FINAL REPORT

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Improving Pedestrian and Bicyclist Safety in Highway Construction Work Zones

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16. Abstract

An investigation of the factors influencing pedestrian and cyclist safety in highway construction work zones. Crash statistics were analyzed with regard to crash characteristics for work zone crashes involving pedestrians and cyclistspedestrians and cyclists. Pedestrians and cyclists were video taped in highway construction work zones. Analysis of the video records was performed to identify at-risk behavior patterns and other factors influencing safety. Strategies for improving pedestrian and cyclist safety in highway construction work zones were developed.

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TABLE OF CONTENTS

page

LIST OF TABLES

LIST OF FIGURES

Figure page

REPORT SUMMARY

Highway construction work zones often interrupt the normal travel paths of pedestrians and bicyclists. Safely accommodating the needs of pedestrians and bicylists while at the same time accommodating vehicle needs, and maintaining reasonably efficient construction operations is challenging.

More detailed guidance was necessary with regard to how to design and implement pedestrian and bicyclist accommodations in highway construction work zones.

This project was undertaken by the Florida Department of Transportation (FDOT) because of their commitment to continually improving safety.

The objective of this research was to identify issues and factors influencing pedestrian and bicyclist safety in construction work zones, and to develop suggested engineering and implementation measures that can be added to existing Florida's Traffic Control Plan (TCP) processes to improve the safety of pedestrians and bicyclists in highway construction work zones.

An investigation of the pedestrians and cyclists' safety needs in work zone was performed using historical pedestrians and cyclist's crash data, observations of pedestrians and cyclists' behaviors in work zones, and surveys conducted with different bicycle/pedestrian associations.

The findings suggest that work zone crashes for pedestrians and cyclists are associated with their at risk behavior. Crossing mid-block through the work zone is one

of the most common. The conclusion is that improving guidance and channelization , and maintaining secure travel routes will improve safety.

The product of this research is the development of suggested additional pedestrians and cyclists safety measures. Additional guidance for work zone designers and suggested work zone layouts are included to safely accommodate pedestrians and cyclists through and around construction areas.

More specifically, the following contributions are offered:

1. Additional guidance for designers concerning pedestrians and cyclists to be added to the FDOT Plans Preparation Manual.
2. Additional Design Standard details to be incorporated in the FDOT Design Standards
    a. Temporary Utility Crossing Sidewalk
    b. Temporary Pedestrian/Bicycle Path
    c. Temporary Mid-Block Crossing
3. Additional technical specifications supporting the above.

CHAPTER 1
INTRODUCTION

Problem Statement

The safety of pedestrians and bicyclists remains a national concern. In 2002, the Traffic Facts on the Fatalities Analysis Reporting Systems (1) and the National Center for Statistics and Analysis (2) showed that 71,000 pedestrians were injured and 4,808 were killed in traffic crashes in the United States; pedestrian represent 2% of all the people injured in traffic crashes and 11% of all traffic fatalities. On average, a pedestrian is killed in a motor vehicle crash every 109 minutes, and one is injured every 7 minutes. In addition to pedestrians, 662 bicyclists were killed and an additional 48,000 were injured in traffic crashes. In 2002, most of the bicyclists injured or killed were males. The average age of bicyclists killed in traffic crashes was 35.7 years, and the average age of those injured was 26.7 years. More than one-fifth (22%) of the bicyclists killed in traffic crashes in 2002 were between 5 and 15 years old.

The National Statistics involving pedestrians and bicycles were obtained from the Transportation Safety Facts (3) (Tables 1-1, 1-2 and Figures 1-1 and 1-2).

Table 1-1 Number of pedestrians and bicyclist killed and injured by year in the United States Ref: (3)

Year	Pedestrians Killed	Pedestrians Injured	Bicyclists Killed	Bicyclists Injured	Other pedestrians and cyclistss killed
1992	5,549	89,000	723	63,000	98
1993	5,649	94,000	816	68,000	111
1994	5,489	92,000	802	62,000	107
1995	5,584	86,000	833	67,000	109
1996	5,449	82,000	765	58,000	154
1997	5,321	77,000	814	58,000	153
1998	5,228	69,000	760	53,000	131
1999	4,939	85,000	754	51,000	149
2000	4,763	78,000	693	51,000	141
2001	4,901	78,000	732	45,000	123
2002	4,808	71,000	662	48,000	113

Table 1-2 Total pedestrians and bicyclist killed and injured by year in the United States Ref: (3)

	Total (Pedestrians + Bicyclists+ Other pedestrians and cyclistss)		TOTAL	% Change Total	
Year	Killed	Injured		Killed	Injured
1992	6,370	152,000	158,370	-	-
1993	6,576	162,000	168,576	+3.23	+6.58
1994	6,398	154,000	160,398	-2.71	-4.94
1995	6,526	153,000	159,526	+2.00	-0.65
1996	6,368	140,000	146,368	-2.42	-8.50
1997	6,288	135,000	141,288	-1.26	-3.57
1998	6,119	122,000	128,119	-2.69	-9.63
1999	5,842	136,000	141,842	-4.53	+11.48
2000	5,597	129,000	134,597	-4.19	-5.15
2001	5,756	123,000	128,756	+2.84	-4.65
2002	5,583	119,000	124,583	-3.01	-3.25

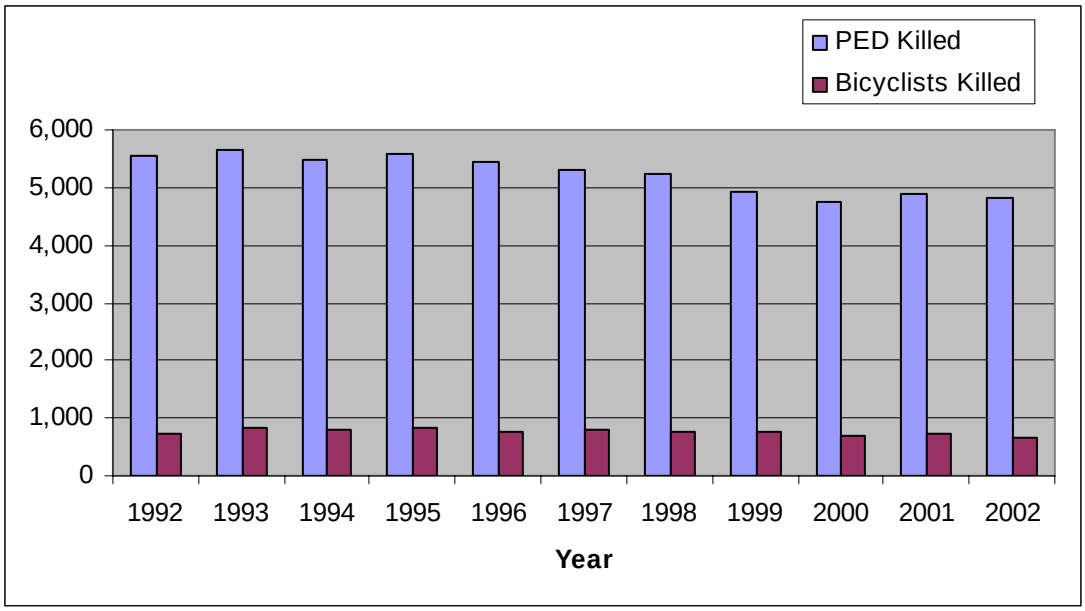


Figure 1-1 Number of pedestrians and bicyclists killed by year in the United States Ref: (3)

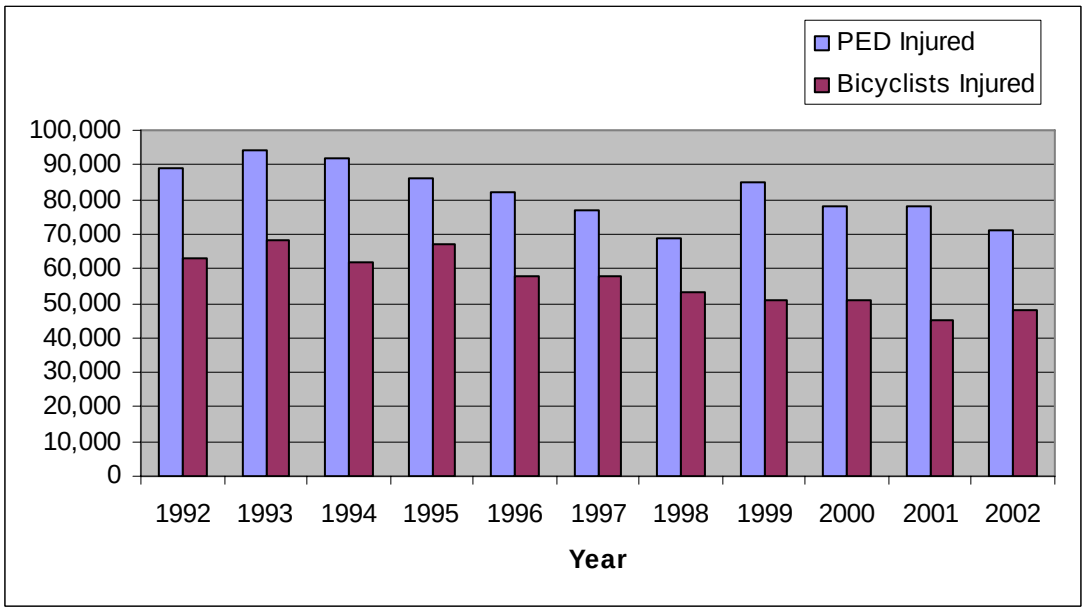


Figure 1-2 Number of pedestrians and bicyclists injured by year in the United States Ref: (3)

A Federal Highway Administration study, "Targeting Highway Fatalities"(4) grouped these pedestrian fatality statistics by state (Figures 1-3 and 1-4) and has assigned

colors to the states depending on the number of pedestrians killed and the severity of the problem in each state.

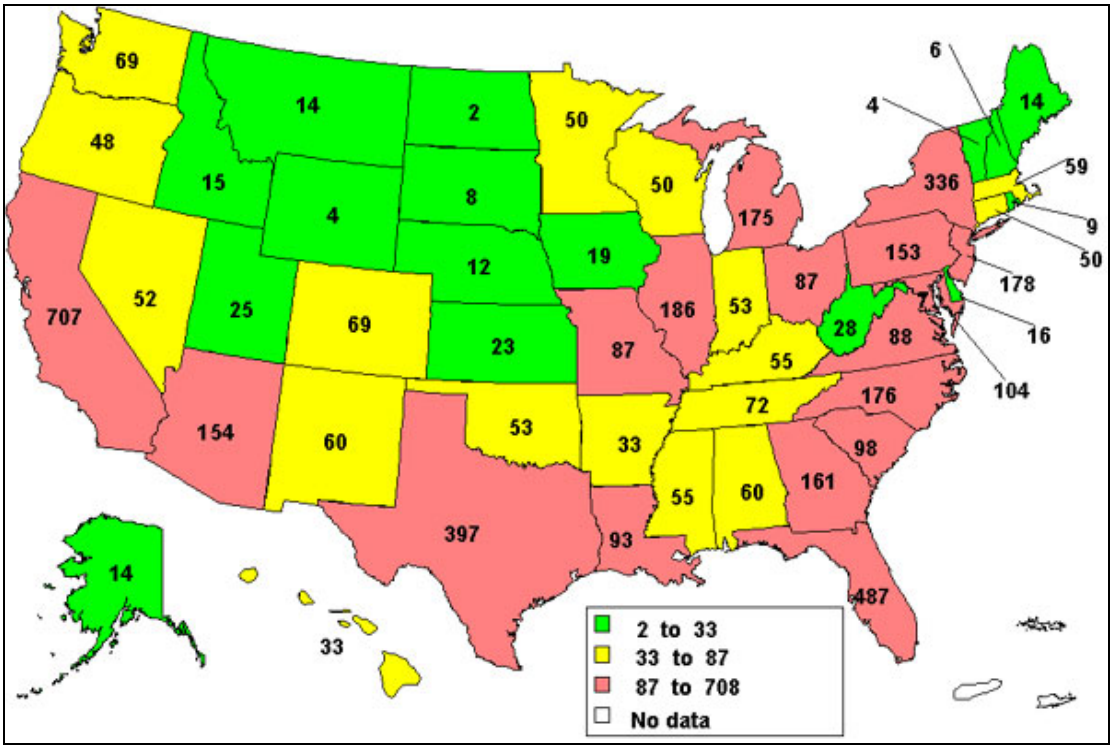


Figure 1-3 Number of pedestrian fatalities per state per 100,000 population. Ref: (4)

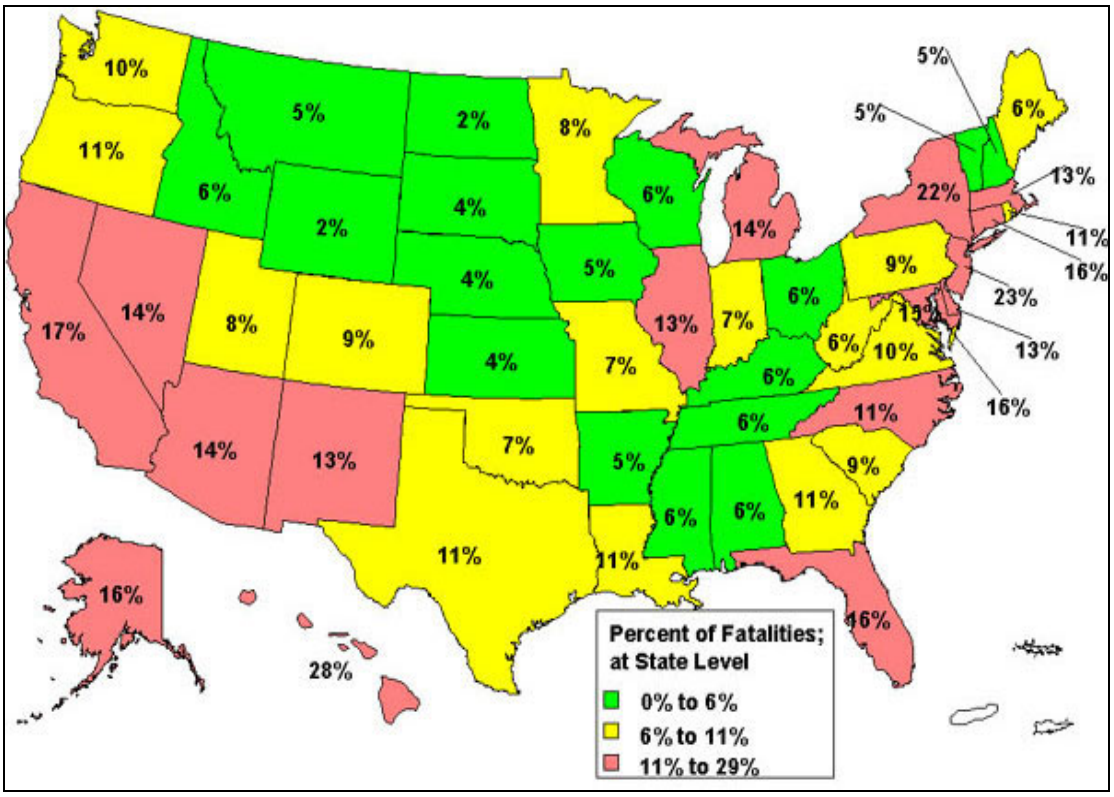


Figure 1-4 Percentage of pedestrian fatalities of all traffic fatalities by state.Ref: (4)

In Florida, pedestrians and cyclists fatalities represent 16% of all crash fatalities. Furthermore, in 2002, the United States had 885 fatal crashes in construction work zones involving a vehicle striking a pedestrians and cyclists and Florida had 60 fatal crashes.

The FARS system ranked each state by pedestrians killed vs. state population, which showed that Florida has the second highest rate of fatalities with 2.91 pedestrian fatalities per 100,000 people. Table 1-3 shows the 20 highest fatality states for 2002.

Table 1-3 Pedestrian fatalities 2002 ranking by State Ref. (1)

Rank	State	Total Traffic Fatalities	Resident Population (Thousands)	Pedestrian Fatalities	Percent of the Total	Pedestrian Fatalities per 100.000 population
1	New Mexico	449	1,855	60	13.4	3.20
2	Florida	3,132	16,713	487	15.5	2.90
3	Arizona	1,117	5,456	154	13.8	2.80
4	Hawaii	119	1,245	33	27.7	2.70
5	Nevada	381	2,173	52	13.6	2.40
6	South Carolina	1,053	4,107	98	9.3	2.40
7	Alaska	87	644	14	16.1	2.20
8	Louisiana	875	4,483	93	10.6	2.10

9	New Jersey	773	8,590	178	23	2.10
10	North Carolina	1,575	8,320	176	11.2	2.10
11	California	4,078	35,116	707	17.3	2.00
12	Delaware	124	807	16	12.9	2.00
13	Georgia	1,523	8,560	161	10.6	1.90
14	Maryland	659	5,458	104	15.8	1.90
15	Mississippi	885	2,872	55	6.2	1.90
16	New York	1,522	19,158	336	22.1	1.80
17	Texas	3,725	21,780	397	10.7	1.80
18	Michigan	1,277	10,050	175	13.7	1.70
19	West Virginia	439	1,802	28	6.4	1.60
20	Colorado	742	4,507	69	9.3	1.50

Agencies such as the Florida Department of Transportation, have recognized the continuing need to improve pedestrian and bicyclist safety.

Highway construction work zones present additional safety challenges for the pedestrians and cyclists. The work zone situation can involve active construction work operations immediately adjacent to open travel lanes. Some travel lanes may be closed and lane shifts are common. Travel lane widths may be temporarily reduced. The presence of numerous temporary traffic control devices and adjacent construction activity may add to a driver's distraction. Pavement conditions can also be an issue. The pavement surface may be rough from milling and there may be differences in elevation, which while not significant for an automobile may present problems for a bicyclist or a pedestrian. It is not uncommon for a roadway construction project to involve a significant change in the grade or elevation between the existing and new roadways. These elevation differences may offer significant problems for pedestrians and cyclists cross traffic. Additionally, construction equipment may track a significant amount of soil on the pedestrian pathways and bicycle lanes.

Work zone areas can disrupt pedestrian and bicycle circulation, and they often create total barriers for pedestrians. Just as traffic is re-routed during roadway

construction, pedestrians and bicyclists should be provided a safe alternative through the work zone. If a safe alternative is not provided, they may try to make their way across the site unprotected.

Detouring pedestrians and bicyclists around work zones is not always a satisfactory solution. Pedestrians and bicyclists seek access to businesses and other destinations when traversing construction work zones. Work zones have occurred between schools and the homes of students. In many situations pedestrians and cyclists cross traffic is inevitable.

In spite of these additional risks, designers and construction managers currently have limited specific guidance with regard to maintaining pedestrian and bicyclist safety within construction work zones. The Manual of Uniform Traffic Control Devices (5), which is the national specification guide and standard, provides the following general guidance:

"*A wide range of pedestrians can be expected at work sites, including the young, old, and disabled (for example, hearing, visual, and mobility). All of these pedestrians need a clearly delineated and usable travel path.*"

Given the above statement, many designers and contractors still require specific guidance on how to satisfy the above requirement. Existing municipal and state standards provide limited detail with regard to the pedestrian and bicyclist issue.

From 1996 to 2002, pedestrians and cyclists fatalities in work zones increased by almost 70%. On average, 2355 pedestrians and cyclistss die yearly in construction work zones (see Table 1-5 and Figure 1-6). On average from 1997 to 2001, 15 percent of the fatalities resulting from crashes in work zones were pedestrians and cyclistss (FARS). Table 1-4 and Figure 1-5 summarize the number of fatalities per year and also organizes the data by type of work zone where those fatalities occurred.

Table 1-4 National pedestrians and cyclists fatality statistics for work zones Ref: (1)

Year	Construction	Maintenance	Utility	Work Zone, Type Unknown	Total Non Motorist	Change %
1996	1,517	153	52	151	1,873	-
1997	1,423	192	23	128	1,766	-5.71
1998	1,786	132	34	129	2,081	17.84
1999	1,988	168	20	119	2,295	10.28
2000	2,358	236	34	133	2,761	20.31
2001	2,251	227	22	205	2,705	-2.03
2002	2,564	247	34	158	3,003	11.02

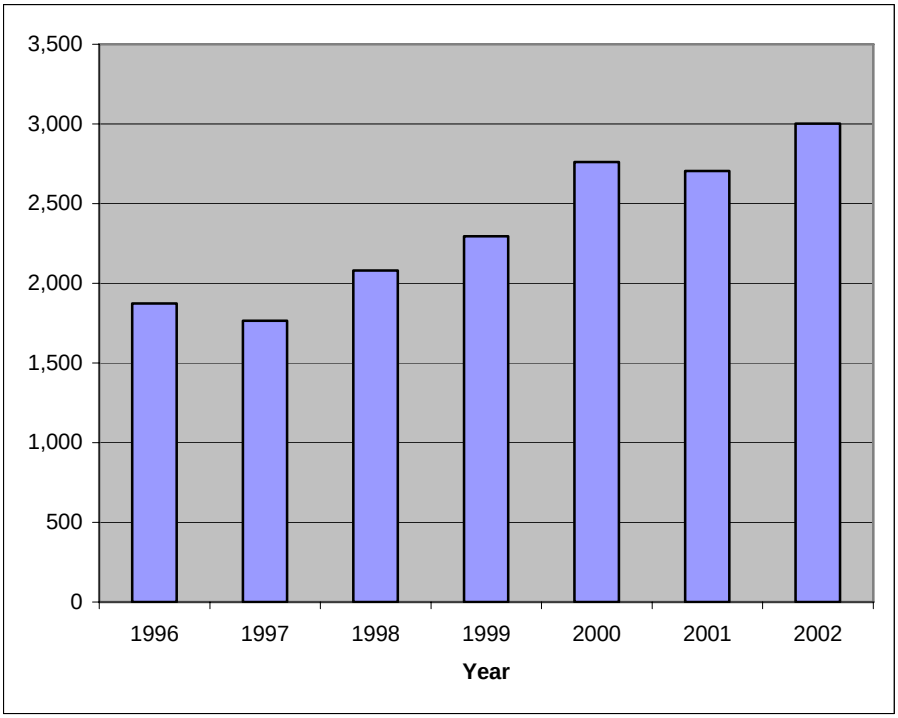


Figure 1-5 National Pedestrians and cyclists fatalities within construction work zones by year Ref:(1)

Table 1-5 National average pedestrians and cyclists fatalities 1996-2002 by type of work zones Ref(1)

Year 1996-2002	Construction	Maintenance	Utility	Work Zone, Type Unknown	Total Non Motorist
Average	1,984	194	31	146	2,355
%	84.25	8.22	1.33	6.21	100.00

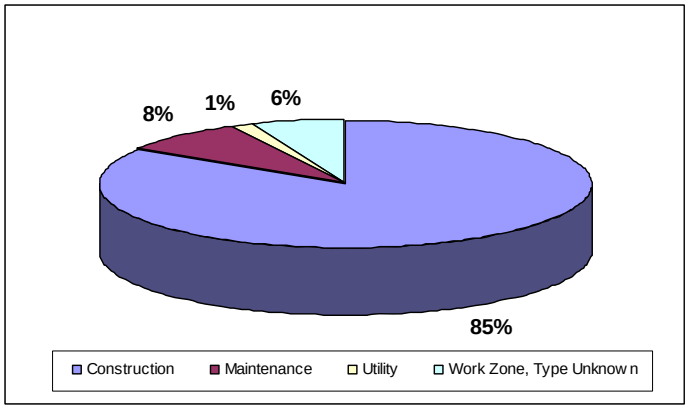


Figure 1-6 National average pedestrians and cyclists fatalities 1996-2002 by type of work zones Ref:(1)

Research by the Turner Fairbanks Highway Research Center suggests that work zone crashes may be under reported. In 1996, research by Turner Fairbanks Highway Research Center (TFHRC) addressed the problem of pedestrians and cyclists crashes in work zones in a study called, "Investigation of Highway Work Zone Crashes" (22). This study found that the crash frequency is greater than what was found through pedestrians and cyclists crash analysis in this research. TFHRC found considerable inconsistencies when reporting and coding work zone crashes. Work zone crashes had to be identified using other variables such as, Special Tag, Road Deficiency, or Road Defect. Data from three States, State A, State B, and State C, were collected.

The results obtained from the TFHRC study show the magnitude of the work zone crash problem**.** Work zone crashes represented approximately 2% of the total police-reported crashes for States A and C, and 3% for State B. These percentages compare favorably with results from earlier studies. It is believed, however, that the number of actual work zone crashes is probably greater than the reported number for three primary reasons:

- Many minor crashes occurring at a work zone site may not result in a police crash report.

- Work zone crashes that occur near work activity may not be reported as work zone crashes.
- The crash reporting/coding process may not pick up work zone crashes if the report form does not have explicit data elements for the work zone condition.

In addition to this research done by the TFHRC, a 1986 study conducted by the Michigan Department of Transportation (23) investigated the reliability of their construction zone codes in the Michigan crash files. The investigation found that about 85% of police-coded work zone crashes (with an explicit variable) occurred in work zones. However, based on a limited investigation of four selected work zones, as many as 77% of the crashes that occurred within the four zones were not coded as work zone crashes. One likely explanation for this is that a police officer may interpret that the work zone crash variable only applied when construction activity was present or influenced the crash. These results support the need for better work zone definitions and suggest that even an "explicit" data element may not ensure that all work zone crashes are properly coded.

In 2002, there were 1,338 bicyclist and pedestrian fatalities in the Southeast Region (see Figure 1-7 for Southeast Region detail), and over 50 percent of those who died were between the ages of 25 and 54. On average, there are more than three pedestrians killed in the Southeast every day. The Southeast Region contains eight of the top ten most dangerous large metropolitan areas for pedestrians and three of the eight states are among the ten worst states for pedestrian fatality rates.

Figure 1-7 National highway traffic safety administration - southeast region Ref:(1)

In Florida, the FDOT Plans Preparation Manual (25) and the FDOT's Design Standards (6) addresses pedestrian issues in construction work zones. Drawing Number 660 Pedestrian Control for Closure of Sidewalks provides guidance for sidewalk closure.

More knowledge is needed of pedestrian and bicyclist safety issues in highway construction work zones. Designers and construction managers need more specific clear guidance with regard to providing work zones that are safe for both motorist and pedestrians and cyclists traffic.

Research Objectives

- Identify issues and factors influencing pedestrian and bicyclist safety in construction work zones.
- Develop Engineering and Implementation measures to improve the safety of pedestrians and bicyclists in highway construction work zones.
- Develop recommended modifications to existing design manuals and standards including the new pedestrian and bicyclist safety measures

Research Premises

- Bicyclist and pedestrian safety is impacted by physical factors and behavioral factors.
- These physical factors and behavioral factors can be identified by observation and analysis.
- Strategic measures can be developed and applied to the existing design standards for improving safety for pedestrians and bicyclists.

CHAPTER 2
SURVEY OF CURRENT PRACTICES AND LITERATURE REVIEW

Introduction

This chapter summarizes the existing literature and current practices related to this research. These sources provide important information that will serve as a basis to accomplish the objectives.

Manual of Uniform Traffic Control Devices

The Manual of Uniform Traffic Control Devices (5) is a national standard for all traffic control devices installed on any street, highway, or bicycle trail open to the public. All traffic control devices shall be defined for all signs, signals, markings, and other devices placed on, over, or adjacent to a street, highway, pedestrian facility, or bikeway to regulate, warn, or guide traffic. Part 6 in the manual presents pedestrian and bicyclist considerations when passing through work zones. The criteria of Part 6 apply to both rural and urban areas and contain general plans or guidelines that should be deployed to provide safety for motorists, bicyclists, pedestrians, workers, enforcement/emergency officials, and equipment. Chapter 6 in the MUTCD has several sections, which have special considerations for all pedestrians and cyclists as shown below.

Section 6D.01: Pedestrian Considerations

- **The needs and control of all road users (motorists, bicyclists, and pedestrians) through a Temporary Traffic Control (TTC) zone shall be an essential part of highway construction, utility work, maintenance operations, and the management of traffic incidents**

- **All pedestrians and cyclists need a clearly delineated and usable travel path when passing through a TTC zone.**

- **Advance notification of sidewalk closures shall be provided**

- **The manual states that the following three items should be considered when planning for pedestrians in TTC zones:**

1. **Pedestrians should not be led into conflicts with work site vehicles, equipment, and operations.**
2. **Pedestrians should not be led into conflicts with vehicles moving through or around the work site.**
3. **Pedestrians should be provided with a reasonably safe, convenient, and accessible path that replicates as nearly as practical the most desirable characteristics of the existing sidewalk(s) or footpath(s).**

Figures 2-1 and 2-2 show typical TTC device usage and techniques for pedestrian movement through work zones.

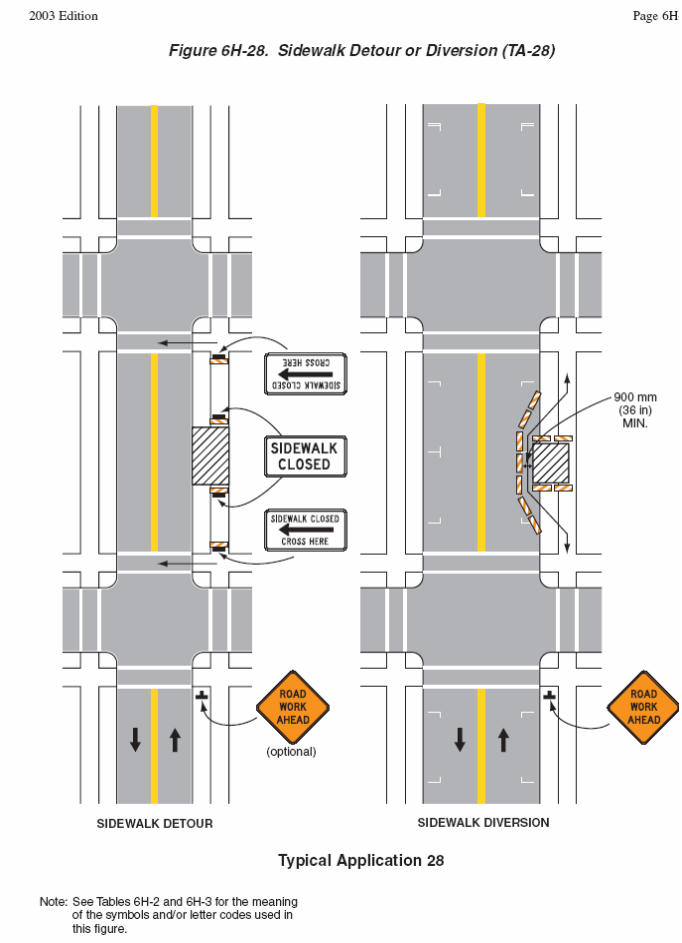


Figure 2-1 - Typical application 28 - sidewalk closures and bypass sidewalks. (5)

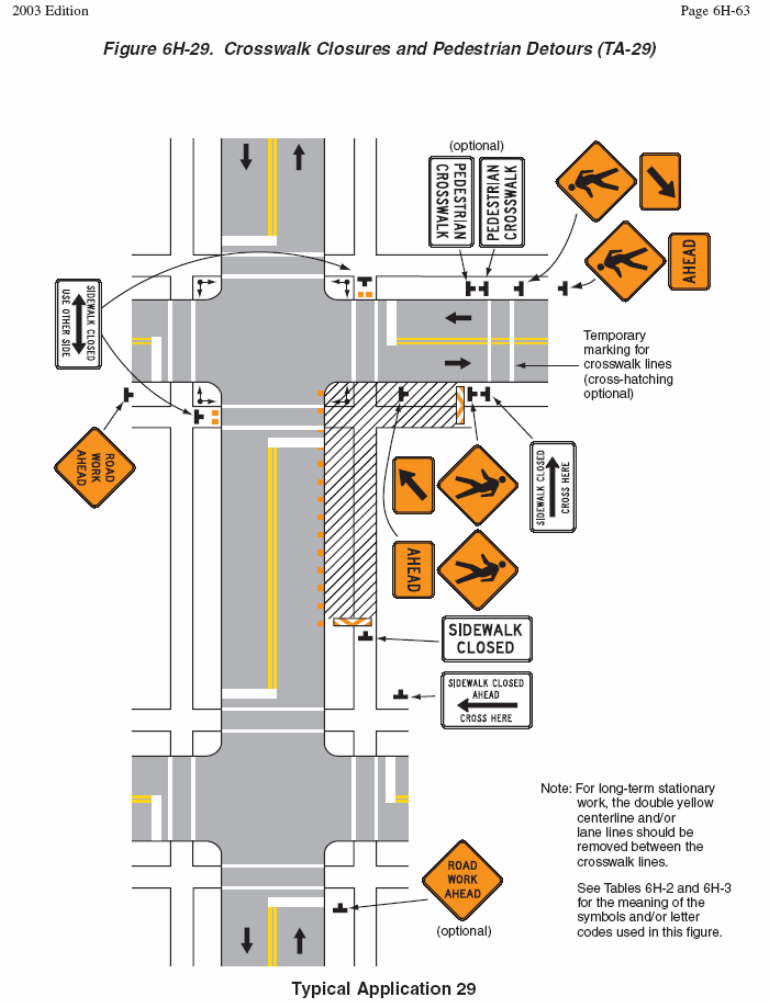


Figure 2-2 - Typical application 29 - crosswalk closures and pedestrian detours (5)

Section 6G.05: Work Affecting Pedestrian and Bicycle Facilities

- **The needs of all road users, including pedestrians with disabilities, are to be considered in TTC zones.**

- **Where pedestrian or bicycle usage is high, pedestrians should be separated from the worksite by appropriate devices that maintain the accessibility and detectability for pedestrians with disabilities.**

- **Bicyclists and pedestrians should not be exposed to unprotected excavations, open utility access, overhanging equipment, or other such conditions.**

- **Except for short duration and mobile operations, when a highway shoulder is occupied, a "SHOULDER WORK" sign should be placed in advance of the activity area. When work is performed on a paved shoulder 2.4 m (8 ft) or more in width, channelizing devices should be placed on a taper having a length that conforms to the requirements of a shoulder taper. Signs should be**

> **placed such that they do not** narrow **any existing pedestrian passages to less than 1200 mm (48 in). Pedestrian detours should be avoided since pedestrians rarely observe them and the cost of providing accessibility and detectability might outweigh the cost of maintaining a continuous route. Whenever possible, work should be done in a manner that does not create a need to detour pedestrians from existing routes or crossings.**

Section 6G.05 provides clear guidance on what is to be done, but provides limited specific information on how pedestrians and bicyclist are to be accommodated. It only states that special considerations such as detours and signage that avoid any exposure to bicyclists and pedestrians should be considered. In addition to Chapter 6, Chapter 9 in the MUTCD provides guidance for traffic control for bicycle faculties, but it does not have any consideration for bicyclists within work zones.

Florida Department of Transportation - Road and Traffic Design Standards 2004

The State of Florida has developed the Design Standards (6) for the design of Florida roadways; to monitor their implementation; and to provide specifications and guidance to contractors or any other entities when doing any roadway work.

These standards are divided in sections depending on the type of work to perform. Section 600 deals with traffic control through work zones. Sheet 660 addresses Pedestrian Control for Sidewalk Closures and is presented in Figure 2-3. Readers are referred to the website address provided in the References for access to downloading the drawing file.

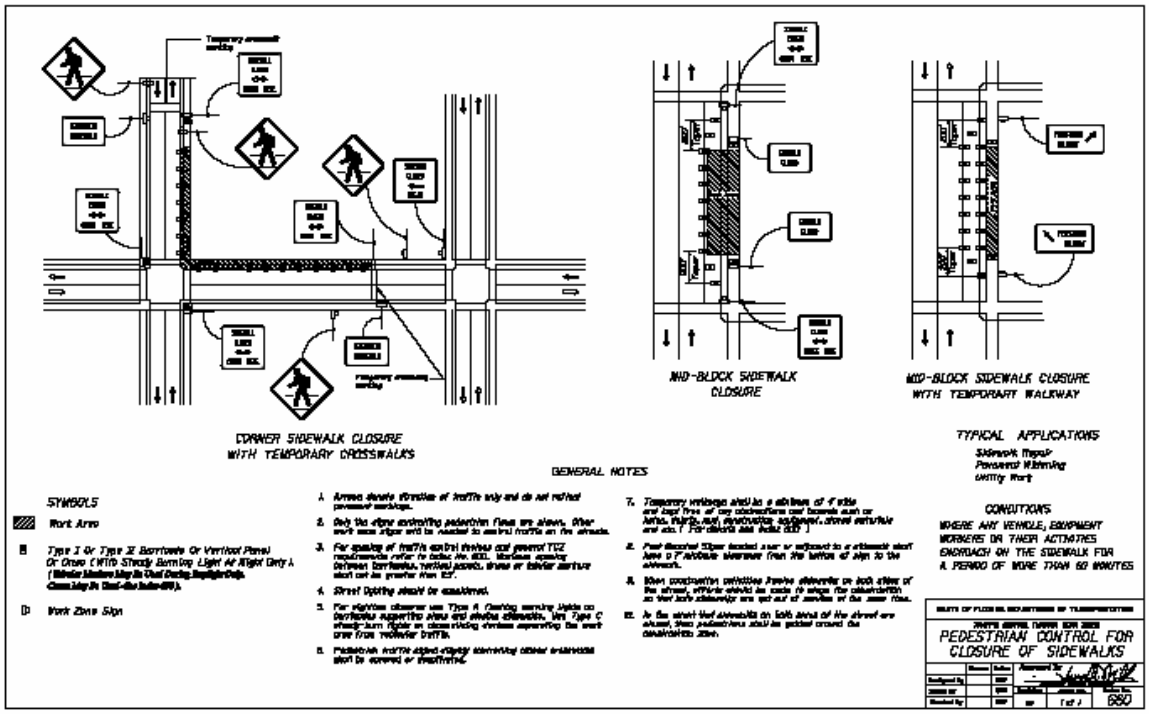


Figure 2-3 Road and traffic design standards (FDOT – 2008) Sheet 660 pedestrian control for closure of sidewalks (6)

Florida Department of Transportation Plans Preparation Manual

The FDOT Plans Preparation Manual (25) provides geometric and other design criteria, and procedures for the design of roadways and structures. Chapter 10 Work Zone Traffic Control presents guidance on the design of Traffic Control Plans. Section 10.14.4 deals directly with Pedestrians and Bicyclists.

Work Zone Traffic Management Synthesis: Work Zone Pedestrian Protection

Work Zone Traffic Management Synthesis: Work Zone Pedestrian Protection (12) is based on a review of work zone traffic control manuals from a selection of cities and state departments of transportation traffic control standards. The publication presents a synthesis of various traffic control standards with regard to pedestrians and cyclists. The results of the study, although published in 1989, are note worthy. The investigators found

a general need for improved pedestrians and cyclists provisions in traffic control plans for most construction agencies.

Florida Pedestrian Planning and Design Handbook

The Florida Pedestrian Planning and Design Handbook (8) was developed for the state of Florida by the Highway Safety Research Center in the University of North Carolina at Chapel Hill in 2000. The purpose of this handbook was to address pedestrian safety when designing any roadway or transportation facility. There is a section within this handbook that deals with construction work zones. This section is summarized as follows.

Work Zone Pedestrian Safety

This specific section of the handbook states, “proper planning for pedestrians through and along construction areas is as important as planning for vehicle traffic, especially in urban and suburban areas”. The handbook basically provides three considerations for pedestrian safety in highway and street work zones:

- Pedestrians must be separated from conflicts with work site vehicles, equipment and operations.
- Pedestrians must be separated from conflicts with mainline traffic moving through or around the work site.
- Pedestrians must be provided with a safe, accessible and convenient travel path that duplicates as nearly as possible the most desirable characteristics of sidewalks or footpaths.

The handbook also allocates liability on the contractor side saying that “when closing existing crosswalks and walkways, contractors and other work crews must provide temporary walkways and direct pedestrians to the safest, most convenient route possible”. Figure 2-4 provides a Florida Pedestrian Handbook sidewalk closure layout.

In order to guarantee safe passage of all pedestrians, all walkways must be clearly identified and wheelchair accessible protected from motor vehicle traffic and free from pedestrian hazards such as holes, debris, dust and mud. When a parking lane exists next to a work site that closes a sidewalk, the parking lane may be used for the pedestrian detour route. Consideration may also be given to closing a moving lane on a multilane street to provide a continuous pedestrian path. When there is no available parking or curb lane, pedestrians must be diverted from a direct encounter with the work site by using advance signage as approved in the Manual on Uniform Traffic Control Devices.

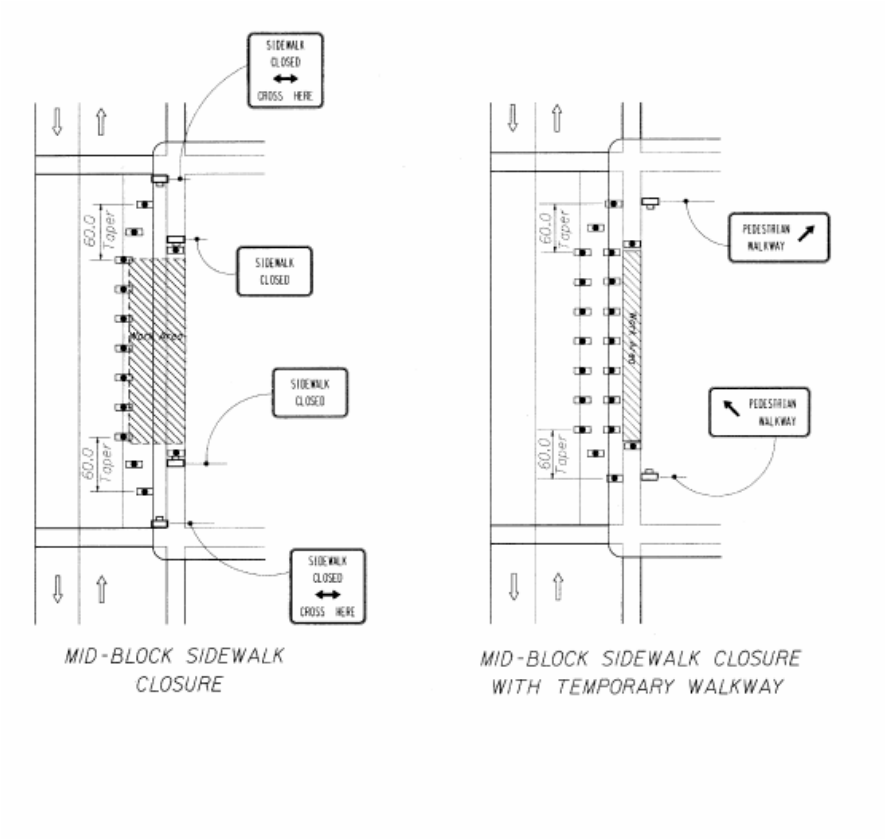


Figure 17-1. Two approaches to accommodate pedestrians in a midblock workzone.[3]

Figure 2-4 Florida pedestrian handbook sidewalk closure layouts.

Work Zone Intersection Safety, U.S. DOT - FHWA

The Work Zone Intersection Safety (9) is a document created by the U.S. DOT and published by the Institute of Transportation Engineers and is organized by different issues. Issue 16 deals with work zone intersection safety. It explains driving habits and its impact on pedestrians and bicyclists in work zones. Ensuring a high level of intersection work zone safety depends on proper pedestrian accommodation, worker safety and visibility and proper traffic control. This issue recommends a pedestrian accommodations to improve safety:

- Access to temporary transit stops should be provided; Temporary crosswalk facilities shall be detectable;
- Curb parking shall be prohibited within 15 m (50 ft.) of the midblock crosswalk;
- Pedestrian signals should be deactivated for closed crosswalks;
- Nighttime lighting may be considered; and
- Alternate route information should be communicated to pedestrians with visual disabilities by providing such things as audible devices, accessible pedestrian signals, or barriers and channelizing devices that are detectable.

Pedestrian Consideration in Highway Work Zones

In the Pedestrian Consideration in Highway Work Zones (10) written by Dr. Chadda and Dr. McGee for the Institute of Transportation Engineers Journal, they address the need for pedestrian accommodation and safety in construction work zones. They criticize the lack of guidelines in the MUTCD and other standards. The requirement for the preparation of traffic control plans for all major construction projects deals with vehicular traffic and rarely makes reference to pedestrians and cyclists accommodation and safety. In this paper they proposed general guidelines for planning for pedestrians in

work zones. According to Chadda and McGee, pedestrian accommodation should be provided when:

- There is a need for pedestrian travel through a work zone as evidenced by existing pedestrian usage.
- Existing pathways are closed, blocked or made more hazardous as a result of the work being performed.

When any of these situations is found, special provisions must be taken into consideration such as providing pedestrian pathways, which meet a minimum width, type protection and signage. The paper included a checklist of all the items that might be checked when planning for pedestrians in work zones.

FHWA Course on Bicycle and Pedestrian Transportation

The Federal Highway Administration has developed a Bicyclist and Pedestrian Course (11) that addresses transportation needs for several situations. Lesson 12 deals specifically with the pedestrian and bicyclist issues within work zones.

Lesson 12: Pedestrian and Bicycle Facilities in Work Zones

Lesson 12 in the course on bicycle and pedestrian transportation describes typical problems, and it presents solutions that improve conditions for bicyclists and pedestrians in work zones.

When construction zones affect sidewalks or crosswalks, pedestrians may be forced to make detours that may be unsafe, difficult to navigate, or both. This fact can increase hazards especially for the elderly and handicapped pedestrians who are also affected when projects are built in phases and the area conditions are changed weekly or even daily.

Bicyclists also experience difficulties when traveling through construction zones, particularly when roadway space is constrained and when pavement conditions are rough.

The lesson recommends solutions, which would be important to develop and implement as part of construction zone policies to eliminate unexpected obstacles for pedestrians and bicyclists and make transitions as safe and smooth as possible. The following concerns should be addressed:

- Advance warning and guidance signs.
- Adequate illumination and reflectorization.
- Channelizing and barricading to separate pedestrians from traffic.
- Wheelchair accessibility.
- Preventing visually impaired pedestrians from entering work zones.
- Warning bicyclists about surface irregularities and maintaining areas where bicyclists can pass through construction zones.
- Circumstances requiring temporary walkways and/or bikeways.

The Implementation Strategies recommended in this course link these requirements to construction permits and in-house training for work crews with the cooperation of traffic engineers, construction inspectors, crew chiefs, contractors, and advocates. The policy should apply whenever construction or maintenance work affects pedestrian or bicycle access, whether the work is done by private firms or city, county, or state crews.

Washington State Pedestrian Facilities Guidebook (WSDOT)

Incorporating Pedestrians into Washington's Transportation System

The state of Washington, in its Pedestrian Facilities Handbook (12) Toolkit 11, states that Pedestrian safety is an important issue in and around work zones. Pedestrians travel at slower speeds than other modes of transportation and are more susceptible to the impacts of access, dirt, noise, and fumes from construction areas. Pedestrians may ignore

a detour that is out of the direction of their travel. Several considerations have been proposed in the Pedestrian Facility Guidebook for the state of Washington.

Considerations for pedestrian safety in work zones (WSDOT)

- Separate pedestrians from conflicts with construction vehicles, equipment, and operations.
- Separate pedestrians from conflicts with traffic traveling around or through the construction area.
- Provide a safe, convenient, and accessible route that maintains the direction and character of the original route.
- In urban areas, avoid work vehicle traffic during high pedestrian travel times which include mornings between 8:00 am - 9:00 am, lunch times between 11:30 am-1:30 pm, and in the evenings between 4:30 pm-5:30 pm.
- Provide police patrols or guards for pedestrian safety when needed, especially during times of high construction and/or high pedestrian traffic.
- Communicate construction activity and pedestrian impacts through local media and pedestrian interest groups. Contact community and school officials in the area.
- Avoid using delineating materials that are difficult to recognize by people with impaired sight.
- Walkways through construction zones should be a minimum width of 5 feet.

Oregon Bicyclist Pedestrian Plan, Oregon Department of Transportation

Pedestrians and cyclists Maintenance and Construction Considerations

The Oregon Bicyclist Pedestrian Plan (13) has a chapter that provides several considerations that should be incorporated in project construction plans. The plan states "It may not always be possible to ensure a desirable or comfortable route for pedestrians and bicyclists, but their access should not be denied". The plan has rural and urban considerations to provide safety to pedestrians and cyclists.

Rural highway construction

Rural construction operations affect mostly touring and recreational cyclists. Pedestrians are seldom encountered in rural settings. The plan for rural considerations is divided in three different types of roads as follows:

- On low-volume roads, or through short construction zones, standard traffic control practices are usually adequate. Bicyclists can ride through without impeding traffic. Their needs can be met by maintaining a paved surface and removing temporary signs, debris and other obstructions from the edge of the roadway after each day's work.

- On high-volume roads or through long construction zones, enough paved roadway width should be provided for motor vehicles to safely pass bicyclists. Flaggers and pilot cars should take into account the cyclists' lower speed. When cyclists are coming through, radio messages can be relayed to other flaggers.

- On highways with very high traffic volumes and speeds, and where construction will restrict available width for a long time, it may be advisable to provide a detour route for cyclists where possible. The detour should not be overly circuitous. Directional signs should guide cyclists along the route and back onto the highway.

Urban highway construction

In urban areas, safe and convenient passage is needed during construction for both pedestrians and bicyclists. Figure 2-4 shows how ODOT accommodates pedestrians and bicyclist within construction work zones.

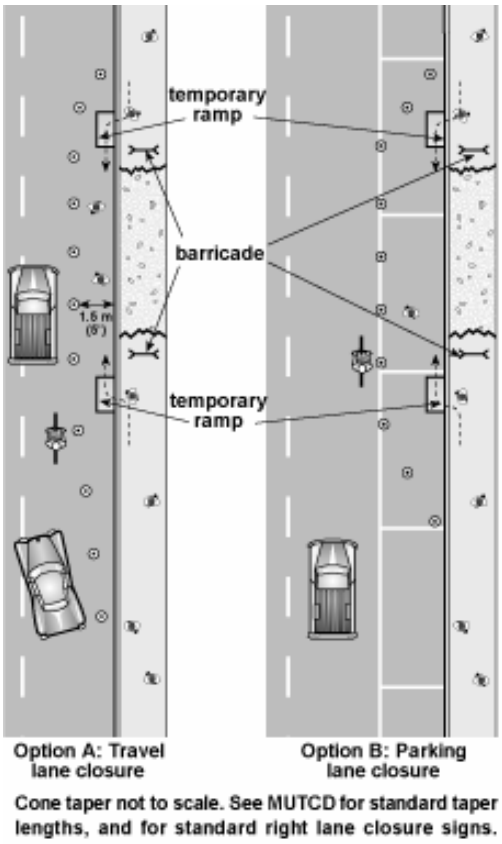


Figure 2-4 Creating passageways for pedestrians during construction (ODOT)

The urban highway construction considerations within the plan are explained below. They address several situations and their solutions when accommodating pedestrians and cyclists inside or around the urban construction areas.

- Pedestrians have little tolerance for out-of-direction travel. Pedestrians may ignore signs that reroute them or prohibit their access if it is inconvenient; they might prefer to walk through the construction zone. It is preferable to create a passage that allows pedestrians to proceed as close to their normal route as possible.

- Solutions such as closing a sidewalk or installing signs asking pedestrians to cross a busy street are undesirable. If a sidewalk must be closed, barricades and cones can be used to create a temporary passageway. This is most practical on streets with parking: the pedestrian passage replaces the parking area. Figure 2-5 shows how signs if used, should be placed in construction area.

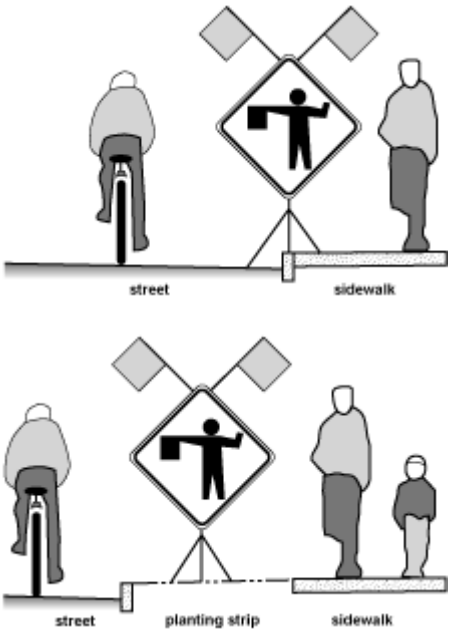


Figure 2-5 Construction sign placement.

- It may not be possible to maintain standard walkway widths during construction. However, a passage wide enough to accommodate the disabled should be maintained with a surface capable of being negotiated in a wheelchair.

- At intersections, it is preferable to keep all crosswalks open. At signalized intersections, temporary crosswalks should be painted if they are relocated. Temporary signals should include pedestrian phases.

- Through bicycle movement must also be maintained. Bicyclists can share a lane over a short distance. On longer projects, and on busy roadways, a temporary bike lane or wide outside lane may be provided. Bicyclists should not be routed onto sidewalks or onto unpaved shoulders where possible.

- Debris should be swept to maintain a reasonably clean riding surface in the outer 1.5 or 1.8 m (5 or 6 ft) of roadway. Bicyclists have a low tolerance for surface grade changes and excessive bumps should be avoided.

- The placement of advance construction signs should obstruct neither the pedestrian's nor the bicyclist's path. Where this is not possible, placing signs half on the sidewalk and half on the roadway may be the best solution.

Guide for the Planning, Design and Operation of Pedestrian Facilities. American Association of State Highways and Transportation Officials (AASHTO)

Maintenance of Pedestrian Traffic in Construction Work Zones

The American Association of State Highways and Transportation Officials in its guide for planning, design and operation for pedestrian facilities (14) has a chapter designated to maintain and provide the accommodation of pedestrians within construction zones such as the access to entrances, bus stops, and crosswalks.

There are three considerations for pedestrian safety in work zones:

- Separate pedestrians from conflicts with work site vehicles, equipment, and operations.
- Separate pedestrians from conflicts with mainline traffic moving through or around the work site.
- Provide pedestrians with a safe, accessible, and convenient travel path that duplicates, as nearly as possible, the most desirable characteristics of sidewalks or footpaths.

Beside these general considerations, there are several recommendations in the same chapter. These recommendations are summarized below:

- When construction requires closing existing crosswalks and walkways, contractors and other work crews must provide a safe, accessible, and convenient route. Walkways must be clearly identified and accessible, protected from motor vehicle traffic, and free from pedestrian hazards such as holes, debris, abrupt changes in grade or terrain, dust, and mud. A width of 1.5 m [5 ft] is desirable for pedestrian walkways through or past work zones.
- Barriers to prevent pedestrians from entering the construction zones should be constructed of wood or other nonbendable material (plastic tape is not adequate) in order to be discerned by pedestrians with vision impairments.
- When a parking lane exists next to a work site that closes a sidewalk, the parking lane may be used for the pedestrian detour route. On multilane streets, a travel lane may also be closed to provide a continuous pedestrian path. Only when there is no available parking lane or it is not possible to temporarily shift or remove a travel

lane out of the curb lane (e.g., a two-lane street with no parking lanes), should pedestrians be diverted across the street by a sidewalk closure.

Figure 2-6 shows two approaches to accommodate pedestrians in a midblock work zone.

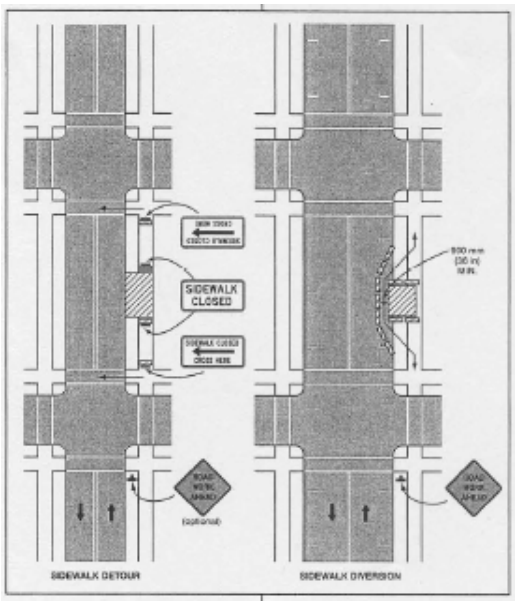


Figure 2-6 Accommodating pedestrians at midblock work zones.

- For temporary work zones of short duration and under low-speed conditions, it is acceptable to use traffic barricades and traffic signs to separate pedestrian traffic from work zone and vehicle traffic.

- At fixed work sites of significant duration, especially in urban areas with high pedestrian volumes, pedestrian fences or other protective barriers may be needed to prevent pedestrian access into a construction site.

- For construction or demolition of buildings adjacent to sidewalks, a covered/screened walkway may be needed to protect pedestrians from falling or spraying debris.

- Construction work zones should be inspected daily and monitored continuously for vehicle and pedestrian needs.

It is important to note that there are no considerations for bicyclists in this guide.

American Disability Act (ADA) Standards for Accessible Designs.

The American Disability Act (15) Standards for accessible design sets guidelines for accessibility to places of public accommodation and commercial facilities by individuals with disabilities. These guidelines are to be applied during the design, construction, and alteration of buildings and facilities that require special accommodation for people with disabilities

Although the situations addressed in this document may not apply directly to construction areas, several considerations should be put in place to fulfill the ADA requirements when closing a sidewalk or detouring pedestrians to an alternative route. Ramps should be included in any work zone design and operation to provide accessibility to ADA individuals. Normally ADA ramps are not present and should be built for these special circumstances such as closing a sidewalk or setting up the work area. The ADA document explains the standards to be used when designing and putting in place these temporary facilities. The most important considerations are explained below.

Curb Ramps.

- General: Any part of an accessible route with a slope greater than 1:20 shall be considered a ramp.
- Location: Curb ramps shall be provided wherever an accessible route crosses a curb.
- Slope: Maximum slopes of adjoining gutters, road surface immediately adjacent to the curb ramp, or accessible route shall not exceed 1:20. Figure 2.7 shows the slope condition.

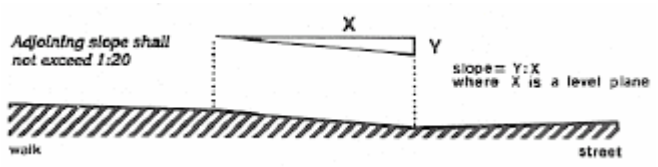


Figure 2-7 Slope condition (ADA)

- Width: The minimum width of a curb ramp shall be 36 in (915 mm), exclusive of flared sides.

- Surface: Ground and floor surfaces along accessible routes and in accessible rooms and spaces including floors, walks, ramps, stairs, and curb ramps, shall be stable, firm, and slip-resistant.

- Changes in Level: Abrupt changes in level up to 1/4 in (6 mm) may be vertical and without edge treatment. Changes in level between 1/4 in and 1/2 in (6 mm and 13 mm) shall be beveled with a slope no greater than 1:2. Changes in level greater than 1/2 in (13 mm) shall be accomplished by means of a ramp. Figure 2-8 describes the first two situations.

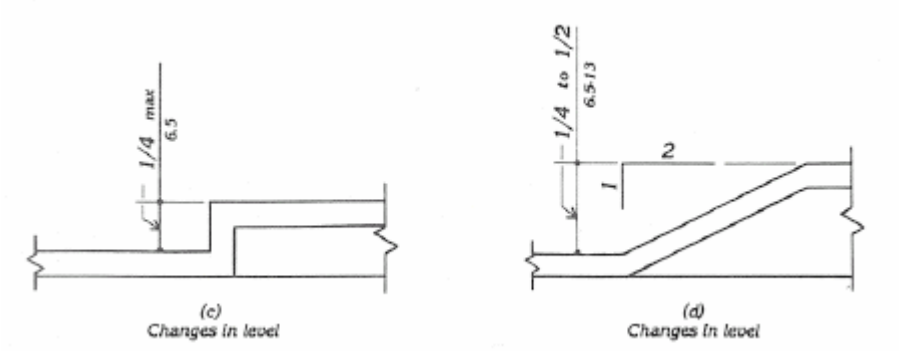


Figure 2-8 Changes in level conditions (ADA)

- Sides of Curb Ramps: If a curb ramp is located where pedestrians must walk across the ramp, or where it is not protected by handrails or guardrails, it shall have flared sides; the maximum slope of the flare shall be 1:10 Curb ramps with returned curbs may be used where pedestrians would not normally walk across the ramp. Figure 2-9 describes these situations respectively.

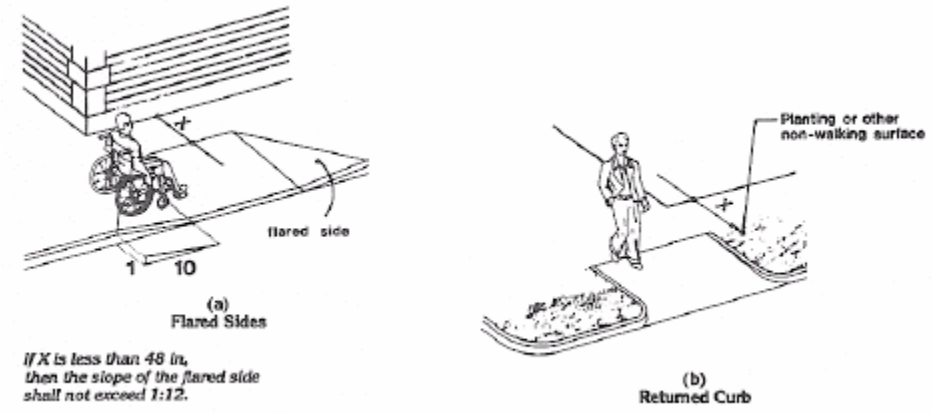


Figure 2-9 Side of curb ramps (ADA)

- Built-up Curb Ramps. Built-up curb ramps shall be located so that they do not project into vehicular traffic lanes. Figure 2-10 shows the requirements for this built-up curb ramps.

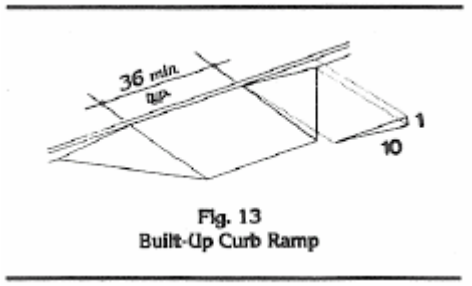


Figure 2-10 Built-up curb ramps

- Detectable Warnings: A curb ramp shall have a detectable warning complying with the detectable warning shall extend the full width and depth of the curb ramp.

- Obstructions: Curb ramps shall be located or protected to prevent their obstruction by parked vehicles.

- Location at Marked Crossings: Curb ramps at marked crossings shall be wholly contained within the markings, excluding any flared sides.

- Diagonal Curb Ramps: If diagonal (or corner type) curb ramps have returned curbs or other well-defined edges, such edges shall be parallel to the direction of pedestrian flow.

- Islands: Any raised islands in crossings shall be cut through level with the street or have curb ramps at both sides and a level area at least 48 in (1220 mm) long between the curb ramps in the part of the island intersected by the crossings.

- Landings: Ramps shall have level landings at bottom and top of each ramp and each ramp run. Landings shall have the following features:

    1. The landing shall be at least as wide as the ramp run leading to it.

    2. The landing length shall be a minimum of 60 in (1525 mm) clear.

    3. If ramps change direction at landings, the minimum landing size shall be 60 in by 60 in (1525 mm by 1525 mm).

    4. If a doorway is located at a landing, then the area in front of the doorway shall comply with 4.13.6.

- Cross Slope: The cross slope of ramp surfaces shall be no greater than 1:50.

- Edge Protection: Ramps and landings with drop-offs shall have curbs, walls, railings, or projecting surfaces that prevent people from slipping off the ramp. Curbs shall be a minimum of 2 in (50 mm) high.
- Outdoor Conditions: Outdoor ramps and their approaches shall be designed so that water will not accumulate on walking surfaces.

Traffic Conflicts Techniques for Safety and Operation. (USDOT & FHWA)

The Traffic Conflicts Techniques for Safety and Operation (16) contains definitions of traffic conflicts, which typically occur at intersections as well as step-by-step instructions for conducting traffic conflict surveys. It also provides a standard, cost-effective method for accurately observing and recording traffic conflicts. The results of traffic conflict observations are used to diagnose safety and operational problems and to evaluate the effectiveness of treatments.

A traffic conflict is an event involving two or more road users, in which the action of one user causes the other user to make an evasive maneuver to avoid a collision.

Generally, the road users are motorists, but the definition also includes pedestrians and cyclists. The action of the first user includes a variety of maneuvers such as turning left across the path of a through vehicle just as the through vehicle is entering the intersection area; turning from the cross street into the path of a through vehicle; and slowing to turn at the cross street placing a following vehicle in danger of a rear-end collision. This general definition, however, does rule out actions that nearly all drivers take under the same conditions such as normal stopping for a STOP sign or red traffic signal.

Conflicts are vehicle interactions which can lead to crashes. For a conflict to occur, the road users must be on a collision course; i.e., the users must be attempting to occupy

the same space at the same time. The primary requirement of a traffic conflict is that the action of the first user places the other user on a collision path unless evasive action is taken by the other user to avoid the crash. Sometimes the other user is either unaware of the collision potential or has poor judgment in estimating time intervals and clearances and does not make an evasive maneuver. Collisions and near miss situations that occur without evasive maneuvers, or when this evasive action is inadequate or inappropriate for conditions, are also recorded as conflicts under the general definition.

Operational Definitions

Within this general framework, a basic set of conflict definitions were developed for intersections, corresponding to the different types of maneuvers and related crash patterns. Similarly to this manner in which crashes are grouped by type of collision, traffic conflicts are categorized by type of maneuver. The primary types of intersection conflicts are same direction, opposing left turn, cross traffic, right-turn–on-red, pedestrian and secondary.

Pedestrian Conflicts

Pedestrian conflicts occur when a pedestrian (the road user causing the conflict) crosses in front of a vehicle that has the right–of–way, thus creating a possible collision situation. The vehicle brakes or swerves, then continues through the intersection area. Any such crossing on the near side or far side of the intersection is liable to be a conflict situation. However, the pedestrian movements on the right and left sides of the intersection are generally not considered to create conflict situations if the pedestrians have the right–of-way, such as during a WALK phase.

In some cases, the observer may be asked to count bicycle conflicts. These conflicts are similar to the pedestrian conflicts described above except the road user causing the conflict is a bicyclist.

Bicycle and Pedestrian Legislation in Title 23 United States Code (U.S.C.) (26)

Specific requirements for accommodation of pedestrians and bicycles are provide in this current federal code. Of specific interest is the prohibition against severing major travel routes for bicycles and pedestrians.

"(m) Protection of Nonmotorized Transportation Traffic. --The Secretary shall not approve any project or take any regulatory action under this title that will result in the severance of an existing major route or have significant adverse impact on the safety for nonmotorized transportation traffic and light motorcycles, unless such project or regulatory action provides for a reasonable alternate route or such a route exists."

Additional Bicycle and Pedestrian Related Publications and Reports (USDOT)

Federal Highway Administration publications

The US Department of Transportation has a listing of all the pedestrian and bicyclist related research done in the last 10 years as well as the current known research that is being actually done. The listing is shown below:

National bicycling and walking study reports

- FHWA-PD-94-023 National Bicycling and Walking Study
- National Bicycling and Walking Study Executive Summary (1994)
- National Bicycling and Walking Study Five Year Status Report (1999)
- FHWA-PD-92-041 #1 Reasons Why Bicycling & Walking are Not Being Used More
- FHWA-PD-92-038 #2 The Training Needs of Transportation Professionals
- FHWA-PD-93-039 #3 What Needs to be Done to Promote Bicycling and Walking
- FHWA-PD-93-031 #4 Measures to Overcome Impediments to Bicycling and Walking
- FHWA-PD-93-008 #5 An Analysis of Current Funding Mechanisms
- FHWA-PD-93-024 #6 Analysis of Successful Grass-Roots Movements

- FHWA-PD-92-040 #7 Transportation Potential and Other Benefits of Off-Road Facilities
- FHWA-PD-93-007 #8 Organizing Citizen Support and Acquiring Funding
- FHWA-PD-93-012 #9 Linking Bicycle/Pedestrian Facilities with Transit
- FHWA-PD-94-012 #10 Trading Off Among the Needs of Motor Vehicle Users, Pedestrians and Bikes
- FHWA-PD-93-009 #11 Balancing Engineering, Education, Law Enforcement, Encouragement
- FHWA-PD-92-036 #12 Incorporating Consideration of Bicyclists & Pedestrians into Education
- FHWA-PD-93-018 #13 A Synthesis of Existing Bicyclist and Pedestrian Related Laws
- FHWA-PD-93-025 #14 Benefits of Bicycling and Walking to Health
- FHWA-PD-93-015 #15 The Environmental Benefits of Bicycling and Walking
- FHWA-PD-92-037 #16 A Study of Bicycle and Pedestrian Programs in European Countries
- FHWA-PD-93-016 #17 Bicycle/Pedestrian Policies and Programs in Asia, Australia, New Z.
- FHWA-PD-93-010 #18 Analyses of Successful Provincial, State, and Local Programs
- FHWA-PD-93-028 #19 Traffic Calming, Auto Restricted Zones, and Traffic Management
- FHWA-PD-93-017 #21 Incorporating Bicycle and Pedestrian Considerations into Planning
- FHWA-PD-93-019 #22 The Role of State Bicycle/Pedestrian Coordinators
- FHWA-PD-93-014 #23 The Role of Local Bicycle/Pedestrian Coordinators
- FHWA-PD-93-006 #24 Current Planning Guidelines and Design Standards

Other FHWA reports

- FHWA-PL-00-021 Innovative Traffic Control: Technology and Practice in Europe
- FHWA-HEP-99-006 Designing Sidewalks and Trails for Access: Part I
- FHWA-RD-98-166 Guidebook on Methods to Estimate Non-motorized Travel: Supporting
- Documentation
- FHWA-RD-98-165 Guidebook on Methods to Estimate Non-motorized Travel: Overview of Methods.
- FHWA-RD-98-105 Implementing Bicycle Improvements at the Local Level
- FHWA-RD-98-095 The Bicycle Compatibility Index: A Level of Service Concept,
- Implementation Manual
- FHWA-RD-98-072 The Bicycle Compatibility Index: A Level of Service Concept, Final Report

- FHWA-PD-98-052 Recreational Trails Program (brochure)
- FHWA-PD-98-049 Bicycle and Pedestrian Provisions of the Federal-aid Program (brochure)
- FHWA-PD-97-053 Bicycle and Pedestrian Planning Under ISTEA
- FHWA-PD-97-062 Flexibility in Highway Design
- FHWA-HI-96-028 Pedestrian and Bicyclist Safety and Accommodation (NHI Participant
- Workbook)
- FHWA-RD-95-163 Bicycle and Pedestrian Crash Types of the Early 1990s
- FHWA-PD-95-009 A Compendium of Available Bicycle and Pedestrian Trip Generation Data
- FHWA-PL-95-006 FHWA Study Tour for Pedestrian and Bicyclists Safety in England, Germany, and the Netherlands
- FHWA-PL-95-005 Bicycling and Walking in the Nineties and Beyond: Applying Scandinavian Experience to America's Challenges
- FHWA-RD-94-062 Bicycle Safety Related Research Synthesis
- FHWA-PD-94-031 Conflicts on Multiple-Use Trails
- FHWA-HI-94-028 Bicycle and Pedestrian Planning (NHI Participant Workbook)
- FHWA-RD-92-073 Selecting Roadway Design Treatments to Accommodate Bicycles

FHWA safety brochures

- FHWA-SA-91-059 Crossing Advice for Pedestrians
- FHWA-SA-92-040 For A Safe Path Through Work Zones – Don't Miss Your Cues!!
- FHWA-SA-93-058 The Signs of Safety Are Everywhere!
- FHWA-SA-96-057 A Kid's Guide to Safe Walking
- FHWA-SA-97-044 Don't Have Blind Spot When it Comes to Walking Safely Near Large Trucks and Buses
- FHWA-SA-97-066 Wanted: Walkable Communities
- FHWA-SA-98-065 Pedestrian Safety for School-age Children
- FHWA-SA-99-017 Rumble Strips: A Sound Investment

NHTSA Reports and Publications

- DOT-HS-808-363 It Wouldn't Hurt to Live in a Safe Community
- DOT-HS-808-607 Prevent Bicycle Crashes (fact sheet)
- DOT-HS-808-000 Your Bicycle Helmet – A Correct Fit (brochure)
- DOT-HS-808-648 Ride Like A Pro (brochure)
- DOT-HS-808-763 10 Smart Routes to Bicycle Safety (booklet)
- DOT-HS-808-781 Be Head Smart – It's Time to Start (brochure)
- DOT-HS-808-746 What's New About Bicycle Helmets? (Poster)
- DOT-HS-808-747 What's New About Bicycle Helmets? (Brochure)

- DOT-HS-808-757 What's New About Bicycle Helmets? (Flyer)
- DOT-HS-808-754 Back to School Safely (booklet)
- DOT-HS-808-885 Highway Safety 1996: A Report on Activities Under the Highway Safety Act of 1996, as Amended.

USDOT Bicycle and Pedestrian Related Research

- *Development of Pedestrian and Bicyclist Injury Databases* Report on non-motor vehicle, and non-roadway crashes available on-line after October 1, 2005 at www.tfhrc.gov

- *Development of National Pedestrian Safety Awareness Campaign* (NHTSA) Partnership for a Walkable America activities and pedestrian safety awareness materials developed under this task order.

- *Development of Planning Guidelines and Training Courses* (includes planning guides, planning training course, and university graduate-level course

- *Development of Bicycle Compatibility Index: A Level of Service Concept* Reports completed.

- *Bicycle Facilities Evaluation* (analysis of bicycle lanes versus wide curb lanes) Bicycle lane analysis report due in October. Report on innovative bicycle facilities still being prepared for printing.

- *Capacity Analysis of Pedestrian and Bicyclist Facilities* Research done. Awaiting publication on tfhrc.gov web site.

- *Development and Test of Bicycle Safety Countermeasures* (NHTSA) Bicycle Safety Resource Guide CD Rom now available.

- *Synthesis of Bicycle and Pedestrian Planning at the State and MPO Levels* Report done.

- *Evaluation of Pedestrian Facilities* (includes synthesis, research report, and users guide) Report being completed.

- *Evaluation of the Effectiveness of 3D/4D Visualization* Completed.

- *ITS Applications for Pedestrian Safety* Findings available on PedSmart website, and on CD Rom.

- *Guidebook on Quantitative Methods to Estimate Non-motorized Travel* Reports available.

- *Pedestrian and Bicycle Crash Analysis Tool*Programming completed; CD Rom and user manual being prepared for release this fall. Evaluation of Intersection

Treatments for Pedestrians Combined with ITS Applications and Pedestrian Facility Evaluation projects.

- *Evaluation of Ultraviolet Headlamps* Pedestrian and Bicyclist Technology Transfer Study**.** Web site under construction in conjunction with PBIC; marketing plan submitted.

Current NHTSA Research Initiatives

- Pedestrian Research Compendium
- Survey on Public Beliefs about Pedestrian and Bicyclist Safety and Accommodation
- Literature Review: Vehicle Travel Speeds and Pedestrian Injury
- Literature Review on Pedestrian and Bicyclist Conspicuity
- Beta-testing of the Pedestrian and Bicyclist Crash Analysis Tool
- Development, Implementation and Evaluation of a Countermeasures Program for Alcohol Impaired Pedestrians
- Large City Demonstration and Evaluation of Pedestrian Countermeasures
- Zone Guide for Pedestrian Safety
- Bicyclist Research Compendium
- Bicycle Safety Resource Guide
- Enhancing the Detection/Recognition of Bicycles

Other current research initiatives

- National Bicycle Education Curriculum (FHWA, NHTSA)

It is notable that in all of the above cited research, no specific research on work zone safety for pedestrians and cyclists was found.

CHAPTER 3
RESEARCH METHODOLOGY

Introduction

The objective of this research was to develop additional safety considerations for pedestrians and cyclists in construction zones which can be applied and added to existing Florida Department of Transportation (FDOT) Maintenance of Traffic (MOT) standards. The tasks have been involved in this effort can be categorized into 6 major steps:

- Step 1 - Obtain and analyze pedestrians and cyclists crash data for work area crashes
- Step 2 - Observe pedestrian and bicyclist interaction at the work area
- Step 3 – Survey pedestrians and cyclistss for input on work zone issues
- Step 4 – Analyze data and determine findings
- Step 5 - Develop strategies to improve pedestrian and bicyclist safety in highway construction zones

Step 1: Obtain and Analyze Pedestrians and Cyclists Crash Data for Work Area Crashes

Pedestrians and cyclists crash data was obtained for selected locations in Florida, and then analyzed to identify the work area and crash factors most frequently associated with work area crashes involving pedestrians and bicyclists. The FDOT's Safety Office has been compiling a statewide Crash Analysis Reporting System (CARS) since 1999 by gathering the extensive, coded traffic crash report forms used by the Florida Highway Patrol and other reporting agencies when reporting on crashes. As of 2002, the data include a code indicating whether a traffic crash occurred in or nearby a work area. The

information in the database includes only crashes that occurred on state-maintained (FDOT) roadways throughout Florida.

FDOT's Safety Office provided access to the CARS database, which was queried to select only those work area crashes involving pedestrians and bicyclists. The results were used to extract, read, and analyze work area crash reports involving pedestrians or bicyclists that were killed or injured. All the crash reports were available electronically. A spreadsheet containing the data from each file studied within the crash reports facilitated the analysis, and was used to filter crashes by codification or category.

Figure 3-1 shows a sample of the printed crash report form (17)used by the law enforcement. Figure 3-2 shows the section in the crash report where the road conditions during the crash are categorized. Code number 04 was used to extract work zone crashes from the existing crash data. Work is underway on developing an electronic crash report that can be completed onsite at the moment of the crash. Essentially, the new electronic crash report will have the same information and fields as conventional reports with the advantage that it will be more accurate and take less time to process.

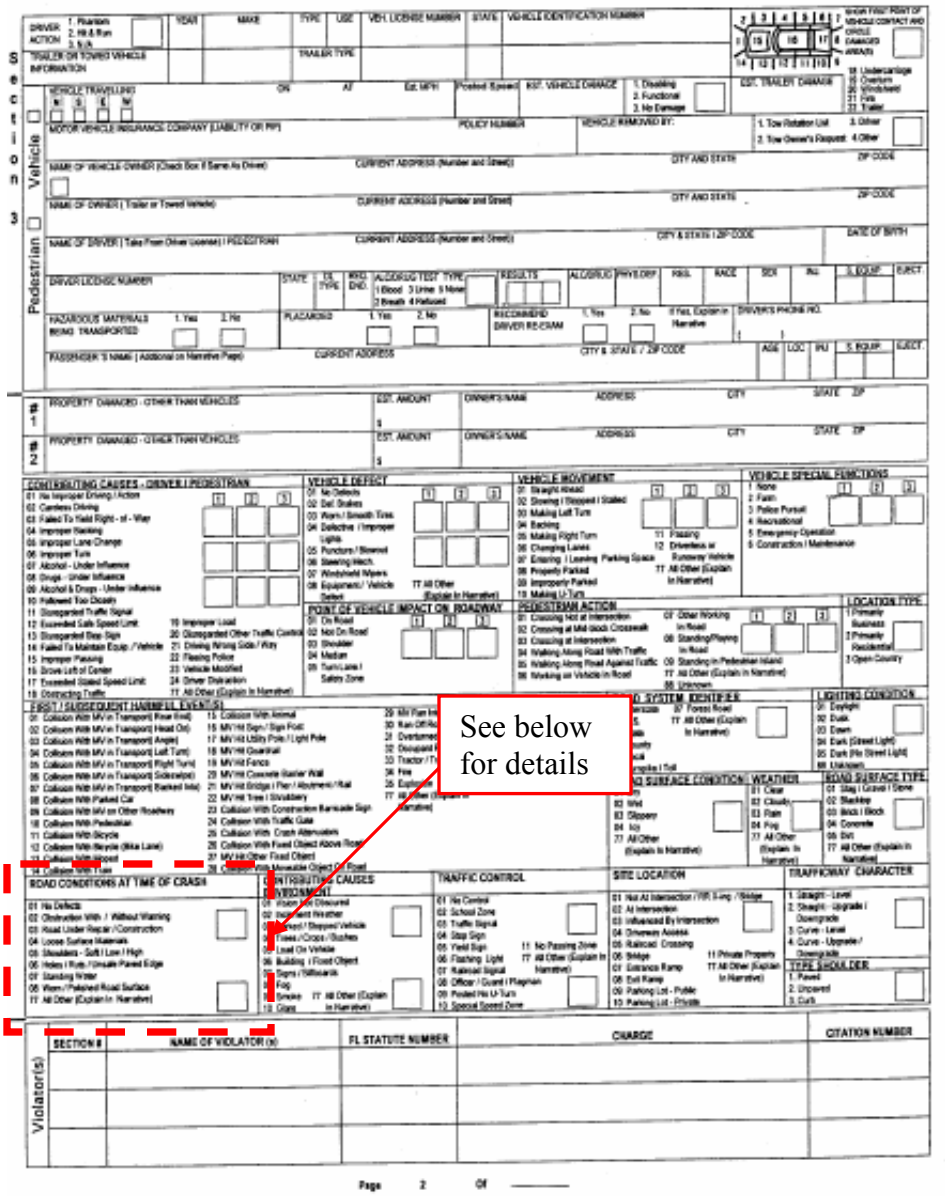


Figure 3-1 Florida crash report form (HSMV 90003)

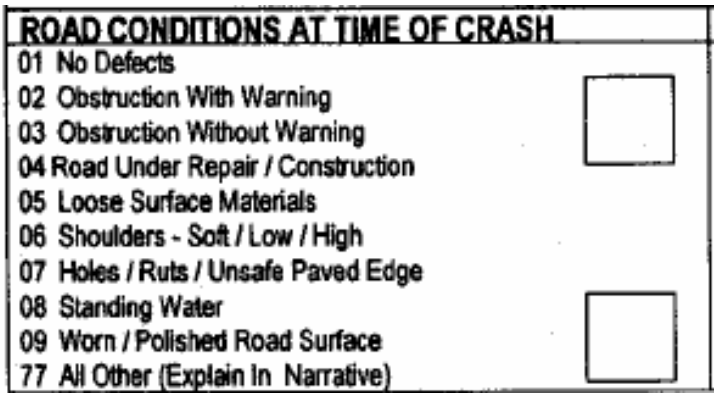


Figure 3-2 Road condition at time of crash section in Crash report form (HSMV90003)

After reviewing and analyzing the crash database and the crash reports, the following factors were found to be of interest:

- Causes of the crashes
- Locations of the crashes (rural vs. urban)
- Ages of the pedestrians, bicyclists, and/or driver
- Speed of the vehicles at the time the crash occurred
- Types of construction projects most likely to produce pedestrian and bicyclist crashes
- Safety measures in place that may have failed at the time of the crash
- Time of day most crashes were likely to happen
- Number of pedestrian crashes vs. bicyclist crashes
- Conditions under which the crash occurred
- Type of road vs. frequency of crashes

Step 2: Observe Pedestrian and Bicyclist Interaction at Construction Zones

Pedestrian and bicyclist activity was recorded and observed for selected construction zones. General statistics, crash data, and current projects influenced which projects and what locations were most critical to observe. The plan was to obtain and observe video recorded from urban work areas, because the crash report analysis showed that the majority of crashes occurred in urban areas. Furthermore, pedestrians and cyclists traffic was typically higher at urban locations than rural locations, and pedestrians and cyclists could be placed in higher risk conditions because of the high volume of traffic and the lack of space to safely accommodate them.

The data collected through video provided the following information:

- Identify conflicts between vehicles and pedestrians and bicyclists at the work area
- Determine hazardous situations for pedestrians and cyclists at the work area
- Examine the lack of planning and the improper use of safety devices, detours, and signage provided to pedestrians and cyclists when setting up the work area
- Identify different pedestrians and cyclists behaviors and their interaction with the work area

The FDOT Construction Office (20) provided a list of all current and future projects by districts and counties. This list and the project descriptions were used to select those projects located in areas that have high volumes of pedestrians and bicyclists.

Figure 3-3 shows the seven FDOT districts and the Florida Turnpike Enterprise System. This research observed construction projects from Districts 2, 5, and 7. The next section contains detailed descriptions of each of the 5 project that was selected.

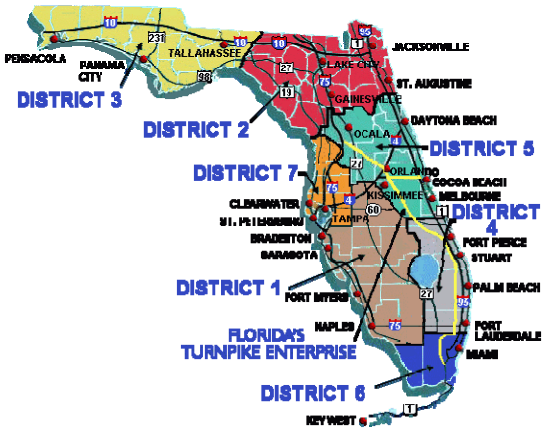


Figure 3-3 Florida Department of Transportation districts map

Work areas and project information

Project 1 (utility work, Gainesville, FL)

Location: Approximately 100 yards east of the corner of Southwest 2nd Avenue (SR 26A) and Southwest 34th Street, Gainesville, FL

Length of Work Area: Approximately 100 yards long. Data were collected approximately 25 yards west of the work area on the north side of the street.

Work Area Layout: Barriers and 3 foot traffic cones were used to delineate sidewalks for pedestrians so they could walk through the work area.

Description of Work: Excavating with backhoes and shovels. Figure 3-4 shows a picture sequence taken from the jobsite.

Comments: Mainly pedestrians walked through the work area using the sidewalk, but others often crossed the street to avoid having to use it. Bicyclists used both the sidewalk and the vehicular lane.

Figure 3-4 Project 1 pictures (Utility work, Gainesville, FL)

Project 2 (resurfacing, Gainesville, FL)

Location: Southwest 16th Avenue (State Road 226), Gainesville FL

Length of Work Area: Approximately 1.5 miles long. Data were recorded along a 200 yard strip.

Layout: Barricade set up in parallel parking spots in west-bound lane.

Description of Work: Resurfacing from Archer Road (State Road 24) to Williston Road (State Road 331) (1 mile). Some of the median crossovers were closed. The center lane was swept of debris and asphalt was laid down along a half-mile section. Figure 3-5 shows a picture sequence taken from the jobsite.

Comments: Mainly pedestrians crossed the barricade and crossed mid-block within a radius of approximately 100 yards of the location. Bicyclists also followed the same

pattern. Pedestrians would lift the tape between the cones and barricades, or walk between them, to gain access to the street. A few individuals walked along the sidewalk without going between the cones or barricades. In addition, 3 or 4 cars were trapped within the barricades and cones, so some pedestrians had to enter the blocked-off area and move the traffic cones to leave the site.

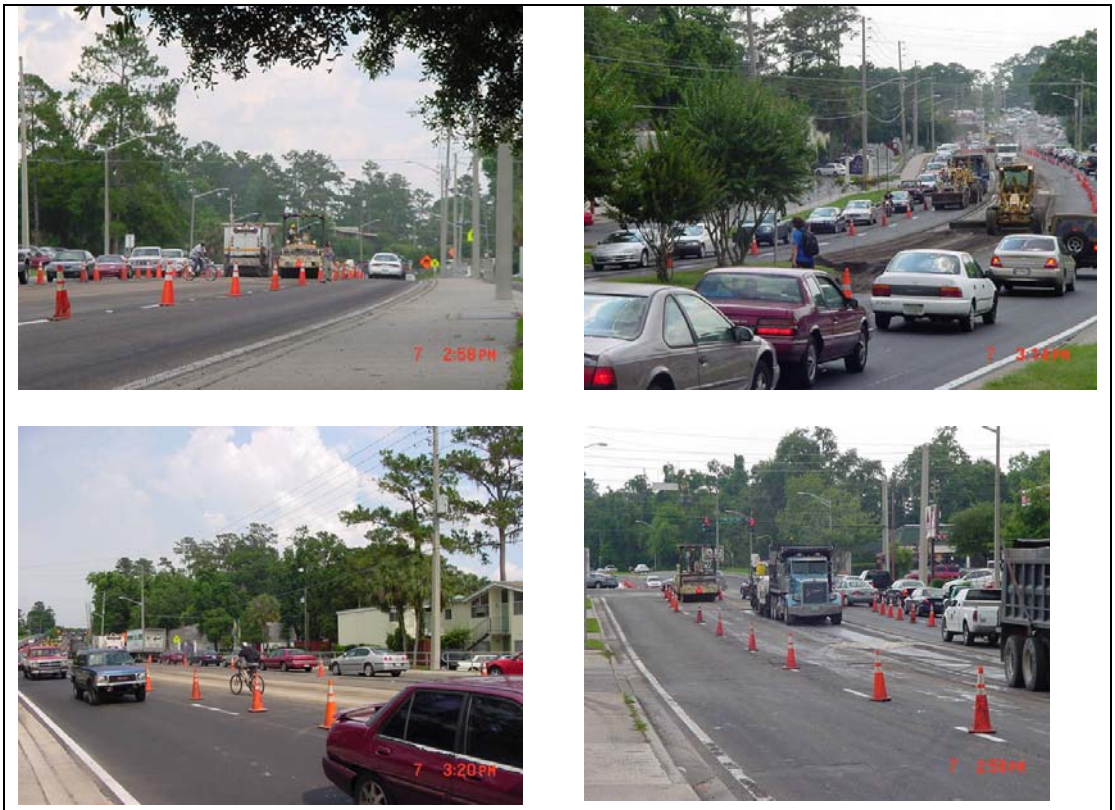


Figure 3-5 Project 2 pictures (Resurfacing work, Gainesville, FL)

Project 3 (utility work, Tampa, FL)

Location: The corner facing the center of the work area, the northwest corner of East Diana Street and North Nebraska Avenue, Tampa, FL

Length of Work Area: Approximately 100 yards long.

Layout: Barriers (large cylindrical cones) were set up in the middle of the north-bound lane converting a two-lane road into a one-lane road. Fold-out signs were set up on the sidewalk on the east side of the street.

Description of Work: Sidewalk and utility installation and resurfacing of concrete directly in the middle of the work area. Figure 3-6 shows a picture sequence taken from the jobsite.

Comments: Very few pedestrians walked along this stretch of Nebraska Avenue. Pedestrians generally crossed boundaries and crossed mid-block from the side of the street with construction to the opposite side of the street. Some bicyclists traveled along the east side/north-bound sidewalk through the construction zone.

Figure 3-6 Project 3 pictures (Utility work, Tampa, FL)

Project 4 (Jacksonville, FL)

Location: The northeast corner of Union Street and Laura Street and the Intersection of First Street and Second Avenue. Downtown Jacksonville, FL

Length of Work Area: Approximately 1 mile.

Layout: Traffic cones and barricades at the edge of the outer east-bound lane completely closing that lane. An Intelligent Transportation System (ITS) arrow indicated that the lane was closed.

Description of Work: New sidewalk construction and gutter repair. Figure 3-7 shows a picture sequence taken from the jobsite.

Comments: Most pedestrians walked between the traffic cones and barricades to cross the street, but a few individuals walked alongside the sidewalk without going between the cones or barricades. Most of the people crossed the street to get to the bus stop on the opposite side.

Figure 3-7 Project 4 pictures (Jacksonville, FL)

Project 5 (road widening – Orlando, FL)

Location: Six-laning 4.6 miles from SR 528 to SR 552 (Curry Ford Road), Orlando, FL. Approximately 150 feet south of the southwest corner of Curry Ford and Semoran Street

Length of Work Area: Approximately 4.6 miles. Data were recorded off the side of the road while facing south.

Layout: Two lanes in each direction. The center lane was marked off with cones for 200 yards.

Description of Work: Installing sewer/drainage pipes. A backhoe appeared to be the only machine in use during observation. Figure 3-8 shows a picture sequence taken from the jobsite.

Comments: Pedestrians crossed the street through the work area. A crosswalk was located at the corner of Semoran and Curry Ford, approximately 150 feet from the location of the video equipment. The pedestrians appeared to cross either to catch the bus or to enter the shopping mall.

Figure 3-8 Project 5 pictures (Orlando, FL)

Each project was visited several times and videos were taken from different locations and angles within the work area. Everyday, as different behaviors were

observed and recorded, the data provided different perspectives on the problems encountered at the work area. A total of 36 hours of real-time video were recorded and observations were scored on a template (Table 3-1).

Table 3-1 Video data collection template.

Video Data Collection

Date:
Start: End: Duration:
Location:

	Pedestrians / Bicyclist										
(A) Obs. #	(B) Number of pedestrians	(C) Walked on sidewalk	(D) Walked inside the work Area	(E) Walked in the vehicular lane	(F) Used the crosswalk to avoid the construction	(G) Used an uncontrolled or different path to avoid the construction	(H) Explain where	(I) Conflict with motorists (yes = 1)	(J) Explain	(K) Obeyed the traffic control devices if any. (yes = 1)	(L) Which traffic control were present
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											
Total	0	0	0	0	0	0		0 yes		0 yes	
Percent	%	%	%	%	%	%		0.00% %		0.00% %	

AADT
AVERAGE HOURLY TRAFFIC (AHT)
Pedestrians/Bikes per hour:
Pedestrians-bikes per hour/ AHT

After viewing several hours of video, the goal was to create categories for all of the observed behaviors and then, for each roadway facility, establish a relationship between the volume of pedestrians and cyclists and the volume of traffic (Table 3-1). By collecting data on common behaviors, measures were obtained on the effectiveness of the traffic control devices at each work area. The Tables and data on pedestrians and bicyclists are included as Appendix A.

The data obtained from the crash reports (Step 1) and video observations (Step 2) were used to prepare survey questions (Step 3). The survey was conducted with members of 4 different bike associations to determine what safety needs were worth addressing when developing new safety measures (Step 5).

Video Recording

Conventional video recording equipment was used for this study, two Sony TVR280 digital camcorders with tripods (Figure 3-9). A Video Data Collection Recording Protocol was prepared to train and guide the student research assistants. The following is the recording protocol followed by the students.

- Familiarize yourself with the work area
- Choose the best spot(s) to set the recording equipment. Keep yourself and the equipment in a safe place, away from the work area
- Open the tripod and mount the camcorder
- Check the date and time in the camcorder before recording
- Choose the LP recording mode to extend the recording duration of the tape
- Adjust the zoom to get a wide angle of the area. The less zoom, the better
- DO NOT MOVE THE CAMCORDER
- Record the same area without changing the aiming point so that you can compare how pedestrians and cyclists behave differently at the same location
- Do not let the camcorder record continuously; record only when pedestrians or bicyclists are present. If there are several pedestrians or bicyclists passing, do not stop recording; let the camcorder record until the next gap in pedestrians
- Repeat the same process around the work area in places you consider valuable for providing information (2 hours per location is recommended)
- Bring the equipment back to the University of Florida (Weil hall 460A) unless otherwise ordered
- Take notes on the construction zone location, date, time, and any other important information on the tape label
- Prepare and send a report about the construction zone visited to jsanda@ufl.edu. In the report, include information such as date, time, locations, type of construction zone, description of the work being performed, and the type of data collected

Figure 3-9 Video data collection equipment

Step 3: Survey Pedestrians and cyclists

Surveys were conducted to learn about what concerns and special needs pedestrians and bicyclists might have when traveling through work areas, structured interviews and comprehensive. A total of 96 surveys were conducted. Before taking the survey, participants were shown a video to familiarize them with the common conditions encountered at work areas. Obtained from two state highway projects located near or within the city of Gainesville, Florida, the video was collected using a specially-equipped bicycle owned by the University of Florida that was built to record from the bicyclist's perspective (Figure 3-10).

Other data used to develop the survey included permits, standards, project specifications and drawings, crash data, site videos, and any other information related to the work area that could benefit the research. The survey was created after reviewing the crash data obtained during Step 1. It was decided to mainly focus on surveying bike associations and other bicyclists who have commuted through work areas. An online

version of the survey was also made available to increase the sample size and obtain responses from throughout the state.

Figure 3-10 Bicycle used to prepare the video presented prior to the surveys

Each participant was asked to first view the 10 minutes video and then look at several pictures to become familiar with the problems faced by pedestrians and bicyclists traveling through constructions zones. Next, they answered questions that asked them to describe their feelings and concerns about the unsafe conditions they had faced, and provide their opinions on how to improve safety in construction work areas (content of survey in Appendix B). The objective of the survey was to identify those safety issues that are most problematic to pedestrians and cyclists around construction zones. The participants provided feedback on what they felt were not appropriate work area regulations for pedestrians and cyclists based on their past experiences.

Step 4: Analyze Data and Determine Findings

Data and information gathered from Steps 1 through 3 were analyzed and evaluated during this step. Key safety issues were identified and prioritized based on:

- Crash data reports obtained from the FDOT Safety Office (CARS database). All crash reports involved pedestrians and cyclists in construction zones
- Video observations obtained from the work areas at the projects selected
- Interviews and surveys conducted with pedestrians, bicyclists, and pedestrians and cyclists associations

To analyze the data Microsoft Excel (19) software was used. This software provided graphic results, had the necessary tools to analyze the data, and was easy to learn so that the student researchers could use it.

All the data were loaded into Microsoft Excel, which provides good quality Tables and graphics with which to manipulate data. Its simple tools can be used by most people for inputting and organizing data.

Step 5: Develop Strategies to Improve Pedestrian and Bicyclist Safety in Highway Construction Zones

After identifying critical issues and causes affecting construction zone safety for pedestrians and cyclists, new safety considerations and guidance were developed.

New work zone layouts were developed in sufficient detail to allow the FDOT to transfer the concepts to its TCP standards for construction work zones. Additionally, new guidance for TCP designers was developed for inclusion in the FDOT's TCP design guidelines. In addition to the above engineering strategies, other suggestions were made. For example, public awareness activities were addressed.

Research Plan Summary

The following flow chart (Figure 3-11) summarizes all the tasks involved in this research.

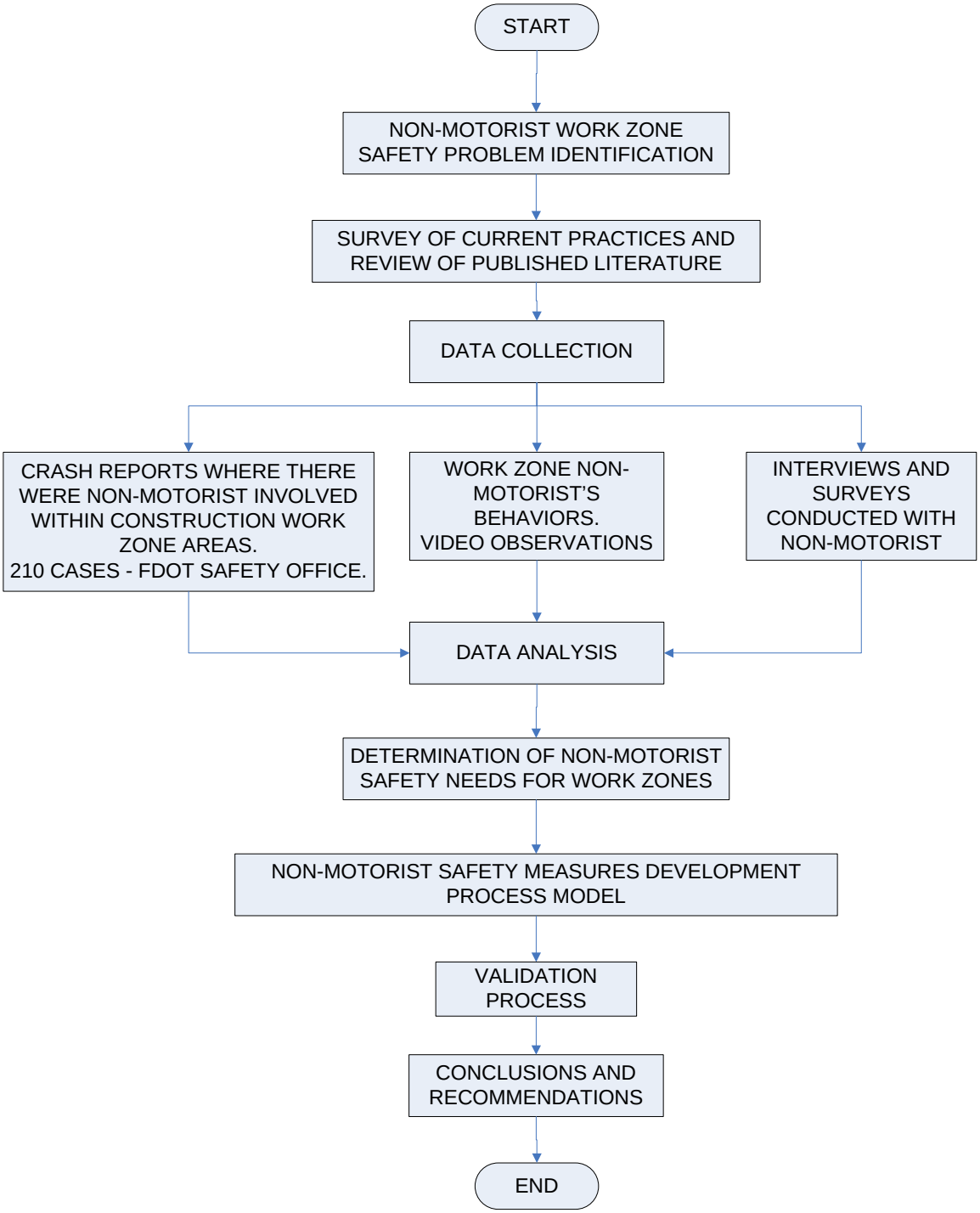


Figure 3-11 Research plan summary

CHAPTER 4

FINDINGS: PEDESTRIANS AND CYCLISTS SAFETY NEEDS IN WORK ZONES

Introduction

This chapter presents the methods used to collect and analyze the data. Three main sources of data were used in this research: crash data, video observations, and surveys. Data analysis involved 3 different tasks:

- Collection and analysis of historical crash data from the FDOT CARS crash database on crashes involving pedestrians and bicyclists. The data were processed to draw conclusions on the frequency of crashes at construction zones
- Video observations collected from different construction zones to study pedestrian and bicyclist behavior and their interaction with the work area
- Surveys conducted with pedestrians and bicyclists to identify and prioritize their safety needs

Pedestrians and cyclists Crash Data for Construction Zone Crashes

Pedestrians and cyclists crash data were obtained from the Crash Analysis Reporting System (CARS) database at the FDOT Safety Office. This database has information on crashes that occurred on state–maintained (FDOT) roadways throughout the State of Florida from 1999 to 2003. The CARS database was queried to obtain a total of 216 work area crashes in which pedestrians and/or bicyclists were injured or killed. The results were used to identify and analyze those factors that caused the crash. The most important findings follow. Interpretation of the data should include a full understanding of the situation. For example, the volume of pedestrians and cyclists using particular road types would logically affect the crash frequency, perhaps more than the road configuration. We would expect that roads which have limited pedestrians and cyclists access to have less crashes.

Causes of the Crashes

Official State of Florida police reports for crashes involving either a bicyclist or a pedestrian in a construction zone were analyzed. The crashes were classified into 10 categories. Table 4-1 shows the frequency of each cause as well as who caused the crash.

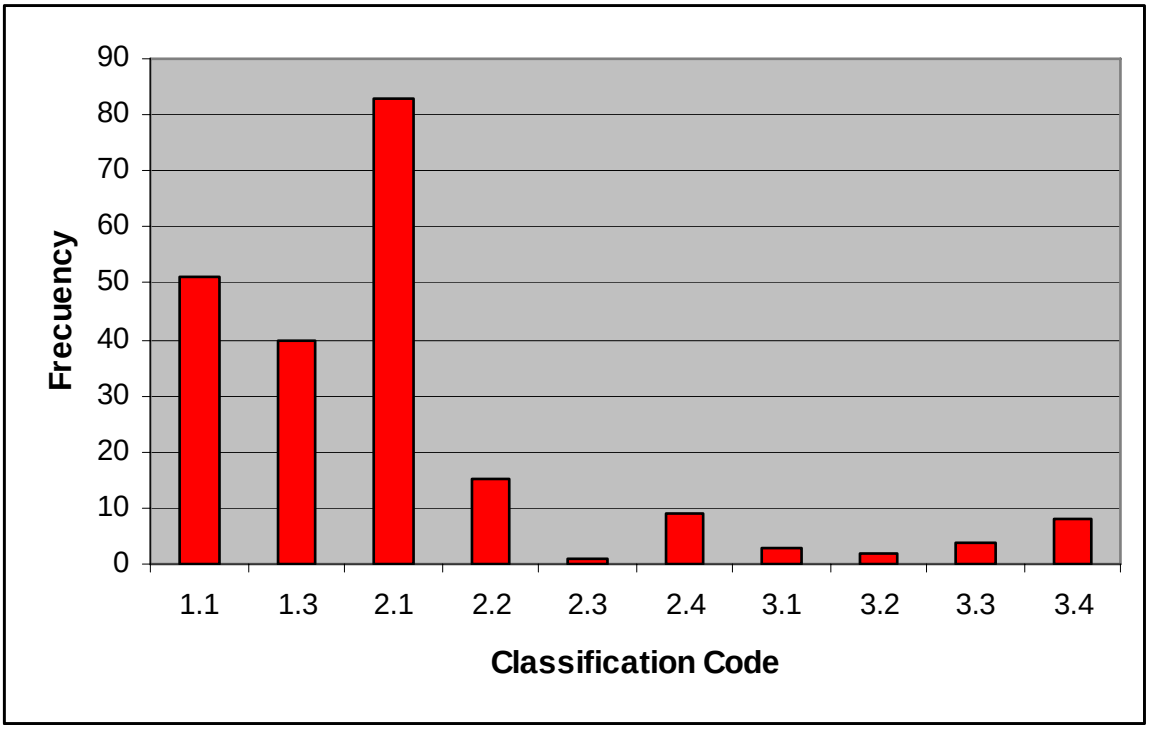
Table 4-1 Causes of crashes and their frequency (All work zone crashes, Florida 1999-2003 involving Pedestrians or Bicyclists)

	Code	Description	Frequency	%	Totals
Driver @ Fault	1.1	Driving Outside of Lane	51	24%	91 43%
	1.3	Failure to Yield	40	19%	
Ped/Bike @ Fault	2.1	Failure to Yield	83	38%	108 49%
	2.2	Driving the Wrong Way	15	7%	
	2.3	Rear End Car	1	0%	
	2.4	Driving Outside of Lane	9	4%	
Site Conditions	3.1	No/Poor Lighting	3	1%	17 8%
	3.2	Equipment/People in the Wrong Place	2	1%	
	3.3	Bad Cone/Barricade Layout	4	2%	
	3.4	No Bike Lane/Shoulder Present in the Work Zone	8	4%	
		Totals	**216**	**100%**	

As Table 4-1 indicates, 38% of crashes in construction zones were a result of pedestrians or bicyclists failing to yield (code 2.1), and 23.6% of the crashes were due to

vehicles driving outside of their lane (code 1.1). Drivers failing to yield caused 18.5% of the crashes. Failure to yield was a significant cause.

Figures 4-1 and 4-2 show the frequency of each classification code and the percentage of the total primary and secondary occurrences, respectively.



Driver at Fault		Site Conditions	
1.1	Driving Outside of Lane	3.1	No/Poor Lighting
1.3	Failure to Yield	3.2	Equipment/People in the Wrong Place
Pedestrians and cyclists at Fault		3.3	Bad Cone/Barricade Layout
2.1	Failure to Yield	3.4	No Bike Lane/Shoulder Present in the Work Zone
2.2	Driving the Wrong Way		
2.3	Rear End Car		
2.4	Driving Outside of Lane		

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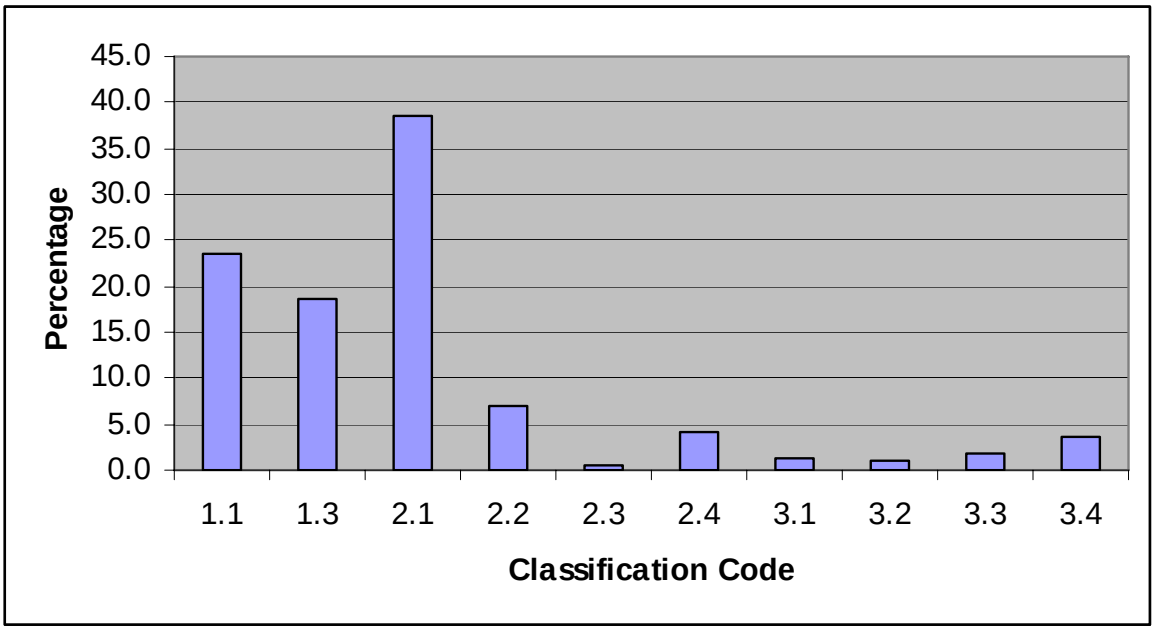
Figure 4-1 Classification code of the crashes vs. frequency



Driver at Fault		Site Conditions	
1.1	Driving Outside of Lane	3.1	No/Poor Lighting
1.3	Failure to Yield	3.2	Equipment/People in the Wrong Place
Pedestrians and cyclists at Fault		3.3	Bad Cone/Barricade Layout
2.1	Failure to Yield	3.4	No Bike Lane/Shoulder Present in the Work Zone
2.2	Driving the Wrong Way		
2.3	Rear End Car		
2.4	Driving Outside of Lane		

Figure 4-2 Percentage of each crash per classification code

It important to note in Figure 4.2 that 81% of the crashes fall under 30% of the codes (1.1, 1.3 and 2.1), these being the main causes of the crashes studied:

1.1 Vehicle Driving Outside of Lane

1.3 Vehicle Failure to Yield

2.1 Pedestrian or Cyclist Failure to Yield

Pedestrian Crashes vs. Bicyclist Crashes

According to the data analyzed, pedestrian crashes in work areas occurred twice as often as bicycle crashes. Sixty-six percent of the crashes studied involved pedestrians and 34% involved bicyclists. There were no crashes that involved both pedestrians and bicyclists. Further review of the crash data indicated that a small portion of the crashes involved injuries to construction workers who were working in designated work areas. Additionally, there were a few crashes involving an odd occurrence not consistent with the study focus. For example vehicle driver was pushing his vehicle and was involve in a crash that was coded as crashes involving pedestrians. Those crashes were removed from the list leaving 185 crashes involving pedestrians and bicyclists. Table 4-2 and Figure 4-3 show the number of crashes and their percentages per category

Table 4-2 Number of crashes involving pedestrians and bicyclists

Category	Totals	%
Total number of crashes in which a pedestrian was involved	123	66%
Total number of crashes in which a bicyclist was involved	62	34%
Total number of crashes in which both a pedestrian and bicyclist were involved	0	0
Total	**185**	**100%**

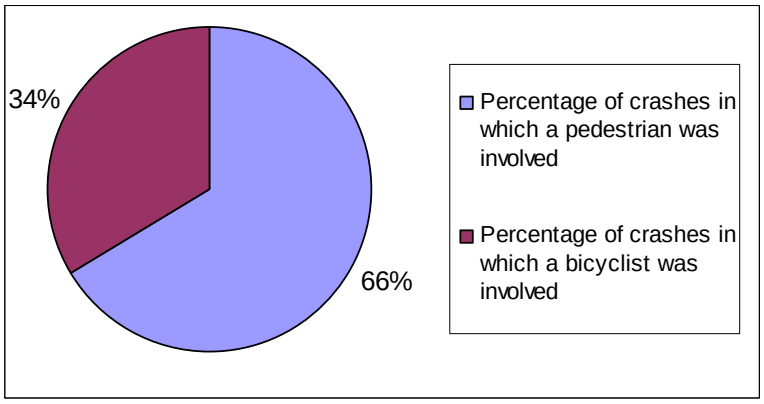


Figure 4-3 Percentage of crashes involving pedestrians and bicyclists

Time of the Crashes

The time of the crash is an important factor when choosing work hours and when providing and enforcing safety measures for pedestrians and bicyclists. After reviewing 185 crash reports, it was noted that 68% of the crashes occurred from 8:00 a.m. to 8:00 p.m., and 45 % occurred in the afternoon from 12:00 p.m. to 8:00 p.m. The afternoon hours proved to be the most frequent hours for pedestrians and cyclists crashes to occur. Table 4-3 and Figure 4-4 show the number and percentage of crashes that occurred during every four-hour time period.

Table 4-3 Number of crashes vs. time of day

Crash Time of Day		Frequency	%
3:59 AM	12:00 AM	14	8%
7:59 AM	4:00 AM	16	9%
11:59 AM	8:00 AM	39	21%
3:59 PM	12:00 PM	41	22%
7:59 PM	4:00 PM	45	24%
11:59 PM	8:00 PM	30	16%
	Total	185	100%

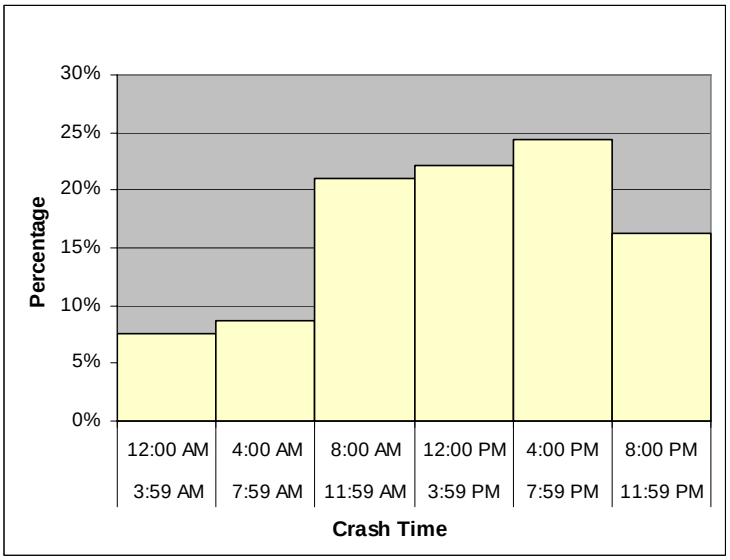


Figure 4-4 Percentage of crashes vs. time of day

Severity of the Crashes

Forty percent of pedestrians and cyclists were injured but not incapacitated. However, almost the same percentage of pedestrians and cyclists involved in crashes (37%) had to be removed from the scene of the crash due to incapacitation or death. Table 4-6 illustrates the number of crashes versus injury severity, or the condition of pedestrians and cyclists following a collision. The percentages for each category presented in Table 4-4 can be observed in Figure 4-5.

Table 4-4 Number of crashes vs. injury severity (1999 -2002)

Highest Injury Severity	Frequency	%
No Injury	0	0%
Possible Injury	43	23%
Non Incapacitating	72	39%
Incapacitating	49	26%
Fatal	21	11%
Total	185	100%

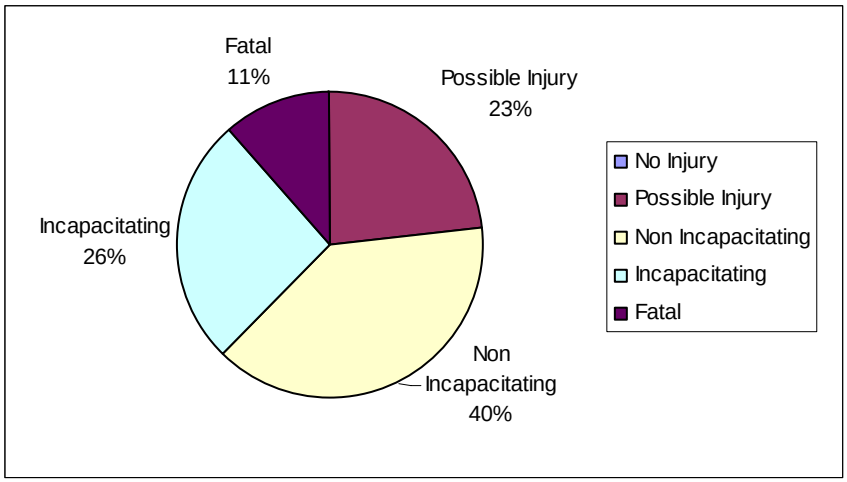


Figure 4-5 Percentage of crashes based on injury severity

Average Daily Traffic (ADT)

The Average Daily Traffic (ADT) count is used to determine how many vehicles travel on a road in a given day. This Figure is used in conjunction with other Figures such

as capacity and speed to determine how busy a roadway is and how efficiently it operates. The Crash Analysis Reporting System (CARS) contains the ADT count of the roadway facilities where these crashes occurred. This information was provided by the FDOT Transportation Statistics Office, which collects traffic data using traffic counters at permanent and temporary traffic count stations throughout the state of Florida.

The results from the crash data analysis showed that 52% of the crashes in the study occurred on roads with ADT counts of 5,000 to 30,000, while 88% of the crashes occurred on roads with ADT counts equal to or lower than 50,000.Table 4-5 and Figure 4-6 show the number of crashes that occurred at different ADT ranges. The reader should note that this data is included for information purposes. We have no information to suggest a cause and effect relationship.

Table 4-5 Number of crashes vs. Average Daily Traffic (ADT)

Average Daily Traffic count		Frequency of crashes	%	Cumulative %
0	5000	6	4%	4%
5001	10000	6	4%	7%
10001	15000	20	12%	19%
15001	20000	22	13%	32%
20001	25000	20	12%	43%
25001	30000	22	13%	56%
30001	35000	14	8%	64%
35001	40000	14	8%	73%
40001	45000	14	8%	81%
45001	50000	13	8%	88%
50001	55000	6	4%	92%
55001	60000	5	3%	95%
60001	65000	4	2%	97%
65001	70000	4	2%	99%
70001	75000	1	1%	100%
		171	100%	

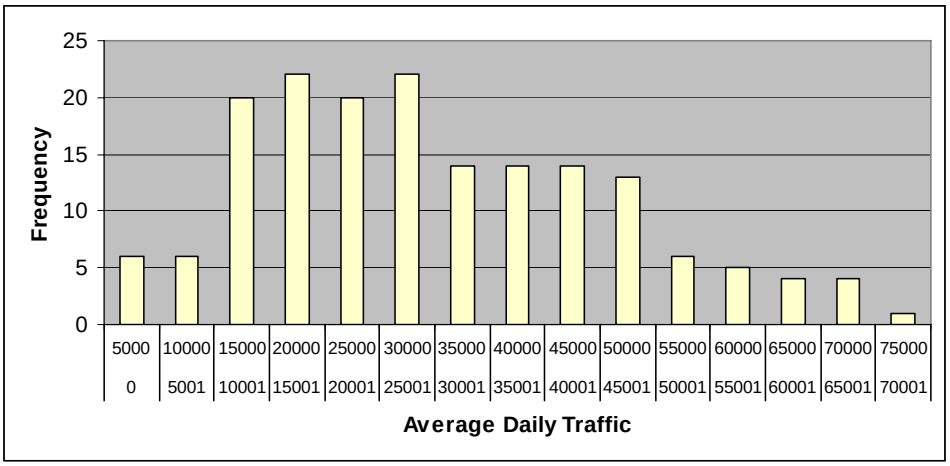


Figure 4-6 Number of crashes that occurred at different average daily traffic counts

To gain a better understanding of a road facility and its ADT count, Table 4-86provides descriptions of major roads categories and ADT counts.

Table 4-6 ADT facility Comparison Table

ADT	Description
12,500	Collector Facility. One lane each direction. Posted speed limit is 35 mph.
45,500	Main city arterial. Three lanes each direction. Posted speed limit is 35 mph.
60,000	Main city arterial. Three lanes each direction. Posted speed limit is 45 mph.
68,500	Interstate highway. Three lanes each direction. Posted speed limit is 70 mph.

Type of Roadway Facility

Seventeen percent of all crashes most frequently occur on urban six-lane, two-way divided highways, followed by 11% of crashes occurring on urban four-lane, two-way divided highways.

It is important to note that 76% of these crashes occurred within or nearby an urban area. Table 4-7 ranks the top twenty types of roadway facilities that demonstrate the

highest frequency of crashes involving pedestrians and cyclists. Figure 4-7 shows the percentages of crashes for each category. The reader should note that this statistic is included for information purposes. We have no information to suggest a cause and effect relationship.

Table 4-7 Number of pedestrians and cyclists crashes occurring at each type of roadway

Rank	Report Code	Description	Frequency	%
1	30	URBAN 6+LN 2WY DIVD	32	17%
2	21	URBAN 4-5LN 2WY DIVD	21	11%
3	23	SUBURBAN 4-5LN 2WY DIVD	15	8%
4	14	SUBURBAN 2-3LN 2WY DIVD	14	8%
5	20	URBAN 4-5LN 2WY DIVD	11	6%
6	1	INTERSTATE URBAN	11	6%
7	18	RURAL 2-3LN 2WY UNDIVD	11	6%
8	15	SUBURBAN 2-3LN 2WY UNDIVD	9	5%
9	26	RURAL 4-5LN 2WY DIVD	8	4%
10	33	SUBURBAN 6+LN 2WY DIVD	8	4%
11	2	INTERSTATE RURAL	5	3%
12	5	URBAN OTHER LIMITED ACCESS	5	3%
13	22	URBAN 4-5LN 2WY UNDIVD	5	3%
14	40	URBAN ONE WAY	5	3%
15	3	TOLL ROAD URBAN	4	2%
16	31	URBAN 6+LN 2WY DIVD	4	2%
17	12	URBAN 2-3LN 2WY UNDIVD	3	2%
18	24	SUBURBAN 4-5LN 2WY DIVD	3	2%
19	4	TOLL ROAD RURAL	2	1%
20	-	OTHER	9	5%
			185	100%

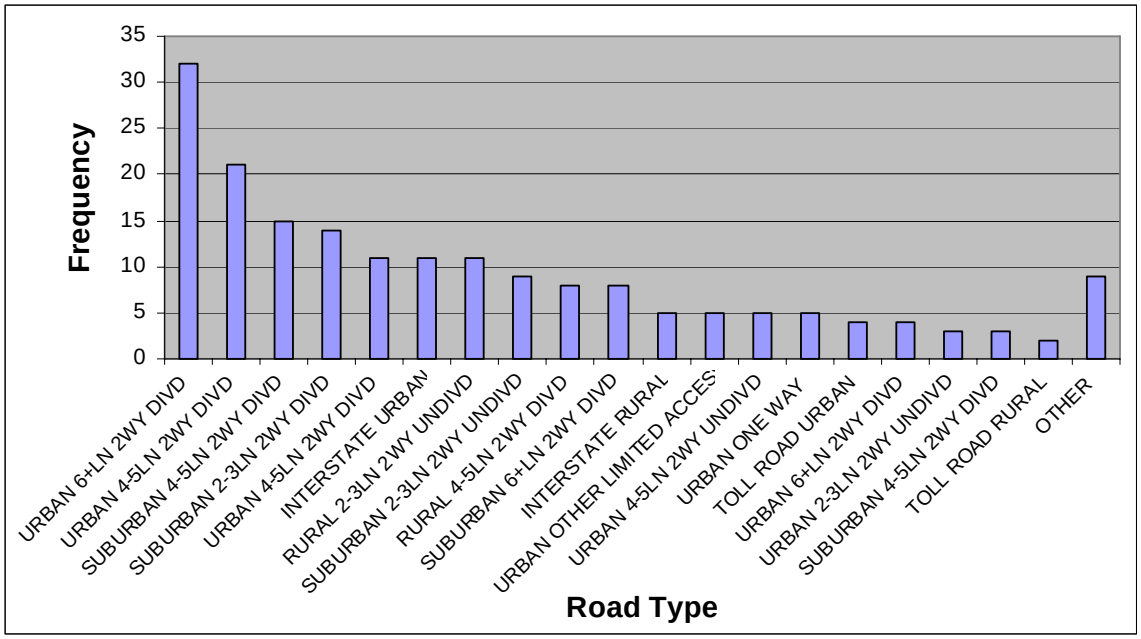


Figure 4-7 Frequency of crashes involving pedestrians and cyclists for each type of roadway facility

Roadway Surface

Eighty-seven percent of all crashes involving pedestrians and bicyclists take place on asphalt, with 6% occurring on concrete surfaces. Table 4-8 and Figure 4-8 present the frequency of crashes per roadway surface type.

Table 4-8 Roadway surface type vs. crash frequency

Report code	Description of roadway surface	Frequency of crashes	%
1	Slag/Gravel/Stone	3	2%
2	Asphalt	162	88%
3	Brick/Block	1	1%
4	Concrete	13	7%
5	Dirt	5	3%
77	Other	1	1%
	Total	**185**	**100%**

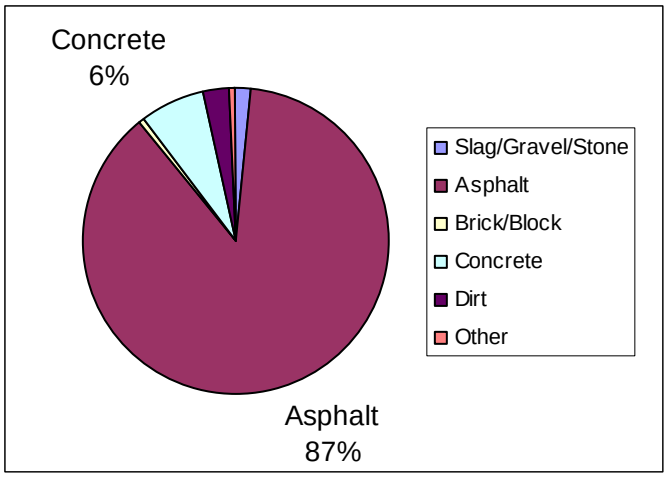


Figure 4-8 Percentages of crashes vs. roadway surface type.

Types of Motor Vehicles Responsible for Crashes

Table 4-9 shows that 46% of all "at-fault" vehicles were automobiles, while 20% were motorcycles and 16% were light trucks.

Table 4-9 Vehicle type for at-fault vehicles

Report code	Description of vehicle	Frequency of at-fault crashes	%
1	Automobile	68	46.26%
10	Motorcycle	28	19.05%
3	Pickup/Light Truck - 2 rear tires	24	16.33%
2	Passenger Van	11	7.48%
4	Medium Truck - 4 rear tires	6	4.08%
5	Heavy Truck - 2 or more rear axles	4	2.72%
6	Truck Tractor (Cab-Bobtail)	3	2.04%
11	Moped	2	1.36%
7	Motor Home (RV)	1	0.68%
	Total	**147**	**0.00%**

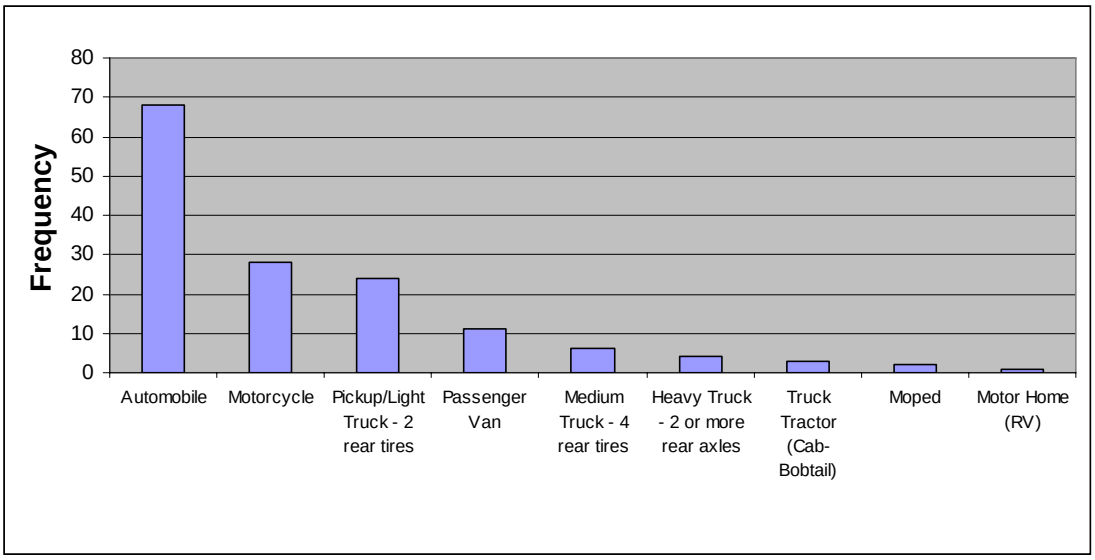


Figure 4-9 Number of crashes vs. type of vehicle responsible

At-fault Vehicle Movement when Crash Occurred

In 68% of the cases noted, the at-fault vehicle was moving straight-ahead. Twelve percent of at-fault vehicles were making right turns and 6% were attempting left turns. Table 4-10 and Figure 4-10 show the number of crashes per each at-fault vehicle's type of movement.

Table 4-10 Number of crashes vs. at-fault vehicle movement

Rank	Report code	Description of vehicle movement	Frequency of crashes	%
1	1	Straight Ahead	108	68%
2	5	Making Right Turn	19	12%
3	3	Making Left Turn	10	6%
4	77	All Other	7	4%
5	2	Slowing/Stopped/Stalled	4	3%
6	4	Backing	3	2%
7	6	Changing Lanes	3	2%
8	11	Passing	3	2%
9	8	Properly Parked	1	1%
		Total	158	100%

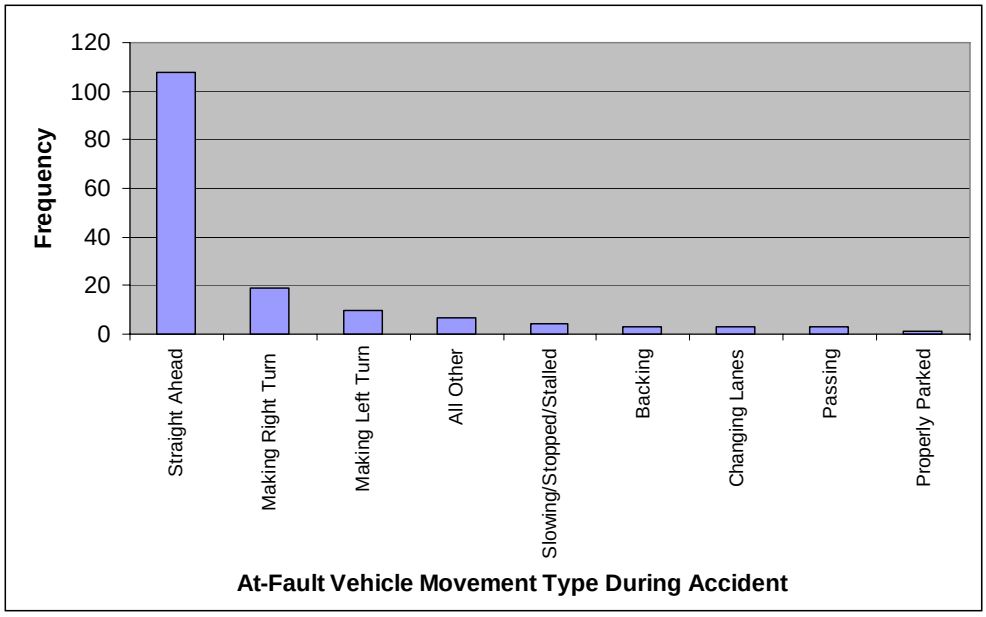


Figure 4-10 Number of crashes vs. at-fault vehicle movement type

At-fault Driver/Pedestrian Age

Fourteen percent of at-fault drivers/pedestrians fall into the 46-50 year-old age range, while 11% are between the ages of 41 and 45. The data also illustrate that 69% of at-fault drivers/pedestrians are between the ages of 16 and 50. Table 4-11 and Figure 4-11 show the frequency of crashes for at-fault drivers of various age ranges.

Table 4-11 At-fault driver/pedestrian age distribution

Age	Frequency	%
1-5	0	0%
6-10	0	0%
11-15	3	2%
16-20	13	10%
21-25	10	8%
26-30	14	11%
31-35	11	8%
36-40	11	8%
41-45	15	11%
46-50	18	14%
51-55	7	5%
56-60	5	4%
61-65	4	3%
66-70	4	3%

71-75	7	5%
76-80	6	5%
81-85	2	2%
86-90	2	2%
91-95	0	0%
96-100	0	0%
101-105	1	1%
Total	**133**	**100%**

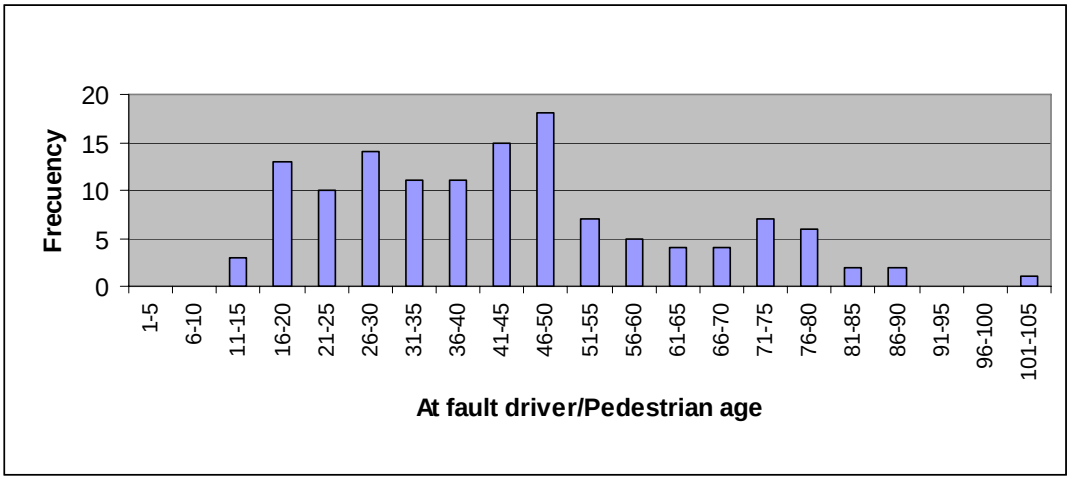


Figure 4-11 Number of crashes vs. at-fault driver/pedestrian age.

Location/Movement of the Pedestrian/Cyclists

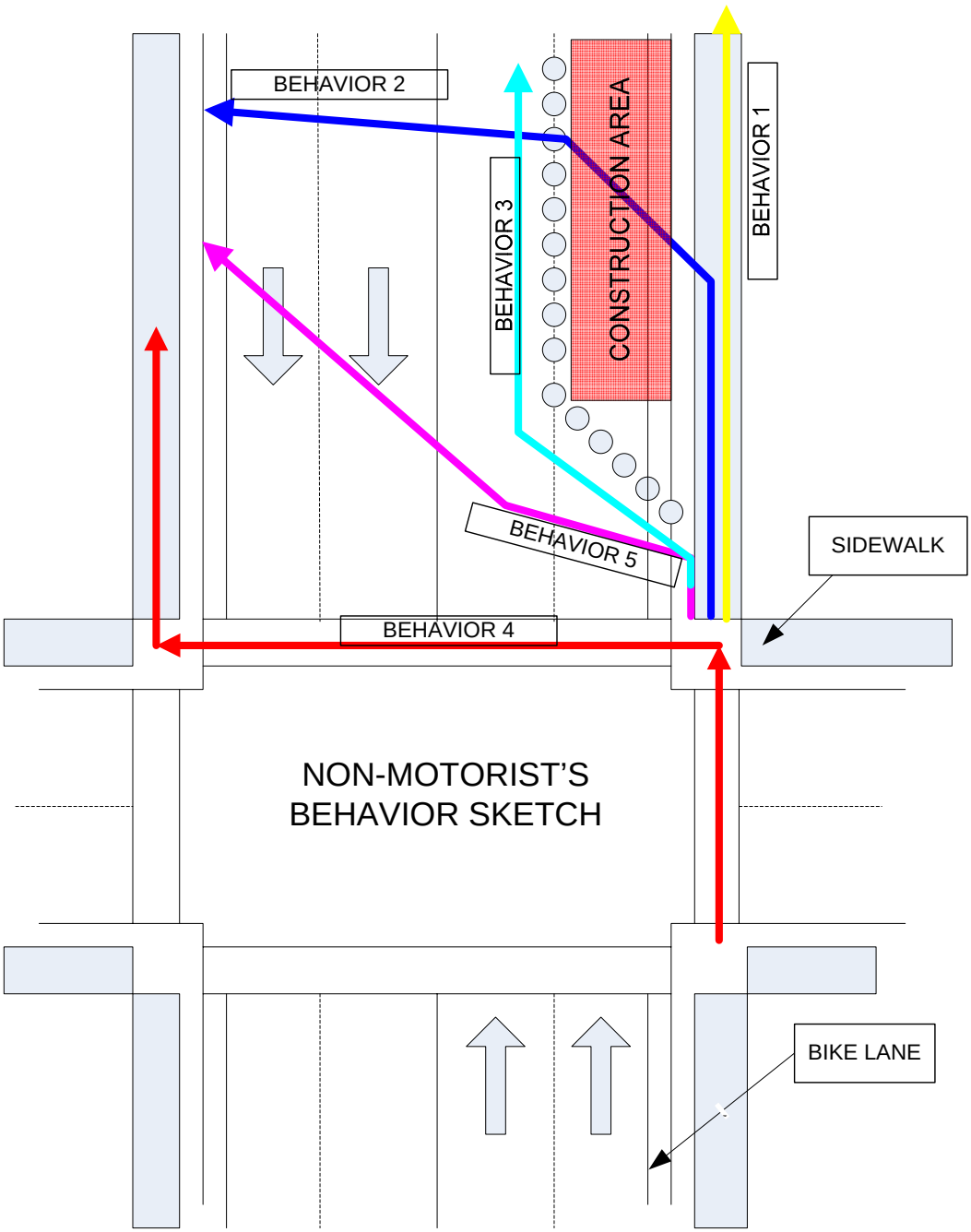
Further analysis of the crash reports was performed to obtain information concerning the location and/or movement of the pedestrians and cyclists at the time of crash. Table 4.14 presents a summary of the results. Pedestrians were most frequently **Crossing Mid-Block** (34.3%) and **Walking in the Travel Lane** (20.2%). Cyclists were most frequently **Riding in the Travel Lane** (18.2%) and **Crossing Mid-Block** (17.2%).

Table 4.12 Location of Pedestrians and Cyclists in Work Zone Crashes

Location of Crash	Pedestrians	Percentage	Bicycles	Percentage
Construction Workzone	8	8.1%	9	9.1%
Crossing Midblock	34	34.3%	17	17.2%
Corssing in crosswalk w/ row	5	5.1%	15	15.2%
Crossing in crosswalk w/o row	7	7.1%	12	12.1%
Shoulder/sidewalk	19	19.2%	5	5.1%
Travel lane	20	20.2%	18	18.2%
Median	2	2.0%	0	0.0%
Other	4	4.0%	0	0.0%

Video Observations: Pedestrian and Bicyclist Behavior and their Interaction with the Work Zone

The research for this study utilized recorded video information of pedestrian and bicyclist activity at 5 specific work zones. Two digital camcorders and tripods were used by trained students to record the interactions. Data collected from reviewing the videos were compiled in spreadsheets that identified specific safety issues and pedestrians and cyclists behaviors within construction zones. These observations were used to identify conflicts between pedestrians and bicyclists, to determine hazardous situations for pedestrians and cyclists, and to pinpoint any lack of planning and improper use of safety devices, detours, and signage posted for pedestrians and cyclists in construction areas. Pedestrian and bicyclist observation data Tables and summarized datasheets are presented in Appendix A. Figure 4-13 is a generic sketch to illustrate the five most common pedestrians and cyclists behaviors in work zones.



BEHAVIOR 1 = Walked / Rode on sidewalk
BEHAVIOR 2 = Walked / Rode inside the work Area
BEHAVIOR 3 = Walked / Rode in the vehicular lane
BEHAVIOR 4 = Used the crosswalk to avoid the construction
BEHAVIOR 5 = Used an Uncontrolled or different path to avoid the construction

Figure 4-13 Pedestrians and cyclists behaviors sketch

Collecting Pedestrian Data

Six hundred thirty-three pedestrian observations were recorded at different construction zones over a period of 36 hours; these observations included one or more pedestrians walking together to equal a total of 1,052 pedestrians recorded. Table 4-13 breaks down the number of pedestrians who chose certain paths or behaviors to avoid the construction site. According to the data collected, 59% of the pedestrians walked inside the work area, took an uncontrolled path to avoid the work area, or walked on the sidewalk right through the work area. However, when a crosswalk was located near the work zone, pedestrians used it 40.11% of the time. Though all pedestrians may not have used the crosswalk specifically to avoid the construction, these observations are an indication that pedestrians may choose a safer route to reach their destination instead of a shorter and potentially more dangerous one.

Table 4-13 Video observation results: pedestrian behaviors

	Counts		Pedestrians behaviors				
			1	2	3	4	5
	(A) Obs. #	(B) Number of Pedestrians	(C) Walked on sidewalk	(D) Walked inside the work Area	(E) Walked in the vehicular lane	(F) Used the crosswalk to avoid the construction	(G) Used an uncontrolled or different path to avoid the construction
TOTAL	633	1052	217	114	6	422	293
%	-	-	20.63%	10.84%	0.57%	40.11%	27.85%

Figure 4-14 shows a graphic distribution of the five most common pedestrian behaviors observed

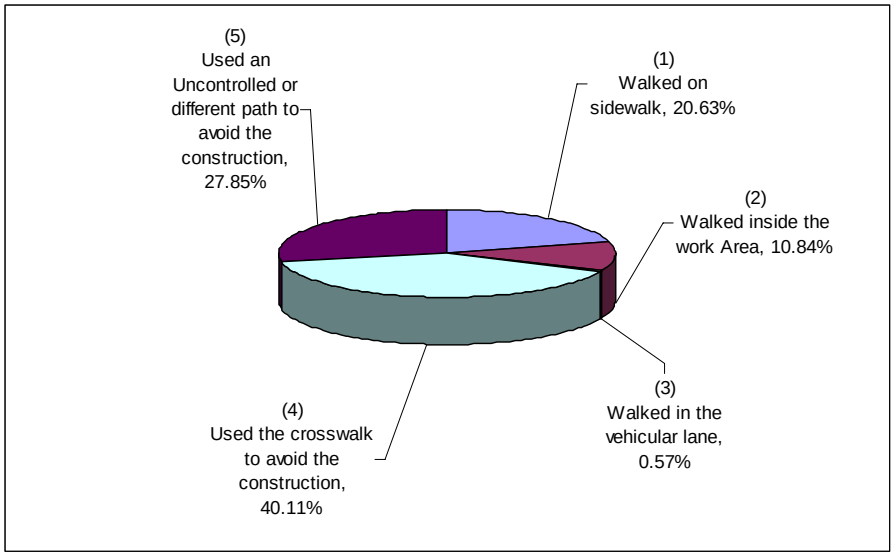


Figure 4-14 Percentage of pedestrians behaviors noted in the video footage

Column H was included in the data collection sheet to explain Column G, which is the fifth behavior noted in the recorded footage. When data collectors scored pedestrians using an alternate or uncontrolled path to avoid the construction, they had to explain which uncontrolled location or path the pedestrians used. Table 4-14 details the four different uncontrolled paths (Column H in the video data collection template) observed from the 5 work zones recorded.

Table 4-14 Uncontrolled paths used by pedestrians

	Column H				
	a Crossed the street as he/she approached the work zone	b Side of the road approached after work zone was passed	c Used other side of the street	d Crossed the street midway through the work zone	
TOTAL	28	20	4	254	306
%	9%	7%	1%	83%	100%

Pedestrian conflicts with motorists (Column J) and their obedience to established traffic control devices (Column L), such as signs and cones, were also observed and scored. In 10.43% of the observations, pedestrians conflicted with motorists. Fifty-seven of the 66 recorded observations were classified in the four main conflict categories shown

in Table 4-15. In 76% of the conflicts observed, pedestrians had to run to avoid cars or became trapped in the median and within the areas delimited by cones near the construction zones.

Table 4-15 Types of pedestrian/motorist conflicts

			Column J – Type of Conflict			
	Number of observations	(I) Conflict with motorists (yes = 1)	a Car slowed to avoid hitting pedestrian	b Pedestrian ran to avoid car	c Car did not see pedestrian	d Trapped
TOTAL	633	66	11	17	3	26
%	100%	10.43%	19%	30%	5%	46%

According to the data collected, 51.97% of the pedestrians obeyed the traffic control devices. Data collectors recorded the type of device was used each time they noted pedestrian obedience of traffic control devices. Table 4-16 lists the 4 different traffic control devices observed in the 5 recorded projects. These were scored in Column L of the video data collection template. The total number of observations per traffic control device is higher than the total number of recorded pedestrian observations because 1 or more traffic control devices were present at the construction zones studied. Therefore, all traffic control devices present in the construction zones were scored in the same observation.

Table 4-16 Traffic control devices pedestrians used in the work areas

			Totals of Column L				
	Number of observations	(K) Obeyed the traffic control devices if any (yes = 1)	a Sidewalk closed sign	b Cones	c Lit sign	d Construction zone sign	
TOTAL	633	329	9	628	285	172	1094
%	100%	51.97%	1%	57%	26%	16%	100%

In addition, the volume of pedestrians on the road per hour was compared with the Average Hourly Traffic (AHT) rate to identify the level of traffic in these roadway

facilities. These Figures were used to compute a ratio of how many pedestrians walked through the work area versus the number of vehicles on the road per hour. The Annual Average Daily Traffic (AADT) values for the roadway facilities studied were obtained from the Florida Traffic Information CD (24). Then, the AHT rate was computed by dividing the AADT by 24, to translate the annual Figure into a number that reflected the AHT rate. The recorded pedestrian observations indicated that pedestrian volumes varied from 93 pedestrians per hour to less than 1 pedestrian per hour.

The volume of traffic on the roadway facilities varied from 17,000 to 50,500 vehicles per day. Detailed information for each recorded project can be found in the summary Table in Appendix A. Table 4-17 presents the average, low, and high ratios comparing pedestrians per hour to the AHT rate obtained from the 5 work zones observed. An average of 2.11 pedestrians per 100 vehicles walked around or through the work area. The highest ratio obtained was 9.96 pedestrians per 100 vehicles, illustrating a large volume of pedestrians walking near or exposed to the work zone conditions.

Table 4-17 Pedestrian traffic/volume information

	Traffic/Volume Information			
	Annual Average Daily Traffic	Average Hourly Traffic rate	Pedestrians per hour	Pedestrians per hour/Average Hourly Traffic (ratio)
LOW	51,500.00	2145.80	0.30	0.014%
MEAN	29226.3158	1217.76316	25.75189	2.11%
HIGH	22500	937.5	93.42	9.965%

Collecting Bicyclist Data

There were 143 bicyclist observations collected over a 30-hour period. Each observation included 1 or more bicyclists riding together, yielding a total of 152 bicyclists recorded in the 143 observations at various work zones. Table 4-18 details the video data collected, noting the 5 primary bicyclist behaviors observed in the work zones. According to the video data, 56.58% of the bicyclists rode inside the work area using a sidewalk or rode in the lane closed to pedestrians and cyclists. Since there was no designated bike lane to accommodate bicyclists through the work area, 17.11% of the bicyclists used the vehicular traffic lane to ride through the work area. Thus, bikes and vehicles had to share the road, creating a potentially dangerous situation. However, when a crosswalk was located near the work zone, bicyclists were observed to use it 24.34% of the time. Though bicyclists did not necessarily use the crosswalk to avoid the construction, these observations showed that 1 in every 4 bicyclists would use a crosswalk as a detour or alternative route when riding near a construction area.

Table 4-18 Video observation results: bicyclist behaviors

	Counts		Bicyclists behaviors				
			1	2	3	4	5
	(A) Number of observa-tions	(B) Number of bicyclists	(C) Rode on sidewalk	(D) Rode inside the work area	(E) Rode in the vehicular lane	(F) Used the crosswalk to avoid the construction	(G) Used an uncontrolled or different path to avoid the construction
TOTALS	143	152	60	25	26	37	4
%	-	-	39.47%	16.45%	17.11%	24.34%	2.63%

Figure 4-15 shows a graphic distribution of the 5 most common bicyclist behaviors observed.

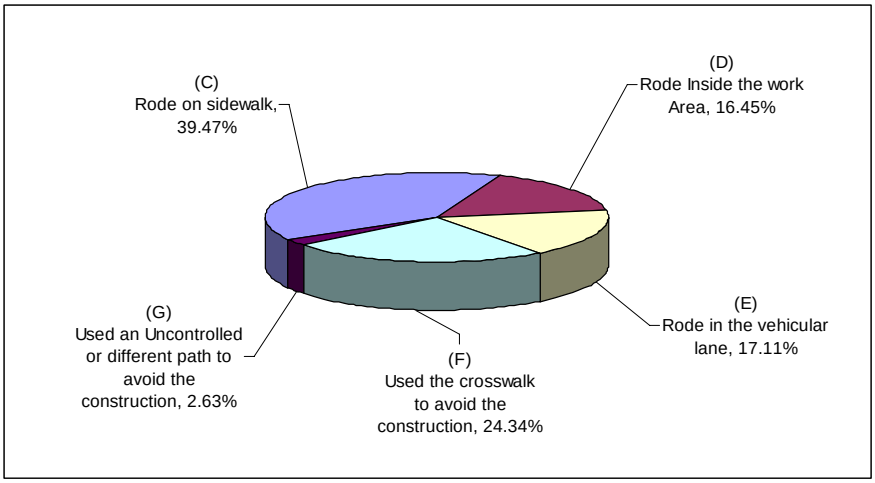


Figure 4-15 Percentages of bicyclist behaviors in work zones

According to the data collected, only 2.63% of bicyclists used an uncontrolled path to avoid the construction. In addition, there were no conflicts with motorists observed when scoring the data.

In 58.74% of the observations, bicyclists obeyed established traffic control devices. Table 4-19 details the four different traffic control devices observed at the five work zones recorded. They were scored in Column L of the video data collection template. The total number of observations per traffic control device is higher than the total number of recorded bicyclist observations because one or more traffic control devices were present at the construction zones studied. Therefore, all traffic control devices present in the construction zones were scored for the same observation.

Table 4-19 Traffic control devices bicyclists used in the work areas

			Totals of Column L				
	Number of observa-tions	(K) Obeyed the traffic control devices if any (yes = 1)	a Sidewalk closed sign	b Cones	c Lit sign	d Construction zone sign	
TOTAL	143	84	8	138	32	34	212
%	100%	58.74%	4%	65%	15%	16%	100%

In addition, the volume of bicyclists on the road per hour was compared with the AHT to identify the level of traffic on these roadway facilities. These Figures were used to compute a ratio of how many bicyclists rode through or around the work area versus the number of vehicles on the road per hour. The AADT values of the roadway facilities studied were obtained using the Florida Traffic Information CD. Then, the AHT rate was computed by dividing the AADT by 24, translating the annual Figure into a number that reflected the hourly traffic rate. From the observations recorded, the volume of bicyclists varied from 12 per hour to less than 1 per hour. Likewise, the traffic volume on the roadway facilities varied from 17,000 to 50,500 vehicles per day. Detailed information for each recorded project is presented in the summary table in Appendix A. Table 4-20 shows the average, low, and high ratios comparing bicyclists per hour to the AHT rate obtained from the 5 work zones observed. An average of almost 5 bicyclists per 1,000 vehicles rode around or through the work area. The highest ratio obtained was almost 1 bicyclist per 100 vehicles, illustrating a low volume of bicyclists riding near or exposed to potentially dangerous work zone conditions.

Table 4-20 Bicyclist traffic/volume information

	Traffic/Volume Information			
	Annual Average Daily Traffic	Average Hourly Traffic	Bicyclists per hour	Bicyclists per hour/Average Hourly Traffic (ratio)
LOW	27,500	1145.8	2.65	0.010%
MEAN	27782.35	1157.598	5.54	0.478%
HIGH	22500	937.5	9.11	0.972%

Conducting Pedestrians and cyclists Surveys

Data collected in this step was to identify and prioritize the concerns of bicyclists and pedestrians regarding their encounters with highway construction zones. A total of 96 structured surveys were conducted with pedestrians and bicyclists. Seventy percent of the surveys were conducted online, while the other 30% were obtained from the following sources:

- Bicyclist associations meetings
- The Alachua County Pedestrian and Bicyclist Advisory Committee
- Bicyclist and pedestrian coordinators' meetings
- The Bikeways Planning and Design course from the Department of Urban and Regional Planning at the University of Florida.

The objective of the survey was to identify which safety issues are most problematic for pedestrians and cyclists in work zones. Those interviewed provided feedback based on their experiences. The survey results indicated the following priorities for the respondents:

- Bike lanes or pedestrian walkways should continue through or around the construction zone
- Clear signs should give pedestrians and cyclists advance warning of construction zones ahead
- Road surface conditions should be adequately maintained and free of sudden drops and construction debris
- The speed of motorists should be controlled in construction zones
- When conditions are not safe, pedestrians and cyclists should be advised to use detours and alternate routes

The pedestrians and cyclists surveys also included user profiles and preferences as well as information that helped design the new pedestrians and cyclists MOT regulations and improve work zone safety conditions. The following is a list of survey results:

- 70.83% of respondents were male
- 50.36% of respondents were between the ages of 21 and 40 years old
- 65.38% of the bicyclist trips were for recreation and exercise
- 74.60% of respondents prefer to ride their bikes on roadway facilities versus side paths
- 70.53% of respondents have had a potentially dangerous experience riding through or adjacent to construction zones
- 54.35% of respondents will use a detour or take an alternate route if it is within one quarter of a mile or less from the work area
- 100% of respondents provided feedback on how to make the work areas safer for pedestrians and cyclists

Table 4-21 charts the general results of the survey and Tables 4-22 and 4-23 categorize the data obtained from questions 7 and 24, which address respondents' concerns about pedestrian and bicyclist safety in work zones. Those polled were also asked to rank the safety precautions needed to protect pedestrians and cyclists in construction zones.

Table 4-21 Pedestrians and cyclists survey results

Question	Description	Totals	Mean	%
	Background & Experience			
1	Are you:			
	Male	68		70.83%
	Female	28		29.17%
2	What is your age?			
	Under 20	3		3.16%
	21-40	48		50.53%
	41-60	34		35.79%
	61 or over	10		10.53%

Question	Description	Totals	Mean	%
3	Will you be answering this survey as a:			
	Bicyclist	30		31.58%
	Pedestrian	11		11.58%
	Both	54		56.84%
4	How often do you ride a bike?			
	Everyday	27		28.42%
	1-2 times a week	22		23.16%
	Only on weekends	15		15.79%
	1-2 times a month	17		17.89%
	Once a year	5		5.26%
	Never	9		9.47%
5	When you ride, what percentage (%) of your trip is for:			
	Commuting to work/school	2310		26.89%
	Errands around town	664		7.73%
	Recreation/exercise	5616		65.38%
	Other (specify)			0.00%
6	On-road vs. off-road "side paths" or sidewalk facilities			
	a. On road:			
	50% or more of the time	47		74.60%
	Seldom	16		25.40%
	Never			0.00%
	b. Off-road or side paths			
	50% or more of the time	39		56.52%
	Seldom	28		40.58%
	Never	2		2.90%
7	Have you ever felt unsafe biking/walking through or adjacent to a construction zone?			
	Yes	67		70.53%
	No	28		29.47%
	If yes, please briefly describe below what happened and what could have been done to make you feel safer.			
	First	See Table 4-26		
	Second			
	Participant feedback regarding pedestrians and bicyclists in construction work zones sites (Least important = 1, and most important =5):		Range (1-5)	
8	Advanced warning of the construction or detour is provided.		4.23	
9	Traffic control devices (including barrels, etc.) provide clear guidance for a path through the work zone.		4.36	

Question	Description	Totals	Mean	%
10	Adequate travel lane width is maintained so that motor vehicles can easily pass or share the lane with bicyclists in the construction zone.		4.66	
11	Bike lane or pedestrian walkway continues through or around the construction zone versus ending abruptly.		4.68	
12	Road surface conditions are adequately maintained (free of construction debris, sand, construction materials, potholes, etc.).		4.33	
13	Bicyclists and pedestrians are provided a side path through the construction zone.		4.12	
14	The speed of motor vehicles through the construction zone is controlled.		4.30	
15	Clear directions to detour paths are provided.		4.17	
16	The road conditions on and to the detour routes are safe.		4.39	
17	Detour instructions are located:			
	a. At the start of the construction zone		3.61	
	b. In advance of the construction zone (500 –1000 feet)		4.15	
18	Notification of construction project dates and detour information is provided in advance of project start date.		3.43	
	Conditions for choosing an alternate route:			
19	The amount of extra time required to take the alternate route.		3.65	
20	The degree of perceived risk in the work zone compared to the risk in the detour route.		4.05	
21	The clarity of detour instructions and warning signs.		3.93	
22	The ability to negotiate the detour (e.g., ramps, elevations, uneven surfaces, sand, debris, etc.).		4.21	
23	How far out of your way would you be willing to go to use a detour route and avoid a construction zone?			
	1 mile	11		11.96%
	1/2 mile	31		33.70%
	1/4 mile	27		29.35%
	500 feet	19		20.65%
	100 feet	4		4.35%

Question	Description	Totals	Mean	%
24	What do you think are the three most important things that should be done in a construction zone to ensure bicycle and pedestrian safety?			
	First Second Third	See Table 4-27		
25	Comments			

Table 4-22 Survey results for question 7

Question 7	If yes, please briefly describe below what happened and what you think could have been done to make you feel safer.	Totals	%
1	Debris on the roadway	7	5.69%
2	No bike/pedestrian facilities	38	30.89%
3	Not enough room	36	29.27%
4	No warning signs	12	9.76%
5	Vehicles or equipment blocking the lane	11	8.94%
6	Visibility problems	7	5.69%
7	Uneven pavement	12	9.76%
	TOTALS	**123**	**100.00%**

Table 4-23 Survey results for question 24

Question 24	What do you think are the three most important things that should be done in a construction zone to ensure bicyclist and pedestrian safety?	Totals	%
1	Speed control	33	13.04%
2	Safe bike/pedestrian path separate from vehicular lane	67	26.48%
3	Detours and alternate routes	27	10.67%
4	Signs and advanced warnings	46	18.18%
5	Debris cleared from roadway	37	14.62%
6	Increased visibility	4	1.58%
7	Pavement markings	13	5.14%
8	Regular supervision and inspection	7	2.77%
9	Smooth pavement surface (no drop offs)	14	5.53%
10	Accessibility	5	1.98%
	TOTALS	**253**	**100.00%**

Data Analysis Conclusion

The preceding analysis of crash data, recorded observations of pedestrian and bicyclist behaviors, and survey of pedestrian and bicyclist encounters with construction zones suggest that the following approach should be followed to determine pedestrians and cyclists safety needs and which safety measures should be enacted for improving construction zone safety.

The identification of pedestrians and cyclists safety needs and research priorities was conducted as follows (Figure 4-16):

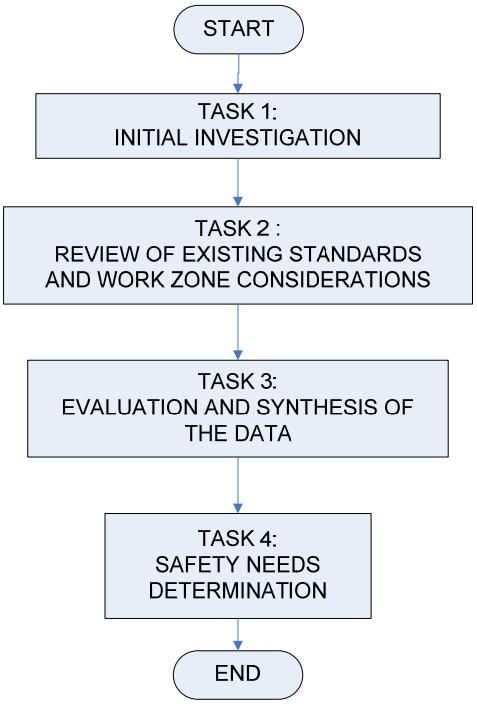


Figure 4-16 Pedestrians and cyclists safety needs investigation process

Task 1: Initial Investigation

This task includes the identification of data sources, collecting the data, and performing an initial investigation of the factors influencing the safety of pedestrians and bicyclists within construction areas.

Task 2: Review of Existing Standards and Work Zone Considerations

Review of existing conditions and current standards that can be used to assess pedestrians and cyclists safety needs such as design standards, drawings and other sources listed in Chapter 2.

Task 3: Evaluation and Synthesis of the Data

The evaluation, analysis, and comparisons of the problems and factors identified in Tasks 1 and 2 will lead to setting priorities and selecting which work zone configurations and safety measures/treatments should be deployed and included in the existing standards to improve the safety of pedestrians and cyclistss, and reduce the risks they face when traveling through or around the work area. The selection of these safety measures should be based on a comprehensive problem analysis including work zone characteristics, pedestrians and cyclists behaviors, crash data, and suggestions obtained from the pedestrians and cyclists survey.

Task 4: Safety Needs Determination

Based on the initial investigation, information gathered, and evaluation and analysis of the data, the following safety needs were identified. Table 4-24 lists the pedestrian and bicyclist safety needs as follows:

Table 4-24 Pedestrians and cyclists safety needs for work zones

Rank	PEDESTRIAN/BIKE SAFETY NEEDS FOR WORK ZONES
1	Safe bike/pedestrian path separate from vehicular lane. Include a bike lane when possible. If not possible, then adequate lane width.
2	When possible, prevent and physically separate pedestrians and bicyclists from entering the work area.
3	Signs and advance warnings for motorists, pedestrians, and bicyclists needed.
4	Clear pathway of debris and eliminate drop offs for pedestrians and bicyclists.
5	Enforce traffic laws for motorists, bicyclists, and pedestrians.
6	Provide detours and alternative routes when designated bike/pedestrian paths can not be maintained.
7	Pavement markings to show the separation of pedestrians and cyclists detours from vehicular traffic.
8	Supervision and inspection of MOT pedestrian/bike features.
9	Avoid blocking pedestrian and bicyclist paths with construction equipment.
10	Accessibility must be ADA compliant.

CHAPTER 5
DEVELOPMENT OF PEDESTRIANS AND CYCLISTS SAFETY MEASURES

Introduction

This research project's investigation of the safety needs of pedestrians and cyclists with regard to highway construction work zones is presented in the previous chapter. Ten key safety needs are presented in Table 4-24. Furthermore, when observing highway construction work zones the research team found that pedestrians and cyclists frequently ignored barricades and signing, crossing through the construction work area and entering the vehicle lanes.

Given the research team's understanding of the FDOT's current Traffic Control Plan (TCP) design and implementation processes, the next step in the research study was to develop new TCP strategies that would offer improved safety for pedestrians and cyclists. These new engineering approaches are presented conceptually with sufficient detail to permit their adaptation and incorporation into the FDOT's TCP design standards, and into the standards of other State Highway Agencies.

This chapter introduces the development of engineering safety measures that will contribute to the protection of pedestrians and cyclists in work zones, and addresses engineering recommendations for accommodating pedestrians and cyclists with safe pathways. More specifically, the following subject areas are addressed:

- Suggested modifications to the FDOT Plans Preparation Manual
- Suggested Additions to the Design Standards 600 series

- Suggested Additions to the Standard Specification for Road and Bridge Construction

Suggested Additions to the FDOT Plans Preparation Manual

The FDOT Plans Preparation Manual (PPM) provides design criteria and procedures to be used in the design of FDOT projects, and the preparation of construction plans (20). Chapter 10 of the PPM covers Work Zone Traffic Control. The following additional language, which reinforces the safety findings and objectives of this study, is suggested for the PPM.

10.14.4 Pedestrians and Bicyclists

Designers are responsible for determining the need to accommodate pedestrian and bicyclists though a work zone as part of the preparation of Work Zone Traffic Control Plans. During their investigation the designer needs to consider the existing facilities provided including sidewalks, dedicated bicycle lanes, crosswalks, and shared use paths. If any of these facilities exist, the Traffic Control shall provide provisions to maintain a safe pathway either by maintaining the existing facility, providing a temporary pathway, or by directing pedestrians and bicyclists around the work area.

The designer shall also consider the demographics of the surrounding area. Presence and location of local neighborhoods, schools, church's and shopping centers that carries pedestrian traffic along an undesignated route that crosses through the proposed work zone should be considered as adequate justification to accommodate pedestrian and/or bicycle traffic even though paved pathways may not exist.

10.14.4.1 Pedestrian Considerations

Where an existing pedestrian way is located or pedestrian use across or through the work zone is likely, a pedestrian facility shall be provided to accommodate this traffic.

There are three threshold considerations in planning for pedestrian safety in work zones on highways and streets:

1. Pedestrians should not be led into direct conflicts with work site vehicles, equipment or operations.
2. Pedestrians should not be led into direct conflicts with mainline traffic moving through or around the work site.
3. Pedestrians should be provided with a safe, convenient travel path that replicates as nearly as possible the most desirable characteristics of sidewalks or footpaths.

In order to accomplish these considerations:

1. Whenever the use of an existing sidewalk is to be temporarily interrupted, include as part of the design, a temporary paved path adjacent to the outside of the existing sidewalk. If it is determined that right-of-way is inadequate or the acquisition of a Temporary Construction Easement is cost prohibitive, a temporary path utilizing the outside lane of traffic should be designed, utilizing longitudinal channelizing barricades. (Note: If barriers, such as the low profile barrier, is already being used in the work zone then they may be used to separate the pedestrian from the traffic lane).
2. Detouring pedestrians across the street to another sidewalk may be used to route pedestrians around the work area. However, it needs to be understood that the pedestrian will subsequently be directed to cross travel lanes a minimum of two times which increases the likelihood of a conflict between the pedestrian and a vehicle.
3. A work zone with the following conditions may warrant a mid-block crossing:
    a. When the work zone temporarily crosses through two or more intersections contiguously and disrupts the functional utility of the cross walks that would otherwise allow access across the street.
    b. When a work zone exceeds six hundred sixty feet in length and does not provide other means of crossing the street within three hundred (300) feet, such as existing crosswalks at intersections.
4. When a mid-block crossing is proposed, a temporary pedestrian signal manually activated by the pedestrian may be used if supported by a warrant analysis.
5. A mid-block crossing that requires pedestrians to cross through a work area shall have a temporary path constructed of either asphalt or concrete pavement. In order to mitigate the potential for the pedestrian having a conflict with the work equipment a temporary traffic separator can be used to create the delineation of the crossing. Furthermore, traffic control devices should be used to stop construction traffic allowing all pedestrians in the crossing to clear the crossing before traffic proceeds. The designer should include the location of crossings if either of the conditions identified in item 3 above are met.

10.14.4.2 Bicycle Considerations

When an existing bicycle lane is located within a work zone, bicyclists should be safely guided through the work area within a designated temporary path protected with longitudinal channelizing barricades or detoured around the work area. Bicyclists should not be encouraged to share the roadway with vehicular traffic during construction.

As a matter of human factor principles supported by case studies, bicyclists become much harder to see with the background of the work area filled with devices that allow the bicyclists to blend in and subsequently become “invisible” to motorists. Combining this occurrence with the understanding that a driver’s perception reaction time is doubled in work zones, a bicyclist traveling through a work zone without physical protection, such as a longitudinal channelizing barricade, between a temporary bicycle lane and vehicular traffic should be avoided.

There are several considerations in planning for bicyclists in work zones on highways and streets:

1. Bicyclists should not be led into direct conflicts with mainline traffic, work site vehicles or equipment moving though or around traffic control zones.
2. Bicyclists should be provided with a travel route that replicates the most desirable characteristics of a wide paved shoulder or bike lane through or around the work zone.
3. If the work zone interrupts the continuity of an existing shared use path or bike route system, signs directing bicyclists through or around the work zone and back to the path or route should be provided.
4. The bicyclist should not be directed onto the same path used by pedestrians unless no other options are available.

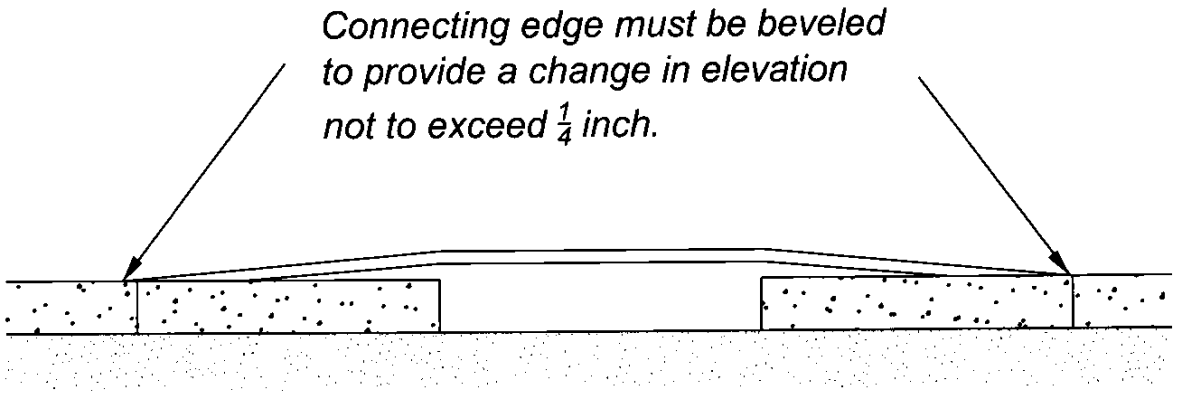
When it is determined to provide temporary bicycle accommodations as part of the work zone traffic control, the following alternatives are recommended:

1. Construct a temporary bicycle lane adjacent to the travel lanes with a longitudinal channelizing barricade as a separation device from the traffic.
2. Discontinue the bicycle lane at the beginning of the work area and divert the bicycle traffic onto the sidewalk.
3. Detour the bicycle traffic onto an alternative route around the work area. Signage throughout the intended detour route should be provided.

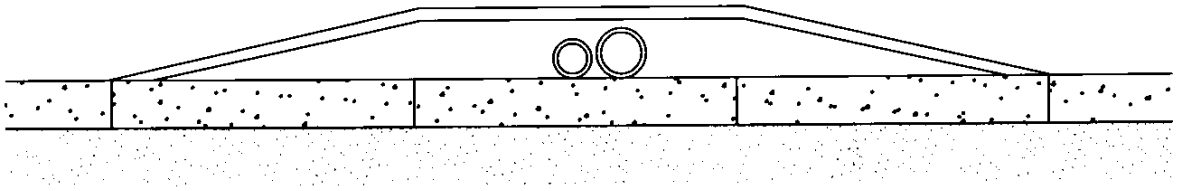
Suggested Modifications to the Design Standards

Temporary Utility Crossing Sidewalk

Construction project utility work frequently requires that a section of existing sidewalk be removed or, in some cases, the temporary utility is place directly on the surface of the sidewalk. both Currently the result is a closure of the sidewalk. Simple, cost effective Temporary Utility Crossing Sidewalk is suggested as an alternative to closing the sidewalk. Figure 5.1 is offered as the suggested addition to the Design Standards. Note that a pdf copy of the original autocad file has been provided separately with the report.



Sidewalk Section Removed



Temporary Utility Crossing Sidewalk

GENERAL NOTES

1. Sidewalk sections that are removed shall have a temporary sidewalk section in place when work associated with the removal is not ongoing.

2. A temporary sidewalk section is also required when utilities or other obstacles temporarily cross the sidewalk creating a tripping hazard for pedestrian traffic.

3. The temporary sidewalk section shall completely bridge the opening in the sidewalk. The materal used for the temporary section can be wood, plastic, or metal, as long as it is structurally sufficient, or supported to withstand a pedestrian load with a maximum deflection of 1/4 inch. The temporary sidewalk section shall provide even, slip resistant surfaces, having slopes not to exceed 1:12.

4. As soon as the temporary sidewalk section is in place, the sidewalk shall be open to pedestrian traffic.

Figure 5-1 Sketch of Temporary Pedestrian/Bicycle Crossing of Work Area

Temporary Pedestrian/Bicycle Path

When construction operations require the temporary closure of the sidewalk and/or bicycle path, a Temporary Pedestrian/Bicycle Path is suggested as one viable alternative. Figure 5.2 provides a Sketch of the suggested addition to the Design Standards. For short term closures the use of Longitudinal Channelizing Barricades is suggested. For long term closures, barrier wall is preferred. Where sufficient right of way is available, this arrangement would avoid the need to detour pedestrian and bicycle traffic.

Temporary Pedestrian/Bicycle Mid-block Crossing

Frequently, highway renewal projects require work zones that may interrupt existing pedestrian crossings. The absence of crossings may lead to pedestrians crossing mid-block through the work zone. Obviously this is at-risk behavior. A Temporary Pedestrian/Bicycle Mid-block crossing is suggested. Figure 5.3 provides a sketch of the suggested addition to the Design Standards.

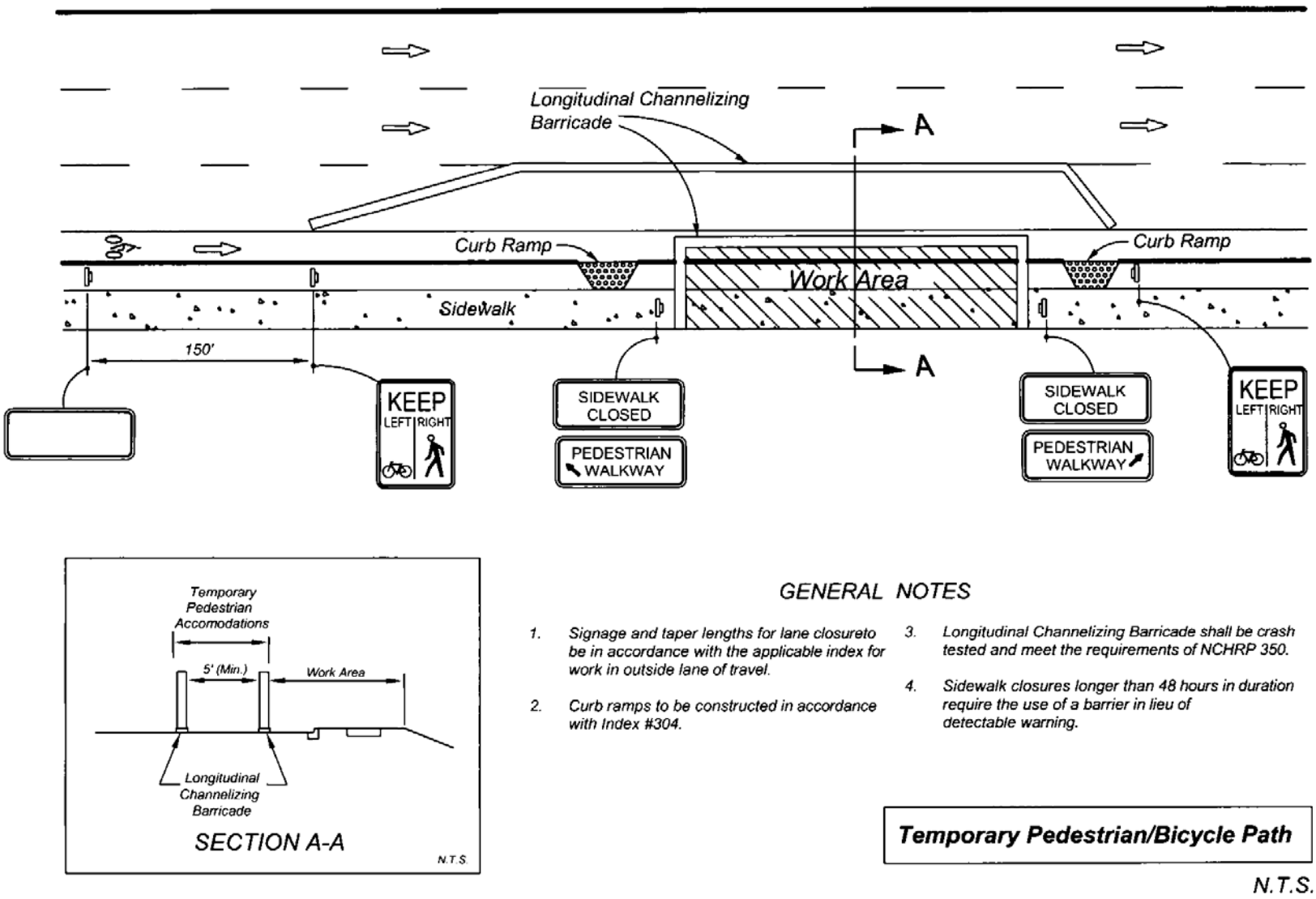
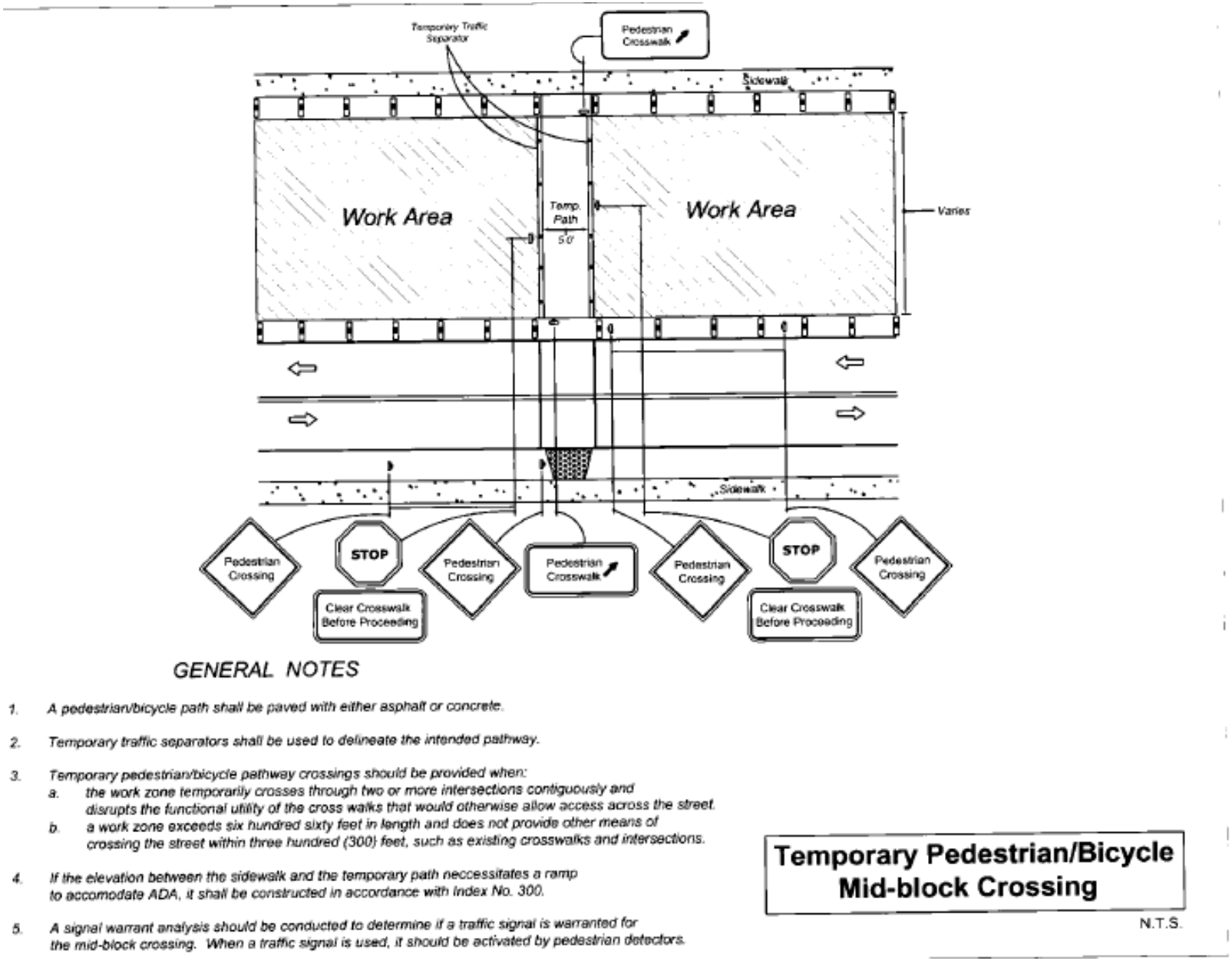


Figure 5.2 Sketch of Temporary Pedestrian/Bicycle Path



GENERAL NOTES

1. A pedestrian/bicycle path shall be paved with either asphalt or concrete.
2. Temporary traffic separators shall be used to delineate the intended pathway.
3. Temporary pedestrian/bicycle pathway crossings should be provided when:
   a. the work zone temporarily crosses through two or more intersections contiguously and disrupts the functional utility of the cross walks that would otherwise allow access across the street.
   b. a work zone exceeds six hundred sixty feet in length and does not provide other means of crossing the street within three hundred (300) feet, such as existing crosswalks and intersections.
4. If the elevation between the sidewalk and the temporary path necessitates a ramp to accomodate ADA, it shall be constructed in accordance with Index No. 300.
5. A signal warrant analysis should be conducted to determine if a traffic signal is warranted for the mid-block crossing. When a traffic signal is used, it should be activated by pedestrian detectors.

Temporary Pedestrian/Bicycle Mid-block Crossing

N.T.S.

Figure 5.3 Sketch of Temporary Pedestrian/Bicycle Mid-block Crossing

Suggested Modifications to Standard Specifications for the Construction of Roads and Bridges

The Florida DOT Plans Preparation Manual states: "where an existing pedestrian way is located within a work zone, it must be maintained."

The Florida Design Standards states the same with the addition that there must be provisions for the disabled.

The Manual of Uniform Traffic Control Devices provides the following guidance:

- Adequate provisions should be made for persons with disabilities as determined by an engineering study. And there are three considerations:
    - Pedestrians should not be led into conflicts with work site vehicles, equipment, and operations;
    - Pedestrians should not be led into conflicts with vehicles moving through or around the work site.
    - Pedestrian should be provided with safe, convenient path that replicates as nearly as practical the most desirable characteristics of the existing sidewalk(s) or a footpath(s).

Taking the above information into account, the following specifications are suggested:

102 – XX Temporary Sidewalk (Pedestrian Pathway)

General: Ensure that all existing pedestrian paths and access to these paths are maintained. When a path or access to a path is disturbed or removed for construction, a temporary path or access path shall be constructed allowing safe passage for pedestrians.

Construction Methods: Construct a path width of five feet minimum with a surface grade not to exceed a five percent slope with a maximum change of grade not to exceed thirteen percent. The path must be constructed of asphalt, concrete or a reusable material approved for temporary pedestrian surface that will maintain the integrity of a smooth, slip resistant, and firm surface, which can withstand loading from a wheel chair without deforming the surface.

Temporary Longitudinal Channelizing Barricades must be placed between the pedestrian path and the work area whenever the distance between the two is less than five feet or the elevation difference between the path and the edge of the work area exceeds two feet.

102 – XZ Temporary Longitudinal Channelizing Barricade

General: Install temporary longitudinal channelizing device in accordance with the plans or Design Standard 6XX.

Material: Temporary longitudinal channelizing device shall be interlocking, without gaps and should conform to the general size, color, stripe pattern, and retroreflection of other channelizing devices described in section 102-11.8.

Additional TCP Suggestions

Continue Public Information Activities

The FDOT is encouraged to continue its project Public Information activities. Accurate and timely reporting of project information is a valuable element in the overall strategy for managing a work zone. The use of resources such as newspapers, radio, television, variable message signs, and other traveler information systems can greatly improve the public's perception and acceptance of necessary detours and alternative routes. The benefits of providing advance public information follow.

- Advance notice might encourage users to seek an alternate route around a project.
- Advance notice might encourage users to travel at off-peak times, or when construction sites are inactive.
- Reduced traffic volumes and increased driver awareness might result in fewer crashes, safer working conditions, and fewer complaints.
- Motorist acceptance might reduce speeding and other aggressive driving behavior in work zones.
- Advance notice might allow abutters and other impacted parties to prepare alternative arrangements and/or ensure that their access needs are considered in the development of traffic management plans.

CHAPTER 6
CONCLUSIONS AND RECOMMENDATIONS

Conclusions

Work zone crashes involving pedestrians and bicyclists were studied in a four year period (1999-2003) for the State of Florida highway system. This number of pedestrians and cyclists work zone crashes represents 0.3% of the total pedestrians and cyclists, non-work zone crashes in Florida.

The most common crash causes reported were:

Motorist	
Driving Outside of Lane	24%
Failure to Yield	19%

Peds/Bike	
Failure to Yield	38%
Driving Wrong Way	15%

Additionally the most common locations at the time of crash were:

Pedestrians	
Crossing Mid Block	34.3%
Walking in Travel Lane	20.2%

Bicyclist	
Riding in Travel Lane	18.2%
Crossing Mid-Block	17.2%

Video observation and analysis of work zones suggest significant at-risk behavior by pedestrians and bicyclists. The following most significant at-risk behaviors were noted:

Pedestrians	
Crossed Through Work Area	35%
Walked on Closed Sidewalk	20%

Bicyclist

Rode Through Work Area	16%
Rode on Closed Sidewalk	39%

The survey conducted with pedestrians and cyclists provided their input on which safety issues are most problematic for pedestrians and cyclists traveling in and around construction work zones. Bicyclists indicated their desire for a clear and continuous path through or around the construction zone that is adequately maintained and free of sudden drops or construction debris, as well as clear signs and advance warning.

The findings of this study suggest that improvements in accommodating pedestrians and bicyclist who travel through work zones may reduce at risk behavior and improve safety. In support of this objective a number of specific modifications to the FDOT TCP design and implementation processes have been suggested.

Recommendations

The objective of this research project has been to better understand the safety needs of pedestrians and cyclists in highway construction work zones, and to develop strategies for improving their safety. The focus has been on safety improvement. However, in recommending changes, the research team acknowledges the reality that recommendations must be considered by the FDOT within the context of its overall mission and operational issues. Nevertheless, safety improvements do not happen without change.

The research team recommends that the FDOT give serious technical review and consideration to the suggestions offered in Chapter 5 of this report. The research team

sees these suggestions as a starting point. Hopefully, with review and input from FDOT professionals, they will be improved and made more successful.

Additional Research Need: Guidance on Transit Stops in Work Zones

During the work on this study the research team found that the management of transit stop issues during construction was a common problem for both FDOT project personnel and for transit agencies. The research team recommends the development of a guide that can be used by transit agencies, TCP designers and construction managers to assist in dealing with transit stop safety issues during construction.

Implementation Activities

The research team is prepared to meet and work with the appropriate FDOT engineering staff in the development of MOT additions and related design criteria. When the FDOT has determined the specific safety measures to be adopted, the following training activities are recommended:

- Development of appropriate MOT design training materials additions to be included in required MOT training courses.
- Development of pedestrians and cyclists awareness information materials to inform pedestrians and cyclists of new MOT issues relating to their safety in work zones.

The research team is prepared to assist in the development of these training resources, when the MOT revisions are determined.

One year after the completion of this project, a joint review of implementation status should be performed jointly by the FDOT functional areas involved in this study.

APPENDIX A
PEDESTRIANS AND CYCLISTS VIDEO DATA COLLECTION TABLES

Date: 24-May-05
Start: 10:19 End: 11:55 Duration: 1:36
Location: Highway 26A - SW 2nd Ave Gainesville, FL

	Pedestrians										
(A) Obs. #	(B) Number of Pedestrians	(C) Walked on sidewalk	(D) Walked inside the work Area	(E) Walked in the vehicular lane	(F) Used the crosswalk to avoid the construction	(G) Used an Uncontrolled or different path to avoid the construction	(H) Explain where	(I) Conflict with motorists (yes = 1)	(J) Explain	(K) obeyed the traffic control devices if any. (yes = 1)	(L) Which Traffic control were present
1	1		1								bc
2	1					1	a				bc
3	1		1								bc
4	1		1								bc
5	1					1	b			1	bc
6	1					1	b			1	bc
7	1		1								bc
8	1		1								bc
9	1		1								bc
10	1		1								bc
11	2	2									bc
12	1					1	a			1	bc
13	1		1								bc
14	2					2	c			1	bc
Total	16	2	8	0	0	6		0 yes		4 yes	
Percent	100.00%	12.50%	50.00%	0.00%	0.00%	37.50%		0.00% %		28.57% %	

AADT	17000
AVERAGE HOURLY TRAFFIC (AHT)	708.3
Pedestrians per hour:	10.00
Pedestrians per hour/ AHT	0.014

Key for Column (H)

a	Crossed the street as he/she approached the work zone
b	Side of the road approached after work zone was passed
c	Used other side of the street (uncontrolled, no sidewalk)
d	Crossed the street midway through the work zone

Summary of Column (H)		
	Total	Percent
a	2	33%
b	2	33%
c	2	33%
d	0	0%
	6	100%

Key for Column (J)

a	Car slowed to avoid hitting pedestrian
b	Pedestrian ran to avoid car
c	Car did not see pedestrian
d	Trapped

Summary of Column (J)		
	Total	Percent
a	0	0%
b	0	0%
c	0	0%
d	0	0%
	0	0%

Key for Column (L)

a	Sidewalk Closed sign
b	Cones
c	Lit Sign
d	Construction Zone sign

Summary of Column (L)		
	Total	Percent
a		0%
b	14	50%
c	14	50%
d		0%
	28	100%

Date: 24-May-05
Start: 12:40 End: 13:51 Duration: 1:11 Page 1 of 1
Location: Highway 226 - SW 16th Ave Gainesville, FL

	Pedestrians										
(A) Obs. #	(B) Number of Pedestrians	(C) Walked on sidewalk	(D) Walked inside the work Area	(E) Walked in the vehicular lane	(F) Used the crosswalk to avoid the construction	(G) Used an Uncontrolled or different path to avoid the	(H) Explain where	(I) Conflict with motorists (yes = 1)	(J) Explain	(K) obeyed the traffic control devices if any. (yes = 1)	(L) Which Traffic control were
1	1				1					1	b
2	2				2					1	b
3	2				2					1	b
4	2				2					1	b
5	2				2					1	b
6	1				1					1	b
7	1		1								b
8	2				2					1	b
9	1		1								b
10	2				2					1	b
11	1		1								b
12	1				1					1	b
13	1		1								b
14	1				1					1	b
15	4				4					1	b
16	1				1					1	b
17	1				1					1	b
18	3				3					1	b
19	1		1								b
20	1				1					1	b
21	1				1					1	b
22	1		1								b
23	1				1					1	b
24	1				1					1	b
25	1				1					1	b
26	1				1					1	b
27	1				1					1	b
28	3				3					1	b
29	1					1	d				b
30	1				1					1	b
31	2				2					1	b
32	1				1					1	b
33	4				4					1	b
34	1				1					1	b
35	2				2					1	b
36	1		1								b
Total	54	0	7	0	46	1		0 yes		28 yes	
Percent	100.00%	0.00%	12.96%	0.00%	85.19%	1.85%		0.00% %		77.78% %	

AADT	22500
AVERAGE HOURLY TRAFFIC (AHT)	937.5
Pedestrians per hour:	45.63
Pedestrians per hour/ AHT	0.049

Key for Column (H)

a	Crossed the street as he/she approached the work zone
b	Side of the road approached after work zone was passed
c	Used other side of the street (uncontrolled, no sidewalk)
d	Crossed the street midway through the work zone

Summary of Column (H)		
	Total	Percent
a	0	0%
b	0	0%
c	0	0%
d	1	100%
	1	100%

Key for Column (J)

a	Car slowed to avoid hitting pedestrian
b	Pedestrian ran to avoid car
c	Car did not see pedestrian
d	Trapped

Summary of Column (J)		
	Total	Percent
a	0	0%
b	0	0%
c	0	0%
d	0	0%
	0	0%

Key for Column (L)

a	Sidewalk Closed sign
b	Cones
c	Lit Sign
d	Construction Zone sign

Summary of Column (L)		
	Total	Percent
a		0%
b	36	100%
c		0%
d		0%
	36	100%

Date: 24-May-05
Start: 13:57 End: 14:37 Duration: 0:40 Page 1 of 1
Location: Highway 226 - SW 16th Ave Gainesville, FL

	Pedestrians										
(A) Obs. #	(B) Number of Pedestrians	(C) Walked on sidewalk	(D) Walked inside the work Area	(E) Walked in the vehicular lane	(F) Used the crosswalk to avoid the construction	(G) Used an Uncontrolled or different path to avoid the construction	(H) Explain where	(I) Conflict with motorists (yes = 1)	(J) Explain	(K) obeyed the traffic control devices if any. (yes = 1)	(L) Which Traffic control were present
1	1				1					1	b
2	3		3								b
3	2					2	d				b
4	1					1	d				b
5	1				1					1	b
6	1					1	a				b
7	2	2									b
8											b
Total	11	2	3	0	2	4		0 yes		2 yes	
Percent	100.00%	18.18%	27.27%	0.00%	18.18%	36.36%		0.00% %		25.00% %	

AADT	22500
AVERAGE HOURLY TRAFFIC (AHT)	937.5
Pedestrians per hour:	16.50
Pedestrians per hour/ AHT	0.018

Key for Column (H)

a	Crossed the street as he/she approached the work zone
b	Side of the road approached after work zone was passed
c	Used other side of the street (uncontrolled, no sidewalk)
d	Crossed the street midway through the work zone

Summary of Column (H)		
	Total	Percent
a	1	25%
b	0	0%
c	0	0%
d	3	75%
	4	100%

Key for Column (J)

a	Car slowed to avoid hitting pedestrian
b	Pedestrian ran to avoid car
c	Car did not see pedestrian
d	Trapped

Summary of Column (J)		
	Total	Percent
a		
b		
c		
d		
	0	0%

Key for Column (L)

a	Sidewalk Closed sign
b	Cones
c	Lit Sign
d	Construction Zone sign

Summary of Column (L)		
	Total	Percent
a		0%
b	8	100%
c		0%
d		0%
	8	100%

Date: 26-May-05
Start: 11:57 End: 13:16 Duration: 1:19
Location: Highway 226 - SW 16th Ave Gainesville, FL

	Pedestrians										
(A) Obs. #	(B) Number of Pedestrians	(C) Walked on sidewalk	(D) Walked inside the work Area	(E) Walked in the vehicular lane	(F) Used the crosswalk to avoid the construction	(G) Used an Uncontrolled or different path to avoid the	(H) Explain where	(I) Conflict with motorists (yes = 1)	(J) Explain	(K) obeyed the traffic control devices if any. (yes = 1)	(L) Which Traffic control were
1	1				1					1	b
2	2				2					1	b
3	1				1					1	b
4	1				1					1	b
5	2				2					1	b
6	2				2					1	b
7	2		2								b
8	2				2					1	b
9	1				1					1	b
10	1				1					1	b
11	1				1					1	b
12	1		1								b
13	2				2					1	b
14	3				3					1	b
15	2		1		1						b
16	1				1					1	b
17	6		1		4	1	a				b
18	1				1					1	b
19	1				1					1	b
20	1					1	d				b
21	1				1					1	b
22	2		1		1						b
23	4		1		3						b
24	2		1		1						b
25	2		1		1						b
26	1				1					1	b
27	4				4					1	b
28	2				2					1	b
29	1				1					1	b
30	2				2					1	b
31	3				3					1	b
32	2				2					1	b
33	3				3					1	b
34	4				3	1	d				b
35	1				1					1	b
36	4				4					1	b
37	5		1		4						b
38	1				1					1	b
39	3				1	2	a				b
40	1					1	d				b
41	1				1					1	b
42	1				1					1	b
43	2				2					1	b
44	6		1		5						b
45	5				5					1	b

Date: 26-May-05
Start: 11:57 End: 13:16 Duration: 1:19
Location: Highway 226 - SW 16th Ave Gainesville, FL

	Pedestrians										
(A) Obs. #	(B) Number of Pedestrians	(C) Walked on sidewalk	(D) Walked inside the work Area	(E) Walked in the vehicular lane	(F) Used the crosswalk to avoid the construction	(G) Used an Uncontrolled or different path to avoid the construction	(H) Explain where	(I) Conflict with motorists (yes = 1)	(J) Explain	(K) obeyed the traffic control devices if any. (yes = 1)	(L) Which Traffic control were present
46	1				1					1	b
47	2	1			1					1	b
48	3		1		2						b
49	1					1	a				b
50	3				3					1	b
51	2				2					1	b
52	4	1			3					1	b
53	2		1		1						b
54	4	2			2					1	b
55	3				3			1	e	1	b
56	1				1					1	b
Total	123	4	13	0	99	7		1 yes		39 yes	
Percent	100.00%	3.25%	10.57%	0.00%	80.49%	5.69%		1.79% %		69.64% %	

AADT	22500
AVERAGE HOURLY TRAFFIC (AHT)	937.5
Pedestrians per hour:	93.42
Pedestrians per hour/ AHT	0.100

Key for Column (H)
- a Crossed the street as he/she approached the work zone
- b Side of the road approached after work zone was passed
- c Used other side of the street (uncontrolled, no sidewalk)
- d Crossed the street midway through the work zone

Summary of Column (H)		
	Total	Percent
a	4	57%
b	0	0%
c	0	0%
d	3	43%
	7	100%

Key for Column (J)
- a Car slowed to avoid hitting pedestrian
- b Pedestrian ran to avoid car
- c Car did not see pedestrian
- d Trapped

Summary of Column (J)		
	Total	Percent
a		
b		
c		
d		
	0	0%

Key for Column (L)
- a Sidewalk Closed sign
- b Cones
- c Lit Sign
- d Construction Zone sign

Summary of Column (L)		
	Total	Percent
a		0%
b	56	100%
c		0%
d		0%
	56	100%

Date: 01-Jun-05
Start: 12:21 End: 14:00 Duration(min): 1:39
Location: Highway 226 - SW 16th Ave Gainesville, FL

	Pedestrians										
(A) Obs. #	(B) Number of Pedestrians	(C) Walked on sidewalk	(D) Walked inside the work Area	(E) Walked in the vehicular lane	(F) Used the crosswalk to avoid the construction	(G) Used an Uncontrolled or different path to avoid the construction	(H) Explain where	(I) Conflict with motorists (yes = 1)	(J) Explain	(K) obeyed the traffic control devices if any. (yes = 1)	(L) Which Traffic control were present
1	1	1								1	b
2	1				1					1	b
3	1				1			1	d	1	b
4	1				1			1	d	1	b
5	1				1					1	b
6	1				1			1	d	1	b
7	1				1					1	b
8	1				1					1	b
9	1				1					1	b
10	1				1					1	b
11	1				1					1	b
12	1				1					1	b
13	1	1								1	b
14	1	1								1	b
15	1				1					1	b
16	1					1	a				b
17	1				1			1		1	b
18	1	1								1	b
19	1				1					1	b
20	1					1	a	1			b
21	2				2					1	b
22	1				1					1	b
23	1				1					1	b
24	1				1			1	d	1	b
25	1	1								1	b
26	2				2			1	d	1	b
27	1	1								1	b
28	1				1			1	d	1	b
29	2				2			1	d	1	b
30	1					1	a				b
31	1				1					1	b
32	1				1					1	b
33	1				1					1	b
34	1				1					1	b
35	1				1					1	b
36	1				1					1	b
37	1				1					1	b
38	2	2								1	b
39	1				1					1	b
40	1				1					1	b
41	1				1					1	b
42	1	1								1	b
43	1				1			1	d	1	b
44	1				1					1	b
45	1				1			1	d	1	b

Date: 26-May-05
Start: 11:57 End: 13:16 Duration: 1:19
Location: Highway 226 - SW 16th Ave Gainesville, FL

	Pedestrians										
(A) Obs. #	(B) Number of Pedestrians	(C) Walked on sidewalk	(D) Walked inside the work Area	(E) Walked in the vehicular lane	(F) Used the crosswalk to avoid the construction	(G) Used an Uncontrolled or different path to avoid the construction	(H) Explain where	(I) Conflict with motorists (yes = 1)	(J) Explain	(K) obeyed the traffic control devices if any. (yes = 1)	(L) Which Traffic control were present
46	1				1					1	b
47	1				1					1	b
48	1				1					1	b
49	1		1								b
50	1				1			1	d	1	b
51	1				1	1	a	1	d		b
52	1							1	d	1	b
53	1				1					1	b
54	1				1					1	b
55	1	1								1	b
56	1				1			1	d	1	b
57	1				1					1	b
58	3				3					1	b
59	2				2					1	b
60	1				1					1	b
61	2				2					1	b
Total	69	10	1	0	54	4		15 yes		56 yes	
Percent	100.00%	14.49%	1.45%	0.00%	78.26%	5.80%		24.59% %		91.80% %	

AADT:	19500
AVERAGE HOURLY TRAFFIC (AHT)	812.5
Pedestrians per hour:	41.82
Pedestrians per hour/ AHT	0.051

Key for Column (H)

a	Crossed the street as he/she approached the work zone
b	Side of the road approached after work zone was passed
c	Used other side of the street (uncontrolled, no sidewalk)
d	Crossed the street midway through the work zone

Summary of Column (H)		
	Total	Percent
a	4	100%
b	0	0%
c	0	0%
d	0	0%
	4	100%

Key for Column (J)

a	Car slowed to avoid hitting pedestrian
b	Pedestrian ran to avoid car
c	Car did not see pedestrian
d	Trapped

Summary of Column (J)		
	Total	Percent
a	0	0%
b	0	0%
c	0	0%
d	13	100%
	13	100%

Key for Column (L)

a	Sidewalk Closed sign
b	Cones
c	Lit Sign
d	Construction Zone sign

Summary of Column (L)		
	Total	Percent
a		0%
b	61	100%
c		0%
d		0%
	61	100%

Date: 01-Jun-05
Start: 15:30 End: 16:30 Duration(min): 1:00 Page 1 of 1
Location: Highway 26A - SW 2nd Ave Gainesville, FL

	Pedestrians										
(A) Obs. #	(B) Number of Pedestrians	(C) Walked on sidewalk	(D) Walked inside the work Area	(E) Walked in the vehicular lane	(F) Used the crosswalk to avoid the construction	(G) Used an Uncontrolled or different path to avoid the construction	(H) Explain where	(I) Conflict with motorists (yes = 1)	(J) Explain	(K) obeyed the traffic control devices if any. (yes = 1)	(L) Which Traffic control were present
1	1		1								abc
2	1					1	b			1	abc
3	1		1								abc
Total	3	0	2	0	0	1		0 yes		1 yes	
Percent	100.00%	0.00%	66.67%	0.00%	0.00%	33.33%		0.00% %		33.33% %	

AADT:	17000
AVERAGE HOURLY TRAFFIC (AHT)	708.3
Pedestrians per hour:	3.00
Pedestrians per hour/ AHT	0.004

Key for Column (H)

a	Crossed the street as he/she approached the work zone
b	Side of the road approached after work zone was passed
c	Used other side of the street (uncontrolled, no sidewalk)
d	Crossed the street midway through the work zone

Summary of Column (H)		
	Total	Percent
a	0	0%
b	1	100%
c	0	0%
d	0	0%
	1	100%

Key for Column (J)

a	Car slowed to avoid hitting pedestrian
b	Pedestrian ran to avoid car
c	Car did not see pedestrian
d	Trapped

Summary of Column (J)		
	Total	Percent
a		
b		
c		
d		
	0	0%

Key for Column (L)

a	Sidewalk Closed sign
b	Cones
c	Lit Sign
d	Construction Zone sign

Summary of Column (L)		
	Total	Percent
a	3	33%
b	3	33%
c	3	33%
d		0%
	9	100%

Date: 07-Jun-05
Start: 13:49 End: 16:42 Duration: 2:53 Page 1 of 1
Location: Highway 226 - SW 16th Ave Gainesville, FL

	Pedestrians										
(A) Obs. #	(B) Number of Pedestrians	(C) Walked on sidewalk	(D) Walked inside the work Area	(E) Walked in the vehicular lane	(F) Used the crosswalk to avoid the construction	(G) Used an Uncontrolled or different path to avoid the construction	(H) Explain where	(I) Conflict with motorists (yes = 1)	(J) Explain	(K) obeyed the traffic control devices if any. (yes = 1)	(L) Which Traffic control were present
1	1				1					1	b
2	1				1					1	b
3	1				1					1	b
4	1				1					1	b
5	2				2					1	b
6	2				2					1	b
7	2		1		1						b
8	1				1					1	b
9	1				1					1	b
10	2				2					1	b
11	1				1					1	b
12	2				2					1	b
13	1				1					1	b
14	1				1					1	b
15	1		1								b
16	2				2					1	b
17	2				2					1	b
18	1				1					1	b
19	2				2					1	b
20	1				1					1	b
21	1		1								b
22	1				1					1	b
23	1		1								b
24	1				1					1	b
25	1				1					1	b
26	2				2					1	b
27	1		1								b
28	1				1					1	b
29	1				1						b
30	1				1						b
31	1				1						b
32	1				1						b
33	3				3						b
34	2				2						b
35	1				1						b
36	1				1						b
37	1				1						b
Total	49	0	5	0	44	0		0	yes	23	yes
Percent	100.00%	0.00%	10.20%	0.00%	89.80%	0.00%		0.00%	%	62.16%	%

AADT:	24500
AVERAGE HOURLY TRAFFIC (AHT)	1020.8
Pedestrians per hour:	16.99
Pedestrians per hour/ AHT	0.017

Key for Column (H)
- a Crossed the street as he/she approached the work zone
- b Side of the road approached after work zone was passed
- c Used other side of the street (uncontrolled, no sidewalk)
- d Crossed the street midway through the work zone

Summary of Column (H)		
	Total	Percent
a		
b		
c		
d		
	0	0%

Key for Column (J)
- a Car slowed to avoid hitting pedestrian
- b Pedestrian ran to avoid car
- c Car did not see pedestrian
- d Trapped

Summary of Column (J)		
	Total	Percent
a		
b		
c		
d		
	0	0%

Key for Column (L)
- a Sidewalk Closed sign
- b Cones
- c Lit Sign
- d Construction Zone sign

Summary of Column (L)		
	Total	Percent
a		0%
b	37	100%
c		0%
d		0%
	37	100%

Date: 07-Jun-05
Start: 14:45 End: 15:37 Duration: 0:52 Page 1 of 1
Location: Highway 226 - SW 16th Ave Gainesville, FL

	Pedestrians										
(A) Obs. #	(B) Number of Pedestrians	(C) Walked on sidewalk	(D) Walked inside the work Area	(E) Walked in the vehicular lane	(F) Used the crosswalk to avoid the construction	(G) Used an Uncontrolled or different path to avoid the construction	(H) Explain where	(I) Conflict with motorists (yes = 1)	(J) Explain	(K) obeyed the traffic control devices if any. (yes = 1)	(L) Which Traffic control were present
1	1		1								b
2	1		1								b
3	1		1								b
4	3		3								b
5	1		1								b
6	3		3								b
7	5		5								b
Total	15	0	15	0	0	0		0 yes		0 yes	
Percent	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%		0.00% %		0.00% %	

AADT	24500
AVERAGE HOURLY TRAFFIC (AHT)	1020.8
Pedestrians per hour:	17.31
Pedestrians per hour/ AHT	0.017

Key for Column (H)

a	Crossed the street as he/she approached the work zone
b	Side of the road approached after work zone was passed
c	Used other side of the street (uncontrolled, no sidewalk)
d	Crossed the street midway through the work zone

Summary of Column (H)		
	Total	Percent
a	0	
b	0	
c	0	
d	0	
	0	0%

Key for Column (J)

a	Car slowed to avoid hitting pedestrian
b	Pedestrian ran to avoid car
c	Car did not see pedestrian
d	Trapped

Summary of Column (J)		
	Total	Percent
a		
b		
c		
d		
	0	0%

Key for Column (L)

a	Sidewalk Closed sign
b	Cones
c	Lit Sign
d	Construction Zone sign

Summary of Column (L)		
	Total	Percent
a		0%
b	7	100%
c		0%
d		0%
	7	100%

Date: 08-Jun-05
Start: 14:38 End: 16:09 Duration: 1:31 Page 1 of 1
Location: Highway 226 - SW 16th Ave Gainesville, FL

	Pedestrians										
(A) Obs. #	(B) Number of Pedestrians	(C) Walked on sidewalk	(D) Walked inside the work Area	(E) Walked in the vehicular lane	(F) Used the crosswalk to avoid the construction	(G) Used an Uncontrolled or different path to avoid the construction	(H) Explain where	(I) Conflict with motorists (yes = 1)	(J) Explain	(K) obeyed the traffic control devices if any. (yes = 1)	(L) Which Traffic control were present
1	1	1								1	bc
2	2	1	1							1	bc
3	1		1								bc
4	1	1								1	bc
5	1		1								bc
6	1	1								1	bc
7	1		1								bc
8	1		1								bc
9	1	1								1	bc
10	1		1								bc
11	1	1								1	bc
12	1		1								bc
13	1	1								1	bc
14	1	1								1	bc
Total	15	8	7	0	0	0		0 yes		8 yes	
Percent	100.00%	53.33%	46.67%	0.00%	0.00%	0.00%		0.00% %		57.14% %	
AADT			22500								
AVERAGE HOURLY TRAFFIC (AHT)			937.5								
Pedestrians per hour:			9.89								
Pedestrians per hour/ AHT			0.011								

Key for Column (H)
- a Crossed the street as he/she approached the work zone
- b Side of the road approached after work zone was passed
- c Used other side of the street (uncontrolled, no sidewalk)
- d Crossed the street midway through the work zone

Summary of Column (H)		
	Total	Percent
a		
b		
c		
d		
	0	0%

Key for Column (J)
- a Car slowed to avoid hitting pedestrian
- b Pedestrian ran to avoid car
- c Car did not see pedestrian
- d Trapped

Summary of Column (J)		
	Total	Percent
a		
b		
c		
d		
	0	0%

Key for Column (L)
- a Sidewalk Closed sign
- b Cones
- c Lit Sign
- d Construction Zone sign

Summary of Column (L)		
	Total	Percent
a		0%
b	14	50%
c	14	50%
d		0%
	28	100%

Date: 07-Jun-05
Start: 10:36 End: 12:12 Duration: 1:36 Page 1 of 1
Location: Highway 226 - SW 16th Ave Gainesville, FL

	Pedestrians										
(A) Obs. #	(B) Number of Pedestrians	(C) Walked on sidewalk	(D) Walked inside the work Area	(E) Walked in the vehicular lane	(F) Used the crosswalk to avoid the construction	(G) Used an Uncontrolled or different path to avoid the construction	(H) Explain where	(I) Conflict with motorists (yes = 1)	(J) Explain	(K) obeyed the traffic control devices if any. (yes = 1)	(L) Which Traffic control were present
1	2				2					1	b
2	1				1					1	b
3	1	1								1	b
4	1				1					1	b
5	1				1					1	b
6	1				1					1	b
7	2				2					1	b
8	2				2					1	b
9	1				1					1	b
10	1				1					1	b
11	1	1								1	b
12	2				2					1	b
13	1				1					1	b
14	1				1					1	b
15	2	2								1	b
16	2				2					1	b
17	1				1					1	b
18	1				1					1	b
19	1				1					1	b
20	1				1					1	b
21	2				2					1	b
22	1		1								b
23	2		1		1						b
24	1				1					1	b
25	3				3					1	b
26	1				1					1	b
27	1		1								b
28	2	1			1					1	b
29	2				2					1	b
30	1	1								1	b
31	8				8					1	b
32	1				1					1	b
33	2				2					1	b
34	4		2		2					1	b
Total	57	6	5	0	46	0		0 yes		31 yes	
Percent	100.00%	10.53%	8.77%	0.00%	80.70%	0.00%		0.00% %		91.18% %	
AADT			22500								
AVERAGE HOURLY TRAFFIC (AHT)			937.5								
Pedestrians per hour:			35.63								
Pedestrians per hour/ AHT			0.038								

Key for Column (H)
- a Crossed the street as he/she approached the work zone
- b Side of the road approached after work zone was passed
- c Used other side of the street (uncontrolled, no sidewalk)
- d Crossed the street midway through the work zone

Summary of Column (H)		
	Total	Percent
a		
b		
c		
d		
	0	0%

Key for Column (J)
- a Car slowed to avoid hitting pedestrian
- b Pedestrian ran to avoid car
- c Car did not see pedestrian
- d Trapped

Summary of Column (J)		
	Total	Percent
a		
b		
c		
d		
	0	0%

Key for Column (L)
- a Sidewalk Closed sign
- b Cones
- c Lit Sign
- d Construction Zone sign

Summary of Column (L)		
	Total	Percent
a		0%
b	34	100%
c		0%
d		0%
	34	100%

Date: 06-Jun-05
Start: 9:12 End: 11:11 Duration: 1:59 Page 1 of 1
Location: Diana and Nebraska - Tampa, FL

	Pedestrians										
(A) Obs. #	(B) Number of Pedestrians	(C) Walked on sidewalk	(D) Walked inside the work Area	(E) Walked in the vehicular lane	(F) Used the crosswalk to avoid the construction	(G) Used an Uncontrolled or different path to avoid the construction	(H) Explain where	(I) Conflict with motorists (yes = 1)	(J) Explain	(K) obeyed the traffic control devices if any. (yes = 1)	(L) Which Traffic control were present
1	1		1					1	a		ab
2	1					1	a				ab
3	1	1								1	ab
4	2	2								1	ab
5	1		1			1	a				ab
6	1										ab
Total	7	3	2	0	0	2		1 yes		2 yes	
Percent	100.00%	42.86%	28.57%	0.00%	0.00%	28.57%		16.67 %		33.33 %	

AADT	17800
AVERAGE HOURLY TRAFFIC (AHT)	741.7
Pedestrians per hour:	3.53
Pedestrians per hour/ AHT	0.005

Key for Column (H)

a	Crossed the street as he/she approached the work zone
b	Side of the road approached after work zone was passed
c	Used other side of the street (uncontrolled, no sidewalk)
d	Crossed the street midway through the work zone

Summary of Column (H)		
	Total	Percent
a	2	100%
b	0	0%
c	0	0%
d	0	0%
	2	100%

Key for Column (J)

a	Car slowed to avoid hitting pedestrian
b	Pedestrian ran to avoid car
c	Car did not see pedestrian
d	Trapped

Summary of Column (J)		
	Total	Percent
a	1	100%
b	0	0%
c	0	0%
d	0	0%
	1	100%

Key for Column (L)

a	Sidewalk Closed sign
b	Cones
c	Lit Sign
d	Construction Zone sign

Summary of Column (L)		
	Total	Percent
a	6	50%
b	6	50%
c	0	0%
d	0	0%
	12	100%

Date: 13-Jun-05
Start: 8:37 End: 11:51 Duration: 3:14
Location: Union St. and Laura St. - Jacksonville, FL

	Pedestrians										
(A) Obs. #	(B) Number of Pedestrians	(C) Walked on sidewalk	(D) Walked inside the work Area	(E) Walked in the vehicular lane	(F) Used the crosswalk to avoid the construction	(G) Used an Uncontrolled or different path to avoid the construction	(H) Explain where	(I) Conflict with motorists (yes = 1)	(J) Explain	(K) obeyed the traffic control devices if any. (yes = 1)	(L) Which Traffic control were present
1	1	1								1	bc
2	1				1					1	bc
3	1					1	d				bc
4	6	2				4	d				bc
5	1				1					1	bc
6	1	1								1	bc
7	2				1	1	d				bc
8	1					1	d				bc
9	6	1			2	3	d				bc
10	1				1					1	bc
11	1	1								1	bc
12	2	1			1					1	bc
13	4	3				1	d				bc
14	1					1	d				bc
15	3				2	1	d				bc
16	2					2	d				bc
17	2	1	1								bc
18	4	1				3	d				bc
19	2	1				1	d				bc
20	2	2								1	bc
21	5	1			2	2	d				bc
22	2					2	d				bc
23	2					2	d				bc
24	3	1				2	d				bc
25	1					1	d				bc
26	1					1	d				bc
27	2					2	d				bc
28	3					3	d				bc
29	2					2	d				bc
30	3	2				1	d				bc
31	7	2				5	d				bc
32	6	1				5	d				bc
33	3					3	d				bc
34	1					1	d				bc
35	2	1	1								bc
36	3	1				2	d				bc
37	4	2				2	d				bc
38	7	4				3	d				bc
39	7	2				5	d				bc
40	1					1	d				bc
41	6	3				3	d				bc
42	6	3				3	d				bc
43	1					1	d				bc
44	2				2					1	bc
45	3				1	2	d				bc

Date: 13-Jun-05
Start: 8:37 End: 11:51 Duration: 3:14
Location: Union St. and Laura St. - Jacksonville, FL

	Pedestrians										
(A) Obs. #	(B) Number of Pedestrians	(C) Walked on sidewalk	(D) Walked inside the work Area	(E) Walked in the vehicular lane	(F) Used the crosswalk to avoid the construction	(G) Used an Uncontrolled or different path to avoid the construction	(H) Explain where	(I) Conflict with motorists (yes = 1)	(J) Explain	(K) obeyed the traffic control devices if any. (yes = 1)	(L) Which Traffic control were present
46	5	2			1	2	d				bc
47	3	2				1	d				bc
48	1	1								1	bc
49	4	1			1	2	d				bc
50	7	2			4	1	d				bc
51	3					3	d				bc
52	6	1			2	3	d				bc
53	1					1	d				bc
54	4	2			2					1	bc
55	7	1				6	d				bc
56	2					2	d				bc
57	3	1				2	d				bc
58	1				1					1	bc
59	1	1								1	bc
60	2					2	d				bc
61	2				1	1	d				bc
62	5	2				3	d				bc
63	1					1	d				bc
64	2	1			1					1	bc
65	3	3								1	bc
66	6	1			4	1	d				bc
67	5				1	4	d				bc
68	4	1			3					1	bc
69	4	1				3	d				bc
70	7	2			1	4	d				bc
71	3					3	d				bc
72	1					1	d				bc
73	2				1	1	d				bc
74	5	2				3	d				bc
75	2				1	1	d				bc
76	5				2	3	d				bc
77	2					2	d				bc
78	1					1	d				bc
79	3	1			1	1	d	1	c		bc
80	3				2	1	d				bc
81	6	2				4	d				bc
82	2					2	d				bc
83	2	2								1	bc
84	2					2	d				bc
85	4					4	d				bc
86	4	1			1	2	d				bc
87	2	1			1					1	bc
88	1	1								1	bc
89	5	3			2					1	bc
90	4					4	d				bc

Date: 13-Jun-05
Start: 8:37 End: 11:51 Duration: 3:14
Location: Union St. and Laura St. - Jacksonville, FL

	Pedestrians										
(A) Obs. #	(B) Number of Pedestrians	(C) Walked on sidewalk	(D) Walked inside the work Area	(E) Walked in the vehicular lane	(F) Used the crosswalk to avoid the construction	(G) Used an Uncontrolled or different path to avoid the construction	(H) Explain where	(I) Conflict with motorists (yes = 1)	(J) Explain	(K) obeyed the traffic control devices if any. (yes = 1)	(L) Which Traffic control were present
91	2	1			1					1	bc
92	2				2					1	bc
93	3	1			2					1	bc
94	5					5	d				bc
95	4	3				1	d				bc
Total	291	81	2	0	52	156		1 yes		23 yes	
Percent	100.00%	27.84%	0.69%	0.00%	17.87%	53.61%		1.05% %		24.21% %	

AADT	27500
AVERAGE HOURLY TRAFFIC (AHT)	1145.8
Pedestrians per hour:	0.31
Pedestrians per hour/ AHT	0.000

Key for Column (H)

a	Crossed the street as he/she approached the work zone
b	Side of the road approached after work zone was passed
c	Used other side of the street (uncontrolled, no sidewalk)
d	Crossed the street midway through the work zone

Summary of Column (H)		
	Total	Percent
a		
b		
c		
d	156	
	156	0%

Key for Column (J)

a	Car slowed to avoid hitting pedestrian
b	Pedestrian ran to avoid car
c	Car did not see pedestrian
d	Trapped

Summary of Column (J)		
	Total	Percent
a	0	0%
b	0	0%
c	1	100%
d	0	0%
	1	100%

Key for Column (L)

a	Sidewalk Closed sign
b	Cones
c	Lit Sign
d	Construction Zone sign

Summary of Column (L)		
	Total	Percent
a		0%
b	95	50%
c	95	50%
d		0%
	190	100%

Date: 13-Jun-05
Start: 13:15 End: 15:50 Duration: 2:35 Page 1 of 1

Location: 1st St. and 2nd Ave S - Jacksonville, FL

	Pedestrians										
(A) Obs. #	(B) Number of Pedestrians	(C) Walked on sidewalk	(D) Walked inside the work Area	(E) Walked in the vehicular lane	(F) Used the crosswalk to avoid the construction	(G) Used an Uncontrolled or different path to avoid the construction	(H) Explain where	(I) Conflict with motorists (yes = 1)	(J) Explain	(K) obeyed the traffic control devices if any. (yes = 1)	(L) Which Traffic control were present
1	1	1								1	bd
2	1	1								1	bd
3	1	1								1	bd
4	3	3								1	bd
5	3	3								1	bd
6	1	1								1	bd
7	2	2								1	bd
8	1	1								1	bd
9	2	2								1	bd
10	2	2								1	bd
11	1		1								bd
Total	18	17	1	0	0	0		0 yes		10 yes	
Percent	100.00%	94.44%	5.56%	0.00%	0.00%	0.00%		0.00% %		90.91% %	
AADT			42000								
AVERAGE HOURLY TRAFFIC (AHT)			1750.0								
Pedestrians per hour:			6.97								
Pedestrians per hour/ AHT			0.004								

Key for Column (H)

a	Crossed the street as he/she approached the work zone
b	Side of the road approached after work zone was passed
c	Used other side of the street (uncontrolled, no sidewalk)
d	Crossed the street midway through the work zone

Summary of Column (H)		
	Total	Percent
a		
b		
c		
d		
	0	0%

Key for Column (J)

a	Car slowed to avoid hitting pedestrian
b	Pedestrian ran to avoid car
c	Car did not see pedestrian
d	Trapped

Summary of Column (J)		
	Total	Percent
a		
b		
c		
d		
	0	0%

Key for Column (L)

a	Sidewalk Closed sign
b	Cones
c	Lit Sign
d	Construction Zone sign

Summary of Column (L)		
	Total	Percent
a		0%
b	11	50%
c		0%
d	11	50%
	22	100%

Date: 14-Jun-05
Start: 10:51 End: 15:14 Duration: 4:23 Page 1 of 1
Location: Highway 226 - SW 16th Ave Gainesville, FL

	Pedestrians										
(A) Obs. #	(B) Number of Pedestrians	(C) Walked on sidewalk	(D) Walked inside the work Area	(E) Walked in the vehicular lane	(F) Used the crosswalk to avoid the construction	(G) Used an Uncontrolled or different path to avoid the construction	(H) Explain where	(I) Conflict with motorists (yes = 1)	(J) Explain	(K) obeyed the traffic control devices if any. (yes = 1)	(L) Which Traffic control were present
1	1		1								b
2	1		1								b
3	2		2								b
4	2		2								b
5	3		3								b
6	4		4					1	d		b
7	1	1								1	b
8	1	1								1	b
9	3	1	2								b
10	2		2								b
11	1		1								b
Total	21	3	18	0	0	0		1 yes		2 yes	
Percent	100.00%	14.29%	85.71%	0.00%	0.00%	0.00%		9.09% %		18.18% %	
AADT			22500								
AVERAGE HOURLY TRAFFIC (AHT)			937.5								
Pedestrians per hour:			4.45								
Pedestrians per hour/ AHT			0.005								

Key for Column (H)
- a Crossed the street as he/she approached the work zone
- b Side of the road approached after work zone was passed
- c Used other side of the street (uncontrolled, no sidewalk)
- d Crossed the street midway through the work zone

Summary of Column (H)		
	Total	Percent
a		
b		
c		
d		
	0	0%

Key for Column (J)
- a Car slowed to avoid hitting pedestrian
- b Pedestrian ran to avoid car
- c Car did not see pedestrian
- d Trapped

Summary of Column (J)		
	Total	Percent
a	0	0%
b	0	0%
c	0	0%
d	1	100%
	1	100%

Key for Column (L)
- a Sidewalk Closed sign
- b Cones
- c Lit Sign
- d Construction Zone sign

Summary of Column (L)		
	Total	Percent
a		0%
b	11	100%
c		0%
d		0%
	11	100%

Date: 16-Jun-05
Start: 10:24 End: 15:18 Duration (n 4:54
Location: Union St. and Laura St. - Jacksonville, FL

	Pedestrians										
(A) Obs. #	(B) Number of Pedestrians	(C) Walked on sidewalk	(D) Walked inside the work Area	(E) Walked in the vehicular lane	(F) Used the crosswalk to avoid the construction	(G) Used an Uncontrolled or different path to avoid the construction	(H) Explain where	(I) Conflict with motorists (yes = 1 ; No = 0)	(J) Explain	(K) obeyed the traffic control devices if any. (yes = 1 ; No = 0)	(L) Which Traffic control were present
1	1	1								1	b c d
2	1				1					1	b c d
3	2				2					1	b c d
4	1				1			1	c	1	b c d
5	1				1					1	b c d
6	1				1					1	b c d
7	1	1								1	b c d
8	2				2					1	b c d
9	1			1							b c d
10	1					1	a				b c d
11	1				1					1	b c d
12	1				1					1	b c d
13	1	1								1	b c d
14	2				2					1	b c d
15	1				1					1	b c d
16	1				1					1	b c d
17	1			1		1	a				b c d
18	2				2			1	a	1	b c d
19	1				1					1	b c d
20	1				1					1	b c d
21	1			1			a				b c d
22	1		1				a				b c d
23	1				1			1	a	1	b c d
24	1				1			1	a	1	b c d
25	1			1							b c d
26	2					2	a				b c d
27	1				1					1	b c d
28	1	1								1	b c d
29	1			1			a				b c d
30	1				1					1	b c d
31	1				1			1	b	1	b c d
32	2				2					1	b c d
33	1	1								1	b c d
34	1	1								1	b c d
35	2				2			1	c	1	b c d
36	1					1	d				b c d
37	1				1					1	b c d
38	1					1	d				b c d
39	1	1								1	b c d
40	1					1	a	1	a		b c d
41	1				1			1	b	1	b c d
42	1	1								1	b c d
43	1					1	d				b c d
44	1					1	d				b c d
45	2	2								1	b c d

Date: 16-Jun-05
Start: 10:24 End: 15:18 Duration : 4:54
Location: Union St. and Laura St. - Jacksonville, FL

	Pedestrians										
(A) Obs. #	(B) Number of Pedestrians	(C) Walked on sidewalk	(D) Walked inside the work Area	(E) Walked in the vehicular lane	(F) Used the crosswalk to avoid the construction	(G) Used an Uncontrolled or different path to avoid the construction	(H) Explain where	(I) Conflict with motorists (yes = 1 ; No = 0)	(J) Explain	(K) obeyed the traffic control devices if any. (yes = 1 ; No = 0)	(L) Which Traffic control were present
46	1	1								1	b c d
47	2				2					1	b c d
48	2					2	b			1	b c d
49	2				2					1	b c d
50	1	1								1	b c d
51	1			1							b c d
52	1					1	b			1	b c d
53	2				2					1	b c d
54	1				1					1	b c d
55	2				2					1	b c d
56	2					2	b			1	b c d
57	1				1					1	b c d
58	1		1								b c d
59	1					1	b			1	b c d
60	1				1					1	b c d
61	1		1								b c d
62	1	1								1	b c d
63	1	1								1	b c d
64	1	1								1	b c d
65	1	1								1	b c d
66	1	1								1	b c d
67	1		1								b c d
68	1				1					1	b c d
69	1		1				d				b c d
70	2					2	b			1	b c d
71	1	1								1	b c d
72	1					1	a				b c d
73	1				1					1	b c d
74	1		1				d				b c d
75	1				1					1	b c d
76	1				1					1	b c d
77	1					1	b			1	b c d
78	1					1	d				b c d
79	1				1					1	b c d
80	1				1					1	b c d
81	1					1	d				b c d
82	2					2	d				b c d
83	1					1	d				b c d
84	1					1	d				b c d
85	2	2								1	b c d
86	1					1	b			1	b c d
87	1					1	d				b c d
88	1	1								1	b c d
89	1					1	d				b c d
90	1				1					1	b c d

Date: 16-Jun-05
Start: 10:24 End: 15:18 Duration : 4:54
Location: Union St. and Laura St. - Jacksonville, FL

	Pedestrians										
(A) Obs. #	(B) Number of Pedestrians	(C) Walked on sidewalk	(D) Walked inside the work Area	(E) Walked in the vehicular lane	(F) Used the crosswalk to avoid the construction	(G) Used an Uncontrolled or different path to avoid the construction	(H) Explain where	(I) Conflict with motorists (yes = 1 ; No = 0)	(J) Explain	(K) obeyed the traffic control devices if any. (yes = 1 ; No = 0)	(L) Which Traffic control were present
91	1					1	b			1	b c d
92	1					1	d				b c d
93	1	1								1	b c d
94	1	1								1	b c d
95	1	1								1	b c d
96	1					1	b	1	b	1	b c d
97	1					1	c			1	b c d
98	1					1	d	1	a		b c d
99	1		1				d				b c d
100	1					1	b			1	b c d
101	1	1								1	b c d
102	2				2			1	a	1	b c d
103	1					1	d	1	a		b c d
104	1	1								1	b c d
105	1				1					1	b c d
106	3				3					1	b c d
107	1					1	d	1	a		b c d
108	2	2								1	b c d
109	2		2				d				b c d
110	2				2					1	b c d
111	1					1	d				b c d
112	1					1	d				b c d
113	2				2			1	b	1	b c d
114	1	1								1	b c d
115	1					1	b			1	b c d
116	1	1								1	b c d
117	1				1					1	b c d
118	1				1					1	b c d
119	1	1								1	b c d
120	1					1	d				b c d
121	1	1								1	b c d
122	1					1	d	1	b		b c d
123	1					1	d				b c d
124	1				1					1	b c d
125	1	1								1	b c d
126	2		2								b c d
127	2	2								1	b c d
128	3	1	1			1	d				b c d
129	1					1	a				b c d
130	1	1								1	b c d
131	1	1								1	b c d
132	1					1	d				b c d
133	1					1	b			1	b c d
134	1				1					1	b c d
135	1					1	d				b c d

Date: 16-Jun-05
Start: 10:24 End: 15:18 Duration : 4:54
Location: Union St. and Laura St. - Jacksonville, FL

	Pedestrians										
(A) Obs. #	(B) Number of Pedestrians	(C) Walked on sidewalk	(D) Walked inside the work Area	(E) Walked in the vehicular lane	(F) Used the crosswalk to avoid the construction	(G) Used an Uncontrolled or different path to avoid the construction	(H) Explain where	(I) Conflict with motorists (yes = 1 ; No = 0)	(J) Explain	(K) obeyed the traffic control devices if any. (yes = 1 ; No = 0)	(L) Which Traffic control were present
136	2					2	b			1	b c d
137	1				1					1	b c d
138	1	1								1	b c d
139	1							1	b	1	b c d
140	2	2								1	b c d
141	1	1								1	b c d
142	1		1				d				b c d
143	1				1					1	b c d
144	1					1	d				b c d
145	1				1					1	b c d
146	2				2					1	b c d
147	2				2					1	b c d
148	1	1								1	b c d
149	1		1				d				b c d
150	1	1								1	b c d
151	1					1	d				b c d
152	1					1	a				b c d
153	1	1								1	b c d
154	3					3	a				b c d
155	1	1								1	b c d
156	1	1								1	b c d
157	1	1								1	b c d
158	1	1								1	b c d
159	1	1								1	b c d
160	1	1					d	1	a		b d
161	1				1					1	b d
162	1	1								1	b
163	1					1	d				b
164	1					1	d				b
165	2	2								1	b
166	2	2								1	b
167	1	1								1	b
168	1				1					1	b
169	2	2								1	b
170	1	1								1	b
171	1					1	c			1	b
172	3	3								1	b
173	1					1	a				b
Total	212	63	14	6	70	59		17		120	
Percent	1	0.297169811	0.066037736	0.028302	0.330188679	0.278301887		0.080188679		0.693641618	

AADT	27500
AVERAGE HOURLY TRAFFIC (AHT)	1145.8
Pedestrians per hour:	0.20
Pedestrians per hour/ AHT	0.000

Key for Column (H)
- a Crossed the street as he/she approached the work zone
- b Side of the road approached after work zone was passed
- c Used other side of the street (uncontrolled, no sidewalk)
- d Crossed the street midway through the work zone

Summary of Column (H)		
	Total	Percent
a	15	21%
b	17	24%
c	2	3%
d	38	53%
	72	100%

Key for Column (J)
- a Car slowed to avoid hitting pedestrian
- b Pedestrian ran to avoid car
- c Car did not see pedestrian
- d Trapped

Summary of Column (J)		
	Total	Percent
a	9	53%
b	6	35%
c	2	12%
d	0	0%
	17	100%

Key for Column (L)
- a Sidewalk Closed sign
- b Cones
- c Lit Sign
- d Construction Zone sign

Summary of Column (L)		
	Total	Percent
a	0	0%
b	173	35%
c	159	32%
d	161	33%
	493	100%

Date: 16-Jun-05
Start: 10:00 End: 12:22 Duration: 2:22 Page 1 of 1
Location: SW corner of Curry Ford Rd. and Semoran Blvd. - Orlando, FL

	Pedestrians										
(A) Obs. #	(B) Number of Pedestrians	(C) Walked on sidewalk	(D) Walked inside the work Area	(E) Walked in the vehicular lane	(F) Used the crosswalk to avoid the construction	(G) Used an Uncontrolled or different path to avoid the construction	(H) Explain where	(I) Conflict with motorists (yes = 1 ; No = 0)	(J) Explain	(K) obeyed the traffic control devices if any. (yes = 1 ; No = 0)	(L) Which Traffic control were present
1	1					1	d	1	b		b
2	2		2								b
3	2					2	d				b
4	1					1	d	1	d		b
5	2					2	d	1	d		b
6	2					2	d	1	b		b
7	1		1								b
8	1					1	d	1	d		b
9	1					1	d				b
10	1					1	d				b
11	1					1	d	1	a		b
12	2					2	d	1	b		b
13	1					1	d	1	d		b
14	1					1	d				b
15	1					1	d	1	d		b
16	2		2								b
17	1					1	d				b
18	1		1								b
19	1	1								1	b
20	3					3	d				b
21	3					3	d	1	b		b
22	1					1	d	1	b		b
23	1					1	d				b
24	1					1	d	1	d		b
25	2					2	d	1	d		b
26	1					1	d	1	d		b
27	1					1	d	1	d		b
28	1					1	d	1	b		b
29	1					1	d	1	b		b
30	3					3	d	1	d		b
31	1					1	d				b
32	1		1								b
33	1					1	d				b
34	1	1								1	b
35	1	1								1	b
36	2	2								1	b
37	2	2								1	b
38	3	3								1	b
39	1					1	d				b
40	1					1	d				b
41	1					1	d	1	b		b
42	1					1	d				b
Total	59	10	7	0	0	42		19		6	
Percent	100.00%	16.95%	11.86%	0.00%	0.00%	71.19%		45.24%		14.29%	
AADT			50500								
AVERAGE HOURLY TRAFFIC (AHT)			2104.2								
Pedestrians per hour:			26.82								
Pedestrians per hour/ AHT			0.013								

Key for Column (H)
- a Crossed the street as he/she approached the work zone
- b Side of the road approached after work zone was passed
- c Used other side of the street (uncontrolled, no sidewalk)
- d Crossed the street midway through the work zone

Summary of Column (H)		
	Total	Percent
a	0	0%
b	0	0%
c	0	0%
d	42	100%
	42	100%

Key for Column (J)
- a Car slowed to avoid hitting pedestrian
- b Pedestrian ran to avoid car
- c Car did not see pedestrian
- d Trapped

Summary of Column (J)		
	Total	Percent
a	1	5%
b	8	42%
c	0	0%
d	10	53%
	19	100%

Key for Column (L)
- a Sidewalk Closed sign
- b Cones
- c Lit Sign
- d Construction Zone sign

Summary of Column (L)		
	Total	Percent
a	0	0%
b	42	100%
c	0	0%
d	0	0%
	42	100%

Date: 23-Jun-05
Start: 15:03 End: 15:23 Duration: 0:20 Page 1 of 1
Location: Newberry Road near the I75 ramp - Gainesville, FL

	Pedestrians										
(A) Obs. #	(B) Number of Pedestrians	(C) Walked on sidewalk	(D) Walked inside the work Area	(E) Walked in the vehicular lane	(F) Used the crosswalk to avoid the construction	(G) Used an Uncontrolled or different path to avoid the construction	(H) Explain where	(I) Conflict with motorists (yes = 1 ; No = 0)	(J) Explain	(K) obeyed the traffic control devices if any. (yes = 1 ; No = 0)	(L) Which Traffic control were present
1	1					1	d	1	d		
2	1	1									
3	2					2	d	1	d		
4	1	1									
5	1					1	d	1	b		
Total	6	2	0	0	0	4		3		0	
Percent	100.00%	33.33%	0.00%	0.00%	0.00%	66.67%		60.00%		0.00%	
AADT			51500								
AVERAGE HOURLY TRAFFIC (AHT)			2145.8								
Pedestrians per hour:			0.30								
Pedestrians per hour/ AHT			0.000								

Key for Column (H)
- a Crossed the street as he/she approached the work zone
- b Side of the road approached after work zone was passed
- c Used other side of the street (uncontrolled, no sidewalk)
- d Crossed the street midway through the work zone

Summary of Column (H)		
	Total	Percent
a	0	0%
b	0	0%
c	0	0%
d	4	100%
	4	100%

Key for Column (J)
- a Car slowed to avoid hitting pedestrian
- b Pedestrian ran to avoid car
- c Car did not see pedestrian
- d Trapped

Summary of Column (J)		
	Total	Percent
a	0	0%
b	1	33%
c	0	0%
d	2	67%
	3	100%

Key for Column (L)
- a Sidewalk Closed sign
- b Cones
- c Lit Sign
- d Construction Zone sign

Summary of Column (L)		
	Total	Percent
a		
b		
c		
d		
	0	0%

Date: 28-Jun-05
Start: 10:23 End: 11:40 Duration: 1:17 Page 1 of 1
Location: NE corner of Curry Ford Rd. and Semoran Blvd. - Orlando, FL

	Pedestrians										
(A) Obs. #	(B) Number of Pedestrians	(C) Walked on sidewalk	(D) Walked inside the work Area	(E) Walked in the vehicular lane	(F) Used the crosswalk to avoid the construction	(G) Used an Uncontrolled or different path to avoid the construction	(H) Explain where	(I) Conflict with motorists (yes = 1 ; No = 0)	(J) Explain	(K) obeyed the traffic control devices if any. (yes = 1 ; No = 0)	(L) Which Traffic control were present
1	2				2					1	b
2	3	3								1	b
3	1		1								b
4	1	1								1	b
5	1				1					1	b
6	1					1	d				b
7	1				1					1	b
8	1		1								b
9	2		2								b
10	1				1					1	b
Total	14	4	4	0	5	1		0		6	
Percent	100.00%	28.57%	28.57%	0.00%	35.71%	7.14%		0.00%		60.00%	

AADT	50500
AVERAGE HOURLY TRAFFIC (AHT)	2104.2
Pedestrians per hour:	10.91
Pedestrians per hour/ AHT	0.005

Key for Column (H)

a	Crossed the street as he/she approached the work zone
b	Side of the road approached after work zone was passed
c	Used other side of the street (uncontrolled, no sidewalk)
d	Crossed the street midway through the work zone

Summary of Column (H)		
	Total	Percent
a	0	0%
b	0	0%
c	0	0%
d	1	100%
	1	100%

Key for Column (J)

a	Car slowed to avoid hitting pedestrian
b	Pedestrian ran to avoid car
c	Car did not see pedestrian
d	Trapped

Summary of Column (J)		
	Total	Percent
a		
b		
c		
d		
	0	0%

Key for Column (L)

a	Sidewalk Closed sign
b	Cones
c	Lit Sign
d	Construction Zone sign

Summary of Column (L)		
	Total	Percent
a		0%
b	10	100%
c		0%
d		0%
	10	100%

Date: 28-Jun-05
Start: 11:49 End: 12:45 Duration: 0:56 Page 1 of 1
Location: NE corner of Curry Ford Rd. and Semoran Blvd. - Orlando, FL

	Pedestrians										
(A) Obs. #	(B) Number of Pedestrians	(C) Walked on sidewalk	(D) Walked inside the work Area	(E) Walked in the vehicular lane	(F) Used the crosswalk to avoid the construction	(G) Used an Uncontrolled or different path to avoid the construction	(H) Explain where	(I) Conflict with motorists (yes = 1 ; No = 0)	(J) Explain	(K) obeyed the traffic control devices if any. (yes = 1 ; No = 0)	(L) Which Traffic control were present
1	1				1					1	b
2	2					2	d				b
3	2					2	d				b
4	1	1								1	b
5	1					1	d				b
6	1				1			1	d	1	b
7	1				1			1	d	1	b
8	1					1	d				b
9	1	1								1	b
10	1				1					1	b
Total	12	2	0	0	4	6		2		6	
Percent	100.00%	16.67%	0.00%	0.00%	33.33%	50.00%		20.00%		60.00%	

AADT	50500
AVERAGE HOURLY TRAFFIC (AHT)	2104.2
Pedestrians per hour:	12.86
Pedestrians per hour/ AHT	0.006

Key for Column (H)

a	Crossed the street as he/she approached the work zone
b	Side of the road approached after work zone was passed
c	Used other side of the street (uncontrolled, no sidewalk)
d	Crossed the street midway through the work zone

Summary of Column (H)		
	Total	Percent
a	0	0%
b	0	0%
c	0	0%
d	6	100%
	6	100%

Key for Column (J)

a	Car slowed to avoid hitting pedestrian
b	Pedestrian ran to avoid car
c	Car did not see pedestrian
d	Trapped

Summary of Column (J)		
	Total	Percent
a	0	0%
b	2	100%
c	0	0%
d	0	0%
	2	100%

Key for Column (L)

a	Sidewalk Closed sign
b	Cones
c	Lit Sign
d	Construction Zone sign

Summary of Column (L)		
	Total	Percent
a		0%
b	10	100%
c		0%
d		0%
	10	100%

Video Data Collection Summary Table Columns H, J and L
Pedestrians

Description				Totals of Column H				Totals of Column J				Totals of Column L			
Location	Date	Start time	Stop Time	a Crossed the street as he/she approached the work zone	b Side of the road approached after Work Zone was passed	c Used other side of the street	d Crossed the street midway through the work zone	a Car slowed to avoid hitting pedestrian	b Pedestrian ran to avoid car	c Car did not see pedestrian	d Trapped	a Sidewalk Closed sign	b Cones	c Lit Sign	d Construction Zone sign
Highway 26A - SW 2nd Ave Gainesville, FL	5/24/05	10:19	11:55	2	2	2	0	0	0	0	0	0	14	14	0
Highway 226 - SW 16th Ave Gainesville, FL	5/24/05	12:40	13:51	0	0	0	1	0	0	0	0	0	36	0	0
Highway 226 - SW 16th Ave Gainesville, FL	5/24/05	13:57	14:37	1	0	0	3	0	0	0	0	0	8	0	0
Highway 226 - SW 16th Ave Gainesville, FL	5/26/05	11:57	13:16	4	0	0	3	0	0	0	0	0	56	0	0
Highway 226 - SW 16th Ave Gainesville, FL	6/1/05	12:21	14:00	4	0	0	0	0	0	0	13	0	61	0	0
Highway 26A - SW 2nd Ave Gainesville, FL	6/1/05	15:30	16:30	0	1	0	0	0	0	0	0	3	3	3	0
Highway 226 - SW 16th Ave Gainesville, FL	6/7/05	13:49	16:42	0	0	0	0	0	0	0	0	0	37	0	0
Highway 226 - SW 16th Ave Gainesville, FL	6/7/05	14:45	15:37	0	0	0	0	0	0	0	0	0	7	0	0
Highway 226 - SW 16th Ave Gainesville, FL	6/8/05	14:38	16:09	0	0	0	0	0	0	0	0	0	14	14	0
Highway 226 - SW 16th Ave Gainesville, FL	6/7/05	10:36	12:12	0	0	0	0	0	0	0	0	0	34	0	0
Diana and Nebraska - Tampa, FL	6/6/05	9:12	11:11	2	0	0	0	1	0	0	0	6	6	0	0
Union St. and Laura St. - Jacksonville, FL	6/13/05	8:37	11:51	0	0	0	156	0	0	1	0	0	95	95	0
1st St. and 2nd Ave S - Jacksonville, FL	6/13/05	13:15	15:50	0	0	0	0	0	0	0	0	0	11	0	11
Highway 226 - SW 16th Ave Gainesville, FL	6/14/05	10:51	15:14	0	0	0	0	0	0	0	1	0	11	0	0
Union St. and Laura St. - Jacksonville, FL	6/16/05	10:24	15:18	15	17	2	38	9	6	2	0	0	173	159	161
SW corner of Curry Ford Rd. and Semoran Blvd. - Orlando, FL	6/16/05	10:00	12:22	0	0	0	42	1	8	0	10	0	42	0	0
Newberry Road near the I75 ramp - Gainesville, FL	6/23/05	15:03	15:23	0	0	0	4	0	1	0	2	0	0	0	0
NE corner of Curry Ford Rd. and Semoran Blvd. - Orlando, FL	6/28/05	10:23	11:40	0	0	0	1	0	0	0	0	0	10	0	0
NE corner of Curry Ford Rd. and Semoran Blvd. - Orlando, FL	6/28/05	11:49	12:45	0	0	0	6	0	2	0	0	0	10	0	0
TOTALS	-	-	-	28	20	4	254	11	17	3	26	9	628	285	172

Video Data Collection Summary Table Columns H, J and L
Pedestrians

Description				% of Column H				% of Column J				% of Column L			
Location	Date	Start time	Stop Time	a Crossed the street as he/she approached the work zone	b Side of the road approached after Work Zone was passed	c Used other side of the street	d Crossed the street midway through the work zone	a Car slowed to avoid hitting pedestrian	b Pedestrian ran to avoid car	c Car did not see pedestrian	d Trapped	a Sidewalk Closed sign	b Cones	c Lit Sign	d Construction Zone sign
Highway 26A - SW 2nd Ave Gainesville, FL	5/24/05	10:19	11:55	33%	33%	0%	0%	0%	0%	0%	0%	0%	50%	50%	0%
Highway 226 - SW 16th Ave Gainesville, FL	5/24/05	12:40	13:51	0%	0%	0%	100%	0%	0%	0%	0%	0%	100%	0%	0%
Highway 226 - SW 16th Ave Gainesville, FL	5/24/05	13:57	14:37	25%	0%	0%	75%	0%	0%	0%	0%	0%	100%	0%	0%
Highway 226 - SW 16th Ave Gainesville, FL	5/26/05	11:57	13:16	57%	0%	0%	43%	0%	0%	0%	0%	0%	100%	0%	0%
Highway 226 - SW 16th Ave Gainesville, FL	6/1/05	12:21	14:00	100%	0%	0%	0%	0%	0%	0%	100%	0%	100%	0%	0%
Highway 26A - SW 2nd Ave Gainesville, FL	6/1/05	15:30	16:30	0%	100%	0%	0%	0%	0%	0%	0%	33%	33%	33%	0%
Highway 226 - SW 16th Ave Gainesville, FL	6/7/05	13:49	16:42	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%
Highway 226 - SW 16th Ave Gainesville, FL	6/7/05	14:45	15:37	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%
Highway 226 - SW 16th Ave Gainesville, FL	6/8/05	14:38	16:09	0%	0%	0%	0%	0%	0%	0%	0%	0%	50%	50%	0%
Highway 226 - SW 16th Ave Gainesville, FL	6/7/05	10:36	12:12	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%
Diana and Nebraska - Tampa, FL	6/6/05	9:12	11:11	100%	0%	0%	0%	100%	0%	0%	0%	50%	50%	0%	0%
Union St. and Laura St. - Jacksonville, FL	6/13/05	8:37	11:51	0%	0%	0%	0%	0%	0%	100%	0%	0%	50%	50%	0%
1st St. and 2nd Ave S - Jacksonville, FL	6/13/05	13:15	15:50	0%	0%	0%	0%	0%	0%	0%	0%	0%	50%	0%	50%
Highway 226 - SW 16th Ave Gainesville, FL	6/14/05	10:51	15:14	0%	0%	0%	0%	0%	0%	0%	100%	0%	100%	0%	0%
Union St. and Laura St. - Jacksonville, FL	6/16/05	10:24	15:18	21%	24%	3%	53%	53%	35%	12%	0%	0%	35%	32%	33%
SW corner of Curry Ford Rd. and Semoran Blvd. - Orlando, FL	6/16/05	10:00	12:22	0%	0%	0%	100%	5%	42%	0%	53%	0%	100%	0%	0%
Newberry Road near the I75 ramp - Gainesville, FL	6/23/05	15:03	15:23	0%	0%	0%	100%	0%	33%	0%	67%	0%	0%	0%	0%
NE corner of Curry Ford Rd. and Semoran Blvd. - Orlando, FL	6/28/05	10:23	11:40	0%	0%	0%	100%	0%	0%	0%	0%	0%	100%	0%	0%
NE corner of Curry Ford Rd. and Semoran Blvd. - Orlando, FL	6/28/05	11:49	12:45	0%	0%	0%	100%	0%	100%	0%	0%	0%	100%	0%	0%
TOTALS	-	-	-	9%	7%	1%	83%	19%	30%	5%	46%	1%	57%	26%	16%

Video Data Collection Summary Table
Pedestrians

Description					Count								
Location	Date	Start time	Stop Time	Duration	(A) Obs. #	(B) Number of Pedestrians	(C) Walked on sidewalk	(D) Walked inside the work Area	(E) Walked in the vehicular lane	(F) Used the crosswalk to avoid the construction	(G) Used an Uncontrolled or different path to avoid the construction	(I) Conflict with motorists (yes = 1)	(K) obeyed the traffic control devices if any. (yes = 1)
Highway 26A - SW 2nd Ave Gainesville, FL	24-May-05	10:19	11:55	1:36	14	16	2	8	0	0	6	0	4
Highway 226 - SW 16th Ave Gainesville, FL	24-May-05	12:40	13:51	1:11	36	54	0	7	0	46	1	0	28
Highway 226 - SW 16th Ave Gainesville, FL	24-May-05	13:57	14:37	0:40	8	11	2	3	0	2	4	0	2
Highway 226 - SW 16th Ave Gainesville, FL	26-May-05	11:57	13:16	1:19	56	123	4	13	0	99	7	7	1
Highway 226 - SW 16th Ave Gainesville, FL	01-Jun-05	12:21	14:00	1:39	61	69	10	1	0	54	4	15	56
Highway 26A - SW 2nd Ave Gainesville, FL	01-Jun-05	15:30	16:30	1:00	3	3	0	2	0	0	1	0	1
Highway 226 - SW 16th Ave Gainesville, FL	07-Jun-05	13:49	16:42	2:53	37	49	0	5	0	44	0	0	23
Highway 226 - SW 16th Ave Gainesville, FL	07-Jun-05	14:45	15:37	0:52	7	15	0	15	0	0	0	0	0
Highway 226 - SW 16th Ave Gainesville, FL	08-Jun-05	14:38	16:09	1:31	14	15	8	7	0	0	0	0	8
Highway 226 - SW 16th Ave Gainesville, FL	07-Jun-05	10:36	12:12	1:36	34	57	6	5	0	46	0	0	31
Diana and Nebraska - Tampa, FL	06-Jun-05	9:12	11:11	1:59	6	7	3	2	0	0	2	1	2
Union St. and Laura St. - Jacksonville, FL	13-Jun-05	8:37	11:51	3:14	95	291	81	2	0	52	156	1	23
1st St. and 2nd Ave S - Jacksonville, FL	13-Jun-05	13:15	15:50	2:35	11	18	17	1	0	0	0	0	10
Highway 226 - SW 16th Ave Gainesville, FL	14-Jun-05	10:51	15:14	4:23	11	21	3	18	0	0	0	1	2
Union St. and Laura St. - Jacksonville, FL	16-Jun-05	10:24	15:18	4:54	173	212	63	14	6	70	59	17	120
SW corner of Curry Ford Rd. and Semoran Blvd. -	16-Jun-05	10:00	12:22	2:22	42	59	10	7	0	0	42	19	6
Newberry Road near the I75 ramp - Gainesville,	23-Jun-05	15:03	15:23	0:20	5	6	2	0	0	0	4	3	0
NE corner of Curry Ford Rd. and Semoran Blvd. -	28-Jun-05	10:23	11:40	1:17	10	14	4	4	0	5	1	0	6
NE corner of Curry Ford Rd. and Semoran Blvd. -	28-Jun-05	11:49	12:45	0:56	10	12	2	0	0	4	6	2	6
TOTALS	-	-	-	36:17:00	633	1052	217	114	6	422	293	66	329
MEAN	-	-	-	-	-	-	-	-	-	-	-	-	-

Video Data Collection Summary Table
Pedestrians

Description					%						
Location	Date	Start time	Stop Time	Duration	(C) Walked on sidewalk	(D) Walked inside the work Area	(E) Walked in the vehicular lane	(F) Used the crosswalk to avoid the construction	(G) Used an Uncontrolled or different path to avoid the construction	(I) Conflict with motorists (yes = 1)	(K) obeyed the traffic control devices if any. (yes = 1)
Highway 26A - SW 2nd Ave Gainesville, FL	24-May-05	10:19	11:55	1:36	12.50%	50.00%	0.00%	0.00%	37.50%	0.00%	28.57%
Highway 226 - SW 16th Ave Gainesville, FL	24-May-05	12:40	13:51	1:11	0.00%	12.96%	0.00%	85.19%	1.85%	0.00%	77.78%
Highway 226 - SW 16th Ave Gainesville, FL	24-May-05	13:57	14:37	0:40	18.18%	27.27%	0.00%	18.18%	36.36%	0.00%	25.00%
Highway 226 - SW 16th Ave Gainesville, FL	26-May-05	11:57	13:16	1:19	3.25%	10.57%	0.00%	80.49%	5.69%	5.69%	1.79%
Highway 226 - SW 16th Ave Gainesville, FL	01-Jun-05	12:21	14:00	1:39	14.49%	1.45%	0.00%	78.26%	5.80%	24.59%	91.80%
Highway 26A - SW 2nd Ave Gainesville, FL	01-Jun-05	15:30	16:30	1:00	0.00%	66.67%	0.00%	0.00%	33.33%	0.00%	33.33%
Highway 226 - SW 16th Ave Gainesville, FL	07-Jun-05	13:49	16:42	2:53	0.00%	10.20%	0.00%	89.80%	0.00%	0.00%	0.00%
Highway 226 - SW 16th Ave Gainesville, FL	07-Jun-05	14:45	15:37	0:52	0.00%	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Highway 226 - SW 16th Ave Gainesville, FL	08-Jun-05	14:38	16:09	1:31	53.33%	46.67%	0.00%	0.00%	0.00%	0.00%	57.14%
Highway 226 - SW 16th Ave Gainesville, FL	07-Jun-05	10:36	12:12	1:36	10.53%	8.77%	0.00%	80.70%	0.00%	0.00%	91.18%
Diana and Nebraska - Tampa, FL	06-Jun-05	9:12	11:11	1:59	42.86%	28.57%	0.00%	0.00%	28.57%	16.67%	33.33%
Union St. and Laura St. - Jacksonville, FL	13-Jun-05	8:37	11:51	3:14	27.84%	0.69%	0.00%	17.87%	53.61%	1.05%	24.21%
1st St. and 2nd Ave S - Jacksonville, FL	13-Jun-05	13:15	15:50	2:35	94.44%	5.56%	0.00%	0.00%	0.00%	0.00%	90.91%
Highway 226 - SW 16th Ave Gainesville, FL	14-Jun-05	10:51	15:14	4:23	14.29%	85.71%	0.00%	0.00%	0.00%	9.09%	18.18%
Union St. and Laura St. - Jacksonville, FL	16-Jun-05	10:24	15:18	4:54	29.72%	6.60%	2.83%	33.02%	27.83%	8.02%	69.36%
SW corner of Curry Ford Rd. and Semoran Blvd. -	16-Jun-05	10:00	12:22	2:22	16.95%	11.86%	0.00%	0.00%	71.19%	45.24%	14.29%
Newberry Road near the I75 ramp - Gainesville,	23-Jun-05	15:03	15:23	0:20	33.33%	0.00%	0.00%	0.00%	66.67%	60.00%	0.00%
NE corner of Curry Ford Rd. and Semoran Blvd. -	28-Jun-05	10:23	11:40	1:17	28.57%	28.57%	0.00%	35.71%	7.14%	0.00%	60.00%
NE corner of Curry Ford Rd. and Semoran Blvd. -	28-Jun-05	11:49	12:45	0:56	16.67%	0.00%	0.00%	33.33%	50.00%	20.00%	60.00%
TOTALS	-	-	-	36:17:00	20.63%	10.84%	0.57%	40.11%	27.85%	10.43%	51.97%
MEAN	-	-	-	-	-	-	-	-	-	-	-

Video Data Collection Summary Table
Pedestrians

Description					Traffic/Volume Information			
Location	Date	Start time	Stop Time	Duration	AADT	Average Hourly Traffic	Pedestrians per Hour	Pedestrians per Hour/Average Hourly Traffic (Ratio)
Highway 26A - SW 2nd Ave Gainesville, FL	24-May-05	10:19	11:55	1:36	17000	708.3	10.00	1.412%
Highway 226 - SW 16th Ave Gainesville, FL	24-May-05	12:40	13:51	1:11	22500	937.5	45.63	4.868%
Highway 226 - SW 16th Ave Gainesville, FL	24-May-05	13:57	14:37	0:40	22500	937.5	16.50	1.760%
Highway 226 - SW 16th Ave Gainesville, FL	26-May-05	11:57	13:16	1:19	22500	937.5	93.42	9.965%
Highway 226 - SW 16th Ave Gainesville, FL	01-Jun-05	12:21	14:00	1:39	19500	812.5	41.82	5.147%
Highway 26A - SW 2nd Ave Gainesville, FL	01-Jun-05	15:30	16:30	1:00	17000	708.3	3.00	0.424%
Highway 226 - SW 16th Ave Gainesville, FL	07-Jun-05	13:49	16:42	2:53	24500	1020.8	16.99	1.665%
Highway 226 - SW 16th Ave Gainesville, FL	07-Jun-05	14:45	15:37	0:52	24500	1020.8	17.31	1.695%
Highway 226 - SW 16th Ave Gainesville, FL	08-Jun-05	14:38	16:09	1:31	22500	937.5	9.89	1.055%
Highway 226 - SW 16th Ave Gainesville, FL	07-Jun-05	10:36	12:12	1:36	22500	937.5	35.63	3.800%
Diana and Nebraska - Tampa, FL	06-Jun-05	9:12	11:11	1:59	17800	741.7	3.53	0.476%
Union St. and Laura St. - Jacksonville, FL	13-Jun-05	8:37	11:51	3:14	27500	1145.8	90.00	7.855%
1st St. and 2nd Ave S - Jacksonville, FL	13-Jun-05	13:15	15:50	2:35	42000	1750.0	6.97	0.398%
Highway 226 - SW 16th Ave Gainesville, FL	14-Jun-05	10:51	15:14	4:23	22500	937.5	4.45	0.475%
Union St. and Laura St. - Jacksonville, FL	16-Jun-05	10:24	15:18	4:54	27500	1145.8	43.27	3.776%
SW corner of Curry Ford Rd. and Semoran Blvd. -	16-Jun-05	10:00	12:22	2:22	50500	2104.2	26.82	1.275%
Newberry Road near the I75 ramp - Gainesville,	23-Jun-05	15:03	15:23	0:20	51500	2145.8	0.30	0.014%
NE corner of Curry Ford Rd. and Semoran Blvd. -	28-Jun-05	10:23	11:40	1:17	50500	2104.2	10.91	0.518%
NE corner of Curry Ford Rd. and Semoran Blvd. -	28-Jun-05	11:49	12:45	0:56	50500	2104.2	12.86	0.611%
TOTALS	-	-	-	36:17:00	-	-	-	-
MEAN	-	-	-	-	29226.32	1217.7632	25.75188949	2.115%

Date: 24-May-05
Start: 10:19 End: 11:55 Duration: 1:36 Page 1 of 1
Location: Highway 26A - SW 2nd Ave. Gainesville, FL

	Bicyclists										
(A) Obs. #	(B) Number of bicyclists	(C) Rode on sidewalk	(D) Rode Inside the work Area	(E) Rode in the vehicular lane	(F) Used the crosswalk to avoid the construction	(G) Used an Uncontrolled or different path to avoid the construction	(H) Explain	(I) Conflict with motorists (yes = 1)	(J) Explain	(K) obeyed the traffic control devices if any. (yes = 1)	(L) Which Traffic control were present
1	1			1							bc
2	1		1								bc
3	1		1								bc
4	1			1							bc
5	1			1							bc
6	1			1							bc
7	1	1								1	bc
8	1			1							bc
9	1			1							bc
Total	9	1	2	6	0	0		0 yes		1 yes	
Percent	100.00%	11.11%	22.22%	66.67%	0.00%	0.00%		0.00% %		11.11% %	
AADT			17000								
AVERAGE HOURLY TRAFFIC (AHT)			708.3								
Bicyclists per hour:			5.63								
Bicyclists per hour/ AHT			0.008								

Key for Column (H)

a	Crossed the street as he/she approached the work zone
b	Side of the road approached after work zone was passed
c	Used other side of the street (uncontrolled, no sidewalk)
d	Crossed the street midway through the work zone

Summary of Column (H)		
	Total	Percent
a		
b		
c		
d		
	0	0%

Key for Column (J)

a	Car slowed to avoid hitting pedestrian
b	Pedestrian ran to avoid car
c	Car did not see pedestrian
d	Trapped

Summary of Column (J)		
	Total	Percent
a		
b		
c		
d		
	0	0%

Key for Column (L)

a	Sidewalk Closed sign
b	Cones
c	Lit Sign
d	Construction Zone sign

Summary of Column (L)		
	Total	Percent
a		0%
b	9	50%
c	9	50%
d		0%
	18	100%

Date: 24-May-05
Start: 12:40 End: 13:51 Duration: 1:11 Page 1 of 1
Location: Highway 226 - SW 16th Ave Gainesville, FL

	Bicyclists										
(A) Obs. #	(B) Number of bicyclists	(C) Rode on sidewalk	(D) Rode Inside the work Area	(E) Rode in the vehicular lane	(F) Used the crosswalk to avoid the construction	(G) Used an Uncontrolled or different path to avoid the construction	(H) Explain	(I) Conflict with motorists (yes = 1)	(J) Explain	(K) obeyed the traffic control devices if any. (yes = 1)	(L) Which Traffic control were present
1	1			1							b
2	1				1					1	b
3	1			1							b
Total	3	0	0	2	1	0		0 yes		1 yes	
Percent	100.00%	0.00%	0.00%	66.67%	33.33%	0.00%		0.00% %		33.33% %	

AADT	22500
AVERAGE HOURLY TRAFFIC (AHT)	937.5
Bicyclists per hour:	2.54
Bicyclists per hour/ AHT	0.003

Key for Column (H)

a	Crossed the street as he/she approached the work zone
b	Side of the road approached after work zone was passed
c	Used other side of the street (uncontrolled, no sidewalk)
d	Crossed the street midway through the work zone

Summary of Column (H)		
	Total	Percent
a		
b		
c		
d		
	0	0%

Key for Column (J)

a	Car slowed to avoid hitting pedestrian
b	Pedestrian ran to avoid car
c	Car did not see pedestrian
d	Trapped

Summary of Column (J)		
	Total	Percent
a		
b		
c		
d		
	0	0%

Key for Column (L)

a	Sidewalk Closed sign
b	Cones
c	Lit Sign
d	Construction Zone sign

Summary of Column (L)		
	Total	Percent
a		0%
b	3	100%
c		0%
d		0%
	3	100%

Date: 24-May-05
Start: 13:57 End: 14:37 Duration: 0:40 Page 1 of 1
Location: Highway 226 - SW 16th Ave Gainesville, FL

	Bicyclists										
(A) Obs. #	(B) Number of bicyclists	(C) Rode on sidewalk	(D) Rode Inside the work Area	(E) Rode in the vehicular lane	(F) Used the crosswalk to avoid the construction	(G) Used an Uncontrolled or different path to avoid the construction	(H) Explain	(I) Conflict with motorists (yes = 1)	(J) Explain	(K) obeyed the traffic control devices if any. (yes = 1)	(L) Which Traffic control were present
1	1		1							0	b
2	1				1					1	b
3	1	1								0	b
4	1		1							0	b
Total	4	1	2	0	1	0		0	yes	1	yes
Percent	100.00%	25.00%	50.00%	0.00%	25.00%	0.00%		0.00%	%	25.00%	%
AADT			22500								
AVERAGE HOURLY TRAFFIC (AHT)			937.5								
Bicyclists per hour:			6.00								
Bicyclists per hour/ AHT			0.006								

Key for Column (H)

a	Crossed the street as he/she approached the work zone
b	Side of the road approached after work zone was passed
c	Used other side of the street (uncontrolled, no sidewalk)
d	Crossed the street midway through the work zone

Summary of Column (H)		
	Total	Percent
a		
b		
c		
d		
	0	0%

Key for Column (J)

a	Car slowed to avoid hitting pedestrian
b	Pedestrian ran to avoid car
c	Car did not see pedestrian
d	Trapped

Summary of Column (J)		
	Total	Percent
a		
b		
c		
d		
	0	0%

Key for Column (L)

a	Sidewalk Closed sign
b	Cones
c	Lit Sign
d	Construction Zone sign

Summary of Column (L)		
	Total	Percent
a		0%
b	4	100%
c		0%
d		0%
	4	100%

Date: 26-May-05
Start: 11:57 End: 13:16 Duration: 1:19 Page 1 of 1
Location: Highway 226 - SW 16th Ave Gainesville, FL

	Bicyclists										
(A) Obs. #	(B) Number of bicyclists	(C) Rode on sidewalk	(D) Rode Inside the work Area	(E) Rode in the vehicular lane	(F) Used the crosswalk to avoid the construction	(G) Used an Uncontrolled or different path to avoid the construction	(H) Explain	(I) Conflict with motorists (yes = 1)	(J) Explain	(K) obeyed the traffic control devices if any. (yes = 1)	(L) Which Traffic control were present
1	1		1								b
2	1				1					1	b
3	1		1								b
4	1				1					1	b
5	1	1									b
6	1	1									b
7	1	1									b
8	1		1								b
9	2		1		1						b
10	1	1									b
11	1				1						b
Total	12	4	4	0	4	0		0 yes		2 yes	
Percent	100.00%	33.33%	33.33%	0.00%	33.33%	0.00%		0.00% %		18.18% %	
AADT			22500								
AVERAGE HOURLY TRAFFIC (AHT)			937.5								
Bicyclists per hour:			9.11								
Bicyclists per hour/ AHT			0.010								

Key for Column (H)

a	Crossed the street as he/she approached the work zone
b	Side of the road approached after work zone was passed
c	Used other side of the street (uncontrolled, no sidewalk)
d	Crossed the street midway through the work zone

Summary of Column (H)		
	Total	Percent
a		
b		
c		
d		
	0	0%

Key for Column (J)

a	Car slowed to avoid hitting pedestrian
b	Pedestrian ran to avoid car
c	Car did not see pedestrian
d	Trapped

Summary of Column (J)		
	Total	Percent
a		
b		
c		
d		
	0	0%

Key for Column (L)

a	Sidewalk Closed sign
b	Cones
c	Lit Sign
d	Construction Zone sign

Summary of Column (L)		
	Total	Percent
a		0%
b	11	100%
c		0%
d		0%
	11	100%

Date: 01-Jun-05
Start: 12:21 End: 14:00 Duration(min): 1:39 Page 1 of 1
Location: Highway 226 - SW 16th Ave Gainesville, FL

	Bicyclists										
(A) Obs. #	(B) Number of bicyclists	(C) Rode on sidewalk	(D) Rode Inside the work Area	(E) Rode in the vehicular lane	(F) Used the crosswalk to avoid the construction	(G) Used an Uncontrolled or different path to avoid the construction	(H) Explain	(I) Conflict with motorists (yes = 1)	(J) Explain	(K) obeyed the traffic control devices if any. (yes = 1)	(L) Which Traffic control were present
1	1	1									b
2	1	1									b
3	2	2									b
4	1	1									b
5	1				1						b
Total	6	5	0	0	1	0		0 yes		0 yes	
Percent	100.00%	83.33%	0.00%	0.00%	16.67%	0.00%		0.00% %		0.00% %	
AADT:			22500								
AVERAGE HOURLY TRAFFIC (AHT)			937.5								
Bicyclists per hour:			3.64								
Bicyclists per hour/ AHT			0.004								

Key for Column (H)

a	Crossed the street as he/she approached the work zone
b	Side of the road approached after work zone was passed
c	Used other side of the street (uncontrolled, no sidewalk)
d	Crossed the street midway through the work zone

Summary of Column (H)		
	Total	Percent
a		
b		
c		
d		
	0	0%

Key for Column (J)

a	Car slowed to avoid hitting pedestrian
b	Pedestrian ran to avoid car
c	Car did not see pedestrian
d	Trapped

Summary of Column (J)		
	Total	Percent
a		
b		
c		
d		
	0	0%

Key for Column (L)

a	Sidewalk Closed sign
b	Cones
c	Lit Sign
d	Construction Zone sign

Summary of Column (L)		
	Total	Percent
a		0%
b	5	100%
c		0%
d		0%
	5	100%

Date: 01-Jun-05
Start: 15:30 End: 16:30 Duration: 1:00 Page 1 of 1
Location: Highway 26A - SW 2nd Ave. Gainesville, FL

	Bicyclists										
(A) Obs. #	(B) Number of bicyclists	(C) Rode on sidewalk	(D) Rode Inside the work Area	(E) Rode in the vehicular lane	(F) Used the crosswalk to avoid the construction	(G) Used an Uncontrolled or different path to avoid the construction	(H) Explain	(I) Conflict with motorists (yes = 1)	(J) Explain	(K) obeyed the traffic control devices if any. (yes = 1)	(L) Which Traffic control were present
1	1	1								1	abc
2	1		1								abc
3	1		1								abc
4	1		1								abc
Total	4	1	3	0	0	0		0 yes		1 yes	
Percent	100.00%	25.00%	75.00%	0.00%	0.00%	0.00%		0.00% %		25.00% %	

AADT:	17000
AVERAGE HOURLY TRAFFIC (AHT)	708.3
Bicyclists per hour:	4.00
Bicyclists per hour/ AHT	0.006

Key for Column (H)

a	Crossed the street as he/she approached the work zone
b	Side of the road approached after work zone was passed
c	Used other side of the street (uncontrolled, no sidewalk)
d	Crossed the street midway through the work zone

Summary of Column (H)		
	Total	Percent
a		
b		
c		
d		
	0	0%

Key for Column (J)

a	Car slowed to avoid hitting pedestrian
b	Pedestrian ran to avoid car
c	Car did not see pedestrian
d	Trapped

Summary of Column (J)		
	Total	Percent
a		
b		
c		
d		
	0	0%

Key for Column (L)

a	Sidewalk Closed sign
b	Cones
c	Lit Sign
d	Construction Zone sign

Summary of Column (L)		
	Total	Percent
a	4	33%
b	4	33%
c	4	33%
d		0%
	12	100%

Date: 07-Jun-05
Start: 13:49 End: 16:42 Duration: 2:53 Page 1 of 1
Location: Highway 226 - SW 16th Ave Gainesville, FL

	Bicyclists										
(A) Obs. #	(B) Number of bicyclists	(C) Rode on sidewalk	(D) Rode Inside the work Area	(E) Rode in the vehicular lane	(F) Used the crosswalk to avoid the construction	(G) Used an Uncontrolled or different path to avoid the construction	(H) Explain	(I) Conflict with motorists (yes = 1)	(J) Explain	(K) obeyed the traffic control devices if any. (yes = 1)	(L) Which Traffic control were present
1	1				1					1	b
2	1	1								1	b
3	1			1							b
4	1				1					1	b
5	1				1					1	b
6	1	1								1	b
7	1	1								1	b
8	1				1					1	b
9	2			2							b
10	1	1								1	b
11	2				2					1	b
12	1	1								1	b
13	1				1					1	b
14	1				1					1	b
15	1	1								1	b
16	1				1					1	b
17	1				1					1	b
18	1				1					1	b
19	1				1					1	b
20	1	1								1	b
21	1				1					1	b
22	1			1						1	b
Total	24	7	0	4	13	0		0 yes		20 yes	
Percent	100.00%	29.17%	0.00%	16.67%	54.17%	0.00%		0.00% %		90.91% %	

AADT	24500
AVERAGE HOURLY TRAFFIC (AHT)	1020.8
Bicyclists per hour:	8.32
Bicyclists per hour/ AHT	0.008

Key for Column (H)

a	Crossed the street as he/she approached the work zone
b	Side of the road approached after work zone was passed
c	Used other side of the street (uncontrolled, no sidewalk)
d	Crossed the street midway through the work zone

Summary of Column (H)		
	Total	Percent
a		
b		
c		
d		
	0	0%

Key for Column (J)

a	Car slowed to avoid hitting pedestrian
b	Pedestrian ran to avoid car
c	Car did not see pedestrian
d	Trapped

Summary of Column (J)		
	Total	Percent
a		
b		
c		
d		
	0	0%

Key for Column (L)

a	Sidewalk Closed sign
b	Cones
c	Lit Sign
d	Construction Zone sign

Summary of Column (L)		
	Total	Percent
a		0%
b	22	100%
c		0%
d		0%
	22	100%

Date: 07-Jun-05
Start: 14:45 End: 15:37 Duration: 0:52 Page 1 of 1
Location: Highway 226 - SW 16th Ave Gainesville, FL

	Bicyclists										
(A) Obs. #	(B) Number of bicyclists	(C) Rode on sidewalk	(D) Rode Inside the work Area	(E) Rode in the vehicular lane	(F) Used the crosswalk to avoid the construction	(G) Used an Uncontrolled or different path to avoid the construction	(H) Explain	(I) Conflict with motorists (yes = 1)	(J) Explain	(K) obeyed the traffic control devices if any. (yes = 1)	(L) Which Traffic control were present
1	1		1								b
2	1		1								b
3	1		1								b
4	1		1								b
Total	4	0	4	0	0	0		0 yes		0 yes	
Percent	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%		0.00% %		0.00% %	

AADT	24500
AVERAGE HOURLY TRAFFIC (AHT)	1020.8
Bicyclists per hour:	4.62
Bicyclists per hour/ AHT	0.005

Key for Column (H)

a	Crossed the street as he/she approached the work zone
b	Side of the road approached after work zone was passed
c	Used other side of the street (uncontrolled, no sidewalk)
d	Crossed the street midway through the work zone

Summary of Column (H)		
	Total	Percent
a		
b		
c		
d		
	0	0%

Key for Column (J)

a	Car slowed to avoid hitting pedestrian
b	Pedestrian ran to avoid car
c	Car did not see pedestrian
d	Trapped

Summary of Column (J)		
	Total	Percent
a		
b		
c		
d		
	0	0%

Key for Column (L)

a	Sidewalk Closed sign
b	Cones
c	Lit Sign
d	Construction Zone sign

Summary of Column (L)		
	Total	Percent
a		0%
b	4	100%
c		0%
d		0%
	4	100%

Date: 08-Jun-05
Start: 14:38 End: 16:09 Duration: 1:31 Page 1 of 1
Location: Highway 226 - SW 16th Ave Gainesville, FL

	Bicyclists										
(A) Obs. #	(B) Number of bicyclists	(C) Rode on sidewalk	(D) Rode Inside the work Area	(E) Rode in the vehicular lane	(F) Used the crosswalk to avoid the construction	(G) Used an Uncontrolled or different path to avoid the construction	(H) Explain	(I) Conflict with motorists (yes = 1)	(J) Explain	(K) obeyed the traffic control devices if any. (yes = 1)	(L) Which Traffic control were present
1	1	1								1	abc
Total	1	1	0	0	0	0		0 yes		1 yes	
Percent	100.00%	100.00%	0.00%	0.00%	0.00%	0.00%		0.00% %		100.00% %	

AADT	22500
AVERAGE HOURLY TRAFFIC (AHT)	937.5
Bicyclists per hour:	0.66
Bicyclists per hour/ AHT	0.001

Key for Column (H)

a	Crossed the street as he/she approached the work zone
b	Side of the road approached after work zone was passed
c	Used other side of the street (uncontrolled, no sidewalk)
d	Crossed the street midway through the work zone

Summary of Column (H)		
	Total	Percent
a		
b		
c		
d		
	0	0%

Key for Column (J)

a	Car slowed to avoid hitting pedestrian
b	Pedestrian ran to avoid car
c	Car did not see pedestrian
d	Trapped

Summary of Column (J)		
	Total	Percent
a		
b		
c		
d		
	0	0%

Key for Column (L)

a	Sidewalk Closed sign
b	Cones
c	Lit Sign
d	Construction Zone sign

Summary of Column (L)		
	Total	Percent
a	1	33%
b	1	33%
c	1	33%
d		0%
	3	100%

Date: 07-Jun-05
Start: 10:36 End: 12:12 Duration: 1:36 Page 1 of 1
Location: Highway 226 - SW 16th Ave Gainesville, FL

	Bicyclists										
(A) Obs. #	(B) Number of bicyclists	(C) Rode on sidewalk	(D) Rode Inside the work Area	(E) Rode in the vehicular lane	(F) Used the crosswalk to avoid the construction	(G) Used an Uncontrolled or different path to avoid the construction	(H) Explain	(I) Conflict with motorists (yes = 1)	(J) Explain	(K) obeyed the traffic control devices if any. (yes = 1)	(L) Which Traffic control were present
1	1				1					1	b
2	1				1					1	b
3	1				1					1	b
4	1				1					1	b
5	1	1								1	b
6	1				1					1	b
7	1				1					1	b
8	1	1								1	b
9	1				1					1	b
10	2			2							b
11	1				1					1	b
12	1				1					1	b
13	1				1					1	b
14	1				1					1	b
15	1				1					1	b
16	1			1							b
17	1			1							b
18	1			1							b
19	1			1							b
20	1				1					1	b
Total	21	2	0	6	13	0		0	yes	15	yes
Percent	100.00%	9.52%	0.00%	28.57%	61.90%	0.00%		0.00%	%	75.00%	%
AADT			22500								
AVERAGE HOURLY TRAFFIC (AHT)			937.5								
Bicyclists per hour:			13.13								
Bicyclists per hour/ AHT			0.001								

Key for Column (H)
- a Crossed the street as he/she approached the work zone
- b Side of the road approached after work zone was passed
- c Used other side of the street (uncontrolled, no sidewalk)
- d Crossed the street midway through the work zone

Summary of Column (H)		
	Total	Percent
a		
b		
c		
d		
	0	0%

Key for Column (J)
- a Car slowed to avoid hitting pedestrian
- b Pedestrian ran to avoid car
- c Car did not see pedestrian
- d Trapped

Summary of Column (J)		
	Total	Percent
a		
b		
c		
d		
	0	0%

Key for Column (L)
- a Sidewalk Closed sign
- b Cones
- c Lit Sign
- d Construction Zone sign

Summary of Column (L)		
	Total	Percent
a		0%
b	20	100%
c		0%
d		0%
	20	100%

Date: 06-Jun-05
Start: 9:12 End: 11:11 Duration: 1:59 Page 1 of 1
Location: Diana and Nebraska - Tampa, FL

	Bicyclists										
(A) Obs. #	(B) Number of bicyclists	(C) Rode on sidewalk	(D) Rode Inside the work Area	(E) Rode in the vehicular lane	(F) Used the crosswalk to avoid the construction	(G) Used an Uncontrolled or different path to avoid the construction	(H) Explain	(I) Conflict with motorists (yes = 1)	(J) Explain	(K) obeyed the traffic control devices if any. (yes = 1)	(L) Which Traffic control were present
1	1	1								1	ab
2	1		1								ab
3	1	1								1	ab
Total	3	2	1	0	0	0		0	yes	2	yes
Percent	100.00%	66.67%	33.33%	0.00%	0.00%	0.00%		0.00%	%	66.67%	%
AADT			17800								
AVERAGE HOURLY TRAFFIC (AHT)			741.7								
Bicyclists per hour:			1.51								
Bicyclists per hour/ AHT			0.002								

Key for Column (L)
a Sidewalk Closed sign

Key for Column (H)
a Crossed the street as he/she approached the work zone
b Side of the road approached after work zone was passed
c Used other side of the street (uncontrolled, no sidewalk)
d Crossed the street midway through the work zone

Summary of Column (H)		
	Total	Percent
a		
b		
c		
d		
	0	0%

Key for Column (J)
a Car slowed to avoid hitting pedestrian
b Pedestrian ran to avoid car
c Car did not see pedestrian
d Trapped

Summary of Column (J)		
	Total	Percent
a		
b		
c		
d		
	0	0%

Key for Column (L)
a Sidewalk Closed sign
b Cones
c Lit Sign
d Construction Zone sign

Summary of Column (L)		
	Total	Percent
a	3	50%
b	3	50%
c		0%
d		0%
	6	100%

Date: 13-Jun-05
Start: 8:37 End: 11:51 Duration: 3:14 Page 1 of 1
Location: Union St and Laura St - Jacksonville, FL

	Bicyclists										
(A) Obs. #	(B) Number of bicyclists	(C) Rode on sidewalk	(D) Rode Inside the work Area	(E) Rode in the vehicular lane	(F) Used the crosswalk to avoid the construction	(G) Used an Uncontrolled or different path to avoid the construction	(H) Explain	(I) Conflict with motorists (yes = 1)	(J) Explain	(K) obeyed the traffic control devices if any. (yes = 1)	(L) Which Traffic control were present
1	1	1								1	bc
2	1				1					1	bc
3	1				1					1	bc
4	1				1					1	bc
5	1				1					1	bc
6	1	1								1	bc
7	1				1					1	bc
8	1	1								1	bc
9	1	1								1	bc
Total	9	4	0	0	5	0		0	yes	9	yes
Percent	100.00%	44.44%	0.00%	0.00%	55.56%	0.00%		0.00%	%	100.00%	%
AADT			27500								
AVERAGE HOURLY TRAFFIC (AHT)			1145.8								
Bicyclists per hour:			2.78								
Bicyclists per hour/ AHT			0.002								

Key for Column (H)

a	Crossed the street as he/she approached the work zone
b	Side of the road approached after work zone was passed
c	Used other side of the street (uncontrolled, no sidewalk)
d	Crossed the street midway through the work zone

Summary of Column (H)		
	Total	Percent
a		
b		
c		
d		
	0	0%

Key for Column (J)

a	Car slowed to avoid hitting pedestrian
b	Pedestrian ran to avoid car
c	Car did not see pedestrian
d	Trapped

Summary of Column (J)		
	Total	Percent
a		
b		
c		
d		
	0	0%

Key for Column (L)

a	Sidewalk Closed sign
b	Cones
c	Lit Sign
d	Construction Zone sign

Summary of Column (L)		
	Total	Percent
a		0%
b	9	50%
c	9	50%
d		0%
	18	100%

Date: 13-Jun-05
Start: 13:15 End: 15:50 Duration: 2:35 Page 1 of 1
Location: 1 ST S and 2 Ave S - Jacsonville, FL

	Bicyclists										
(A) Obs. #	(B) Number of bicyclists	(C) Rode on sidewalk	(D) Rode Inside the work Area	(E) Rode in the vehicular lane	(F) Used the crosswalk to avoid the construction	(G) Used an Uncontrolled or different path to avoid the construction	(H) Explain	(I) Conflict with motorists (yes = 1)	(J) Explain	(K) obeyed the traffic control devices if any. (yes = 1)	(L) Which Traffic control were present
1	1	1								1	bd
2	1	1								1	bd
3	2	2								1	bd
4	2		2								bd
5	2		2								bd
6	1		1								bd
7	1	1								1	bd
8	1	1								1	bd
9	2	2								1	bd
10	2	2								1	bd
11	1		1								bd
12	1	1								1	bd
13	2	2								1	bd
14	1	1								1	bd
15	1	1								1	bd
16	2	1	1								bd
17	3	3								1	bd
18	1	1								1	bd
19	1	1								1	bd
20	1	1								1	bd
21	1	1								1	bd
22	1		1								bd
Total	31	23	8	0	0	0		0 yes		16 yes	
Percent	100.00%	74.19%	25.81%	0.00%	0.00%	0.00%		0.00% %		72.73% %	

AADT	42000
AVERAGE HOURLY TRAFFIC (AHT)	1750.0
Bicyclists per hour:	12.00
Bicyclists per hour/ AHT	0.007

Key for Column (H)

a	Crossed the street as he/she approached the work zone
b	Side of the road approached after Work Zone was passed
c	Used other side of the street (uncontrolled, no sidewalk)
d	Crossed the street midway through the work zone

Summary of Column (H)		
	Total	Percent
a		
b		
c		
d		
	0	0%

Key for Column (J)

a	Car slowed to avoid hitting pedestrian
b	Pedestrian ran to avoid car
c	Car did not see pedestrian
d	Trapped

Summary of Column (J)		
	Total	Percent
a		
b		
c		
d		
	0	0%

Key for Column (L)

a	Sidewalk Closed sign
b	Cones
c	Lit Sign
d	Construction Zone sign

Summary of Column (L)		
	Total	Percent
a		0%
b	22	50%
c		0%
d	22	50%
	44	100%

Date: 16-Jun-05 Page 1 of 1
Start: 10:24 End: 15:18 Duration: 4:54
Location: Union St and Laura St - Jacksonville, FL

	Bicyclists										
(A) Obs. #	(B) Number of bicyclists	(C) Rode on sidewalk	(D) Rode Inside the work Area	(E) Rode in the vehicular lane	(F) Used the crosswalk to avoid the construction	(G) Used an Uncontrolled or different path to avoid the construction	(H) Explain	(I) Conflict with motorists (yes = 1)	(J) Explain	(K) obeyed the traffic control devices if any. (yes = 1)	(L) Which Traffic control were present
1	1				1					1	b c d
2	1				1					1	b c d
3	1			1							b c d
4	1					1	b			1	b c d
5	1	1								1	b c d
6	1					1	a				b c d
7	1	1								1	b c d
8	1				1					1	b c d
9	1			1							b c d
10	1			1			c			1	b d
11	2					2	b			1	b d
12	1	1									b d
Total	13	3	0	3	3	4		0		8	
Percent	100.00%	23.08%	0.00%	23.08%	23.08%	30.77%		0.00%		66.67%	

AADT	27500
AVERAGE HOURLY TRAFFIC (AHT)	1145.8
Bicyclists per hour:	2.65
Bicyclists per hour/ AHT	0.000

Key for Column (H)

a	Crossed the street as he/she approached the work zone
b	Side of the road approached after work zone was passed
c	Used other side of the street (uncontrolled, no sidewalk)
d	Crossed the street midway through the work zone

Summary of Column (H)		
	Total	Percent
a		
b		
c		
d		
	0	0%

Key for Column (J)

a	Car slowed to avoid hitting pedestrian
b	Pedestrian ran to avoid car
c	Car did not see pedestrian
d	Trapped

Summary of Column (J)		
	Total	Percent
a	1	25%
b	2	50%
c	1	25%
d		0%
	4	100%

Key for Column (L)

a	Sidewalk Closed sign
b	Cones
c	Lit Sign
d	Construction Zone sign

Summary of Column (L)		
	Total	Percent
a		0%
b	12	36%
c	9	27%
d	12	36%
	33	100%

Date: 23-Jun-05
Start: 16:30 End: 17:00 Duration: 0:30 Page 1 of 1
Location: Highway 26A - SW 2nd Ave. Gainesville, FL

	Bicyclists										
(A) Obs. #	(B) Number of bicyclists	(C) Rode on sidewalk	(D) Rode Inside the work Area	(E) Rode in the vehicular lane	(F) Used the crosswalk to avoid the construction	(G) Used an Uncontrolled or different path to avoid the construction	(H) Explain	(I) Conflict with motorists (yes = 1)	(J) Explain	(K) obeyed the traffic control devices if any. (yes = 1)	(L) Which Traffic control were present
1	1	1									
2	1	1									
3	1	1									
4	1	1									
5	1	1									
Total	5	5	0	0	0	0		0		0	
Percent	100.00%	100.00%	0.00%	0.00%	0.00%	0.00%		0.00%		0.00%	

AADT	38500
AVERAGE HOURLY TRAFFIC (AHT)	1604.2
Bicyclists per hour:	10.00
Bicyclists per hour/ AHT	0.000

Key for Column (H)

a	Crossed the street as he/she approached the work zone
b	Side of the road approached after work zone was passed
c	Used other side of the street (uncontrolled, no sidewalk)
d	Crossed the street midway through the work zone

Summary of Column (H)		
	Total	Percent
a		
b		
c		
d		
	0	0%

Key for Column (J)

a	Car slowed to avoid hitting pedestrian
b	Pedestrian ran to avoid car
c	Car did not see pedestrian
d	Trapped

Summary of Column (J)		
	Total	Percent
a		
b		
c		
d		
	0	0%

Key for Column (L)

a	Sidewalk Closed sign
b	Cones
c	Lit Sign
d	Construction Zone sign

Summary of Column (L)		
	Total	Percent
a		
b		
c		
d		
	0	0%

Date: 28-Jun-05
Start: 10:23 End: 11:40 Duration: 1:17 Page 1 of 1
Location: NE corner of Curry Ford Rd. and Semoran Blvd. - Orlando, FL

	Bicyclists										
(A) Obs. #	(B) Number of bicyclists	(C) Rode on sidewalk	(D) Rode Inside the work Area	(E) Rode in the vehicular lane	(F) Used the crosswalk to avoid the construction	(G) Used an Uncontrolled or different path to avoid the construction	(H) Explain	(I) Conflict with motorists (yes = 1)	(J) Explain	(K) obeyed the traffic control devices if any. (yes = 1)	(L) Which Traffic control were present
1	1	1								1	b
2	1	1								1	b
3	1			1							b
4	1	1								1	b
5	1				1					1	b
6	1	1								1	b
7	1	1								1	b
Total	7	5	0	1	1	0		0		6	
Percent	100.00%	71.43%	0.00%	14.29%	14.29%	0.00%		0.00%		85.71%	

AADT	50500
AVERAGE HOURLY TRAFFIC (AHT)	2104.2
Bicyclists per hour:	5.45
Bicyclists per hour/ AHT	0.003

Key for Column (H)

a	Crossed the street as he/she approached the work zone
b	Side of the road approached after work zone was passed
c	Used other side of the street (uncontrolled, no sidewalk)
d	Crossed the street midway through the work zone

Summary of Column (H)		
	Total	Percent
a		
b		
c		
d		
	0	0%

Key for Column (J)

a	Car slowed to avoid hitting pedestrian
b	Pedestrian ran to avoid car
c	Car did not see pedestrian
d	Trapped

Summary of Column (J)		
	Total	Percent
a		
b		
c		
d		
	0	0%

Key for Column (L)

a	Sidewalk Closed sign
b	Cones
c	Lit Sign
d	Construction Zone sign

Summary of Column (L)		
	Total	Percent
a		0%
b	7	100%
c		0%
d		0%
	7	100%

Date: 28-Jun-05
Start: 11:49 End: 12:45 Duration: 0:56 Page 1 of 1
Location: NE corner of Curry Ford Rd. and Semoran Blvd. - Orlando, FL

	Bicyclists										
(A) Obs. #	(B) Number of bicyclists	(C) Rode on sidewalk	(D) Rode Inside the work Area	(E) Rode in the vehicular lane	(F) Used the crosswalk to avoid the construction	(G) Used an Uncontrolled or different path to avoid the construction	(H) Explain	(I) Conflict with motorists (yes = 1)	(J) Explain	(K) obeyed the traffic control devices if any. (yes = 1)	(L) Which Traffic control were present
1	1	1								1	b
2	1				1					1	b
Total	2	1	0	0	1	0		0		2	
Percent	100.00%	50.00%	0.00%	0.00%	50.00%	0.00%		0.00%		100.00%	

AADT	50500
AVERAGE HOURLY TRAFFIC (AHT)	2104.2
Bicyclists per hour:	2.14
Bicyclists per hour/ AHT	0.001

Key for Column (H)

a	Crossed the street as he/she approached the work zone
b	Side of the road approached after work zone was passed
c	Used other side of the street (uncontrolled, no sidewalk)
d	Crossed the street midway through the work zone

Summary of Column (H)		
	Total	Percent
a		
b		
c		
d		
	0	0%

Key for Column (J)

a	Car slowed to avoid hitting pedestrian
b	Pedestrian ran to avoid car
c	Car did not see pedestrian
d	Trapped

Summary of Column (J)		
	Total	Percent
a		
b		
c		
d		
	0	0%

Key for Column (L)

a	Sidewalk Closed sign
b	Cones
c	Lit Sign
d	Construction Zone sign

Summary of Column (L)		
	Total	Percent
a		0%
b	2	100%
c		0%
d		0%
	2	100%

Video Data Collection Summary Table Columns H, J and L
Bicyclists

Description				Totals of Column H				Totals of Column J				Totals of Column L			
Location	Date	Start time	Stop Time	a Crossed the street as he/she approached the work zone	b Side of the road approached after Work Zone was passed	c Used other side of the street	d Crossed the street midway through the work zone	a Car slowed to avoid hitting pedestrian	b Pedestrian ran to avoid car	c Car did not see pedestrian	d Trapped	a Sidewalk Closed sign	b Cones	c Lit Sign	d Construction Zone sign
Highway 26A - SW 2nd Ave. Gainesville, FL	24-May-05	10:19	11:55	0	0	0	0	0	0	0	0	0	9	9	0
Highway 226 - SW 16th Ave Gainesville, FL	24-May-05	12:40	13:51	0	0	0	0	0	0	0	0	0	3	0	0
Highway 226 - SW 16th Ave Gainesville, FL	24-May-05	13:57	14:37	0	0	0	0	0	0	0	0	0	4	0	0
Highway 226 - SW 16th Ave Gainesville, FL	26-May-05	11:57	13:16	0	0	0	0	0	0	0	0	0	11	0	0
Highway 226 - SW 16th Ave Gainesville, FL	01-Jun-05	12:21	14:00	0	0	0	0	0	0	0	0	0	5	0	0
Highway 26A - SW 2nd Ave. Gainesville, FL	01-Jun-05	15:30	16:30	0	0	0	0	0	0	0	0	4	4	4	0
Highway 226 - SW 16th Ave Gainesville, FL	07-Jun-05	13:49	16:42	0	0	0	0	0	0	0	0	0	22	0	0
Highway 226 - SW 16th Ave Gainesville, FL	07-Jun-05	14:45	15:37	0	0	0	0	0	0	0	0	0	4	0	0
Highway 226 - SW 16th Ave Gainesville, FL	08-Jun-05	14:38	16:09	0	0	0	0	0	0	0	0	1	1	1	0
Highway 226 - SW 16th Ave Gainesville, FL	07-Jun-05	10:36	12:12	0	0	0	0	0	0	0	0	0	20	0	0
Diana and Nebraska - Tampa, FL	06-Jun-05	9:12	11:11	0	0	0	0	0	0	0	0	3	3	0	0
Union St and Laura St - Jacksonville, FL	13-Jun-05	8:37	11:51	0	0	0	0	0	0	0	0	0	9	9	0
1 ST S and 2 Ave S - Jacsonville, FL	13-Jun-05	13:15	15:50	0	0	0	0	0	0	0	0	0	22	0	22
Union St and Laura St - Jacksonville, FL	16-Jun-05	10:24	15:18	0	0	0	0	1	2	1	0	0	12	9	12
Highway 26A - SW 2nd Ave. Gainesville, FL	23-Jun-05	16:30	17:00	0	0	0	0	0	0	0	0	0	0	0	0
NE corner of Curry Ford Rd. and Semoran Blvd. - Orlando, FL	28-Jun-05	10:23	11:40	0	0	0	0	0	0	0	0	0	7	0	0
NE corner of Curry Ford Rd. and Semoran Blvd. - Orlando, FL	28-Jun-05	11:49	12:45	0	0	0	0	0	0	0	0	0	2	0	0
TOTALS	-	-	-	0	0	0	0	1	2	1	0	8	138	32	34

Video Data Collection Summary Table Columns H, J and L
Bicyclists

Description				% of Column H				% of Column J				% of Column L			
Location	Date	Start time	Stop Time	a Crossed the street as he/she approached the work zone	b Side of the road approached after Work Zone was passed	c Used other side of the street	d Crossed the street midway through the work zone	a Car slowed to avoid hitting pedestrian	b Pedestrian ran to avoid car	c Car did not see pedestrian	d Trapped	a Sidewalk Closed sign	b Cones	c Lit Sign	d Construction Zone sign
Highway 26A - SW 2nd Ave. Gainesville, FL	24-May-05	10:19	11:55	0%	0%	0%	0%	0%	0%	0%	0%	0%	50%	50%	0%
Highway 226 - SW 16th Ave Gainesville, FL	24-May-05	12:40	13:51	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%
Highway 226 - SW 16th Ave Gainesville, FL	24-May-05	13:57	14:37	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%
Highway 226 - SW 16th Ave Gainesville, FL	26-May-05	11:57	13:16	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%
Highway 226 - SW 16th Ave Gainesville, FL	01-Jun-05	12:21	14:00	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%
Highway 26A - SW 2nd Ave. Gainesville, FL	01-Jun-05	15:30	16:30	0%	0%	0%	0%	0%	0%	0%	0%	33%	33%	33%	0%
Highway 226 - SW 16th Ave Gainesville, FL	07-Jun-05	13:49	16:42	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%
Highway 226 - SW 16th Ave Gainesville, FL	07-Jun-05	14:45	15:37	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%
Highway 226 - SW 16th Ave Gainesville, FL	08-Jun-05	14:38	16:09	0%	0%	0%	0%	0%	0%	0%	0%	33%	33%	33%	0%
Highway 226 - SW 16th Ave Gainesville, FL	07-Jun-05	10:36	12:12	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%
Diana and Nebraska - Tampa, FL	06-Jun-05	9:12	11:11	0%	0%	0%	0%	0%	0%	0%	0%	50%	50%	0%	0%
Union St and Laura St - Jacksonville, FL	13-Jun-05	8:37	11:51	0%	0%	0%	0%	0%	0%	0%	0%	0%	50%	50%	0%
1 ST S and 2 Ave S - Jacsonville, FL	13-Jun-05	13:15	15:50	0%	0%	0%	0%	0%	0%	0%	0%	0%	50%	0%	50%
Union St and Laura St - Jacksonville, FL	16-Jun-05	10:24	15:18	0%	0%	0%	0%	25%	50%	25%	0%	0%	36%	27%	36%
Highway 26A - SW 2nd Ave. Gainesville, FL	23-Jun-05	16:30	17:00	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
NE corner of Curry Ford Rd. and Semoran Blvd. - Orlando, FL	28-Jun-05	10:23	11:40	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%
NE corner of Curry Ford Rd. and Semoran Blvd. - Orlando, FL	28-Jun-05	11:49	12:45	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%
TOTALS	-	-	-	0%	0%	0%	0%	25%	50%	25%	0%	4%	65%	15%	16%

Video Data Collection Summary Table
Bicyclists

Description					Count								
Location	Date	Start time	Stop Time	Duration	(A) Obs. #	(B) Number of bicyclists	(C) rode on sidewalk	(D) Rode Inside the work Area	(E) rode in the vehicular lane	(F) Used the crosswalk to avoid the construction	(G) Used an Uncontrolled or different path to avoid the construction	(I) Conflict with motorists (yes = 1)	(K) obeyed the traffic control devices if any. (yes = 1)
Highway 26A - SW 2nd Ave. Gainesville, FL	24-May-05	10:19	11:55	1:36	9	9	1	2	6	0	0	0	1
Highway 226 - SW 16th Ave Gainesville, FL	24-May-05	12:40	13:51	1:11	3	3	0	2	1	0	0	0	1
Highway 226 - SW 16th Ave Gainesville, FL	24-May-05	13:57	14:37	0:40	4	4	1	2	0	1	0	0	1
Highway 226 - SW 16th Ave Gainesville, FL	26-May-05	11:57	13:16	1:19	11	12	4	4	0	4	0	0	2
Highway 226 - SW 16th Ave Gainesville, FL	01-Jun-05	12:21	14:00	1:39	5	6	5	0	0	1	0	0	0
Highway 26A - SW 2nd Ave. Gainesville, FL	01-Jun-05	15:30	16:30	1:00	4	4	1	3	0	0	0	0	1
Highway 226 - SW 16th Ave Gainesville, FL	07-Jun-05	13:49	16:42	2:53	22	24	7	0	4	13	0	0	20
Highway 226 - SW 16th Ave Gainesville, FL	07-Jun-05	14:45	15:37	0:52	4	4	0	4	0	0	0	0	0
Highway 226 - SW 16th Ave Gainesville, FL	08-Jun-05	14:38	16:09	1:31	1	1	1	0	0	0	0	0	0
Highway 226 - SW 16th Ave Gainesville, FL	07-Jun-05	10:36	12:12	1:36	20	21	2	0	6	13	0	0	15
Diana and Nebraska - Tampa, FL	06-Jun-05	9:12	11:11	1:59	3	2	1	0	0	0	0	0	2
Union St and Laura St - Jacksonville, FL	13-Jun-05	8:37	11:51	3:14	9	4	0	0	5	0	0	0	9
1 ST S and 2 Ave S - Jacsonville, FL	13-Jun-05	13:15	15:50	2:35	22	31	23	8	0	0	0	0	16
Union St and Laura St - Jacksonville, FL	16-Jun-05	10:24	15:18	4:54	12	13	3	0	3	3	4	0	8
Highway 26A - SW 2nd Ave. Gainesville, FL	23-Jun-05	16:30	17:00	0:30	5	5	5	0	0	0	0	0	0
NE corner of Curry Ford Rd. and Semoran Blvd. - Orlando, FL	28-Jun-05	10:23	11:40	1:17	7	7	5	0	1	1	0	0	6
NE corner of Curry Ford Rd. and Semoran Blvd. - Orlando, FL	28-Jun-05	11:49	12:45	0:56	2	2	1	0	0	1	0	0	2
TOTALS	-	-	-	29:42:00	143	152	60	25	26	37	4	0	84
MEAN	-	-	-	-	-	-	-	-	-	-	-	-	-

Video Data Collection Summary Table
Bicyclists

Description					%						
Location	Date	Start time	Stop Time	Duration	(C) rode on sidewalk	(D) Rode Inside the work Area	(E) rode in the vehicular lane	(F) Used the crosswalk to avoid the construction	(G) Used an Uncontrolled or different path to avoid the construction	(I) Conflict with motorists (yes = 1)	(K) obeyed the traffic control devices if any. (yes = 1)
Highway 26A - SW 2nd Ave. Gainesville, FL	24-May-05	10:19	11:55	1:36	11.11%	22.22%	66.67%	0.00%	0.00%	0.00%	11.11%
Highway 226 - SW 16th Ave Gainesville, FL	24-May-05	12:40	13:51	1:11	0.00%	0.00%	66.67%	33.33%	0.00%	0.00%	33.33%
Highway 226 - SW 16th Ave Gainesville, FL	24-May-05	13:57	14:37	0:40	25.00%	50.00%	0.00%	25.00%	0.00%	0.00%	25.00%
Highway 226 - SW 16th Ave Gainesville, FL	26-May-05	11:57	13:16	1:19	33.33%	33.33%	0.00%	33.33%	0.00%	0.00%	18.18%
Highway 226 - SW 16th Ave Gainesville, FL	01-Jun-05	12:21	14:00	1:39	83.33%	0.00%	0.00%	16.67%	0.00%	0.00%	0.00%
Highway 26A - SW 2nd Ave. Gainesville, FL	01-Jun-05	15:30	16:30	1:00	25.00%	75.00%	0.00%	0.00%	0.00%	0.00%	25.00%
Highway 226 - SW 16th Ave Gainesville, FL	07-Jun-05	13:49	16:42	2:53	29.17%	0.00%	16.67%	54.17%	0.00%	0.00%	90.91%
Highway 226 - SW 16th Ave Gainesville, FL	07-Jun-05	14:45	15:37	0:52	0.00%	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Highway 226 - SW 16th Ave Gainesville, FL	08-Jun-05	14:38	16:09	1:31	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%
Highway 226 - SW 16th Ave Gainesville, FL	07-Jun-05	10:36	12:12	1:36	9.52%	0.00%	28.57%	61.90%	0.00%	0.00%	75.00%
Diana and Nebraska - Tampa, FL	06-Jun-05	9:12	11:11	1:59	66.67%	33.33%	0.00%	0.00%	0.00%	0.00%	66.67%
Union St and Laura St - Jacksonville, FL	13-Jun-05	8:37	11:51	3:14	44.44%	0.00%	0.00%	55.56%	0.00%	0.00%	100.00%
1 ST S and 2 Ave S - Jacsonville, FL	13-Jun-05	13:15	15:50	2:35	74.19%	25.81%	0.00%	0.00%	0.00%	0.00%	72.73%
Union St and Laura St - Jacksonville, FL	16-Jun-05	10:24	15:18	4:54	23.08%	0.00%	23.08%	23.08%	30.77%	0.00%	66.67%
Highway 26A - SW 2nd Ave. Gainesville, FL	23-Jun-05	16:30	17:00	0:30	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
NE corner of Curry Ford Rd. and Semoran Blvd. - Orlando, FL	28-Jun-05	10:23	11:40	1:17	71.43%	0.00%	14.29%	14.29%	0.00%	0.00%	85.71%
NE corner of Curry Ford Rd. and Semoran Blvd. - Orlando, FL	28-Jun-05	11:49	12:45	0:56	50.00%	0.00%	0.00%	50.00%	0.00%	0.00%	100.00%
TOTALS	-	-	-	29:42:00	39.47%	16.45%	17.11%	24.34%	2.63%	0.00%	58.74%
MEAN	-	-	-	-	-	-	-	-	-	-	-

Video Data Collection Summary Table
Bicyclists

Description								
Location	Date	Start time	Stop Time	Duration	AADT	Average Hourly Traffic	Bicyclists per Hour	Bicyclist per Hour/Average Hourly Traffic (Ratio)
Highway 26A - SW 2nd Ave. Gainesville, FL	24-May-05	10:19	11:55	1:36	17000	708.3	5.63	0.794%
Highway 226 - SW 16th Ave Gainesville, FL	24-May-05	12:40	13:51	1:11	22500	937.5	2.54	0.270%
Highway 226 - SW 16th Ave Gainesville, FL	24-May-05	13:57	14:37	0:40	22500	937.5	6.00	0.640%
Highway 226 - SW 16th Ave Gainesville, FL	26-May-05	11:57	13:16	1:19	22500	937.5	9.11	0.972%
Highway 226 - SW 16th Ave Gainesville, FL	01-Jun-05	12:21	14:00	1:39	22500	937.5	3.64	0.388%
Highway 26A - SW 2nd Ave. Gainesville, FL	01-Jun-05	15:30	16:30	1:00	17000	708.3	4.00	0.565%
Highway 226 - SW 16th Ave Gainesville, FL	07-Jun-05	13:49	16:42	2:53	24500	1020.8	8.32	0.815%
Highway 226 - SW 16th Ave Gainesville, FL	07-Jun-05	14:45	15:37	0:52	24500	1020.8	4.62	0.452%
Highway 226 - SW 16th Ave Gainesville, FL	08-Jun-05	14:38	16:09	1:31	22500	937.5	0.66	0.070%
Highway 226 - SW 16th Ave Gainesville, FL	07-Jun-05	10:36	12:12	1:36	22500	937.5	13.13	0.058%
Diana and Nebraska - Tampa, FL	06-Jun-05	9:12	11:11	1:59	17800	741.7	1.51	0.204%
Union St and Laura St - Jacksonville, FL	13-Jun-05	8:37	11:51	3:14	27500	1145.8	2.78	0.243%
1 ST S and 2 Ave S - Jacsonville, FL	13-Jun-05	13:15	15:50	2:35	42000	1750.0	12.00	0.686%
Union St and Laura St - Jacksonville, FL	16-Jun-05	10:24	15:18	4:54	27500	1145.8	2.65	0.010%
Highway 26A - SW 2nd Ave. Gainesville, FL	23-Jun-05	16:30	17:00	0:30	38500	1604.2	10.00	0.026%
NE corner of Curry Ford Rd. and Semoran Blvd. - Orlando, FL	28-Jun-05	10:23	11:40	1:17	50500	2104.2	5.45	0.259%
NE corner of Curry Ford Rd. and Semoran Blvd. - Orlando, FL	28-Jun-05	11:49	12:45	0:56	50500	2104.2	2.14	0.102%
TOTALS	-	-	-	29:42:00	-	-	-	-
MEAN	-	-	-	-	27782.35	1157.598	5.540029275	0.479%

APPENDIX B
PEDESTRIANS AND CYCLISTSS SURVEY

Thank you for taking the time to fill out this survey. All responses will be kept confidential. The objective of this research is to develop strategies to improve pedestrians and cyclists (bicyclist and pedestrian) safety in highway construction work zones. These are areas where maintenance or new construction is taking place on or adjacent to the roadway. It may also include the sidewalk or other parts of the road right-of-way.

We would like your help in identifying issues and factors that you think affect pedestrian and bicyclist safety. You may answer the questions from the perspective of a bicyclist, a pedestrian, or both.

Background information:

1. What is the name of the agency/employer you work for?
_____

2. Are you?
   Male _____ Female _____

3. What is your age?
   Under 20 _____ 21-40 _____ 41-60 _____ 61 or over

4. Will you be answering this survey as a

   Bicyclist _____

   Pedestrian _____

   Both _____

Experience as a bicyclist (If you do not ride a bike, check "never" and move on to question #7).

5. How often do you ride a bike?

   _____ everyday _____ 1-2 times a month

   _____1-2 times a week _____ once a year

   _____ only on weekends _____ never

6. When you ride, what percentage of your trips is for:

   _____ commuting to work/school

   _____ Errands around town

   _____ Recreation/exercise

   _____ other _____(please specify)

7. This question relates to where you chose to ride (on- road vs. off-the-road, "side-path" or sidewalk facilities). For the purpose of this study, we are considering "side-paths" to be all off-of-the-road facilities, including shared use paths, adjacent to the road pathways, and sidewalks. When both options are available (on-road vs. "side-path"), where do you most often prefer to ride?

   On-road _____ 50% or more of the time _____ seldom _____ never

   "Side paths" _____ 50 % or more of the time _____ seldom _____ never

8. Have you ever had a situation going through or adjacent to a construction work zone area (on a bicycle or as a pedestrian) where you felt unsafe?

   _____Yes _____ No

If yes, please briefly describe below what happened and what you feel could have been done to make you feel safer.

Participant feedback on issues confronting Pedestrians and Bicyclists: On a scale of 1- 5 (one being least important and 5 most important), please circle the number, which represents how important the following issues are confronting bicyclists and pedestrians in construction work zones sites:

	Least important				Most important
9. Advanced warning of the construction or detour is provided.	1	2	3	4	5
10. Traffic control devices (including barrels etc.) Provide clear guidance for path through the work zone.	1	2	3	4	5
11. Adequate travel lane width is maintained so that motor vehicles can easily pass or share side by side the lane with bicyclists, in the construction zone	1	2	3	4	5
12. Bike lane or pedestrian walkway is continuous through or around the construction zone, vs. abruptly ending.	1	2	3	4	5
13. Condition of road surface is adequately maintained (Free of construction debris, sand, construction materials, potholes, etc.).	1	2	3	4	5
14. Bicyclist and pedestrians are provided a side-path through the construction zone.	1	2	3	4	5
15. The speed of motor vehicles through the construction zone is controlled.	1	2	3	4	5
16. Clear directions to detour paths are provided.	1	2	3	4	5
17. The road conditions on and to the detour routes are safe.	1	2	3	4	5
18. Detour instructions are located					
a. At the start of the construction zone	1	2	3	4	5
b. In advance of the construction zone (500 –1000 feet)	1	2	3	4	5
19. Notification of construction project dates and detour information, is provided in advance of project start date	1	2	3	4	5

Conditions for choosing an alternate route:
The following questions relate to the conditions under which you would chose an alternate route (detour) vs. continuing through the construction work zone. Please Rate on a scale of 1 to 5, how important these factors are to your decision (1 being least important and 5 most important).

	Least important				most important
20. Amount of extra time required for taking alternate Route	1	2	3	4	5
21. Degree of perceived risk to safety of the work zone Compared to risk to safety of the detour route	1	2	3	4	5
22. Clarity of detour instructions and signage	1	2	3	4	5
23. Ability to negotiate to the detour (i.e. ramps, elevations uneven surfaces, sand, debris, etc.)	1	2	3	4	5

24. How far would you be willing to go out of your way to a detour route, to avoid a construction work zone site?

_____ 1 mile _____ ½ mile _____ ¼ mile _____ 500 feet _____ 100 feet

25. What would you consider to be the most important 3 things that should be done in a construction work zone site to make it safer for bicyclists and pedestrians?

1) _____

2) _____

3) _____

Please feel free to share with us any other information you would like to give us to enhance our understanding of the bicyclist or pedestrian perspective relating to construction work zones. (Use back of survey form or email jsanda@ufl.edu).
Thank you for taking the time to complete this survey.

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