when the traffic light changed and traffic started to move. This is distinguished from the multiple threat situation described in Group 1.

Emergency/Police Vehicle Related—The pedestrian was near an active police or emergency vehicle, such as a firetruck or ambulance, when struck.

VIII. How To Obtain Additional Information

For further information on programs, countermeasures, or materials not previously referenced in this Guide, contact the appropriate person(s) listed below:

National Highway Traffic Safety Administration

Information on Pedestrian Safety Programs and Countermeasures

Contact: Roger Kurrus
Office of Driver and
Pedestrian Programs (NTS-14)
Washington, D.C. 20590
(202) 426-2180

Information on Pedestrian Safety Research:

Contact: Dr. Alfred Farina
Office of Driver and
Pedestrian Research (NRD-42)
(202) 426-2977

Federal Highway Administration

Information on safety program development and evaluation and accident analysis.

Contact: Edwin M. Wood
Office of Highway Safety HHS-1
400 Seventh Street, SW
Washington, D.C. 20590
(202) 426-1153

Information on signs, markings, signals, lighting, traffic characteristics, and traffic regulation.

Contact: Marshall Jacks, Jr.
Office of Traffic Operations HTO-1
400 Seventh Street, SW
Washington, D.C. 20590
(202) 426-0372

Information on pedestrian accommodation and facility design.

Contact: John O. Hibbs
Office of Engineering HNG-20
400 Seventh Street, SW
Washington, D.C. 20590
(202) 426-0317

Information on pedestrian research activities.

**Contact: John Fegan
Office of Research HRS-41
400 Seventh Street, SW
Washington, D.C. 20590
(202) 426-9710**

DOT HS 805 850
November 1981

U.S. Department
of Transportation
**National Highway
Traffic Safety
Administration**

400 Seventh St., S.W.
Washington, D.C. 20590



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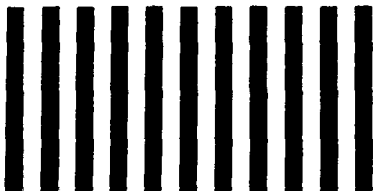
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Office of Driver & Pedestrian
Programs (NTS-14)
Washington, DC 20590

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U.S. Department of Transportation
National Highway Traffic Safety
Administration

PEDESTRIAN ACCIDENT REDUCTION GUIDE REQUEST

Date _____

Please place me on your mailing list for updates and changes to the PEDESTRIAN ACCIDENT REDUCTION GUIDE AND NOTICE OF AVAILABILITY OF NEW COUNTERMEASURES AND MATERIALS.

Name _____

Address _____

City, State, Zip Code _____

Comments: _____
