

On the positive side, the sites were generally characterized by good alignment. Daytime sight distance was more than adequate, with 85 percent of the sites having sight distances in excess of 1000 ft and all providing sight distances in excess of AASHO standards. The data also reflect the typically uncluttered nature of New Mexico's roadsides, with the absence of fixed objects, which precludes the opportunity for a pedestrian to dart-out from behind a tree or post into the path of a vehicle. Lane width, with an average of just greater than 12 ft, is certainly adequate for the types of roadways studied in this project. The presence of pedestrian warning signs at 13 of the accident sites shows a recognition by highway officials of the pedestrian activity at some of the study locations.

The principal negative finding from the field study involves the general lack of pedestrian facilities on these roadways. The absence of such facilities may be attributed in part to the failure of AASHO, the prime source of standards for rural highway design, to provide warrants for their use. Although the "Blue Book" (2) suggests that sidewalks along rural highways will reduce pedestrian accident experience, the general absence of sidewalks in rural areas of New Mexico virtually precludes the opportunity to evaluate either their use or effectiveness. AASHO supports the use of adequate shoulders in lieu of sidewalks.

A factor that is troublesome for the engineer is the 80 percent of the pedestrian accidents that occur at night. The good alignment, adequate sight distance, and clear roadside provided by the engineer all assume secondary importance when the actual sight distance is limited by the illumination from vehicle headlights. Although some of the sites, principally those near major intersections or commercial development, could profit from the installation or upgrading of roadway lighting, the application of this type of improvement was judged to be useful or practical at less than 30 percent of the accident sites.

One finding of the study that could be of value in planning and implementing corrective action is that the accidents are not uniformly distributed on the road system. The 95 sites studied actually involved only 82 locations; the difference is due to sites with multiple accidents during the study period. Two clusters of pedestrian accidents along 14 miles of rural road accounted for 39 percent of the accidents, and they obviously deserve the most immediate attention.

A final conclusion is worth mentioning. This study is one of the more thorough that has been conducted on this topic. The measurements made were comprehensive from an engineering point of view and suitably precise to meet the needs of the study. Statistical techniques, however, which experience has often shown are able to help in explaining the interaction of parameters associated with accident occurrence, yielded somewhat inconclusive results. The most logical explanation is that the human and vehicular factors not examined in this study may be of overriding importance in these accidents.

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## The Obstacle Course: Pedestrians in Highway Work Zones

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There has been an increased awareness of the safety problems associated with highway work zones among traffic professionals and government agencies during the past several years. For the most part, attention has been focused on motorist safety, while pedestrian safety has been virtually ignored. Federal, state, and local manuals do not adequately address the issue of pedestrian accommodation and safety in highway work zones. There are currently no well-defined techniques, standards, or practices that pertain to pedestrian control and safety in work zones. Traffic-control plans for maintenance of traffic through work zones are prepared primarily for vehicular traffic and make rare reference to pedestrians. Inadequate pedestrian accommodation in work zones forces pedestrians to choose their own paths and fight through construction areas full of debris and other obstructions. Pedestrian accommodation and safety in work zones deserve careful attention. Guidelines for accommodating pedestrians should be developed at the federal level and preferably included in the Manual on Uniform Traffic Control Devices for proper implementation and uniform compliance. A concerted effort to improve pedestrian safety in work zones is highly desirable. Pedestrians should be afforded the same rights and privileges enjoyed by vehicles that pass through construction zones.

Traffic control in highway work zones has become a major safety concern for traffic professionals and government agencies during the past several years.

Traffic-control efforts in highway work zones have primarily been directed toward vehicular traffic. The Manual on Uniform Traffic Control Devices (MUTCD) (1) and the associated supplements (2,3) provide a comprehensive coverage of guidelines, principles, and devices for vehicular traffic control in highway work zones. These guides, however, do not adequately address the issue of pedestrian safety and accommodations in highway work zones.

The requirements for preparation of traffic-control plans (TCPs) for all major highway construction projects are essentially related to vehicular traffic control in work zones. Maintenance of traffic is generally included as a separate pay item on all major highway projects. TCPs for highway projects rarely make reference to pedestrian accommodations and safety in work zones.

Given this lack of attention to pedestrian needs, one could expect to find, in general, a lack of pedestrian accommodations in terms of separators, protection, and guidance devices at highway work

zones. This situation is exactly what was observed at several sites surveyed during the course of a study on pedestrian accommodation in highway work zones conducted for the Federal Highway Administration (FHWA) (4).

Figures 1 through 8 provide evidence of some typical hazards and pedestrian safety problems that result from the lack of (or inadequate) accommodation for pedestrians in work zones. Blocking or closing of existing sidewalk pathways without providing alternate pathways and adequate information endangers the safety of pedestrians in and around work zones. The lack of pedestrian accommodations and guidance forces pedestrians to choose their own paths, walk in traffic lanes, and place themselves in hazardous conditions. Improperly placed traffic-control devices, signs, barriers, and separators create their own hazards and add to the confusion of pedestrians and motorists alike.

The important reasons for accommodating pedestrians in work zones include the following:

1. To provide pedestrian access to abutting properties or the right-of-way in a safe manner,

2. To minimize adverse economic consequences for commercial establishments in the vicinity of the highway work zone, and

3. To minimize the possibility of tort liability claims that result from inadequate provisions and protection.

In addition, the needs of special groups of pedestrians, such as children, the elderly, the handicapped, and the blind, where they are expected to pass through work zones, need to be considered, evaluated, and adequately accommodated.

This paper briefly summarizes the state of the art and current practice for pedestrian accommodations in work zones, findings based on field investigations and discussions with professionals, and recommendations for future efforts in this area. This paper deals primarily with work zones that involve highway construction and maintenance activities, but other work-zone types, which involve building construction, public works projects, and utility operations, were also included in the study to provide a good mix of field sites.

Figure 1. Sidewalk completely blocked by construction material; no pedestrian information or accommodations provided.



Figure 2. Sidewalk completely blocked by construction equipment; pedestrians forced into traffic lanes.



Figure 3. Inadequate protection around utility excavation creates pedestrian safety problem.



Figure 4. Temporary ramps with steep slopes create unsafe conditions for pedestrians with mobility problems.



Figure 5. Inadequate delineation of pedestrian pathway and protection results in confusion and discourages use.



Figure 6. Crosswalk blocked by several devices; no pedestrian information provided.



#### CURRENT POLICIES AND PROCEDURES

Current policies and procedures for accommodating pedestrians in work zones were determined from various sources, including a literature review, field visits, and discussions with professionals associated with various levels of government.

#### Literature Review

A literature review of the national, state, and local manuals and other publications revealed only sparse reference to pedestrian accommodations in work zones. At the federal level, guidelines and standards for work-zone traffic controls are contained in MUTCD (1) and its supplemental handbooks. Part VI of MUTCD provides specifications and guidelines for traffic control in highway work zones. Although some of the principles and information provided in MUTCD would apply to pedestrian controls, the entire section is primarily devoted to vehicular traffic control with no specific guidance for pedestrian control.

The appendix to Part VI of MUTCD, Traffic Control

Figure 7. Absence of pedestrian access to abutting properties on highway widening project results in hazardous conditions.



Figure 8. Inadequate separation and protection from vehicles endanger pedestrians' safety.



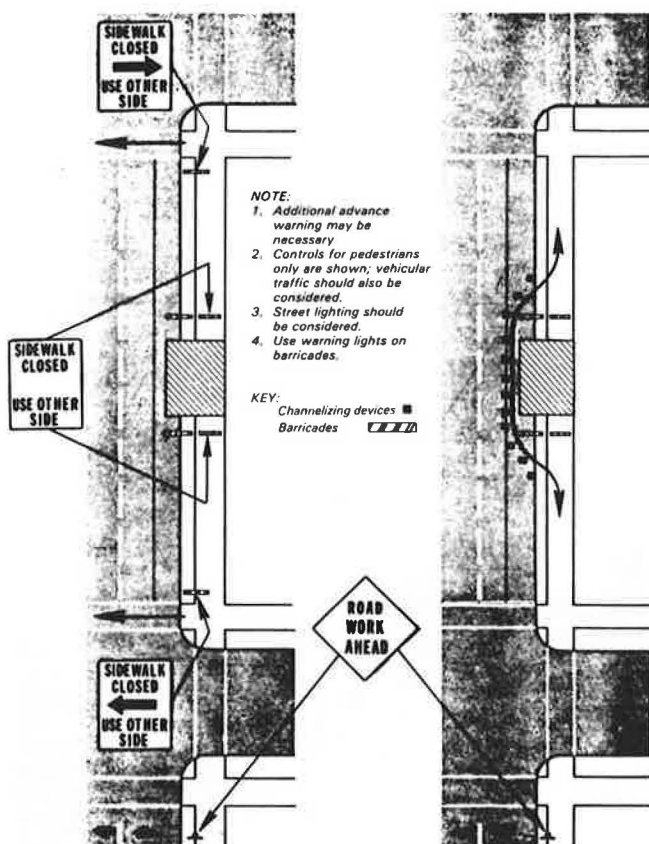
Devices Handbook--An Operating Guide, contains only very broad references to pedestrian needs throughout the handbook and contains a brief section specifically relating to pedestrian considerations in work zones (2). It also provides a schematic illustration of methods of controlling pedestrian traffic, as shown in Figure 9 (2, p. 61). This information is simply not specific enough for planners to determine the type and level of accommodation for pedestrians through work zones.

Some additional guidance for pedestrian control is contained in Traffic Controls in Construction and Maintenance Work Zones (3). The report suggests the use of protective barricades, fencing, handrails, and bridges together with warning and guidance devices for the safety and delineation of passageways for pedestrians and bicycles, bridle paths, and other nonmotorists in work zones. Provision of alternate walkways is also recommended where existing walkways are closed by construction or maintenance. Installation of a fixed pedestrian walkway of the fence-and-canopy type to protect and control pedestrians is also recommended where hazardous work conditions exist overhead.

A search of the state manuals again revealed very little reference to pedestrian planning considerations in work zones. Some states simply included the pedestrian protection requirements in their own manuals on uniform traffic-control devices.



Figure 9. Typical application of two methods for accommodating pedestrians in work zones.



The description of pedestrian protection included in city and county construction manuals is also very brief and of a very general nature. Most of these manuals contain either the same or similar general and brief paragraphs and descriptions that relate to pedestrian considerations in work zones. The work area traffic-control manuals for the cities of High Point, North Carolina; Wichita, Kansas; Los Angeles; Phoenix; Flint, Michigan; and Seattle included somewhat detailed coverage of pedestrian protection requirements and also some typical illustrations for pedestrian control in work zones (5-10). The information contained in these city manuals is neither detailed nor site specific to help the designer evaluate pedestrian accommodation needs in work zones (11).

In summary, the federal, state, and local manuals reviewed do not specify any conditions under which pedestrian accommodations in highway work zones are essential. There are currently no well-defined techniques, standards, or practices that pertain to pedestrian accommodation, control, or safety in work zones. Also, no documentation or criteria for determining the type of pedestrian accommodation needs and devices to be used at a given site for a particular pedestrian or traffic volume is currently available.

#### Discussions with Federal, State, and Local Officials

Discussions held with officials of various government agencies confirmed the contention that little, if any, attention has been given to the pedestrian needs through and around work-zone sites, particularly on highway construction projects. The usual

reasons given for this lack of attention range from "There are no pedestrians on our highway jobs," to "MUTCD does not specifically require a plan for pedestrians in construction areas."

The following additional observations are made based on the general findings gleaned from the discussions with the various officials:

1. Some officials mentioned that because, in many situations, pedestrian facilities such as sidewalks are either nonexistent or poorly maintained during nonconstruction times, how can one expect to provide a neat, clean, reasonably safe, and obstacle-free pedestrian path through a work zone just for the duration of the construction period. The basic tenet is that, "If you don't do it, why do I have to do it."

2. Some officials indicated that no problem of pedestrian accommodations and safety in work zones existed because they had received no complaints. On the other hand, people affected do not seem to be disposed to complain because they either do not know to whom to complain or feel that complaining does not do any good.

3. Currently, no statistics that relate to pedestrian accidents in work zones are available to truly gauge the type and magnitude of the pedestrian safety problem. However, realizing the potential benefits, some states have now started to keep proper records of vehicular and pedestrian accidents in work zones.

4. All agencies generally referred to Chapter VI, Traffic Construction and Maintenance, of MUTCD for preparation of TCPs for work zones. However, MUTCD does not adequately address the problem of pedestrian accommodation and safety in a work-zone environment.

5. Urban areas included in the study generally seem to have a greater awareness of the pedestrian problems in work zones and have developed some guidelines and policies for these requirements. However, the guidelines and policies were not available in published form in all cases.

6. Regarding the question of establishing a minimum threshold level of pedestrian activity for considering pedestrian accommodation in work zones, the response was generally guarded. The general feeling was that pedestrian needs should be considered in relation to pedestrian activity, type and duration of the project, and level of hazard in a work-zone environment. Some work sites would not require any accommodation, regardless of pedestrian volume, while some other types of work zones (building construction, deep excavation, etc.) would require pedestrian accommodation and protection in most cases. Minor sidewalk repair or interruption seemed to be of least concern for pedestrian considerations, while work sites that involve deep excavations (for example, subway construction) are the greatest concern.

7. Some agency officials cited lack of any information, guidance, and standards for pedestrian accommodation in work zones as the primary reason for not considering the pedestrian access needs in a highway construction environment.

8. There is a general recognition and realization among professionals that pedestrian access and safety needs should be considered during the planning and design stages of highway construction or reconstruction projects.

9. The general feeling among professionals was that the guidelines for pedestrian accommodation and safety in work zones should be incorporated in MUTCD for proper compliance and implementation. MUTCD is the single primary resource used by professionals and field staff for maintenance of traffic in work zones.

Table 1. Distribution of study sites.

Study Area	Area Type				Construction Type				Duration				Pedestrian Volumes <sup>a</sup>			
	Commercial	Residential	Educational	Other	Highway	Utility	Building	Other	1 Day or Less	1 Day to 1 Week	1 Week to 1 Month	More Than 1 Month	Low	Medium	High	Total
Tampa area	3	2	2	4	6	3	2					9	4	4	1	9
St. Petersburg area	5	3		1	7	1				1		6	5	2		7
Fort Meyers area	4	2			4	1					1	4	5			5
Atlanta	9	8	3	4	7	2	1	2	2	1		9	4	8		12
Denver	6	2	2	2	7	4					1	7	2	1	5	8
Salt Lake City	7	5	1		5	4	1			2		7	4	5		9
Washington, D.C.	5	2			5	1	1	3			1	6	3	3	4	7
Washington metropolitan area	8	9	3	1	9	3		6		1	3	8	8	1	3	12
Baltimore metropolitan area	12	9	1	2	12	3		4		4		11	6	4	5	15
Northern Virginia area	3	4	1		3	1				1		3	2	2		4
Miami and Ft. Lauderdale area	8	5	4		7	2		3			2	9	7	4		11
Total	70	51	17	14	72	25	5	18	2	10	8	79	47	34	18	99

<sup>a</sup>Pedestrian volumes are as follows: low = less than 50 pedestrians/h, medium = 50-150 pedestrians/h, and high = more than 150 pedestrians/h.

Figure 10. Example of bad pedestrian accommodation; pedestrian needs totally ignored on this side.



10. Traffic engineers and construction engineers suggested that the type, size, and color of the signs to be used for pedestrian information and accommodation in a work-zone environment should be standardized. The same suggestion applies to other traffic-control devices needed for pedestrian accommodation in work zones. The current practice of using nonstandard signs of various color, size, and materials provided misleading and confusing information in some work-zone situations.

11. Pedestrian accommodations are generally provided only if the design plans indicate their need or are based on the personal judgment or knowledge of the field engineer responsible for construction.

12. Currently, enforcement of traffic-control plans is done primarily on major construction projects. In regard to enforcement, some agencies stated that they can shut down the job if a particular contractor is in constant violation of the approved TCP. Others mentioned that they simply do not have any legal basis for such an action.

#### Field Investigations

Field investigations were conducted at nearly 100 work-zone sites located in different geographic sections of the country. Table 1 gives the distribution and other attributes of the study sites. The purpose of the field observations was to conduct in-

Figure 11. Example of good pedestrian accommodation; adequate pedestrian bypass provided on this side.



vestigations and critiques of as many different types of pedestrian work zones as possible. Field investigations also provided a basis for identification of good and bad practices related to provisions for pedestrian control and safety in work zones. An example of good and bad pedestrian accommodation at the same work zone site is shown in Figures 10 and 11. Adequate guidance, channelization, and bypass away from the work site were provided for pedestrian traffic on one approach (Figure 11), while pedestrian needs were totally ignored on the other approach of the same site (Figure 10).

Field data were based mainly on observations (except for some physical site data and traffic count data). No specific pedestrian or driver performance data were collected. Site investigations included an evaluation and critique of the pedestrian information (and motorist information if applicable to the pedestrians), guidance, separation, and protection needs. Site-specific pedestrian needs were identified, and adequacy of traffic-control plans to meet desired needs were evaluated based on observed pedestrian behavior and engineering judgments. Good and bad practices were identified to extrapolate planning principles and guidelines based on observations. The data-reduction procedure consisted of reviewing slides, photographs, field sketches, comments, and notes made on the data-collection form for each study site.

The following observations are made based on the results of the field investigations:

Figure 12. Informational signs currently used at work zones.

SIGN MESSAGE	COLOR BACKGROUND	COLOR LETTERING	MATERIAL	SIGN MESSAGE	COLOR BACKGROUND	COLOR LETTERING	MATERIAL
	WHITE	BLACK	WOOD		WHITE	BLACK	METAL
	WHITE	BLACK	WOOD		WHITE	BLACK	CARD-BOARD
	WHITE	BLACK	METAL		WHITE	BLACK	WOOD/METAL
	RED	BLACK	METAL		WHITE	BLACK	METAL
	WHITE	BLACK/RED	WOOD		CONSTRUCTION ORANGE	BLACK	METAL
	WHITE	BLACK	METAL		WHITE	BLACK	METAL
	CONSTRUCTION ORANGE	BLACK	METAL		WHITE	BLACK	METAL
	CONSTRUCTION ORANGE	BLACK	METAL		YELLOW	BLACK	METAL
	CONSTRUCTION ORANGE	BLACK	METAL				

NOTE: SIZES OF SIGNS VARY AND ARE IRREGULAR.

1. Pedestrian activity can be found at nearly every work-zone site.

2. Pedestrian accommodations of some type were generally provided for the following type of construction zones: (a) major building construction work where required as a part of local building codes; (b) construction zones located in urban areas, especially in downtown areas that generate heavy pedestrian and vehicular traffic volumes; and (c) work zones that are associated with subway construction and that impact highway and pedestrian traffic.

3. The agencies that provided pedestrian accommodation in work zones have used traffic-control devices, including cones, signs, rope, flagging tape, barricades (types I and II), and other types of barriers (fencing, plywood walls, etc.) mostly based on the judgment of the construction supervisor. Canopy-type protection was used where there is an overhead construction hazard.

4. Currently, informational signs used at work-zone sites vary by size, color, and material. Both regulatory and construction orange signs are common. Sign material included cardboard, wood, and metal. Some of the signs used appeared to have been fabricated at the site. Figure 12 shows an assortment of signs and messages used for pedestrian information at some of the study sites.

5. Many jurisdictions require submission of TCPs that conform to MUTCD on major highway and utility construction projects. Currently, this requirement is applicable to control of vehicular traffic in work zones. Pedestrians are considered only in situations where the volume and safety problems justify their accommodation (i.e., urban areas or, specifically, downtown areas). In some cases, a general and brief note that relates to pedestrian considerations in work zones appeared on some TCPs. The following are typical examples of such notes found on the TCPs reviewed for some of the study sites: "If pedestrian traffic cannot be maintained on existing crosswalks, pedestrians must be routed to desired

paths by means of barricades and/or signs." "A 5-foot walkway suitable for pedestrian use must be provided at Cherry Street, Dahlia Street, etc., ... on weekends and holidays, to allow pedestrian access to churches in that area." "Special considerations shall be given to pedestrian safety when construction work encroaches upon a sidewalk, walkway, or crosswalk."

Finally, traffic regulation specifications for Metropolitan Atlanta Rapid Transit Authority (MARTA) construction projects in Atlanta included the following special provision in the contract documents:

Regulating vehicular and pedestrian flow adjacent to the work site shall consist of ensuring that construction operations do not impede vehicular and pedestrian traffic to the extent that public safety will be threatened and the passage of emergency vehicles will be restricted. Public ways, including streets, sidewalks, and accesses to public and private properties, shall not be obstructed, and the carrying capacity shall not be reduced, except as indicated on the reviewed and accepted traffic regulating plan. Pavement surfaces shall be maintained in a smooth riding plane where vehicular and pedestrian traffic is routed. Excavations in those areas shall be backfilled, and temporary pavement shall be installed immediately after the backfill has been placed. If temporary pavement becomes rutted, it shall be supplemented with steel plates over the excavation or by other accepted means. Each section of permanent pavement and sidewalk shall be restored as soon as is practicable after completion of the work for which that section of pavement and sidewalk was removed. Obstructed public ways, including streets, sidewalks, and accesses to public and private properties, shall be returned to public and private uses when the obstruction thereto is no longer necessary for the prosecution of the project.

Vehicular and pedestrian access to buildings adjacent to the work site shall be unimpeded by construction operations to the extent that public safety will not be threatened and that public convenience will not be unduly impaired in the opinion of the engineer.

Closing streets and sidewalks shall be in accordance with the reviewed and accepted traffic regulating plan.

#### CURRENT TECHNIQUES AND DEVICES

Techniques and devices currently used for pedestrian accommodation in work zones have been identified from two separate sources--the literature review and the field investigation. The literature review indicated a very general and brief discussion of when and how to accommodate pedestrians in work zones. Diversion of pedestrians into curb or parking lanes or to the other side of the street is suggested where existing walkways necessitate blocking or closing for construction and maintenance activities. Likewise, installation of a fixed pedestrian walkway of the fence-and-canopy type for pedestrian accommodation is recommended where overhead protection is required.

The pedestrian accommodation techniques found in the literature do not specify their use in relation to site conditions, i.e., type of work zone, duration of construction activity (long- versus short-term projects), pedestrian activity levels, vehicular traffic, and degree of hazard. Further, no detailed planning and implementation guidelines are currently available that can be used by planners or designers for accommodating pedestrians in work zones.

Based on field investigations, the following techniques for pedestrian accommodation have been used in varying degrees at some of the sites:

1. None; the majority of sites reviewed did not employ pedestrian accommodations of any type, even though pedestrian use and the potential for accommodation was observed;
2. Use of an existing pathway mainly where construction was either overhead (bridge-widening projects or building construction) or the physical separation between the pedestrian path and construction site was adequate;
3. Directing pedestrians to either an alternate walkway or another route by use of a bypass or a detour; and/or
4. Closing the work-zone area to pedestrians by erecting NO PEDESTRIANS signs without providing an alternate pathway for the pedestrians.

Field investigations also revealed that pedestrian accommodation techniques were not uniformly used at different segments of the same work zone or at different sites in the same area. This could be due to lack of adequate local planning and enforcement policies and procedures. Further, techniques were rarely modified to meet changing work-zone environments in relation to construction schedules and activities. The literature review and field investigations revealed that a wide assortment of devices is currently used for accommodating pedestrians in and around a work-zone environment. The outline below lists these devices by groups:

- I. Channelization
  - A. Cones
  - B. Barricades (types I and II)
  - C. Markings
  - D. Flagging tape
  - E. Rope

- F. Construction delineators
- II. Advance warning
  - A. Signs
  - B. Barricades (for sidewalk closure or blockage)
  - C. Cones
- III. Separators
  - A. Pedestrian and vehicle
    1. Traffic cones
    2. Barricades (type I and II)
    3. Wooden handrails
    4. Portable concrete barriers
  - B. Pedestrian and construction
    1. Wooden handrails
    2. Wooden post and plywood fences (walls)
    3. Chain-link fences
    4. Portable concrete barriers
- IV. Pathway material
  - A. Concrete
  - B. Wood
  - C. Plywood overlaid with roofing felt material
  - D. Steel plates
  - E. Asphalt

Available literature and field investigations do not provide any information relating to the type of device to be used for a given situation based on type and duration of construction work or pedestrian and vehicular traffic levels. Further, use of various devices to perform functions such as pedestrian control, separation, protection, informational needs, channelization, and guidance in work zones is not adequately documented in the existing literature.

#### CONCLUSIONS AND SUGGESTIONS

The results of the literature review revealed only brief and sparse reference to pedestrian planning and safety considerations in work zones, except where pedestrian accommodations are required by local building codes for building construction work. Traffic-control plans required for highway construction projects make rare reference to pedestrian safety needs and are primarily directed toward vehicular traffic control. Very little formal guidance for use of any techniques or devices for pedestrian accommodation for a given work-zone situation is currently available.

It seems as though there is no real concerted effort being made by any organization, group, or agency to afford the pedestrian the same rights and privileges that a vehicle has as it passes through a construction zone. The vehicle is provided with an open, nearly unrestricted, relatively smooth, fairly well-marked way to proceed either around and through or detoured completely away from construction areas and problems. The pedestrian, however, is simply allowed to fight through construction areas full of debris, mud, and other obstructions.

Because nationally accepted guidelines for pedestrian accommodation in work zones are currently not available, some local jurisdictions have taken a lead and developed their own policies and standards. Other local jurisdictions that recognize the problem are simply following the information and guidance developed by these agencies.

Inadequate accommodation of pedestrians in work zones is the result of (a) a lack of awareness of the pedestrian safety problems; (b) a lack of the necessary information, guidance, applicable standards, adequate legal precedence, and work-zone pedestrian accident statistics; and (c) the absence of adequate enforcement policies and procedures at local levels.



The following observations and professional judgments are based on the experience gained through the conduct of this study:

1. Pedestrian activity can be found near every work zone.
2. Pedestrian routes should be well marked, safe, efficient, and easy to follow.
3. Pedestrians should have the same right to traverse a work zone as does a vehicle, even if detouring or rerouting is required.
4. In residential and commercial areas, adequate pedestrian access should be provided to properties abutting work zones.
5. Logical, visible, and direct paths will be followed by pedestrians regardless of the level of hazard. Pathways that route pedestrians out of their way will only be used when absolutely necessary.
6. A minimum amount of special devices need to be provided for special groups, i.e., the elderly and the handicapped. Designs should include ramps and curb-free walkways.

A general apathy toward pedestrians also exists. The persons responsible for developing maintenance of traffic plans still seem to be resistant to considering the pedestrians within the scope of maintenance of traffic. The problem seems to be a spill-over from the general attitude toward pedestrians.

The bottom line is that efforts must be made to accommodate and provide for pedestrian safety through work zones. This, however, is dependent on the fact that the pedestrians or nonmotorized vehicles have the right to traverse the work zone or gain access to abutting properties in a safe manner.

Based on the experience gained through field work, the project study team recommends consideration of pedestrian accommodation within work zones in the following situations:

1. Where sidewalks existed prior to construction,
2. Where the work-zone site is located along a designated route to a school,
3. Where there is evidence of pedestrian use (i.e., well-worn paths exist), and
4. Where existing land use (shopping centers, parks, recreation areas, educational institutions, community centers, residential developments, etc.) generates pedestrian traffic.

The results of the research indicated the need for pedestrian considerations in urban work zones. TCPs for highway construction projects should include considerations for pedestrian accommodation and safety where pedestrian use either exists or is expected to be generated based on land use. Further, the guidelines for pedestrian accommodation in highway work zones should be prepared at the federal level and preferably included in MUTCD for proper compliance, implementation, and enforcement. It is desirable that guidelines should specify conditions under which pedestrians should be accommodated in

work zones and also suggest techniques and devices to be used for site-specific needs. The guidelines should be rational, simple, easy to understand and implement, and usable by planners, designers, engineers, and construction and maintenance personnel.

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The contents of this article reflect our views, and we are responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official views or policy of the U.S. Department of Transportation. The U.S. government assumes no liability for its contents or use thereof.

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